STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 17, 2009

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Mr. David Baker
NCDOT Coordinator

Dear Sir:

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the widening of NC 28 from North of SR 1323 (Riverview Street) to South of SR 1378 (Bennett Road) in Macon County. Federal Aid Project No. STP-28(1), Division 14, TIP No. R-2408B. Debit $570 from WBS 34427.1.1.

Please see the enclosed ENG 4345, USFWS concurrence letter, permit drawing review meeting minutes, permit drawings, stream relocation plans, stream mitigation plan, design plans, State Stormwater Management Plan and Rapanos jurisdictional determination form for the above referenced project. An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been completed and distributed for this project. Also, an Indirect and Cumlative Effects Assessment was completed and distributed in August 2004. Additional copies of these documents are available upon request. The North Carolina Department of Transportation (NCDOT) proposes to widen the existing 2-lane highway, which has a 20-foot pavement width and 1 to 4-foot shoulders with a 2-lane highway with a 24-foot pavement width and 8-foot shoulders. The total length of the project is 2.7 miles.

Purpose and Need:
The purpose of the proposed project is to correct existing roadway deficiencies by improving the vertical and horizontal alignment and widening the travel lanes and shoulders. Due to the mountainous terrain, the road has steep drop-offs and large inclines on opposite sides of the road. This makes it difficult to travel along this road with narrow lanes and sharp curves that limit a driver's sight distance. The corridor is also a preferred route for tractor trailer trucks. With the amount and variety of vehicles that travel this route, the narrow lanes and sharp curves can reduce a driver's sight distance and result in an unsafe travel condition.

Summary of Impacts:
The project will permanently impact 0.09 acres of wetlands, 663 linear feet of streams, and temporarily impact 216 feet of streams. Impacts for this project are slightly higher than originally proposed in the FONSI, predominantly due to the relocation of Rocky Branch near Airport Road.

Summary of Mitigation: The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the NEPA and design processes. Compensatory mitigation for proposed impacts to jurisdictional streams and wetlands will be provided by on-site mitigation and the use of the Tulula Bog Mitigation Site.

NEPA DOCUMENT STATUS

An EA was prepared for this project in April 2004. A FONSI was prepared in September 2005. A Right of Way Consultation was completed in 2007. Additional copies will be provided upon request.

MERGER PROCESS SUMMARY

Due to its limited scope, this project was not a part of the formal merger process. However an informal 4B/4C meeting was held with agency personnel on September 24, 2008 to review the project.

INDEPENDENT UTILITY

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

(1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope,
(2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
(3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Wetland delineations:
Potential wetland communities were investigated pursuant to the 1987 Corps of Engineers Wetland Delineation Manual. Mr. David Baker of the U.S. Army Corps of Engineers field verified the wetlands and surface waters on November 21, 2006. Written verification will be received at the time of permit issuance. Each impact is described below, in detail. Site and station numbers correspond with the permit (hydraulic) drawings included in this application.

R-2408B Stream Classifications

Permit Site No.	Stream Name	Sub-basin	Stream Index No.	Best Usage Classification
1A	UT to Little Tennessee River	04-04-01	2-(1)	C
1,2	UT to Rocky Branch	04-04-01	2-26	C
3,4	Rocky Branch	04-04-01	2-26	C

All streams in the project area are perennial

Impacts to Waters of the United States

Wetland Impacts & Descriptions

Permit Site No.	Permanent (ac)	Temporary (ac)	Mitigation Required
3	0.05	--	Yes
5	0.04	--	Yes
Total	0.09	--	--

All wetlands impacted are riparian wetlands.

Surface Water Impacts

Permit Site No.	Stream Name	Permanent (lf)	Temporary (lf)	Mitigation Required
1A	UT to Little Tennessee River	9	31	Yes
1	UT to Rocky Branch	41	4	Yes
2	Rocky Branch	65	46	Yes
3	Rocky Branch	442	60	Yes
4	Rocky Branch	106	75	Yes
Total		663	216	--

Utility Impacts

No temporary or permanent jurisdictional impacts will occur to wetlands and streams from utilities for this project.

PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 31, 2008, the U.S. Fish and Wildlife Service (USFWS) lists eight federally protected species for Macon County (Table 1).

Biological conclusions of "May Affect-Not Likely to Adversely Affect" were rendered for Indiana bat, spotfin chub, Appalachian elktoe and little-wing pearlymussel. Concurrence was requested from USFWS on December 11, 2008 for these biological conclusions and will be forwarded as soon as it is received by the NCDOT. The bog turtle is listed due to similarity of

appearance and does not require a biological conclusion. Biological conclusions of "No Effect" were rendered for all remaining species.

Table 1. Federally protected species listed for Macon County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Clemmys muhlenbergii	Bog turtle	T (S/A)	No	Not Required
Myotis sodalis	Indiana bat	E	Yes	MA-NLAA
Erimonax monachus	Spotfin chub	T	Yes	MA-NLAA
Alasmidonta raveneliana	Appalachian elktoe	E	Yes	MA-NLAA
Pegias fabula	Little-wing pearlymussel	E	Yes	MA-NLAA
Isotria medeoloides	Small whorled pogonia	T	No	No Effect
Spiraea virginiana	Virgina spiraea	T	No	No Effect
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4) require that the DWQ determine that a project "does not result in cumulative impacts, based on past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards."

An Indirect and Cumulative Effects Report (ICE) was completed for this project in 2004, and is included in this application.

Indirect Land Use Effects Screening Tool - TIP Project R-2408B - Widening of NC 28 (Bryson City Road)

Rating	Scope of Project	Change in Accessibility	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
More Concern	Major New Location	> 10 minute travel time savings	> 3% annual population growth	Substantial # of New Jobs Expected	2000+ Acres of Land	All services existing / available	Development activity abundant	Less stringent; no growth management	Targeted or Threatened Resource	
↑					X					
↑								X		
→				X					X	
↓			X							
↓	X	X				X	X			Scenario Assessment Not Warrented
Less Concern	Very Limited Scope	No travel time savings	No population growth or decline	No new Jobs or Job Loses	Limited Land Avaialble	No service available now or in future	Development activity lacking	More stringent; growth management	Features incorporated in local protection	

The shaded columns on the tool are weighted to reflect the strong realtionship of these attributes to the project's possible impact on development activity and realtionship to related impacts.

Indirect Effects

The proposed project is located within an unincorporated portion of Macon County to the north of the Town of Franklin, which is not covered by formal zoning or subdivision ordinances, so growth would not be controlled very stringently if it did occur. However, only a small amount of growth has occurred in the area or is expected for the foreseeable future, according to local planners. The area does not have public water or sewer, and there are currently no plans to extend services to that area. Due to the limited scope of the proposed project, a safety widening on existing location, and the rugged topography, which limits development in the area, the

proposed project is unlikely to stimulate complementary or intra-regional land development, or to cause a change in travel patterns in the area. There should also be no travel-time savings or change in access. As a result, indirect effects because of TIP Project R-2408B alone, and environmental impacts due to ICEs, should be low or minimal.

Cumulative Effects

Direct impacts associated with the project that are not avoided, minimized, or mitigated are expected to be minimal. Since the project is not likely to result in a change in land use as result the transportation impact causing activities associated with the project, cumulative effects should be minimal or low.

MORATORIUM

No moratoriums were proposed in a letter from NCWRC dated July 27, 2004.

CULTURAL RESOURCES

Historical Structures & Archaeology:

An architectural survey for structures listed in the National Register or eligible for nomination to the National Register was conducted in the project area. There are no properties in the project area that are eligible for or are listed in the National Register of Historic Places.

Two archaeological sites located within the project limits were recommended as eligible for listing in the National Register of Historic Places (NRHP). Sites 31MA588 and 31MA589 consist of dense concentrations of cultural remains and intact subsurface deposits dating to the Qualla Phase (A.D. 1450-1838). The two sites have been recommended as eligible for listing in the NRHP under Criterion D for their potential to yield significant information about the prehistory of the region. The SHPO concurred with these recommendations according to a July 11, 2003 memorandum.

Current design for the project maintains the existing topography along the west side of NC 28, where the sites are located, and proposes to widen to the east, away from the areas of interest.

FEMA COMPLIANCE

The project has been coordinated with appropriate state and local officials and the Federal Emergency Management Agency (FEMA) to assure compliance with FEMA, state, and local floodway regulations.

WILD AND SCENIC RIVER SYSTEM

The project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

Avoidance and Minimization:
This project has been designed using asymmetrical widening. Using this method, the NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Other specific examples of avoidance and minimization measures include:

- Onsite natural stream design methods for the relocation of Rocky Branch
- The removal of a culvert carrying a UT to Rocky Branch and return the area to natural grade.
- At site 4, the culvert carrying Rocky Branch across NC 28 will be replaced with a bottomless structure.
- The use of 2:1 slopes in wetlands and stream crossings.
- NCDOT will implement erosion and sedimentation control measures as specified by "Design Standards in Sensitive Watersheds".

Compensation:
The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Due to construction, 442 feet of Rocky Branch will be relocated away from the fill slope of NC 28. Using natural stream design techniques, 393 feet of the stream will be restored. Additionally as mentioned in the permit for R-2408A, NCDOT proposes to restore 190 linear feet of a UT to the Little Tennessee River on the A section, by removing an existing 18-inch pipe. The tributary will have a stable stream channel established and buffer planted. This restoration of 190 feet of stream will be used to offset impacts in the B section. As a result of these two activities, 80 linear feet of permanent stream impacts remain for R-2408B. The remaining, unavoidable impacts to 0.09 acre of jurisdictional wetlands and 80 feet of streams will be offset by the use of the Tulula Bog Mitigation Site.

The Tulula Bog Mitigation Site is a 222 acre tract located in Graham County, NC within the 8-digit HU 06010204. The site it located off of Highway 129 between Topton and Robbinsville, NC in a rural area of the Blue Ridge Belt of the North Carolina mountains. The mitigation site contains 102 acres of wetland restoration, 121 acres of upland buffer protection, 8,639 linear feet of stream restoration, and 1,248 linear feet of stream preservation.

The site was originally constructed in 2002 by NCDOT. The Phase I portion of the site was planted in April 2002, while Phase II was planted in March 2003. The 2003-year represents the first complete year of hydrologic and vegetation monitoring following site construction. The subsequent years of monitoring were performed under EEP management. According to the Tulula Monitoring Report dated March 2008 prepared for EEP, 2007 served as Monitoring Year 5 of 5, the final year of site monitoring.

Summary of Stream Mitigation for R-2408B

Mitigation Source (Site)	Stream Mitigation
Relocation of Rocky Branch (Site 3)	393
Restoration of UT to Little Tennessee River (A section)	190
Tulula Bog	80
Total	**663 lf**

Total Permanent Stream Impact = 663 lf

PROJECT SCHEDULE

R-2408B calls for a November 17, 2009 let date, and a review date of September 29, 2009. This application provides final design and impacts for the project.

REGULATORY APPROVALS

Section 404: Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities.

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Quality. In compliance with Section 143 215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing five (5) copies of this application to the NCDWQ for their review and approval.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Mr. Jason Dilday at jldilday@ncdot.gov or (919) 413-6693. A copy of this application will also be posted at http://www.ncdot.org/planning/pe/naturalunit/Permit.html.

Sincerely,

E. K. Rusk

fcv Gregory J. Thorpe, Ph.D., Environmental Management Director
Project Development and Environmental Analysis Branch

W/attachment
- Mr. Brian Wrenn, NCDWQ (5 Copies)
- Ms. Marella Buncick, USFWS
- Ms. Marla Chambers, NCWRC
- Ms. Kathy Matthews, USEPA-Whitter, NC
- Dr. Charles Nicholson, TVA

W/o attachment (see website for attachments)
- Dr. David Chang, P.E., Hydraulics
- Mr. Victor Barbour, P.E., Project Services Unit
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Mark Staley, Roadside Environmental
- Mr. J. B. Setzer, P.E. (Div. 14), Division Engineer
- Mr. Mark Davis (Div. 14), DEO

W/o attachment (cont.)
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Majed Alghandour, P. E., Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Scott McLendon, USACE, Wilmington
- Ms. Beth Harmon, EEP
- Mr. Todd Jones, NCDOT External Audit Branch
- Mr. Steven Brown, P.E., PDEA Planning Engineer
- Mr. Drew Joyner, PE, Human Environment Unit
- Mr. Clarence W. Coleman, P.E., FHWA
- Ms. LeiLani Paugh, NEU
- Mr. Randy Griffin, NEU

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires December 31, 2004

Public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: Rivers and Harbors Act, Section 10, 33 USC 403: Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
North Carolina Department of Transportation Project Development & Environmental Analysis	
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
1598 Mail Service Center Raleigh, NC 27699-1548	
7. APPLICANT'S PHONE NOs. W/AREA CODE a. Residence b. Business 919-733-3141	**10. AGENT'S PHONE NOs. W/AREA CODE** a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2408B

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Rocky Branch and associated UT's.
UT to Little Tennessee River

14. PROJECT STREET ADDRESS (if applicable)

15. LOCATION OF PROJECT
Macon NC
COUNTY STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **Section, Township, Range, Lat/Lon, and/or Accessors's Parcel Number, for example.**

17. DIRECTIONS TO THE SITE
Please see attached vicinity map and cover letter.

18. Nature of Activity (Description of project, include all features)

Widening the current NC 28 from a 20-foot two lane facility with 1 to 4-foot shoulders , to a 24-foot two lane facility with 8-foot shoulders on existing location.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of this project is to correct existing roadway deficiencies by improving the vertical and horizontal alignment and widening the travel lanes and shoulders.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Impacts will result from widening the roadway and shoulders, and lengthening/ replacing hydraulic structures.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards
See attached cover letter.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)
See attached cover letter.

23. Is Any Portion of the Work Already Complete? Yes ___ No _X__ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Please see adjacent property landowners page attached to the permit drawing package.

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
N/A					

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

E. L. Lusk 4.16.09

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

March 4, 2009

Delday

RECEIVED
MAR 9 2009
DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

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

Dear Dr. Thorpe:

Subject: Endangered Species Concurrence for TIP Project No. R-2408B, Proposed Widening of NC 28 North of Franklin in Macon County, North Carolina, Federal Aid Project No. STP-28(1), WBS No. 34427.1.1

We have reviewed your concurrence request and the protective measures proposed for project implementation for the subject project. We provide the following comments in accordance with the provisions of section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

The North Carolina Department of Transportation proposes to maintain NC 28 as a two-lane road and widen the travel lanes to 12 feet, with 8-foot paved shoulders. The existing culvert at Rocky Branch will be replaced with a bottomless arch culvert. In addition, a perched culvert, which conveys an unnamed tributary to Rocky Branch, on an abandoned road will be removed. The project terminates prior to crossing the Little Tennessee River.

According to the information provided, eight federally protected species were considered for this project. You determined that implementation of the project would have no effect on four of those species and is not likely to adversely affect the federally threatened spotfin chub (*Erimonax monachus)* or the federally endangered Appalachian elktoe (*Alasmidonta raveneliana*), little-wing pearlymussel (*Pegias fabula*), or Indiana bat (*Myotis sodalis*).

Appalachian elktoe, littlewing pearlymussel, and spotfin chub – The culvert replacement at Rocky Branch is about 1.5 miles from the confluence with the Little Tennessee River. Rocky Branch does not provide habitat for the elktoe or the littlewing pearlymussel and provides marginal habitat for the spotfin chub. Although the spotfin chub has been documented to use other tributaries to the Little Tennessee River, several surveys of Rocky Branch have not resulted

in the discovery of any spotfin chubs using this tributary. The NCDOT also has committed to implementing design standards for sensitive watersheds for erosion control for this project. Given the lack of suitable habitat, negative survey data, and protective commitments for erosion control, we can concur with your conclusion of "not likely to adversely affect" for the aquatic species for the subject project.

Indiana bat - A combination of mist-net surveys and habitat assessments conducted for the Indiana bat have not resulted in the discovery of any individuals in the project area. In addition, tree clearing will be minimal and will occur only during the winter months (October 15 through April 15); therefore, we concur with your conclusion of "not likely to adversely affect" for the Indiana bat for the subject project.

We believe the requirements under section 7(c) of the Act are fulfilled regarding listed species for the subject project. 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.

If you have questions about these comments please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237. In any future correspondence concerning this project, please reference our Log Number 4-2-01-393.

Sincerely,

Brian P. Cole
Field Supervisor

cc:
Ms. Marla J. Chambers, Western NCDOT Permit Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129
Mr. David Baker, Asheville Regulatory Field Office, U.S. Army Corps of Engineers, 151 Patton Avenue, Room 208, Asheville, NC 28801-5006
Mr. Jason Dilday, Natural Environment Unit, North Carolina Department of Transportation, 1598 Mail Service Center, Raleigh, NC 27699-1598

Minutes for Permit Drawing Review Meeting
R-2408B, Macon County
NC 28 from SR 1323 (Riverview Street) to SR 1378 (Bennett Road)

A Permit Drawing Review Meeting was held on Wednesday, September 24, 2008 in the Hydraulics conference room at the NCDOT Century Center Complex, Raleigh.

Team Members Present:

Andrew Nottingham - NCDOT Hydraulics Design
David Baker - USACOE
Marella Buncick - USFWS
Marla Chambers - NCWRC
Brian Wrenn - NCDWQ
Kathy Matthews - EPA
Donnie Brew - FHWA
Mark Staley (for David Harris) - NCDOT Roadside Environmental
Jason Moore - NCDOT Roadway Design
John Duggins (for Quang Nguyen) - NCDOT Structure Design
Linwood Stone – PDEA
Carla Dagnino – NCDOT NEU

Team Members Absent:

Jamie Wilson – NCDOT Division 14

Participants:

Jeanie Tyson – NCDOT Roadway Design
Stephen Morgan – NCDOT Hydraulics Design
Randy Griffin – NCDOT NEU
LeiLani Paugh – NCDOT NEU
Byron Moore – NCDOT NEU
Eugene Tarascio – NCDOT Project Development
Amy Simes – DENR
Jennifer Parish – NCDOT Roadside Environmental
Mark Staley – Ncdot Roadside Environmental
Jason Dilday – NCDOT NEU

The meeting began at 1:00 p.m. with introductions followed by NCDOT Hydraulics giving a brief description and history of the project. It was noted that this project was not following the merger process. The group was reminded of a prior on- site meeting to discuss the impacts associated with the culvert crossing at station 110+00 –L-. The project's Environmental Assessment identified the project as being located within the critical habitat area for the Appalachian elk toe mussel and spot fin chub. NCDOT will implement appropriate erosion and sedimentation controls to minimize impacts from construction and runoff. NCDOT described the project as a safety improvement project. The overall lane configuration remains the same, but the vertical and horizontal alignments will be improved. The typical section consist of a two-lane section with roadside ditches. Where needed to eliminate large cut sections, expressway gutter was used. There are no retaining walls on the project.

NCDOT led the discussion by reviewing the Stormwater Management Plan for the project. The Roadway Description, Environmental Description and Impacts, and Best Management Practices were presented. NCDOT noted that the project is in the Little Tennessee watershed, with a portion of the project near the beginning flowing into Lake Emory. The remainder of the project flows into tributaries of the Little Tennessee River below the lake. DWQ expressed concern with the extensive amount of piping on the project. NCDOT explained that the new roadway typical section will allow storm water to flow overland in grassed ditches built with 4:1 and 6:1 side slopes before it will enter the pipe system through grated inlets. This design will allow for more effective overland flow than the current design because the new grassed shoulders are wider, and the existing ditches are stabilized extensively with pavement.

NCDOT began a site by site discussion of the permit drawings. At Site 1A, the team members agreed a detail would be needed to show that placement of rip rap at the pipe inlet would be embedded. DWQ asked for a review of the pipe design along Hughes Lane. NCDOT described that the amount of water in the pipe system warranted the design, and the ditch along Hughes will be replaced once the pipe is installed.

At Site 1, USACOE asked about the extent of the impact. NCDOT explained that the new roadway cross section required a longer pipe than is now present. The rip rap will be on the stream banks only.

At Site 2, NCDOT explained the benefits to erosion and sedimentation by piping into the pipe crossing rather than releasing storm water into a steep ditch that would require rip rap stabilization. The entire pipe system has grass swale treatment before entering the pipe system at grated inlets.

At Site 3, NCDOT will add the stream name (and at all other stream sites as well). USACOE asked if the stream impacts could be reduced below 300' using retaining walls or other means. Several team members expressed concerns with the proposal and agreed to leave the design as is. The temporary easement encompassing the stream relocation will be changed to Right of Way. NCDOT may revise the stream details slightly to aid

in stakeout and construction. Additional Rock Cross Vanes may be added if needed during this process.

At Site 4, NCDOT noted that the existing 6'x 6' culvert upstream of the proposed culvert will be removed. USFWS expressed concerns that bottomless culverts may not always adequately allow for the formation of a natural stream channel inside the culvert depending on the width and length of the culvert. The team agreed more study and evaluation of existing bottomless culverts is needed to address this concern in the future.

No comments for Site 5.

Other business:

The team agreed NCDOT NEU should proceed with a proposal to "daylight" an existing underground pipe on the R2408A section using natural stream design.

The meeting was adjourned at 2:05 p.m.

STORMWATER MANAGEMENT PLAN

R-2408B, WBS No.: 34427.1.1 Date:09/09/08
Macon County
Hydraulics Project Manager: Andrew Nottingham, PE

ROADWAY DESCRIPTION

The project involves roadway improvements to NC28 from north of SR 1323 (Riverview Street) to south of SR 1378 (Bennett Rd.) just north of Franklin. The project's purpose is to correct existing roadway deficiencies by improving the vertical and horizontal alignment and widening the travel lanes and shoulders. The existing roadway is a two-lane highway, having a 20' pavement width and 1' to 4' grassed shoulders. The proposed roadway will have a 24' pavement width and 8' shoulders, 4' of which will be paved. Both the existing roadway and proposed roadway convey roadway storm water runoff in roadside ditches. To improve traffic flow and safety, a turn lane will be added at SR 1337 (Riverbend Rd.) and at Sr 1434 (Airport Rd.)

ENVIRONMENTAL DESCRIPTION AND IMPACTS

The project is located in the Little Tennessee River Basin in the Mountain Physiographic Province. The natural ground elevation range is from 1990 to 2160. There are 5 stream impact sites on this project which are all classified as Class C waters. The streams impacted by the project are a UT to the Little Tennessee River, Rocky Branch and a UT to Rocky Branch. Rocky Branch is a Tributary to the Little Tennessee River. Portions of the Little Tennessee River are designated by the US Fish and Wildlife Service as "critical habitat" and "proposed critical habitat"[1]. Two small wetland sites will be impacted. Stream impacts will consist of removing and upgrading existing pipe crossings along the project, relocating a portion of the creek due to a shifted alignment, and replacing a culvert with a bottomless culvert. Wetland impacts are due to roadway fill.

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) and measures used on the project are non-structural and attempt to reduce storm water impacts to the receiving streams due to erosion and runoff. Grassed roadside ditches have been used almost exclusively along the project to convey storm water. The use of grass roadway ditches aids in pollutant removal through vegetative filtration and infiltration. Expressway gutter has been used to minimize excessive cuts which reduce the amount of disturbed area. Where possible, piped drainage systems were designed to outlet away from surface waters to allow time for infiltration in ditches or natural areas. Rip rapped ditches and riprap along stream banks were used where warranted to control erosion. The inverts of all new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter, up to 1 foot deep. Culverts were designed to protect stream stability and provide fish passage where possible. In locations where the proposed alignment will be shifted from the current

alignment, the existing pavement will be removed. The remaining area will then be replanted with vegetation. Natural stream design will be used in the stream relocation.

Stream Relocations

- Station 99+42 to station 104+68 –L- left side. 393 feet of natural stream design proposed.

Culverts

- -L- Station 109+00: 16' x 7' Three-sided Bottomless culvert. The existing culvert upstream of the proposed culvert will be removed to restore the existing stream in this location.

[1] Environmental Assessment, May 2004

Adjacent Property Owners

Owner/ Business	Address	Site	Parcel
Robert Paul Revis	980 Windy Gap Rd, Franklin, NC 28734	1	53
Mark Robert Nowicki	Franklin, NC 28734	1A	
Gary Wayne Crisp	19 Lee Talent Rd, Franklin, NC 28734	2	56
Carole Ann Simmons	2600-1 Peachtree Rd NW, Atlanta, GA 30305	3	60
Nanthala Power & Light Co (former = Crescent Resources Inc.)	Main St, Franklin, NC 28734	4 & 5	62
Larry Dale Fouts	85 Aylen Village Ln, Franklin, NC 28734	4	64

Permit Drawing
Sheet 1 of 19

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Macon County
PROJ - 34427.1.1 (R-2408B)

SHEET 08/25/2008

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1A	SR 1468 Huges Lane	54" RCP & JB						0.00	0.00	9	31	
1	-Y5- 12+00 RT	36" RCP						0.01	0.01	24	4	
1	-Y5- 12+00 RT	BANK STAB.								17		
2	-Y6- 12+07 LT	72" RCP & JB						0.01	0.01	43	46	
2	-Y6- 12+07 LT	BANK STAB.								22		
3	-L- 99+42/104+68 LT	strm relocation/fill	0.05					0.04	0.01	442	60	393
4	-L- 108+22/109+85	16'x7' Bottomless Culv.						0.02	0.03	84	75	
4	-L- 108+22/109+85	BANK STAB.								22		
5	-L- 109+03/109+60 LT	Rdy fill	0.04									
TOTALS:			0.09					0.09	0.06	663	216	393

Permit Drawing
Sheet 2 of 19

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

MACON COUNTY
WBS - 34427.1.1 (R-2408B)

SHEET 2/25/2009

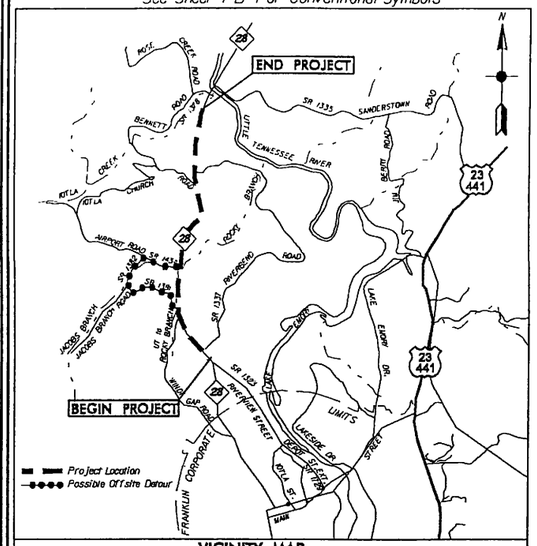
ATN Revised 3/31/05

09/08/2

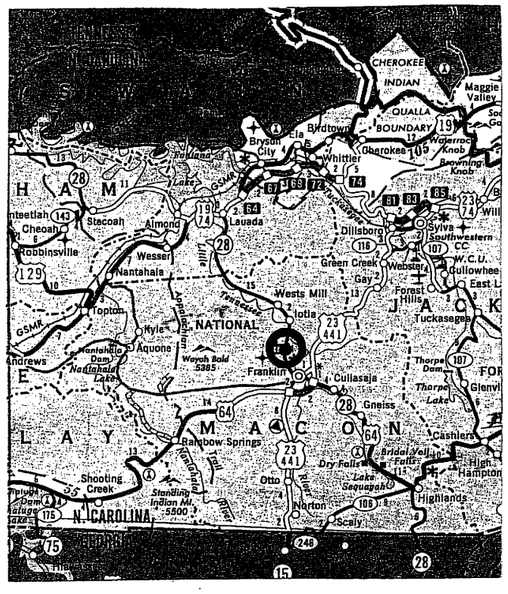
TIP PROJECT: R-2408B

CONTRACT:

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



VICINITY MAP



PROJECT

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MACON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2408B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34427.1.1	STP-28 (1)	P.E.
34427.2.3	STP-0028 (4)	R/W, UTIL
		CONST.

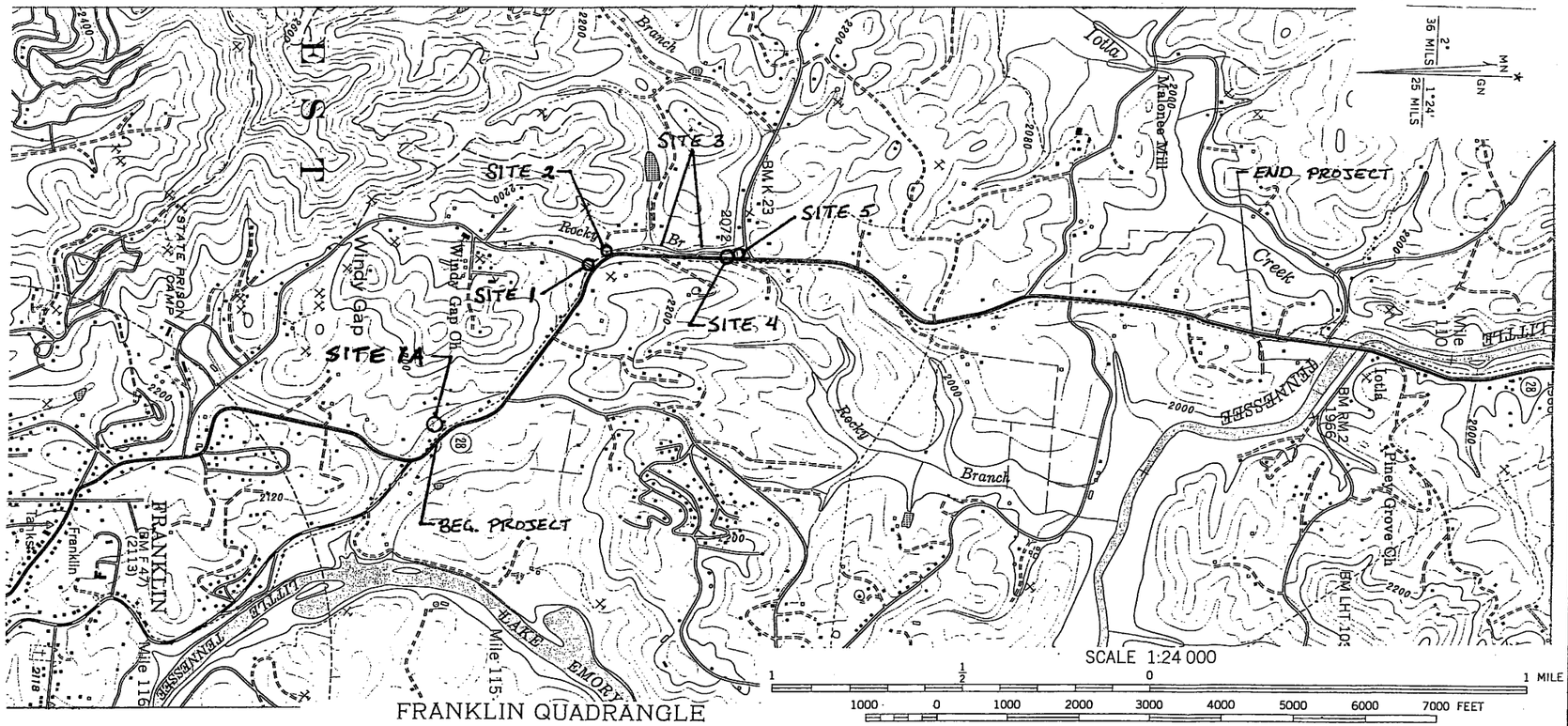
Permit Drawing
Sheet 3 of 19

LOCATION: NC 28 FROM NORTH OF SR 1323 (RIVERVIEW ST.) TO SOUTH OF SR 1378 (BENNETT RD.)

TYPE OF WORK: GRADING, DRAINAGE, CULVERT, WIDENING, AND PAVING

PERMIT DRAWINGS

UTM GRID AND 1978 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



FRANKLIN QUADRANGLE
NORTH CAROLINA-MACON CO
7.5 MINUTE SERIES (TOPOGRAPHIC) 167-NW

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS PROJECT DOES NOT FALL WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FRANKLIN.

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

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 10,400
ADT 2030 = 15,300
DHV = 9%
D = 60%
T = 7% *
V_D = 50 TO 60 MPH

* TTST 2% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2408B = 2.500 MI
LENGTH STRUCTURE TIP PROJECT R-2408B = 0.000 MI
TOTAL LENGTH TIP PROJECT R-2408B = 2.500 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 28, 2007

LETTING DATE: NOVEMBER 17, 2009

JASON MOORE, PE
PROJECT ENGINEER

JEANIE TYSON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

18-AUG-2008 10:45
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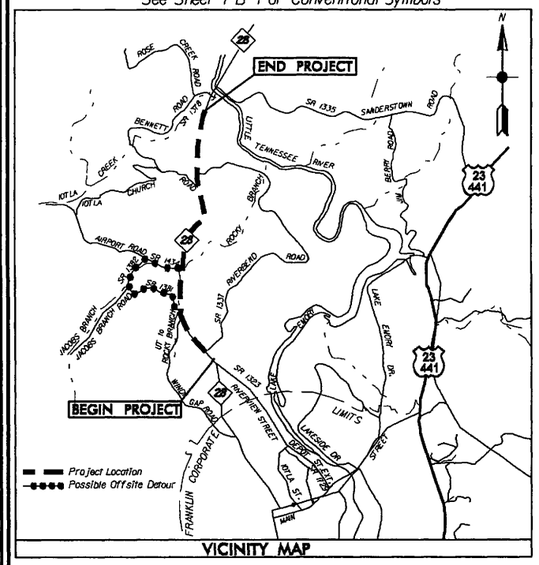
09/08

TIP PROJECT: R-2408B

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MACON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2408B	1	

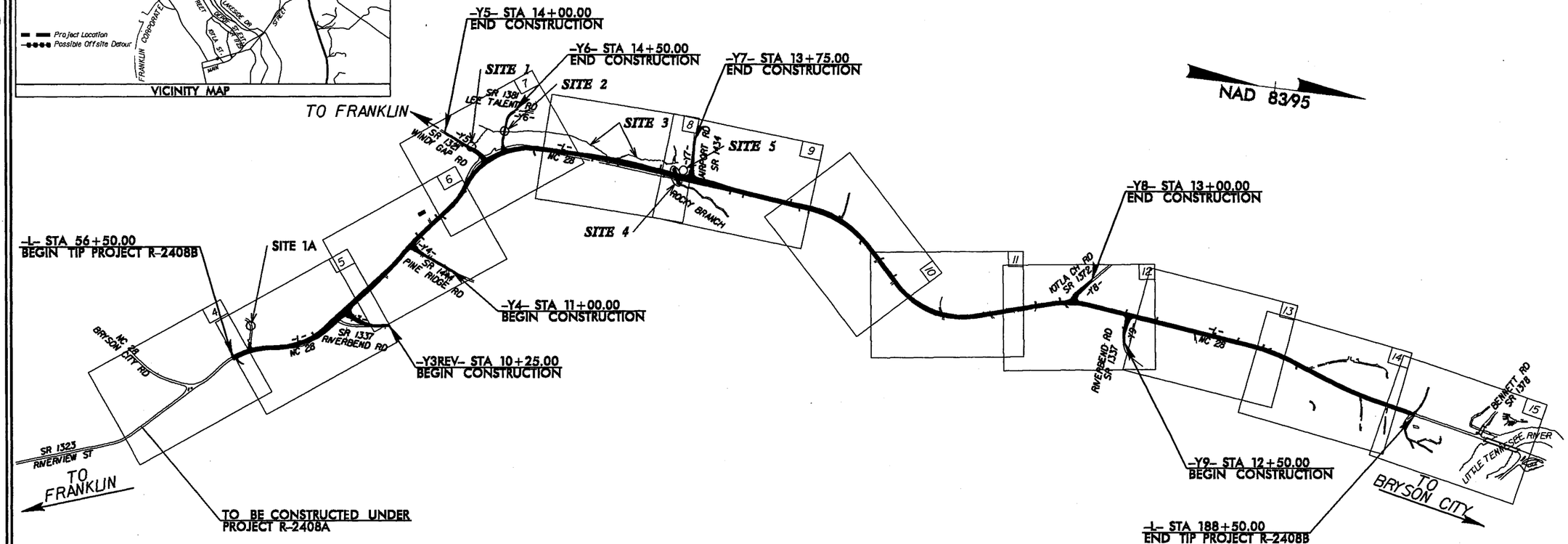
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34427.1.1	STP-28 (1)	P.E.
34427.2.3	STP-0028 (4)	R/W, UTIL
		CONST.

Permit Drawing
Sheet 4 of 19.

LOCATION: NC 28 FROM NORTH OF SR 1323 (RIVERVIEW ST.) TO SOUTH OF SR 1378 (BENNETT RD.)

TYPE OF WORK: GRADING, DRAINAGE, CULVERT, WIDENING, AND PAVING

PERMIT DRAWINGS



** DESIGN EXCEPTION NEEDED FOR

THIS PROJECT DOES NOT FALL WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FRANKLIN.

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

SEE SHEETS 16 - 23 FOR DETOURS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS 50 25 0 50 100
PROFILE (HORIZONTAL) 50 25 0 50 100
PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2007 = 10,400
ADT 2030 = 15,300
DHV = 9%
D = 60%
T = 7% *
V_D = 50 TO 60 MPH

* TTST 2% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2408B = 2.500 MI
LENGTH STRUCTURE TIP PROJECT R-2408B = 0.000 MI
TOTAL LENGTH TIP PROJECT R-2408B = 2.500 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 28, 2007

LETTING DATE: NOVEMBER 17, 2009

JASON MOORE, PE
PROJECT ENGINEER

JEANIE TYSON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-L-	-Y3REV-
PI Sta 58+09.32	PI Sta 63+96.87	PI Sta 13+24.68
Δ = 34° 28' 15.7" (RT)	Δ= 41° 16' 56.0" (LT)	Δ = 46° 23' 47.1" (RT)
D = 7° 09' 43.1"	D = 7° 32' 20.1"	D = 16° 22' 12.8"
L = 481.31'	L = 547.59'	L = 283.42'
T = 248.18'	T = 286.29'	T = 150.00'
R = 800.00'	R = 760.00'	R = 350.00'
e = .06	e = .06	e = .02
RO = 138'	RO = 138'	RO = SEE PLANS
Vd = 45mph	Vd = 45mph	

REVISIONS
8/28/08 ELIMINATED PARCEL 32-Z CHANGED PARCEL 33-Z TO PARCEL 39 AND CHANGED PARCEL 29-Z TO PARCEL 38. DESIGN REVISION ON -Y3REV- AND ADDED PARCELS 42A & 44A, NAME CHANGES ON PARCELS 41 & 42 JSM

Permit Drawing
Sheet 5 of 19

MATCHLINE TO SHEET 4 -L- STA. 57+00.00

MATCHLINE TO SHEET 6 -L- STA. 71+50.00

SITE 1A

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

NAD 83/95

10,400 / 15,300 — NC 28 — 8,600 / 13,200
2,000 / 2,900 — SR 1337 (RIVERBEND RD.) — 200 / 800
2,200 / 3,700
2007 ADT
2030 ADT

MARK ROBERT NOWICKI — 39
GUY O. DUVALL
JULIA MOODY BRITT — 40
MARK ROBERT NOWICKI
MARJORIE MOODY MENEFEE — 43
EVELYN GREER — 38
JULIA MOODY BRITT — 40
CHARLES D. BALDWIN
SUSAN SANDERS — 41
LAURA M KNIGHT — 42
CIBIRAS ANGELOA — 42A
CHARLES MOODY JR — 44
G-SQUARED LLC — 44A

UT to Little Tennessee River

-L- PCSta. 61+10.58
-L- PTSta. 66+58.17
-L- PTSta. 60+42.44
-L- POTSta. 69+00.00
-Y3REV- POTSta. 15+11.30
-Y3REV- PTSta. 14+58.10
-Y3REV- PCSta. 11+74.68
-DETIREV- POTSta. 10+00.00
-L- POTSta. 70+85.00
-Y3REV- 10+25.00
BEGIN CONSTRUCTION

BEGIN EXPRESSWAY GUTTER
-L- STA. 58+00.00 RT
END EXPRESSWAY GUTTER
-L- STA 60+00.00 RT

CL 'I' RIP RAP
EST. 21 TONS
47 S.Y. FF
SEE DETAIL 'I'

SEE DETAIL C
SPECIAL CUT DITCH
-L- STA 64+50 - 68+00 LT

SEE DETAIL A
SPECIAL LATERAL 'A' DITCH
-L- STA 69+50 - 70+50 RT

DO NOT DISTURB TELEPHONE PEDESTAL & POLE

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

SEE SHEET 24 FOR -L- PROFILE
SEE SHEET 30 FOR -Y3- PROFILE
SEE SHEET 16 FOR -DETIREV- PLANVIEW
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-Y3REV-
PI Sta 58+09.32	PI Sta 63+96.87
Δ = 34° 28' 15.7" (RT)	Δ= 41° 16' 56.0" (LT)
D = 7° 09' 43.1"	D = 7° 32' 20.1"
L = 481.31'	L = 547.59'
T = 248.18'	T = 286.29'
R = 800.00'	R = 760.00'
e = .06	e = .06
RO = 138'	RO = 138'
Vd = 45mph	Vd = 45mph

-Y3REV-
PI Sta 13+24.68
Δ = 46° 23' 47.1" (RT)
D = 16° 22' 12.8"
L = 283.42'
T = 150.00'
R = 350.00'
e = .02
RO = SEE PLANS

10,400	NC 28	8,600
15,300		13,200
2,000 / 2,900 (D.)		200 / 800
SR 1327 (INNERSEND RD.)		
2,200 / 3,700		
2007 ADT		
2030 ADT		

Permit Drawing
Sheet 6 of 19

SITE 1A

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

NAD 83PS

MATCHLINE TO SHEET 4 -L- STA. 57+00.00

MATCHLINE TO SHEET 6 -L- STA. 71+50.00

MARK ROBERT NOWICKI

GUY O. DUVALL

CL 'I' RIP RAP EST. 21 TONS 47 S.Y. PR SEE DETAIL 'V'

UT to Little Tennessee River

JULIA MOODY BRITT

MARJORIE MOODY MENEFEE

EVELYN GREER

SUSAN SANDERS

LAURA M KNIGHT

CIBRAS ANGELOA

G-SQUARED LLC

CHARLES MOODY JR

CHARLES D. BALDWIN

-L- PC Sta. 61+10.58

-L- PT Sta. 66+58.17

-L- POT Sta. 69+00.00
-Y3REV- POT Sta. 15+11.30

-L- PT Sta. 60+42.44

-Y3REV- PT Sta. 14+38.10

-Y3REV- PC Sta. 11+74.68

DETIREV- POT Sta. 10+00.00
-L- POT Sta. 70+85.00

-Y3REV- 10+25.00
BEGIN CONSTRUCTION

SEE DETAIL C
SPECIAL CUT DITCH
-L- STA 64+50 - 68+00 LT

SEE DETAIL A
SPECIAL LATERAL 'V' DITCH
-L- STA 69+50 - 70+50 RT

BEGIN SUPERSWAY GUTTER
-L- STA 59+20.00 RT
END SUPERSWAY GUTTER
-L- STA 66+00.00 RT

DO NOT DISTURB TELEPHONE PEDESTAL & POLE

TELEPHONE PEDESTAL AND REPEATER ON POLE

SEE SHEET 24 FOR -L- PROFILE
SEE SHEET 30 FOR -Y3- PROFILE
SEE SHEET 16 FOR -DETIREV- PLANVIEW
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

REVISIONS

8/28/08 ELIMINATED PARCEL 32-Z CHANGED PARCEL 33-Z TO PARCEL 38.
DESIGN REVISION ON -Y3REV- AND ADDED PARCELS 42A & 44A. NAME CHANGES ON PARCELS 41 & 42. JBM

5/14/99

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jacombs
ATOPSHEET
HYDRAULICS

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 7 of 19

5/14/99

REVISIONS

8/28/08 ELIMINATED PARCEL 32-Z CHANGED PARCEL 33-Z TO PARCEL 39 AND DESIGN REVISION ON -Y3REV- AND ADDED PARCELS 42A & 44A NAME CHANGES

-L- SIA. 57+00.00

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MARK ROBERT NOWICKI

SITE 1A

191.62'
N 09°21'07" W

144.83'
S18°44'00"E

211.66'
S 82°59'24"

99.57'
N 17°45'52" W

131.56'
N 87°48'07" W

GUY O. DUVALL

CL 'I' RIP RAP
EST. 21 TONS
47 S.Y. FF
SEE DETAIL 'V'

PDE

54" CMP

36" CMP

JB

S18°44'00"E EIP

UT to Little Tennessee River

85.19'
N83°33'16"W

60+00

42"

48" WM

BST

ISFD

GR

G

45' R/W

EXISTING R/W

17' BST

10' BST

HUGHES LN

SR 1468

42" E

39

MARK ROBERT NOWICKI

ISF BUS

HTR

2012

1102

2012

-L- PCSta. 61+10.58

ATL CANOPY

JB W/MH

EXISTING R/W

SOIL

NC 28 BRYSON CITY RD 22' BST

18" CMP

LID

42" F

WD SIGN

2GI

15"

28' R/W

106

105

410.38'
N 80°11'21" E

SITE 1A ENLARGEMENT

50' 0' 50' 100' 150'
GRAPHIC SCALE

23-OCT-2008 11:21
pscomb AT HY244556

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-		-Y5-	-Y6-	
PI Sta 84+89.36	PI Sta 91+17.74	PI Sta 10+99.35	PI Sta 10+90.34	PI Sta 14+40.90
Δ = 20° 45' 26.1" (LT)	Δ = 71° 47' 05.6" (RT)	Δ = 21° 48' 49.6" (LT)	Δ = 32° 17' 14.5" (RT)	Δ = 85° 33' 33.8" (RT)
D = 8° 25' 33.1"	D = 8° 11' 06.4"	D = 16° 22' 12.8"	D = 38° 11' 49.9"	D = 42° 26' 28.7"
L = 246.35'	L = 877.02'	L = 133.25'	L = 84.53'	L = 201.59'
T = 124.54'	T = 506.57'	T = 67.44'	T = 43.42'	T = 124.92'
R = 680.00'	R = 700.00'	R = 350.00'	R = 150.00'	R = 135.00'
e = .06	e = .06	e = .02	e = .02	e = .02
RO = 1.38'	RO = 1.38'	RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS
Vdes = 45mph	Vdes = 45mph			

NAD 83/95

100' 0' 100' 200'
SCALE: 1" = 100'

Permit Drawing Sheet 8 of 19

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL U
PIPE OUTLET CHANNEL
(Not to Scale)
Length= 17.0 Ft.
D= 3.0 Ft.
Est.= 4 Tons of Class I Rip-Rap
-Y5- STA. 12+00 RT.
-Y6- STA. 12+18 RT.

SR 1321 (WINDY GAP RD.)
400/600
100/100 300/500
8,400 / 13,000 NC 28 8,600 / 13,400
2007 ADT
2030 ADT

-Y5- POT Sta. 15+06.36
-Y5- POT Sta. 14+00.00
END CONSTRUCTION
-Y6- POT Sta. 14+50.00
END CONSTRUCTION
-Y6- PT Sta. 15+17.57
-Y6- PC Sta. 13+15.98
-Y6- PT Sta. 11+31.45
-Y6- PC Sta. 10+46.92
-Y5- PT Sta. 11+65.16
-L- PRC Sta. 86+11.17
-L- PC Sta. 83+64.81
-Y5- PC Sta. 10+31.90
-L- POC Sta. 91+51.52
-Y6- POT Sta. 10+00.00
-L- POC Sta. 89+41.32
-Y5- POT Sta. 10+00.00
-L- POC STA 87+00.00
BEGIN -LTEMP- GRADE
-L- PT Sta. 94+88.18
-DETIREV- PRC Sta. 25+21.49
-DETIREV- PT Sta. 25+32.01 =
-L- POC Sta. 86+11.17

MATCHLINE TO SHEET 6
-L- STA. 83+00.00

MATCH LINE TO SHEET 8
-L- STA. 98+00.00

SITE 1
SITE 2

ROBERT PAUL REVIS (53)
ROBERT P. REVIS (53)
MOUNTAIN MIST PROPERTY, LLC
GARY WAYNE CRISP (56)
JOYCE BRENDLE FOX (54)
ELMER J SERRLE DB C 27 PG 389 (57)
RALPH J ALLEN DB 829 PG 909 (52)
JAMES MCCALL (58)

EXPRESSWAY GUTTER FROM 13+18 TO 13+90 LT.
REMOVE 24"CMP & HW'S
36" RCP BURIED 0.8'
UT to Rocky Branch
SEE DETAIL U CLASS I RIP RAP ON BANKS ONLY EST CLASS I RIP RAP= 4 TONS
SEE DETAIL L SPECIAL LATERAL V DITCH -Y6- STA 12+50 TO 13+00 LT
SEE DETAIL K LATERAL V DITCH -Y6- STA 12+00 - 12+50 LT
SEE DETAIL I LATERAL V DITCH -L- STA 91+00 - 91+25 LT
REMOVE 18" RCP & 4' UNDERDRAIN AS NEEDED
REMOVE 36" 72" RCP BURIED 1.0'
SEE DETAIL U CL I RIP RAP ON BANKS ONLY EST CL I RIP RAP= 4 TONS
CL 'I' RIP RAP EST. 2 TON 30' S.Y. FF TIE TO EXIST. DRIVE
PLUG FILL W/FLOWABLE MATERIAL
SEE DETAIL M BERM DITCH W/CL B RIP RAP -L- STA 88+00 - 89+50 RT
SEE DETAIL M BERM DITCH W/CL B RIP RAP -L- STA 93+50 - 97+50 RT
BEGIN SBG -L- STA 82+00 LT END SBG -L- STA 84+00 LT
BEGIN SBG -L- STA 98+80 LT END SBG -L- STA 98+64 LT
Rocky Branch
GRADE TO DRAIN
REMOVE
SEPTIC
WD DECK
WD CANOPY
HTR
WD OK
ISBD
ISFD
WELL
TS
PDE
PDP
PRC
POC
PT
PC
POT
BRIDGE NO. 350
BRIDGE NO. 220

SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 31 FOR -Y5- & -Y6- PROFILES
SEE SHEET 25 FOR -LTEMP- PROFILE
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

REVISIONS
CHANGED ROW PARCEL NUMBERS ON ROBERT PAUL REVIS PARCELS TO NO.53 12/17/07

5/14/C

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Persons at 4172445516

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 9 of 19

-L-	-Y5-	-Y6-	
PI Sta 84+89.36	PI Sta 91+17.74	PI Sta 10+99.35	PI Sta 10+90.34	PI Sta 14+40.90
Δ = 20° 45' 26.1" (LT)	Δ = 71° 47' 05.6" (RT)	Δ = 21° 48' 49.6" (LT)	Δ = 32° 11' 14.5" (RT)	Δ = 85° 33' 33.8" (RT)
D = 8° 25' 33.1"	D = 8° 11' 06.4"	D = 16° 22' 12.8"	D = 38° 11' 49.9"	D = 42° 26' 28.7"
L = 246.35'	L = 877.02'	L = 133.25'	L = 84.53'	L = 201.59'
T = 124.54'	T = 506.57'	T = 67.44'	T = 43.42'	T = 124.92'
R = 680.00'	R = 700.00'	R = 350.00'	R = 150.00'	R = 135.00'
e = .06	e = .06	e = .02	e = .02	e = .02
RO = 1.38'	RO = 1.38'	RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS
Vdes = 45mph	Vdes = 45mph			

SR 1321 (WINDY GAP RD.)
400/600 100/100 300/500
8,400 / 13,000 NC 28 8,600 / 13,400
2007 ADT / 2030 ADT

DETAIL U
PIPE OUTLET CHANNEL
(Not to Scale)
Length= 17.0 Ft.
D= 3.0 Ft.
Est.= 4 Tons of Class I Rip-Rap
-Y8- STA. 12+00 RT.
-Y6- STA. 12+18 RT.

NAD 83/95

SCALE: 1" = 100'

-Y5- POT Sta. 15+06.36
-Y5- POT Sta. 14+00.00
END CONSTRUCTION
-Y6- POT Sta. 14+50.00
END CONSTRUCTION
-Y5- PT Sta. 11+65.16
-Y6- PT Sta. 15+17.52
-Y6- PC Sta. 13+15.98
-Y6- PT Sta. 11+31.45
-L- PRC Sta. 86+11.17
-Y5- PC Sta. 10+31.90
-Y6- PC Sta. 10+46.92
-L- PC Sta. 85+64.81
-L- POC Sta. 91+51.52
-Y6- POT Sta. 10+00.00
-L- POC Sta. 89+41.32
-Y5- POT Sta. 10+00.00
-L- POC STA 87+00.00
BEGIN -LTEMP- GRADE
-L- PT Sta. 94+85.18
-DETIREV- PRC Sta. 25+21.49
-DETIREV- PT Sta. 25+32.01
-L- POC Sta. 86+11.17

ROBERT PAUL REVIS (53)
ROBERT P. REVIS (53)
MOUNTAIN MIST PROPERTY, LLC (51)
GARY WAYNE CRISP (56)
JOYCE BRENDLE FOX (54)
ELMER J SERRILL DB 6.2 PG 495 (57)
RALPH J ALLEN DB 829 PG 109 (52)
JAMES MCCALL (58)

SITE 1
SITE 2

EXPRESSWAY GUTTER FROM 13+18 TO 13+90 LT.
REMOVE 24"CMP & HW'S
36" RCP BURIED 0.8'
UT to Rocky Branch
SEE DETAIL U CLASS I RIP RAP ON 1 BANKS ONLY EST CLASS I RIP RAP= 4 TONS
SEE DETAIL I LATERAL V DITCH -Y6- STA 12+80 TO 13+90 LT
SEE DETAIL K LATERAL V DITCH -Y6- STA 12+00 - 12+80 LT
SEE DETAIL J LATERAL V DITCH -L- STA 91+00 - 91+25 LT
REMOVE 36" 72" RCP BURIED 1.0'
REMOVE 18" RCP & 4" UNDERDRAIN AS NEEDED
GRADE TO DRAIN
REMOVE
CL I RIP RAP 8 TON 39 S.Y. FF TIE TO DIST. DRIVE
SEE DETAIL M BERM DITCH W/CL II RIP RAP -L- STA 88+00 - 89+50 RT
SEE DETAIL N BERM DITCH W/CL II RIP RAP -L- STA 93+30 - 97+50 RT
FILL W/FLOWABLE MATERIAL
BEGIN SBG -L- STA 82+00 LT
END SBG -L- STA 84+08 LT
BEGIN SBG -L- STA 93+80 LT
END SBG -L- STA 98+64 LT
MATCHLINE TO SHEET 6 -L- STA 83+00.00
MATCH LINE TO SHEET 8 -L- STA 98+00.00

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 31 FOR -Y5- & -Y6- PROFILES
SEE SHEET 25 FOR -LTEMP- PROFILE
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

REVISIONS
CHANGED ROW PARCEL NUMBERS ON ROBERT PAUL REVIS PARCELS TO NO.53 12/11/07

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Roads_A (PVR) (USA)
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SITES 1 & 2 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT APPROVED FOR CONSTRUCTION

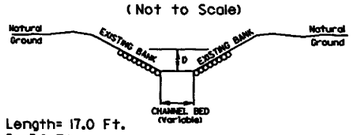
Permit Drawing
Sheet 10 of 19

SCALE: 1"= 50'

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL U
PIPE OUTLET CHANNEL
(Not to Scale)



Length= 17.0 Ft.
D= 3.0 Ft.
Est.= 4 Tons of Class I Rip-Rap

-Y5- STA. 12+00 RT.
-Y6- STA. 12+15 RT.

REMOVE 24"CMP & HW'S

UT to Rocky Branch

36" RCP BURIED 0.5'
SEE DETAIL U
CLASS I RIP RAP
ON BANKS ONLY
EST CLASS I RIP RAP= 4 TONS

SEE DETAIL L
SPECIAL LATERAL V DITCH
-Y6- STA 12+50 TO 13+00 LT

SEE DETAIL K
LATERAL V DITCH
-Y6- STA 12+00 - 12+50 LT

SEE DETAIL J
LATERAL V DITCH
-L- STA 91+00 - 91+25 LT

REMOVE

REMOVE 15" RCP
& 4" UNDERDRAIN
AS NEEDED

REMOVE 36"
72" RCP BURIED 1.0'
SEE DETAIL U
CL I RIP RAP
ON BANKS ONLY
EST CL I RI RAP= 4 TONS

REMOVE 2112.00

GRADE TO DRAIN

GRADE TO DRAIN

REMOVE

TOP=2117.8

TOP=2114.75

TOP=2110.18

SITE 1

SITE 2

SR 1321 WINDY GAP RD

LEE TALENT RD

ROCK DITCH

EXISTING R/W

ISMD

WELL

CHANGED ROW PARCEL NUMBERS ON ROBERT PAUL REVIS PARCELS TO NO.53 12/17/07

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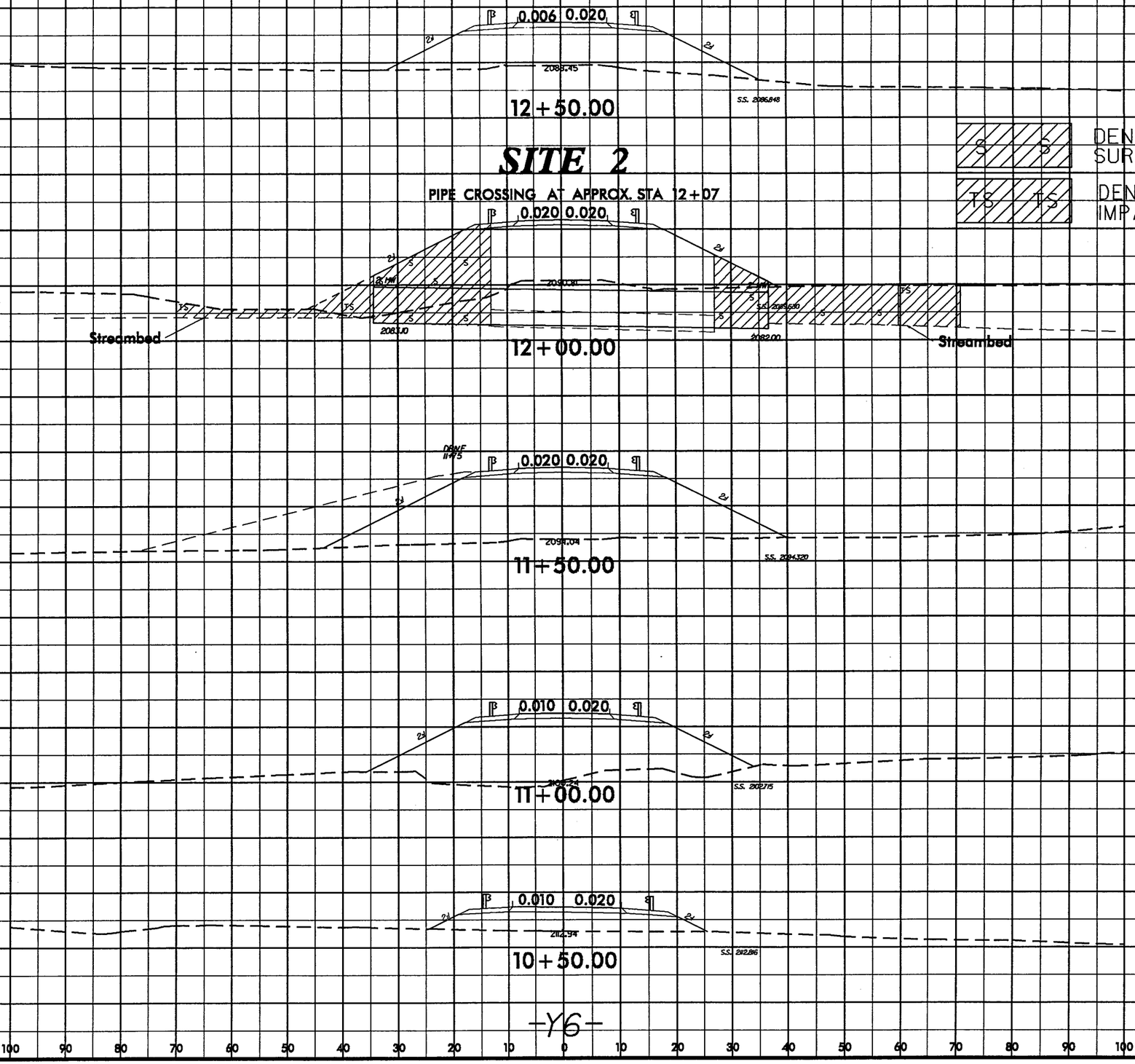
	R-2408B	X-191

Permit Drawing
Sheet 11 of 12

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



-Y6-

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 12 of 19

-L-
PI Sta 102+05.36
Δ = 6°01' 43.1" (RT)
D = 1°08' 45.3"
L = 526.10'
T = 263.29'
R = 5,000.00'
e = .03
RO = 78'
Vdes = 45 mph

NAD 83/95

100' 0' 100' 200' 300'
SCALE: 1" = 100'

F/F DENOTES FILL IN WETLAND
S/S DENOTES IMPACTS IN SURFACE WATER
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GARY WAYNE CRISP
DB B-19 PG 1299
(56)

CAROLE ANN SIMMONS
DB C-23 PG 437
(60)

GARY WAYNE CRISP
DB Q-14 PG 98
(56)

JOYCE BRENDLE FOX
DB Z-31 PG 2377
(58)

JAMES MCCALL
DB S-25 PG 1581

JACQUELIN G. NELSON
DB C-20 PG 66
(59)

CAROLINA BUILDER SERVICES INC
DB W30 PG 1300
(61)

CRESCENT RESOURCES INC.
DB S-23 PG 849
(62)

WILLIAM A. ROTEN
DB G-14 PG 76

DAVID CHARLES MYERS
DB T-24 PG 1528

-DET2REV- PRC Sta. 14+15.46=
-L- POC Sta. 101+70.40
END -LTEMP- GRADE
BEGIN -DET2REV- GRADE
BEGIN CONSTRUCTION

-DET2REV- PRC Sta. 17+18.82

-DET2REV- PT Sta. 19+59.27

-L- PC Sta. 99+42.07

-L- PT Sta. 104+68.16

SITE 3

360' UNIFORM TRANSITION

STREAM RELOCATION SEE SHEETS 2-F, 2-G & 2-H FOR DETAIL

SEE DETAIL E
LATERAL BASE DITCH W/CL B RIP RAP
-L- STA 98+50 - 100+00 LT
BEGIN SBG
-L- STA 98+80 LT
END SBG
-L- STA 98+64 LT

TAIL DITCH W/CLASS I RIP RAP
EST. 17 TONS
24 S.Y. FF
SEE DETAIL 'T'

SEE SHEET 2-H
ROCK CROSS VANE (RCV)

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF
SEE SHEET 2-B FOR STREAM DETAIL
BEGIN SBG
-L- STA 106+20 LT
END SBG
-Y- STA 10+78 LT

CL 'B' RIP RAP
EST. 5 TON
14 S.Y. FF

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF

ROCK DITCH

MATCHLINE TO SHEET 7
-L- STA. 98+00.00

MATCHLINE TO SHEET 9
-L- STA. 108+00.00

SEE SHEETS 25 & 26 FOR -L- PROFILE
SEE SHEETS 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 33 FOR -DET2REV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-F FOR STREAM RELOCATION DETAIL

— — — SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
— · — · SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	8
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 13 of 19

-L-
PI Sta 102+05.36
Δ = 6° 01' 43.1" (RT)
D = 1° 08' 45.3"
L = 526.10'
T = 263.29'
R = 5,000.00'
e = .03
RO = 78'
Vdes = 45 mph

NAD 83/95

SCALE: 1" = 100'

GARY WAYNE CRISP
DB 8-19 PG 1299
(56)

GARY WAYNE CRISP
DB Q-14 PG 98
(56)

CAROLE ANN SIMMONS
DB C-23 PG 437
(60)

JOYCE BRENDLE Rvkx
DB Z-38 PG 231
(58)

JAMES MCCALL
DB S-25 PG 181

JACQUELIN G. NELSON
DB C-20 PG 66
(59)

CAROLINE BURDEN SERVICES INC.
DB W-30 PG 106
(61)

CRESCENT RESOURCES INC.
DB S-23 PG 849
(62)

WILLIAM A. ROTEN
DB Q-14 PG 76

DAVID CHARLES MYERS
DB T-24 PG 1528

MATCHLINE TO SHEET 7
-L- STA. 98+00.00

MATCHLINE TO SHEET 9
-L- STA. 108+00.00

-DET2REV- PRC Sta. 14+15.46=
-L- POC Sta. 101+70.40
END -LTEMP= GRADE
BEGIN -DET2REV= GRADE
BEGIN CONSTRUCTION

-DET2REV- PRC Sta. 17+18.82

-DET2REV- PT Sta. 19+59.27

SITE 3

-L- PC Sta. 99+42.01

SEE DETAIL E
LATERAL BASE DITCH W/CL B RIP RAP
-L- STA 98+80 - 100+00 LT
BEGIN EDC
-L- STA 98+80 LT
END EDC
-L- STA 98+84 LT

TAIL DITCH
W/CLASS I RIP RAP
EST. 19 TONS
24 S.Y. FF
SEE DETAIL 'T'

SEE SHEET 2-H
ROCK CROSS VANE
(RCV)

360°
UNIFORM TRANSITION

STREAM RELOCATION
SEE SHEETS 2-F, 2-G & 2-H
FOR DETAIL

Rocky Branch

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF

SEE SHEET 2-F FOR
STREAM DETAIL

BEG IN EDC
-L- STA 108+28 LT
END EDC
-L- STA 107+76 LT

CL 'B' RIP RAP
EST. 8 TON
14 S.Y. FF

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF

SEE SHEETS 25 & 26 FOR -L- PROFILE
SEE SHEETS 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 33 FOR -DET2REV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-F FOR STREAM RELOCATION DETAIL

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

5/14/9

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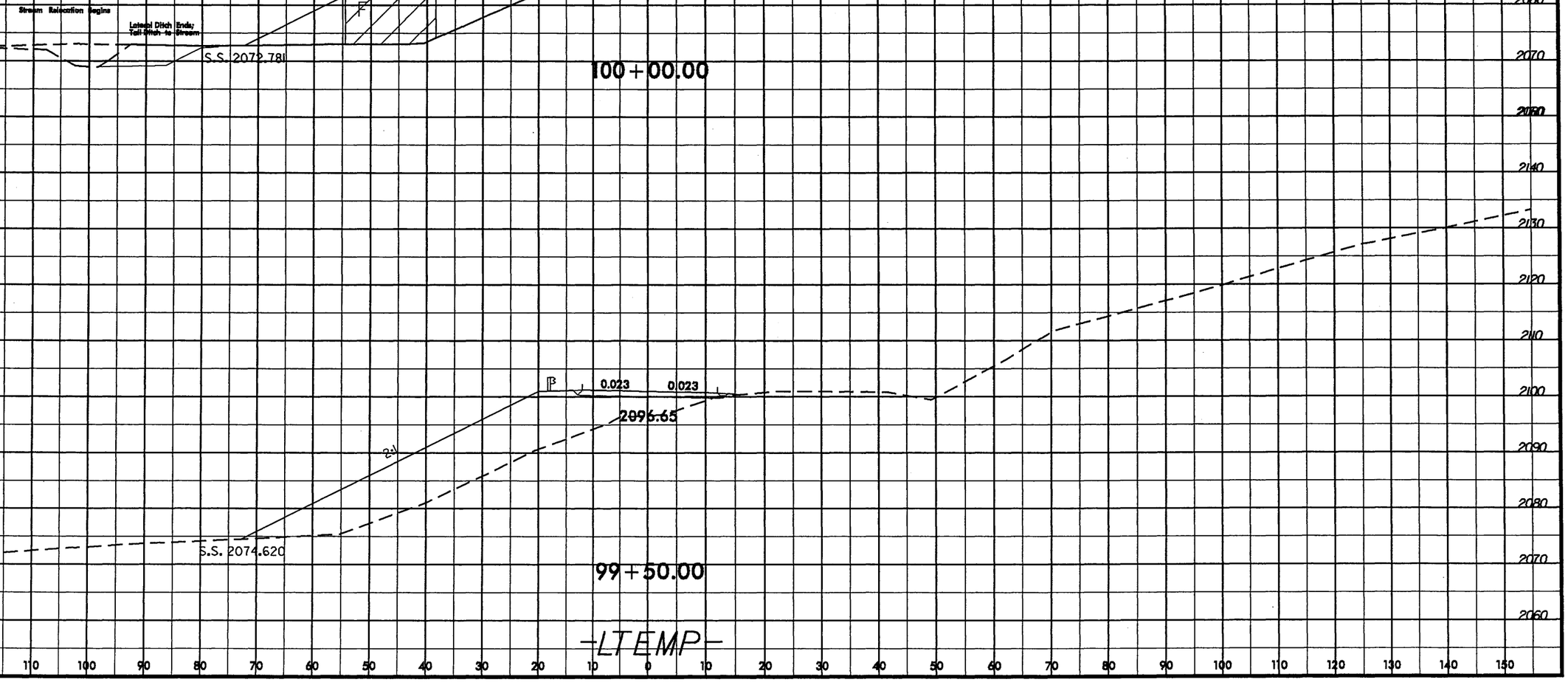
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2408B	X-31

SITE 3

F F DENOTES FILL IN WETLAND

Permit Drawing Sheet 14 of 19



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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

100' 0' 100' 200' 300'
SCALE: 1" = 100'

Permit Drawing
Sheet 15 of 19

SR 1434 (AIRPORT RD.)
2,800
4,400
2,500
3,700
300
700
8,600
13,400
NC 28
6,400
10,400
2007 ADT
2030 ADT

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y7- POT Sta. 14+30.00
-Y7- POT Sta. 13+75.00
END CONSTRUCTION

-DET2REV- PRC Sta. 24+28.37
-DET2REV- PT Sta. 26+09.72=
-L- POT Sta. 113+61.00
END CONSTRUCTION

-DET3- PC Sta. 10+80.00
-DET3- POT Sta. 10+00.00
-DET3- PT Sta. 13+75.43
-DET3- PRC Sta. 12+50.39
-DET2REV- PC Sta. 22+47.01
-L- POT Sta. 110+61.87
-Y7- POT Sta. 10+00.00

MATCHLINE TO SHEET 8
-L- STA. 108+00.00

MATCHLINE TO SHEET 10
-L- STA. 121+00.00

SITE 5
SITE 4

SEE DETAIL N
DB C-23 PG 437
LATERAL V DITCH W/CL I RIP RAP
-L- STA 108+00 - 108+50 LT
-L- STA 109+00 - 110+00 LT
-Y7- 10+70 - 11+15 LT

CL 'B' RIP RAP
EST. 3 TONS
11 S.Y. FF

BAND/EXTEND W/18" CSP

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF

SEE SHEET 2-E FOR STREAM DETAIL

BEGIN SBG
-L- STA 108+20 LT
END SBG
-Y7- STA 10+75 LT

REMOVE EXISTING CULVERT

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

REMOVE EXISTING 7'-0" STONE MASONRY ARCH CULVERT

REMOVE

SEE DETAIL 'I'
CL 'B' RIP RAP
TOE PROTECTION
EST. = 17 TONS
S.Y. FF = 34

CL 'B' RIP RAP
RIP RAP = 45 TONS

SEE DETAIL 'P'
CL 'B' RIP RAP
TOE PROTECTION
EST. = 317 TONS
S.Y. FF = 34

CAROLINA BUILDER SERVICES INC
DB K30 PG 1300

DB F-16 PG 88

DB I-19 PG 961

DB G-25 PG 1564

JAY MITCHELL HOUSTON
DB T-28 PG 1390

DB M-5 PG 425

DB K-6 PG 569

DB T-6 PG 456

BEGIN SBG
-L- STA 109+65 RT
END SBG
-L- STA 112+00 RT

Rocky Branch

390' UNIFORM TRANSITION

SEE DETAIL M
BERM DITCH W/CL B RIP RAP
-L- STA 111+50 - 112+50 LT

BEGIN EXPRESSWAY GUTTER
-L- STA 111+50.00
END EXPRESSWAY GUTTER
-L- STA 116+75.00

PLUG

PLUG AND FILL

NC 28 BRYSON CITY RD (SR 1434)

EXISTING R/W

GRAU 350

TOE PROTECTION

CLASS I RIP RAP ROCK CHECK
CL I = 7 TONS
F.F. = 13 S.Y.

SEE DETAIL H
TOE PROTECTION
W/CL B RIP RAP
-L- STA 117+35 -120+50 RT

PERMANENT STONE SILT SCREEN

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y7- PROFILE
SEE SHEET 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 19,20,21 & 22 FOR -DET3- PLAN VIEW
SEE SHEET 33 FOR -DET2REV- PROFILE
SEE SHEETS 35 FOR -DET3- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

100' 0' 100' 200' 300'
SCALE: 1"= 100'

Permit Drawing
Sheet 16 of 19

SR 1434 (AIRPORT RD.)
2,800 / 4,400
2,500 / 3,700 — 300 / 700
8,600 / 13,400 — NC 28 — 6,400 / 10,400
2007 ADT / 2030 ADT

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y- POT Sta. 14+30.00
-Y- / POT Sta. 13+75.00
END CONSTRUCTION

JAY MITCHELL HOUSTON
DB T-28 PG 1390
65

-DET2REV- PRC Sta. 24+28.37
-DET2REV- PT Sta. 26+09.72=
-L- POT Sta. 113+61.00
END CONSTRUCTION

SEE DETAIL N
LATERAL V DITCH
W/CL I RIP RAP
-L- STA 108+00 - 108+50 LT
-L- STA 109+00 - 110+00 LT
-Y7- 10+70 - 11+15 LT
DB C-23 PG 437

CL 'B' RIP RAP
EST. 3 TONS
11 S.Y. FF

BAND/EXTEND W/18" CSP

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
16 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF

SEE SHEET 2-E FOR STREAM DETAIL

BEGIN SBG
-L- STA 108+20 LT
END SBG
-Y7- STA 10+75 LT

REMOVE EXISTING CULVERT
CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

SITE 5

SITE 4

SEE DETAIL N
BERM DITCH W/CL B RIP RAP
-L- STA 111+50 - 112+50 LT

BEGIN /DRIVEWAY GUTTER/
-L- STA 111+50.00
END/DRIVEWAY GUTTER/
-L- STA 114+75.00

DET3- PC Sta. 10+00.00
DET3- BOR Sta. 10+00.00
UNIFORM TRANSITION
BROWN SBG
-L- STA 109+66 RT
END SBG
-L- STA 112+00 RT

DET3- PRC Sta. 12+50.30
DET3- PT Sta. 13+75.43

-DET2REV- PC Sta. 22+47.01
-L- POT Sta. 110+61.87
-Y7- POT Sta. 10+00.00

DB I-19 PG 961
DB F-16 PG 85
DB F-8 PG 496
DB G-26 PG 1594
DB K-6 PG 569
DB M-5 PG 425

MATCHLINE TO SHEET 8
-L- STA. 108+00.00

MATCHLINE TO SHEET 10
-L- STA. 121+00.00

PLUG AND FILL
HC 28 BRYSON CITY RD 20' BST
5'R
15'R
EXISTING R/W
GRAU 350 Rt
GRAU 350 Lt
TOE PROTECTION
CLASS I RIP RAP ROCK CHECK
CL. I = 7 TONS
F.F. = 15 S.Y.
SEE DETAIL H
TOE PROTECTION
W/CL B RIP RAP
-L- STA 117+35 -120+50 RT
PERMANENT STONE SILT SCREEN

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y7- PROFILE
SEE SHEET 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 19,20,21 & 22 FOR -DET3- PLAN VIEW
SEE SHEET 33 FOR -DET2REV- PROFILE
SEE SHEETS 35 FOR -DET3- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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SITES 4 & 5 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

50' 0' 50' 100'
SCALE: 1"= 50'

NAD 83/95

-DET2REV- PT Sta
-L- POT Sta. 113+61
END CONSTRUCTION

Permit Drawing
Sheet 17 of 19

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF

SEE SHEET 2-E FOR
STREAM DETAIL

BAND/EXTEND
W/18" CSP

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF

CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF

BAND/EXTEND
W/18" CSP

PLUG

RETAIN

SITE 5

SITE 4

PROP 3-SIDED
PRECAST
CONCRETE
CULVERT

REMOVE EXISTING
6'X6' STONE MASONRY
CULVERT

REMOVE

REMOVE

SEE DETAIL 'F'
CL 'B' RIP RAP
TOE PROTECTION
EST. = 17 TONS
S.Y. FF = 34

CL 'II' RIP RAP
RIP RAP = 45 TONS

SEE DETAIL 'F'
CL 'B' RIP RAP
TOE PROTECTION
EST. = 17 TONS

CAROLINA BUILDER
SERVICES INC

ISFD

-DET3- PC Sta. 10+80.00

-DET3- POT Sta. 10+00.00

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y7- PROFILE
SEE SHEET 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 19,20,21 & 22 FOR -DET3- PLAN VIEW
SEE SHEET 33 FOR -DET2REV- PROFILE
SEE SHEETS 35 FOR -DET3- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR TEMPORARY -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

5/14/9

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Rascomb
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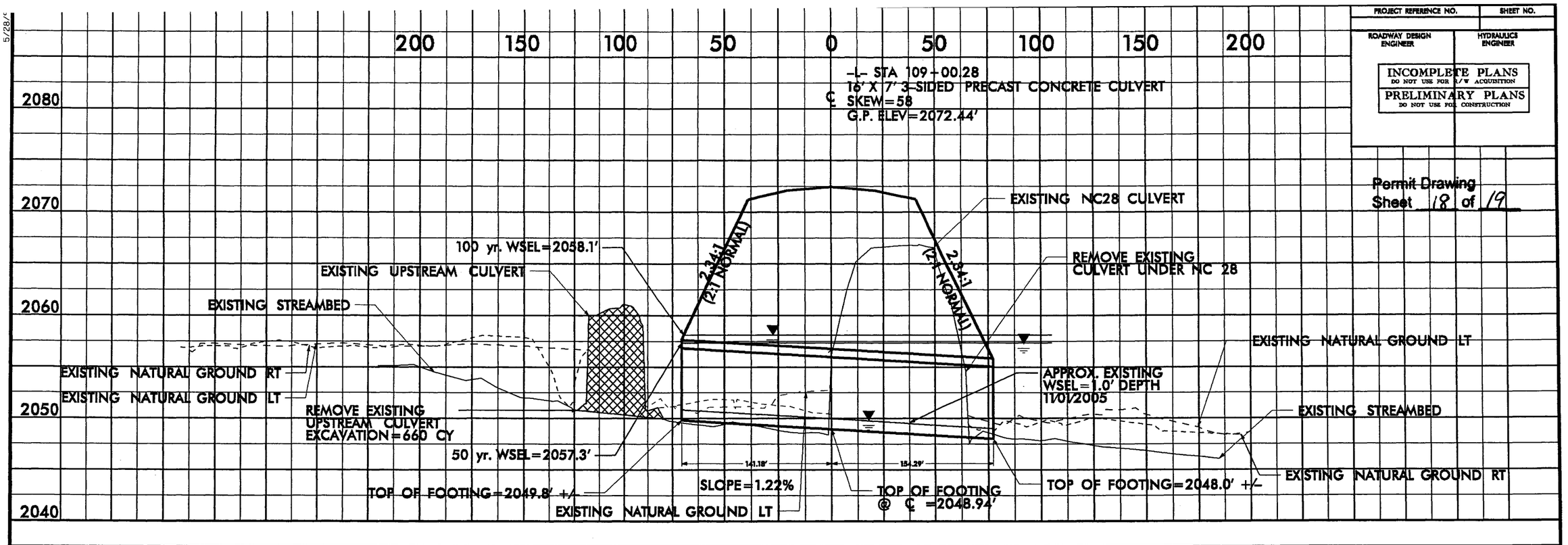
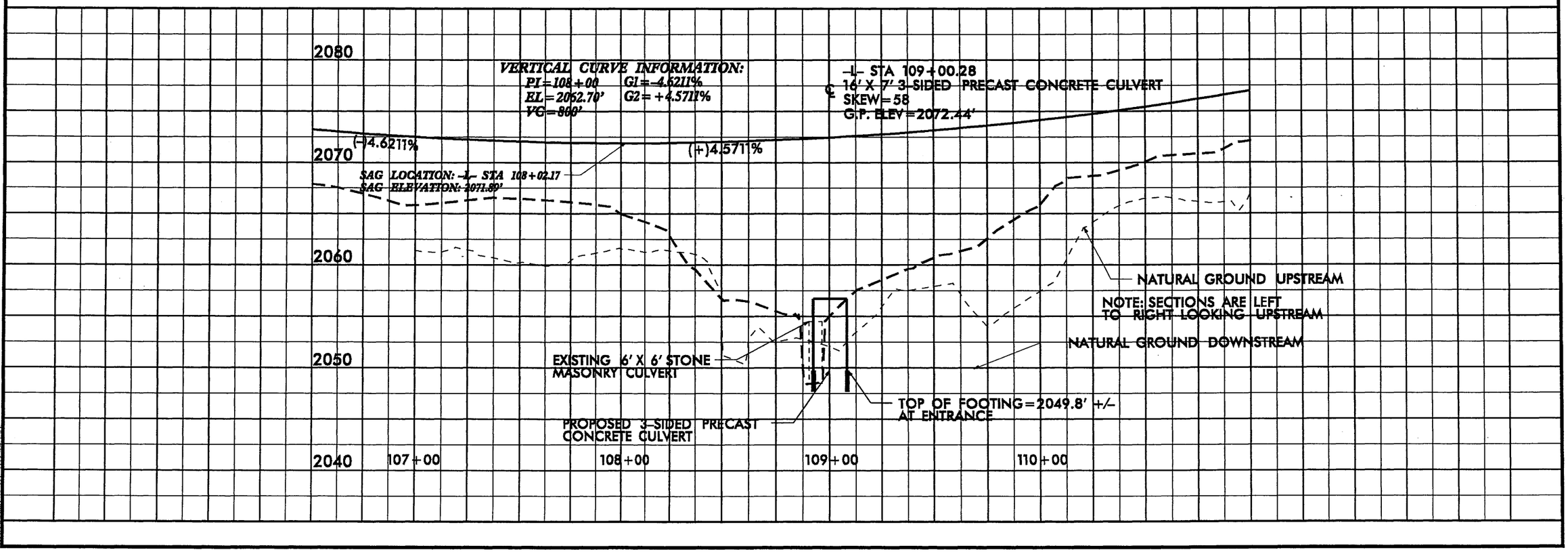
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 18 of 19





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plotcomb AT HV24656

F F DENOTES FILL IN WETLAND

Permit Drawing Sheet 19 of 42

111+00.00

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S.S. 2065.929

2072.12

S.S. 2072.710

Y7

0.020 0.020 2H

2070.07

S.S. 2070.424

110+50.00

0.020 0.020 2H 2.23H

2065.32

S.S. 2068.488

110+00.00

SITE 5

Fill from Detour Phase

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2061.46

S.S. 2067.161

S.S. 2054.674

109+50.00

—L—

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Stream Relocation Site 3

Summary

An unnamed tributary to Rocky Branch will be impacted by proposed roadway fill near stations 100 to 104 on the left side of the alignment. The stream is perennial and has a drainage area of 360 acres. The existing stream varies in classification from a G5 to a C5 using the Rosgen classification system. The sinuosity is very slight. Where sufficient vegetation is present, the stream is stable. The floodplain is generally available for flooding relief, except in thoses sections that are entrenched. The streambed is predominately sand.

The proposed stream will be classified as a Rosgen C5 stream. Rock cross-vanes will be used to establish grade control at both ends of the proposed realignment. Referencing a stable portion of the stream just below the reach, a similar dimension, patter, and profile will be established.

The stream will be relocated and restored using a priority-2 stream restoration approach. To the extent practicable, a constructed floodplain will be created along the stream relocation to provide bankfull flood stage relief. This will decrease shear stresses along the stream. Additionally, rock cross-vanes will establish grade control and prevent head-cutting. Pools will be constructed in the stream relocation and should continue to provide aquatic habitat. To ensure long-term stability of the stream, the riparian buffer will be held in Right of Way to allow for vegetation establishment and buffer protection.

Sediment Transport Analysis

Shear stress, $\tau = \gamma R s$

γ = density of water (62.4 lb/ft^2)
R = hydraulic radius = Area/Wetted Perimeter
s = slope

Stream power computation

$P = v\tau$

v = channel velocity (ft/s)
τ = shear stress (lb/ft^2)

Sediment transport analysis, continued

Existing Stream

$R = 10.0ft^2/9.5ft = 1.05ft$
$s = 0.011ft/ft$
$\tau = (62.4\ lb/ft^3)(1.05ft)(0.011ft/ft) = 0.72lb/ft^2$

$P = (5.5\ ft/s)(0.72lb/ft^2) = 3.96\ ft.lbs/s.ft^2$

Reference Stream

$R = 12.3ft^2/13.7ft = 0.90ft$
$s = 0.012ft/ft$
$\tau = (62.4\ lb/ft^3)(0.90ft)(0.012ft/ft) = 0.67lb/ft^2$

$P = (4.8\ ft/s)(0.67lb/ft^2) = 3.22\ ft.lbs/s.ft^2$

Proposed Stream

$R = 12.8ft^2/13.5ft = 0.95ft$
$s = 0.012ft/ft$
$\tau = (62.4\ lb/ft^3)(0.95ft)(0.012ft/ft) = 0.71lb/ft^2$

$P = (4.6\ ft/s)(0.71lb/ft^2) = 3.26\ ft.lbs/s.ft^2$

Variables	*Existing Channel*	*Proposed Reach*	*Reference Reach*	*Reference Reach*
			Lost Cove Cr.	Downstream
1. Stream type	G5/C5	C5	C3	C5
2. Drainage area (D.A.) ac.	360 ac.	360 ac.	24.8 sq. mi.	360 ac.
3. Bankfull width (Wbkf) ft.	11.0	13.0	62.3	13.3
4. Bankfull mean depth (dbkf) ft.	0.91	0.98	3.36	0.92
5. Width/depth ratio (Wbkf/dbkf)	12.1	13.2	18.5	14.5
6. Bankfull cross-sectional area (Abkf) $ft.^2$	10.0	12.8	208.0	12.2
7. Bankfull mean velocity (Vbkf) ft/sec	5.5	4.6		4.8
8. Bankfull discharge (Qbkf) $ft.^3$/sec	55	59		59
9. Bankfull max depth (dmbkf) ft.	2.0	1.5	5.4	1.8
10. Width of floodprone area (Wfpa) ft.	17 to 70	50	>200	71
11. Entrenchment ratio (Wfpa/Wbkf)	2.0 to 6.4	3.8	>3	5.3
12. Meander length (Lm) ft.	30 to 80	90 to 124	540	38 to 51
13. Ratio of meander length to bankfull width (Lm/Wbkf)	2.7 to 7.3	6.9 to 9.5	8.7	2.9 to 3.8
14. Radius of curvature (Rc) ft.	12 to 25	25 to 40	62.5	20 to 30
15. Ratio of radius of curvature to bankfull width (Rc/Wbkf)	1.1 to 2.3	1.9 to 3.1	1	1.5 to 2.3
16. Belt width (Wblt) ft.	20	25	500	18
17. Meander width ratio (Wblt/Wbkf)	1.80	1.90	8	1.40
18. Sinuosity (stream length/valley length) (K)	1.05	1.03	1.2	1.09
19. Valley Slope (VS)	1.05%	1.30%	0.0088	1.27%
20. Average slope (CS)	1.10%	1.20%	0.0084	1.39%
21. Pool slope	0.001	0.001		0.001
22. Ratio of pool slope to average slope	0.091	0.083		0.072
23. Maximum pool depth (dpmax) ft.	1.9	2.5	7.7	1.8
24. Ratio of pool depth to average bankfull depth (dp/dbkf)	2.09	2.54	2.3	1.96
25. Pool width (Wp) ft.	16.0	15.0	59.5	14.0
26. Ratio of pool width to bankfull width	1.45	1.15	0.96	1.05
27. Pool to pool spacing ft.	30 to 80	35 to 70	190	30 to 80
28. Ratio of pool to pool spacing to bankfull width	1.9 to 5.2	2.7 to 5.4	3.05	2.3 to 6.0
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BHlow/dmbkf)	0.7	1.0	1.0	0.6

NATURAL CHANNEL DESIGN DATA

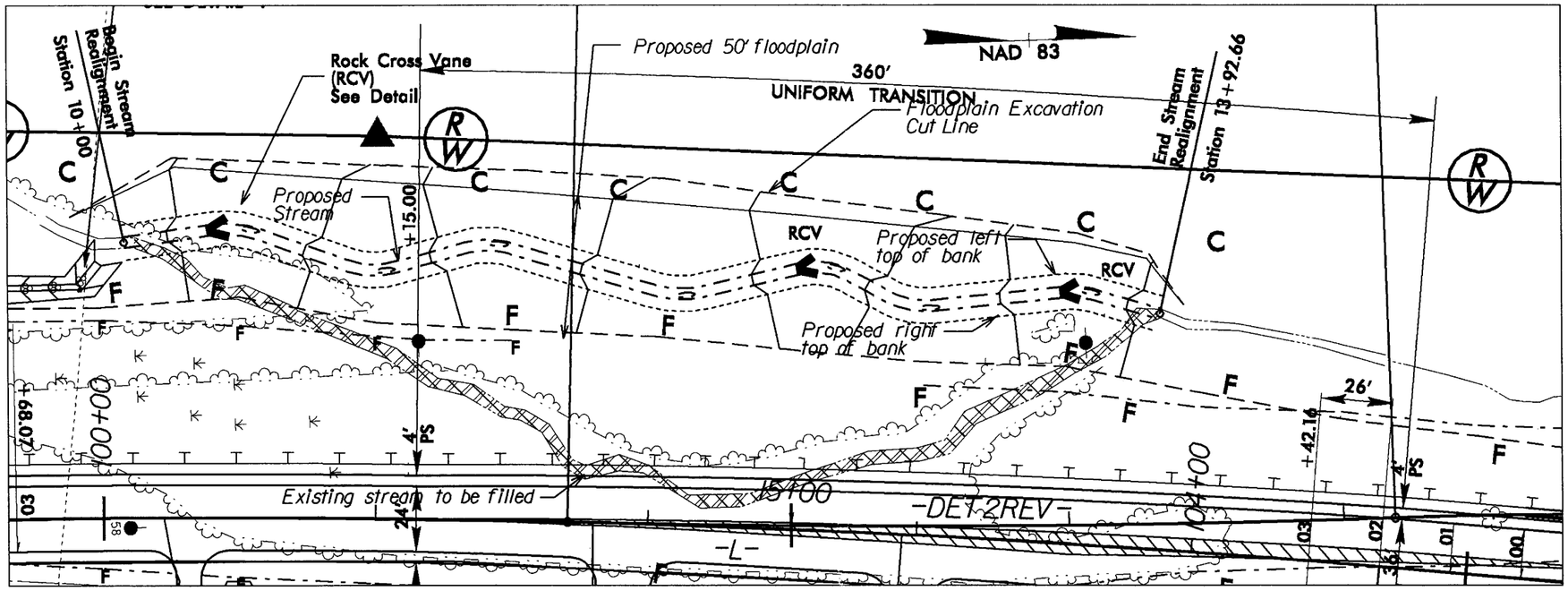
MORPHOLOGICAL MEASUREMENT TABLE

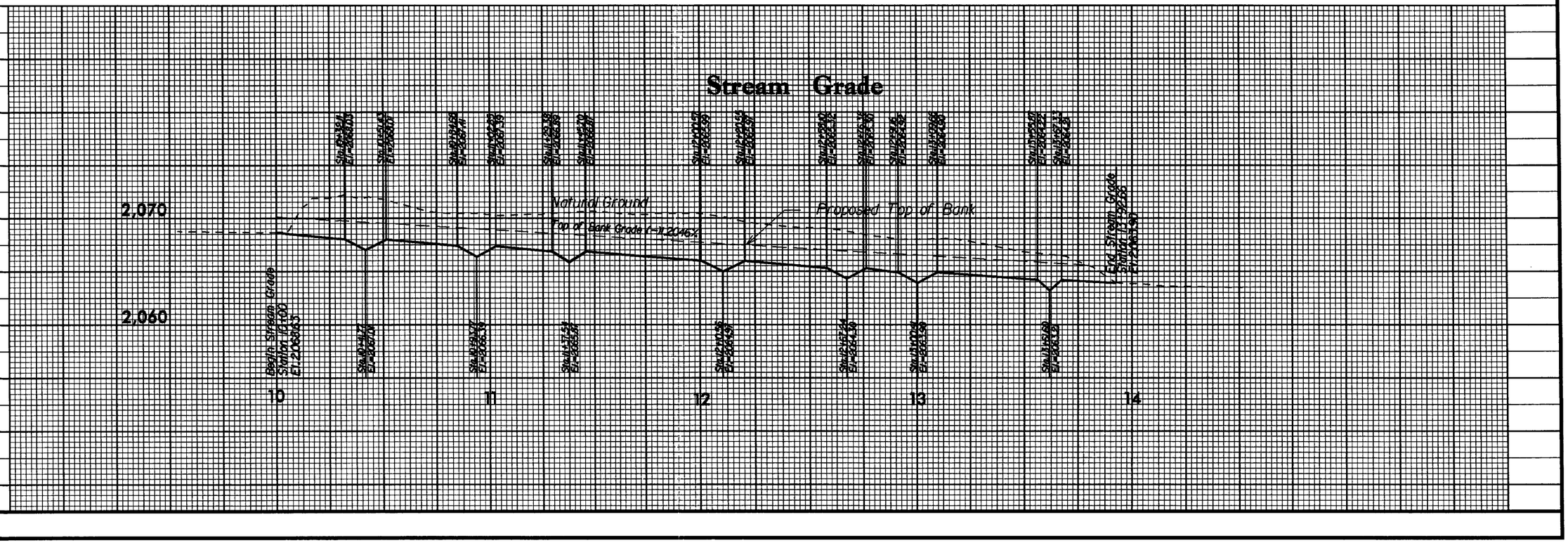
SITE 3 Station 99+42 to 104+68

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
Macon County
PROJECT: 34427.1.1 (R-2408B)

SHEET __ OF __ 10/24/2008

Stream Relocation –L– 100+00 to 104+00 Left





PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-F
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

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

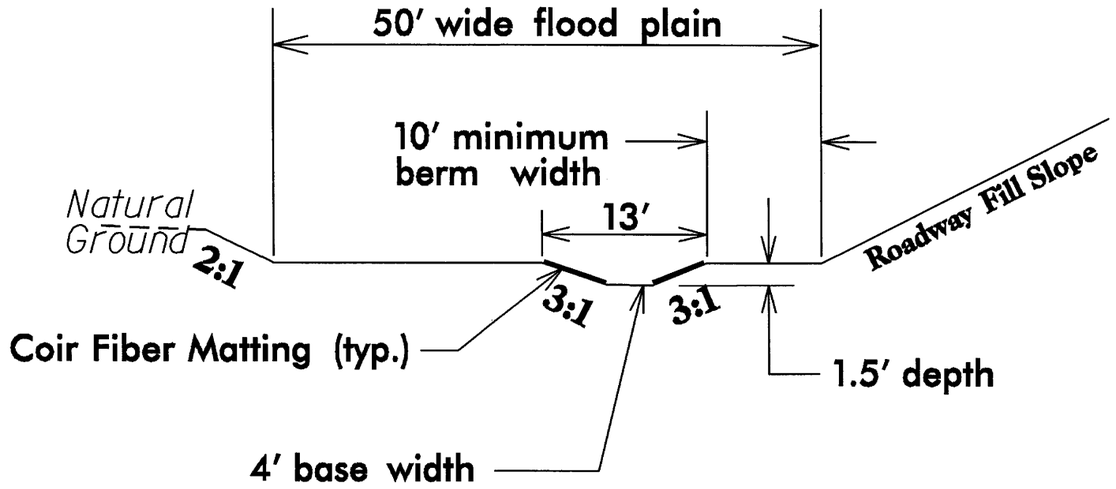
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

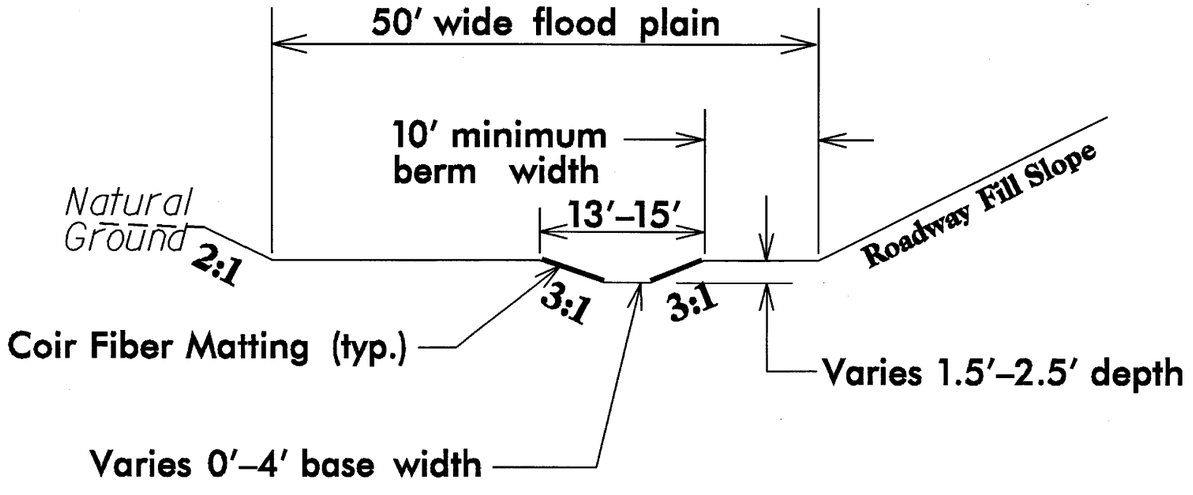
Stream Details

NOT TO SCALE

Typical Stream Dimensions



Typical Stream Section with Pool

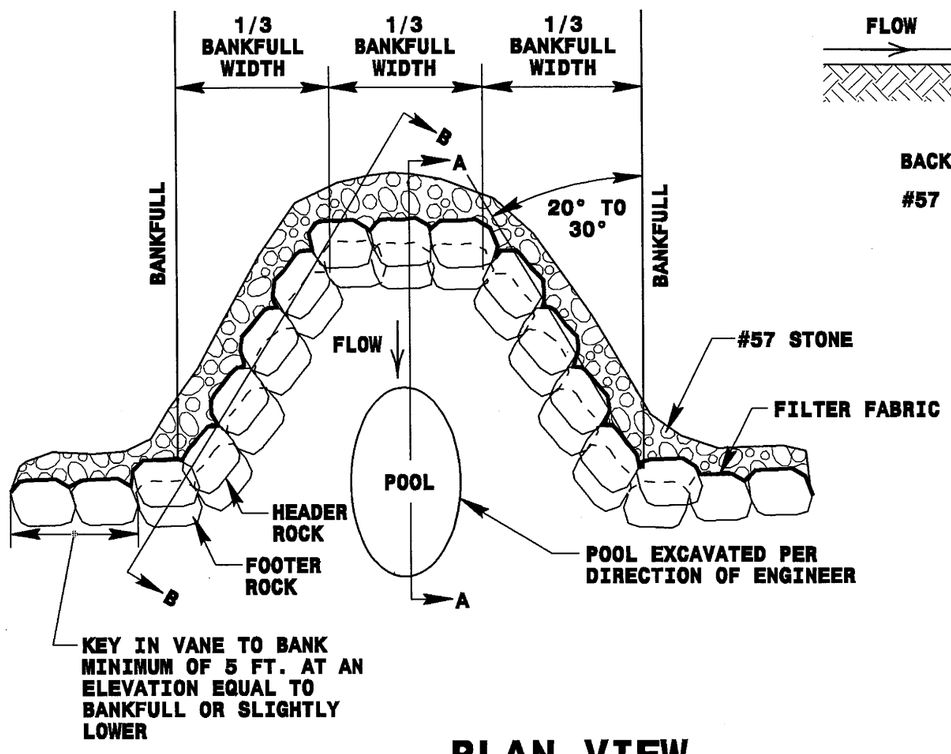


5/14/99

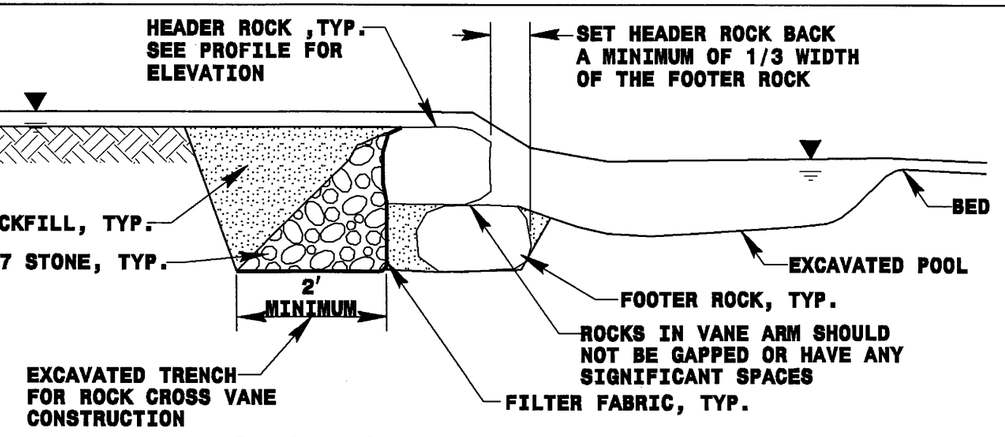
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

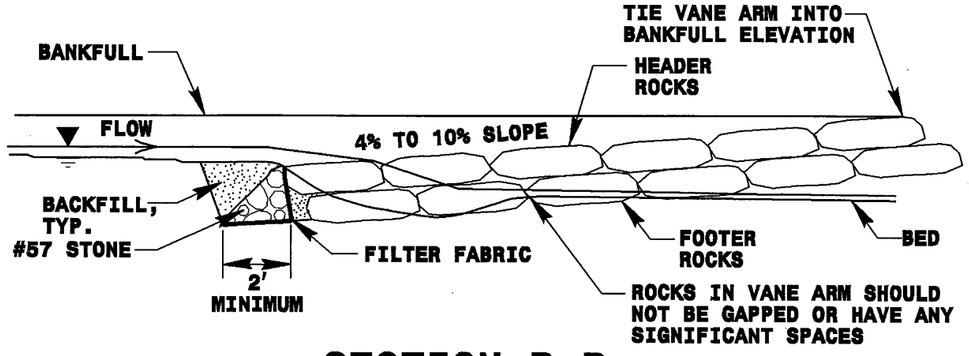
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
-L-100+40	1	4	2
-L-102+55	1	4	2
-L-103+48	1	4	2

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

NOT TO SCALE

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UT to LittleTennessee
Stream Mitigation Plan
TIP R-2408
WBS No. 34427.1.1
January 2009

The North Carolina Department of Transportation will perform on-site mitigation for stream impacts associated with TIP R-2408. The mitigation site contains approximately 190 linear feet of stream restoration and occurs within the right of way located adjacent to NC 28 near station 28+00R.

NCDOT proposes to restore 190 linear feet of stream by removing an existing 18" reinforced concrete pipe (RCP), establishing a stable stream channel, and replanting a buffer along the unamed tributary that leads to Little Tennessee River. This site is proposed to offset 190 feet of stream impacts associated with the road project.

Existing Conditions

This project is located in the central region of Macon County on NC 28 about two miles north of Franklin NC. NCDOT plans to widen NC 28, making it a four lane road. The existing unnamed tributary runs East Northeast to West Southwest through an 18 inch (RCP) pipe perpendicular to NC 28. Steep upstream topography varies greatly from the topography downstream of the culvert. The riparian area adjacent to the stream is currently grass with a very sparse riparian buffer. The stream flows from pipe to wetland therefore no existing dimensions are shown in the geomorphic Table.

Proposed Conditions

The proposed stream channel design involves removing approximately 190 linear feet of existing 18" RCP and restoring the appropriate dimension, pattern and profile to the stream. The design proposes an A t ype channel with a 13% slope transitioning into a B type channel with a 6.5 % slope.The cross-sectional area for this stream is 2.5 square feet. This information is shown in detail on the morphological table included in Appendix A. The proposed design includes reshaping the stream channel, applying the appropriate cross sectional areas and installing grade control structures. The design parameters were verified using the NC Regional Curves found in Appendix A. A minimum 50' buffer along each side of the channel will be planted at a a density rate of 680 trees per acre on 8 foot centers with the following species: silky willow, (salix sericea) elderberry,(*sambucus canadensis*) for Type I. Northern red oak, (*quercus rubra*), american sycamore (*platanus occidentalis*), white oak (*quercus alba*), yellow poplar (*liriodendron tulipifera*) for Type II. The mitigation site was purchased fee simple and will be held in perpetuity by NCDOT.

Monitoring

NCDOT proposes to monitor the restoration site by visual observation for channel and bank stability and by, photo documentation for the survival and the density of the vegetation. NCDOT will monitor the site for a minimum of three years or until the site is a success. The USACE stream quality assessment forms used to evaluate success criteria are shown in Appendix A.

Appendix A:

MORPHOLOGICAL MEASUREMENTS TABLE

STREAM NAME AND LOCATION

-REACH NAME- Sta. 1n+nn.nn to Sta. nn+nn.nn

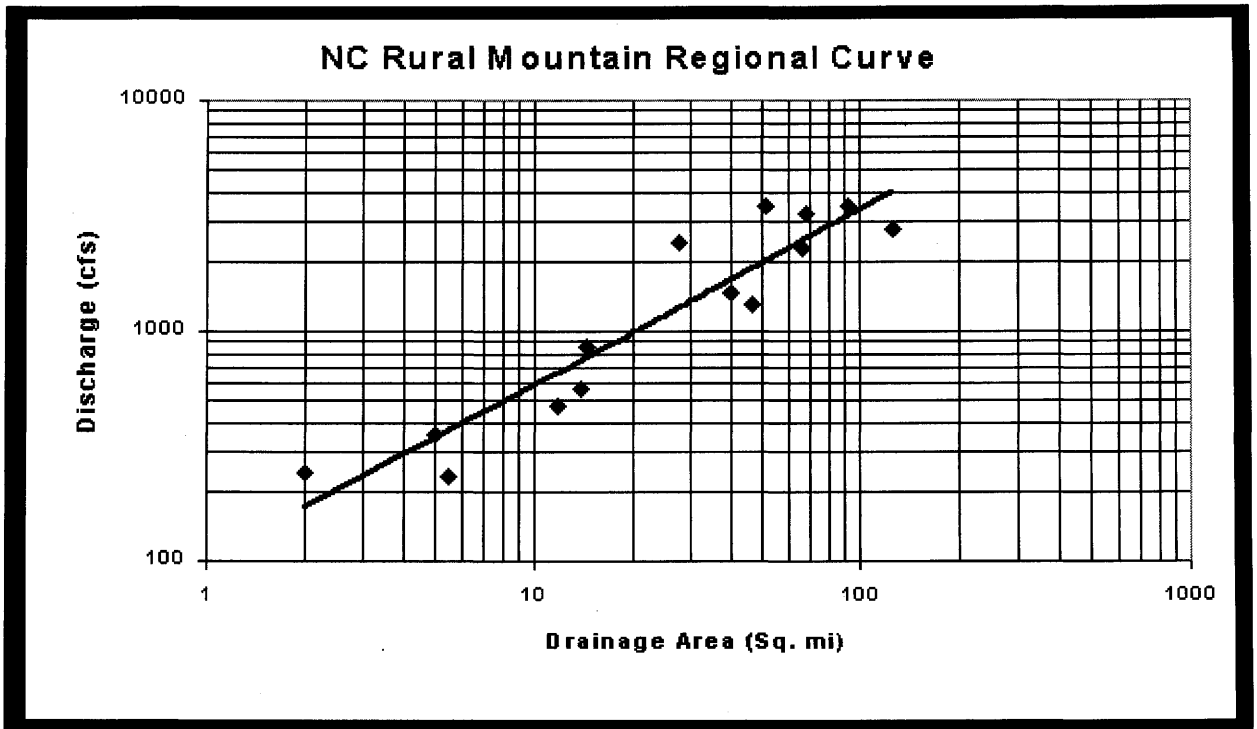
Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream type	--	A	--	A
2. Drainage area	-----	0.5	-----	7.42
3. Bankfull width	Mean: ----- Range:	Mean: 5 Range:		Mean: 9.7 Range:
4. Bankfull mean depth	Mean: ----- Range:	Mean: 1 Range:		Mean: 1.65 Range:
5. Width/depth ratio	Mean: ----- Range:	Mean: 5 Range:		Mean: 7.23 Range:
6. Bankfull cross-sectional area	Mean: ----- Range:	Mean: 2.5 Range:		Mean: ----- Range:
7. Bankfull mean velocity	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
8. Bankfull discharge, cfs	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
9. Bankfull max depth	Mean: ----- Range:	Mean: 1 Range:		Mean: 1.37 Range:
10. Width of floodprone area	Mean: ----- Range:	Mean: 50 Range:		Mean: 13.93 Range:
11. Entrenchment ratio	Mean: ----- Range:	Mean: 10 Range:		Mean: 89.04 Range:
12. Meander length	Mean: ----- Range:	Mean: 20 Range:		Mean: ----- Range:
13. Ratio of meander length to bankfull width	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
14. Radius of curvature	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
15. Ratio of radius of curvature to bankfull width	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
16. Belt width	Mean: ----- Range:	Mean: 7.00 Range:		Mean: ----- Range:
17. Meander width ratio	Mean: ----- Range:	Mean: 1.4 Range:		Mean: ----- Range:
18. Sinuosity (stream length/valley length)	Mean: ----- Range:	Mean: 1.0 Range:		Mean: 1.05 Range:
19. Valley slope	Mean: ----- Range:	Mean: 15% Range:		Mean: 7.9 Range:
20. Average slope	Mean: ----- Range:	Mean: 15% Range:		Mean: 6.41% Range: 2.5 - 9.8
21. Pool slope	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
22. Ratio of pool slope to average slope	Mean: Range:	Mean: ----- Range:		Mean: ----- Range:
23. Maximum pool depth	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
24. Ratio of pool depth to average bankfull depth	Mean: ----- Range:	Mean: 5 Range:		Mean: 8 Range:
25. Pool width	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
26. Ratio of pool width to bankfull width	Mean: ----- Range:	Mean: 10 Range:		Mean: 2.4 Range:
27. Pool to pool spacing	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
28. Ratio of pool to pool spacing to bankfull width	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: ----- Range:	Mean: ----- Range:		Mean: ----- Range:

MORPHOLOGICAL MEASUREMENTS TABLE

STREAM NAME AND LOCATION

-REACH NAME- Sta. 1n+nn.nn to Sta. nn+nn.nn

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream type	--	B	--	A
2. Drainage area	-----	0.5	-----	7.42
3. Bankfull width	Mean: ----- Range: -----	Mean: 5 Range: -----	-----	Mean: 9? Range: -----
4. Bankfull mean depth	Mean: ----- Range: -----	Mean: 1 Range: -----	-----	Mean: 7.65 Range: -----
5. Width/depth ratio	Mean: ----- Range: -----	Mean: 5 Range: -----	-----	Mean: 7.23 Range: -----
6. Bankfull cross-sectional area	Mean: ----- Range: -----	Mean: 2.5 Range: -----	-----	Mean: ----- Range: -----
7. Bankfull mean velocity	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
8. Bankfull discharge, cfs	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
9. Bankfull max depth	Mean: ----- Range: -----	Mean: 1 Range: -----	-----	Mean: 1.37 Range: -----
10. Width of floodprone area	Mean: ----- Range: -----	Mean: 50 Range: -----	-----	Mean: 13.93 Range: -----
11. Entrenchment ratio	Mean: ----- Range: -----	Mean: 10 Range: -----	-----	Mean: 89.04 Range: -----
12. Meander length	Mean: ----- Range: -----	Mean: 35 Range: -----	-----	Mean: ----- Range: -----
13. Ratio of meander length to bankfull width	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
14. Radius of curvature	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
15. Ratio of radius of curvature to bankfull width	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
16. Belt width	Mean: ----- Range: -----	Mean: 7.00 Range: -----	-----	Mean: ----- Range: -----
17. Meander width ratio	Mean: ----- Range: -----	Mean: 1.4 Range: -----	-----	Mean: ----- Range: -----
18. Sinuosity (stream length/valley length)	Mean: ----- Range: -----	Mean: 1.0 Range: -----	-----	Mean: 1.05 Range: -----
19. Valley slope	Mean: ----- Range: -----	Mean: 5.45% Range: -----	-----	Mean: 7.9 Range: -----
20. Average slope	Mean: ----- Range: -----	Mean: 6.5% Range: -----	-----	Mean: 6.41% Range: 2.5 - 9.8
21. Pool slope	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
22. Ratio of pool slope to average slope	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
23. Maximum pool depth	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
24. Ratio of pool depth to average bankfull depth	Mean: ----- Range: -----	Mean: 5 Range: -----	-----	Mean: 8 Range: -----
25. Pool width	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
26. Ratio of pool width to bankfull width	Mean: ----- Range: -----	Mean: 21 Range: -----	-----	Mean: 24 Range: -----
27. Pool to pool spacing	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
28. Ratio of pool to pool spacing to bankfull width	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: ----- Range: -----	Mean: ----- Range: -----	-----	Mean: ----- Range: -----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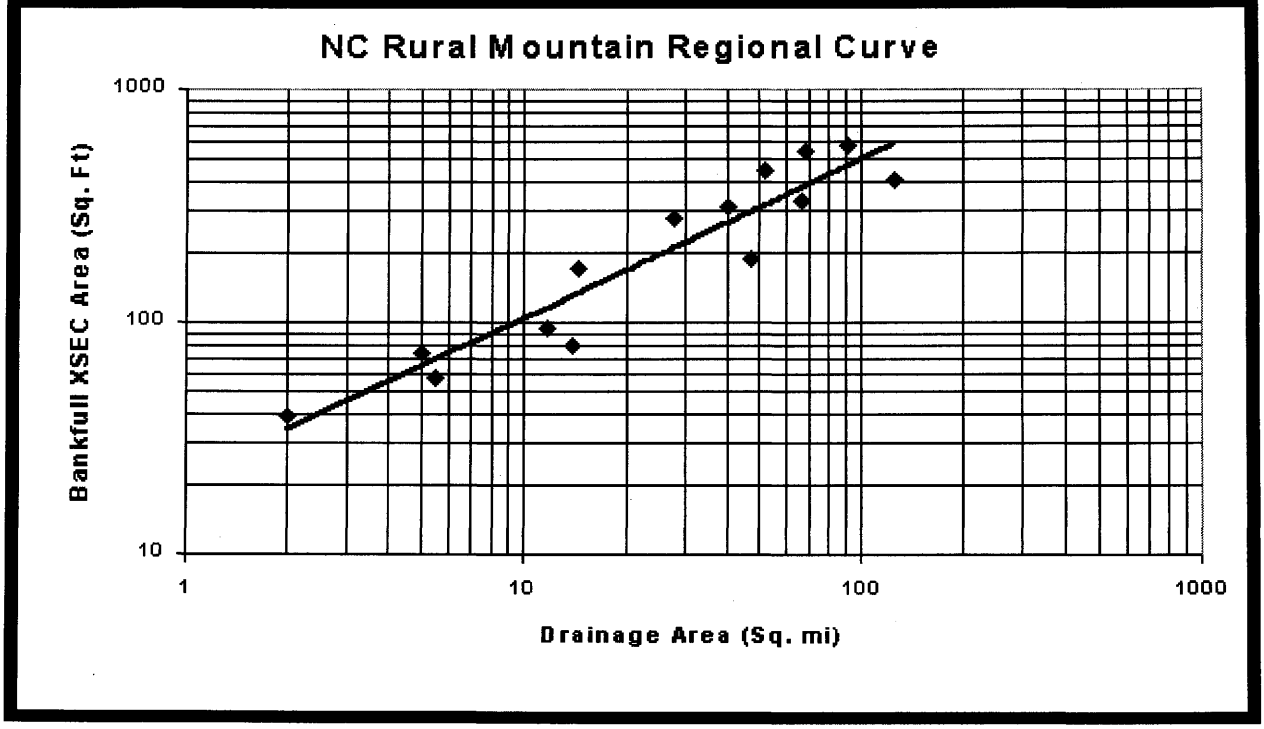
100
Discharge (cfs)
1
10
100
1000
Drainage Area (Sq. mi)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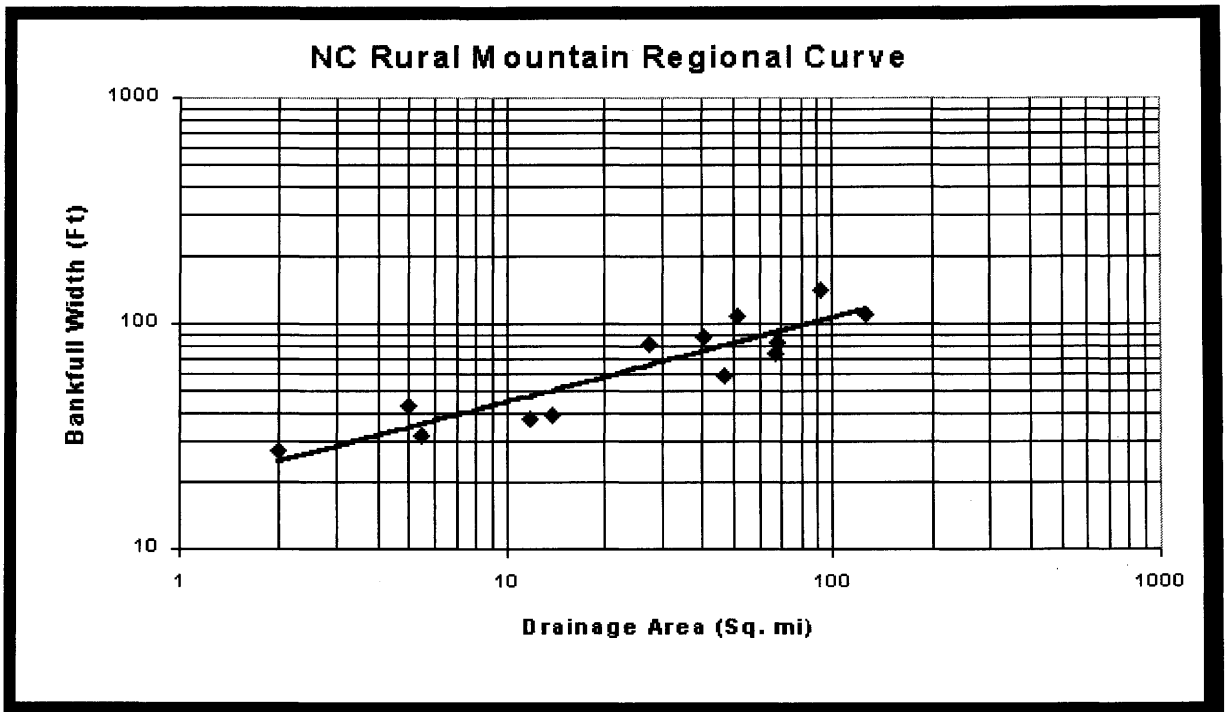
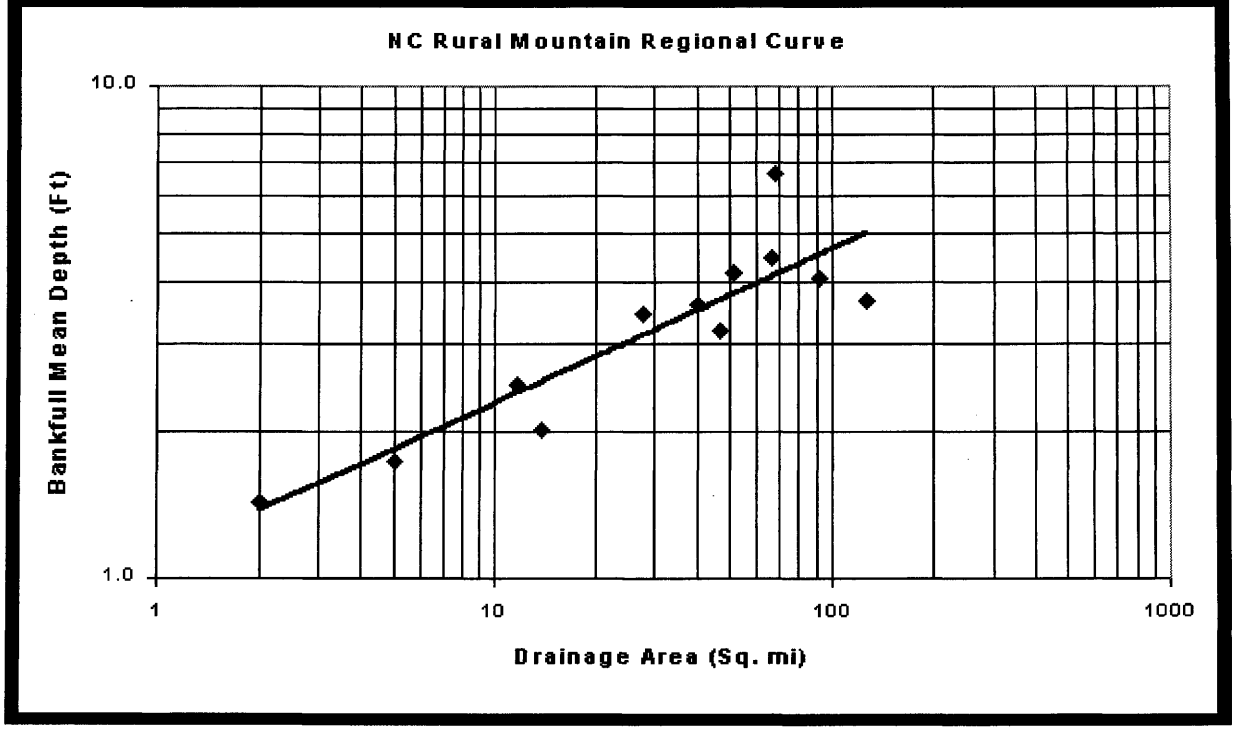
1000
100
10
Bankfull XSEC Area (Sq. Ft)
1
10
100
1000
Drainage Area (Sq. mi)


NC Rural Mountain Regional Curve
Bankfull Width (Ft)
1000
100
10
1
10
100
1000
Drainage Area (Sq. mi)


NC Rural Mountain Regional Curve
Bankfull Mean Depth (Ft)
10.0
1.0
1
10
100
1000
Drainage Area (Sq. mi)

Channel Mitigation Monitoring Sheets I, II, III, AND IV

Monitoring Data Record

Project Title: _____ COE Action ID: _____
Stream Name: _____ DWQ Number: _____
City, County and other Location Information: _____
Date Construction Completed:_____ Monitoring Year: ( ) of 5
Ecoregion:_____ 8 digit HUC unit_____
USGS Quad Name and Coordinates: _____
Rosgen Classification: _____
Length of Project: _____ Urban or Rural: _____ Watershed Size: _____
Monitoring DATA collected by: _____ Date: _____
Applicant Information:
Name: _____
Address: _____
Telephone Number: _____ Email address:_____
Consultant Information:
Name: _____
Address: _____
Telephone Number: _____ Email address:_____
Project Status: _____
_____

Monitoring Level required by COE and DWQ (404 permit/ 401 Cert.): Level **1** ~~2~~ ~~3~~
Monitoring Level 1 requires completion of *Section 1, Section 2 and Section 3*

Section 1. PHOTO REFERENCE SITES
(Monitoring at all levels must complete this section)

Total number of reference photo locations at this site: _____
Dates reference photos have been taken at this site: _____
_____
Individual from whom additional photos can be obtained (name, address, phone):_____
_____
Other Information relative to site photo reference: _____
_____

If required to complete Level 3 monitoring only stop here; otherwise, complete section 2.

Section 2. PLANT SURVIVAL
Attach plan sheet indicating reference photos.

Identify specific problem areas (missing, stressed, damaged or dead plantings):

Estimated causes, and proposed/required remedial action:

ADDITIONAL COMMENTS:

If required to complete Level 1 and Level 2 monitoring only stop here; otherwise, complete section 3.

Section 3. CHANNEL STABILITY

Visual Inspection: The entire stream project as well as each in-stream structure and bank stabilization/revetment structure must be evaluated and problems addressed.

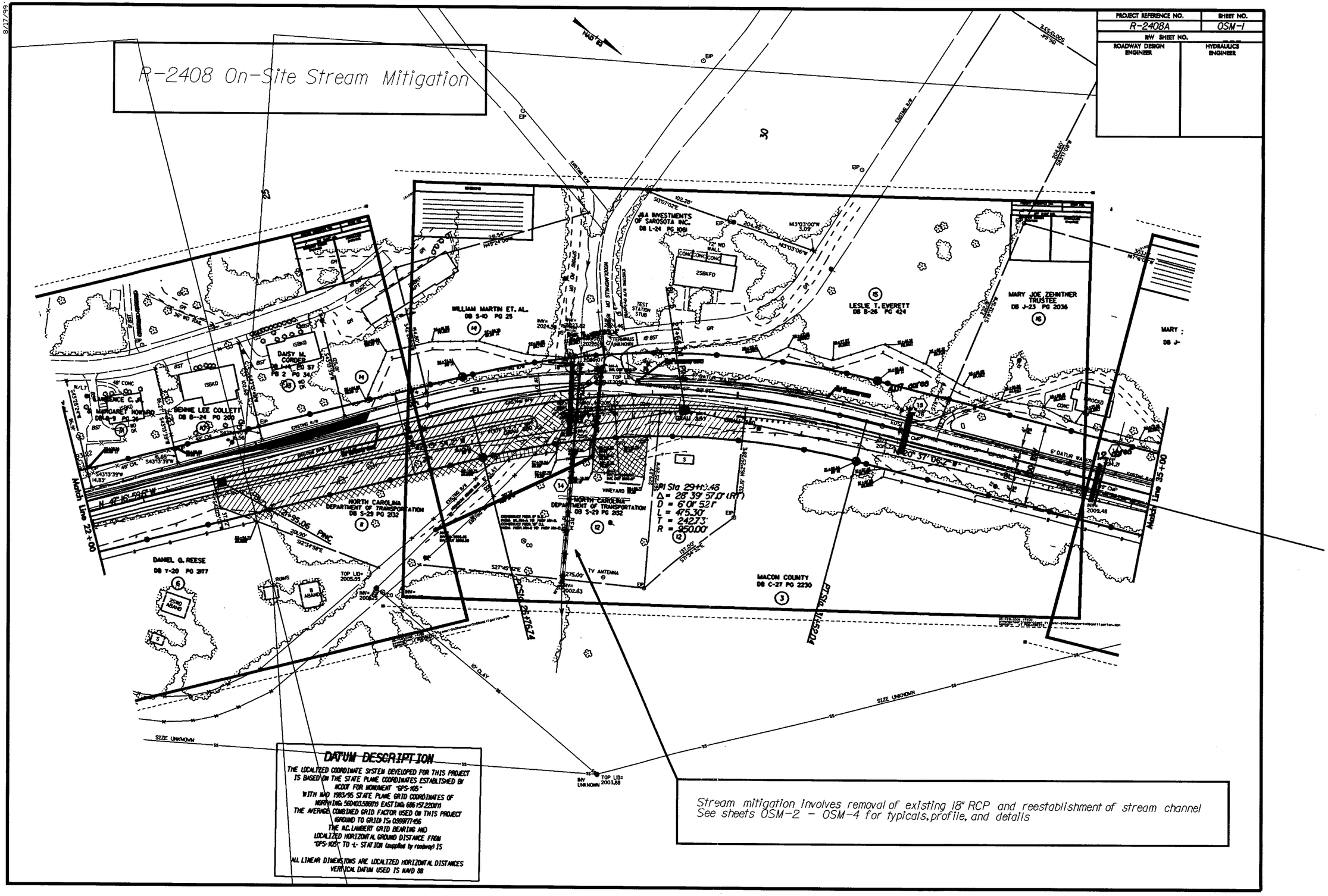
Report on the visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. Include a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situation.

Date Inspected	Station Number	Station Number	Station Number	Station Number	Station Number
Structure Type					
Is water piping through or around structure?					
Head cut or down cut present?					
Bank or scour erosion present?					
Other problems noted?					

8/17/99

R-2408 On-Site Stream Mitigation

PROJECT REFERENCE NO.	SHEET NO.
R-2408A	OSM-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



DATUM DESCRIPTION

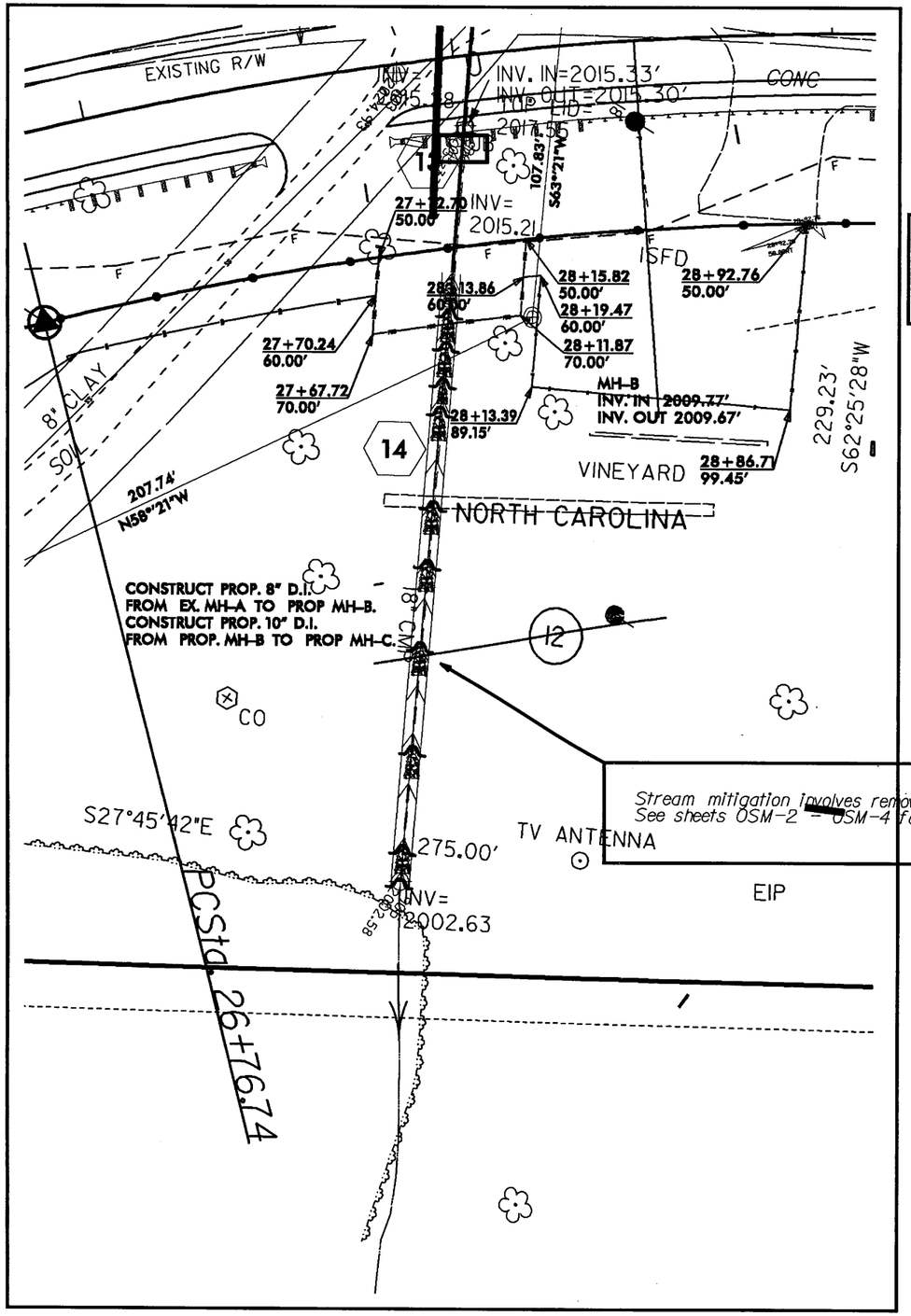
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS-105" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING 560403.586(m) EASTING 686157.220(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS 0.999777456
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-105" TO -L- STATION (supplied by roadway) IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

Stream mitigation involves removal of existing 18" RCP and reestablishment of stream channel
See sheets OSM-2 - OSM-4 for typicals, profile, and details

8/17/99

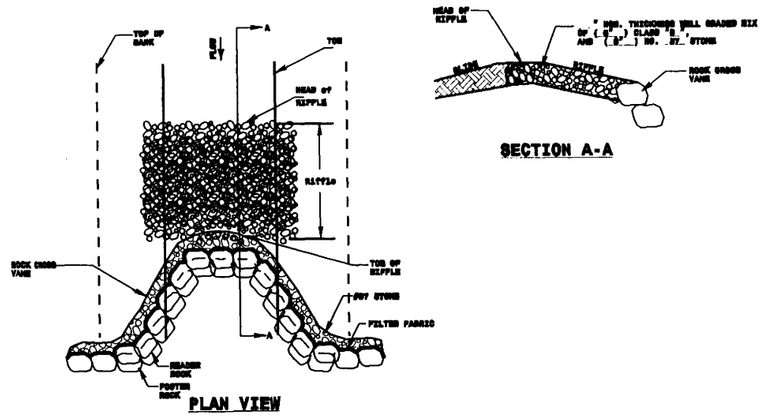
PROJECT REFERENCE NO.	SHEET NO.
R-2408A	OSM-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



R-2408 On-Site Stream Mitigation

Stream mitigation involves removal of existing 18" RCP and reestablishment of stream channel
See sheets OSM-2 - OSM-4 for typicals, profile, and details

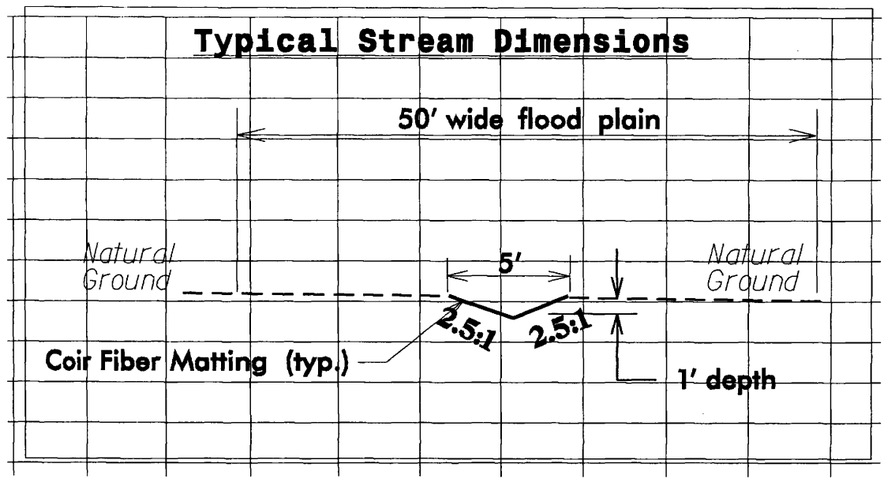
PROJECT REFERENCE NO.	SHEET NO.
R-2408A	OSM-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



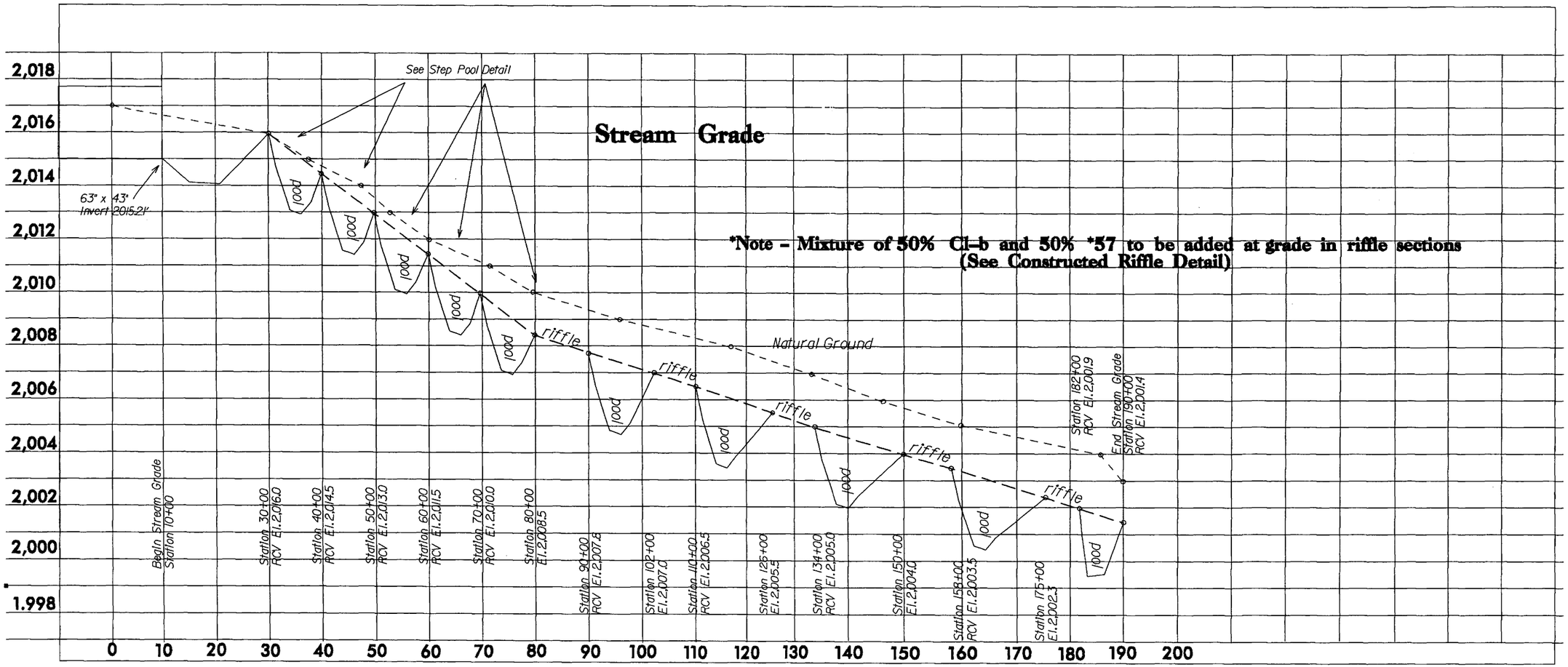
CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE

Typical Stream Dimensions

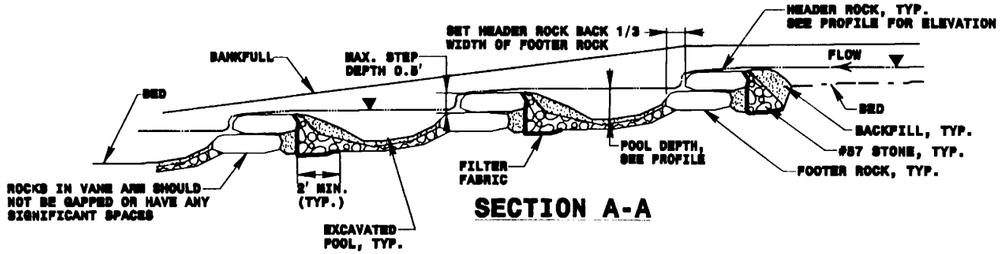


Stream Grade

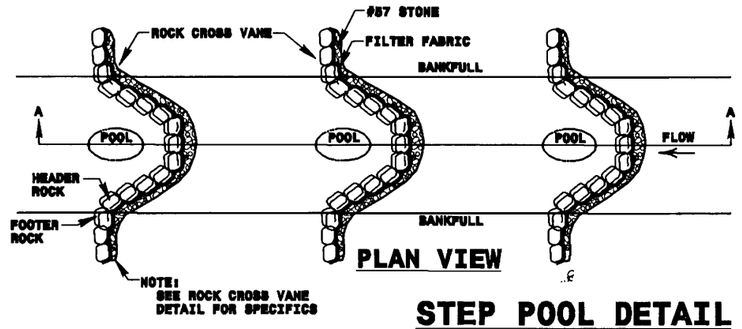


***Note – Mixture of 50% Cl–b and 50% *57 to be added at grade in riffle sections (See Constructed Riffle Detail)**

PROJECT REFERENCE NO.	SHEET NO.
R-2408A	OSM-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SECTION A-A

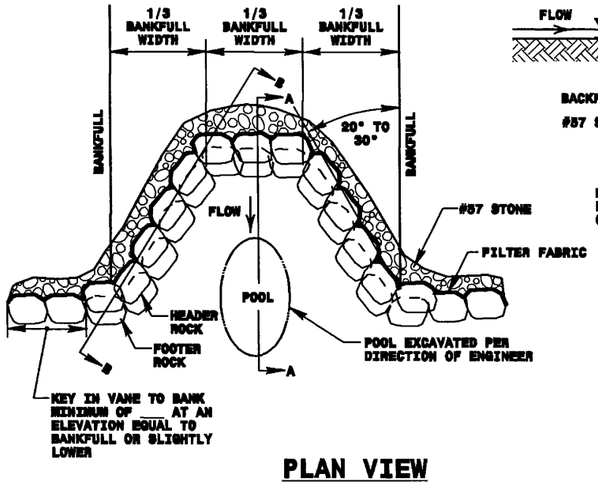


PLAN VIEW

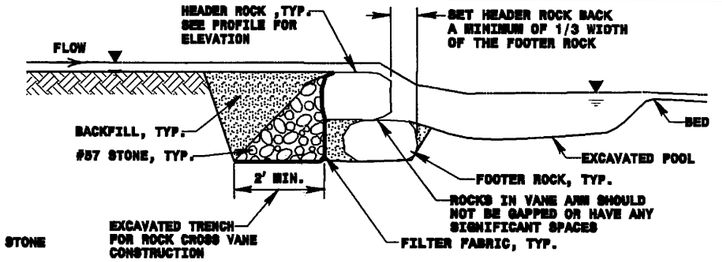
STEP POOL DETAIL

NOT TO SCALE

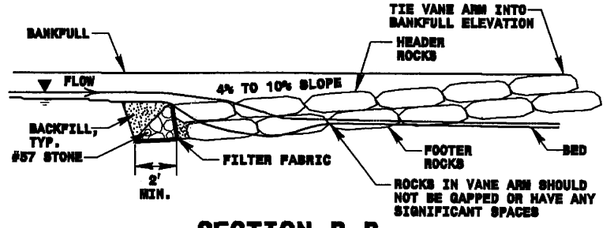
NOTES:
1. STEPS TO BE SHORT, FREQUENT, AND CLOSELY SPACED.
2. POOL SPACING SHALL BE INVERSELY PROPORTIONAL TO STREAM SLOPE, AND DIRECTLY PROPORTIONAL TO BANKFULL WIDTH.
3. POOL DEPTHS AT BANKFULL ELEVATION SHALL BE TYPICALLY 2 TO 3 TIMES DEEPER THAN STEP DEPTHS AT BANKFULL ELEVATION.
4. ADEQUATE NUMBER OF FOOTER BOULDERS TO BE USED IN ORDER TO HOLD UP THE BOULDERS AT HEAD OF STEPS DURING HIGH ENERGY/HIGH FLOW EVENTS.
5. STEP POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
_____	1	2	2
_____	1	2	2
_____	___	___	___
_____	___	___	___
_____	___	___	___
_____	___	___	___

ROCK CROSS VANE DETAIL FOR STEP POOLS

NOT TO SCALE

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

5/14/99

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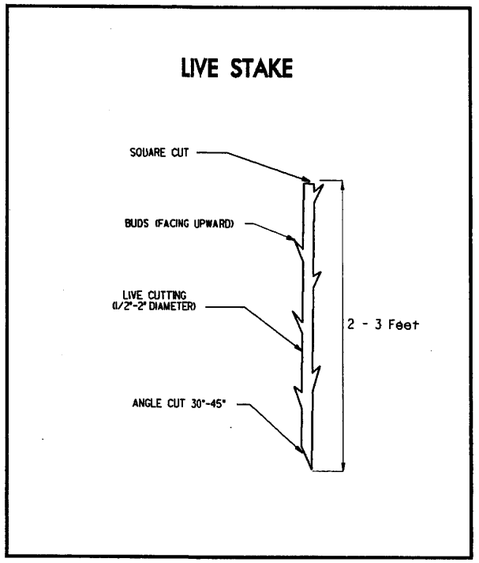
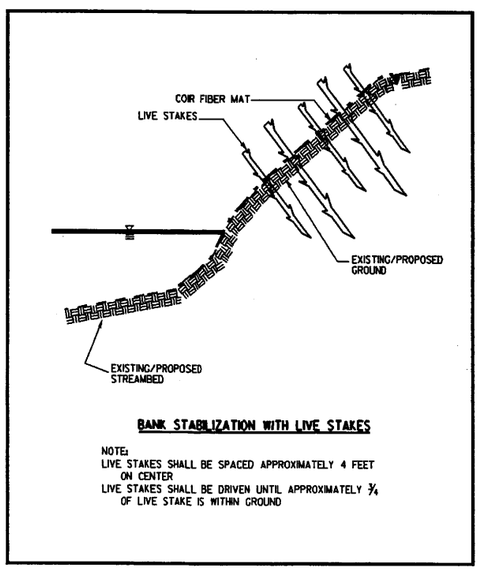
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	RF-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PLANTING DETAILS

LIVE STAKES PLANTING DETAIL

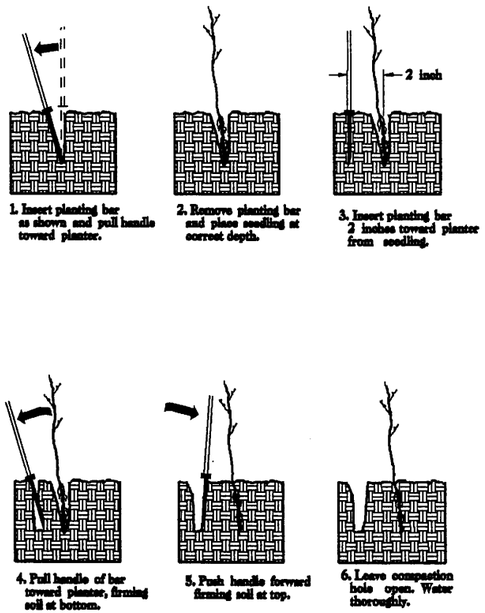




BANK STABILIZATION WITH LIVE STAKES

NOTE:
LIVE STAKES SHALL BE SPACED APPROXIMATELY 4 FEET ON CENTER
LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY ¾ OF LIVE STAKE IS WITHIN GROUND

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.

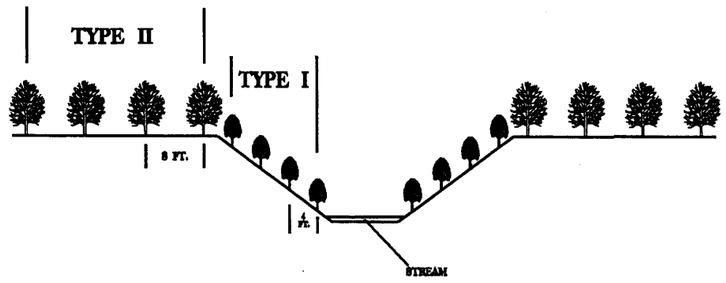
ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

☐ 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:

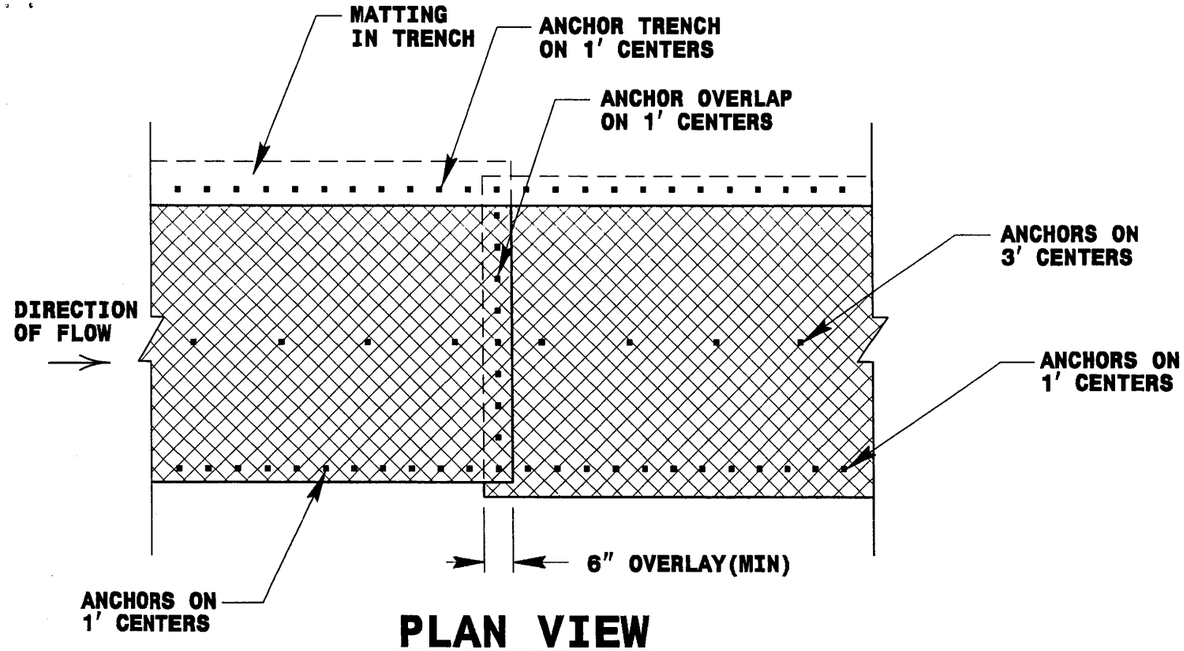
TYPE 1		
50% SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50% CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES
TYPE 2		
25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% PRUNUS SEROTINA	BLACK CHERRY	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

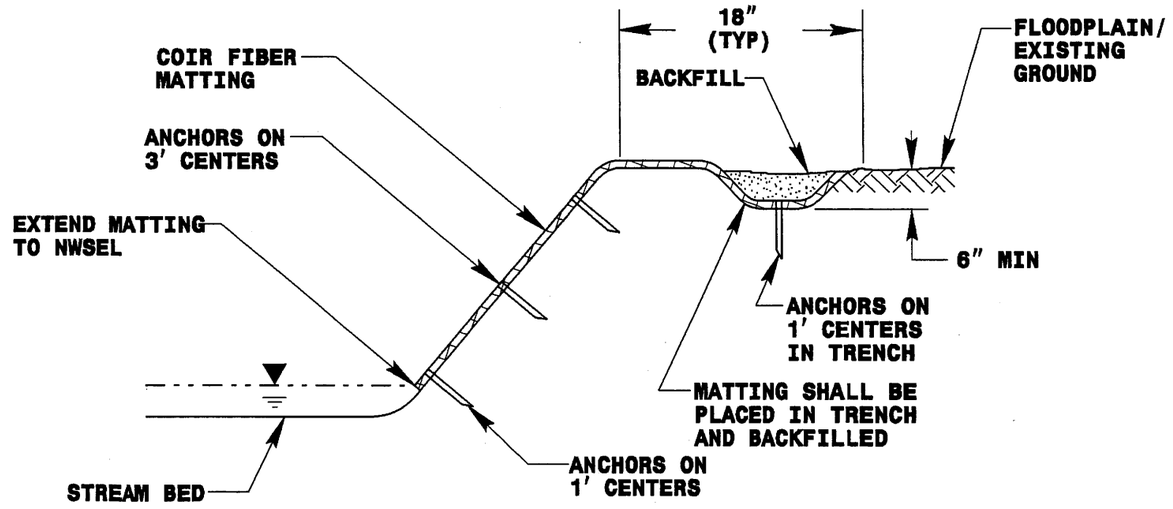
STREAMBANK REFORESTATION
DETAIL SHEET 1 OF 2

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

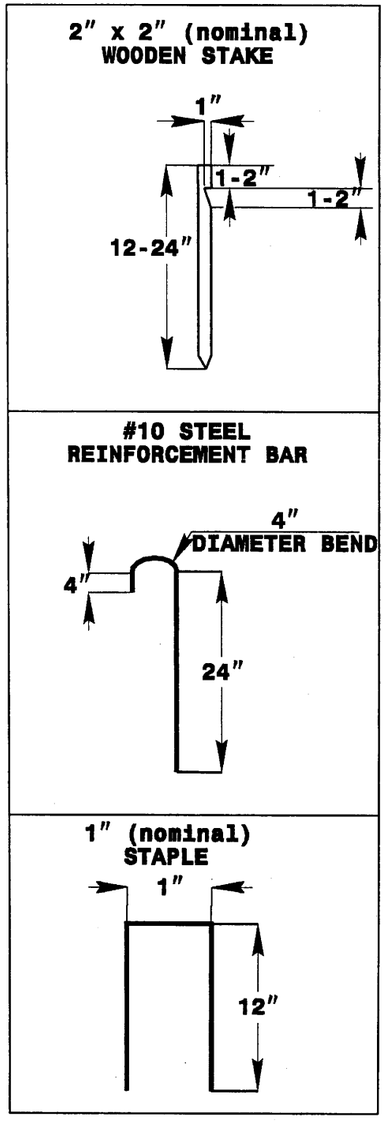
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	RF-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PLAN VIEW



TYPICAL CROSS SECTION



ANCHOR OPTIONS

COIR FIBER MATTING DETAIL

NOT TO SCALE

STREAMBANK REFORESTATION

DETAIL SHEET 2 OF 2

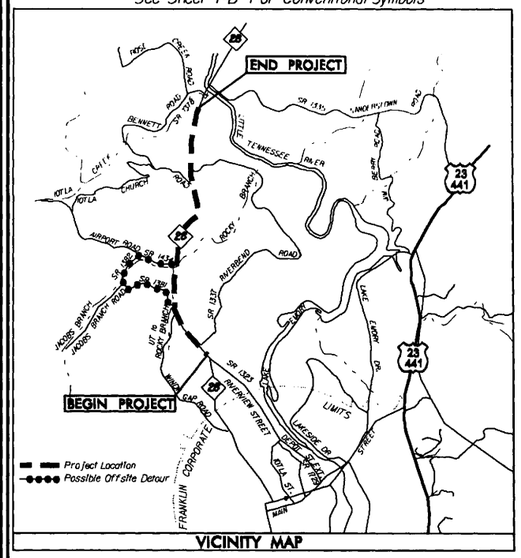
N.C.D.O.T.- ROADSIDE ENVIRONMENTAL UNIT

09/08/09

TIP PROJECT: R-2408B

CONTRACT:

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

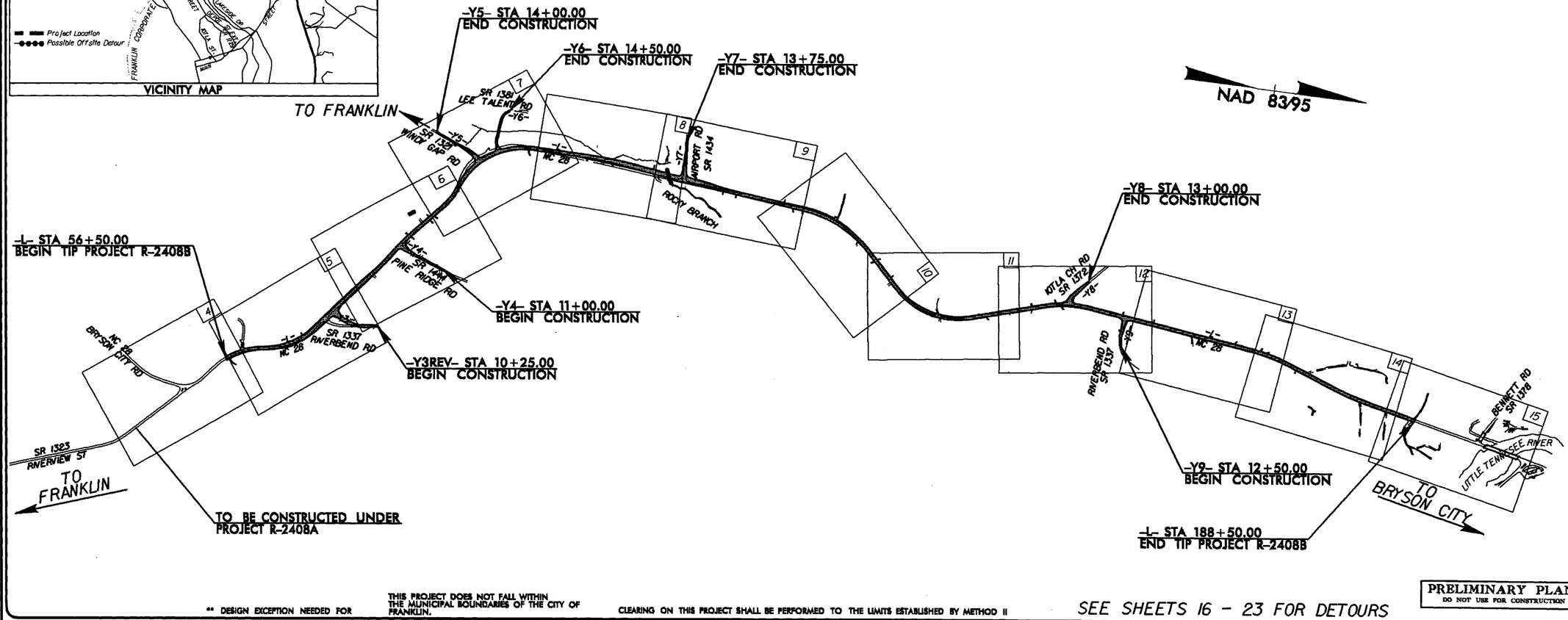
MACON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2408B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34427.1.1	STP-28 (1)	P.E.
34427.2.3	STP-0028 (4)	R/W, UTIL
		CONST.

LOCATION: NC 28 FROM NORTH OF SR 1323 (RIVERVIEW ST.) TO SOUTH OF SR 1378 (BENNETT RD.)

TYPE OF WORK: GRADING, DRAINAGE, CULVERT, WIDENING, AND PAVING



** DESIGN EXCEPTION NEEDED FOR THIS PROJECT DOES NOT FALL WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FRANKLIN.

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

SEE SHEETS 16 - 23 FOR DETOURS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 10,400
ADT 2030 = 15,300
DHV = 9%
D = 60%
T = 7% *
V_D = 50 TO 60 MPH

* TTST 2% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2408B = 2.500 MI
LENGTH STRUCTURE TIP PROJECT R-2408B = 0.000 MI
TOTAL LENGTH TIP PROJECT R-2408B = 2.500 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: NOVEMBER 28, 2007

LETTING DATE: NOVEMBER 17, 2009

JASON MOORE, PE
PROJECT ENGINEER

JEANIE TYSON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

NOV-2008 10:48
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$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — IP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Guage — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equaility Symbol
- Pavement Removal
- Paint Striping

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

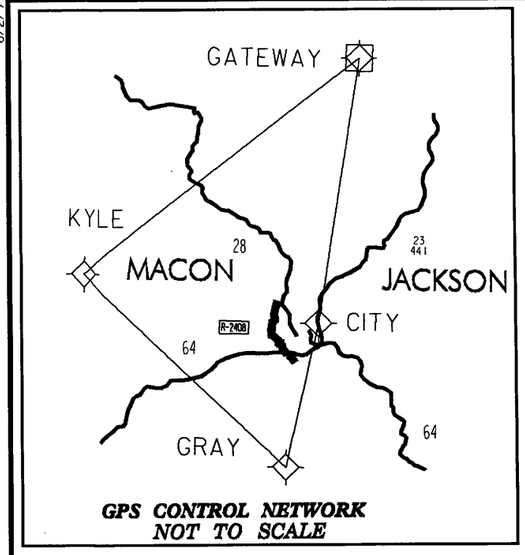
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?U/L
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

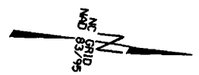
6/2/99

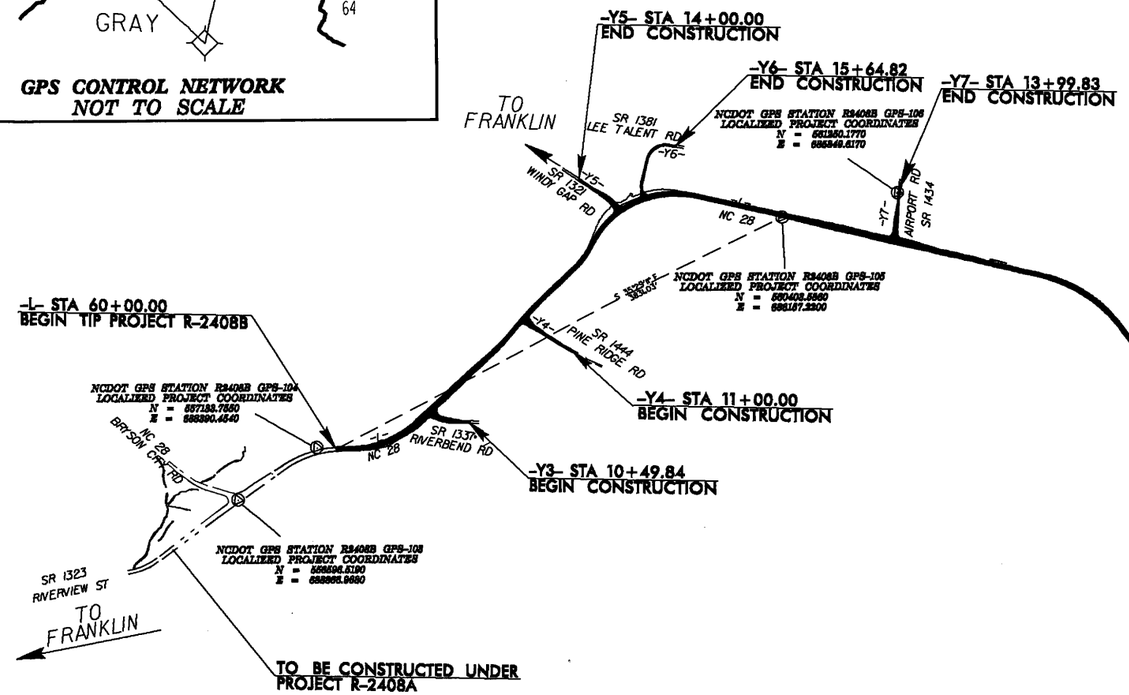
PROJECT REFERENCE NO.	SHEET NO.
34427.1.1	1C
Location and Surveys	

SURVEY CONTROL SHEET R-2408B



GPS CONTROL NETWORK
NOT TO SCALE





DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2408B GPS-105" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 560403.5860(ft) EASTING: 686157.2200(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999777456 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2408B GPS-105" TO -L- STATION 60+00.00 IS S 35°29'11" E 3831.03' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTE:

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R2408B_LS_GPSCALIB_051207.HTML
   R2408B_LS_WGS84_051207.TXT
   R2408B_LS_LOCAL_051207.TXT
   R2408B_LS_CONTROL_051207.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

△ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

NOTE: DRAWING NOT TO SCALE

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$$$$USERNAME$$$$

6/2/99

SURVEY CONTROL SHEET R-2408B

PROJECT REFERENCE NO.	SHEET NO.
34427.1.1	1D
Location and Surveys	

GPS CALIBRATION REPORT
PROJECT : R2408BSITECALIBRATIONUSE

TIP NUMBER	R2408B		
USER NAME	RMCDONALD	DATE & TIME	10:02:56 AM 12/12/2005
COORDINATE SYSTEM	US STATE PLANE (1983(91 GRD/NAD))	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM	NAVD 88	GEOID MODEL	GEOID99 NC SUB GRID
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION
LOCALIZED AROUND GE105
LATITUDE 35°13'35.26242"N
LONGITUDE 83°23'00.09376"W
SITE SCALE FACTOR 1.00002226320
HEIGHT 1995.5645FT

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED. PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS. AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS
DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION
UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN CENTER	562873.086SFT
EASTING COORDINATE OF ROTATION CENTER	685695.171SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	0.0000SFT
TRANSLATION EAST	0.0000SFT
SCALE FACTOR	0.99999983

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	567873.588SFT
EASTING COORDINATE OF ORIGIN POINT	622656.081SFT
VERTICAL SEPARATION AT ORIGIN	0.008SFT
SLOPE NORTH	0.139PPM
SLOPE EAST	-0.628PPM

GEOID MODEL DEFINITION
GEOID99 NC SUB GRID

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.045FT	0.006	KYLE_WGS84
VERTICAL	0.061FT	0.009	GPS-105 WGS84
THREE-DIMENSIONAL	0.069FT	0.011	GPS-105 WGS84

POINT RESIDUALS

WGS84 COORDINATES	CALCULATED POINT FOR DISPLAY ONLY	LOCAL COORDINATES
POINT KYLE_WGS84	NORTHING 567873.588SFT	POINT KYLE_LOCAL
LATITUDE 35°13'28.86930"N	EASTING 622656.081SFT	NORTHING 567873.588SFT
LONGITUDE 83°36'48.68780"W	ELEVATION 3211.787SFT	EASTING 622656.081SFT
HEIGHT 3179.467SFT	ROBZ ERROR 0.045FT	ELEVATION 3211.806SFT
	VERT ERROR 0.019FT	UTILIZED HORZ AND VERT
	3D ERROR 0.052FT	QUALITY SURVEY QUALITY
POINT GATEWAY_WGS84	NORTHING 636779.258SFT	POINT GATEWAY_LOCAL
LATITUDE 35°20'10.58163"N	EASTING 700524.447SFT	NORTHING 636779.258SFT
LONGITUDE 83°20'10.40803"W	ELEVATION 1867.635SFT	EASTING 700524.447SFT
HEIGHT 1770.384SFT	ROBZ ERROR 0.027FT	ELEVATION 1867.498SFT
	VERT ERROR 0.031FT	UTILIZED HORZ AND VERT
	3D ERROR 0.038FT	QUALITY SURVEY QUALITY
POINT GRAY_WGS84	NORTHING 509223.876SFT	POINT GRAY_LOCAL
LATITUDE 35°04'19.26729"N	EASTING 687693.468SFT	NORTHING 509223.867SFT
LONGITUDE 83°23'19.53405"W	ELEVATION 2089.724SFT	EASTING 687693.459SFT
HEIGHT 1476.007SFT	ROBZ ERROR 0.042FT	ELEVATION 2089.587SFT
	VERT ERROR 0.026FT	UTILIZED HORZ AND VERT
	3D ERROR 0.054FT	QUALITY SURVEY QUALITY
POINT CITY_WGS84	NORTHING 550028.431SFT	POINT CITY_LOCAL
LATITUDE 35°11'37.73808"N	EASTING 697205.692SFT	NORTHING 550028.433SFT
LONGITUDE 83°21'39.78095"W	ELEVATION 2152.172SFT	EASTING 697205.655SFT
HEIGHT 2058.621SFT	ROBZ ERROR 0.004FT	ELEVATION 2152.035SFT
	VERT ERROR 0.045FT	UTILIZED HORZ AND VERT
	3D ERROR 0.045FT	QUALITY SURVEY QUALITY
POINT GPS-101_WGS84	NORTHING 552175.480SFT	POINT GPS-101_LOCAL
LATITUDE 35°11'28.17959"N	EASTING 691483.184SFT	NORTHING 552175.480SFT
LONGITUDE 83°22'59.11935"W	ELEVATION 2004.704SFT	EASTING 691483.149SFT
HEIGHT 1910.630SFT	ROBZ ERROR 0.011FT	ELEVATION 2004.567SFT
	VERT ERROR 0.003FT	UTILIZED HORZ AND VERT
	3D ERROR 0.011FT	QUALITY SURVEY QUALITY
POINT GPS-102_WGS84	NORTHING 553561.096SFT	POINT GPS-102_LOCAL
LATITUDE 35°11'25.96853"N	EASTING 694143.672SFT	NORTHING 553561.096SFT
LONGITUDE 83°22'56.56833"W	ELEVATION 2004.672SFT	EASTING 694143.636SFT
HEIGHT 1911.102SFT	ROBZ ERROR 0.003FT	ELEVATION 2004.536SFT
	VERT ERROR 0.012FT	UTILIZED HORZ AND VERT
	3D ERROR 0.015SFT	QUALITY SURVEY QUALITY
POINT GPS-103_WGS84	NORTHING 556536.511SFT	POINT GPS-103_LOCAL
LATITUDE 35°11'08.93623"N	EASTING 688865.969SFT	NORTHING 556536.511SFT
LONGITUDE 83°23'08.24243"W	ELEVATION 2054.577SFT	EASTING 688865.934SFT
HEIGHT 1961.136SFT	ROBZ ERROR 0.006FT	ELEVATION 2054.563SFT
	VERT ERROR 0.013FT	UTILIZED HORZ AND VERT
	3D ERROR 0.016FT	QUALITY SURVEY QUALITY
POINT GPS-104_WGS84	NORTHING 557133.747SFT	POINT GPS-104_LOCAL
LATITUDE 35°10'59.93571"N	EASTING 688390.455SFT	NORTHING 557133.747SFT
LONGITUDE 83°23'01.31457"W	ELEVATION 2067.100SFT	EASTING 688390.420SFT
HEIGHT 1943.864SFT	ROBZ ERROR 0.008FT	ELEVATION 2067.100SFT
	VERT ERROR 0.015FT	UTILIZED HORZ AND VERT
	3D ERROR 0.017FT	QUALITY SURVEY QUALITY
POINT GPS-105_WGS84	NORTHING 560403.569SFT	POINT GPS-105_LOCAL
LATITUDE 35°13'35.26242"N	EASTING 686157.217SFT	NORTHING 560403.586SFT
LONGITUDE 83°24'00.08379"W	ELEVATION 2088.594SFT	EASTING 686157.220SFT
HEIGHT 1995.564SFT	ROBZ ERROR 0.017FT	ELEVATION 2088.523SFT
	VERT ERROR 0.061FT	UTILIZED HORZ AND VERT
	3D ERROR 0.063FT	QUALITY SURVEY QUALITY

POINT	GPS-106_WGS84		POINT	GPS-106_LOCAL
LATITUDE	35°12'43.45178"N	NORTHING 561250.161SFT	NORTHING	561250.161SFT
LONGITUDE	83°24'04.23847"W	EASTING 685849.617SFT	EASTING	685849.617SFT
HEIGHT	1989.387SFT	ROBZ ERROR 0.008FT	ELEVATION	2062.808SFT
		VERT ERROR 0.025SFT	UTILIZED	HORZ AND VERT
		3D ERROR 0.034SFT	QUALITY	SURVEY QUALITY
POINT	GPS-107_WGS84	NORTHING 565743.335SFT	POINT	GPS-107_LOCAL
LATITUDE	35°13'02.41134"N	EASTING 687056.256SFT	NORTHING	565743.335SFT
LONGITUDE	83°23'52.41134"W	ROBZ ERROR 0.008FT	EASTING	687056.217SFT
HEIGHT	1972.015SFT	VERT ERROR 0.025SFT	ELEVATION	2065.443SFT
		3D ERROR 0.034SFT	UTILIZED	HORZ AND VERT
			QUALITY	SURVEY QUALITY
POINT	GPS-108_WGS84	NORTHING 565919.158SFT	POINT	GPS-108_LOCAL
LATITUDE	35°12'49.38629"N	EASTING 687473.075SFT	NORTHING	565919.158SFT
LONGITUDE	83°23'40.78425"W	ROBZ ERROR 0.002FT	EASTING	687473.075SFT
HEIGHT	1969.036SFT	VERT ERROR 0.008FT	ELEVATION	2052.246SFT
		3D ERROR 0.011SFT	UTILIZED	HORZ AND VERT
			QUALITY	SURVEY QUALITY
POINT	GPS-109_WGS84	NORTHING 563426.176SFT	POINT	GPS-109_LOCAL
LATITUDE	35°12'08.95348"N	EASTING 688390.565SFT	NORTHING	563426.176SFT
LONGITUDE	83°23'18.73184"W	ROBZ ERROR 0.006SFT	EASTING	688390.530SFT
HEIGHT	1880.519SFT	VERT ERROR 0.012SFT	ELEVATION	1974.026SFT
		3D ERROR 0.014SFT	UTILIZED	HORZ AND VERT
			QUALITY	SURVEY QUALITY
POINT	GPS-110_WGS84	NORTHING 560038.810SFT	POINT	GPS-110_LOCAL
LATITUDE	35°13'01.76183"N	EASTING 688868.908SFT	NORTHING	560038.809SFT
LONGITUDE	83°23'12.08404"W	ROBZ ERROR 0.005SFT	EASTING	688868.874SFT
HEIGHT	1885.349SFT	VERT ERROR 0.016SFT	ELEVATION	1978.315SFT
		3D ERROR 0.017SFT	UTILIZED	HORZ AND VERT
			QUALITY	SURVEY QUALITY

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
8	GPS-103	556596.5190	688866.9680	2054.56	51+44.52	0.61 RT
9	GPS-104	557133.7550	688390.4540	2087.11	58+56.35	35.05 LT
10	BL-10	557703.4610	688300.1620	2114.71	64+15.70	49.12 RT
11	BL-11	557938.1680	688037.8710	2122.92	67+56.17	19.63 RT
12	BL-12	558574.7350	687235.2940	2160.84	77+79.45	19.34 RT
13	BL-13	558976.2790	686668.0290	2126.56	84+77.59	14.76 LT
14	BL-14	559180.9710	686212.2360	2116.62	89+56.97	75.72 LT
15	BL-15	559565.0590	686050.3850	2109.82	93+44.44	46.08 LT
16	BL-16	559983.6820	686080.0020	2104.02	97+53.91	24.37 LT
17	GPS-105	560403.5860	686157.2200	2088.92	101+78.93	16.14 RT
18	BL-18	561321.3070	686201.7500	2071.43	110+97.06	19.09 LT
19	BL-19	561724.3680	686283.4830	2095.12	115+05.69	27.39 RT
20	BL-20	562381.6940	686286.2650	2095.29	120+81.08	19.91 LT
21	BL-21	562933.8850	686479.4990	2085.74	127+41.40	18.84 LT
22	BL-22	563388.1120	686986.6060	2085.29	134+19.33	31.39 RT
23	BL-23	563866.8410	687251.4160	2110.91	139+54.16	38.34 RT
24	BL-24	564588.0260	687103.8640	2084.57	146+82.86	18.13 RT
25	BL-25	565118.4970	686899.6400	2075.28	152+42.12	46.30 LT
26	GPS-107	565743.2980	687056.2560	2065.44	158+73.22	60.17 RT
27	BL-27	566579.0850	687084.4840	2072.10	167+05.93	16.86 LT
28	BL-28	567435.0400	687257.0600	2086.63	175+78.53	15.21 LT
29	BL-29	567810.9190	687395.0530	2063.86	179+78.94	15.28 LT
30	BL-30	568487.6670	687572.1000	2089.92	186+81.35	14.44 LT
31	BL-31	569255.4290	687733.0330	1978.91	194+65.79	18.48 LT
32	BL-32	569776.0930	687913.3270	1975.16	OUTSIDE PROJECT LIMITS	

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
39	BL-11	557938.1680	688037.8710	2122.92	13+73.86	22.74 LT
40	BY3-40	558217.6450	688055.0490	2147.96	10+97.88	12.19 LT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
41	BL-12	558574.7350	687235.2940	2160.84	15+41.73	46.90 LT
42	BY4-42	559001.9820	687374.0950	2204.41	11+02.55	11.04 RT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
43	BY5-43	558826.7410	686050.4480	2108.52	14+58.58	9.09 RT
44	BL-14	559180.9710	686212.2360	2116.62	10+73.27	19.92 RT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
45	BY6-45	559380.8790	685785.4110	2092.43	13+77.35	13.36 LT
46	BL-14	559180.9710	686212.2360	2116.62	10+46.23	212.77 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
47	GPS-106	561250.1770	685849.6170	2062.78	13+69.48	17.07 LT
48	BY7-48	561321.3070	686201.7500	2071.43	10+14.26	36.34 RT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
49	BY8-49	565307.9780	686692.6170	2059.94	12+96.60	15.44 LT
50	BL-25	565118.4970	686899.6400	2075.28	10+37.29	43.76 LT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
51	GPS-107	565743.3360	687056.2140	2065.45	14+67.69	23.94 RT
52	GPS-108	565919.1560	687473.0750	2052.50	OUTSIDE PROJECT LIMITS	

BM4 ELEVATION = 2059.82
N 556643 E 688883
L STATION 51+67 44 RIGHT
RAILROAD SPIKE SET IN 18" OAK

BM5 ELEVATION = 2126.17
N 557898 E 688153
L STATION 66+43 63 RIGHT
RAILROAD SPIKE SET IN 20" POPLAR

BM6 ELEVATION = 2155.63
N 558420 E 687466
L STATION 75+03 23 RIGHT
NCGS "MAC-2"

BM7 ELEVATION = 2138.27
N 558847 E 686823
L STATION 82+72 24 LEFT
RAILROAD SPIKE SET IN 21" MAPLE

BM8 ELEVATION = 2105.84
N 559948 E 686072
L STATION 97+18 30 LEFT
RAILROAD SPIKE SET IN 20" POPLAR

BM9 ELEVATION = 2077.42
N 561348 E 686129
L STATION 111+17 94 LEFT
RAILROAD SPIKE SET IN 7" OAK

BM10 ELEVATION = 2093.16
N 562804 E 686392
L STATION 125+88 30 LEFT
CHISLED POINT ON ROCK WALL

BM11 ELEVATION = 2109.97
N 564040 E 687293
L STATION 141+18 70 RIGHT
RAILROAD SPIKE SET IN POWER POLE

BM12 ELEVATION = 2056.78
N 565726 E 686898
L STATION 158+36 95 LEFT
RAILROAD SPIKE SET IN 12" WALNUT

BM13 ELEVATION = 2082.64
N 567340 E 687209
L STATION 174+73 28 LEFT
RAILROAD SPIKE SET IN 8" WALNUT

BM14 ELEVATION = 2032.30
N 568324 E 687513
L STATION 185+09 38 LEFT
RAILROAD SPIKE SET IN 8" WALNUT

BM15 ELEVATION = 1976.85
N 569689 E 687865
L STATION 195+90
N 15° 34' 10.5" E DIST 328.32
CHISLED POINT ON BRIDGE HEADWALL

BM16 ELEVATION = 1970.98
N 569338 E 688320
L STATION 195+90
S 86° 23' 49.3" E DIST 544.23
RAILROAD SPIKE SET IN 15" OAK

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NOTE:

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NOTE: DRAWING NOT TO SCALE

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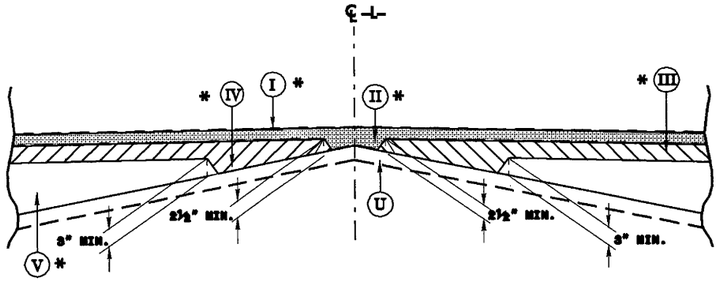
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

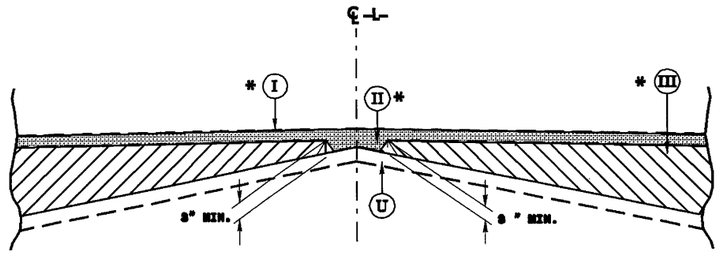
PAVEMENT SCHEDULE
(PRELIMINARY PAVEMENT SCHEDULE)

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 166 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1½" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH , TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E3	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 8½" IN DEPTH.
J	PROP. 8" AGGREGATE BASE COURSE.
R1	EXPRESSWAY GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging

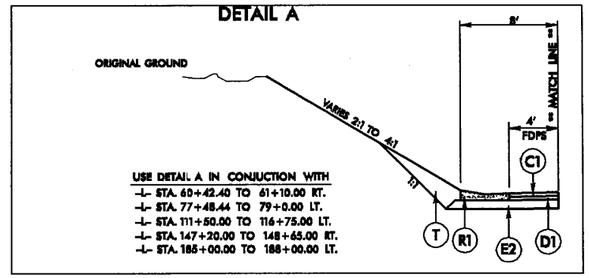


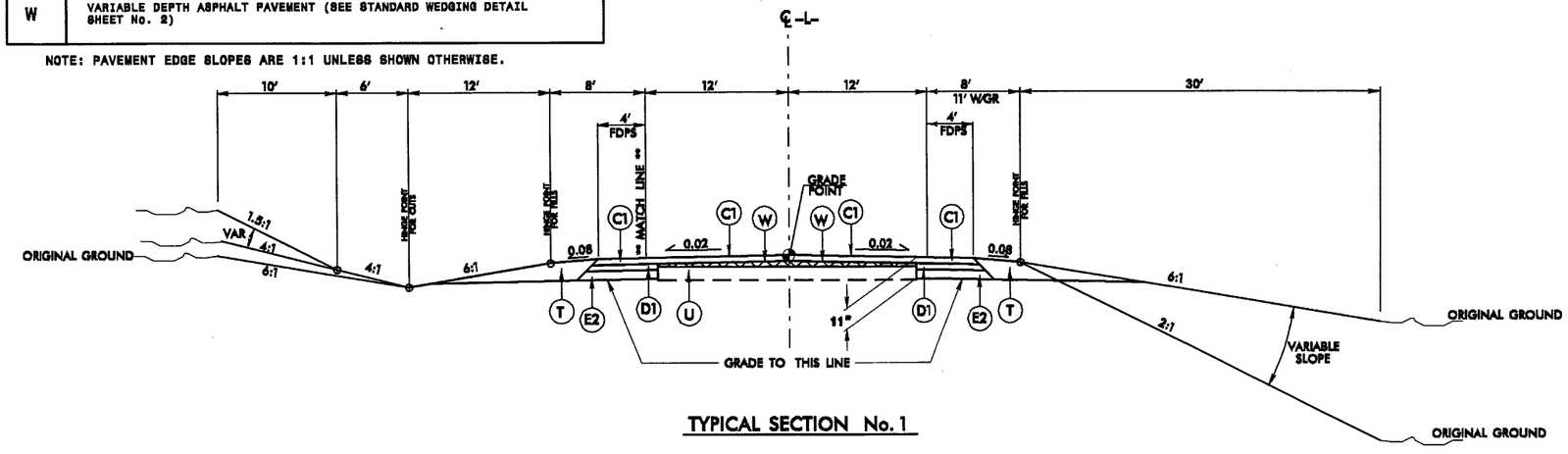
Detail Showing Method of Wedging

WEDGING CHART

	I	II	III	IV	V
TYPICAL SECTION NO. 1 -L-	C1	C4	D1	D2	E4
TYPICAL SECTION NO. 3 -Y3-	C3	C5	E4		
TYPICAL SECTION NO. 5 -Y7-	C2	C5	D1	D2	E4
TYPICAL SECTION NO. 7 -Y4-,-Y5-,-Y6-,-Y9-	C3	C5	E4		
TYPICAL SECTION NO. 8 -Y8-	C3	C5	E4		

* USE DIFFERENT PAVEMENT DESIGNS FOR THE TYPICAL SECTIONS LISTED ABOVE





TYPICAL SECTION No. 1

USE TYPICAL SECTION No. 1

-L- STA 56+50.00 TO 62+50.00
-L- STA 65+00.00 TO 73+50.00
*-L- STA 85+00.00 TO 105+50.00
-L- STA 111+50.00 TO 113+50.00
-L- STA 128+00.00 TO 134+00.00
-L- STA 146+50.00 TO 150+50.00
-L- STA 159+00.00 TO 168+50.00
-L- STA 174+50.00 TO 178+00.00
-L- STA 185+00.00 TO 188+00.00

*RESURFACING OVER -LTEMP- GRADE FROM -L- STA 87+00.00 TO 101+70.40 AND OVER -DET2REV- FROM -L- STA 101+70.40 TO 105+50.00

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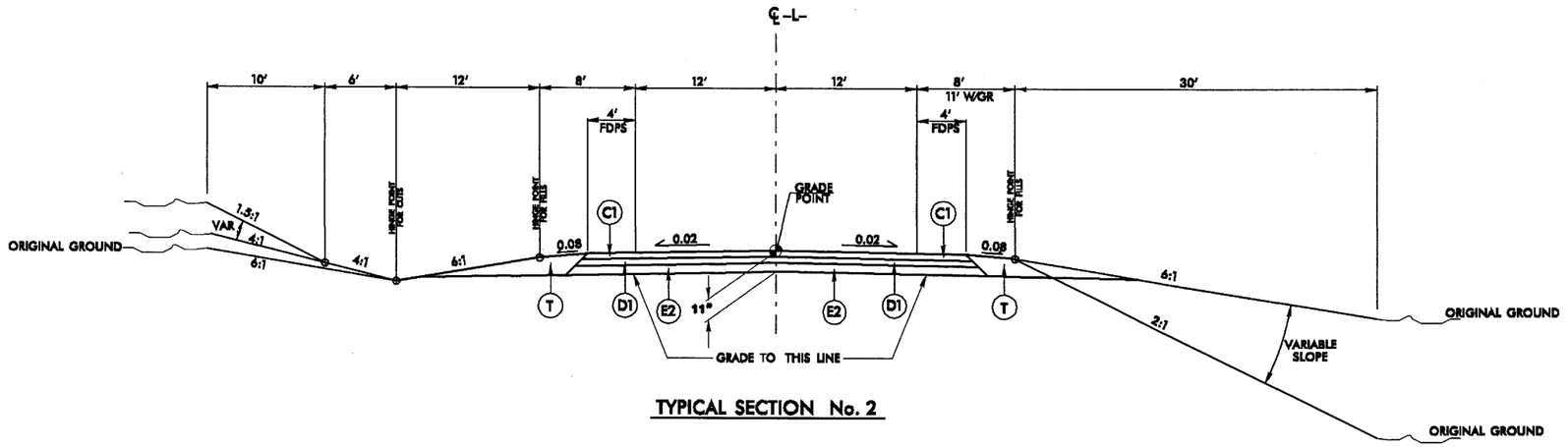
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION



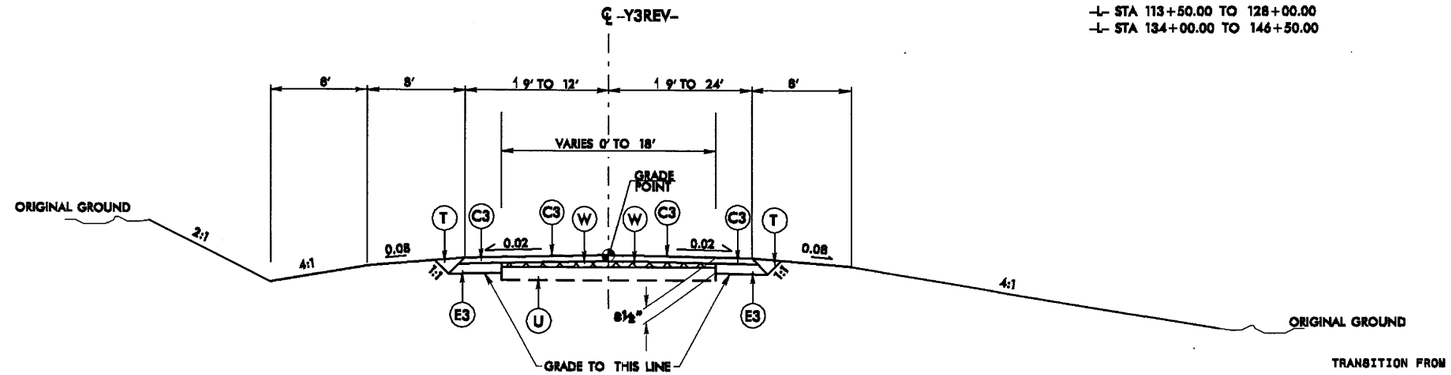
TYPICAL SECTION No. 2

USE TYPICAL SECTION No. 2

-L- STA 62+50.00 TO 65+00.00
-L- STA 73+50.00 TO 85+00.00
-L- STA 105+50.00 TO 111+50.00
-L- STA 113+50.00 TO 128+00.00
-L- STA 134+00.00 TO 146+50.00
-L- STA 150+50.00 TO 159+00.00
-L- STA 168+50.00 TO 174+50.00
-L- STA 178+00.00 TO 185+00.00

PAVEMENT SCHEDULE

C1	3" S9.5B
C3	3" SF9.5A
D1	3" I19.0B
E2	5" B25.0B
E3	5.5" B25.0B
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



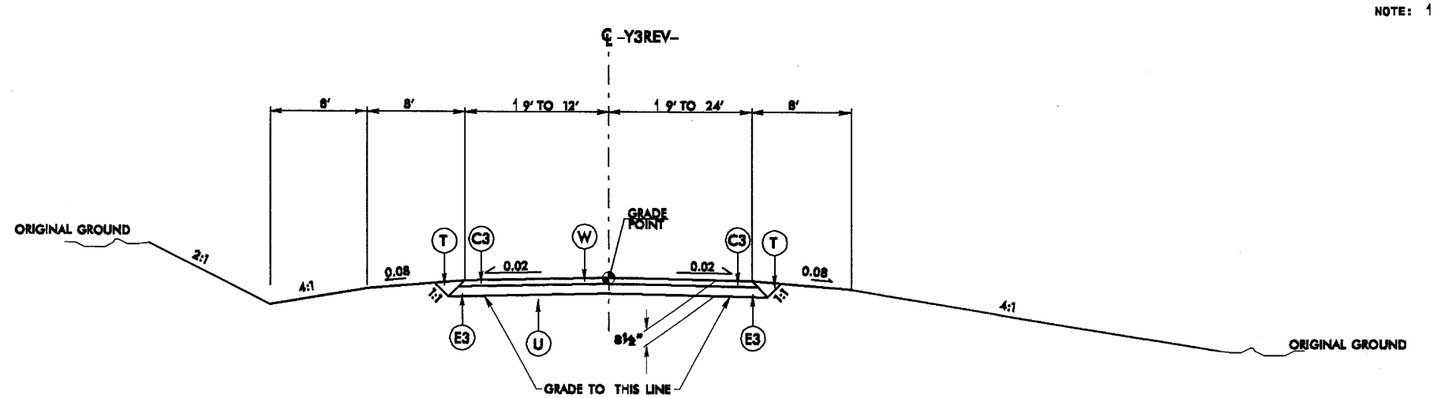
TYPICAL SECTION No. 3

TRANSITION FROM EXIST. TO TYPICAL SECTION No. 3
-Y3REV- STA 10+25.00 TO 11+25.00

USE TYPICAL SECTION No. 3

-Y3REV- STA 11+25.00 TO 12+86.00

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 4

USE TYPICAL SECTION No. 4

-Y3REV- STA 12+86.00 TO 14+05.37

NOTE: 1 SEE PLANS FOR TRANSITION

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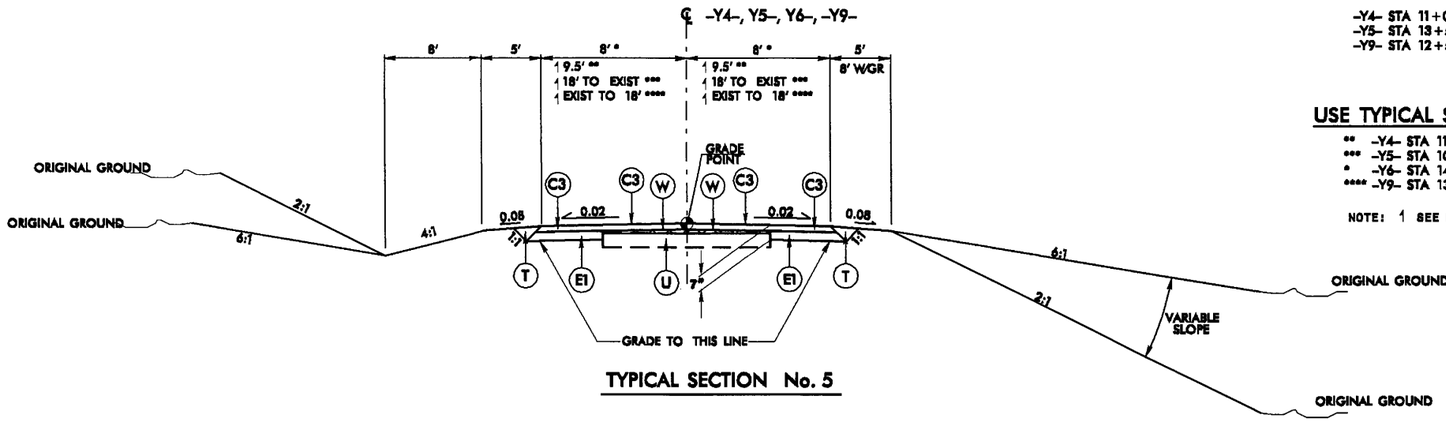
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE

C3	3" SF9.5A
E1	4.0" B25.0B
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



TYPICAL SECTION No. 5

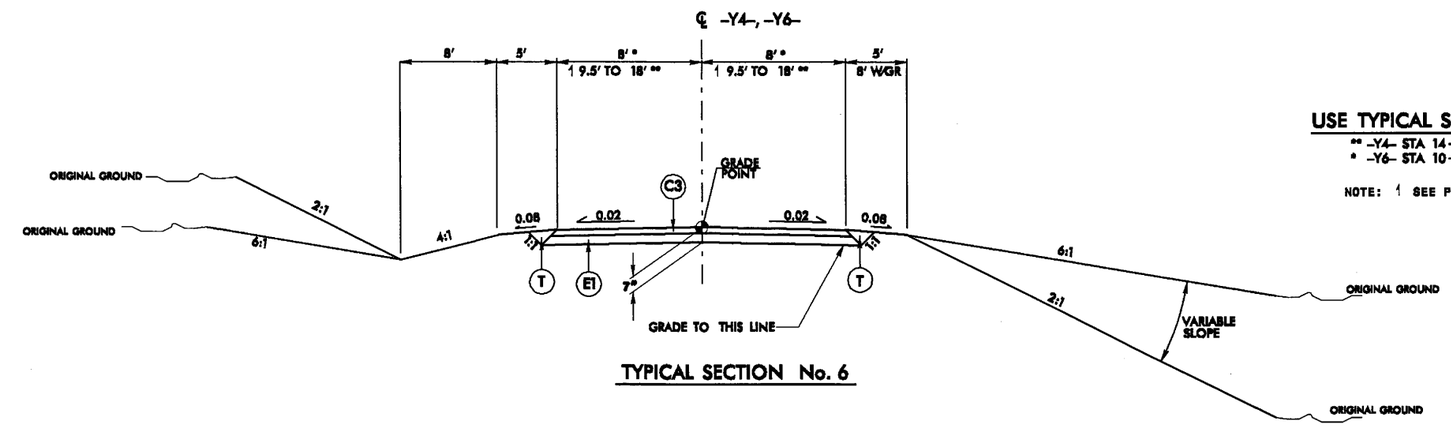
TRANSITION FROM EXIST. TO TYPICAL SECTION No. 5

-Y4- STA 11+00.00 TO 11+47.16
-Y5- STA 13+50.00 TO 14+00.00
-Y9- STA 12+50.00 TO 13+00.00

USE TYPICAL SECTION No. 5

** -Y4- STA 11+47.16 TO 14+00.00
*** -Y5- STA 10+80.74 TO 13+50.00
* -Y6- STA 14+00.00 TO 14+50.00
**** -Y9- STA 13+00.00 TO 14+53.74

NOTE: 1 SEE PLANS FOR TRANSITION

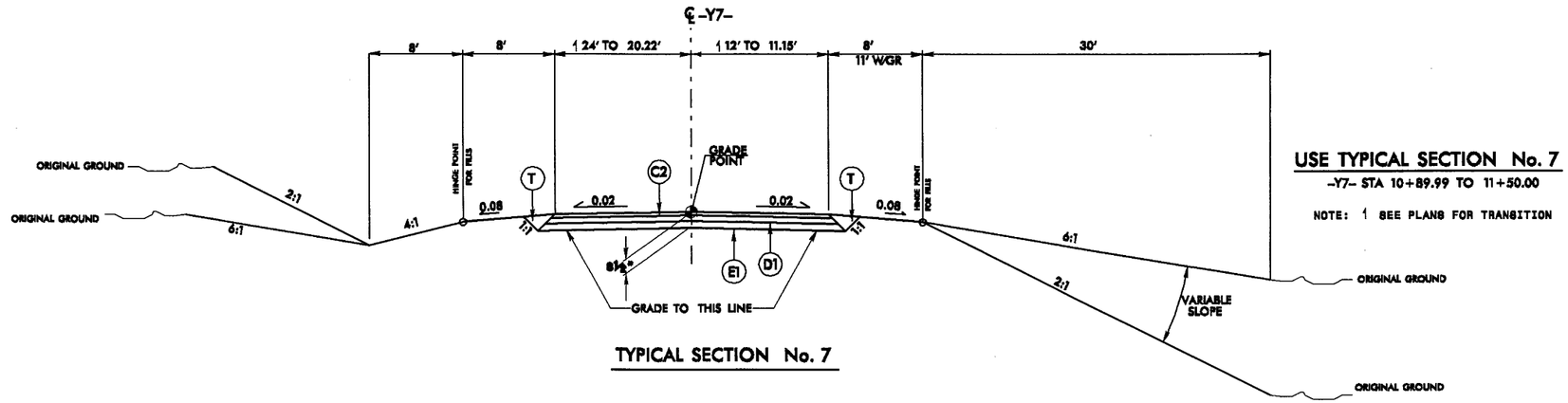


TYPICAL SECTION No. 6

USE TYPICAL SECTION No. 6

** -Y4- STA 14+00.00 TO 14+84.24
* -Y6- STA 10+62.34 TO 14+00.00

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 7

USE TYPICAL SECTION No. 7

-Y7- STA 10+89.99 TO 11+50.00

NOTE: 1 SEE PLANS FOR TRANSITION

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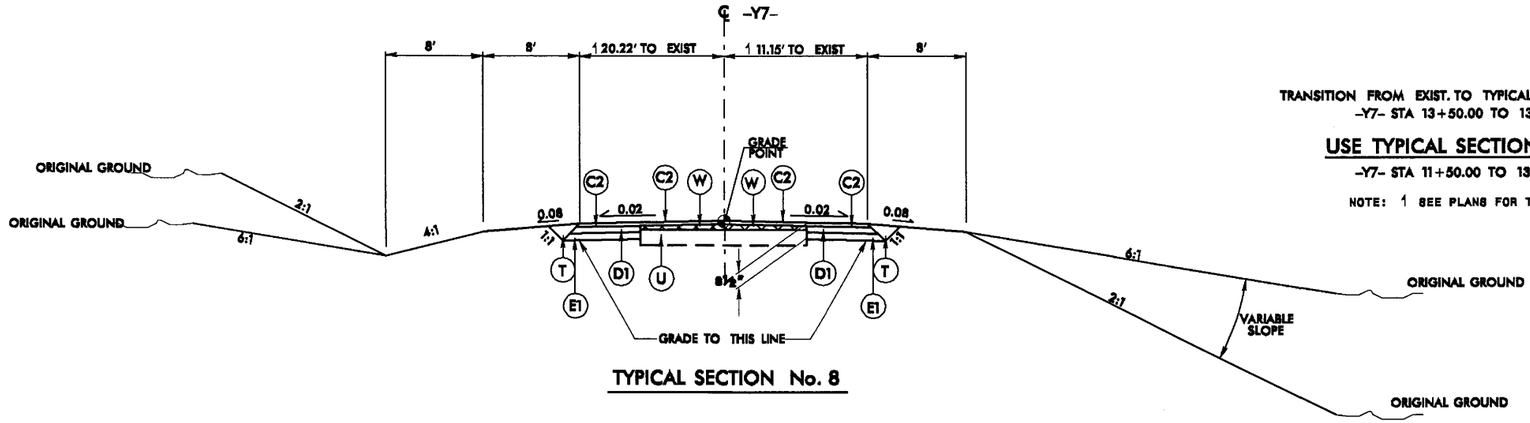
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

PAVEMENT SCHEDULE

C2	1.5" SF9.5A
C3	3" SF9.5A
D1	3.0" I19.0B
E1	4.0" B25.0B
E2	5.0" B25.0B
J	PROP. 8" ABC
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



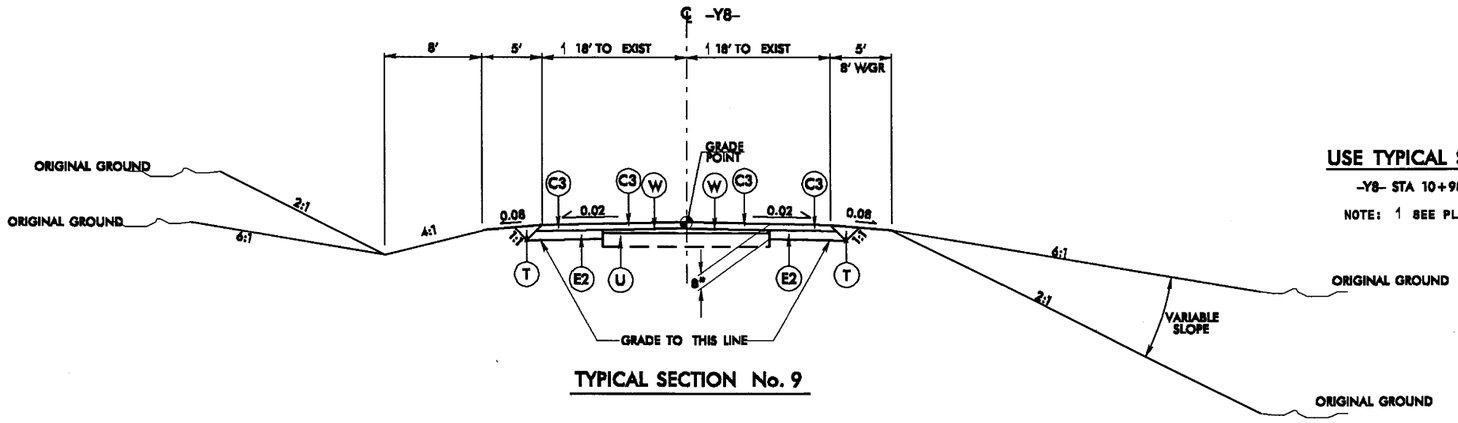
TYPICAL SECTION No. 8

TRANSITION FROM EXIST. TO TYPICAL SECTION No. 8
-Y7- STA 13+50.00 TO 13+75.00

USE TYPICAL SECTION No. 8

-Y7- STA 11+50.00 TO 13+50.00

NOTE: 1 SEE PLANS FOR TRANSITION

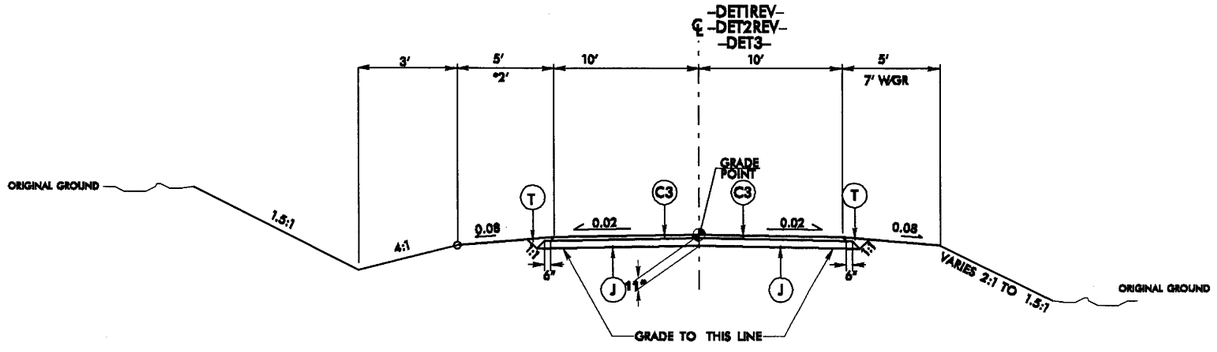


TYPICAL SECTION No. 9

USE TYPICAL SECTION No. 9

-Y8- STA 10+98.75 TO 13+00.00

NOTE: 1 SEE PLANS FOR TRANSITION



TYPICAL SECTION No. 10

USE TYPICAL SECTION No. 10

NOTE: TRANSITION FROM EXISTING TO TYPICAL SECTION No. 10
-DET1REV- STA 10+00.00 TO 11+85.00

-DET1REV- STA 11+85.00 TO 33+51.33

NOTE: TRANSITION FROM TYPICAL SECTION No. 9 TO EXISTING
-DET1REV- STA 22+88.82 TO 25+32.01

NOTE: TRANSITION FROM EXISTING TO TYPICAL SECTION No. 10
-DET1REV- STA 10+00.00 TO 11+85.00

-DET2REV- STA 14+15.46 TO 26+09.72

NOTE: TRANSITION FROM EXISTING TO TYPICAL SECTION No. 10
-DET3- STA 10+88.43 TO 14+01.00

*-DET3- STA 14+01.00 TO 28+22.50

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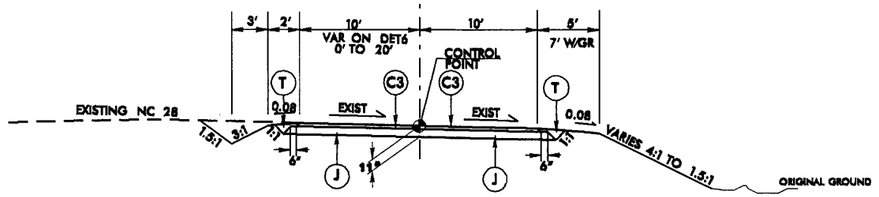
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

-DET3-
-DET6-



TYPICAL SECTION No. 11

USE TYPICAL SECTION No. 11

-DET3- STA 28+22.5 TO 58+50

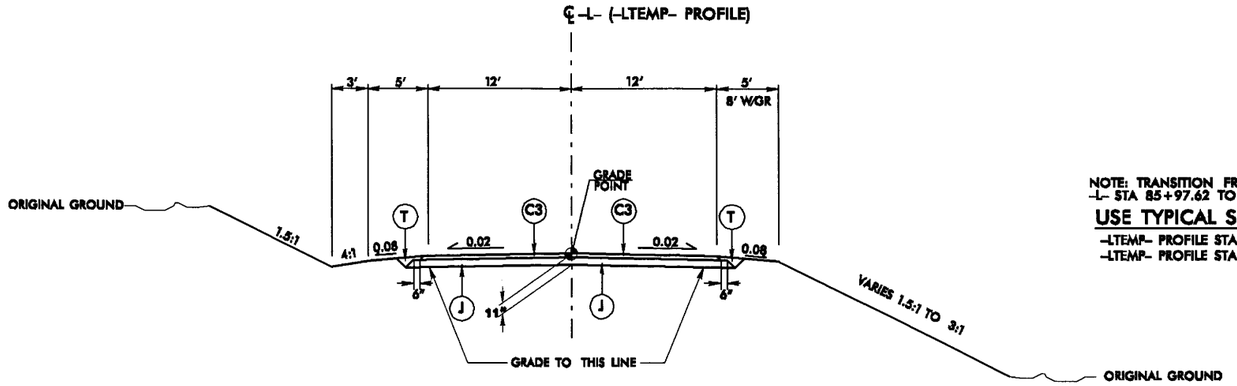
NOTE: TRANSITION FROM TYPICAL SECTION No. 10 TO EXISTING -DET3- STA 58+50 TO 61+11.08

-DET6- STA 10+00 TO 24+75.33

*NOTE: NO DITCH LEFT OF -DET6-

PAVEMENT SCHEDULE	
C2	1.5" SF9.5A
C3	3" SF9.5A
D1	3.0" I19.0B
E1	4.0" B25.0B
E2	5.0" B25.0B
J	PROP. 8" ABC
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING

℄ -L- (-LTEMP- PROFILE)



TYPICAL SECTION No. 12

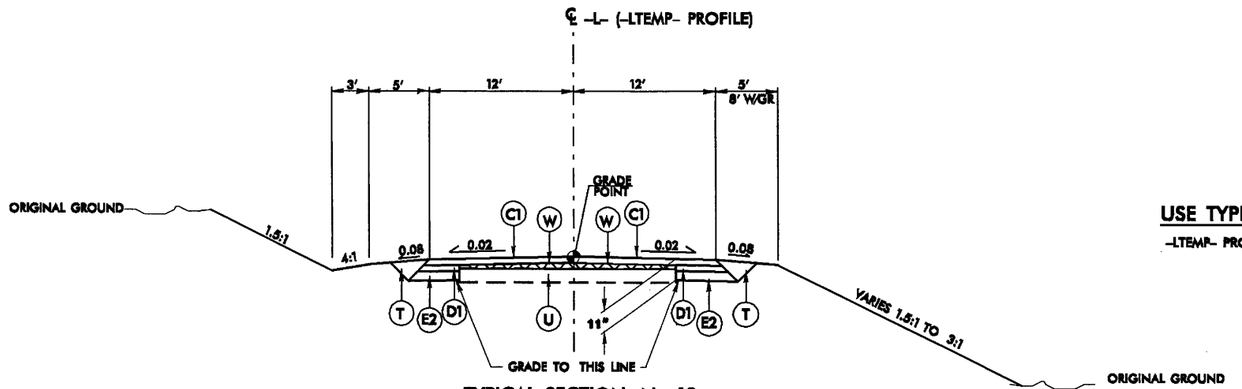
NOTE: TRANSITION FROM EXISTING TO TYPICAL No. 12 -L- STA 85+97.62 TO -LTEMP- PROFILE STA 87+00.00

USE TYPICAL SECTION No. 12

-LTEMP- PROFILE STA 87+00.00 TO 93+50.00

-LTEMP- PROFILE STA 98+00.00 TO 101+70.40

℄ -L- (-LTEMP- PROFILE)

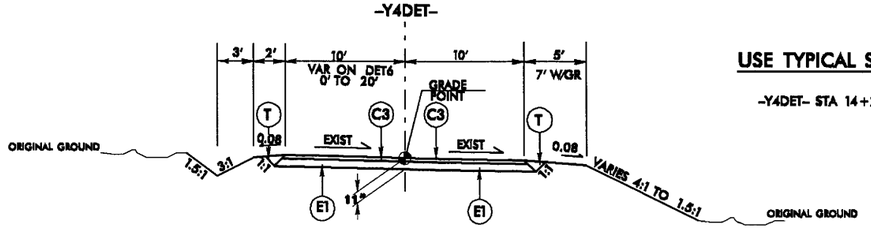


TYPICAL SECTION No. 13

USE TYPICAL SECTION No. 13

-LTEMP- PROFILE STA 93+50.00 TO 98+00.00

-Y4DET-



TYPICAL SECTION No. 14

USE TYPICAL SECTION No. 13

-Y4DET- STA 14+27.5 TO 14+89.24

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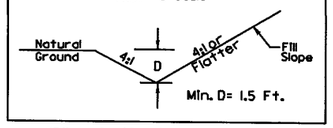
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-E
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

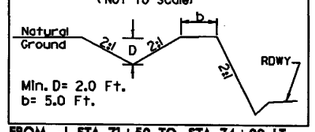
DRAINAGE DITCH DETAILS

DETAIL A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



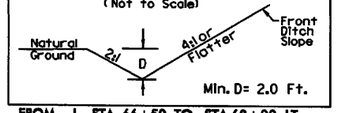
FROM -L- 69+50 TO 70+50 RT.

DETAIL B
BERM 'V' DITCH
(Not to Scale)



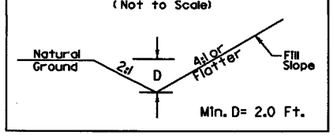
FROM -L-STA. 71+50 TO STA. 74+00 LT
FROM -L-STA. 77+00 TO STA. 77+50 LT

DETAIL C
SPECIAL CUT DITCH
(Not to Scale)



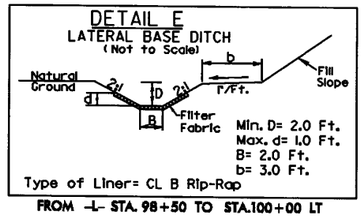
FROM -L- STA. 66+50 TO STA.68+00 LT
FROM -L- STA. 68+50 TO STA.69+50 RT
FROM -Y5- STA. 10+ 50 LT
FROM -L- STA. 157+00 TO STA. 157+50 RT
FROM -L- STA. 169+50 TO STA. 170+00 LT

DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



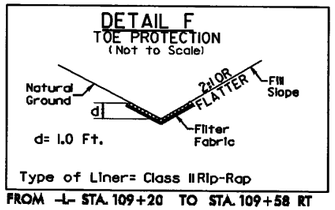
FROM -L- STA. 121+50 TO STA. 122+40 RT
FROM -L- STA. 131+50
FROM -L- STA. 144+50 TO STA. 145+50 RT
FROM -L- STA. 149+50 TO STA. 151+00 LT
FROM -L- STA. 157+50 TO STA. 158+00 RT
FROM -L- STA. 170+00 TO STA. 171+50 LT

DETAIL E
LATERAL BASE DITCH
(Not to Scale)



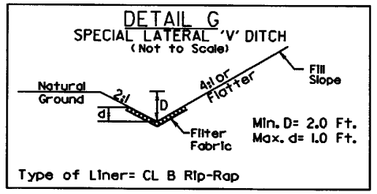
FROM -L- STA. 98+50 TO STA.100+00 LT

DETAIL F
TOE PROTECTION
(Not to Scale)



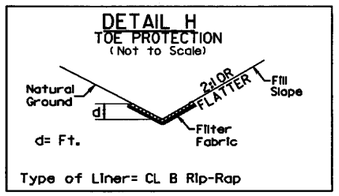
FROM -L- STA. 109+20 TO STA. 109+58 RT

DETAIL G
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



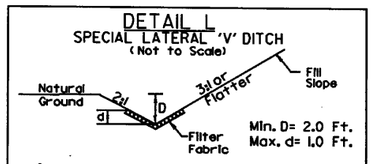
FROM -L- STA. 83+00 TO STA. 83+75 RT
FROM -L- STA. 178+50 TO STA. 179+00 LT
FROM -L- STA. 183+00 TO STA. 184+00 RT
FROM -L- STA. 184+00 TO STA. 184+50 LT

DETAIL H
TOE PROTECTION
(Not to Scale)



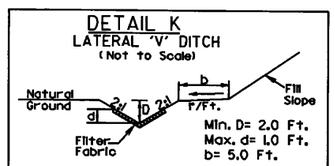
FROM -L- STA. 117+35 TO STA 120+50 RT
FROM -L- STA. 133+10 TO STA. 133+30 LT
FROM -Y9- STA. 13+00 TO STA. 13+60 LT
FROM -Y9- STA. 13+00 TO STA. 14+00 RT

DETAIL L
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



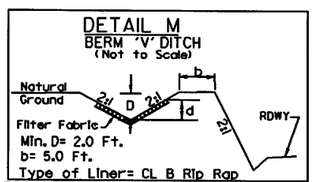
FROM -Y6- STA. 12+50 TO 13+00 LT.

DETAIL K
LATERAL 'V' DITCH
(Not to Scale)



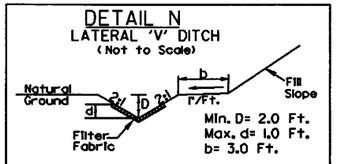
FROM -Y6- STA. 12+00 TO STA. 12+50 LT

DETAIL M
BERM 'V' DITCH
(Not to Scale)



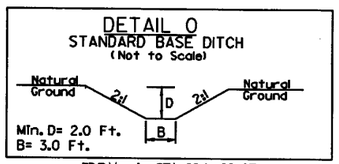
FROM -L- STA. 88+00 TO STA. 89+50 RT
FROM -L- STA. 93+50 TO STA. 97+50 RT
FROM -L- STA. 111+50 TO STA. 112+50 LT

DETAIL N
LATERAL 'V' DITCH
(Not to Scale)



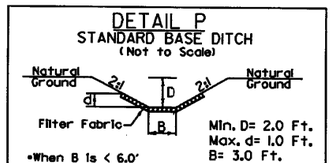
FROM -L- STA.108+00 TO STA. 108+50 LT
FROM -L- STA. 109+00 TO STA. 110+00 LT
FROM -Y7- STA. 10+70 TO STA. 11+15 LT

DETAIL O
STANDARD BASE DITCH
(Not to Scale)



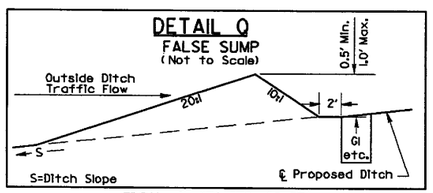
FROM -L- STA. 124+10 LT

DETAIL P
STANDARD BASE DITCH
(Not to Scale)



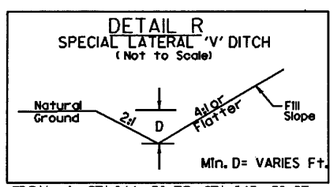
-L- STA. 124+10 RT

DETAIL Q
FALSE SUMP
(Not to Scale)



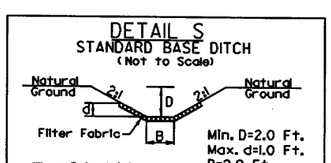
FROM -L- STA. 179+00 RT

DETAIL R
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



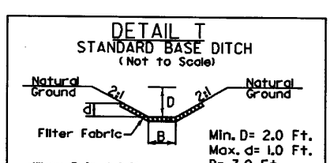
FROM -L- STA.144+50 TO STA. 145+50 RT

DETAIL S
STANDARD BASE DITCH
(Not to Scale)



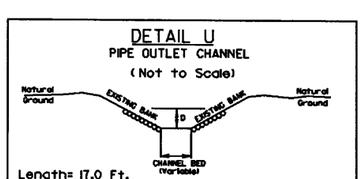
FROM -L- STA. 178+00 TO STA. 178+25 RT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)



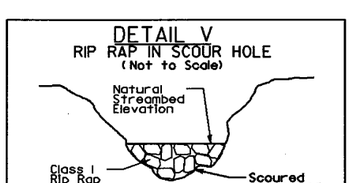
LEFT OF -L- STA. 100+00

DETAIL U
PIPE OUTLET CHANNEL
(Not to Scale)

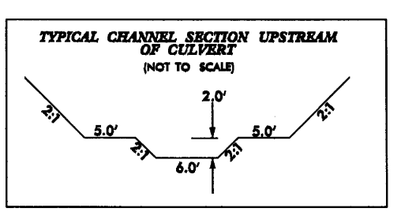


-Y5- STA. 12+00 RT.
-Y6- STA. 12+15 RT.

DETAIL V
RIP RAP IN SCOUR HOLE
(Not to Scale)



TYPICAL CHANNEL SECTION UPSTREAM OF CULVERT
(NOT TO SCALE)



-L- STA.108+50 LT
NOTE: EXISTING 6' x 6' RCBC TO BE REMOVED

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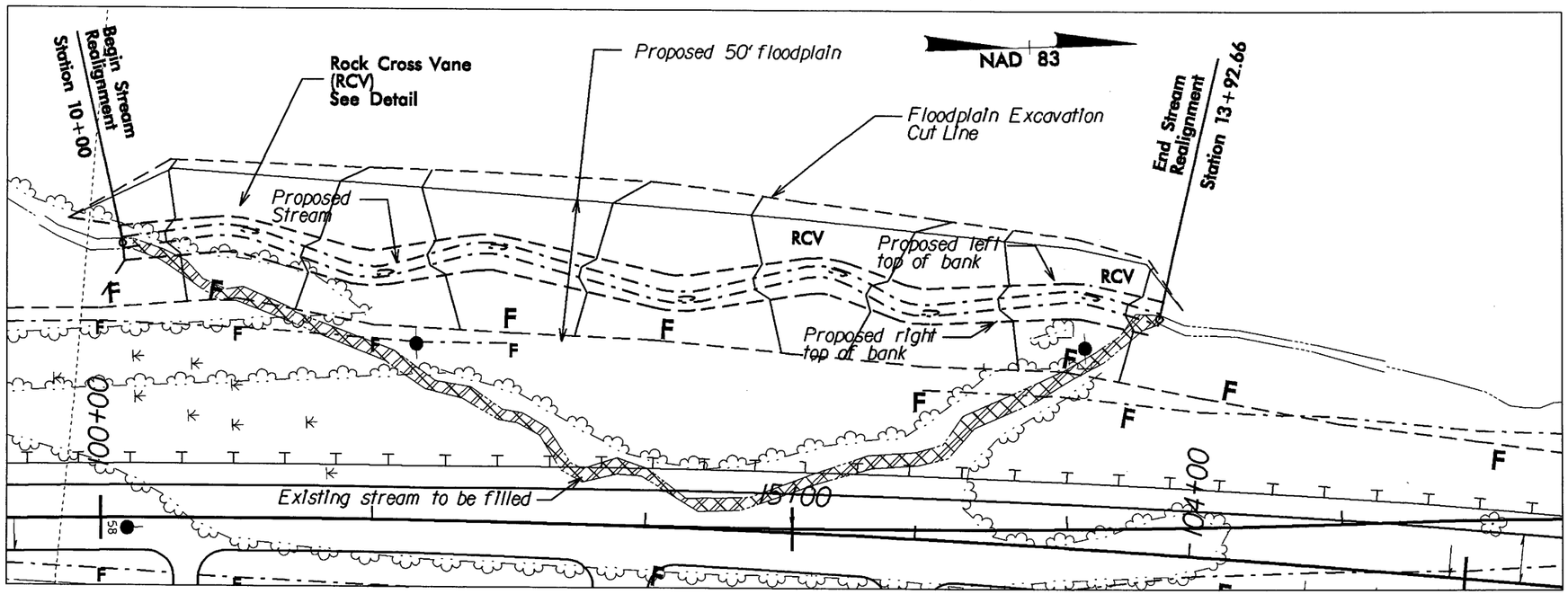
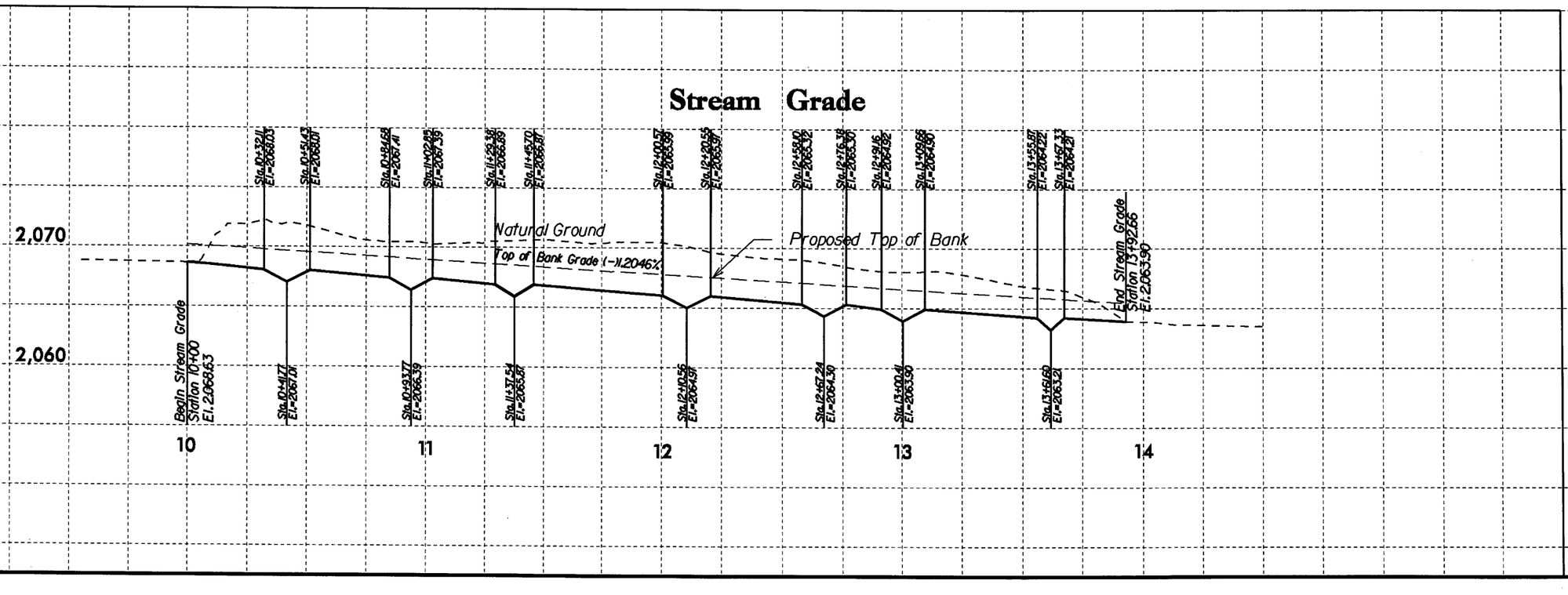
Stream Relocation –L– 100+00 to 104+00 Left





PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-F
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

8/17/98

REVISIONS

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5/14/99

Stream Details

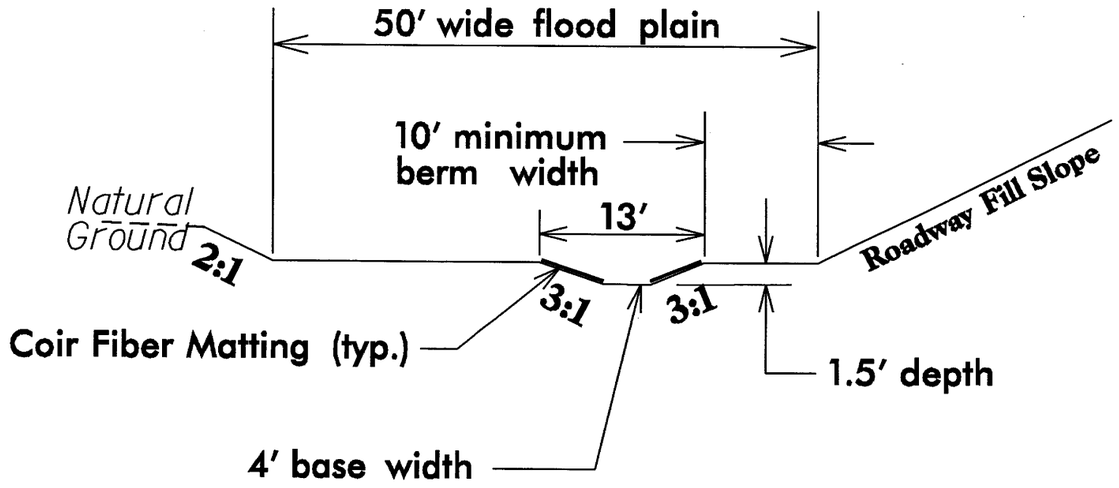
NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

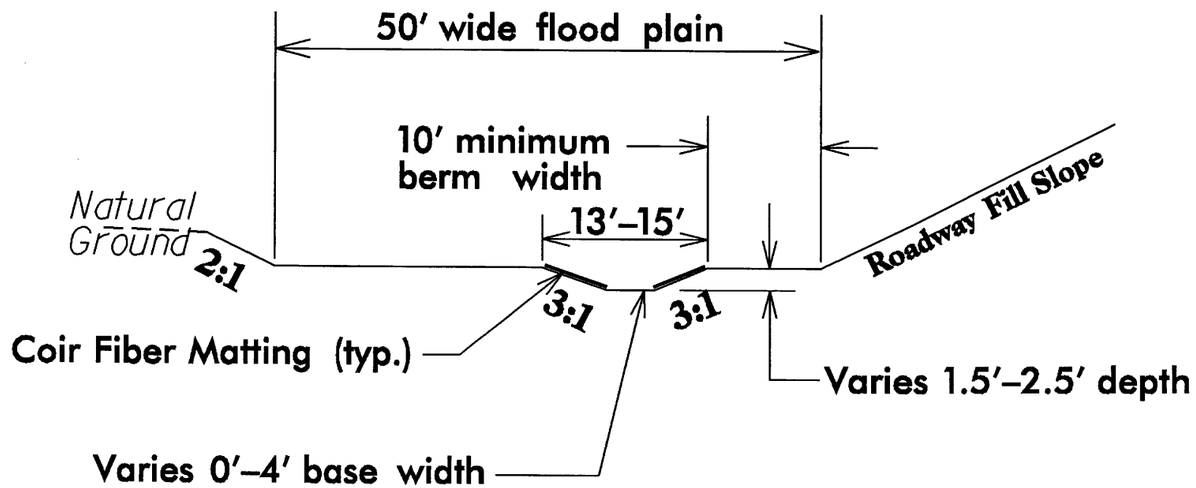
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Typical Stream Dimensions



Typical Stream Section with Pool



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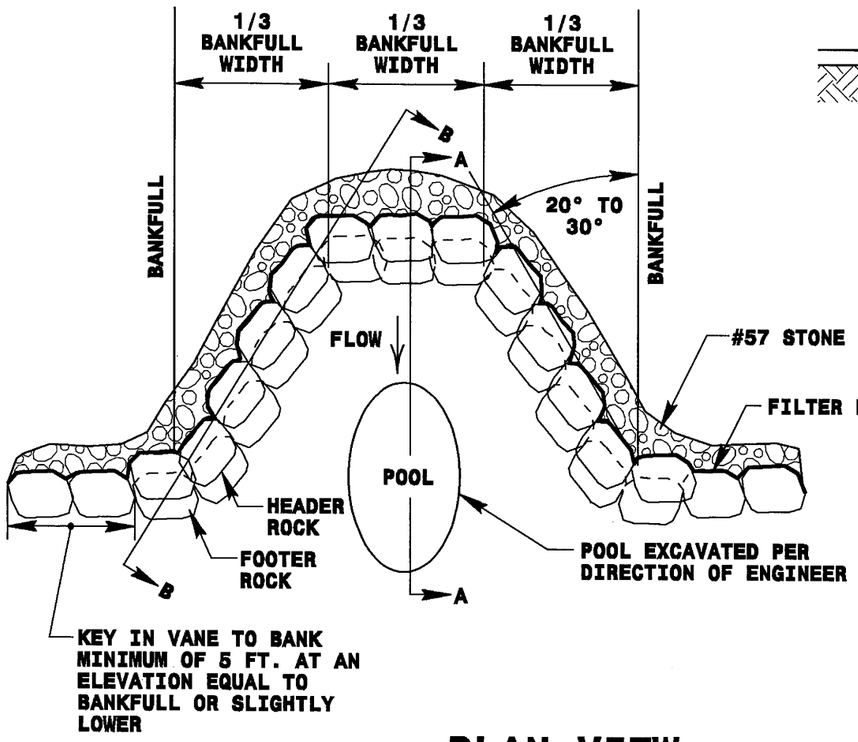
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

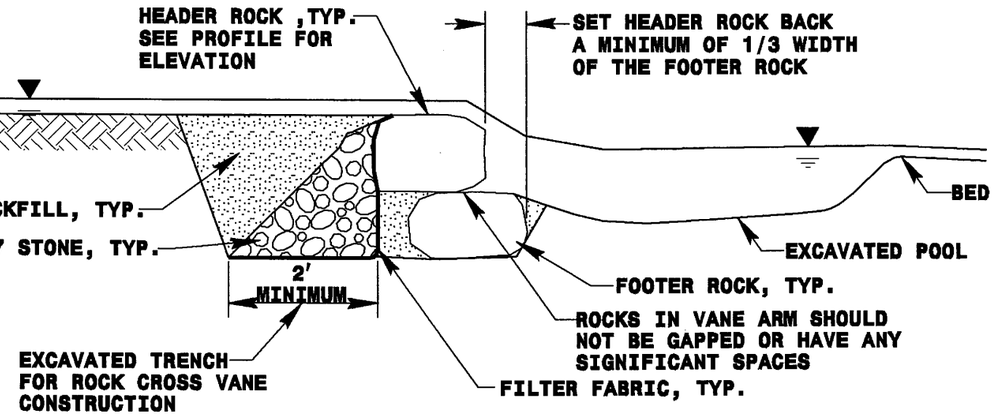
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

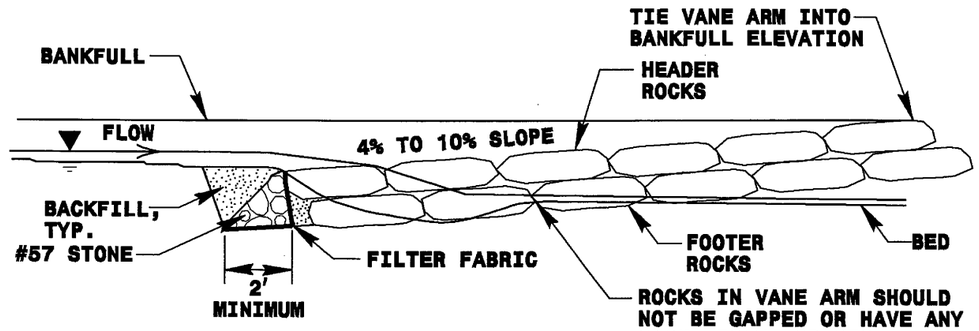


PLAN VIEW

	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
-L-100+40	1	4	2
-L-102+55	1	4	2
-L-103+48	1	4	2



SECTION A-A



SECTION B-B

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

2007 ADT			
2030 ADT		6,000 / 10,000	
		NC 28	
	600 / 2,200		5,400 / 7,800
5,600 / 9,700	SR 1323	NC 28	10,400 / 15,300

-L-
PI Sta 58+09.32
Δ = 34° 28' 15.7" (RT)
D = 7° 09' 43.5"
L = 481.31'
T = 248.18'
R = 800.00'
e = .06
RO = 138'
Vd = 45mph

NAD 83/95

MATCHLINE TO SHEET 5
-L- STA. 57+00.00

-L- POC 56+50.00
END PROJECT R-2408A
BEGIN PROJECT R-2408B

-L- PCSta. 55+61.13

-BL- B
-L- STA 51+44.52
.612 RT

BM = 4
-BL- STA. 49+92.61
42.45 RT.
ELEV. = 2059.820

-L- POTSta. 49+95.47

TIE PROP SS TO EXIST

TIE PROP SS TO EXIST

MELANIE C. DOWNS
DB I-24 PG 1691
PB 1/291 PG 4

LOUISE M. ARVEY
DB R-8 PG 349

MILDRED D. CARPENTER
D.B. Y-4 PG. 21

MARK ROBERT NOWICKI
DB Y-21 PG 1754

MARK ROBERT NOWICKI
DB E-24 PG 150

THEODORE TALLENT
DB N-6 PG 439

KHANS OF FRANKLIN, INC.
DB S-24 PG 1966

JAMES L. KINSLAND
DB G-24 PG 1649

TABITHY S. CONNER
DB H-16 PG 60

NORMAN WEST
DB Z-5 PG 109

CHARLES D. BALDWIN
DB Y-4 PG 203

JAMES L. KINSLAND
DB U-18 PG 159

TO BE CONSTRUCTED UNDER
PROJECT R-2408A

PROJECT R-2408A

SEE SHEET 24 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-Y3REV-
PI Sta 58+09.32	PI Sta 63+96.87	PI Sta 13+24.68
Δ = 34° 28' 15.7" (RT)	Δ= 41° 16' 56.0" (LT)	Δ = 46° 23' 47.1" (RT)
D = 7° 09' 43.1"	D = 7° 32' 20.1"	D = 16° 22' 12.8"
L = 481.31'	L = 547.59'	L = 283.42'
T = 248.18'	T = 286.29'	T = 150.00'
R = 800.00'	R = 760.00'	R = 350.00'
e = .06	e = .06	e = .02
RO = 1.38'	RO = 1.38'	RO = SEE PLANS
Vd = 45mph	Vd = 45mph	

	NC 28	
10,400		8,600
15,300		13,200
2,000		200
2,900		800
SR 1337 (PINEBRAE RD.)		
2,200		
3,700		
2007 ADT		
2030 ADT		

REVISIONS
8/28/08 ELIMINATED PARCEL 32-Z CHANGED PARCEL 33-Z TO PARCEL 39 AND CHANGED PARCEL 29-Z TO PARCEL 38.
DESIGN REVISION ON -Y3REV- AND ADDED PARCELS 42A & 44A. NAME CHANGES ON PARCELS 41 & 42. JBM

5/14/99

MATCHLINE TO SHEET 4 -L- STA. 57+00.00

MATCHLINE TO SHEET 6 -L- STA. 71+50.00

NAD 83'95

MARK ROBERT NOWICKI DB Y-21 PG 1754

-BY2- 37
-L- STA 59+07.87
281.02 LT

-BL- 9
-L- STA 58+56.35
35.05 LT
-BY2-38

EASEMENT ACQUIRED UNDER R-2408A

CL 'I' RIP RAP EST. 21 TONS 47 S.Y. PP SEE DETAIL 'I'

GUY O. DUVALL DB N-24 PG 541

UT to Little Tennessee River

EASEMENT ACQUIRED UNDER R-2408A

RIGHT OF WAY ACQUIRED UNDER R-2408A

MARK ROBERT NOWICKI DB Y-21 PG 1754

RIGHT OF WAY ACQUIRED UNDER R-2408A

BEGIN EXPRESSWAY GUTTER -L- STA 58+00.00 RT
END EXPRESSWAY GUTTER -L- STA 60+00.00 RT

EASEMENT ACQUIRED UNDER R-2408A

EVELYN GREER DB P-12 PG 132

-L- PT Sta. 60+42.44

-L- PCSta. 61+10.58

-L- PTSta. 66+58.17

JULIA MOODY BRITT DB Z-28 PG 720

JULIA MOODY BRITT DB Z-28 PG 720

-BL- 10
-L- STA 64+15.69
49.11 RT

BM = 5
BL- STA. 65+02.65
46.58 RT.
ELEV. = 2126.17

-BL- 11
-L- STA 67+56.17
19.63 RT
-BY3- 39

SEE DETAIL C SPECIAL CUT DITCH -L- STA 66+50 - 68+00 LT

-Y3REV- PT Sta. 14+58.10

RETAIN EXISTING R/W

SUSAN SANDERS DB H-30 PG 1826

LAURA M KNIGHT DB J-27 PG 1539

DO NOT DISTURB TELEPHONE PEDESTAL & POLE

-BY3- 40
-Y3REV- STA 12+72.78
29.39 LT

-Y3REV- PC Sta. 11+74.68

MARJORIE MOODY MENEFEE DB Z-28 PG 716

-L- POTSta. 69+00.00
-Y3REV- POTSta. 15+11.30

SEE DETAIL A SPECIAL LATERAL 'V' DITCH -L- STA 69+50 - 70+50 RT

-DETIREV- POT Sta. 10+00.00
-L- POT Sta. 70+85.00

CHARLES MOODY JR DB H-29 PG 344 DB Z-28 PG 718

G-SQUARED LLC DB H-30 PG 1420

CEBRAS, ANGEL 04 DB H-25 PG 1006

-Y3REV- 10+25.00
BEGIN CONSTRUCTION

CHARLES D. BALDWIN DB Y-8 PG 203

— — — SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— · — · - SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

SEE SHEET 24 FOR -L- PROFILE
SEE SHEET 30 FOR -Y3- PROFILE
SEE SHEET 16 FOR -DETIREV- PLANVIEW
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

REVISIONS
8/28/08 REVISED TOPO AND CONSTRUCTION EASEMENT ON PARCEL 48, NAME CHANGES ON PARCELS 48,51,& 52.JBM

-L-

P1 Sta 75+43.74	P1 Sta 78+80.49
Δ= 6° 43' 28.8" (LT)	Δ= 6° 34' 18.4" (RT)
D = 2° 29' 28.0'	D = 2° 29' 28.0'
L = 269.95'	L = 263.81'
T = 135.13'	T = 132.05'
R = 2,300.00'	R = 2,300.00'
e = .04	e = .04
RO = 96'	Ro = 96'
Vdes = 50mph	Vdes = 50mph

8,600 / 13,200 — NC 28 — 8,400 / 13,000
200 / 300 — 100 / 100
SR 1444 (PINE RIDGE RD.) — 200 / 400
2007 ADT
2030 ADT

NAD 83/95

MATCHLINE TO SHEET 5
-L- STA. 71+50.00

MATCHLINE TO SHEET 7
-L- STA. 83+00.00

-BL- 12
-L- STA 77+19.46
19.34 RT
-BY4- 41

BEGIN EXPRESSWAY GUTTER
-L- STA 77+48.44 LT
END EXPRESSWAY GUTTER
-L- STA 79+00.00

BEGIN SBG
-L- STA 82+71 LT
-L- STA 84+00 LT

-L- PTSta. 80+12.25

-L- POCSta. 78+26.76=
-Y4- POTSta. 15+61.55

-L- PCSta. 77+48.44
-L- PTSta. 76+78.56

-L- PCSta. 74+08.62

-DETIREV- PRC Sta. 10+79.40

-DETIREV- PT Sta. 15+76.52

-DETIREV- PC Sta. 16+55.30

-Y4- PCSta. 14+00.99

-Y4DET- POT Sta. 15+27.37=
-DETIREV- POC Sta. 17+75.00

-Y4DET- PT Sta. 15+16.70

-DETIREV- PT Sta. 19+42.05

-Y4- PTSta. 15+08.51

-Y4DET- PC Sta. 14+45.35

-Y4DET- PT Sta. 14+35.35

-Y4DET- PRC Sta. 13+51.10

-Y4DET- PC Sta. 12+23.80=
-Y4- POT Sta. 12+23.80

-BY4- 42
-Y4- STA 11+02.55
11.04 RT

-Y4- POTSta. 11+00.00
BEGIN CONSTRUCTION

-Y4-

P1 Sta 14+54.96
Δ = 12° 19' 12.6" (RT)
D = 11° 27' 33.0"
L = 107.51'
T = 53.96'
R = 500.00'

-Y4- POTSta. 10+00.00

BM # 6
-BL- STA. 73+63.17
21.90 RT.
RETAIN ELEV. = 2155.63

BM # 7
-BL- STA. 81+33.29
15.77 RT.
ELEV. = 2138.27

CHARLES H. MCCALL
DB J-13 PG 47
45

SHARON B. COOK
DB B-20 PG 2281
50

MOUNTAIN MIST PROPERTY, LLC
DB J-30 PG 1195
PLAT CARD 5658

MOUNTAIN MIST PROPERTY, LLC
DB J-30 PG 1195
PLAT CARD 5658
51

MARJORIE MOODY MENEFEE
DB Z-28 PG 116
43

CHARLES MOODY JR
DB H-29 PG 344
DB Z-28 PG 118
44

C-SQUARED, LLC
DB M-30 PG 1420
44A

CHURCH OF JESUS CHRIST LATTER DAY SAINTS
DB E-15 PG 15
46

WILLIAM H. WALDROOP
DB L-8
PG 207
47

JANET SHULER
DB K-29 PG 1884
48

MARY WILSON
DB A-20 PG 2088
49

ROBERT JEFFREY PRUETT
DB Z-19 PG 2224

RALPH J ALLEN
DB 829 PG 809
52

GARY TALLENT
DB 0-22 PG 2316

SEE DETAIL B
BERM DITCH
-L- STA 77+00 - 77+50 LT

SEE DETAIL B
BERM DITCH
-L- STA 71+50 - 74+00 LT

UNIFORM TRANSITION 300'
100' TAPER

REMOVE 15" CMP
REMOVE 18" CMP
REMOVE 24" CMP
REMOVE 30" CMP
REMOVE 36" CMP
REMOVE 2GI, A 24"
REMOVE 2GI, A 30"
REMOVE 3GI, A 36"
REMOVE 4GI, A 36"
REMOVE 5'x3' CONC BOX CULVERT
REMOVE 6'x3' CONC BOX CULVERT
REMOVE 8'x3' CONC BOX CULVERT
REMOVE CL 'B' RIP RAP EST. 1 TON 5 S.Y. PP
REMOVE 10' CMP
REMOVE 12' CMP
REMOVE 15' CMP
REMOVE 18' CMP
REMOVE 24' CMP
REMOVE 30' CMP
REMOVE 36' CMP
REMOVE 2GI, A 24"
REMOVE 2GI, A 30"
REMOVE 3GI, A 36"
REMOVE 4GI, A 36"
REMOVE 5'x3' CONC BOX CULVERT
REMOVE 6'x3' CONC BOX CULVERT
REMOVE 8'x3' CONC BOX CULVERT

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

SEE SHEETS 24 & 25 FOR -L- PROFILE
SEE SHEET 30 FOR -Y4- PROFILE
SEE SHEET 16 FOR -DETIREV- & -Y4DET- PLAN VIEW
SEE SHEET 32 FOR -DETIREV- & -Y4DET- PROFILES
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-Y5-	-Y6-
PI Sta 84+89.36	PI Sta 10+99.35	PI Sta 10+90.34
Δ = 20° 45' 26.1" (LT)	Δ = 21° 48' 49.6" (LT)	Δ = 32° 17' 14.5" (RT)
D = 8° 25' 33.1"	D = 16° 22' 12.8"	D = 38° 11' 49.9"
L = 246.35'	L = 133.25'	L = 84.53'
T = 124.54'	T = 67.44'	T = 43.42'
R = 680.00'	R = 350.00'	R = 150.00'
e = .06	e = .02	e = .02
RO = 138'	RO = SEE PLANS	RO = SEE PLANS
Vdes = 45mph		
PI Sta 91+17.74		PI Sta 14+40.90
Δ = 7° 41' 05.6" (RT)		Δ = 85° 33' 33.8" (RT)
D = 8° 11' 06.4"		D = 42° 26' 28.7"
L = 877.02'		L = 201.59'
T = 506.57'		T = 124.92'
R = 700.00'		R = 135.00'
e = .06		e = .02
RO = 138'		RO = SEE PLANS
Vdes = 45mph		

SR 1321 (WINDY GAP RD.)
400/600 · 100/100 · 300/500
8,400 / 13,000 — NC 28 — 8,600 / 13,400
2007 ADT
2030 ADT

NAD 83/95

-Y5- POT Sta. 15+06.36
-Y5- POT Sta. 14+00.00
END CONSTRUCTION
-BY5- 43
-Y5- STA 14+58.58
9.09 RT
-BY6- 45
-Y6- STA 13+17.35
13.36 LT
-Y6- POT Sta. 14+50.00
END CONSTRUCTION
-Y6- PT Sta. 15+17.57
-Y6- PC Sta. 13+15.98
-Y5- PT Sta. 11+65.16
-Y6- PT Sta. 11+31.45
-Y6- PC Sta. 10+46.92
-Y5- PC Sta. 10+31.90
-L- PRC Sta. 86+11.17
-L- PC Sta. 83+64.81
-BL- 13
-L- STA 84+77.59
14.76 LT
-BL- 14
-L- STA 89+56.97
75.72 LT
-BY5-, -BY6-
-L- POC Sta. 91+51.52
-Y6- POT Sta. 10+00.00
-L- POC Sta. 89+41.32
-Y5- POT Sta. 10+00.00
-L- POC STA 87+00.00
BEGIN -LTEMP- GRADE
-L- PT Sta. 94+88.16
-BL- 16
-L- STA 97+53.91
24.37 LT
-BL- Rocky Branch
-L- STA 93+44.44
46.08 LT
-DETIREV- PRC Sta. 25+21.49
-DETIREV- PT Sta. 25+32.01=
-L- POC Sta. 86+11.17
MATCHLINE TO SHEET 6
-L- STA. 83+00.00
MATCH LINE TO SHEET 8
-L- STA. 98+00.00

ROBERT P. REVIS DB C-22 PG 155 PB 1 PG 121 (53)
ROBERT PAUL REVIS DB D-12 PG 5-6 PB 1 PG 10 (53)
MOUNTAIN MIST PROPERTY, LLC DB L-30 PG 895 PLAT CARD 558
GARY WAYNE CRISP DB 0-14 PG 98 (56)
GARY WAYNE CRISP DB S-8 PG 45 (56)
GARY WAYNE CRISP DB J-14 PG 232 (56)
GARY WAYNE CRISP DB B-19 PG 1299
JOYCE BRENDLE FOX DB Z-22 PG 1219 (54)
JOYCE BRENDLE FOX DB Z-31 PG 2371 (58)
ELMER J SERRLE DB C 27 PG 999 (57)
JAMES MCCALL DB S-25 PG 1581
RALPH J ALLEN DB 829 PG 109 (52)

EXPRESSWAY GUTTER FROM 13+18 TO 13+90 LT.
REMOVE 24"CMP & HW'S
36" RCP BURIED 0.5'
LT to Rocky Branch
SEE DETAIL U CLASS I RIP RAP ON BANKS ONLY EST CLASS I RIP RAP= 4 TONS
REMOVE 15" RCP & 4" UNDERDRAIN AS NEEDED
REMOVE 36" 72" RCP BURIED 1.0'
SEE DETAIL L SPECIAL LATERAL V DITCH -Y6- STA 12+50 TO 13+00 LT
SEE DETAIL K LATERAL V DITCH -Y6- STA 12+00 - 12+50 LT
SEE DETAIL J LATERAL V DITCH -L- STA 91+00 - 91+25 LT
SEE DETAIL M BERM DITCH W/CL B RIP RAP -L- STA 88+00 - 89+50 RT
SEE DETAIL M BERM DITCH W/CL B RIP RAP -L- STA 93+50 - 97+50 RT
CL 'I' RIP RAP REF. 2 TON 29 S.Y. FF TIE TO EXIST. DRIVE
PLUG FILL W/FLOWABLE MATERIAL
GRADE TO DRAIN
REMOVE
SEPTIC
WELL
BEGIN SBG -L- STA 95+80 LT END SBG -L- STA 98+64 LT

SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 31 FOR -Y5- & -Y6- PROFILES
SEE SHEET 25 FOR -LTEMP- PROFILE
SEE SHEET 32 FOR -DETIREV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

REVISIONS
8/28/08 DRAINAGE REDESIGNED TO REDUCE IMPACTS, R/W & EASEMENTS ON PARCEL 53. PARCEL NUMBERS CORRECTED ON THE REVIS PROPERTY.
NAME CHANGES ON PARCEL 51, 52, 57 & 58. JBM

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	8
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-DR-
PI Sta 102+05.36	PI Sta 10+92.28
Δ = 6° 01' 43.1" (RT)	Δ = 53° 19' 44.9" (LT)
D = 1° 08' 45.3"	D = 114° 35' 29.6"
L = 526.10'	L = 46.54'
T = 263.29'	T = 25.11'
R = 5,000.00'	R = 50.00'
e = .03	
RO = 78'	
Vdes = 45 mph	

NAD 83/95

REVISIONS
8/28/08 NAME CHANGES ON PARCELS 58,60 & 61.COMBINED PARCEL 63 WITH PARCEL 60. JBM
10/2/08 REVISED R/W ON PARCEL 60 TO ENCOMPASS STREAM RELOCATION AND STREAM. JBM

MATCHLINE TO SHEET 7
-L- STA. 98+00.00

MATCHLINE TO SHEET 9
-L- STA. 108+00.00

GARY WAYNE CRISP
DB B-19 PG 1299
56

GARY WAYNE CRISP
DB 0-14 PG 98
56

CAROLE ANN SIMMONS
DB C-23 PG 437
60

JOYCE BRENDLE FOX
DB Z-31 PG 2377
58

JAMES MCCALL
DB S-25 PG 1681

JACQUELIN G. NELSON
DB C-20 PG 66
59

CAROLINA BUILDER SERVICES INC
DB W30 PG 1300
61

WILLIAM A. ROTEN
DB G-14 PG 76

CRESCENT RESOURCES INC.
DB S-23 PG 849
62

DAVID CHARLES MYERS
DB T-24 PG 1528

-DET2REV- PRC Sta. 14+15.46=
-L- POC Sta. 101+70.40
END -LTEMP- GRADE
BEGIN -DET2REV- GRADE
BEGIN CONSTRUCTION

-DET2REV- PRC Sta. 17+18.82

-DET2REV- PT Sta. 19+59.27

-BL- 17
-L- STA 101+78.93
16.14 RT

-L- PC Sta. 99+42.07

-L- PT Sta. 104+68.16

-DR- POT Sta. 10+00.00=
-L- POT STA 107+35.00

-DR- PC Sta. 10+67.18

-DR- PT Sta. 11+1

-DR- POT Sta
END CONSTRU

-T1- 62 POT 5+00.00
ELEV=2061.16
NAIL SET

SEE DETAIL E
LATERAL BASE DITCH W/CL B RIP RAP
-L- STA 98+50 - 100+00 LT

BEGIN SBG
-L- STA 98+80 LT
END SBG
-L- STA 98+64 LT

TAIL DITCH W/CLASS I RIP RAP
EST. 17 TONS
24 S.Y. FF
SEE DETAIL 'T'

SEE SHEET 2-H
ROCK CROSS VANE (RCV)

360' UNIFORM TRANSITION

STREAM RELOCATION
SEE SHEETS 2-F, 2-G & 2-H
FOR DETAIL

Rocky Branch

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF
SEE SHEET 2-E FOR STREAM DETAIL

BEGIN SBG
-L- STA 103+20 LT
END SBG
-Y7- STA 10+78 LT

CL 'B' RIP RAP
EST. 3 TON
14 S.Y. FF

CL 'B' RIP RAP
EST. 2 TON
7 S.Y. FF

SEE SHEETS 25 & 26 FOR -L- PROFILE
SEE SHEETS 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 33 FOR -DET2REV- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-F FOR STREAM RELOCATION DETAIL

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS
8/28/08 ELIMINATED A PORTION OF BERM DITCH TO REDUCE IMPACTS & EASEMENT ON PARCEL 65, NAME CHANGES ON PARCELS 60,61,65 & 70.
COMBINED PARCEL 63 WITH PARCEL 60. JBM
9/11/08 ADJUSTED SLOPE STAKES ON PARCEL 65 TO REDUCE IMPACTS. JBM

5/14/99

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NAD 83/95

SR 1434 (AIRPORT RD.)
2,800 / 4,400
2,500 / 3,700 — 300 / 700
8,600 / 13,400 — NC 28 — 6,400 / 10,400
2007 ADT
2030 ADT

-Y7- POT Sta. 14+30.00
-Y7- POT Sta. 13+75.00
END CONSTRUCTION
-BY7- 47
-Y7- STA 13+69.48
17.07 LT
-DET2REV- PRC Sta. 24+28.37
-DET2REV- PT Sta. 26+09.72=
-L- POT Sta. 113+61.00
END CONSTRUCTION
-BL- 20
-L- STA 120+81.08
19.91 LT
-BL- 19
-L- STA 115+05.68
27.38 RT
-T1- 64 PINC 10+27.55
ELEV=2078.98
NAIL SET
-T1- 65 POT 14+11.82
ELEV=2083.59
NAIL SET
-T1- 63 PINC 7+64.38
ELEV=2067.20
NAIL SET
-T1- 70 PINC 9+04.05
ELEV=2071.43
NAIL SET
-DET3- PC Sta. 10+60.60
-DET3- POT Sta. 10+00.00
-DET3- PT Sta. 13+75.43
-DET3- PRC Sta. 12+50.30
-DET2REV- PC Sta. 22+47.01
-L- POT Sta. 110+61.87
-Y7- POT Sta. 10+00.00
-BL- 18
-L- STA 101+97.06
19.09 LT
-BY7- 48
BM = 9
-BL- STA. 110+27.86
76.84 LT.
ELEV. = 2077.42

MATCHLINE TO SHEET 8
-L- STA. 108+00.00

MATCHLINE TO SHEET 10
-L- STA. 121+00.00

CAROLE ANN SIMMONS
DB C-23 PG 437
SEE DETAIL N
LATERAL V DITCH
W/CL I RIP RAP
-L- STA 108+00 - 108+50 LT
-L- STA 109+00 - 110+00 LT
-Y7- 10+70 - 11+15 LT
CL 'B' RIP RAP
EST. 3 TONS
CAROLE ANN SIMMONS 11 S.Y. FF
DB C-23 PG 437
BAND/EXTEND W/18" CSP
CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF
CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF
CL 'B' RIP RAP
EST. 3 TONS
10 S.Y. FF
SEE SHEET 2-E FOR STREAM DETAIL
BEGIN SBG
-L- STA 108+20 LT
END SBG
-Y7- STA 10+75 LT
REMOVE EXISTING CULVERT
CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF
PROP 3-SIDED PRECAST CONCRETE CULVERT 3x6'
REMOVE EXISTING MASONRY CULVERT
CRESCENT RESOURCES, INC.
DB S-23 Pg 849
NOT DISTURB FENCE
CAROLINA BUILDER SERVICES INC
DB W30 PG 1300
LARRY DALE FOUTS
DB F-16 PG 88
DAVID CHARLES MYERS
DB T-24 PG 1528
THOMAS HARMON
DB I-19 PG 981
DENNIS THOMPSON
DB G-25 PG 564
Rocky Branch
JAY MITCHELL HOUSTON
DB T-28 PG 1390
PAULINE S. HOUSTON
DB M-5 PG 425
CHLOE P. HOUSTON
DB K-6 PG 569
BERNICE D. HENRY
DB F-5 PG 456
JOHN C PARRISH
DB O-6 PG 55
PERMANENT STONE SILT SCREEN
CLASS I RIP RAP ROCK CHECK
CL I = 7 TONS
F.F. = 15 S.Y.
SEE DETAIL H
TOE PROTECTION
W/CL B RIP RAP
-L- STA 117+35 -120+50 RT
BEGIN EXPRESSWAY GUTTER
-L- STA 111+80.00
END EXPRESSWAY GUTTER
-L- STA 116+75.00
SEE DETAIL M
BERM DITCH W/CL B RIP RAP
-L- STA 111+80 - 112+50 LT
PLUG AND FILL
N 0°46'33.9" E MC 28 BRYSON CITY RD 20' BSL
TOE PROTECTION
PERMANENT STONE SILT SCREEN
SEE DETAIL 'P'
CL 'B' RIP RAP
TOE PROTECTION
EST.= 17 TONS
S.Y. FF= 34
RIP RAP= 45 TONS
UNIFORM TRANSITION
SEE DETAIL 'P'
CL 'B' RIP RAP
TOE PROTECTION
EST.= 37 TONS
S.Y. FF= 34
BEGIN SBG
-L- STA 109+65 RT
END SBG
-L- STA 112+00 RT
REMOVE EXISTING MASONRY CULVERT
PDE
PROF PDE
ISFD
ISMD
BST
GRAU 350
RIP RAP
CLASS I RIP RAP
ROCK CHECK
CL I = 7 TONS
F.F. = 15 S.Y.
24" BURY 6'
5'R
15'R
16'R

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y7- PROFILE
SEE SHEET 18 FOR -DET2REV- PLAN VIEW
SEE SHEETS 19,20,21 & 22 FOR -DET3- PLAN VIEW
SEE SHEET 33 FOR -DET2REV- PROFILE
SEE SHEETS 35 FOR -DET3- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

— — — SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— · — · — SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

REVISIONS

5/14/99 8/28/08 NAME CHANGES ON PARCELS 70 & 74, JBM

-L-
PI Sta 126+36.27
Δ = 38° 57' 59.8" (RT)
D = 5° 22' 47.6"
L = 724.30'
T = 376.79'
R = 1,065.00'
e = .06
RO = 156'
Vdes = 55mph

NAD 83/95

PAULINE S. HOUSTON
DB M-5 PG 425
69

LOIS J. MEADOWS
DB N-6 PG 215
72

REGINA M. MOORE
DB B-19 PG 260
73

JESSIE J. WILSON
DB L-15 PG 233
74

TODD J. PARRISH
DB Z-21 PG 158
79

GEORGE RICHARD GIBSON
DB S-16 PG 364
75

LINDA CUNNINGHAM
DB S-16 PG 365
71

JOHN C. PARRISH
DB O-6 PG 55
70

-BL- 21
-L- STA 127+41.40
18.84 LT

BM = 10
-BL- STA. 125+16.41
46.17 LT.
ELEV. = 2093.16

ENVIRONMENTALLY SENSITIVE AREA
31MA589

ENVIRONMENTALLY SENSITIVE AREA
31MA588

REMOVE 18" & HW'S
REPLACE W/36"

CHANGE FILL SLOPE TO 5:1
@ -L- STA 132+50 LT
AND TO 3:1 @
-L- STA 133+00 LT

SEE DETAIL H
TOE PROTECTION
W/CL II RIP RAP
STA 133+10 - 133+30
REMOVE

SEE DETAIL O
3' STD BASE DITCH
-L- 124+10 LT

SEE DETAIL P
3' STD BASE DITCH
W/CL I RIP RAP
-L- 124+10 RT

SEE DETAIL D
SPECIAL LATERAL V DITCH
-L- 121+50 - 122+40 RT

SEE DETAIL D
SPECIAL LATERAL V DITCH
-L- 131+50 RT

CL 'I' RIP RAP
EST. 1 TONS
5 S.Y. FF

CL 'I' RIP RAP
EST. 15 TONS
80 S.Y. FF

CL 'B' RIP RAP
EST. 7 TONS
22 S.Y. FF

BEGIN SBQ
-L- STA 123+00 RT
END SBQ
-L- STA 125+60 RT

-DET3- PC Sta. 21+51.62

-L- PCSta. 122+59.48

-DET3- PT Sta. 28+53.47

-L- PTSta. 129+83.78

MATCHLINE TO SHEET 9
-L- STA. 121+00.00

MATCHLINE TO SHEET 11
-L- STA. 134+00.00

SEE SHEETS 26 & 27 FOR -L- PROFILE
SEE SHEETS 19,20,21 & 22 FOR -DET3- PLAN VIEW
SEE SHEETS 35 FOR -DET3- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

— — — SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— - — - SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

-L-
PI Sta 139+20.62
Δ= 62° 13' 08.7" (LT)
D = 7° 09' 43.5"
L = 868.74'
T = 482.77'
R = 800.00'
e = .06
RO = 138'
Vdes = 45mph *
* denotes design exception

REVISIONS
5/14/99 PARCELS 77 & 82. JBM
8/28/08 COMBINED PARCEL 76 WITH PARCEL 79, NAME CHANGES ON PARCELS 77 & 82. JBM

MATCHLINE TO SHEET 10
-L- STA. 134+00.00

MATCHLINE TO SHEET 12
-L- STA. 147+00.00

-L- PCSta. 134+37.85
-DET3- PC Sta. 33+09.65
-L- PTSta. 143+06.59
-DET3- PT Sta. 42+11.07
-BL- 22
-L- STA 134+19.33
31.39 RT
-BL- 23
-L- STA 139+54.16
38.34 RT
-BL- 24
-L- STA 146+82.86
18.13 RT

BM # 11
-BL- STA. 140+55.38
74.95 LT.
ELEV. = 2109.97

TODD J. PARRISH
DB Z-21 PG 158
79

LINDA CUNNINGHAM
DB S-16 PG 365
71

DONALD W. HOLLAND
DB P-18 PG 601
78

JAMES H. PARRISH
DB B-17 PG 93
81

DONALD W. HOLLAND
DB T-30 PG 1001
82

GEORGE RICHARD GIBSON
DB S-16 PG 364
75

HUGH SHANNON
STACY TRACIA PARRISH SHANNON
DB A-27 PG 1804
77

WILLIAM T. PARRISH
DB Z-21 PG 156
80

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

— — — SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— - — - SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-	-Y8-	-Y9-
PI Sta 152+68.25	PI Sta 10+60.66	PI Sta 12+24.34
Δ = 23° 35' 34.0" (RT)	Δ = 45° 26' 22.0" (RT)	Δ = 67° 31' 39.8" (RT)
D = 5° 22' 41.6"	D = 57° 11' 44.8"	D = 19° 25' 20.3"
L = 438.54'	L = 79.31'	L = 347.68'
T = 222.42'	T = 41.87'	T = 197.22'
R = 1,065.00'	R = 100.00'	R = 295.00'
e = .06	e = .02	e = EXIST.
RO = 156'	RO = SEE PLANS	RO = SEE PLANS
Vdes = 55mph		

NAD 83/95

-Y8- POT Sta. 14+81.34

-Y8- POT Sta. 13+00.00
END CONSTRUCTION

-BY8- 49
-Y8- ST A 12+96.60
15.44 LT

-Y8- PT Sta. 10+98.09

-BL- 25
-L- ST A 152+42.12
46.31 LT
-BY8- 50

-Y8- PCS Sta. 10+18.78

-L- POC Sta. 152+77.16
-Y8- POT Sta. 10+00.00

-L- PCS Sta. 150+45.83

-DET3- PC Sta. 49+38.03

-DET3- PT Sta. 53+70.50

-L- PT Sta. 154+84.37

-L- POT Sta. 158+46.74
-Y9- POT Sta. 15+27.22

BM = 12
-BL- STA. 157+87.84
149.23 LT.
ELEV. = 2056.78

-BL- 26
-L- STA 158+73.22
60.17 RT
-BY9- 51

-Y9- PT Sta. 13+74.80

-DET3- PC Sta. 57+15.84

BEGIN CONSTRUCTION
-Y9- POC Sta. 12+50.00

-Y9- PCS Sta. 10+27.12

-Y9- POT Sta. 10+00.00

-BY9- 52
-L- STA 167+05.94
16.86 LT

MATCHLINE TO SHEET 11
-L- STA. 147+00.00

MATCHLINE TO SHEET 13
-L- STA. 160+00.00

82 DONALD W HOLLAND DB T-30 PG 1001

83 PATSY C. SMITH DB V-8 PG 300

80 WILLIAM T. PARRISH DB Z-21 PG 156

85 KEVIN W RABY DB F-3 PG 2072

86 HELEN A. KASS DB M-13 PG 232

87 LINDA S. WALDROOP DB N-22 PG 469

88 WILLIAM N. DEWITT DB M-18 PG 576 PB X PG

89 LEE R ROPER DB K-5 PG 355

89A LOT 1 CLEAR SKY LLC DB J-30 PG 858

CLEAR SKY LLC DB J-30 PG 858

BEGIN EXPRESSWAY GUTTER
-L- STA 147+30.00
END EXPRESSWAY GUTTER
-L- STA 148+65.00

BEGIN SBG
-L- STA 150+00 RT
END SBG
-L- STA 151+50 RT

SEE DETAIL C
SPECIAL CUT DITCH
-L- STA 157+00 - 157+50 RT

SEE DETAIL D
SPECIAL LATERAL V DITCH
-L- STA 157+50 - 158+00 RT

SEE DETAIL D
SPECIAL LATERAL V DITCH
-L- STA 149+50 - 151+00 LT

SEE DETAIL H
TOE PROTECTION
W/CL B RIP RAP
-Y9- STA 13+00 - 13+40 LT
-Y9- STA 13+00 - 14+00 RT

AT-1
CL 'B' RIP RAP
EST. 7 TONS
22 S.Y. PP

CL 'B' RIP RAP
EST. 1 TONS
5 S.Y. PP

8" x 12' CHANNELIZATION

REMOVE HW 24"

REMOVE HW 18" CMP

REMOVE

"DO NOT DISTURB TEST WELL"

ABANDONED DRAIN LINES

SEPTIC TANK

DRAIN LINES

GAS TANK

FUEL PUMP

MTL CANOPY

ISBLK BUS

ISBKD

ISFD

CONC.

GRAU

BW

GR

EP

EX

PDE

SBL

ABL

EBL

WBL

NBL

SR 1372 (NOTLA CHURCH RD.)

1,200 / 1,900		1,600 / 2,400
		400 / 500
6,400 / 10,400	NC 28	5,600 / 9,000

2007 ADT
2030 ADT

SR 1337 (RIVERBEND RD.)

5,600 / 9,000	NC 28	5,400 / 8,800
300 / 400		100 / 200
		400 / 600

2007 ADT
2030 ADT

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 31 FOR -Y8- & -Y9- PROFILES
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

——— SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— — — SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

REVISIONS
8/28/08 COMBINED PARCEL 84 WITH PARCEL 82 NAME CHANGE ON PARCELS 82,85 & 89. ADDED PARCEL 89A. JBM
5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

-L-
PI Sta 173+01.30
Δ = 12° 56' 57.8" (RT)
D = 3° 00' 56.0"
L = 429.42'
T = 215.63'
R = 1,900.00'
e = .05
RO = 135'
Vdes = 60mph

REVISIONS
8/28/08 ADDED PARCELS 89B,89C,89D,89E & 89F. NAME CHANGE ON PARCELS 89 & 91. JBM

MATCHLINE TO SHEET 12
-L- STA. 160+00.00

MATCHLINE TO SHEET 14
-L- STA. 172+00.00

CLEAR SKY LLC
DB J-30 PG 858

LOT 2
CLEAR SKY LLC
DB J-30 PG 858

LOT 3
DANIEL K. CROCKETT
DB F-31 PG 78

LOT 4
CLEAR SKY LLC
DB J-30 PG 858

LOT 5
CLEAR SKY LLC
DB J-30 PG 858

LOT 6
CLEAR SKY LLC
DB J-30 PG 858

THOMAS A BOWMAN
DB F-26 PG 753

RUFUS TAYLOR
DB T-6 PG 403

LEE R ROPER
DB K-5 PG 355

CLAYTON RAMSEY
DB J-18 PG 209

CLAYTON H. RAMSEY
DB H-10 PG 296

-BL- 27
-L- STA 167+05.94
16.86 LT

-L- PCSta. 170+85.67

SEE DETAIL C
SPECIAL CUT DITCH
-L- STA 169+50 - 170+00 LT

SEE DETAIL D
SPECIAL LATERAL V DITCH
-L- STA 170+00 - 171+80 LT

-DET3- PRC Sta. 59+13.46

-DET3- POT Sta. 62+91.98

-DET3- PT Sta. 61+11.08=
-L- POT Sta. 162+19.10

-DET6- POT Sta. 10+00.00=
-L- POT Sta. 165+00.00

-DET6- PC Sta. 10+26.80

-DET6- PRC Sta. 12+39.11

-DET6- PT Sta. 14+51.42

-DET6- PC Sta. 15+87.09

REMOVE HW

REMOVE 18" & HW

UNDER GROUND POWER LINE

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

NC 28 BRYSON CITY RD 20' BST

SEE SHEETS 27 & 28 FOR -L- PROFILE
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

-L-	
PI Sta 173+01.30	PI Sta 181+90.46
Δ = 12° 56' 57.8" (RT)	Δ = 8° 02' 06.8" (LT)
D = 3° 00' 56.0'	D = 1° 54' 35.5"
L = 429.42'	L = 420.75'
T = 215.63'	T = 210.72'
R = 1,900.00'	R = 3,000.00'
e = .05	e = .04
RO = 135'	Ro = 108'
Vdes = 60mph	Vdes = 60mph

MATCHLINE TO SHEET 13
-L- STA. 172+00.00

MATCHLINE TO SHEET 15
-L- STA. 186+00.00

REVISIONS
8/28/08 NAME CHANGE ON PARCELS 94,95 & 97. REDESIGNED DRIVEWAYS ON PARCELS 94 & 95. JBM
5/14/99

95 JOHN HOPE DB F-29 PG 104

94 ROBIN A BRASWELL DB C-31 PG 336

94 ROBIN A BRASWELL DB C-31 PG 336

97 EDWIN LEE SWAFFORD DB Z-7 PG35

98 MARTHA C. DONALDSON DB L-20 PG 230

98 MARTHA C. DONALDSON DB L-20 PG 230

96 C.M. & MARY LOU COMBS DB B-6 PG 447

92 CLAYTON H. RAMSEY DB H-10 PG 296

-BL- 28
-L- STA 175+78.53
15.21 LT

-BL- 29
-L- STA 179+78.94
15.28 LT

-L- PC Sta. 179+79.74

-L- PT Sta. 184+00.49

-L- PT Sta. 175+15.09

-DET6- PT Sta. 18+92.09

-DET6- PC Sta. 23+80.97

-DET6- PT Sta. 24+75.33

BM = 13
-BL- STA. 174+49.64
28.66 LT.
ELEV. = 2082.64

BM = 14
-BL- STA. 184+79.25
15.50 LT.
ELEV. = 2032.30

SEE DETAIL G
SPECIAL LATERAL V DITCH
W/CL B RIP RAP
-L- STA 178+50 - 179+00 LT

SEE DETAIL H
TOE PROTECTION
W/CL B RIP RAP
-L- STA 183+00 - 184+00 LT

SEE DETAIL G
SPECIAL LATERAL 'V' DITCH
-L- STA 184+00 - 184+50 LT

SEE DETAIL G
SPECIAL LATERAL V DITCH
W/CL B RIP RAP
-L- STA 183+00 - 184+00 RT

SEE DETAIL E
STANDARD BASE DITCH
-L- STA 178+00 - 178+25 RT

SEE DETAIL G
FALSE SUMP
TO ELEV 2074.4
-L- STA 179+00 RT

CL 'B' RIP RAP
EST. 5 TONS
14 S.Y. FF

CL 'B' RIP RAP
EST. 2 TONS
7 S.Y. FF

REMOVE
18" & HW

REMOVE HW &
18" CMP

BEGIN EXPRESSWAY GUTTER
-L- LT. STA. 184+00
END EXPRESSWAY GUTTER
-L- LT. STA. 186+00

WELL HOUSE

ESBK BUS

SEE SHEETS 28 & 29 FOR -L- PROFILE
SEE SHEET 2-E FOR DRIANAGE DITCH DETAILS

— — — SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
— · — · — SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

MATCHLINE TO SHEET 14
-L- STA. 186+00.00

SR 1378 (BENNET RD.)
1,600 / 2,300
1,000 / 1,400 — 600 / 900
5,400 / 8,800 — NC 28 — 5,000 / 8,300
2007 ADT
2030 ADT

NAD 83/95

MARTHA C. DONALDSON
DB L-20 PG 230
98

ALTON GLENN RAY
DB C-18 PG 304
100

ROBERT RAY III
DB M-17 PG 141

FAYE LARUE & LARRY ELLIS STEWART LIFE ESTATE
DB V-21 PG 955

JERRY ANSELMO
DB I-20 PG III

FLORENCE L. OSTRANDER
DB B-7 PG 173
99

BETTIE R. DALGO
DB T-15 PG 50

CRESCENT RESOURCES INC.
DB S-23 PG 849

MITCHELL OWENBY
DB Y-10 PG 17

-BL- 30
-L- STA 186+81.35
14.44 LT

-BL- 31
-L- STA 194+65.79
18.48 LT
-BY10- 54

-BY10- 53
5+00.00 LT

-BL- 32
STA 199+87.75
-BY11- 55 5+00.00

-T2- 66 POT 5+00.00
ELEV=1971.86
NAIL SET

-T2- 67 POT 7+02.36
ELEV=1978.91
NAIL SET

-T2- 68 POT 8+88.24
ELEV=1971.32
NAIL SET

-T2- 69 POT 9+87.45
ELEV=1970.42
NAIL SET

-L- POT 188+50.00
END PROJECT R-2408B

MINIMUM RESURFACING TO -L- STA 195+85.41

-L- POT Sta. 195+85.41
END CONSTRUCTION

BEGIN EXPRESSWAY GUTTER
-L- LT. STA. 183+00
END EXPRESSWAY GUTTER
-L- LT. STA. 188+00

REMOVE HW & 18" CMP

TIE RDY DITCH TO EXISTING DITCH

NC 28 BRYSON CITY RD 20' BST

SR 1378 BENNETT RD 18' BST

SR 1335 SMOKESTOWN RD 20' BST

LITTLE TENNESSEE RIVER

BM = 15
-BL- STA. 198+89.63
16.89 LT.
ELEV. = 1976.85

N 12° 08' 00.9" E
N 16° 02' 12.3" W
N 1° 04' 23.3" W
S 41° 52' 43.4" E
N 19° 05' 59.3" E
S 50° 00' 51.7" E

SEE SHEET 29 FOR -L- PROFILE

SLOPESTAKES FOR -L- & -Y- ALIGNMENTS
SLOPESTAKES FOR TEMPORARY DETOUR ALIGNMENTS

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

PLAT CARD 5158

-Y4DET-		
PI Sta 12+87.80	PI Sta 13+93.33	PI Sta 14+81.08
Δ = 14° 35' 16.0" (RT)	Δ = 9° 39' 12.6" (LT)	Δ = 8° 10' 36.3" (RT)
D = 11° 27' 33.0"	D = 11° 27' 33.0"	D = 11° 27' 33.0"
L = 127.30'	L = 84.24'	L = 71.36'
T = 64.00'	T = 42.22'	T = 35.74'
R = 500.00'	R = 500.00'	R = 500.00'

-DETIREV-				
PI Sta 10+39.79	PI Sta 13+29.55	PI Sta 17+98.83	PI Sta 23+35.11	PI Sta 25+26.75
Δ = 9° 05' 56.6" (RT)	Δ = 15° 49' 25.4" (LT)	Δ = 6° 34' 18.4" (RT)	Δ = 21° 37' 04.2" (LT)	Δ = 0° 51' 38.1" (RT)
D = 11° 27' 33.0"	D = 3° 10' 59.2"	D = 2° 17' 30.6"	D = 5° 43' 46.5"	D = 8° 11' 06.4"
L = 79.40'	L = 497.12'	L = 286.75'	L = 377.30'	L = 10.51'
T = 39.79'	T = 250.15'	T = 143.53'	T = 190.92'	T = 5.26'
R = 500.00'	R = 1,800.00'	R = 2,500.00'	R = 1,000.00'	R = 700.00'

-DETIREV-
-Y4DET-

-L- PC Sta. 83+64.81

-Y4DET- POT Sta. 15+27.37=
-DETIREV- POT Sta. 17+75.00

-L- PT Sta. 80+12.25

-L- PC Sta. 77+48.44

-L- PC Sta. 74+08.62

-L- PT Sta. 76+78.56

-DETIREV- PRC Sta. 25+21.49

-DETIREV- PT Sta. 25+32.01=
-L- PRC Sta. 86+11.17

-DETIREV- PT Sta. 19+42.05

-Y4DET- PC Sta. 14+45.35

-Y4DET- PT Sta. 14+35.35

-DETIREV- PC Sta. 21+44.19

-Y4DET- PRC Sta. 13+51.10

-DETIREV- PT Sta. 15+76.52

-DETIREV- PC Sta. 16+55.30

-DETIREV- PRC Sta. 10+79.40

-DETIREV- PC Sta. 10+00.00=
-L- POT Sta. 70+85.00

-Y4DET- PC Sta. 12+23.80=
-Y4- POT Sta. 12+23.80
BEGIN CONSTRUCTION

-Y4DET- POT Sta. 10+00.00=
-Y4- POT Sta. 10+00.00

NAD 83'95

MOUNTAIN MIST PROPERTY, LLC
DB J-30 PG 1195
PLAT CARD 5158

SHARON B. COOK
DB B-20 PG 2281

CHARLES H. MCCALL
DB J-13 PG 47

ROBERT P. REVIS
DB C-22 PG 1135
PB 1 PG 121

RALPH J ALLEN
DB 829 PG 109

JANET SHULER
DB K-29 PG 1884

ROBERT JEFFREY PRUETT
DB Z-19 PG 2224

MARY WILSON
DB A-20 PG 2088

MARJORIE MOODY MENEFEE
DB Z-28 PG 716

CHARLES MOODY JR
DB H-29 PG 344
DB Z-28 PG 718

G-SQUARED LLC
DB M-30 PG 1420

CHURCH OF JESUS CHRIST LATTER DAY SAINTS
DB E-15 PG 15

WILLIAM H. WALDROOP
DB L-8
PG 207

GARY TALLENT
DB O-23 PG 2316

BRYSON CITY RD
NC 28

FOR -DETIREV- & -Y4DET- PROFILE VIEWS SEE SHEET 32
FOR -L- PLAN VIEW SEE SHEETS 5,6 & 7
FOR -L- PROFILE VIEW SEE SHEETS 24 & 25

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

REVISIONS

8/17/98

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

-LTEMP-

-Y5-	-Y6-	
PI Sta 10+99.35	PI Sta 10+90.34	PI Sta 14+40.90
Δ = 21° 48' 49.6" (LT)	Δ = 32° 17' 14.5" (RT)	Δ = 85° 33' 33.8" (RT)
D = 16° 22' 12.8"	D = 38° 11' 49.9"	D = 42° 26' 28.7"
L = 133.25'	L = 84.53'	L = 201.59'
T = 67.44'	T = 43.42'	T = 124.92'
R = 350.00'	R = 150.00'	R = 135.00'

-L-	
PI Sta 91+17.74	PI Sta 102+05.36
Δ = 71° 47' 05.6" (RT)	Δ = 6° 01' 43.1" (RT)
D = 8° 11' 06.4"	D = 1° 08' 45.3"
L = 877.02'	L = 526.10'
T = 506.57'	T = 263.29'
R = 700.00'	R = 5,000.00'

NAD 83/95

-Y6- PTSta. 15+17.57

-Y6- PCSta. 13+15.98

-Y5- PT Sta. 11+65.16

-Y6- PTSta. 11+31.45

-Y6- PCSta. 10+46.92

-Y5- PC Sta. 10+31.90

-L- POCSta. 91+51.52
-Y6- POTSta. 10+00.00

-L- PTSta. 94+88.18

-L- POCSta. 87+00.00
BEGIN -LTEMP- GRADE

-L- POC Sta. 101+70.40=
-DET2REV- PRC Sta. 14+15.46
END -LTEMP- GRADE
BEGIN -DET2REV- GRADE

PROPOSED TEMPORARY GUARDRAIL

-L- PCSta. 99+42.07

ROBERT PAUL REVIS DB D-12 PG 5-6 PB 1 PG 70

ROBERT P. REVIS DB C-22 PB 1 PG 125

GARY WAYNE CRISP DB 0-14 PG 98

GARY WAYNE CRISP DB S-4 PG 45

GARY WAYNE CRISP DB J-14 PG 252

GARY WAYNE CRISP DB B-19 PG 1299

GARY W. DB B-19

ELMER J. SERRLE PB C 27 PG 369

JOYCE BRENDLE FOX DB 2-22 PG 218

JOYCE BRENDLE FOX DB 2-31 PG 2377

JAMES MCCALL DB S-25 PG 188

RALPH J ALLEN DB 629 PG 105

JACQUELIN G. NELSON DB C-20 PG 62

FOR -LTEMP- PROFILE SEE SHEET 34

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET2REV-

NAD 83/95

-DET2REV-				
PI Sta 13+01.32	PI Sta 15+67.19	PI Sta 18+39.19	PI Sta 23+37.94	PI Sta 25+19.29
Δ = 2° 36' 59.5" (RT)	Δ = 3° 28' 34.3" (LT)	Δ = 6° 53' 18.0" (RT)	Δ = 10° 23' 27.3" (RT)	Δ = 10° 23' 27.4" (LT)
D = 1° 08' 45.3"	D = 1° 08' 45.3"	D = 2° 51' 53.2"	D = 5° 43' 46.5"	D = 5° 43' 46.5"
L = 228.33'	L = 303.36'	L = 240.45'	L = 181.36'	L = 181.36'
T = 114.19'	T = 151.72'	T = 120.37'	T = 90.93'	T = 90.93'
R = 5,000.00'	R = 5,000.00'	R = 2,000.00'	R = 1,000.00'	R = 1,000.00'

836.12'
N 05°21'44" E

CAROLE ANN SIMMONS
DB C-23 PG 437

-DET2REV- PRC Sta. 14+15.46=
-L- POC Sta. 101+70.40
END -LTEMP- GRADE
BEGIN -DET2REV- GRADE
BEGIN CONSTRUCTION

-DET2REV- PRC Sta. 17+18.82

-DET2REV- PT Sta. 19+59.27

TIE TEMPORARY GUARD RAIL TO PROPOSED

50' TAPER LEFT SIDE

75+00

100.00'

48" WD RAIL

60' TAPER RIGHT SIDE

-L- PT Sta. 104+68.16

105.00'

20+00

-DET2REV-

N 6°52'46.8" E

-L-

NC 28 BRYSON CITY RD 22' BST

CAROLINA BUILDER SERVICES INC
DB W30 PG 1300

WILLIAM A. ROTEN
DB G-14 PG 76

JACQUELIN G. NELSON
DB C-20 PG 66

DAVID CHARLES MYERS
DB T-24 PG 1528

CRESCENT RESOURCES INC.
DB S-23 PG 1149

-DET2REV- PC Sta. 22+47.01

CAROLE ANN SIMMONS
DB C-23 PG 437

-Y7- POT Sta. 14+30.00

-Y7- POT Sta. 11+75.00
END CONSTRUCTION

JAY MITCHELL HOUST
DB T-28 PG 1390

-Y7- POT Sta. 10+31.68=
-DET2REV- POC Sta. 23+03.27

-DET2REV- PRC Sta. 24+28.37

-DET2REV- PT Sta. 26+09.72=
-L- POT Sta. 113+61.00
END CONSTRUCTION

-Y7- POT Sta. 10+00.00=
-L- POT Sta. 110+61.87

110.00'

CRESCENT RESOURCES INC.
DB S-23 PG 849

LARRY DALE FOUTS
DB F-16 PG 88

THOMAS HARMON
DB I-13 PG 961

DENNIS THOMPSON
DB G-25 PG 1554

FOR -DET2REV- PROFILE SEE SHEET 33
FOR -Y7TIE- PROFILE SEE SHEET 33
FOR -L- PLAN VIEW SEE SHEETS 8 & 9
FOR -L- PROFILE SEE SHEETS 25 & 26

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET3-

NAD 83/95

CAROLE ANN SIMMONS
DB C-23 PG 457

JAY MITCHELL HOUSTON
DB T-28 PG 1390

PAULINE S. HOUSTON
DB M-5 PG 425

CHLOE P. HOUSTON
DB K-6 PG 569

CRESCENT RESOURCES INC.
DB S-23 PG 1849

CAROLINA BUILDER SERVICES INC
DB W30 PG 1300

DENNIS THOMPSON
DB O-25 PG 1554

BERNICE D. HENRY
DB T-6 PG 456

JOHN C PARRISH
DB O-6 PG 55

THOMAS HARMON
DB I-19 PG 961

LARRY DALE FOUTS
DB F-16 PG 88

DAVID CHARLES MYERS
DB T-24 PG 1528

NC 28 BRYSON CITY RD 20' BST

EXISTING R/W

ROCK DITCH

TEMP GRAU 350

-DET3- PC Sta. 10+80.00

-DET3- PRC Sta. 12+50.30

-DET3- POT Sta. 10+00.00=
-L- POT Sta. 111+10.32 (19.66' RT)

-DET3- PT Sta. 13+75.43

-DR4- POT Sta. 10+00.00=
-DET3- POT Sta. 20+50.00

-DR4- PC Sta. 10+21.85

-DR4- PT Sta. 10+57.86

-DR4- POT Sta. 10+85.93

-DR4- POT Sta. 11+27.13

-DR4- POT Sta. 11+50.00
END CONSTRUCTION

-DR4- POT Sta. 11+58.76

-DET3-		-DR4-
PI Sta 11+65.24	PI Sta 13+12.90	PI Sta 10+40.41
Δ = 6° 30' 17.8" (RT)	Δ = 4° 46' 46.2" (LT)	Δ = 34° 23' 13.7" (LT)
D = 3° 49' 11.0"	D = 3° 49' 11.0"	D = 95° 29' 34.7"
L = 170.30'	L = 125.13'	L = 36.01'
T = 85.24'	T = 62.60'	T = 18.57'
R = 1,500.00'	R = 1,500.00'	R = 60.00'

FOR -DET3- PROFILE SEE SHEET 35
FOR -DR4- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

MATCHLINE TO SHEET 20
-DET3- STA. 21+25.00

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-DET3-

NAD 83/95

PAULINE S. HOUSTON
DB M-5 PG 425

LOIS J. MEADOWS
DB N-6 PG 215

REGINA M. MOORE
DB B-19 PG 1560

WILLIAM T. PARRISH
DB Z-21 PG 156

TODD J. PARRISH
DB Z-21 PG 158

GEORGE RICHARD GIBSON
DB S-16 PG 364

LINDA CUNNINGHAM
DB S-16 PG 365

-L- PC Sta. 122+59.48

-L- PT Sta. 129+83.78

-L- PC Sta. 134+37.85

-DET3- PC Sta. 21+51.62

-DET3- PT Sta. 28+53.47

-DET3- PC Sta. 33+09.65

MATCHLINE TO SHEET 19
-DET3- STA. 21+25.00

MATCHLINE TO SHEET 21
-DET3- STA. 34+00.00

NC 28 BRYSON CITY RD 20' RST

CANEYBOTTOM RD 20' RST

ROCK DITCH

TEMP GRAU 350

EXISTING R/W

2-2' CONC STRIPS

-DET3-	
PI Sta 25+16.73	PI Sta 38+11.01
Δ = 38° 57' 59.8" (RT)	Δ = 62° 27' 05.8" (LT)
D = 5° 33' 06.9"	D = 6° 55' 41.3"
L = 701.86'	L = 901.42'
T = 365.11'	T = 501.36'
R = 1,032.00'	R = 827.00'

FOR -DET3- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET3-

NAD 83/95

MATCHLINE TO SHEET 20
-DET3- STA. 34+00.00

MATCHLINE TO SHEET 22
-DET3- STA. 47+00.00

TODD J. PARRISH
DB Z-21 PG 158

DONALD W. HOLLAND
DB P-18 PG 601

JAMES H. PARRISH
DB B-17 PG 93

SHANNON STACY TRACIA PARRISH
DB A-27 PG 1804

GEORGE RICHARD GIBSON
DB S-16 PG 364

WILLIAM T. PARRISH
DB Z-21 PG 156

-L- PT Sta. 143+06.59

-DET3- PT Sta. 42+11.07

-DET3-
PI Sta 38+11.01
Δ = 62° 27' 05.8" (LT)
D = 6° 55' 41.3"
L = 901.42'
T = 501.36'
R = 827.00'

FOR -DET3- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

-DET3-

MATCHLINE TO SHEET 21 -LDET4- STA. 20+00.00

-L- PC Sta. 150+45.83

-L- PT Sta. 154+84.37

-DET3- PC Sta. 49+38.03

-DET3- PT Sta. 53+70.50

-DET3- PC Sta. 57+15.84

-DET3- PRC Sta. 59+13.46

-DET3- PT Sta. 61+11.08
END CONSTRUCTION

DONALD W HOLLAND
DB T-30 PG 1001

KEVIN W RABY
DB F-3 PG 2012

HELEN A. KASS
DB M-13 PG 232

WILLIAM N. DEWITT
DB W-8 PG 376
PB X PG

CLEAR SKY LLC
DB J-30 PG 858

LOT 1
CLEAR SKY LLC
DB J-30 PG 858

LOT 2
CLEAR SKY LLC
DB J-30 PG 858

LOT 3
DANIEL K. CROCKETT
DB F-31 PG 78

PATSY C. SMITH
DB V-8 PG 300

LINDA S. WALDROOP
DB N-22 PG 469

LEE R ROPER
DB K-5 PG 355

WILLIAM T. PARRISH
DB Z-21 PG 156

-DET3-		
PI Sta 51+57.43	PI Sta 58+14.79	PI Sta 60+12.41
Δ = 23° 49' 31.1" (RT)	Δ = 7° 32' 55.0" (LT)	Δ = 7° 32' 55.0" (RT)
D = 5° 30' 33.2"	D = 3° 49' 11.0"	D = 3° 49' 11.0"
L = 432.46'	L = 197.62'	L = 197.62'
T = 219.40'	T = 98.95'	T = 98.95'
R = 1,040.00'	R = 1,500.00'	R = 1,500.00'

FOR -DET3- PROFILE SEE SHEET 35
FOR -L- PLAN VIEW SEE SHEETS 9 & 10
FOR -L- PROFILE SEE SHEETS 26 & 27

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET6-

NAD 83/95

-DET6- POT Sta. 10+00.00=
-L- POT Sta. 165+00.00

-DET6- PC Sta. 10+26.80

-DET6- PRC Sta. 12+39.11

-DET6- PT Sta. 14+51.42

-DET6- PC Sta. 15+87.09

-L- PC Sta. 170+85.67

-DET6- PT Sta. 18+92.09

-L- PT Sta. 175+15.09

-DET6- PC Sta. 23+80.97

-DET6- PT Sta. 24+75.33
-L- PC Sta. 179+79.74

-DET6-			
PI Sta 11+33.13	PI Sta 13+45.44	PI Sta 17+39.93	PI Sta 24+28.16
Δ = 8°06' 34.6" (RT)	Δ = 8°06' 34.6" (LT)	Δ = 9°20' 43.0" (RT)	Δ = 3°36' 14.7" (RT)
D = 3°49' 11.0"	D = 3°49' 11.0"	D = 3°03' 50.2"	D = 3°49' 11.0"
L = 212.31'	L = 212.31'	L = 305.01'	L = 94.36'
T = 106.33'	T = 106.33'	T = 152.84'	T = 47.19'
R = 1,500.00'	R = 1,500.00'	R = 1,870.00'	R = 1,500.00'

FOR -L- PLAN VIEW SEE SHEETS 13 & 14
FOR -L- PROFILE SEE SHEETS 27, 28 & 29

MAINTAIN ALL -Y- LINE AND DRIVEWAY CONNECTIONS DURING CONSTRUCTION

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2408B	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-

PI = 56+20.00
EL = 2,076.11'
VC = 200'
K = 137
Vdes = 50+ MPH

PI = 59+00.00
EL = 2,091.19'
VC = 200'
K = 138
Vdes = 50+ MPH

END R-2408A GRADE
BEGIN R-2408B GRADE
-L- STA 56+50.00
EL = 2,077.91'

(+) 13.9334%

(+) 13.8538%

(+) 13.9733%

(-) 20.0000%

BEGIN 4' LAT. BASE DITCH
-L- STA. 60+25 LT.
EL = 2080.50

END 4' LAT. BASE DITCH
-L- STA. 61+50.00 LT.
EL = 2093.00

LEFT DITCH — · — · —
RIGHT DITCH - - - - - -

-L-

SEE SHEETS 4 & 5 FOR PLAN VIEW

2150 2140 2130 2120 2110 2100 2090 2080 2070 2060

50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00

NC 28 (BRYSON CITY RD)
-L-

BM #5
-L- STA 66+43.14 62.71' RIGHT
RAILROAD SPIKE SET IN 20" POPLAR
EL. 2126.17'

BM #6
-L- STA 75+03.26 23.18' RIGHT
NCGS "MAC 2"
EL. 2155.63'

PI = 66+50.00
EL = 2,120.70'
VC = 150'
K = 281
Vdes = 50+ MPH

PI = 70+00.00
EL = 2,132.60'
VC = 250'
K = 147
Vdes = 50+ MPH

PI = 77+50.00
EL = 2,170.86'
VC = 750'
K = 69
Vdes = 45 MPH

(+) 18.9947%

(+) 4.8000%

(+) 2.2600%

(+) 13.4000%

(+) 4.0800%

(+) 14.4200%

(-) 15.1043%

-L- STA 67+03.37
-L- STA 67+06.46

P.I. = 67+00.00
EL = 2126.51

P.I. = 67+50.00
EL = 2122.34

BEGIN SPECIAL CUT DITCH
-L- STA 66+50.00 LT.
EL = 2126.21

END SPECIAL CUT DITCH
-L- STA 68+00.00 LT.
EL = 2122.04

P.I. = 70+00.00
EL = 2129.46

BEG. SPECIAL CUT DITCH
-L- STA 69+50.00 RT.
EL = 2129.32

END SPECIAL CUT DITCH
-L- STA 70+50.00 RT.
EL = 2129.57

LEFT DITCH — · — · —
RIGHT DITCH - - - - - -

-L-

SEE SHEETS 5 & 6 FOR PLAN VIEW

2180 2170 2160 2150 2140 2130 2120 2110 2100 2090

63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00 73+00 74+00 75+00 76+00 77+00

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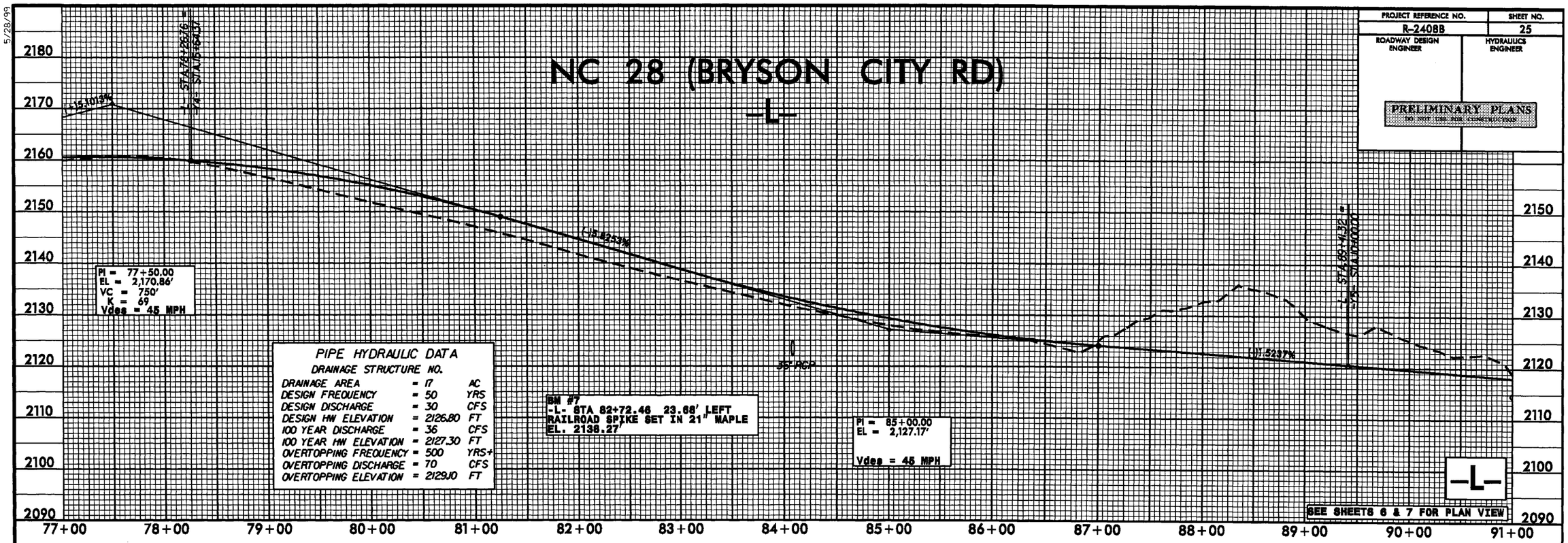
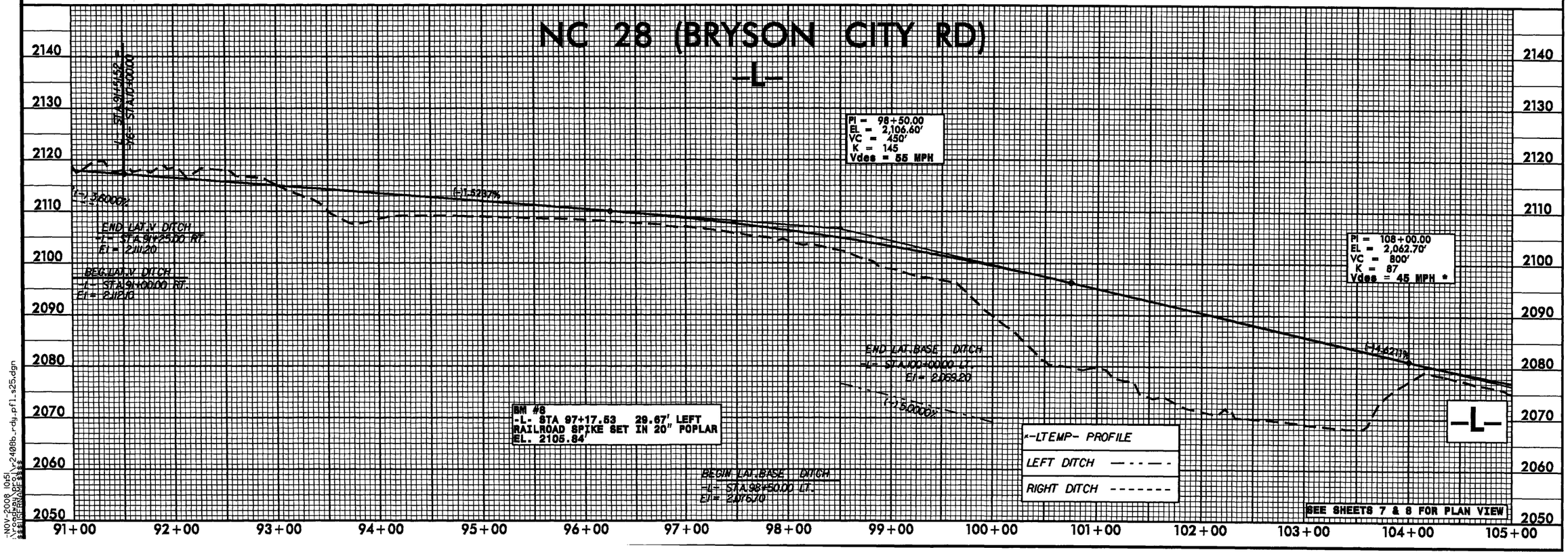
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-



NC 28 (BRYSON CITY RD)
-L-



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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	26

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2057.30	FT
BASE DISCHARGE	= 1100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2058.10	FT
OVERTOPPING DISCHARGE	= 1400+	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 2071.90	FT

BM #9
-L- STA 111+16.82 94.17' LEFT
RAILROAD SPIKE SET IN 7" OAK
EL. 2077.42'

PI = 108+00.00
EL = 2,062.70'
VC = 800'
K = 87
Vdes = 45 MPH *

PI = 117+00.00
EL = 2,103.84'
VC = 940'
K = 152
Vdes = 60 MPH

-L- STA 109+00.38
16'X 7' 3-SIDED PRECAST CONCRETE CULVERT
SKEW=58
G.P. ELEV=2073.44'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 3.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 2087.43	FT
100 YEAR DISCHARGE	= 8	CFS
100 YEAR HW ELEVATION	= 2087.43	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 21.5	CFS
OVERTOPPING ELEVATION	= 2096.14	FT

-L-

SEE SHEETS 8 & 9 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

NC 28 (BRYSON CITY RD)
-L-

BM #10
-L- STA 125+88.30 30.29' LEFT
CHISLED POINT ON ROCK WALL
EL. 2093.16'

PI = 117+00.00
EL = 2,103.84'
VC = 940'
K = 152
Vdes = 60 MPH

PI = 132+25.00
EL = 2,079.34'
VC = 490'
K = 80
Vdes = 45 mph *

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 31	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 2087.60	FT
100 YEAR DISCHARGE	= 60	CFS
100 YEAR HW ELEVATION	= 2088.20	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 65	CFS
OVERTOPPING ELEVATION	= 2089.50	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 25	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 45	CFS
DESIGN HW ELEVATION	= 2078.96	FT
100 YEAR DISCHARGE	= 55	CFS
100 YEAR HW ELEVATION	= 2080.16	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 2081.40	FT

LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -

-L-

SEE SHEETS 9 & 10 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-

PI = 139+00.00
EL = 2,109.61'
VC = 650'
K = 88
Vdes = 50 MPH *

BM #11
-L- STA 141+18.35 69.65' RIGHT
RAILROAD SPIKE SET IN POWER POLE
EL. 2109.97'

PI = 148+50.00
EL = 2,082.70'
VC = 400'
K = 312
Vdes = 60+ MPH

PI = 132+25.00
EL = 2,079.34'
VC = 490'
K = 80
Vdes = 45 mph *

(-)2.4537%

(-)1.2000% (-)1.3400%

BEG.SPECIAL CUT DITCH
-L- STA.144+50.00 RT.
EI = 2088.50

END SPECIAL CUT DITCH
BEG.LAT.V DITCH
-L- STA.145+00.00 RT.
EI = 2086.00

END LAT.V DITCH
-L- STA.145+50.00 RT.
EI = 2084.50

LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -

-L-

SEE SHEETS 10 & 11 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

2150 2140 2130 2120 2110 2100 2090 2080 2070 2060

133+00 134+00 135+00 136+00 137+00 138+00 139+00 140+00 141+00 142+00 143+00 144+00 145+00 146+00 147+00

NC 28 (BRYSON CITY RD)
-L-

PI = 148+50.00
EL = 2,082.70'
VC = 400'
K = 312
Vdes = 60+ MPH

BM #12
-L- STA 158+36.33 94.56' LEFT
RAILROAD SPIKE SET IN 12" WALNUT
EL. 2056.78'

(-)2.4537%

(-)2.6540%

(-)1.5800%

(-)1.2800%

(-)1.1570%

(-)1.1680%

-L- STA.152+77.76 =
-Y8- STA.10+40.00

-L- STA.158+46.34 =
-Y8- STA.15+72.22

36" RCP

BEG.LAT.V DITCH
-L- STA.148+50.00 LT.
EI = 2076.13

PI = 150+00.00
EI = 2071.85

PI = 150+50.00
EI = 2070.26

END LAT.V DITCH
-L- STA.151+00.00 LT.
EI = 2069.97

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.		
DRAINAGE AREA	= 23	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 40	CFS
DESIGN HW ELEVATION	= 2073	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 2073.50	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 95	CFS
OVERTOPPING ELEVATION	= 2077.10	FT

BEG.SPECIAL CUT DITCH
-L- STA.157+00.00 RT.
EI = 2061.43

END SPECIAL CUT DITCH
BEG.LAT.V DITCH DITCH
-L- STA.157+50.00 RT.
EI = 2063.44

END LAT.V DITCH DITCH
-L- STA.158+00.00 RT.
EI = 2061.66

LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -

-L-

SEE SHEETS 12 & 13 FOR PLAN VIEW

2120 2110 2100 2090 2080 2070 2060 2050 2040 2030

147+00 148+00 149+00 150+00 151+00 152+00 153+00 154+00 155+00 156+00 157+00 158+00 159+00 160+00 161+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	28

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-

BM #13
-L- STA 174+73.32 28.43' LEFT
RAILROAD SPIKE SET IN 8" WALNUT
EL. 2082.64'

PI = 162+00.00
EL = 2,061.50'
VC = 500'
K = 121
Vdes = 55 MPH

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 79	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 119	CFS
DESIGN HW ELEVATION	= 2057.94	FT
100 YEAR DISCHARGE	= 211	CFS
100 YEAR HW ELEVATION	= 2057.98	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 14	CFS
OVERTOPPING ELEVATION	= 2061.25	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 17	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 2065.33	FT
100 YEAR DISCHARGE	= 8	CFS
100 YEAR HW ELEVATION	= 2065.50	FT
OVERTOPPING FREQUENCY	= 100	YRS+
OVERTOPPING DISCHARGE	= 11	CFS
OVERTOPPING ELEVATION	= 2066.31	FT

(-L1-) -1.57004%
1-18" RCP
1-18" CSP
(-L2-) -12.65143%
(-L3-) 4.00%
(-L4-) 2.56000%
(-L5-) 3.62000%
PI-#7=160.000
EL= 2077.97
PI-#7=160.000
EL= 2077.97
PI-#7=500.000
EL= 2078.62
PI-#11=160.000
EL= 2079.59
BEG SPECIAL CUT DITCH
-L- STA 169+50.00 LT.
EL= 2077.00
END SPECIAL CUT DITCH
-L- STA 171+50.00 LT.
EL= 2080.72

LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -
-L-

SEE SHEETS 13 & 14 FOR PLAN VIEW

2120 2110 2100 2090 2080 2070 2060 2050 2040 2030

161+00 162+00 163+00 164+00 165+00 166+00 167+00 168+00 169+00 170+00 171+00 172+00 173+00 174+00 175+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-L-

PI = 176+00.00
EL = 2,097.22'
VC = 750'
K = 72
Vdes = 45 MPH *

(-L- STA 176+50.00 LT.)

24" RCP

END LAT. V DITCH
-L- STA. 179+00.00 LT.
EL = 2,064.83

BEG. LAT. V DITCH
-L- STA. 178+50.00 LT.
EL = 2,072.40

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 2074	FT
100 YEAR DISCHARGE	= 10	CFS
100 YEAR HW ELEVATION	= 2074.11	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 32	CFS
OVERTOPPING ELEVATION	= 2074.50	FT

BM #14
-L- STA 185+09.14 37.56' LEFT
RAILROAD SPIKE SET IN 8" WALNUT
EL. 2032.30'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 4.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 2027.51	FT
100 YEAR DISCHARGE	= 20	CFS
100 YEAR HW ELEVATION	= 2027.63	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 33	CFS
OVERTOPPING ELEVATION	= 2029.85	FT

-L- STA 195+85.41
END RESURFACING

-L- STA 188+00.00
EL = 2,002.82'
END GRADE
BEGIN RESURFACING

BEG. LAT. V DITCH
-L- STA. 183+00.00 RT.
EL = 2,034.71

END LAT. V DITCH
-L- STA. 184+00.00 RT.
EL = 2,022.62

LEFT DITCH — - - - —
RIGHT DITCH - - - - - - -
-L-

SEE SHEETS 14 & 15 FOR PLAN VIEW
* DENOTES DESIGN EXCEPTION

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PROJECT REFERENCE NO.	SHEET NO.
R-24088	30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DR3-

END GRADE
-DR3- STA 14+00.00
EL = 2,146.22'

PI = 12+60.00
EL = 2,136.00'
VC = 150'
K = 12
Vdes = STOP CONDITION

BEGIN GRADE
-DR3- STA 10+12.00
EL = 2,096.27'

PI = 10+60.00
EL = 2,095.79'
VC = 50'
K = 2
Vdes = STOP CONDITION

(+)0.0060ft/ft
(+)0.0100ft/ft
(+)0.0400ft/ft
(+)0.0600ft/ft

2,150
2,140
2,130
2,120
2,110
2,100
2,090

10 11 12 13 14

-DR3-

SR 1337 RIVERBEND ROAD
-Y3REV-

BEGIN GRADE
-Y3- STA 10+25.00
EL = 2,169.56'

PI = 11+50.00
EL = 2,161.00'
VC = 150'
K = 38

PI = 14+50.00
EL = 2,128.62'
VC = 60'
K = 6

-Y3REV- 14+81.30=
-L- 69+00.00 (30' RT)
EL = 2,128.62'

(-)0.0400ft/ft
(-)0.0267ft/ft
(-)0.0233ft/ft
(+)0.0000ft/ft

30" RCP

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 2127.7	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 2128.4	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 51	CFS
OVERTOPPING ELEVATION	= 2128.6	FT

SEE SHEET 5 FOR PLAN VIEW

2,160
2,150
2,140
2,130
2,120
2,110
2,100
2,090

10 11 12 13 14 15

SR 1444 PINE RIDGE ROAD
-Y4-

BEGIN GRADE
-Y4- STA 11+00.00
EL = 2,204.85

PI = 12+60.00
EL = 2,194.90'
VC = 190'
K = 47
Vdes = 30 MPH

PI = 14+25.00
EL = 2,177.90'
VC = 80'
K = 10
Vdes = STOP CONDITION

END GRADE
-Y4- STA 15+49.55=
-L- STA 78+26.76 12' RT
EL = 2,159.43'

(-)0.2167ft/ft
(-)0.3000ft/ft
(-)0.2000ft/ft
(-)0.1688ft/ft
(-)0.0788ft/ft

PI = 15+24.00
EL = 2,159.68'
VC = 50'
K = 3
Vdes = STOP CONDITION

SEE SHEET 6 FOR PLAN VIEW

2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140

10 11 12 13 14 15 16

-Y3-
-Y4-

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SR 1321 WINDY GAP ROAD -Y5-

BEGIN GRADE
-Y5- STA 10+12.00
EL = 2,121.16'

PI = 10+70.00
EL = 2,120.52'
VC = 60'
K = 8
Vdes = STOP CONDITION

L=100.00'
(-)1.0000%
(-)0.3000%
L=107.39'
(-)3.4000%
L=130.00'
(-)2.2000%
36" RCP

END GRADE
-Y5- STA 13+50.00
EL = 2,105.3084'

PI = 12+45.00
EL = 2,101.73'
VC = 200'
K = 14
Vdes = STOP CONDITION

BEG.LAT.V DITCH
-Y5- STA10+50.00 LT.
EI= 2117.00

END LAT.V DITCH
-Y5- STA12+50.00 LT.
EI= 2101.0

BEG.LAT.V DITCH
-Y5- STA12+00.00 LT.
EI= 2100.00

END LAT.V DITCH
-Y5- STA11+00.00 LT.
EI= 2104.25

LEFT DITCH — - - — -

SEE SHEET 7 FOR PLAN VIEW

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 19.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 2100.80	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 2102.0	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 2104.0	FT

SR 1381 LEE TALENT ROAD -Y6-

BEGIN GRADE
-Y6- STA 10+12.00
EL = 2,117.96'

PI = 10+45.00
EL = 2,118.29'
VC = 50'
K = 4
Vdes = STOP CONDITION

L=100.00'
(+)1.6000%
(-)0.3000%
L=107.39'
(-)3.4000%
72" RCP
(+)5.8000%
(+)3.7200%
L=328.66'
24" RCP

END GRADE
-Y6- STA 14+50.00
EL = 2,096.61'

PI = 13+00.00
EL = 2,090.93'
VC = 200'
K = 14
Vdes = STOP CONDITION

BEG.LAT.V DITCH
-Y6- STA12+00.00 LT.
EI= 2093.50

END LAT.V DITCH
-Y6- STA13+00.00 LT.
EI= 2088.26

LEFT DITCH — - - — -

SEE SHEET 7 FOR PLAN VIEW

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 225	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 209	CFS
DESIGN HW ELEVATION	= 2090.40	FT
100 YEAR DISCHARGE	= 330	CFS
100 YEAR HW ELEVATION	= 2093.80	FT
OVERTOPPING FREQUENCY	= 50	YRS+
OVERTOPPING DISCHARGE	= 287	CFS
OVERTOPPING ELEVATION	= 2091.40	FT

-Y5-
-Y6-

SR 1434 AIRPORT ROAD -Y7-

BEGIN GRADE
-Y7- STA 10+18.17
EL = 2,075.36'

END GRADE
-Y7- STA 13+50.00
EL = 2,064.02'

PI = 12+00.00
EL = 2,062.63'
VC = 200'
K = 25
Vdes = STOP CONDITION

L=100.00'
(-)4.0000%
L=100.00'
(-)1.0000%
(+)0.9244%
18" CMP
(+)3.3333%
24" RCP

END LAT.V DITCH
-Y7- STA.11+15.00 LT.
EI= 2057.50

BEG.LAT.V DITCH
-Y7- STA.10+70.00 LT.
EI= 2065.00

LEFT DITCH — - - — -

SEE SHEET 9 FOR PLAN VIEW

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.59	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 2065.54	FT
100 YEAR DISCHARGE	= 7	CFS
100 YEAR HW ELEVATION	= 2065.70	FT
OVERTOPPING FREQUENCY	= 500	YRS+
OVERTOPPING DISCHARGE	= 8.5	CFS
OVERTOPPING ELEVATION	= 2066	FT

SR 1372 IOTLA CHURCH ROAD -Y8-

BEGIN GRADE
-Y8- STA 10+12.00
EL = 2,076.64'

PI = 10+35.00
VC = 40'
EL = 2,076.87'
K = 6
Vdes = STOP CONDITION

END GRADE
-Y8- STA 13+00.00
EL = 2,062.29'

L=100.00'
(+)0.0000%
(-)5.5000%

SEE SHEET 12 FOR PLAN VIEW

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 16.9	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 23	CFS
DESIGN HW ELEVATION	= 2063.50	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 2065.20	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 19	CFS
OVERTOPPING ELEVATION	= 2063.50	FT

SR 1337 RIVERBEND ROAD -Y9-

END GRADE
-Y9- STA 15+15.21
EL = 2066.74'

PI = 14+50.00
EL = 2,084.02'
VC = 90'
K = 39
Vdes = STOP CONDITION

BEGIN CONST.
-Y9- STA 12+50.00
EL = 2051.13'

BEGIN GRADE
-Y9- STA 13+00.00
EL = 2054.32'

L=107.08'
(+)0.4639%
(+)3.4000%

SEE SHEET 12 FOR PLAN VIEW

-Y7-
-Y8-
-Y9-

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USER: mpeters

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DETIREV-

-DETIREV- STA 10+00.00=
-L- 70+85.00
BEGIN 3" RESURFACING AND WIDENING

-DETIREV- STA 10+75.00
ELEV = 2139.62
BEGIN GRADE

PI = 16+50.00
EL = 2,167.00'
VC = 300'
K = 29

PI = 22+00.00
EL = 2,137.00'
VC = 150'
K = 90

(-L-)4.761%

(-L-)-3.278%

(-L-)-3.786%

FOR -DETIREV- PLAN VIEW SEE SHEET 16

-DETIREV- STA 23+75.00
ELEV = 2130.37
END GRADE
BEGIN 3" RESURFACING AND WIDENING

-DETIREV- STA 25+32.01=
-L- 86+11.17
END RESURFACING AND WIDENING

(-L-)-3.799%

-Y4- STA 12+23.80
BEGIN WIDENING

-Y4- STA 14+27.48
EL = 2,174.96'
END WIDENING
BEGIN GRADE

-Y4DET-

PI = 15+00.00
EL = 2,160.55'
VC = 30'
K = 2

(-L-)2.321%

-Y4- STA 15+17.37=
-DETIREV- 17+75.00 10' RT
EL = 2,160.06'
END GRADE

FOR -Y4DET- PLAN VIEW SEE SHEET 16

-DETIREV-
-Y4DET-

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET2REV-

-DET2REV- STA 14+15.46 =
-L- 101+70.40
ELEV 2091.54 (3' BELOW PROPOSED -L- PROFILE)
BEGIN GRADE

PI = 25+00.00
EL = 2,083.46'
VC = 150'
K = 56

PI = 21+15.00
EL = 2,058.79
VC = 585'
K = 53

-DET2REV- STA 26+09.72 =
-L- STA 113+61.00
ELEV = 2087.53 (3' BELOW -L- PROFILE)
END GRADE

FOR -DET2REV- PLANVIEW SEE SHEET 18
FOR CULVERT PLANS SEE SHEETS

-Y7-
(-Y7TIE- PROFILE)

-Y7- STA 10+41.93 =
-DET2REV- STA 23+00.99 (2' LT)
EL = 2071.14
BEGIN GRADE

PI = 10+55.00
EL = 2,072.14'
VC = 20'
K = 2

PI = 11+25.00
EL = 2,065.01'
VC = 80'
K = 9

-Y7- STA 11+75.08
EL = 2064.18
END GRADE

FOR -Y7- PLANVIEW SEE SHEET 16

-DR-

-DR- STA 10+28.09 =
-L- STA 107+52.65 (122' RT)
ELEV = 2071.59

PI = 10+50.00
EL = 2,069.85'
L = 30'
K = 15

-DR- STA 11+31.03
ELEV = 2065.28

PI = 11+00.00
EL = 2,064.85'
L = 50'
K = 10

-DET2REV-
(-Y7TIE- PROFILE)
-DR-

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PROJECT REFERENCE NO.	SHEET NO.
R-2408B	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NC 28 (BRYSON CITY RD)
-LTEMP- PROFILE

-L- PROFILE

STA 76+26.76 -L-
STA 0+00.00 -LTEMP-

-L- 3.10%

-L- -3.8233%

36" RCP

BM #7
-L- STA 82+72.46 23.66' LEFT
RAILROAD SPIKE SET IN 21" MAPLE
EL. 2138.27'

PI = 89+00.00
EL = 2,120.83'
VC = 400'
K = 244

-L- -1.5237%

-L- -1.5200%

-L- -3.8125%

STA 89+43.36 -L-
STA 0+00.00 -LTEMP-

STA 90+52.00 -L-
STA 0+00.00 -LTEMP-

*TO BE USED DURING PHASE II TRAFFIC CONTROL

-LTEMP- PROFILE

-L- STA 87+00.00
EL = 2,124.12
3' BELOW -L- PROFILE
BEGIN -LTEMP- PROFILE

SEE SHEET 17 FOR PLAN VIEW

77 78 79 80 81 82 83 84 85 86 87 88 89 90 91

2,170 2,160 2,150 2,140 2,130 2,120 2,110 2,100 2,090

NC 28 (BRYSON CITY RD)
-LTEMP- PROFILE

-L- PROFILE

-L- -3.8125%

-L- -1.5237%

-L- -1.5200%

-L- -3.8125%

-L- -1.5237%

-L- -3.8125%

-L- -0.6114%

-L- -4.0933%

-L- -4.6875%

-L- -3.8271%

PI = 93+00.00
EL = 2,108.20'
VC = 210'
K = 49

PI = 94+50.00
EL = 2,109.84'
VC = 90'
K = 47

PI = 98+00.00
EL = 2,107.00'
VC = 250'
K = 77

PI = 101+00.00
EL = 2,094.84'
VC = 100'
K = 158

BM #8
-L- STA 97+17.53 29.67' LEFT
RAILROAD SPIKE SET IN 20" POPLAR
EL. 2105.84'

-L- STA 104+00.00
EL = 2,091.54'
3" BELOW -L- PROFILE
END -LTEMP- PROFILE
BEGIN -DET2REV- PROFILE

*TO BE USED DURING PHASE II TRAFFIC CONTROL

-LTEMP- PROFILE

SEE SHEET 17 FOR PLAN VIEW

91 92 93 94 95 96 97 98 99 100 101 102 103 104 105

2,140 2,130 2,120 2,110 2,100 2,090 2,080 2,070 2,060 2,050

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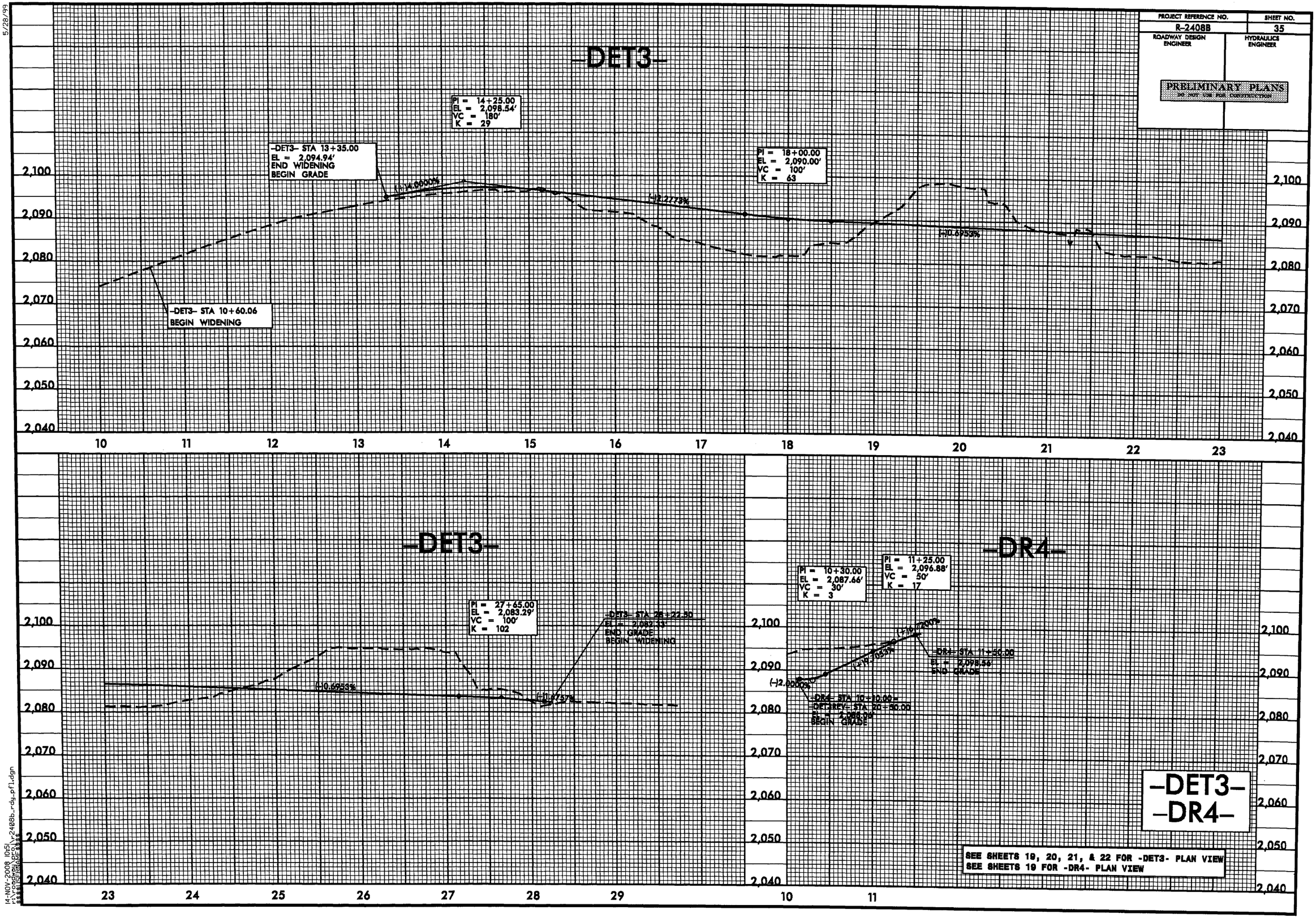
PROJECT REFERENCE NO.	SHEET NO.
R-2408B	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION



SEE SHEETS 19, 20, 21, & 22 FOR -DET3- PLAN VIEW
SEE SHEETS 19 FOR -DR4- PLAN VIEW

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APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: R-2408B (Widening of NC 28 from SR 1323 to SR 1335)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State:NC County/parish/borough: Macon City: Franklin
Center coordinates of site (lat/long in degree decimal format): Lat. 35'12'21"° N, Long. 83'23'52"° W.
Universal Transverse Mercator:
Name of nearest waterbody: Rocky Branch/Little Tennesse River
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Little Tennessee River
Name of watershed or Hydrologic Unit Code (HUC): 06010202
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There Appear to be no *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There Are *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 3000 linear feet: 2-8 width (ft) and/or acres.
   Wetlands: 0.09 acres.

   c. **Limits (boundaries) of jurisdiction** based on: Established by OHWM.
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: Pick List
   Drainage area: Pick List
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☒ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List tributaries before entering TNW.

   Project waters are Pick List river miles from TNW.
   Project waters are Pick List river miles from RPW.
   Project waters are Pick List aerial (straight) miles from TNW.
   Project waters are Pick List aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☐ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
- Average width: feet
- Average depth: feet
- Average side slopes: Pick List.

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☐ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☐ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: Pick List
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: Pick List
Estimate average number of flow events in review area/year: Pick List
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: Pick List. Characteristics: .

Subsurface flow: Pick List. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☐ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ■ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ■ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: Pick List. Explain: .

Surface flow is: Pick List

Characteristics: .

Subsurface flow: Pick List. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are Pick List river miles from TNW.

Project waters are Pick List aerial (straight) miles from TNW.

Flow is from: Pick List.

Estimate approximate location of wetland as within the Pick List floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: Pick List

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☒ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: UT to Little Tennessee River, Rocky Branch and Jacob Branch have NCDWQ stream rating scores greater than 30.
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☒ Tributary waters: **3000** linear feet **2 - 8** width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☒ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **The wetlands have a jurisdictional connection based on the three criteria defining a wetland from the 1987 Manual.**

     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: **0.09** acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ■ Tributary waters: linear feet width (ft).
- ■ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ■ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ■ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ■ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ■ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ■ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ■ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ■ Lakes/ponds: acres.
- ■ Other non-wetland waters: acres. List type of aquatic resource: .
- ■ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ■ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ■ Lakes/ponds: acres.
- ■ Other non-wetland waters: acres. List type of aquatic resource: .
- ■ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ■ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ■ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ■ Data sheets prepared by the Corps: .
- ■ Corps navigable waters' study: .
- ■ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ■ U.S. Geological Survey map(s). Cite scale & quad name: .
- ■ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ■ National wetlands inventory map(s). Cite name: .
- ■ State/Local wetland inventory map(s): .
- ■ FEMA/FIRM maps: .
- ■ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ■ Photographs: ☐ Aerial (Name & Date): .
  - or ☐ Other (Name & Date): .
- ■ Previous determination(s). File no. and date of response letter: .
- ■ Applicable/supporting case law: .
- ■ Applicable/supporting scientific literature: .
- ■ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

WET B

Project/Site: R 2408 NC 28 @ Airport Road Applicant/Owner: NCDOT Investigator: Turchy M., Stanton T	Date: 11-15-2005 County: Macon State: NC
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: wetland Transect ID: Plot ID: B

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Acer Rubrum	Tree	FAC	9.		
2. Carex	Herb		10.		
3. Blackwillow	Tree	OBL	11.		
4. Polygonum Sp.		FAC	12.		
5. Ligustrum Sp.		FAC	13.		
6. Nyssa silvatica		FAC	14.		
7. Cornus florida		FACU	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other X No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: X Inundated X Saturated in Upper 12 Inches X Water Marks X Drift Lines X Sediment Deposits X Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12" X Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: -None- (in.) Depth to Free Water in Pit: 4 (in.) Depth to Saturated Soil: Ø (in.)	

Remarks:

SOILS

Map Unit Name (Series and Phase): ScB Sumach loam 2-8% slope

Drainage Class: WD

Taxonomy (Subgroup): Humic Hapludults

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10YR 4/2	- None -		Silty Clay Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Up B

Project/Site: R-2408 NC 28 @ Airport Road	Date: 11-15-2005
Applicant/Owner: NC DOT	County: MACON
Investigator: Tracey M. Stanton, T	State: NC
Do Normal Circumstances Exist on the site? (Yes) No	Community ID: Upland
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID: B
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Privet			9.		
2. blackberry			10.		
3. Kudzu			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

X No Recorded Data Available

Field Observations:
- Depth of Surface Water: -None- (in.)
- Depth to Free Water in Pit: -None- (in.)
- Depth to Saturated Soil: -None- (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): ScB Scanlock loam 2-8% slopes

Drainage Class: WD

Taxonomy (Subgroup): Humic Hapludults

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR 4/3	10YR 3/3	30%	Clay Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks:

Wetland B

WETLAND RATING WORKSHEET Fourth Version

Project Name: R-2408 B Nearest road: NC28/Airport Rd.

County: Macon Wetland area: 0.04 acres Wetland width: ____ feet

Name of evaluator: Jason Diddy Date: 11/20/06

Wetland location

____ on pond or lake
__✓__ on perennial stream
____ on intermittent stream
____ within interstream divide
____ other:____

Soil series Saunook loam 2-8%
____ predominantly organic (humus, muck, or peat)
__✓__ predominantly mineral (non-sandy)
____ predominantly sandy

Hydraulic factors
__✓__ steep topography
___ ditched or channelized
___ total riparian wetland width ≥ 100 ft

Adjacent land use (within ½ mile upstream, upslope, or radius)
____ forested/natural vegetation ____%
__✓__ agriculture, urban/suburban 40%
__✓__ impervious surface 60%

Dominant vegetation
1) Acer rubrum
2) Salix nigra
3) Polygonum sp.

Flooding and wetness
____ semipermanently to permanently flooded or inundated
__✓__ seasonally flooded or inundated
____ intermittently flooded or temporary surface water
____ no evidence of flooding or surface water

Wetland type (select one)

____ Bottomland hardwood forest	____ Pine savanna
__✓__ Headwater forest	____ Freshwater marsh
____ Swamp forest	____ Bog/fen
____ Wet flat	____ Ephemeral wetland
____ Pocosin	____ Carolina Bay
____ Bog forest	____ Other ____

*The rating system cannot be applied to salt or brackish marshes or stream channels.

				weight		
R	Water storage	3	x	4.00	=	12
A	Bank/Shoreline stabilization	1	x	4.00	=	4
T	Pollutant removal	3[1]	x	5.00	=	15
I	Low flow augmentation	—	x	2.00	=	—
N	Wildlife habitat	1	x	4.00	=	4
G	Aquatic life	1	x	1.00	=	1

Total Score: 36

[1]Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

Wet A

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-2408	Date:	11/20/06
Applicant/Owner:	NCDOT S. of Airport Rd. Just to junkyard	County:	Macon
Investigator:	S. Dilday, G. Kaugh, M. Twichy	State:	NC
Do Normal Circumstances exist on the site?	☑ Yes ☐ No	Community ID:	Wetland
Is the site significantly disturbed (Atypical Situation)?	☐ Yes ☑ No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐ Yes ☑ No	Plot ID:	A

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
Ty Alder	1. Alnus serrulata	Tree	FACW+	9.			
	2. Juncus sp.	Herb	FACW	10.			
	3. Arundinaria gigantea	Shrub	FACW	11.			
	4.			12.			
	5.			13.			
	6.			14.			
	7.			15.			
	8.			16.			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☑ Other

☑ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☑ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☑ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☑ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): S-B Sawyer loam 2-8% slopes

Drainage Class: WD

Taxonomy (Subgroup): Humic Haplaquolls

Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-12+	A	10YR 3/2	10YR 4/4	Few	Clayey loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☑ Aquic Moisture Regime
- ☑ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☑ Yes ☐ No (Check)

Wetland Hydrology Present? ☑ Yes ☐ No

Hydric Soils Present? ☑ Yes ☐ No

Is this Sampling Point Within a Wetland? (Check) ☑ Yes ☐ No

Remarks

Up A

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	R-2408 S. of Biscuit Rd. / next to junkyard	Date:	11/20/06
Applicant/Owner:	NCDOT	County:	Macon
Investigator:	J Dilday, B Foard, M Tuchy	State:	NC
Do Normal Circumstances exist on the site?	☑ Yes ☐ No	Community ID:	Upland
Is the site significantly disturbed (Atypical Situation)?	☐ Yes ☑ No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐ Yes ☑ No	Plot ID:	A

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Ligustrum spp.	Shrub	FAC	9.		
2. Quercus alba	Tree	FACU	10.		
3. Polystichum acrostichoides	Herb	FAC	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☑ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: None (in.)

Depth to Saturated Soil: None (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): SaB Sawmook loam 2-8% slopes

Drainage Class: WD

Taxonomy (Subgroup): Humic Hapludults

Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12+	A	10YR 4/3			Silty Clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes	☑ No	(Check)
Wetland Hydrology Present?	☐ Yes	☑ No	
Hydric Soils Present?	☐ Yes	☑ No	

Is this Sampling Point Within a Wetland? (Check) ☐ Yes ☑ No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

Wetland A

WETLAND RATING WORKSHEET: Fourth Version

Project Name: R-2405B Nearest road: NC28/Airport Rd.

County: Macon Wetland area: 0.05 acres Wetland width: ____ feet

Name of evaluator: Jason Diday Date: 11/20/06

Wetland location

____ on pond or lake
✓ on perennial stream
____ on intermittent stream
____ within interstream divide
____ other: ____

Soil series Saunook loam 2-8%
____ predominantly organic (humus, muck, or peat)
✓ predominantly mineral (non-sandy)
____ predominantly sandy

Hydraulic factors
✓ steep topography
___ ditched or channelized
___ total riparian wetland width ≥ 100 ft

Adjacent land use (within ½ mile upstream, upslope, or radius)
____ forested/natural vegetation ____%
✓ agriculture, urban/suburban 50%
✓ impervious surface 50%

Dominant vegetation
1) Alnus serrulata
2) Juncus sp.
3) Arundinaria gigantea

Flooding and wetness
____ semipermanently to permanently flooded or inundated
____ seasonally flooded or inundated
✓ intermittently flooded or temporary surface water
____ no evidence of flooding or surface water

Wetland type (select one)

____ Bottomland hardwood forest	____ Pine savanna
✓ Headwater forest	____ Freshwater marsh
____ Swamp forest	____ Bog/fen
____ Wet flat	____ Ephemeral wetland
____ Pocosin	____ Carolina Bay
____ Bog forest	____ Other ____

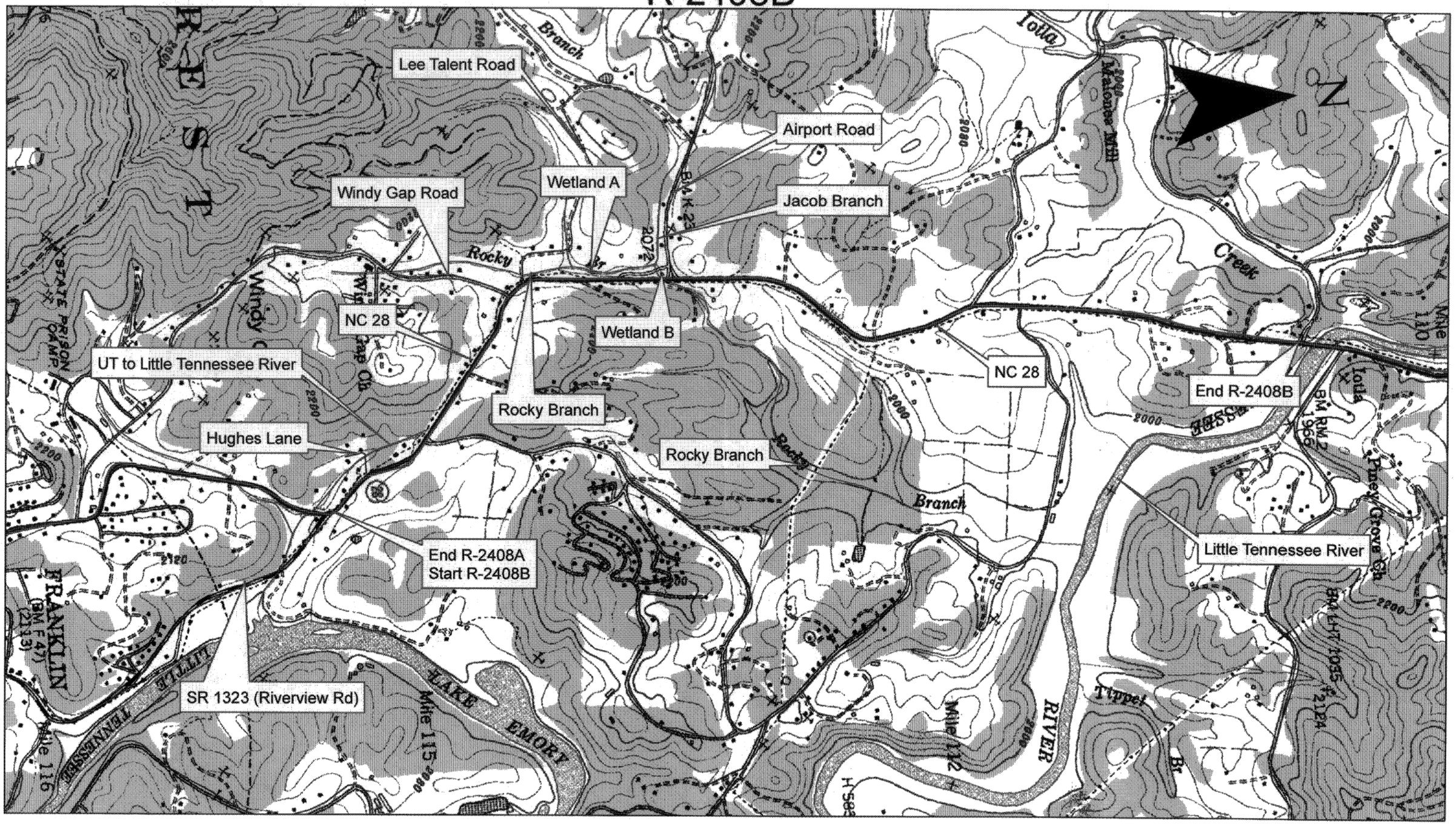
*The rating system cannot be applied to salt or brackish marshes or stream channels.

				weight		
R	Water storage	1	x	4.00	=	4
A	Bank/Shoreline stabilization	1	x	4.00	=	4
T	Pollutant removal	3 [1]	x	5.00	=	15
I	Low flow augmentation	~~1~~	x	2.00	=	~~2~~
N	Wildlife habitat	2	x	4.00	=	8
G	Aquatic life	1	x	1.00	=	1

Total Score: 32

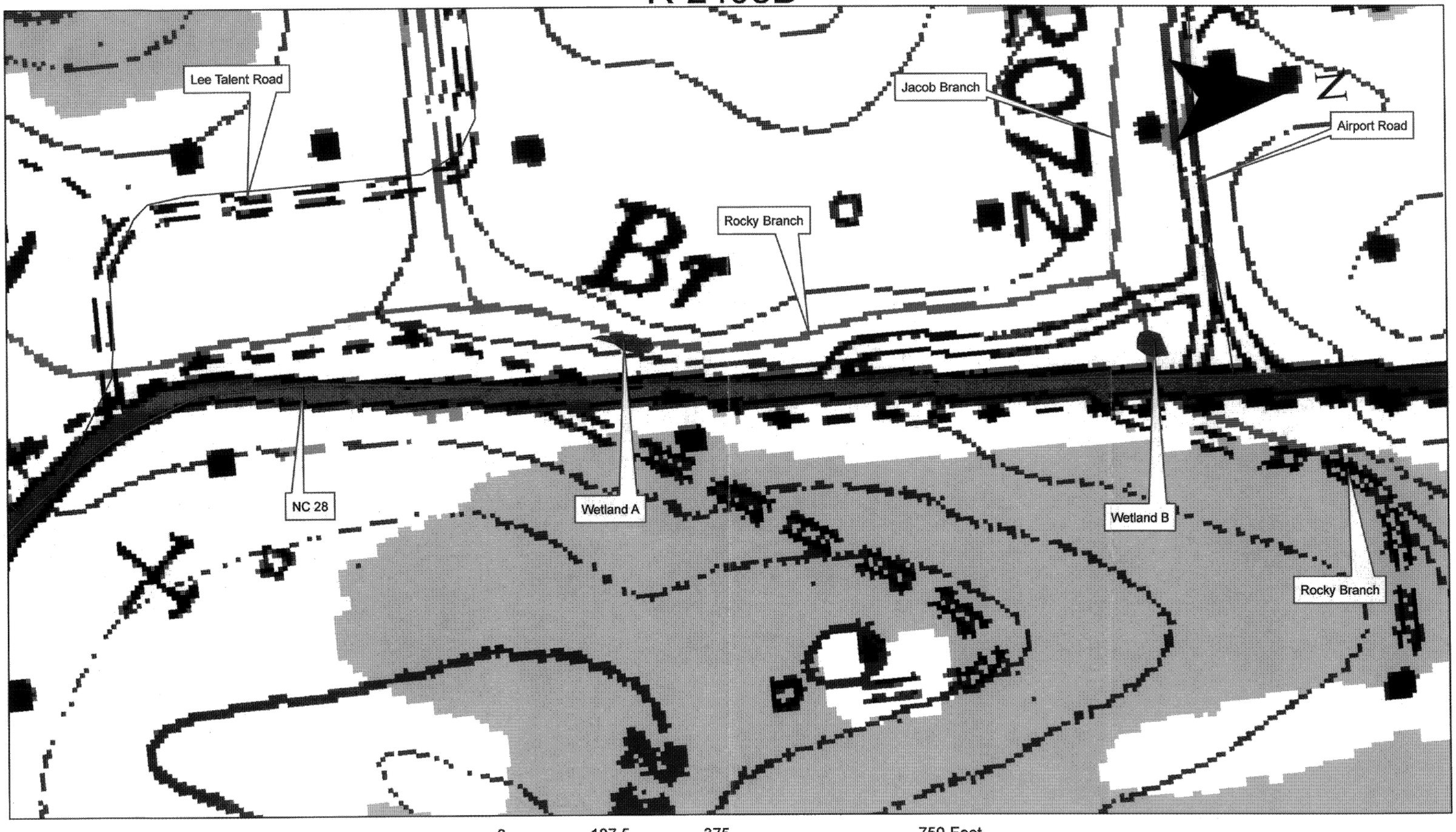
[1] Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

R-2408B



0 1,750 3,500 7,000 Feet

R-2408B


Lee Talent Road
Jacob Branch
Airport Road
Rocky Branch
NC 28
Wetland A
Wetland B
Rocky Branch
N
0
187.5
375
750 Feet