STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 3, 2009

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

ATTN: Mr. Steve Chapin
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23, 33 and Section 401 Water Quality Certifications** for the proposed replacement of Bridge No. 82 over Jacktown Creek on NC 226 in McDowell County, Federal Aid Project No. BRSTP-226(10); Division 13; TIP No. B-4191
$570.00 debit WBS 33538.1.1

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 82 over Jacktown Creek on NC 226. There will be 85 feet (0.02 acres) of temporary surface water impacts, 175 feet (0.04 acres) of permanent surface water impacts. Following construction of the project, NCDOT will mitigate for 175 feet of permanent stream impacts onsite at 1:1 ratio by restoring approximately 450 ft. of Jacktown Creek. The conceptual mitigation plan for the restoration is attached. NCDOT will apply for a separate permit for the onsite mitigation project and will include final mitigation design plans at that time. If for any reason the mitigation cannot be obtained onsite, NCDOT will request mitigation from the North Carolina Ecosystem Enhancement Program.

Please see enclosed copies of the Pre-Construction Notification (PCN), permit drawings, design plans and Stormwater Management Plan for the above-referenced project. The Categorical Exclusion (CE) was completed in March 2006 and the Right-of-Way Consultation was completed in July 2008. Documents were distributed shortly thereafter. Additional copies are available upon request.

This project calls for a letting date of September 15, 2009 and a review date of July 28, 2009.

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

TELEPHONE: 919-431-2000
FAX: 919-431-2002

WEBSITE: WWW.NCDOT.ORG

LOCATION:
4701 ATLANTIC AVENUE
SUITE 116
RALEIGH NC 27604

A copy of this permit application will be posted on the NCDOT Website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call Jennifer Harrod at (919) 431-6672.

Sincerely,

E. F. Luck

for Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

w/attachment

Mr. Brian Wrenn, NCDWQ (5 copies)
Ms. Marla Chambers, NCWRC
Ms. Marella Buncick, USFWS

w/o attachment (see permit website for attachments)

Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Greg Perfetti, P.E., Structure Design
Mr. J.J. Swain, P.E., Division Engineer
Mr. Roger Bryan, DEO
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
Mr. Vincent Rhea, PDEA

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 23 33	or General Permit (GP) number:	
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No

1d. Type(s) of approval sought from the DWQ (check all that apply):

☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit

☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization

1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☐ Yes ☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☐ Yes ☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☐ Yes ☒ No

2. Project Information

2a. Name of project:	Replacment of Bridge 82 over Jacktown Creek on NC 226
2b. County:	McDowell
2c. Nearest municipality / town:	Marion
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4191

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC if applicable):	*not applicable*
3d. Street address:	1598 Mail Service Center
3e. City, state, zip:	Raleigh, NC 27699-1598
3f. Telephone no.:	(919) 431-6672
3g. Fax no.:	(919) 431-2002
3h. Email address:	jwharrod@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	*not applicable*
1b. Site coordinates (in decimal degrees):	Latitude: 35.65 (DD.DDDDDD) Longitude: - 81.95 (-DD.DDDDDD)
1c. Property size:	950 ft L x 225 ft W = 213,750 sq. ft (213,750) sq. ft. / (43,650) sq. ft = 4.9 acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Jacktown Creek
2b. Water Quality Classification of nearest receiving water:	C
2c. River basin:	Catawba
3. Project Description	
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: Bridge No. 82 will be replaced with a 90-foot long reinforced concrete box culvert. Area is heavily developed/disturbed.	
3b. List the total estimated acreage of all existing wetlands on the property: 0	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 250 feet	
3d. Explain the purpose of the proposed project: To replace a structurally deficient and/ or functionally obsolete bridge.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing a 21-foot bridge with a 90-foot, RCBC at new location just northeast of the existing location. Standard road building equipment, such as trucks, dozers, and cranes will be used.	
4. Jurisdictional Determinations	
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments:	☐ Yes ☒ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known):	Agency/Consultant Company: Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.	
5. Project History	
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☒ No ☐ Unknown
5b. If yes, explain in detail according to "help file" instructions.	
6. Future Project Plans	
6a. Is this a phased project?	☐ Yes ☒ No
6b. If yes, explain.	

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☐ Wetlands ☒ Streams - tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
Site 1 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 2 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 3 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 4 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 5 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 6 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
				2g. **Total wetland impacts**	X Permanent X Temporary

2h. Comments:

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
Site 1 ☒ P ☐ T	Culvert 2 @ 8' X 10' RCBC	Jacktown Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	8'	175
Site 2 ☐ P ☒ T	Temporary Pipe 2 @ 66" CSP	Jacktown Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	8'	85
Site 3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	175 Perm 85 Temp

3i. Comments:

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
O4 ☐ P ☐ T				
			4f. Total open water impacts	X Permanent X Temporary

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?			☐ Neuse ☐ Catawba	☐ Tar-Pamlico ☐ Randleman	☐ Other:
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			
6i. Comments:					

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

The current bridge will be replaced at new location just northeast of the existing location. During construction traffic will follow an on-site detour. There will be no direct discharge into Jacktown Creek. Low flow channel in RCBC and preformed scoure hole to reduce road runoff.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

NCDOT Best Management Practices will be implemented during all phases of construction and demolition.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☒ Yes ☐ No
2b. If yes, mitigation is required by (check all that apply):	☒ DWQ ☒ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☒ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

NCDOT will restore approximately 175 feet of jurisdictional stream as onsite-mitigation at 1:1 ratio by restoring the downstream reach of Jacktown Cree. See attached Conceptual Stream Restoration Plan.

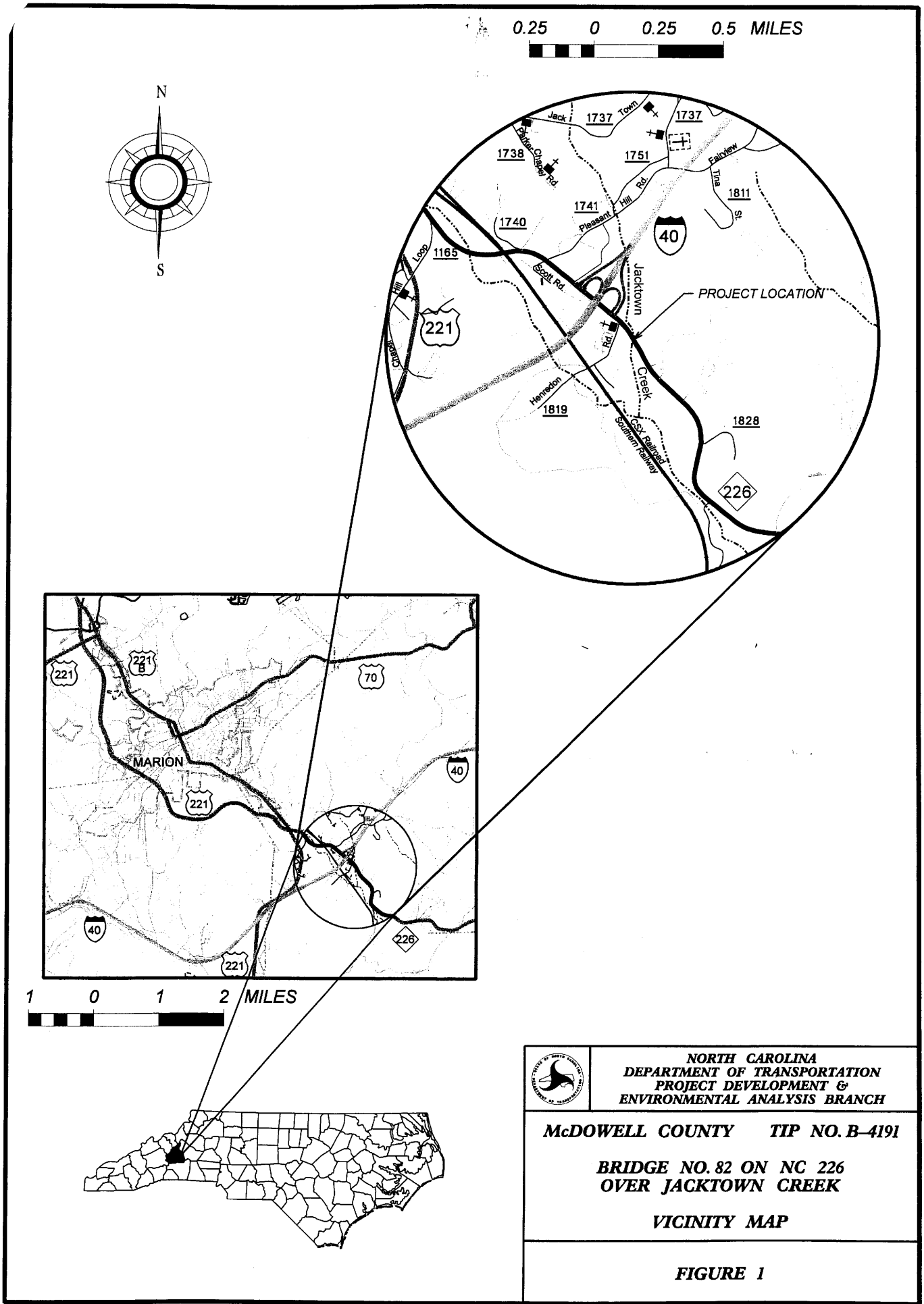
6. **Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ**				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?			☐ Yes ☐ No	
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.				
Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			
6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).				
6h. Comments:				

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments:	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	See attached %
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See attached	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☐ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☐ Yes	☒ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☐ Yes	☒ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☐ Raleigh ☐ Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? http://www.fws.gov/nc-es/es/countyfr.html ; Field investigations within the project study area were conducted by NCDOT staff resulting in biological conclusions of No Effect (No Habitat Present) for all T&E species listed for McDowell County.		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? NMFS County Index		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? NEPA Documentation		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☐ Yes	☒ No
8b. If yes, explain how project meets FEMA requirements: Hydraulics coordination with FEMA		
8c. What source(s) did you use to make the floodplain determination? FEMA Maps		

Dr. Gregory J. Thorpe, Ph D Applicant/Agent's Printed Name	Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	Date



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS BRANCH

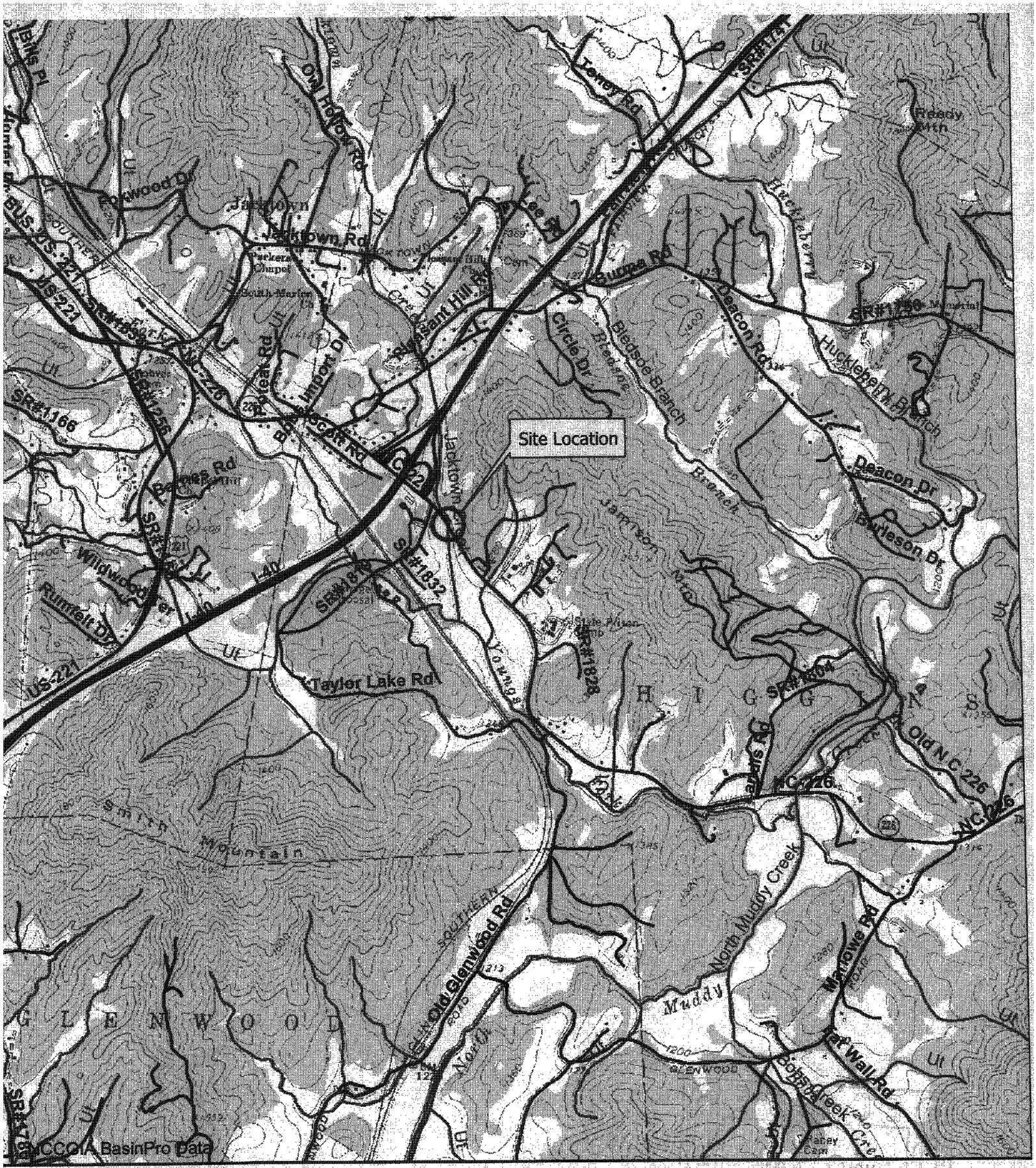
McDOWELL COUNTY TIP NO. B-4191

BRIDGE NO. 82 ON NC 226
OVER JACKTOWN CREEK

VICINITY MAP

FIGURE 1

Permit Drawing
Sheet 1 of 13



B-4191

BRIDGE No. 82
OVER JACKTOWN CREEK
McDOWELL COUNTY

M A Engineering

Permit Drawing
Sheet 2 of 13

Property Owners

Parcel Number	Names	Addresses
3	Trustees of the McDowell County Technical Institute	54 College Dr,. Marion NC 278752
4	Dawn J. Smith & Leo M. Smith: AND Phyllis J. Lynch & Linard P. Lynch	Route 3, Box 68A, Ameliia, NC 23002

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

McDowell COUNTY
WBS - 33538.1.1 (B-4191)

SHEET 10/27/2008

Permit Drawing
Sheet 3 of 13

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)
1	-L- STA 74+95 to 75+96	2 @ 8' x 10' RCBC						0.04	< 0.01	175		
1	-DET- STA 16+46 to 17+24	Temporary Pipe 2@66" CSP							0.02		85	
TOTALS:								0.04	0.02	175.00	85.00	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

McDowell COUNTY
WBS - 33538.1.1 (B-4191)

SHEET 10/27/2008

ATN Revised 3/31/05

Permit Drawing
Sheet 4 of 13

09/08/99

TIP PROJECT: B-4191

CONTRACT:

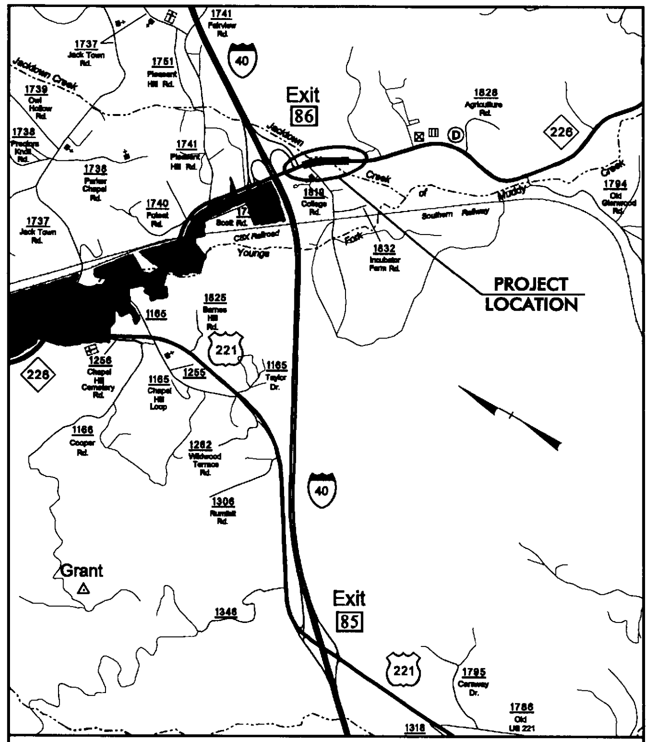
$$$$SYSTIME$$$$
$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4191	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33538.1.1	BRSTP-226 (10)	PE
33538.3.1	BRSTP-226 (10)	R/W, UTILITIES

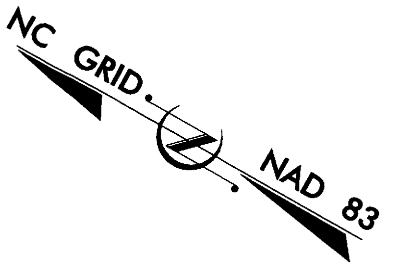


VICINITY MAP

McDOWELL COUNTY

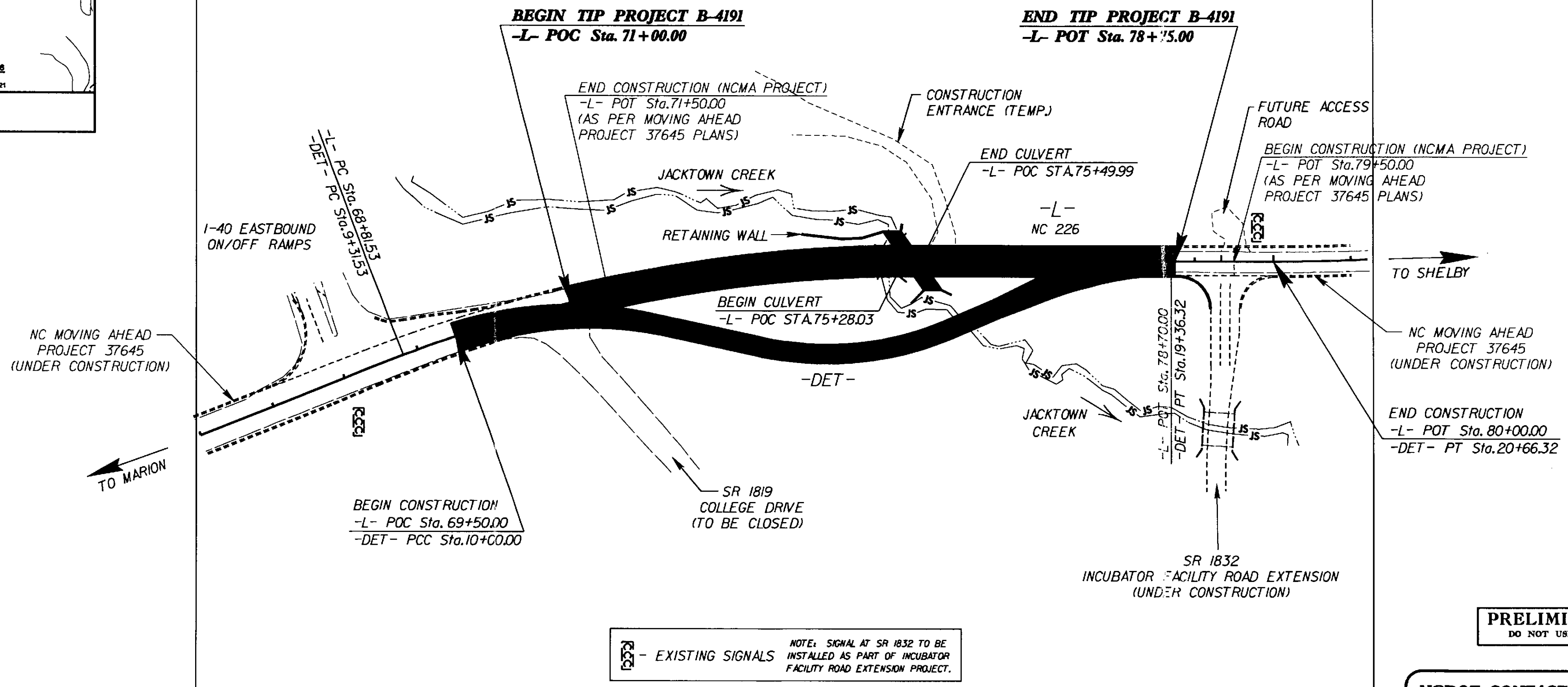
LOCATION: BRIDGE NO. 82 OVER A CREEK ON NC 226

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE, AND GUARDRAIL.



Wetland Permit

4



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

NCDOT CONTACT:

MR. DOUG TAYLOR, PE - ENGINEERING COORDINATION - PROJECT ENGINEER - ROADWAY DESIGN UNIT

GRAPHIC SCALES

0 50 100
PLANS

0 50 100
PROFILE (HORIZONTAL)

0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009 = 8,940
ADT 2029 = 12,765
DHV = 10 %
D = 60 %
T = 8 % *
V = 50 MPH
* (TTST 3% + DUAL 5%)
FUNC. CLASS = RURAL MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4191	=	0.143 mile
LENGTH STRUCTURE TIP PROJECT B-4191	=	0.004 mile
TOTAL LENGTH TIP PROJECT B-4191	=	0.147 mile

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 270-0220

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 19, 2008

LETTING DATE:
SEPTEMBER 15, 2009

ROBERT W. PORTER, JR PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

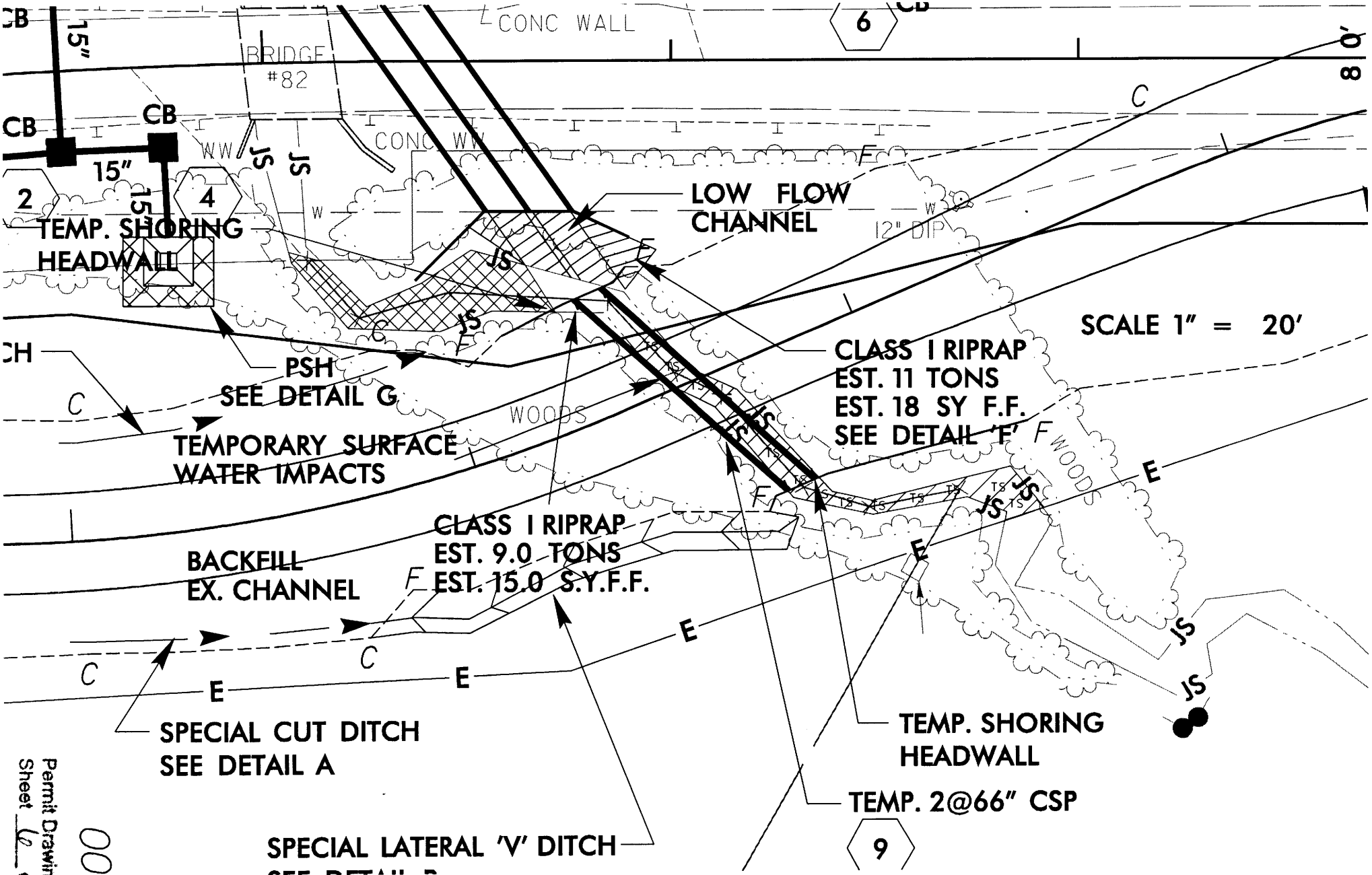
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

Permit Drawing



Permit Drawing
Sheet 42 of 43

00

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4191	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

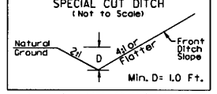
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

WETLAND PERMIT

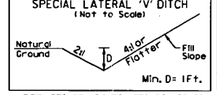
NAD 83

DETAIL A
SPECIAL CUT DITCH
(Not To Scale)



-DET- STA. 14+98 TO STA. 15+84 RT
-DET- STA. 14+98 TO STA. 15+97 LT

DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not To Scale)



-DET- STA. 15+84 TO STA. 16+62 RT

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

(2) McDOWELL COUNTY

(4) DAWN J. SMITH & LEO M. SMITH; AND PHYLLIS J. LYNCH & LINARD P. LYNCH

(3) TRUSTEES OF THE McDOWELL COUNTY TECHNICAL INSTITUTE

(1) ITL CORP.

NCDOT

BRIDGE DESCRIPTION
CONCRETE DECK ON STEEL I-BEAMS, BRIDGE #82 OVER JACKTOWN CREEK ON NC 226

TAIL BASE DITCH SEE DETAIL E

CL B RIP RAP EST. 8 TONS EST. 21 SY F.F.

CLASS I RIPRAP EST. 7 TONS EST. 12 SY F.F. SEE DETAIL F

ROCK INLET SILL

CL B RIP RAP EST. 2 TONS EST. 7 SY F.F.

SPECIAL LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL D

LOW FLOW CHANNEL

CLASS I RIPRAP EST. 11 TONS EST. 18 SY F.F. SEE DETAIL F

SPECIAL CUT DITCH SEE DETAIL A

LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL C

BACKFILL EX. CHANNEL

CLASS I RIPRAP EST. 9.0 TONS EST. 15.0 S.Y.F.F.

SPECIAL CUT DITCH SEE DETAIL A

TEMP. SHORING HEADWALL

SPECIAL LATERAL 'V' DITCH SEE DETAIL B

TEMP. 2@66" CSP

REMOVE

FUTURE DRAINAGE FOR MOVING-AHEAD PROJECT

NOTE:
EXISTING R/W IN THIS AREA WAS AQUIRED PREVIOUSLY UNDER MOVING AHEAD PROJECT MAI3063R, AND IS BASED ON THAT DESIGN ALIGNMENT. MAI3063R IS UNDER CONSTRUCTION.

MULTI-PLATE ARCH CULVERT 42" x 15"

BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'

BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'

-DET-

BEGIN GRADE
-L- STA. 11+49.30
EL. 1247.45'

END GRADE
-L- STA. 18+31.17
EL. 1246.30'

PI = 14+80.00
EL = 1228.35'
VC = 580'
K = 53
V = 35 mph

-L- L.P. 1242.97'

PROPOSED GRADE

EXISTING PROFILE

-DET- L.P. 1236.21'

-L- 5.7756%

-15.1115%

BEGIN SPECIAL CUT DITCH
-DET- STA. 14+98.00 RT
EL. = 1235.55

BEGIN SPECIAL CUT DITCH
-DET- STA. 14+98.00 LT
EL. = 1234.11

END SPECIAL CUT DITCH
BEGIN SPECIAL LATERAL 'V' DITCH
-DET- STA. 15+84.00 RT
EL. = 1234.34

END SPECIAL CUT DITCH
-DET- STA. 15+97.00 LT
EL. = 1233.62

TEMP. 2 @ 66" CSP SKEW 65°

END SPECIAL LATERAL 'V' DITCH
-DET- STA. 16+62.00 RT
EL. = 1233.09

= 5
= 290
= 1233.4
= 870
= 1237.8
= 25
= 560
= 1236.2

Permit Drawing

10/01/2008
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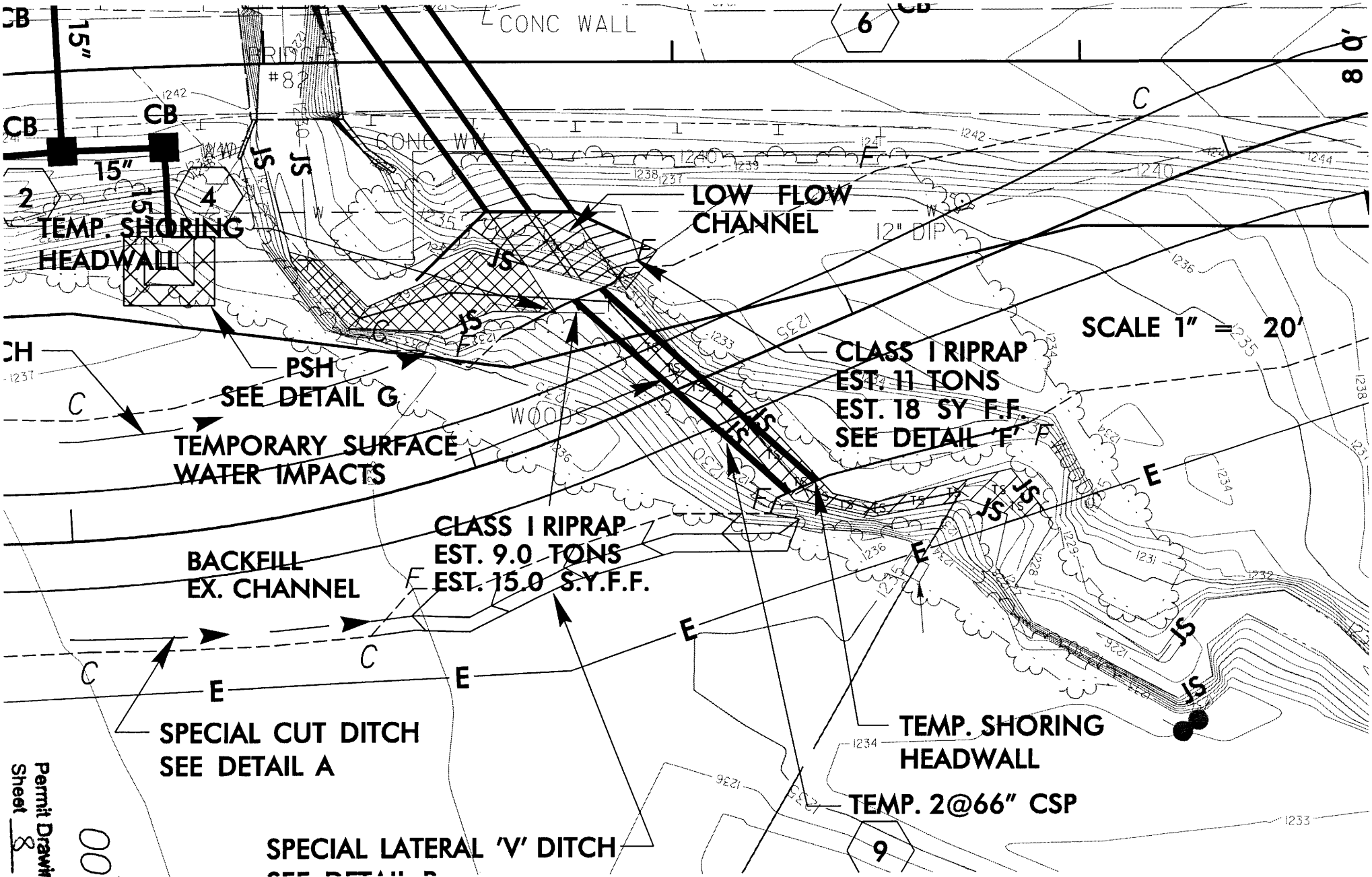


Permit Drawing
Sheet 8 of 13

00

8/17/99

REVISIONS

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

-DET- STA. 14+98 TO STA. 15+84 RT
-DET- STA. 14+98 TO STA. 15+97 LT

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

-DET- STA. 15+84 TO STA. 16+62 RT

WETLAND PERMIT

NAD 83

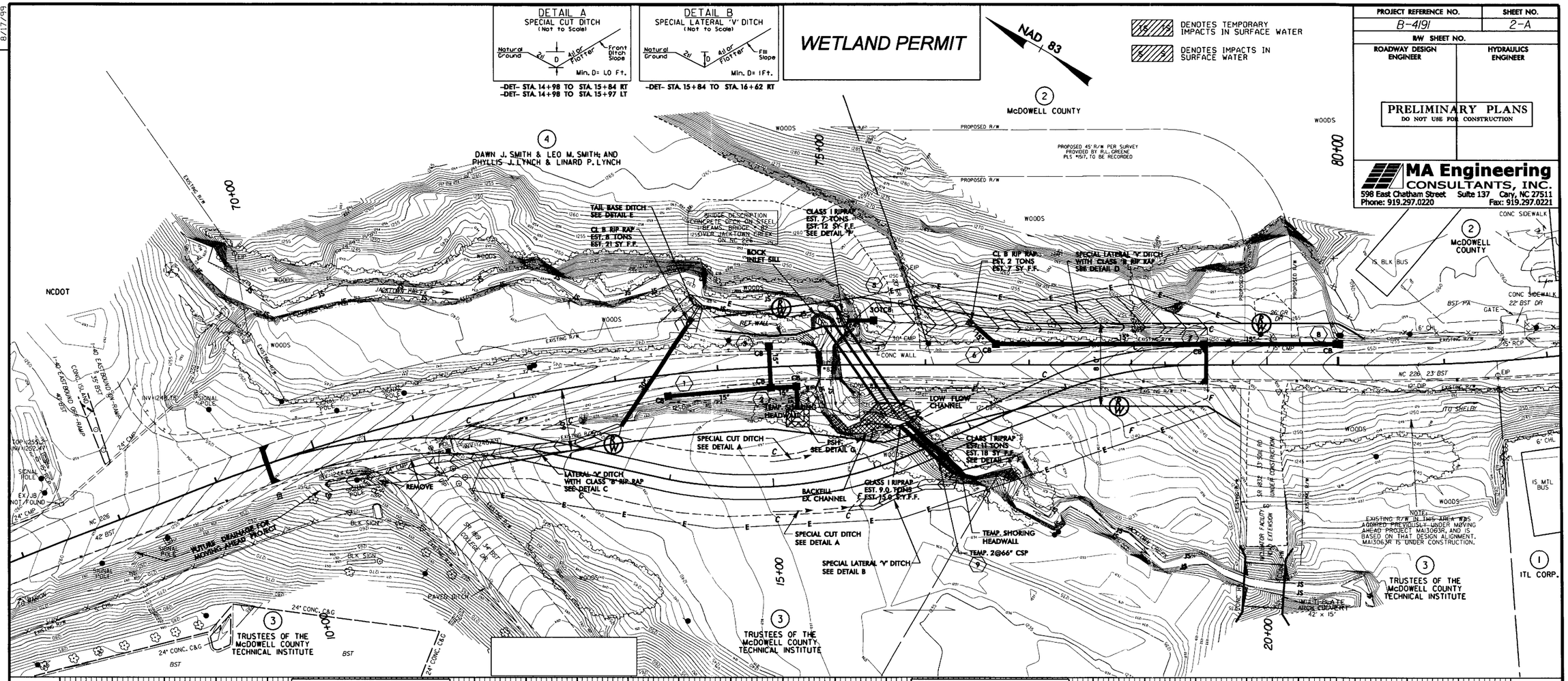
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
B-4191	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221


(2) McDOWELL COUNTY
(4) DAWN J. SMITH & LEO M. SMITH; AND PHYLLIS J. LYNCH & LINARD P. LYNCH
NCDOT
(3) TRUSTEES OF THE McDOWELL COUNTY TECHNICAL INSTITUTE
(1) ITL CORP.
70+00
75+00
80+00
60+00
15+00
20+00
PROPOSED R/W
EXISTING R/W
WOODS
JACKTOWN CREEK
NC 226
I-40 EASTBOUND OFF-RAMP
TAIL BASE DITCH SEE DETAIL E
CL B RIP RAP EST. 8 TONS EST. 21 SY F.F.
BRIDGE DESCRIPTION CONCRETE DECK ON STEEL BEAMS BRIDGE OVER JACKTOWN CREEK ON NC 226
ROCK INLET SILL
CLASS I RIPRAP EST. 7 TONS EST. 12 SY F.F. SEE DETAIL F
CL B RIP RAP EST. 2 TONS EST. 7 SY F.F.
SPECIAL LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL D
REF. WALL
30" CMP
CONC WALL
SOTCB
LOW FLOW CHANNEL
SPECIAL CUT DITCH SEE DETAIL A
PSH SEE DETAIL G
CLASS I RIPRAP EST. 11 TONS EST. 18 SY F.F. SEE DETAIL F
LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL C
BACKFILL EX. CHANNEL
CLASS I RIPRAP EST. 9.0 TONS EST. 15.0 SY F.F.
SPECIAL CUT DITCH SEE DETAIL A
TEMP. SHORING HEADWALL
TEMP. 2@66" CSP
SPECIAL LATERAL 'V' DITCH SEE DETAIL B
REMOVE
FUTURE DRAINAGE FOR WIDENING AHEAD PROJECT
PAVED DITCH
24" CONC. C&G
BST
NOTE: EXISTING R/W IN THIS AREA WAS ACQUIRED PREVIOUSLY UNDER WIDENING AHEAD PROJECT MA1306SR, AND IS BASED ON THAT DESIGN ALIGNMENT. MA1306SR IS UNDER CONSTRUCTION.
ITU SHELBY
IS BLK BUS
IS MTL BUS
CONC SIDEWALK
BST PA
GATE
22' BST DR
26 GA DR
6" CRL
15" RCP
12" DIP
18" CMP
24" CMP
42" BST
35" BST
SIGNAL POLE
BLK SIGN
EX JB NOT FOUND
TOP=1255.5 INV=1250.41
INV=1246.68
INV=1246.50
INV=1246.41
INV=1246.33
INV=1246.25
INV=1246.17
INV=1246.09
INV=1246.01
INV=1245.93
INV=1245.85
INV=1245.77
INV=1245.69
INV=1245.61
INV=1245.53
INV=1245.45
INV=1245.37
INV=1245.29
INV=1245.21
INV=1245.13
INV=1245.05
INV=1244.97
INV=1244.89
INV=1244.81
INV=1244.73
INV=1244.65
INV=1244.57
INV=1244.49
INV=1244.41
INV=1244.33
INV=1244.25
INV=1244.17
INV=1244.09
INV=1244.01
INV=1243.93
INV=1243.85
INV=1243.77
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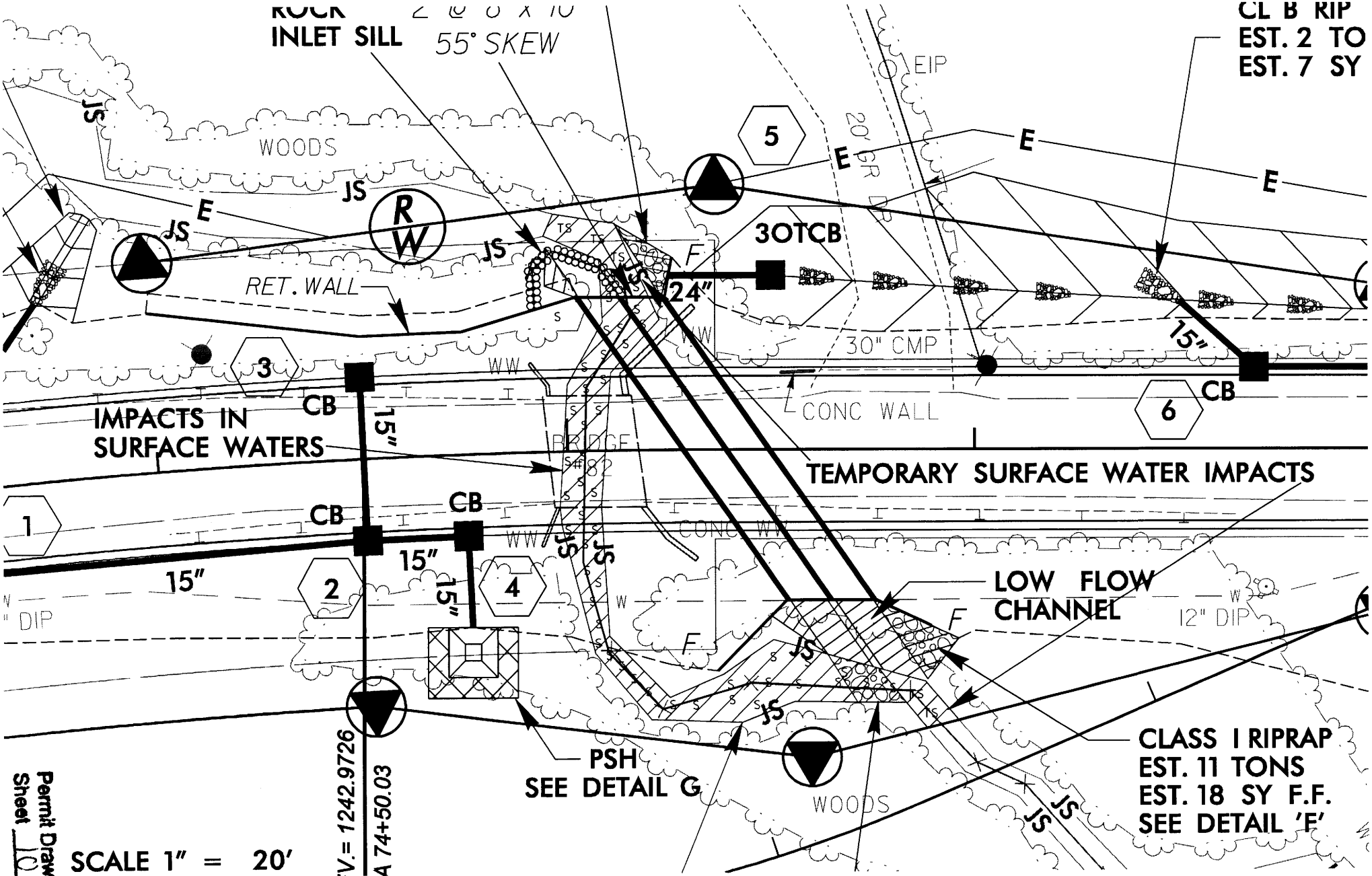
INV=1243.61
INV=1243.53
INV=1243.45
INV=1243.37
INV=1243.29



Permit Drawing Sheet 10 of 13

8/17/99

REVISIONS

WETLAND PERMIT

NAD 83

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

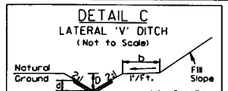
DENOTES IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
B-4191	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

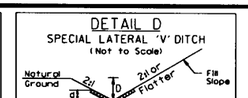
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA. 70+00 TO STA. 73+00 RT

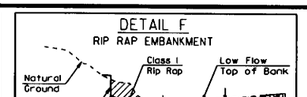
DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

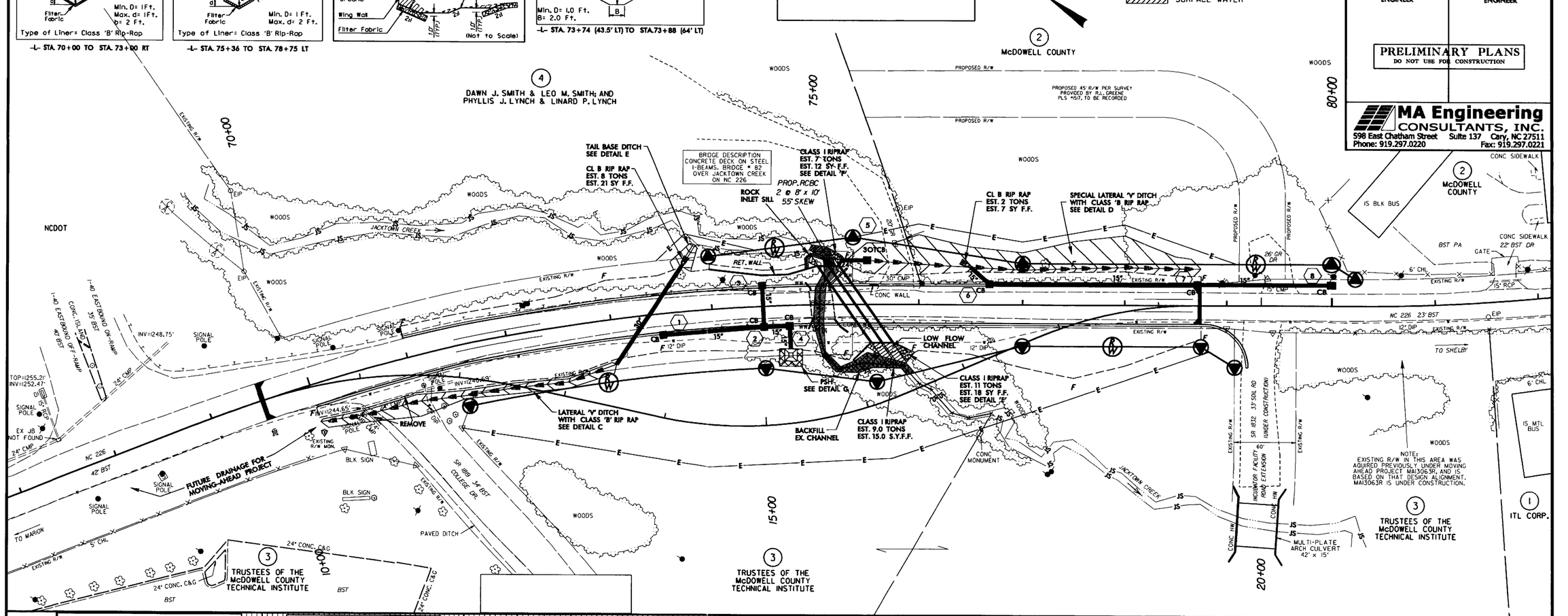
-L- STA. 75+36 TO STA. 78+75 LT

DETAIL F
RIP RAP EMBANKMENT



DETAIL E
TAIL BASE DITCH
(Not to Scale)

-L- STA. 73+74 (43.5' LT) TO STA. 73+88 (64' LT)



DETAIL G
PREFORMED SCOUR HOLE
PLAN VIEW

*NOT TO SCALE

STA. -L- 74+75 RT

BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'

BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'

BEGIN GRADE
-L- STA. 71+00.00
EL. 1248.60'

BEGIN GRADE MOVING AHEAD PROJECT
-L- STA. 79+50.00
EL. 1,253.93'

END GRADE
-L- STA. 78+75.00
EL. 1,251.30'

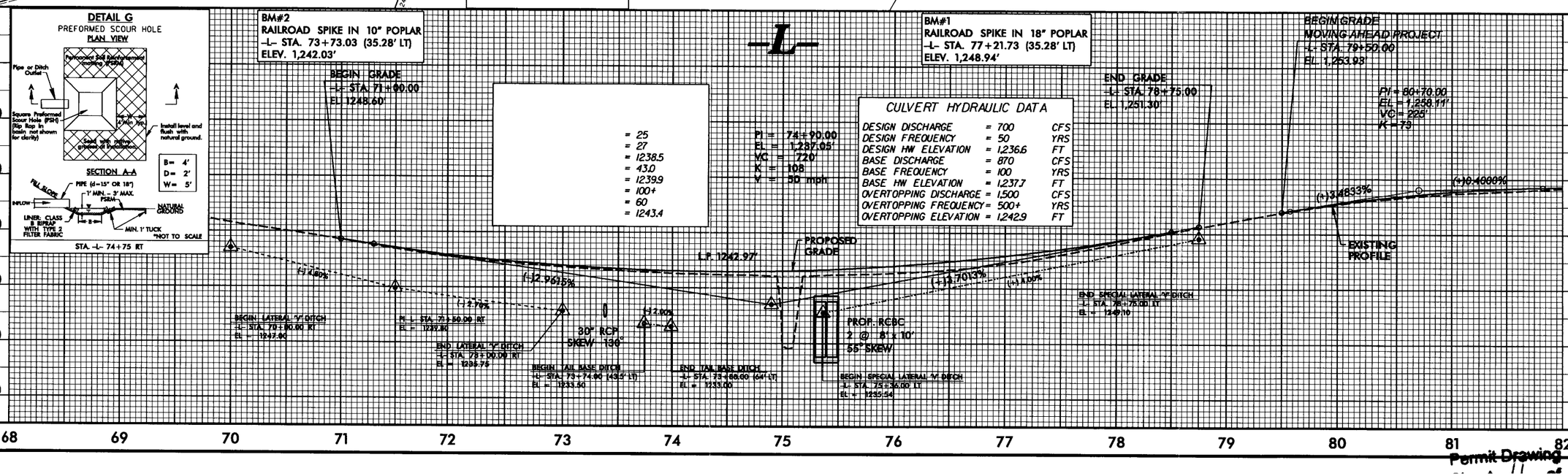
PI = 74+90.00
EL = 1,237.05'
VC = 720'
K = 108
V = 50 mph

= 25
= 27
= 1238.5
= 43.0
= 1239.9
= 100+
= 60
= 1243.4

PI = 80+70.00
EL = 1,258.11'
VC = 225'
K = 79

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 700	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1,236.6	FT
BASE DISCHARGE	= 870	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1237.7	FT
OVERTOPPING DISCHARGE	= 1,500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1,242.9	FT



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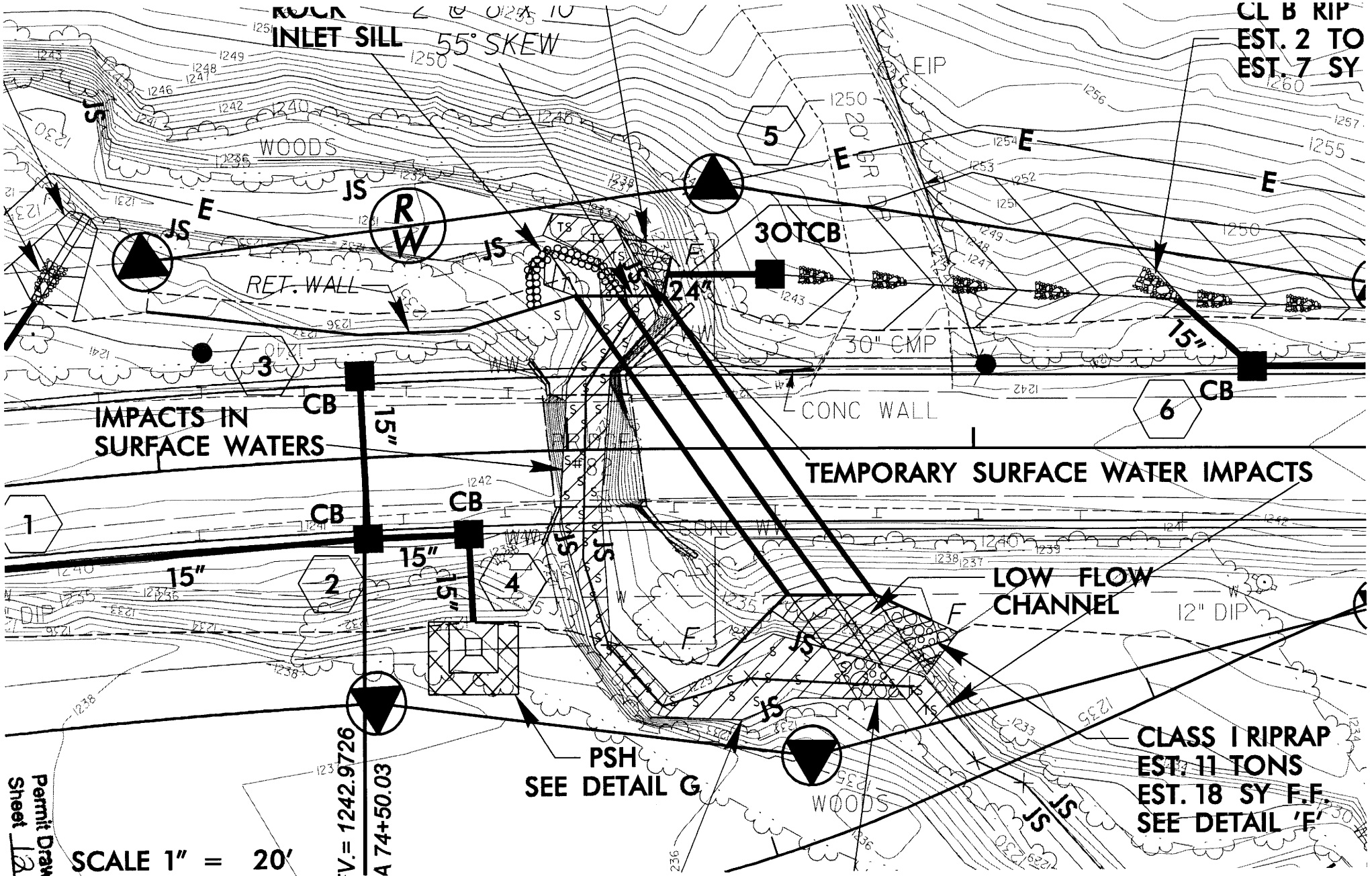
Permit Drawing


INLET SILL
55° SKEW
CL B RIP
EST. 2 TO
EST. 7 SY
WOODS
RET. WALL
30OTCB
24"
30" CMP
15"
CB
CONC WALL
IMPACTS IN
SURFACE WATERS
TEMPORARY SURFACE WATER IMPACTS
LOW FLOW
CHANNEL
12" DIP
CLASS I RIPRAP
EST. 11 TONS
EST. 18 SY F.F.
SEE DETAIL 'F'
PSH
SEE DETAIL G
V.= 1242.9726
A 74+50.03
SCALE 1" = 20'
Permit Drawing
Sheet 12 of 13

8/17/99

REVISIONS

WETLAND PERMIT

NAD 83

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

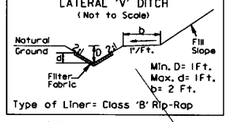
DENOTES IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
B-4191	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

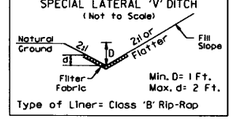
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA. 70+00 TO STA. 73+00 RT

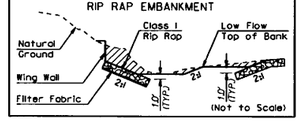
DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



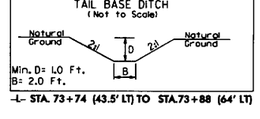
Type of Liner= Class 'B' Rip-Rap

-L- STA. 75+36 TO STA. 78+75 LT

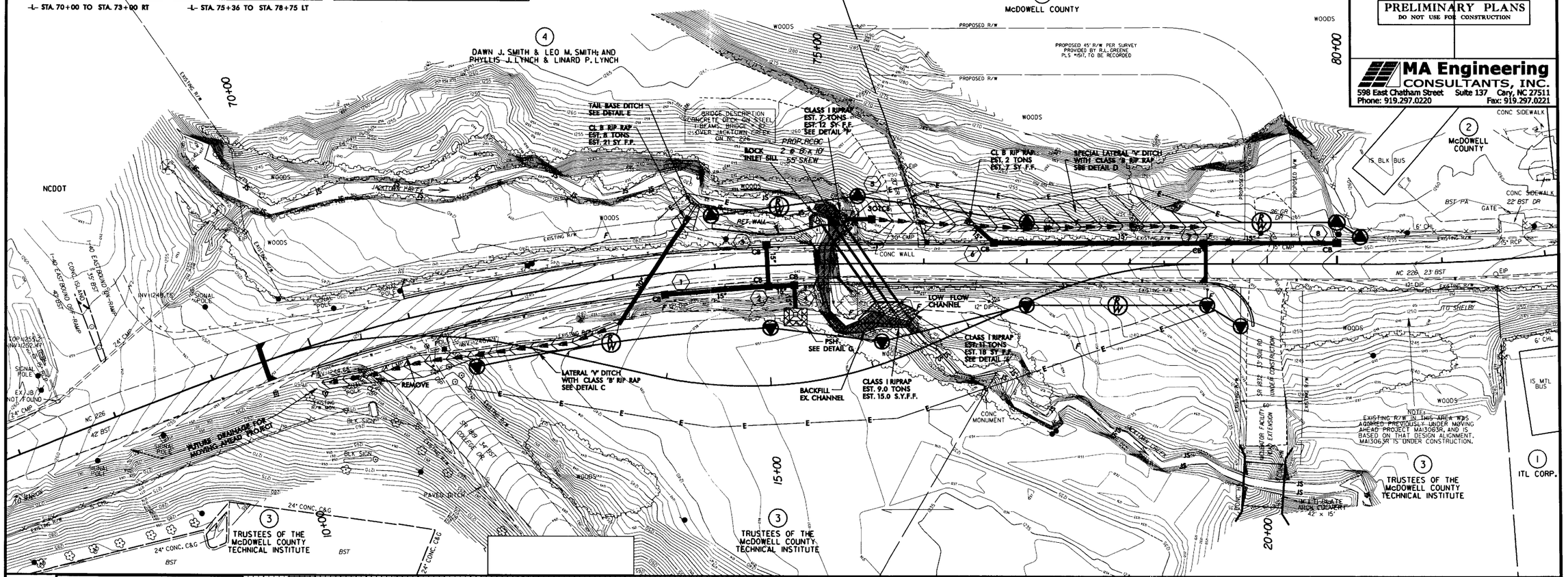
DETAIL F
RIP RAP EMBANKMENT



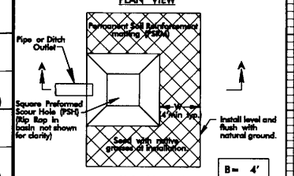
DETAIL E
TAIL BASE DITCH
(Not to Scale)



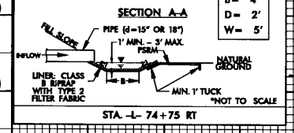
-L- STA. 73+74 (43.5' LT) TO STA. 73+88 (64' LT)



DETAIL G
PREFORMED SCOUR HOLE
PLAN VIEW



SECTION A-A



STA. -L- 74+75 RT

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Permit Drawing

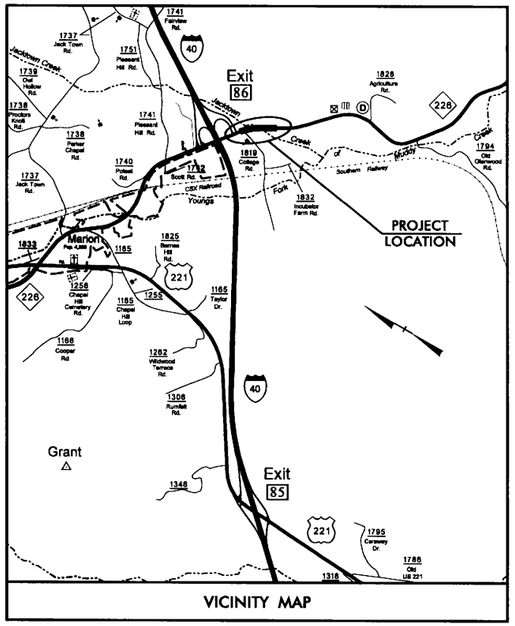
09/08/09

TIP PROJECT: B-4191

CONTRACT:

Roadway - Final Draft
Drawings

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

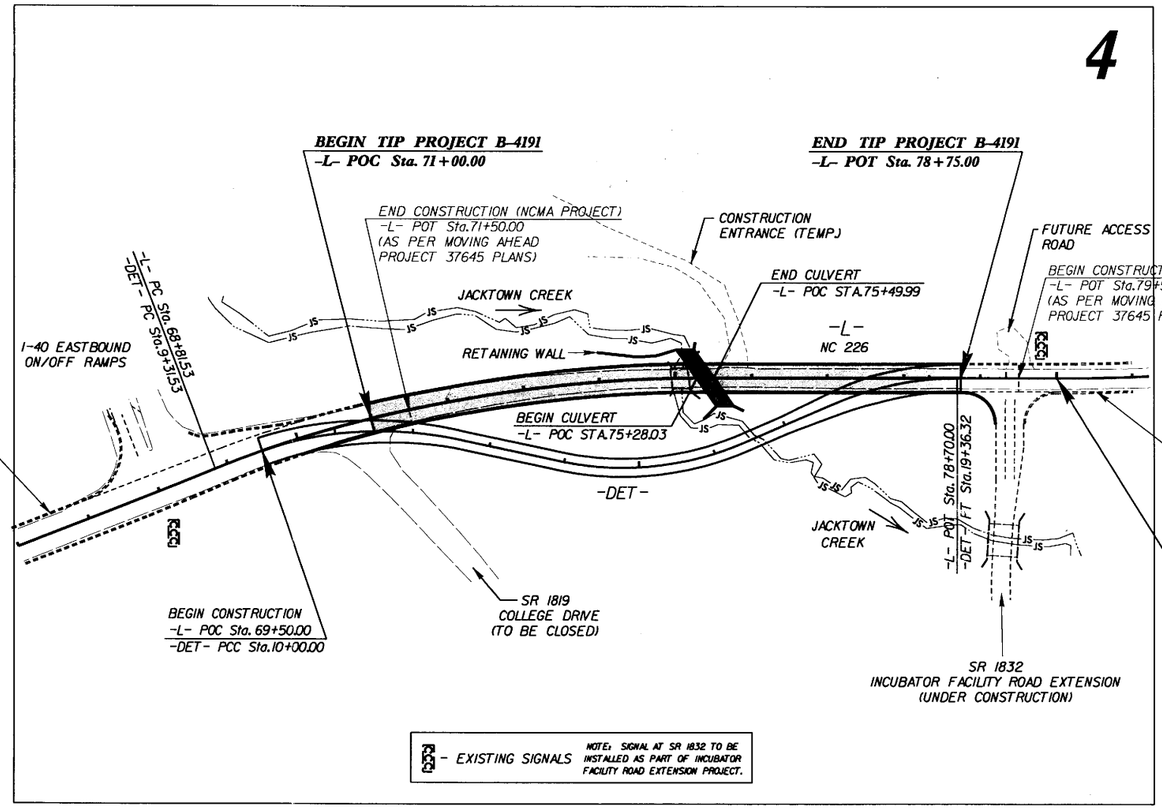
McDOWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4191	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33538.1.1	BRSTP-226 (10)	PE
33538.3.1	BRSTP-226 (10)	R/W, UTILITIES

LOCATION: ***BRIDGE NO. 82 OVER A CREEK ON NC 226***

TYPE OF WORK: ***GRADING, DRAINAGE, PAVING, STRUCTURE, AND GUARDRAIL.***



NC GRID
NAD 83

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NCDOT CONTACT:
MR. DOUG TAYLOR, PE – ENGINEERING COORDINATION – PROJECT ENGINEER – ROADWAY DESIGN UNIT

GRAPHIC SCALES

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

DESIGN DATA

ADT 2009	=	8,940
ADT 2029	=	12,765
DHV	=	10 %
D	=	60 %
T	=	8 % *
V	=	50 MPH

* (TTST 3% + DUAL 5%)
FUNC. CLASS = RURAL MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4191	=	***0.143 mile***
LENGTH STRUCTURE TIP PROJECT B-4191	=	***0.004 mile***
TOTAL LENGTH TIP PROJECT B-4191	=	***0.147 mile***

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 270-0220

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 19, 2008

LETTING DATE: SEPTEMBER 15, 2009

ROBERT W. PORTER, JR PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

10/29/2008
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3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4191	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 — EIP
- 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 Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — 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
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

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
- Designated U/G Water Line (S.U.E.*)
- 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

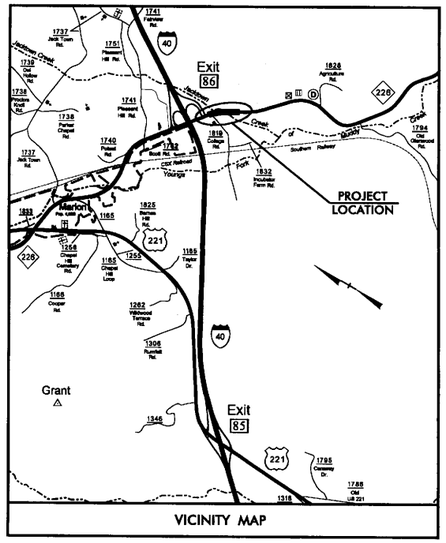
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- 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.

7822595

PROJECT REFERENCE NO.	SHEET NO.
B-4191	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4191



BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
5	BL-5	705873.7830	1121607.5300	1253.71	86+69.15	19.28 RT
4	BL-4	706270.3060	1121260.7500	1257.46	81+45.64	21.23 RT
3	BL-3	706727.1240	1120998.5010	1240.94	76+20.20	19.62 RT
2	BL-2	707148.9955	1120758.7569	1248.21	71+37.36	25.81 LT
23	BL-23	707478.6460	1120392.9440	1261.78	66+48.39	31.86 LT

BY

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
24	BY-24	706867.3607	1120562.9572	1266.95	72+28.26	306.95 RT
BY2		707148.9955	1120758.7569	1248.21	71+37.36	25.81 LT

****
BM1 ELEVATION = 1248.94
N 706668 E 1121100
L STATION 6+43 555 RIGHT
RAILROAD SPIKE SET IN BASE 18" POPLAR
****
****
BM2 ELEVATION = 1242.03
N 706968 E 1120916
L STATION 7+84 232 RIGHT
RAILROAD SPIKE SET IN BASE 10" POPLAR
****

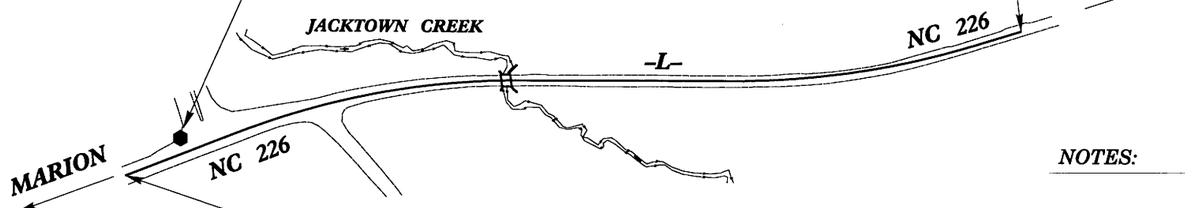
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4191-2"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 707418.2407(ft) EASTING: 1120471.9192(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99984226
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4191-2" TO -L- STATION 66+00.00 IS
N 64°08'17" W 151.83'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NC GRID NAD 83

NCDOT GPS STA. "B4191-2"
LOCALIZED PROJECT COORDINATES
N = 707418.2407
E = 1120471.9192

-L- STA. 87+00.00 END STATE PROJECT 33538.1.1
LOCALIZED PROJECT COORDINATES
N = 705866.5515
E = 1121643.1819



-L- STA. 66+00.00 BEGIN STATE PROJECT 33538.1.1
LOCALIZED PROJECT COORDINATES
N = 707484.4677
E = 1120335.2987

NCDOT GPS STA. "B4191-1"
LOCALIZED PROJECT COORDINATES
N = 708001.6745
E = 1119645.1459

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   B4191_LS_CONTROL_080513.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. 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.*
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

NOTE: DRAWING NOT TO SCALE

10/29/2008
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PROJECT REFERENCE NO.	SHEET NO.
B-4191	2
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

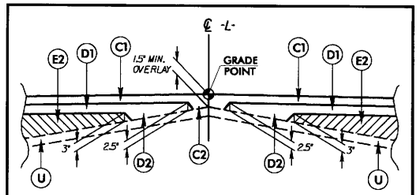
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

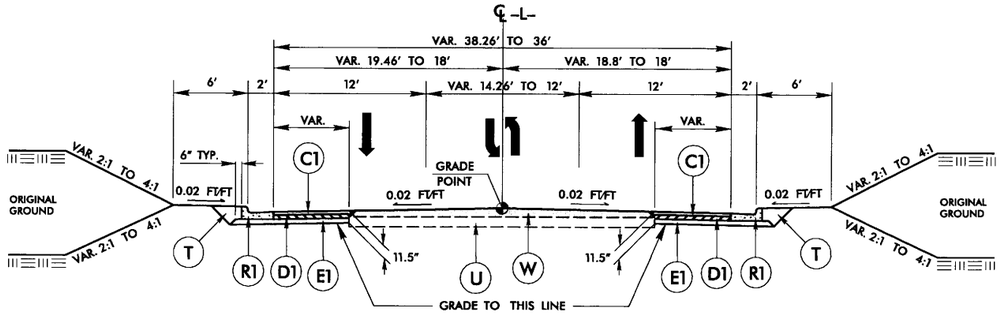
PAVEMENT SCHEDULE

C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 Lbs PER SQUARE YARD IN EACH OF TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5" OR GREATER THAN 2.0" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 Lbs. PER SQUARE YARD.
D2	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4.0" IN DEPTH.
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 Lbs PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 Lbs PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
J	PROP. 10" AGGREGATE BASE COURSE
P	PRIME COAT (AT THE RATE OF 0.35 Gal. PER SQUARE YARD)
R1	2'-6" CONCRETE CURB AND GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL THIS SHEET)

PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

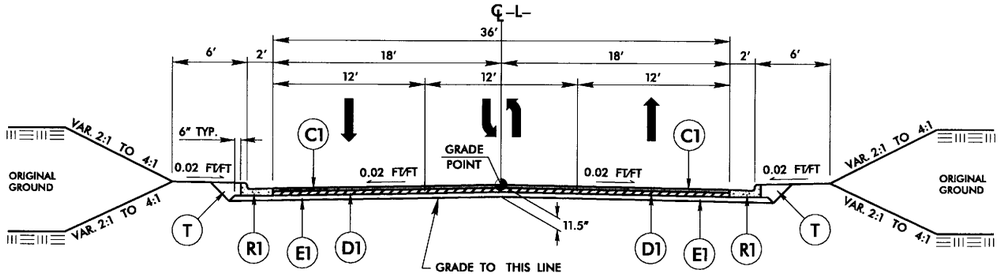


DETAIL SHOWING METHOD OF WEDGING



TYPICAL SECTION NO. 1

FROM -L- STA. 71+00.00 TO 74+75.00
FROM -L- STA. 76+00.00 TO STA. 78+75.00



TYPICAL SECTION NO. 2

FROM -L- STA. 74+75.00 TO 76+00.00

NOTES:

IN ORDER TO OBLITERATE DETOUR PAVEMENT MARKINGS, MILL EXISTING PAVEMENT 1.5" IN DEPTH FROM:
-L- STA. 69+50.00 TO 71+00.00
REPLACE MILLED PAVEMENT WITH 1.5" OF S9.5B DURING PLACEMENT OF FINAL PAVING LAYER.

SUMMARY OF EARTHWORK

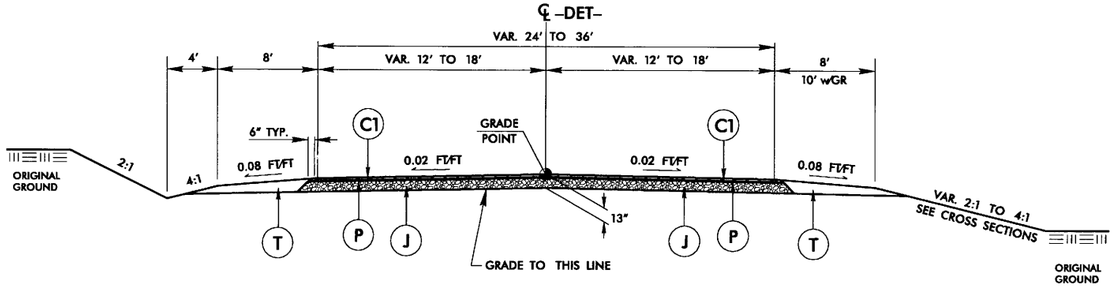
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+15%	BORROW	WASTE
PHASE 1					
-DET- 10+51.51 TO 19+41.32	1,717		2,735	1,018	
SUBTOTAL	1,717		2,735	1,018	
EST. SHOULDER MATERIAL			650	650	
TOTAL (PHASE 1)	1,717		3,385	1,668	0
PHASE 2					
-L- (LT.) 71+00.00 TO 71+75.00					
-L- (LT. & RT.) 71+75.00 TO 76+25.00	42		3,049	3,007	
-L- (LT.) 76+25.00 TO 78+00.00					
TOTAL (PHASE 2)	42		3,049	3,007	0
PHASE 3					
-L- (LT.) 78+00.00 TO 78+75.00	4		53	49	
-L- (RT.) 70+00.00 TO 72+75.00	3		327	324	
-L- (RT.) 76+25.00 TO 78+75.00	5		462	457	
-DET- REMOVAL 12+25+/- TO 18+40+/-	1,691		1,176	0	515
SUBTOTAL	1,699		1,965	781	515
WASTE TO REPLACE BORROW				-515	-515
TOTAL (PHASE 3)	1,699		1,965	266	0
TOTAL (ALL PHASES)	3,458		8,399	4,941	0
EST. LOSS DUE TO CLEARING AND GRUBBING	-1			1	
PROJECT TOTAL	3,457		8,399	4,942	0
EST. 5% TO REPLACE TOPSOIL ON BORROW PIT				247	
GRAND TOTAL	3,457		8,399	5,189	0
SAY	3,500			5,200	

SELECT GRANULAR MATERIAL (CL. II or III) = CY
CLASS IV SUBGRADE STABILIZATION = TONS

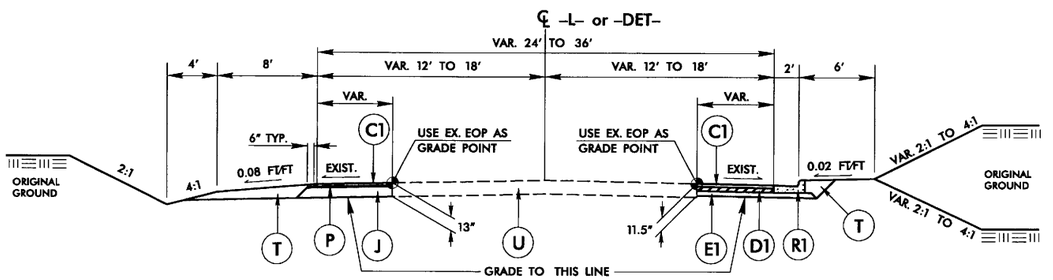
(CONTINGENCY ITEMS PER 'GEOTECHNICAL REPORT – DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED)

APPROXIMATE QUANTITIES ONLY. CLEARING AND GRUBBING, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".



TYPICAL SECTION NO. 3

FROM -DET- STA. 11+49.30 TO 18+31.17



TYPICAL SECTION NO. 4

FROM -DET- STA. 10+51.51 TO 11+49.30 RT. (SHOULDER TYPICAL)
FROM -DET- STA. 18+31.17 TO 19+41.32 RT. (SHOULDER TYPICAL)
FROM -DET- STA. 18+72.76 TO 19+41.32 LT. (SHOULDER TYPICAL)
FROM -L- STA. 70+00.00 TO 71+00.00 RT. (CURB & GUTTER TYPICAL)

NOTES:

MIRROR SHOULDER OR CURB & GUTTER SECTIONS AS REQUIRED FOR LEFT OR RIGHT SIDE CONSTRUCTION.

USE ALL ASPHALT PAVEMENT DESIGN FOR CONSTRUCTING DETOUR PAVEMENT IN LOCATIONS WHERE PROPOSED -L- LINE PAVEMENT AND DETOUR PAVEMENT OVERLAP:
FROM -DET- STA. 18+60+/- TO 19+41.32 RT.
FROM -DET- STA. 18+70+/- TO 19+41.32 LT.

10/29/2008
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rtaylor

8/17/99

REVISIONS

-DET-

PI Sta 9+65.77
Δ = 2°13' 31.5" (RT)
D = 3°15' 00.0"
L = 68.47'
T = 34.24'
R = 1762.95'
SE = 0.04 ft/ft
RO = EXISTING
V = 35 mph

PI Sta 11+32.51
Δ = 31°10' 28.7" (RT)
D = 12°03' 44.2"
L = 258.45'
T = 132.51'
R = 475.00'
SE = 0.06 ft/ft
RO = 150'
V = 35 mph

PI Sta 15+20.16
Δ = 35°24' 56.6" (LT)
D = 14°19' 26.2"
L = 247.25'
T = 127.72'
R = 400.00'
SE = 0.04 ft/ft
RO = 100'
V = 35 mph

PI Sta 18+56.15
Δ = 23°17' 41.4" (RT)
D = 14°19' 26.2"
L = 162.63'
T = 82.45'
R = 400.00'
SE = 0.04 ft/ft
RO = 100'
V = 35 mph

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

-DET- STA. 14+98 TO STA. 15+84 RT
-DET- STA. 14+98 TO STA. 15+97 LT

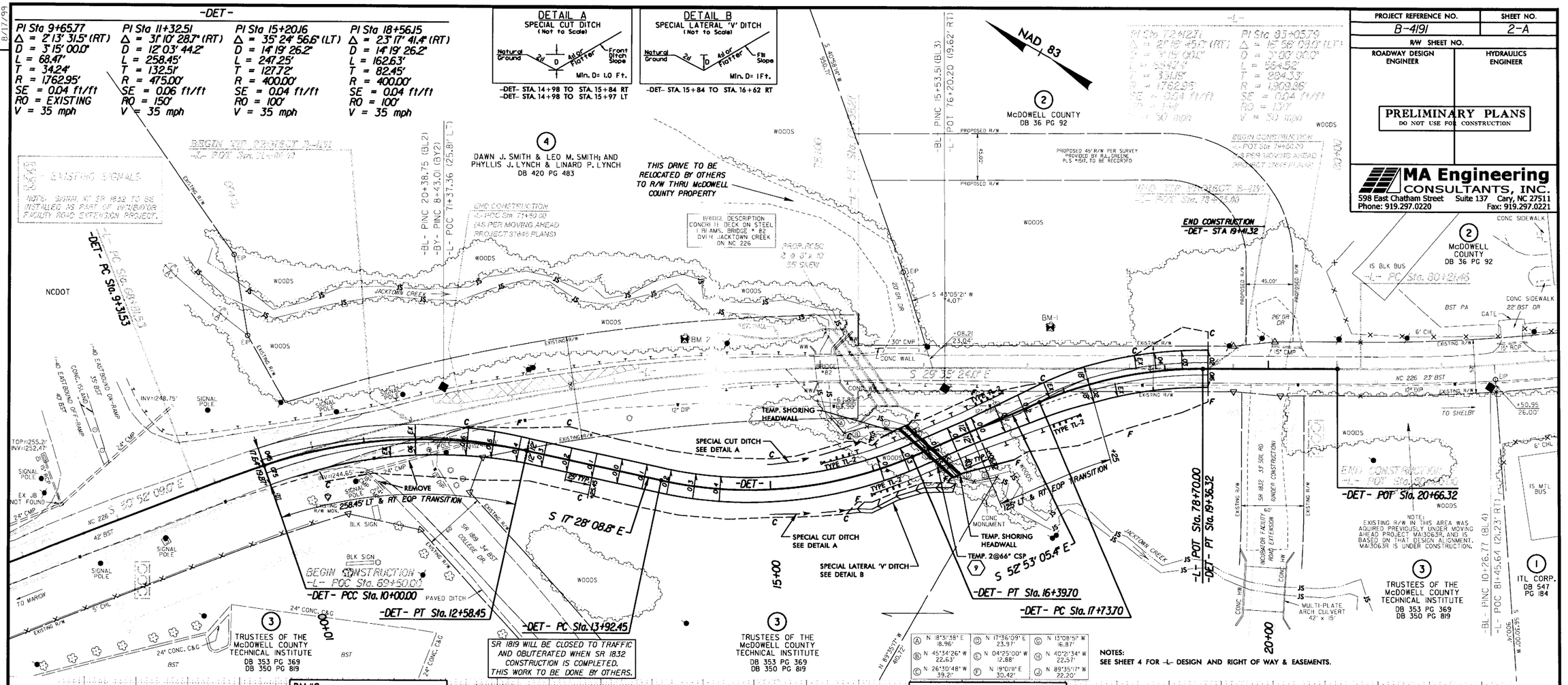
DETAIL B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

-DET- STA. 15+84 TO STA. 16+62 RT

PROJECT REFERENCE NO.	SHEET NO.
B-4191	2-A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

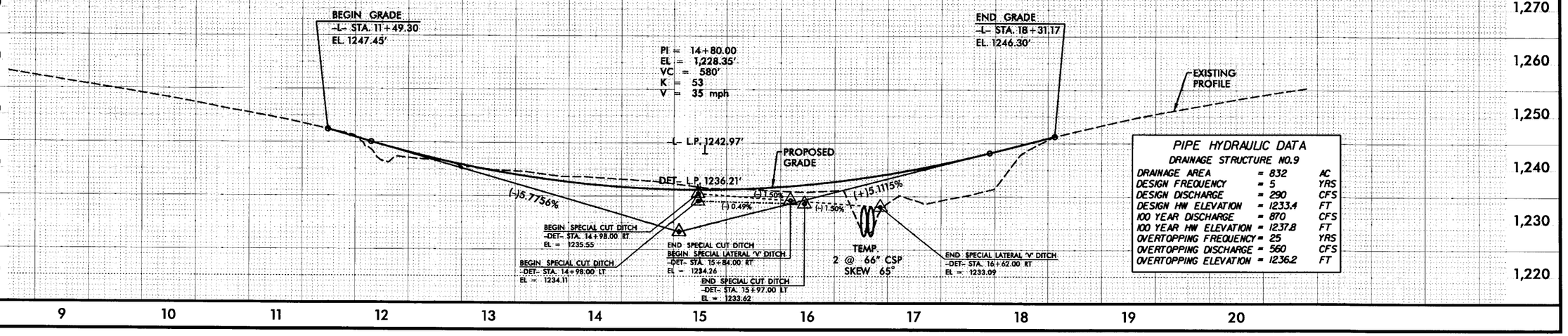
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



-DET-

BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'

BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9

DRAINAGE AREA	= 832	AC
DESIGN FREQUENCY	= 5	YRS
DESIGN DISCHARGE	= 290	CFS
DESIGN HW ELEVATION	= 1233.4	FT
100 YEAR DISCHARGE	= 870	CFS
100 YEAR HW ELEVATION	= 1237.8	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 560	CFS
OVERTOPPING ELEVATION	= 1236.2	FT

10/29/2008
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8/17/99

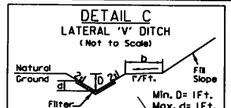
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4191	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

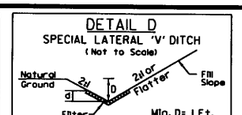
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA. 70+00 TO STA. 73+80 RT

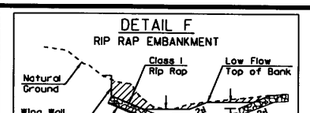
DETAIL D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



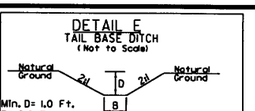
Type of Liner= Class 'B' Rip-Rap

-L- STA. 75+36 TO STA. 78+75 LT

DETAIL F
RIP RAP EMBANKMENT



DETAIL E
TAIL BASE DITCH
(Not to Scale)



-L- STA. 73+74 (43.5' LT) TO STA.73+88 (64' LT)

-L-

PI Sta 72+12.71	PI Sta 83+05.79
Δ = 21°16' 45.0" (RT)	Δ = 16°56' 08.0" (LT)
D = 3°15' 00.0"	D = 3°00' 00.0"
L = 654.74'	L = 564.52'
T = 331.19'	T = 284.33'
R = 1,762.95'	R = 1,909.86'
SE = 0.04 ft/ft	SE = 0.04 ft/ft
RO = 144'	RO = 130'
V = 50 mph	V = 50 mph

NAD 83

(2) McDOWELL COUNTY DB 36 PG 92

(4) DAWN J. SMITH & LEO M. SMITH; AND PHYLLIS J. LYNCH & LINARD P. LYNCH DB 420 PG 483

(3) TRUSTEES OF THE McDOWELL COUNTY TECHNICAL INSTITUTE DB 353 PG 369 DB 350 PG 819

(1) ITL CORP. DB 547 PG 184

BEGIN TIP PROJECT B-4191
-L- POT Sta. 71+00.00

END TIP PROJECT B-4191
-L- POT Sta. 78+75.00

BEGIN CONSTRUCTION
-L- POT Sta. 79+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)

END CONSTRUCTION
-L- POC Sta. 71+50.00
(AS PER MOVING AHEAD PROJECT 37645 PLANS)

BEGIN CONSTRUCTION
-L- POT Sta. 69+50.00

END CONSTRUCTION
-L- POT Sta. 80+90.00

-L- PC Sta. 68+81.53

-L- PC Sta. 80+21.46

-L- PT Sta. 75+36.27

-L- POT Sta. 75+39.00
Δ = 55°

-L- POC STA.75+49.99

-L- POC STA.75+28.03

-L- EXISTING SIGNALS

NOTE: SIGNAL AT SR 1832 TO BE INSTALLED AS PART OF INCUBATOR FACILITY ROAD EXTENSION PROJECT.

-BL- PINC 20+38.75 (BL2)
-BY- PINC 8+43.01 (BY2)
-L- POC 71+37.36 (25.81' LT)

-BL- PINC 5+53.51 (BL3)
-L- POT 76+20.20 (19.62' RT)

-BL- PINC 10+26.77 (BL4)
-L- POC 8+45.64 (21.23' RT)

PROPOSED 45' R/W PER SURVEY PROVIDED BY R.L. GREENE PLS *ISIT, TO BE RECORDED

THIS DRIVE TO BE RELOCATED BY OTHERS TO R/W THRU McDOWELL COUNTY PROPERTY

BRIDGE DESCRIPTION
CONCRETE DECK ON STEEL I-BEAMS, BRIDGE # 82 OVER JACKTOWN CREEK ON NC 226

REMOVE EXISTING PAVEMENT
-L- STA 71+25 TO 73+25 +/-

TIE PROPOSED GUARDRAIL TO EX.GUARDRAIL

TIE TO EXISTING 2'-6" C&G

TAIL BASE DITCH SEE DETAIL E

CL B RIP RAP EST. 8 TONS EST. 21 SY F.F.

CLASS I RIPRAP EST. 7 TONS EST. 12 SY F.F. SEE DETAIL 'F'

PROP. RCBC 2 @ 8' x 10' 55° SKEW

ROCK INLET SILL

CL B RIP RAP EST. 2 TONS EST. 7 SY F.F.

SPECIAL LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL D

LOW FLOW CHANNEL

CLASS I RIPRAP EST. 11 TONS EST. 18 SY F.F. SEE DETAIL 'E'

PSH SEE DETAIL G

BACKFILL EX. CHANNEL

CLASS I RIPRAP EST. 9.0 TONS EST. 15.0 S.Y.F.F.

LATERAL 'V' DITCH WITH CLASS 'B' RIP RAP SEE DETAIL C

FUTURE DRAINAGE FOR MOVING-AHEAD PROJECT

REMOVE

SR 1819 WILL BE CLOSED TO TRAFFIC AND OBLITERATED WHEN SR 1832 CONSTRUCTION IS COMPLETED. THIS WORK TO BE DONE BY OTHERS.

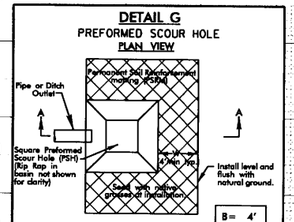
NOTE: EXISTING R/W IN THIS AREA WAS ACQUIRED PREVIOUSLY UNDER MOVING AHEAD PROJECT MA1063R, AND IS BASED ON THAT DESIGN ALIGNMENT. MA1063R IS UNDER CONSTRUCTION.

NOTES:
SEE SHEET 2A FOR DETOUR DESIGN.

(A)	N 18°31'38" E 8.96'	(D)	N 17°36'09" E 23.97'
(B)	N 45°34'26" W 22.63'	(E)	N 04°25'00" W 12.88'
(C)	N 26°30'48" W 39.21'	(F)	N 19°01'11" E 30.42'
(G)	N 15°08'57" W 16.87'	(H)	N 40°21'34" W 22.57'
(J)	N 89°35'17" W 22.20'		

DETAIL G
PREFORMED SCOUR HOLE

PLAN VIEW



STA. -L- 74+75 RT

BM#2
RAILROAD SPIKE IN 10" POPLAR
-L- STA. 73+73.03 (35.28' LT)
ELEV. 1,242.03'

BM#1
RAILROAD SPIKE IN 18" POPLAR
-L- STA. 77+21.73 (35.28' LT)
ELEV. 1,248.94'

BEGIN GRADE
-L- STA. 71+00.00
EL. 1248.60'

END GRADE
-L- STA. 78+75.00
EL. 1,251.30'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 11.1	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 27	CFS
DESIGN HW ELEVATION	= 1238.5	FT
100 YEAR DISCHARGE	= 43.0	CFS
100 YEAR HW ELEVATION	= 1239.9	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 60	CFS
OVERTOPPING ELEVATION	= 1243.4	FT

PI = 74+90.00
EL = 1,237.05'
VC = 720'
K = 108
V = 50 mph

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 700	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1236.6	FT
BASE DISCHARGE	= 870	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1237.7	FT
OVERTOPPING DISCHARGE	= 1,500	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1242.9	FT

L.P. 1242.97'

PROPOSED GRADE

EXISTING PROFILE

(-)4.80%
(-)2.9615%
(-)2.70%
(-)2.00%
(+)13.7013%
(+) 4.00%

BEGIN LATERAL 'V' DITCH
-L- STA. 70+00.00 RT
EL = 1247.00

PI -L- STA. 71+50.00 RT
EL = 1239.80

END LATERAL 'V' DITCH
-L- STA. 73+00.00 RT
EL = 1235.75

30" RCP SKEW 130°

BEGIN TAIL BASE DITCH
-L- STA. 73+74.00 (43.5' LT)
EL = 1233.50

END TAIL BASE DITCH
-L- STA. 73+88.00 (64' LT)
EL = 1233.00

PROP. RCBC
2 @ 8' x 10'
55° SKEW

BEGIN SPECIAL LATERAL 'V' DITCH
-L- STA. 75+36.00 LT
EL = 1235.54

END SPECIAL LATERAL 'V' DITCH
-L- STA. 78+75.00 LT
EL = 1249.10

1,270
1,260
1,250
1,240
1,230
1,220

68 69 70 71 72 73 74 75 76 77 78 79 80 81 82

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4191	X-2

DET
10+50.03

0.075

1249.81

125.56

1247.00

70+00.00

DET
10+00.00

0.032 0.045 0.075

1253.30

69+50.00

1254.95

69+00.00

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

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8/23/99

PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-3

0 5 10

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1260 1250 1240

DET
12+02.08

2:1 0.056 12+47.14 0.056 12+63.93 0.072 12+44.42 4:1 0.072 4:1 2:1

1246.93

1239.80 1241.745

71+50.00

1270 1260 1250 1240

DET
11+50.86

0.070 12+48.60 0.068 0.068 12+47.36 4:1 0.072 4:1 2:1

1248.57

1244.596 1242.20

71+00.00

1270 1260 1250 1240

DET
11+00.25

0.063 12+44.62 0.063 4:1 4:1 2:1

1250.09

1246.884 1244.60

70+50.00

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

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PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-4

0 5 10

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1250
1240
1230

2:1 0.040 0.040 2:1

1243.44 1243.10 1242.56

73+50.00

DET 14+07.36

1236.98

2.00:1 4.17:1 0.018 0.019 4.15:1 2.00:1

1235.181 1235.883

1250
1240
1230

2:1 0.040 0.040 2:1

1244.01 1243.74 1243.13

73+00.00

DET 13+57.42

1238.06

2.25:1 4.25:1 0.008 0.005 4.25:1 2.13:1

1235.75 1236.748 1236.486

1250
1240
1230

2:1 0.040 0.040 2:1 4:1 2:1 (temp.)

1241.82 1244.56 1243.84

72+50.00

DET 13+06.37

1239.65

0.031 0.028 4.30:1 2.16:1

6.45:1 4.30:1

1238.09 1237.1 1237.653

1260
1250
1240

2:1 0.042 0.043 4:1

1245.07 1245.58 1244.93

72+00.00

DET 12+54.17

1241.78

4.35:1 0.055 0.051 4.35:1 2.17:1

1241.98 1238.45 1239.471

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

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PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-5

0 5 10

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1250 1240 1230 1220

RET. WALL
2:1
0.037
0.037
2:1
1243.99
1243.73
1243.27
1229.56
75+00.00
DET
15+49.20
1236.46
2.02:1
4.06:1
0.038
0.038
4.05:1
2.02:1
1233.83
(15+53.96)
1234.84
(15+45.03)

RET. WALL
2:1
0.040
0.040
2:1
1243.00
1242.76
1243.12
1242.31
74+75.00
DET
15+25.62
1236.29
2.01:1
4.02:1
0.038
0.039
4.01:1
2.01:1
1233.96
(15+27.92)
1235.17
(15+23.52)

RET. WALL
2:1
0.040
0.040
2:1
1242.97
1243.47
1243.02
1242.38
74+50.00
DET
15+02.21
1236.22
2:1
4:1
0.040
0.040
4:1
2:1
1234.08
(15+02.57)
1235.49
(15+01.89)

BEGIN RET. WALL
2:1
0.040
0.040
2:1
1243.09
1243.79
1243.21
1242.63
74+00.00
DET
14+55.34
1236.38
2.02:1
4.04:1
0.039
0.039
4.99:1
2.02:1
1234.275
1235.679

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PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-6

0 5 10

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1250 1240 1230 1220

1243.70
0.016 0.020
2:1 2:1 2:1 2:1
1237.10
1242.54
75+75.00

DET
16+24.85
1237.73
5:1 2.34:1
0.020 0.024
2:1 2.27:1 2.27:1
1233.81
(16+14.01)

1243.44
0.023 0.023
2:1 2:1 2:1 2:1
1236.10
PROP. RCBC
2 @ 8' x 10'
55° SKEW
WINGWALL
1242.42
75+50.00

DET
15+98.36
1237.16
2:1 2:1
0.032 0.033
4.36:1 2.18:1
1234.20
(15+88.33)

1243.32
0.027 0.027
2:1 2:1 2:1 2:1
PROP. RCBC
2 @ 8' x 10'
55° SKEW
1242.33
75+36.27

DET
15+84.06
1236.91
2.06:1 4.16:1
0.034 0.035
4.14:1 2.07:1
1233.64
(15+93.03)
1234.38
(15+76.18)

1243.23
0.030 0.030
2:1 2:1 2:1 2:1
WINGWALL
PROP. RCBC
2 @ 8' x 10'
55° SKEW
1242.23
75+25.00

DET
15+73.12
1236.75
2.06:1 4.12:1
0.035 0.036
4.11:1 2.05:1
1233.70
(15+80.64)
1234.52
(15+66.50)

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PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-7

0 5 10

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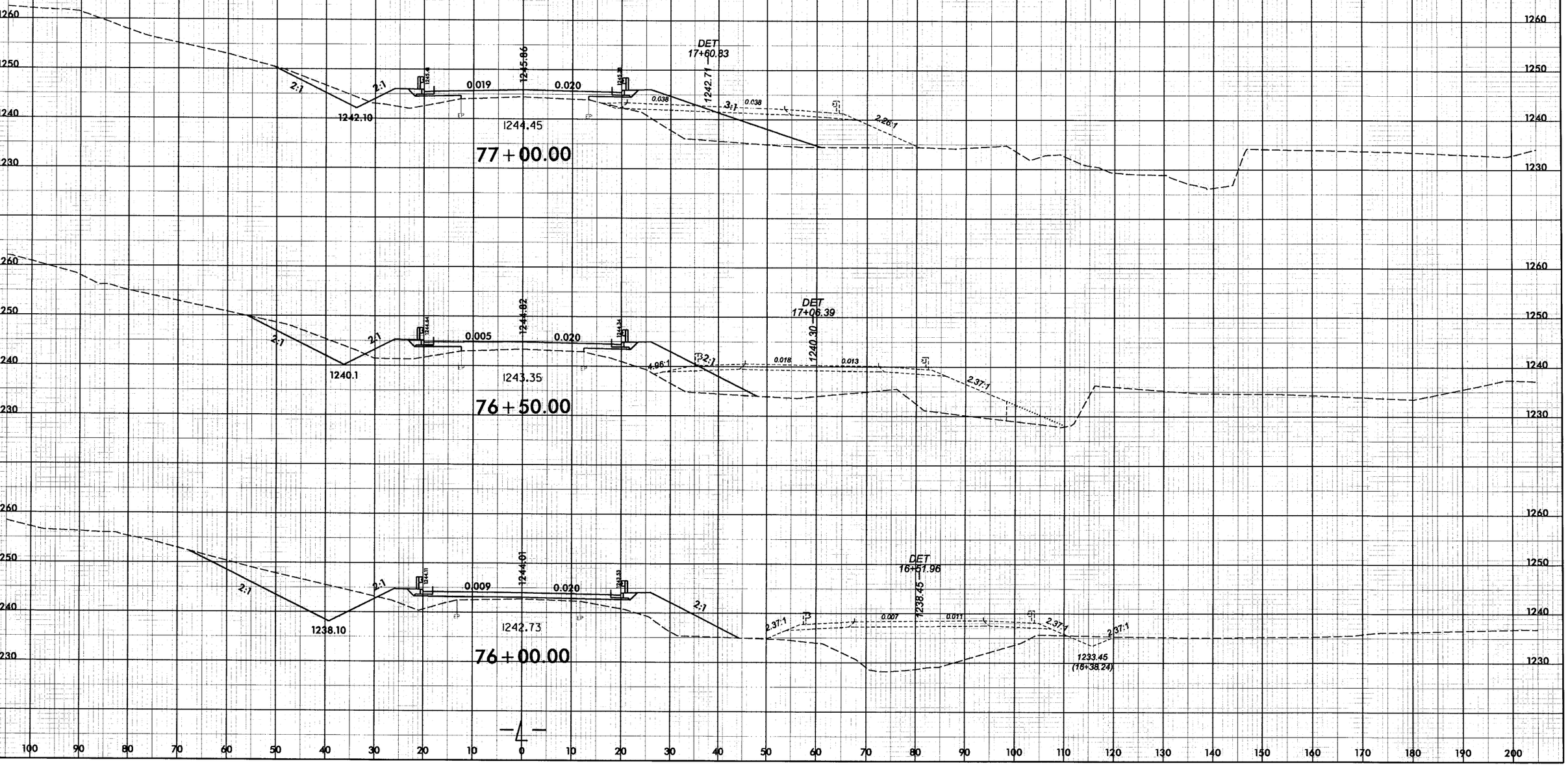
1260 1250 1240 1230



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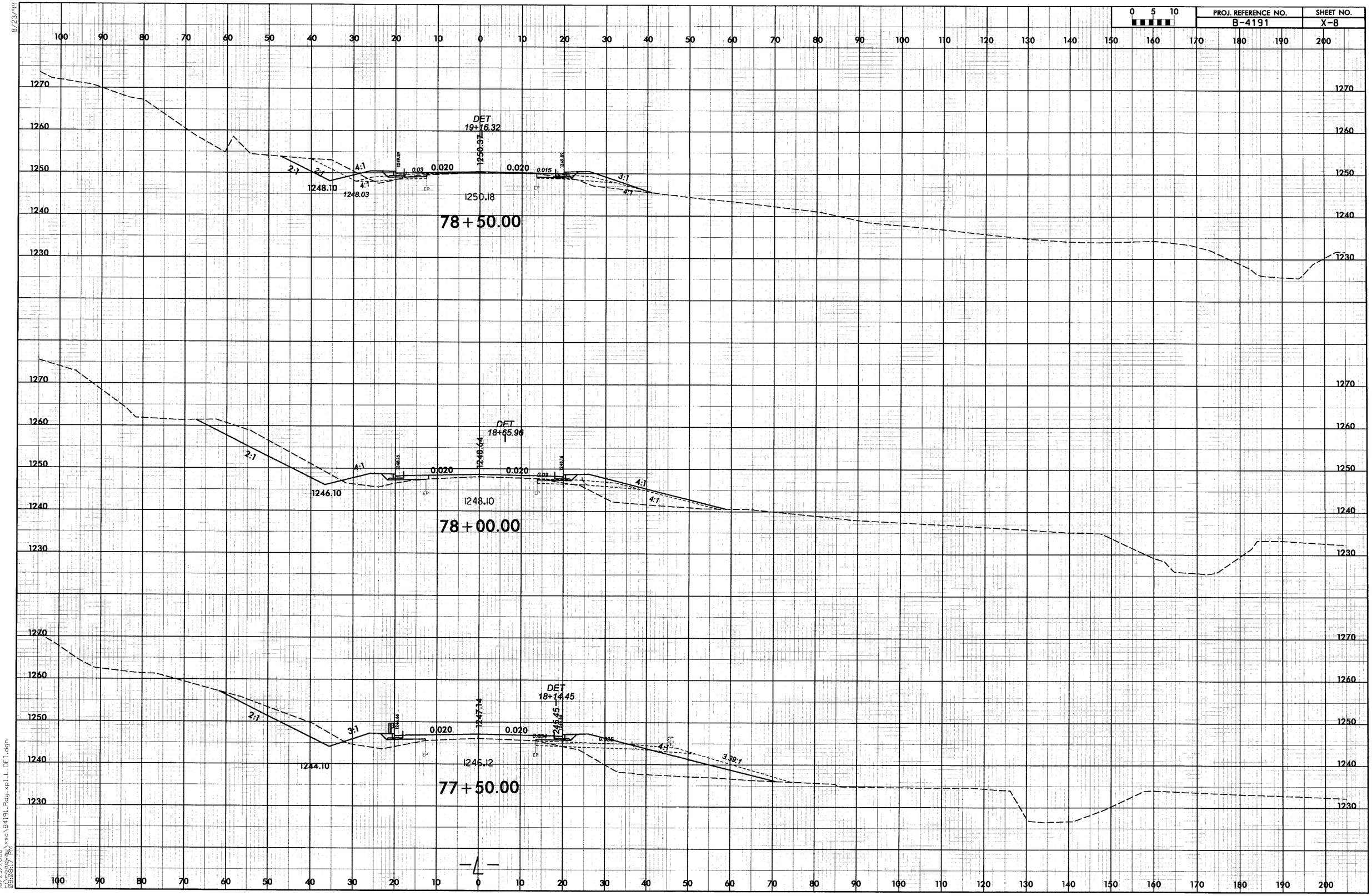
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4191	X-8



8/23/05

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
B-4191	X-9

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1270
1260
1250
1240
1230

1252.04

DET
19+41.32

1251.30

4:1
2:1
1250.82
0.02
0.020
0.020
0.018
1250.82
3:1
4:1
2:1
3:1

1249.10
1249.12

1251.11

78+75.00

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

1270
1260
1250
1240
1230

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Jacktown Creek
Conceptual Stream Restoration Plan
Replacement of Bridge No. 82 on NC 226
McDowell County

TIP B-4191
Federal Aid Project No. BRSTP-226(10)
WBS No. 33538.1.1
March 2009

The North Carolina Department of Transportation (NCDOT) will perform on-site mitigation for stream impacts associated with the replacement of Bridge Number 82 over Jacktown Creek on NC 226 in McDowell County. The project will replace a bridge with a reinforced concrete box culvert and permanently impact 175 linear feet and temporarily impact 85 linear feet of stream channel. NCDOT will restore approximately 450 linear feet of jurisdictional stream to use as onsite mitigation at 1:1 ratio for the impacts once construction has been completed. The mitigation will occur immediately downstream of Transportation Improvement Program (TIP) B-4191. Based on agency comments, any remaining mitigation credit will be considered onsite assets and will be available as mitigation for future projects in the service area.

EXISTING CONDITIONS

The project is located in McDowell County, approximately 0.2 miles south of I-40 on NC 226. The drainage area of the reach is 1.27 sq. miles and is comprised mainly of forested land with interspersed light residential and commercial. The reach flows through a fallow field on McDowell Technical Community College (MTCC). Roughly 0.25 mile downstream of the project, Jacktown Creek flows into Coperning Creek which is a 303d listed stream.

A cross section was measured at a representative riffle section for Rosgen classification determination. The width/depth ratio was found to be 12.6 (moderate to high) with an entrenchment ratio of 1.28 (entrenched) which would classify the stream as an F-type. The stream has high steep banks with little mature vegetation which leaves them susceptible to erosion. The stream slope for the entire reach is 0.007 ft/ft.

PROPOSED CONDITIONS

The creek currently flows under a bridge on US 226, but will be replaced with an 8' x 10' double box culvert. A rock sill will placed at one of the openings to restrict use to high flows only.

The proposed stream mitigation will consist of restoring 450 linear feet of jurisdictional stream by improving channel dimensions, profile and to some extent, pattern. The proposed channel will be a C-type channel with a width/depth ratio of 12 or greater. The proposed bankfull depth of approximately 1.2 feet is appropriate according to the

mountain regional curve data. A floodplain will be excavated to increase the entrenchment ratio above 2.2 and a planted buffer will be established to allow storage of floodwaters and filtering runoff. Pools will be excavated to provide more variability and habitat in the profile. The stream slope will remain at approximately 0.007 ft/ft. The stream pattern will be improved in meanders with low radius of curvature values to reduce the near bank stress and erosion susceptibility. The stream banks will be stabilized using coir fiber matting and planted in accordance to the reforestation plan. Structures, such as rock cross vanes will likely be utilized as needed to maintain the channel grade and establish pool habitats. NCDOT will be working with the Muddy Creek Restoration Partnership and NCSU Water Quality Group to incorporate stormwater wetlands into the site which are intended to capture and treat stormwater from the MTCC campus.

The Natural Environment Unit shall be contacted to provide construction assistance, if necessary, to ensure that the stream mitigation area is constructed appropriately.

The Natural Environment Unit is currently coordinating with MTCC to secure an easement to protect the mitigation site into perpetuity. During a meeting on 12/16/08, Brian Wilson, President of MTCC, gave NCDOT an initial approval for an easement and will be presenting a copy of an easement document to the MTCC Board in February 2009. The MTCC Grounds Committee will need to approve the easement as well.

MONITORING

NCDOT proposes to perform a Level 1 monitoring of the stream following completion of restoration. Monitoring shall be performed twice annually (summer and winter) for each of a five year period, provided at least two bankfull events have occured during this period. Monitoring activities shall consist of reference photos, plant survival determinations and visual inspection of stream stability.

STORMWATER MANAGEMENT PLAN

Project: 33538.1.1
TIP No.: B-4191
County: McDowell 03/27/2009

Hydraulics Project Manager: Roger Weadon, P.E. (MA Engineering),
Marshal Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project B-4191 consists of constructing a 2 @ 8x10 Reinforced Concrete Box Culvert, which is 90' long to replace the existing bridge #82 in McDowell County on NC-226 over Jacktown Creek. The total project length is 0.147 miles. The project creates impacts to Jacktown Creek, which is located in the Catawba River Basin. The project drainage systems consist of curb and gutter streets with an enclosed storm system as well as roadside ditches and cross pipes culverts.

Jurisdiction Stream: Jacktown Creek

ENVIRONMENTAL DESCRIPTION

The project is located within the Catawba River Basin in McDowell County. The stream is classified as type C. Jacktown Creek will be impacted by the proposed project; however impacts have been minimized by burying the primary 8'x10' RCBC barrel by 1 foot and raising the second barrel closer to the floodplain by installing a rock inlet sill.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. The BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP measures used on this project to reduce stormwater impacts are:

- Bury primary flow barrel of the RCBC by 1'
- Set second barrel of RCBC closer to the floodplain with a rock inlet sill.
- Use preformed scour holes at storm drain outlets in flat areas.