STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

May 26, 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

Subject: **Application for Section 404 Nationwide Permit 33** for the proposed replacement of Bridge No. 193 over Davidson River on SR 1504 (Old Hendersonville Highway) in Transylvania County, Federal Aid Project No. BRSTP-1504(7); Division 14; TIP No. B-4291; WBS 33630.1.1

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 193 over the Davidson River on SR 1504 (Old Hendersonville Highway). There will be 273 feet of temporary surface water impacts associated with this project.

Please see enclosed copies of the Pre-Construction Notification (PCN), stormwater management plan, permit drawings, and design plans for the above-referenced project. The Categorical Exclusion (CE) was completed in January 2008. Documents were distributed shortly thereafter. Additional copies are available upon request.

This project calls for a letting date of December 15, 2009 and a review date of October 27, 2009.

Comments from the North Carolina Wildlife Resources Commission (NCWRC) will be required prior to authorization by the United States Army Corps of Engineers (USACE). By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

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 Kris Dramby at (919) 431-6687 or by email at kjdramby@ncdot.gov.

Sincerely,

E. L. Lusk

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

w/attachment
Mr. Brian Wrenn, NCDWQ (2 copies)
Ms. Marla Chambers, NCWRC
Ms. Marella Buncick, USFWS
Mr. Harold Draper, TVA

w/o attachment
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. B. Setzer, P.E., Division Engineer
Mr. Mark Davis, 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 Rivers, P.E., Project Development Engineer

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: 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 193 over Davidson River on SR 1504
2b. County:	Transylvania
2c. Nearest municipality / town:	Brevard
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4291

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) 431-6687
3g. Fax no.:	(919) 431-2002
3h. Email address:	kjdramby@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: 35.255117 (DD.DDDDDD)	Longitude: - 82.697825 (-DD.DDDDDD)
1c. Property size:	1.5 acres	
2. Surface Waters		
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Davidson River	
2b. Water Quality Classification of nearest receiving water:	C	
2c. River basin:	French Broad	
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: General land use within the vicinity of the project area consists of residential, commericial, and mostly developed land. Existing conditions onsite can be described as rolling to moderately rolling topography and mainly developed land. The project vicinity is situated just north of the city of Brevard, which is a highly populated and developed area.		
3b. List the total estimated acreage of all existing wetlands on the property: N/A		
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 100		
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 118.8-foot bridge with a 120-foot bridge on new alignment, south of existing bridge, with an on-site detour. 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**	0 0

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	Causeway	Davidson	☒ PER ☐ INT	☒ Corps ☐ DWQ	30	134
Site 2 ☐ P ☒ T	Causeway	Davidson	☒ PER ☐ INT	☒ Corps ☐ DWQ	30	139
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**	0 Perm 273 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	0 0

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 proposed bridge is 9 feet longer than the existing bridge; 3:1 fill slopes where practicable will be used, and Design Standards for Sensitive Watersheds will be used with a trout moratorium from October 15 to April 15 in place.

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

Design Standards for Sensitive Watersheds will be used. Additionally, causeway placement will not exceed 50 % of the stream channel at any time.

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.

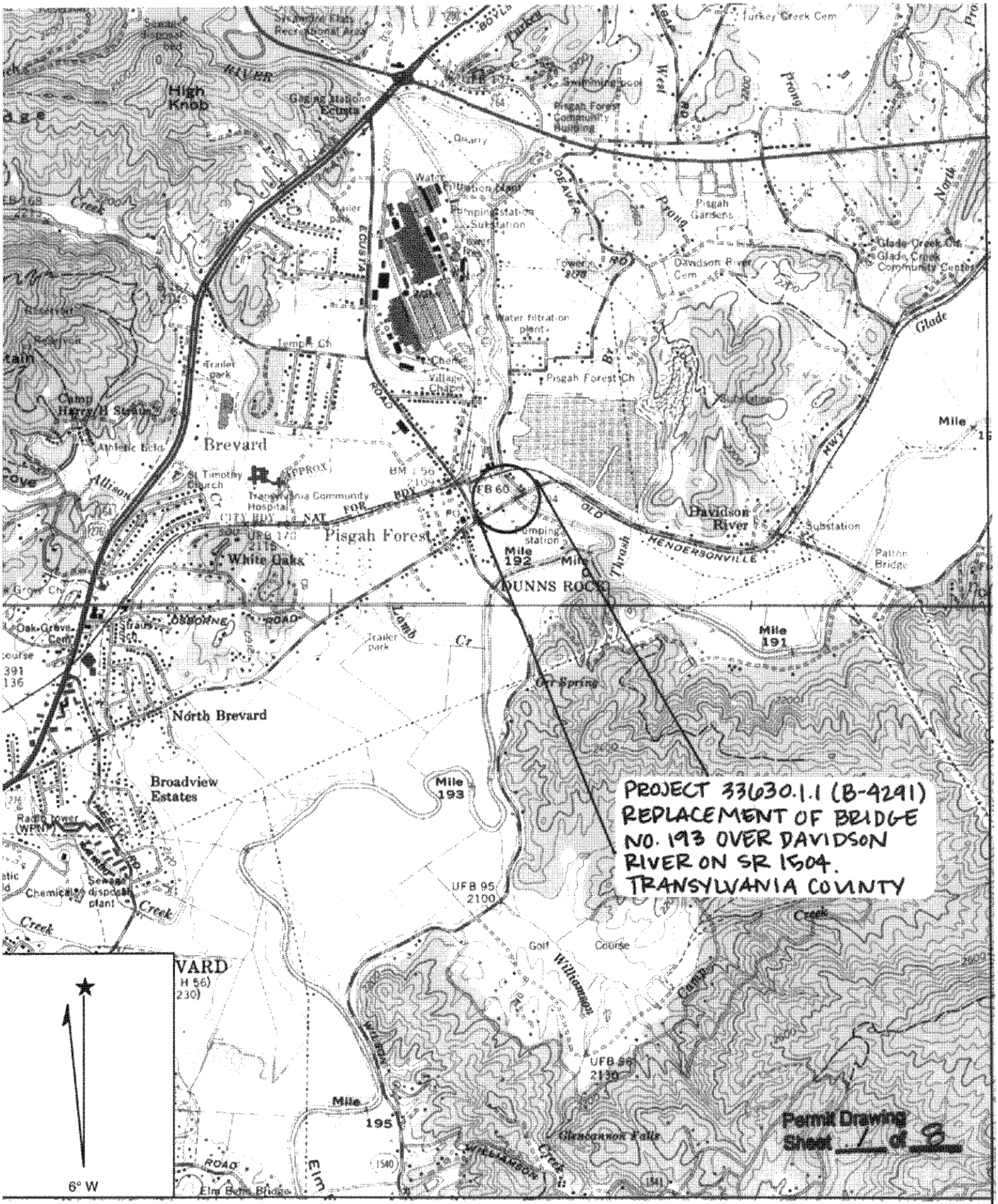
6. **Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ**				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?			☐ Yes	☒ No
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that 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?	NA %
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? NHP, USFWS, and NCDOT field surveys		
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	E. L. Lusk Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	5.26.09<br ~~4.21.09~~ Date



Name: PISGAH FOREST
Date: 2/26/2007
Scale: 1 inch equals 2000 feet

Location: 035° 15' 00.9" N 082° 41' 58.4" W
Caption: Project: 33630.1.1 (B-4291)
Replacement of Bridge No. 193 Over Davidson River
On SR 1504

	OWNER'S NAME	ADDRESS
(1)	Ecusta Real Estate I, LLC.	PO Box 1119 Pisgah Forest, NC 28768
(2)	Ecusta Real Estate I, LLC.	PO Box 1119 Pisgah Forest, NC 28768
(3)	Ecusta Real Estate I, LLC.	PO Box 1119 Pisgah Forest, NC 28768
(4)	Ecusta Real Estate I, LLC.	PO Box 1119 Pisgah Forest, NC 28768
(5)	Hines Sr., William Hunter	5720 Chandler Road Baton Rouge, LA 70808
(6)	Houch & Sons, Inc.	PO Box 867 Pisgah Forest, NC 28768
(7)	Transylvania County	28 East Main St Brevard, NC 28712

Permit Drawing
Sheet 2 of 32

PROPERTY OWNER NAME AND ADDRESS

DIVISION OF HIGHWAYS
TRANSYLVANIA COUNTY

PROJECT: 33630.1.1 (B-4291)
REPLACEMENT OF BRIDGE NO. 193
OVER DAVIDSON RIVER
ON SR 1504

1/6/2009

$FILE$
1/6/2009

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- 19+78.76	Causeway 1 (**)							0.07		134	
1	-L- 20+37.14	Causeway 2 (**)							0.07		139	
TOTALS:									0.14		273	

Permit Drawing
Sheet 3 of 8

* IF CAUSEWAYS 1 AND 2 ARE IN PLACE AT SAME TIME THEY CANNOT BLOCK MORE THAN 50% OF THE CHANNEL. CAUSEWAYS TO BE PLACED ONE AT A TIME TO ALLOW FLOW THROUGH REMAINDER OF CHANNEL.

** TOTAL LINEAR CHANNEL IMPACTS ALONG CENTERLINE OF BROAD RIVER FOR CAUSEWAYS 1 AND 2 IS APPROXIMATELY 145 LINEAR FEET.

*** TOTAL IMPACTS FROM PROPOSED PIERS IS 282 SQ. FT.

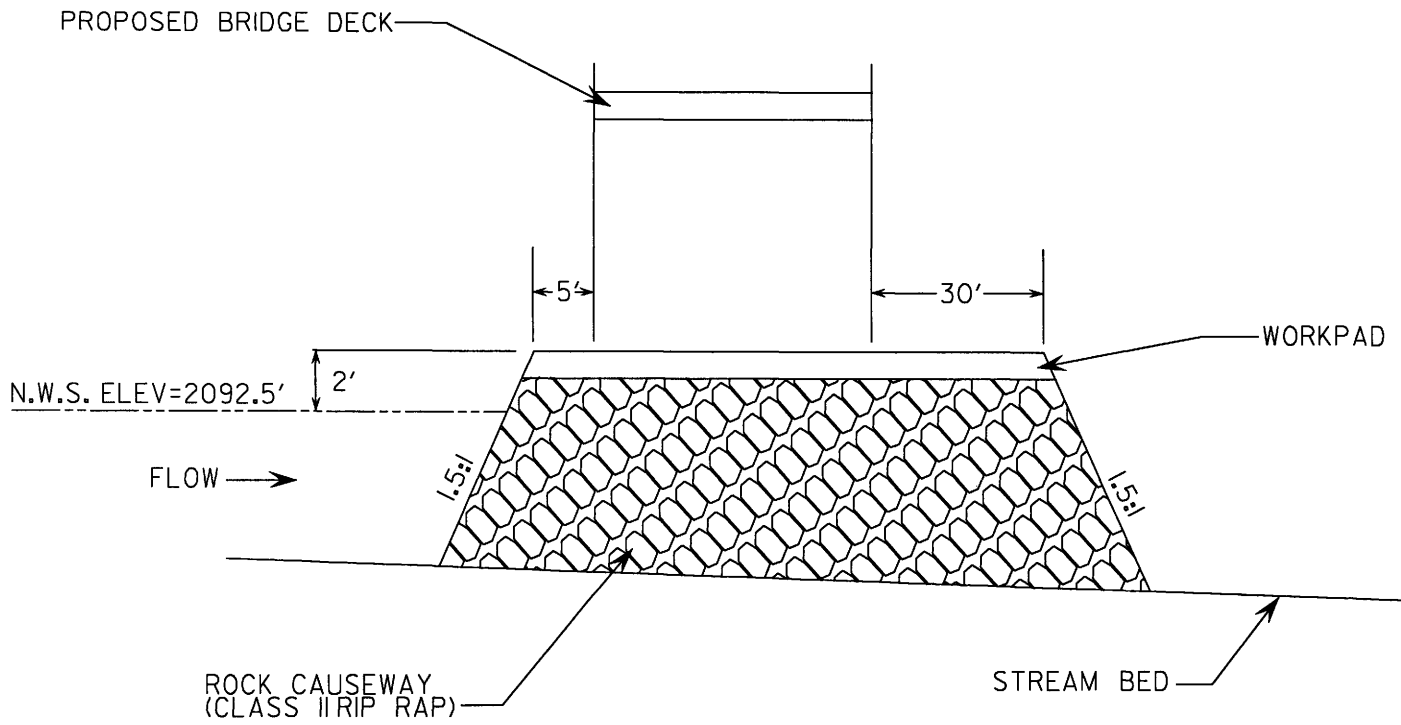
ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

TRANSYLVANIA COUNTY
PROJECT: 35630.1.1 (B-4291)

1/6/2009

CAUSEWAY DETAIL
(NOT TO SCALE)



Permit Drawing
Sheet 4 of 8

$FILE$

QUANTITIES OF ESTIMATES: CAUSEWAY 1

VOLUME OF CLASS II RIP RAP= 65 yds ^{3}
AREA OF CLASS II RIP RAP= 0.04 acres
Estimate 92 Tons Class II Rip Rap

QUANTITIES OF ESTIMATES: CAUSEWAY 2

VOLUME OF CLASS II RIP RAP= 65 yds ^{3}
AREA OF CLASS II RIP RAP= 0.04 acres
Estimate 83 Tons Class II Rip Rap

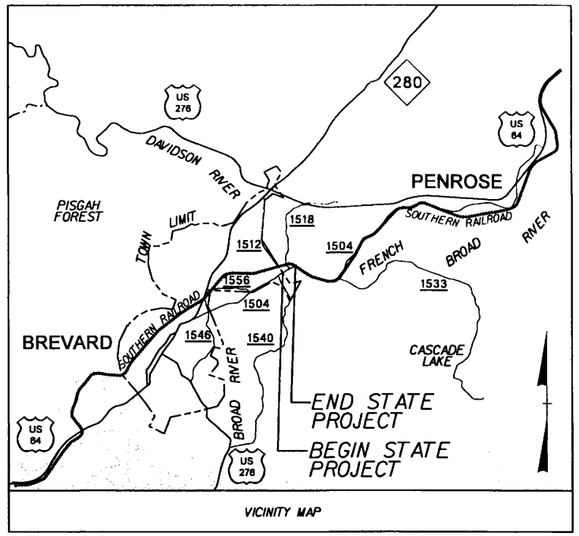
NCDOT

DIVISION OF HIGHWAYS
TRANSYLVANIA COUNTY
PROJECT: 33630.1.1 (B-4291)
REPLACEMENT OF BRIDGE NO.193
OVER DAVIDSON RIVER
ON SR 1504

1/6/2009

TIP PROJECT: B-4291

SEE SHEET 1-A FOR INDEX OF SHEETS
SEE SHEET 1-B FOR CONVENTIONAL PLAN SHEET SYMBOLS



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4291	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33630.1.1	BRSTP-1504(7)	P.E.
33630.2.1	BRSTP-1504(7)	RIGHT-OF-WAY
33630.2.1	BRSTP-1504(7)	UTILITY
33630.3.1	BRSTP-1504(7)	CONSTRUCTION

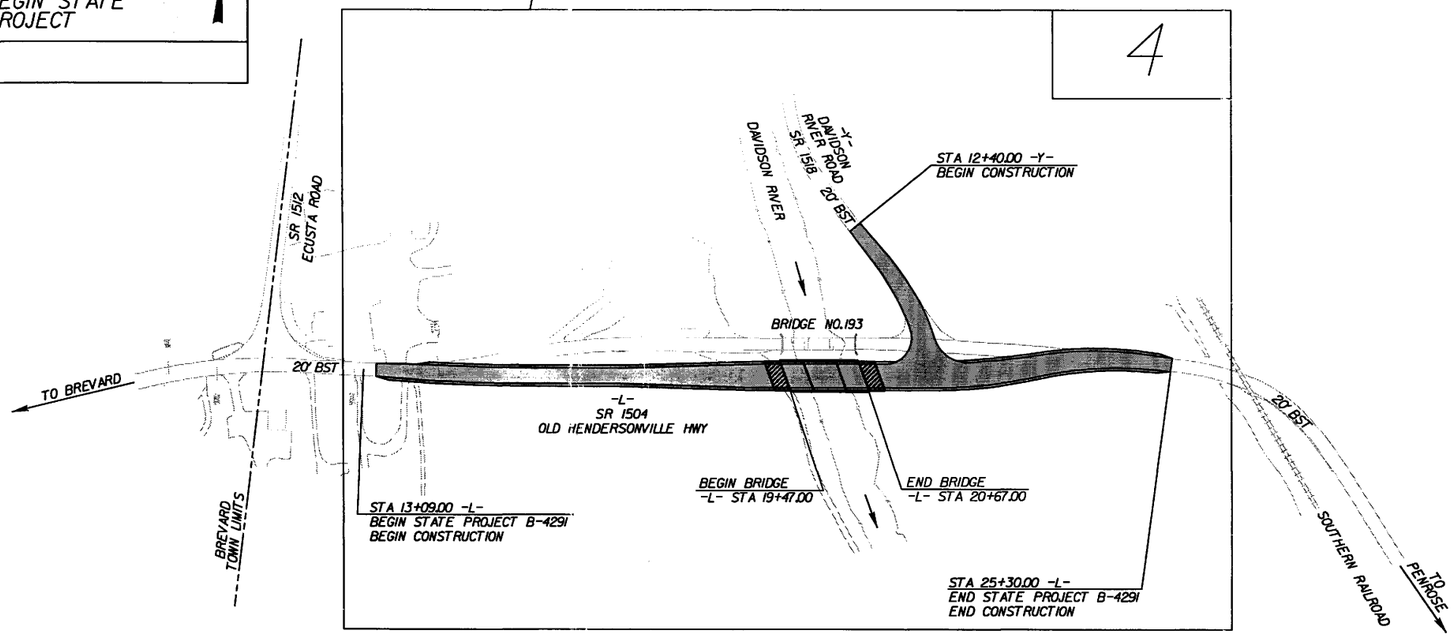
TRANSYLVANIA COUNTY

LOCATION: BRIDGE NO. 193 OVER DAVIDSON RIVER ON SR 1504

WETLAND / STREAM PERMIT DRAWINGS

NC GRID NAD 83/95

SITE 1



Permit Drawing Sheet 5 of 22

NCDOT CONTACT: B.D. TAYLOR, P.E.
PROJECT ENGINEER
ROADWAY DESIGN UNIT

CONTRACT:

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 2008 = 8,000 VPD
ADT 2030 = 12,900 VPD
DHV = 10%
D = 60%
T = 5% *
V = 40 mph

FUNCTIONAL CLASSIFICATION: RURAL MAJOR COLLECTOR

* (TTST 1% + DUAL 4%)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4291 = 0.208 MILE

LENGTH OF STRUCTURE TIP PROJECT B-4291 = 0.023 MILE

TOTAL LENGTH OF TIP PROJECT B-4291 = 0.231 MILE

PLANS PREPARED FOR NCDOT BY:

Kimley-Horn and Associates, Inc.
© 2008
Post Office Box 33068
Raleigh, North Carolina 27636

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: DECEMBER 19, 2008

LETTING DATE: DECEMBER 15, 2009

JEFFREY W. MOORE, PE
PROJECT ENGINEER

J. JASON PACE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

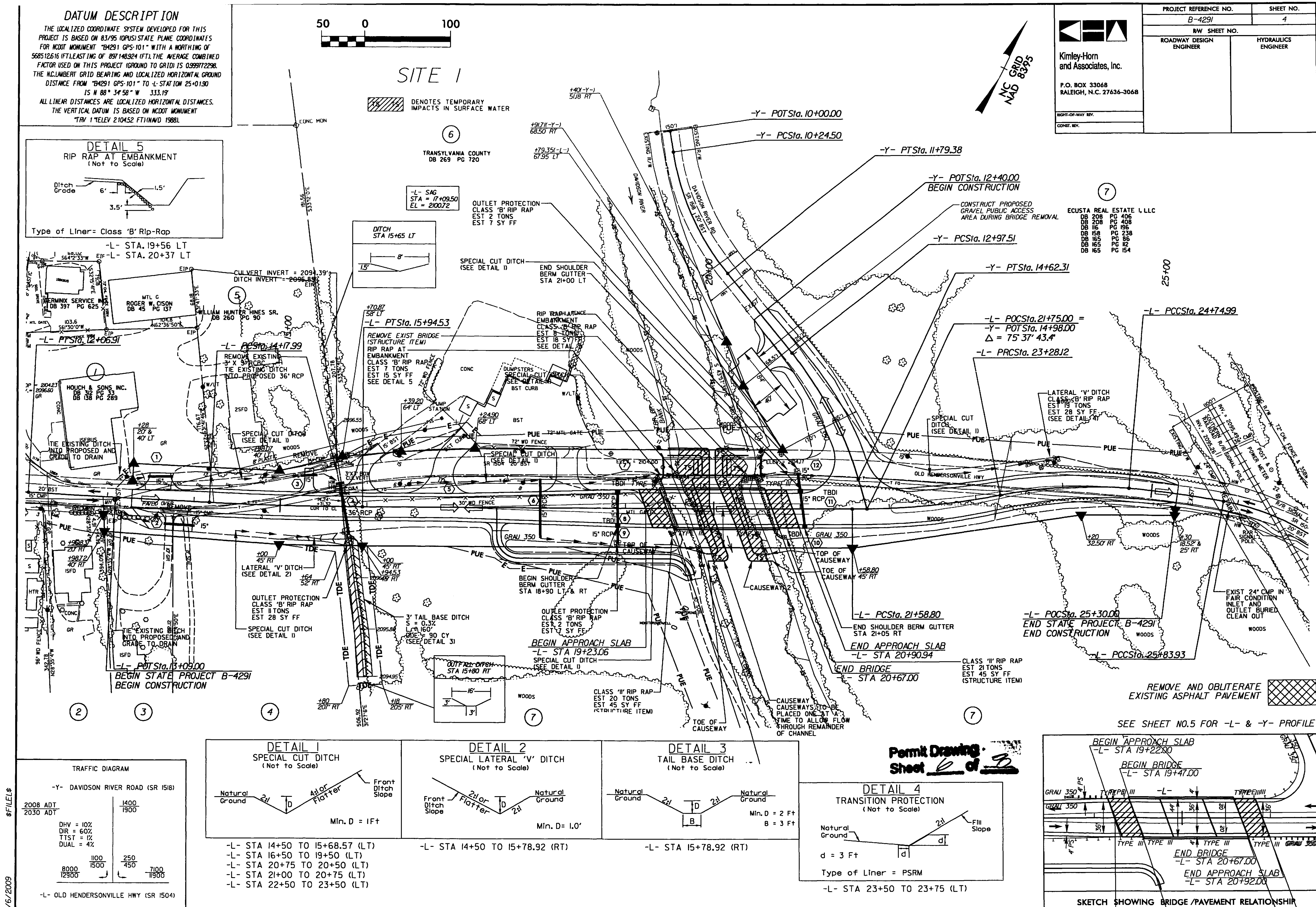
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

K:\RAL_Roadway\Dll0361241\Permits\b4291_wet_1sh.dgn
1/6/2009


DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON 83/95 (OPUS) STATE PLANE COORDINATES FOR NCDOT MONUMENT "B4291 GPS-101" WITH A NORTHING OF 568512.616 (FT), EASTING OF 897148.924 (FT). THE AVERAGE COMBINED FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS 0.999772298.
THE NC LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4291 GPS-101" TO -L- STATION 25+01.90 IS N 88° 34' 58" W 333.19'
ALL LINEAR DISTANCES ARE LOCALIZED HORIZONTAL DISTANCES.
THE VERTICAL DATUM IS BASED ON NCDOT MONUMENT "TRV 1" (ELEV 2104.52 FT) (NAVD 1988).
50 0 100
SITE 1
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NC GRID NAD 83/95
Kimley-Horn and Associates, Inc.
P.O. BOX 33068 RALEIGH, N.C. 27636-3068
PROJECT REFERENCE NO. B-4291
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
RIGHT-OF-WAY REV.
CONST. REV.
DETAIL 5
RIP RAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
Type of Liner= Class 'B' Rip-Rap
-L- STA. 19+56 LT
-L- STA. 20+37 LT
TRANSYLVANIA COUNTY DB 269 PG 720
-L- SAG STA = 17+09.50 EL = 2100.72
DITCH STA 15+65 LT
OUTLET PROTECTION CLASS 'B' RIP RAP EST 2 TONS EST 7 SY FF
SPECIAL CUT DITCH (SEE DETAIL 1)
END SHOULDER BERM GUTTER STA 21+00 LT
-Y- POT Sta. 10+00.00
-Y- PC Sta. 10+24.50
-Y- PT Sta. 11+79.38
-Y- POT Sta. 12+40.00
BEGIN CONSTRUCTION
CONSTRUCT PROPOSED GRAVEL PUBLIC ACCESS AREA DURING BRIDGE REMOVAL
-Y- PC Sta. 12+97.51
-Y- PT Sta. 14+62.31
ECUSTA REAL ESTATE I, LLC
DAVIDSON RIVER
DAVIDSON RIVER RD SR 1518
CULVERT INVERT = 2094.39'
DITCH INVERT = 2096.85'
TERMINIX SERVICE INC DB 397 PG 625
ROGER W. CISON DB 45 PG 137
WILLIAM HUNTER HINES SR. DB 260 PG 90
-L- PT Sta. 12+06.91
-L- PC Sta. 14+17.99
-L- PT Sta. 15+94.53
REMOVE EXISTING 3' X 3' RCBC. TIE EXISTING DITCH INTO PROPOSED 36" RCP
REMOVE EXIST BRIDGE (STRUCTURE ITEM)
RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST 7 TONS EST 15 SY FF SEE DETAIL 5
RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST 8 TONS EST 18 SY FF SEE DETAIL 5
-L- POC Sta. 21+75.00 = -Y- POT Sta. 14+98.00 Δ = 75° 37' 43.4"
-L- PRC Sta. 23+28.12
-L- PCC Sta. 24+74.99
HOUCH & SONS INC. DB 312 PG 33 DB 138 PG 289
TIE EXISTING DITCH INTO PROPOSED AND GRADE TO DRAIN
SPECIAL CUT DITCH (SEE DETAIL 1)
LATERAL 'V' DITCH CLASS 'B' RIP RAP EST 19 TONS EST 28 SY FF (SEE DETAIL 4)
OLD HENDERSONVILLE HWY
LATERAL 'V' DITCH (SEE DETAIL 2)
OUTLET PROTECTION CLASS 'B' RIP RAP EST 11 TONS EST 28 SY FF
SPECIAL CUT DITCH (SEE DETAIL 1)
3' TAIL BASE DITCH S = 0.3% L = 160' DDE = 90 CY (SEE DETAIL 3)
BEGIN SHOULDER BERM GUTTER STA 18+90 LT & RT
OUTLET PROTECTION CLASS 'B' RIP RAP EST 2 TONS EST 7 SY FF
BEGIN APPROACH SLAB -L- STA 19+23.06
SPECIAL CUT DITCH (SEE DETAIL 1)
CLASS 'II' RIP RAP EST 20 TONS EST 45 SY FF (STRUCTURE ITEM)
TOP OF CAUSEWAY
TOE OF CAUSEWAY
CAUSEWAY 2
CAUSEWAY CAUSEWAYS TO BE PLACED ONE AT A TIME TO ALLOW FLOW THROUGH REMAINDER OF CHANNEL
-L- PC Sta. 21+58.80
END SHOULDER BERM GUTTER STA 21+05 RT
END APPROACH SLAB -L- STA 20+90.94
END BRIDGE -L- STA 20+67.00
CLASS 'II' RIP RAP EST 21 TONS EST 45 SY FF (STRUCTURE ITEM)
-L- POC Sta. 25+30.00
END STATE PROJECT B-4291
END CONSTRUCTION
-L- PCC Sta. 25+83.93
EXIST 24" CMP IN FAIR CONDITION INLET AND OUTLET BURIED CLEAN OUT
-L- POT Sta. 13+09.00
BEGIN STATE PROJECT B-4291
BEGIN CONSTRUCTION
OUTLET DITCH STA 15+80 RT
REMOVE AND OBLITERATE EXISTING ASPHALT PAVEMENT
SEE SHEET NO. 5 FOR -L- & -Y- PROFILE
DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
4:1 or Flatter
Min. D = 1 Ft
-L- STA 14+50 TO 15+68.57 (LT)
-L- STA 16+50 TO 19+50 (LT)
-L- STA 20+75 TO 20+50 (LT)
-L- STA 21+00 TO 20+75 (LT)
-L- STA 22+50 TO 23+50 (LT)
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Front Ditch Slope
2:1 or Flatter
Natural Ground
Min. D= 1.0'
-L- STA 14+50 TO 15+78.92 (RT)
DETAIL 3
TAIL BASE DITCH
(Not to Scale)
Natural Ground
Min. D = 2 Ft
B = 3 Ft
-L- STA 15+78.92 (RT)
DETAIL 4
TRANSITION PROTECTION
(Not to Scale)
Natural Ground
Fill Slope
d = 3 Ft
Type of Liner = PSRM
-L- STA 23+50 TO 23+75 (LT)
Permit Drawing Sheet 6 of 3
TRAFFIC DIAGRAM
-Y- DAVIDSON RIVER ROAD (SR 1518)
2008 ADT
2030 ADT
1400 1900
DHV = 10% DIR = 60% TTST = 1% DUAL = 4%
1100 1500
250 450
8000 12900
7100 11900
-L- OLD HENDERSONVILLE HWY (SR 1504)
BEGIN APPROACH SLAB -L- STA 19+22.00
BEGIN BRIDGE -L- STA 19+47.00
END BRIDGE -L- STA 20+67.00
END APPROACH SLAB -L- STA 20+92.00
SKETCH SHOWING BRIDGE / PAVEMENT RELATIONSHIP
$FILEL$
1/6/2009

PROJECT REFERENCE NO.	SHEET NO.
B-4291	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

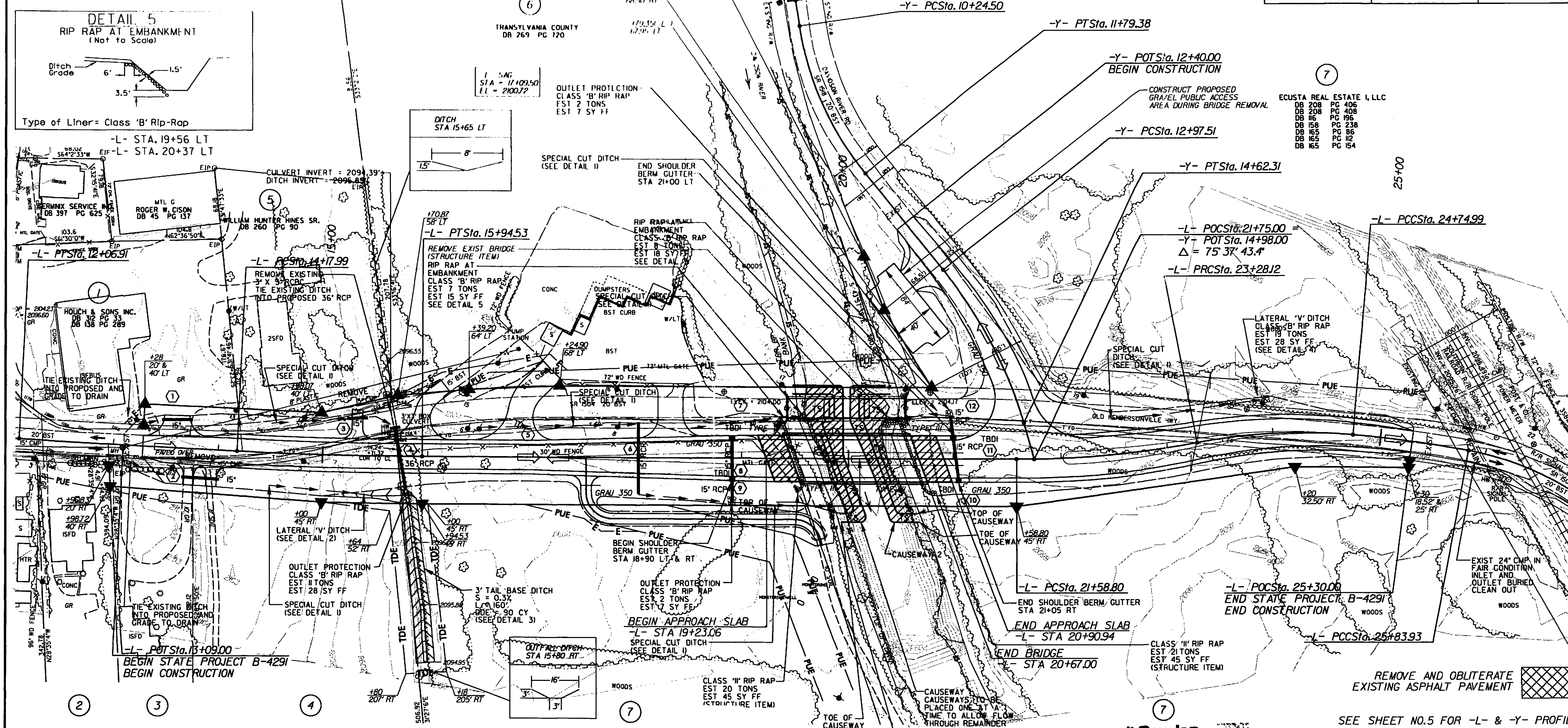
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON 83/95 (OPUS) STATE PLANE COORDINATES FOR NCDOT MONUMENT "B4291 GPS 101" WITH A NORTHING OF 568512.616 (FT) EASTING OF 891148.924 (FT). THE AVERAGE COMBINED FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS 0.99917224. THE NC LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4291 GPS 101" TO -L- STATION 25+01.90 IS N 88° 34' 58" W 333.19'
ALL LINEAR DISTANCES ARE LOCALIZED HORIZONTAL DISTANCES. THE VERTICAL DATUM IS BASED ON NCDOT MONUMENT "TRV 1" (ELEV 2104.52 FT) (NAVD 1988).

50 0 100

SITE 1

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



Permit Drawing Sheet 7 of 8

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground — 2:1 — D — 4:1 or Flatter — Front Ditch Slope

Min. D = 1 Ft

-L- STA 14+50 TO 15+68.57 (LT)
-L- STA 16+50 TO 19+50 (LT)
-L- STA 20+75 TO 20+50 (LT)
-L- STA 21+00 TO 20+75 (LT)
-L- STA 22+50 TO 23+50 (LT)

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Front Ditch Slope — 2:1 or Flatter — D — 2:1 — Natural Ground

Min. D= 1.0'

-L- STA 14+50 TO 15+78.92 (RT)

DETAIL 3
TAIL BASE DITCH
(Not to Scale)

Natural Ground — 2:1 — D — B — 2:1 — Natural Ground

Min. D = 2 Ft
B = 3 Ft

-L- STA 15+78.92 (RT)

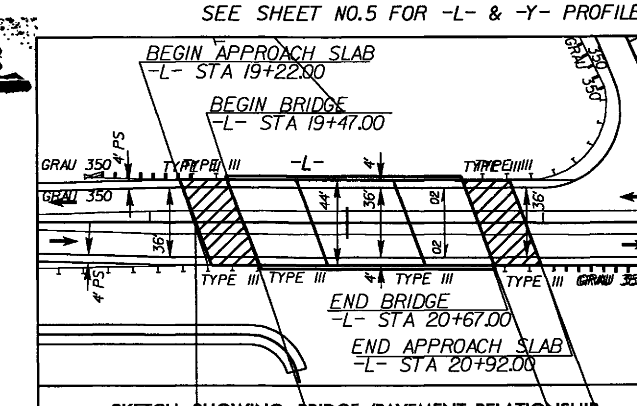
DETAIL 4
TRANSITION PROTECTION
(Not to Scale)

Natural Ground — d — 2:1 — Fill Slope

d = 3 Ft

Type of Liner = PSRM

-L- STA 23+50 TO 23+75 (LT)



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP

TRAFFIC DIAGRAM

-Y- DAVIDSON RIVER ROAD (SR 1518)

2008 ADT / 2030 ADT

1400 / 1900

DHV = 10%
DIR = 60%
TTST = 1%
DUAL = 4%

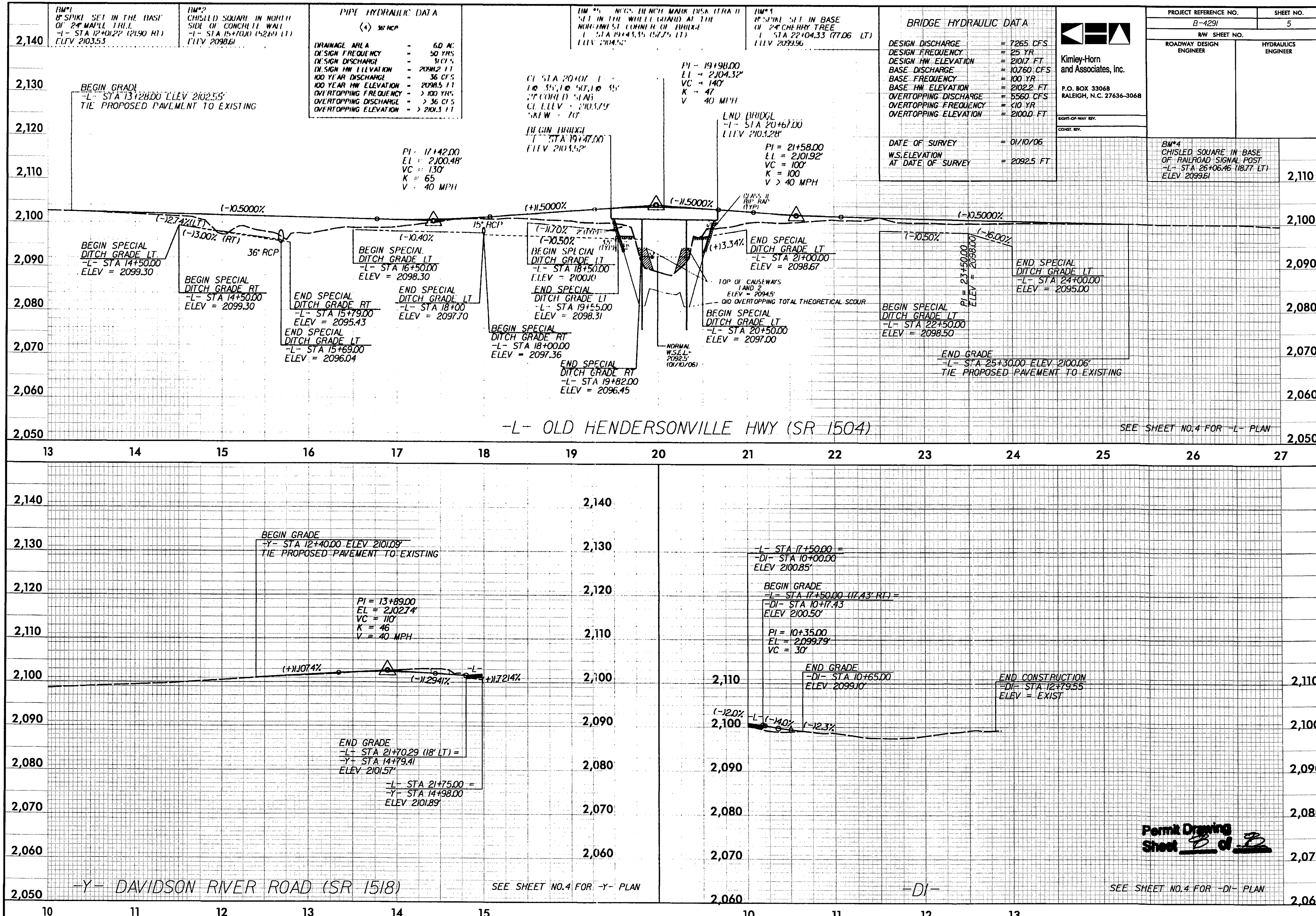
1100 / 1500 — 250 / 450

8000 / 12900 — 7100 / 11900

-L- OLD HENDERSONVILLE HWY (SR 1504)

$FILE$

1/6/2009


BM#1 8" SPIKE SET IN THE BASE OF 24" MAPLE TREE -L- STA 12+01.22 (21.90 RT) ELEV 2103.53
BM#2 CHISELED SQUARE IN NORTH SIDE OF CONCRETE WALL -L- STA 15+70.10 (52.69 LT) ELEV 2098.61
PIPE HYDRAULIC DATA
(4) 36" RCP
DRAINAGE AREA = 6.0 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 31 CFS
DESIGN HW ELEVATION = 2098.2 FT
100 YEAR DISCHARGE = 36 CFS
100 YEAR HW ELEVATION = 2098.5 FT
OVERTOPPING FREQUENCY = > 100 YRS
OVERTOPPING DISCHARGE = > 36 CFS
OVERTOPPING ELEVATION = > 2101.3 FT
BM #5 NCGS BENCH MARK DISK (TRA 1) SET IN THE WHEEL GUARD AT THE NORTHWEST CORNER OF BRIDGE -L- STA 19+43.35 (57.75 LT) ELEV 2104.52
BM#3 8" SPIKE SET IN BASE OF 24" CHERRY TREE -L- STA 22+04.33 (77.06 LT) ELEV 2099.96
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 7265 CFS
DESIGN FREQUENCY = 25 YR
DESIGN HW ELEVATION = 2101.7 FT
BASE DISCHARGE = 10,760 CFS
BASE FREQUENCY = 100 YR
BASE HW ELEVATION = 2102.2 FT
OVERTOPPING DISCHARGE = 5560 CFS
OVERTOPPING FREQUENCY = <10 YR
OVERTOPPING ELEVATION = 2100.0 FT
DATE OF SURVEY = 01/10/06
W.S. ELEVATION AT DATE OF SURVEY = 2092.5 FT
Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068
RIGHT-OF-WAY REV.
CONST. REV.
PROJECT REFERENCE NO. B-4291
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
BM#4 CHISLED SQUARE IN BASE OF RAILROAD SIGNAL POST -L- STA 26+06.46 (18.77 LT) ELEV 2099.61
BEGIN GRADE -L- STA 13+28.00 ELEV 2102.55' TIE PROPOSED PAVEMENT TO EXISTING
CL STA 20+07 -L- 1@ 55', 1@ 50', 1@ 55' 21" CORED SLAB CL ELEV = 2103.79 SKEW = 70°
BEGIN BRIDGE -L- STA 19+47.00 ELEV 2103.52'
PI = 19+98.00 EL = 2104.32' VC = 140' K = 47 V = 40 MPH
END BRIDGE -L- STA 20+67.00 ELEV 2103.28'
PI = 17+42.00 EL = 2100.48' VC = 130' K = 65 V = 40 MPH
PI = 21+58.00 EL = 2101.92' VC = 100' K = 100 V > 40 MPH
(-)0.5000% (+)1.5000% (-)1.5000% (-)0.5000%
(-)12.74%(LT) (-)13.00% (RT) 36" RCP 15" RCP (-)0.40% (-)1.70% (-)0.50% (-)0.50% (-)6.00% (+)13.34%
CLASS II RIP RAP (TYP)
BEGIN SPECIAL DITCH GRADE LT -L- STA 14+50.00 ELEV = 2099.30
BEGIN SPECIAL DITCH GRADE RT -L- STA 14+50.00 ELEV = 2099.30
END SPECIAL DITCH GRADE RT -L- STA 15+79.00 ELEV = 2095.43
END SPECIAL DITCH GRADE LT -L- STA 15+69.00 ELEV = 2096.04
BEGIN SPECIN. DITCH GRADE LT -L- STA 16+50.00 ELEV = 2098.30
END SPECIAL DITCH GRADE LT -L- STA 18+00 ELEV = 2097.70
BEGIN SPECIAL DITCH GRADE RT -L- STA 18+00.00 ELEV = 2097.36
BEGIN SPECIN DITCH GRADE LT -L- STA 18+50.00 ELEV = 2100.10
END SPECIAL DITCH GRADE LT -L- STA 19+55.00 ELEV = 2098.31
END SPECIAL DITCH GRADE RT -L- STA 19+82.00 ELEV = 2096.45
TOP OF CAUSEWAYS 1 AND 2 ELEV = 2094.5'
Q10 OVERTOPPING TOTAL THEORETICAL SCOUR
NORMAL W.S.E.L. = 2092.5' (01/10/06)
END SPECIAL DITCH GRADE LT -L- STA 21+00.00 ELEV = 2098.67
BEGIN SPECIAL DITCH GRADE LT -L- STA 20+50.00 ELEV = 2097.00
BEGIN SPECIAL DITCH GRADE LT -L- STA 22+50.00 ELEV = 2098.50
PI = 23+50.00 ELEV = 2098.00
END SPECIAL DITCH GRADE LT -L- STA 24+00.00 ELEV = 2095.00
END GRADE -L- STA 25+30.00 ELEV 2100.06' TIE PROPOSED PAVEMENT TO EXISTING
-L- OLD HENDERSONVILLE HWY (SR 1504)
SEE SHEET NO.4 FOR -L- PLAN
BEGIN GRADE -Y- STA 12+40.00 ELEV 2101.09' TIE PROPOSED PAVEMENT TO EXISTING
PI = 13+89.00 EL = 2102.74' VC = 110' K = 46 V = 40 MPH
(+)1.1074% (-)1.2941% (+)1.7214%
END GRADE -L- STA 21+70.29 (18' LT) = -Y- STA 14+79.41 ELEV 2101.57'
-L- STA 21+75.00 = -Y- STA 14+98.00 ELEV 2101.89'
-Y- DAVIDSON RIVER ROAD (SR 1518)
SEE SHEET NO.4 FOR -Y- PLAN
-L- STA 17+50.00 = -DI- STA 10+00.00 ELEV 2100.85'
BEGIN GRADE -L- STA 17+50.00 (17.43' RT) = -DI- STA 10+17.43 ELEV 2100.50'
PI = 10+35.00 EL = 2099.79' VC = 30'
END GRADE -DI- STA 10+65.00 ELEV 2099.10'
END CONSTRUCTION -DI- STA 12+79.55 ELEV = EXIST
(-)2.0% (-)4.0% (-)2.3%
-DI-
SEE SHEET NO.4 FOR -DI- PLAN
Permit Drawing Sheet 8 of 12
$FILE$
1/6/2009

STORMWATER MANAGEMENT PLAN

Project: 33630.1.1
TIP No. B-4291
Transylvania County 04/22/2009

Hydraulics Project Manager: Dan Robinson, P.E. (Kimley-Horn and Associates, Inc.),
Marshall Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project B-4291 consists of constructing a new bridge 120 feet long to replace the existing bridge #193 in Transylvania County on SR 1504 over Davidson River. The total project length is 0.231 miles. The project creates impacts to Davidson River, which is located in the French Broad River Basin. The project drainage systems consist of a roadside ditches, a preformed scour hole, grated inlets with associated pipe system, and rip rap outlet protection at the pipe outlets.

Jurisdictional Streams: Davidson River

ENVIRONMENTAL DESCRIPTION

The project is located within the French Broad River Basin in Transylvania County, which is not a CAMA county. The stream is classified as Class B. There are no wetlands in the area of the proposed project. Stream impacts have been minimized by spanning Davidson River with a bridge.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

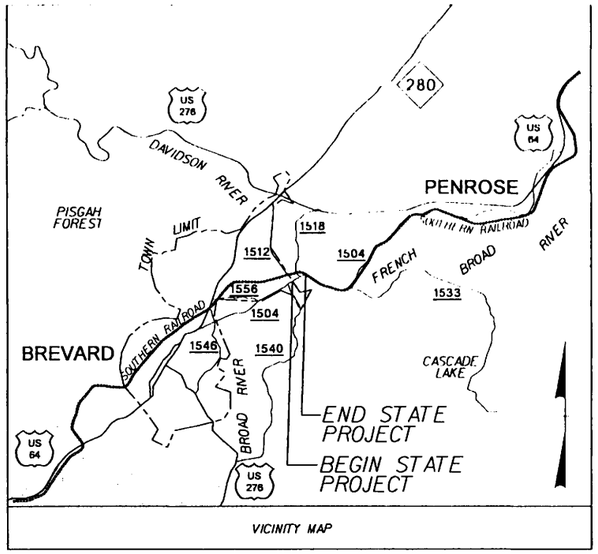
The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. The BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP measures used on this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

- Rip rap outlet protection at pipe outlets.
- Use of preformed scour holes.

TIP PROJECT: B-4291

CONTRACT:

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL PLAN SHEET SYMBOLS



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSYLVANIA COUNTY

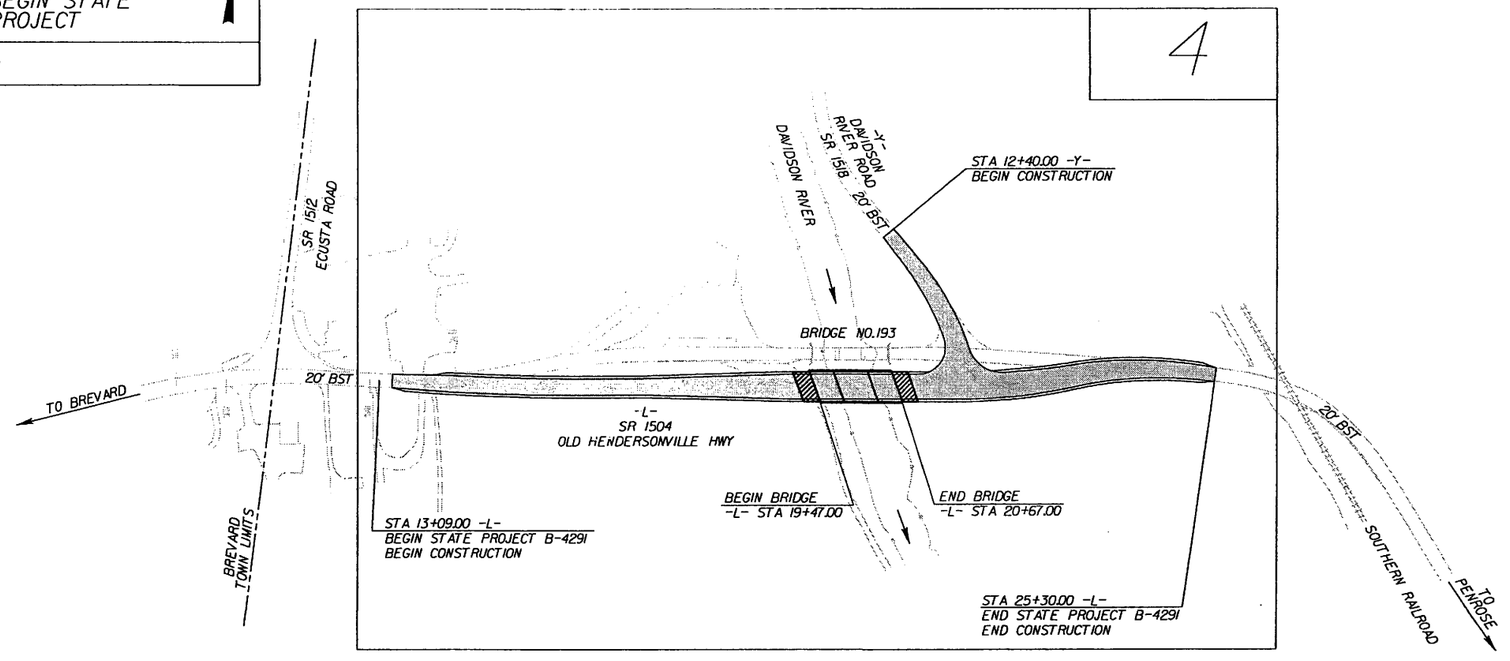
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4291	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33630.1.1	BRSTP-1504(7)	P.E.
33630.2.1	BRSTP-1504(7)	RIGHT-OF-WAY
33630.2.1	BRSTP-1504(7)	UTILITY

LOCATION: BRIDGE NO. 193 OVER DAVIDSON RIVER ON SR 1504

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

NC GRID
NAD 83/95



NCDOT CONTACT: B.D. TAYLOR, P.E.
PROJECT ENGINEER
ROADWAY DESIGN UNIT

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

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 2008 = 8,000 VPD
ADT 2030 = 12,900 VPD
DHV = 10%
D = 60%
T = 5% *
V = 40 mph

FUNCTIONAL CLASSIFICATION:
RURAL MAJOR COLLECTOR

* (TTST 1% + DUAL 4%)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4291 = 0.208 MILE

LENGTH OF STRUCTURE TIP PROJECT B-4291 = 0.023 MILE

TOTAL LENGTH OF TIP PROJECT B-4291 = 0.231 MILE

PLANS PREPARED FOR NCDOT BY:

Kimley-Horn and Associates, Inc.

Post Office Box 33068
Raleigh, North Carolina 27636

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 19, 2008

LETTING DATE:
DECEMBER 15, 2009

JEFFREY W. MOORE, PE
PROJECT ENGINEER

J. JASON PACE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

K:\RAL_Roadway\OII\036124\Sent\NCDOT\Row Plans\Roadway\Proj\b4291_rdy_1sh.dgn
12/30/2008

PROJECT REFERENCE NO.	SHEET NO.
B-4291	1-B

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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 — CM
- 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
- Swamp Marsh
- 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 — BL
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- 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
- 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 — 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 — ?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.

12/30/2008 K:\RAL_Roadway\Oil\036124\Sent\NCDOT\Raw Plans\Roadway\Proj\b4291_rdy_tsh.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-4291	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4291

CONTROL DATA

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	567912.3340	895607.0950	2102.57	11+47.45	21.45 RT
2	BL-2	568134.6670	895943.2980	2099.07	15+47.14	46.30 LT
3	BL-3	568296.4480	896237.6030	2102.60	18+86.08	63.19 LT
4	BL-4	568381.3310	896412.7340	2103.28	20+77.91	64.81 LT
5	BL-5	568497.0520	896685.8020	2099.73	23+78.00	74.48 LT
6	BL-6	568585.2160	896942.0350	2098.79	26+49.44	73.14 LT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
8	BY2-8	568652.9510	896122.7210	2098.37	10+00.00	5.20 RT
44	BL-4	568381.3310	896412.7340	2103.28	14+00.31	72.96 RT

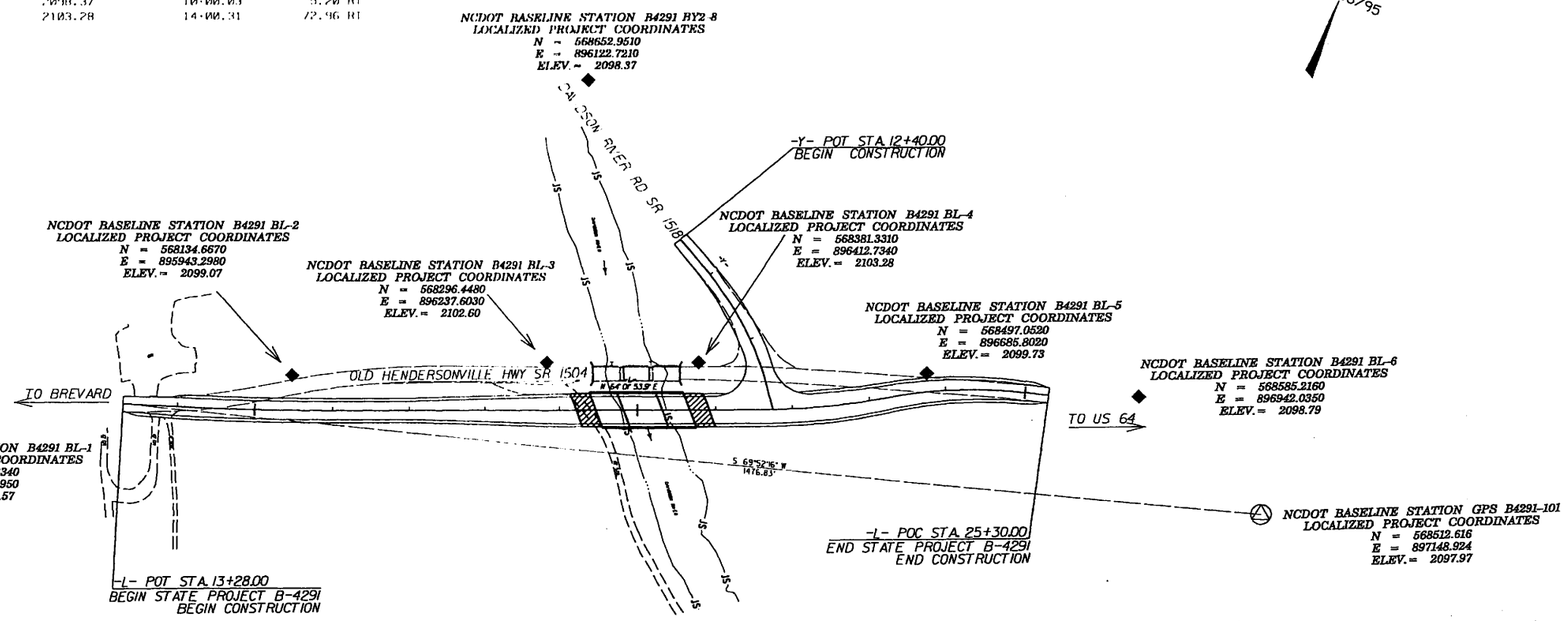
BM1 ELEVATION = 2103.53
N 567934 E 895655
BL STATION 5+52 8 RIGHT
8 INCH SPIKE SET IN BASE OF 24 INCH
MAPLE TREE

BM2 ELEVATION = 2098.61
N 568150 E 895961
BL STATION 9+26 5 LEFT
CHISLED SQUIRE IN NORTH SIDE OF
CONCRETE HEADWALL

BM3 ELEVATION = 2099.96
N 568449 E 896516
BL STATION 15+55 22 LEFT
8 INCH SPIKE SET IN BASE OF 24 INCH
CHEERY TREE

BM4 ELEVATION = 2099.61
N 568576 E 896907
BL STATION 19+65 3 LEFT
CHISLED SQUIRE IN BASE OF RAILROAD
SIGNAL POST

BM5 ELEVATION = 2104.52
N 568318 E 896294
BL STATION 12+99 5 RIGHT
NCGS BENCH MARK DISK (TRA 1) SET IN THE
WHEEL GUARD AT THE NORTHWEST CORNER OF
THE BRIDGE



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4291 GPS-101" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 568512.616(ft) EASTING: 897148.924(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999772298 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4291 GPS-101" TO -L- STATION 13+28.00 IS S 69 52 16 W 1476.83 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. 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:
   TIP B4291_LS_CONTROL_060711.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.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

△ NCDOT BASELINE STATION GPS B4291-102
LOCALIZED PROJECT COORDINATES
N = 568079.280
E = 897811.930
ELEV.= 2096.35

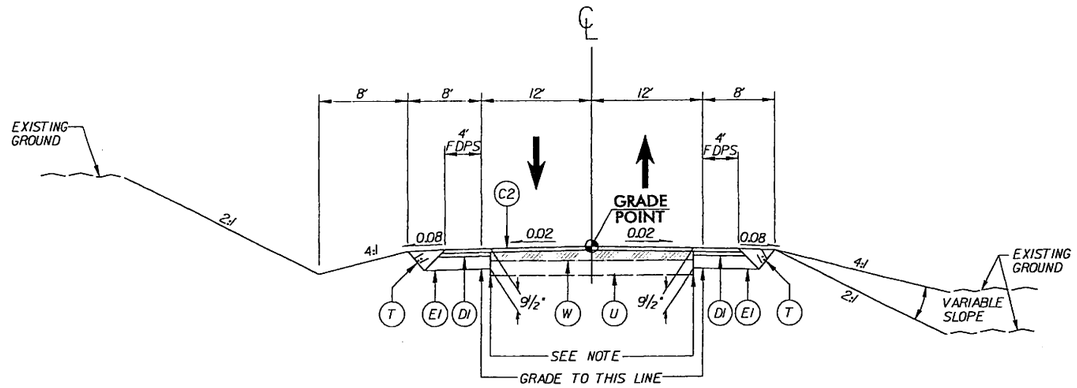
K:\RAL_Roadway\DII036124\Serf\NCDOT\Row Plans\Roadway\Proj\b4291_rdy_1shdgn
12/30/2008

PROJECT REFERENCE NO.	SHEET NO.
B-4291	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- SR 1504 (OLD HENDERSONVILLE HWY)



TYPICAL SECTION NO. 1

-L- STA 13+28.00 TO STA 14+50.00
-L- STA 23+72.00 TO STA 25+30.00

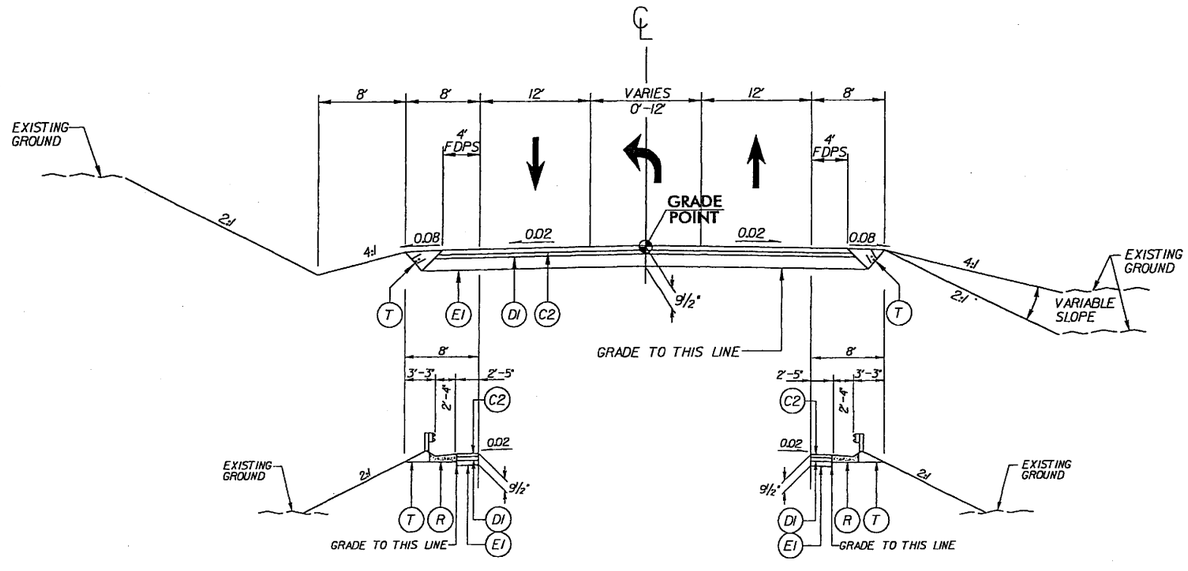
NOTE: SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT TO PROVIDE 1' MINIMUM WIDTH FULL DEPTH PAVEMENT

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1.5" IN DEPTH OR GREATER THAN 2" IN DEPTH.
DI	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 285 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 2.5" OR GREATER THAN 4" DEPTH.
EI	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" DEPTH.
J	PROPOSED 8" AGGREGATE BASE COURSE
R	PROPOSED SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL W)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE INDICATED

-L- SR 1504 (OLD HENDERSONVILLE HWY)



TYPICAL SECTION NO. 2

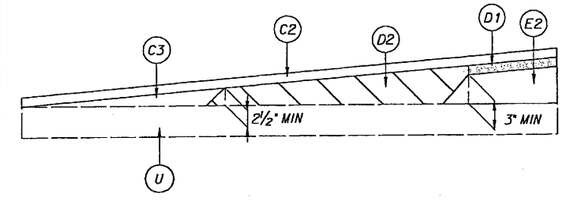
-L- STA 14+50.00 TO STA 19+47.00 (BEGIN BRIDGE)
-L- STA 20+67.00 (END BRIDGE) TO STA 23+72.00

TYPICAL SECTION NO. 2A

-L- STA 18+90.00 TO STA 19+15.00 (LT)
-L- STA 20+83.00 TO STA 21+00.00 (LT)

TYPICAL SECTION NO. 2B

-L- STA 18+90.00 TO STA 19+31.00 (RT)
-L- STA 20+99.00 TO STA 21+05.00 (RT)



DETAIL W SHOWING METHOD OF WEDGING

COMPUTED BY:	JJP	DATE:	12/29/2008
CHECKED BY:	LDR	DATE:	12/29/2008

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-4291	3-A

Kimley-Horn and Associates, Inc. P.O. Box 33068 Raleigh, N.C. 27636-3068

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT IN ELEVATION	INVERT OUT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
13+59 -L-	LT	1													
13+83 -L-	RT	2													
15+32 -L-	LT	3													
15+73 -L-	CL	4			2095.3	2094.7							60		
16+85 -L-	LT	5													
18+00 -L-	CL	6			2097.7	2097.4	0.005		68						
18+90 -L-	LT	7		2102.3	2098.8										
18+90 -L-	LT	7	8		2098.8	2097.9	0.025		36						
18+90 -L-	RT	8		2102.3	2097.9										
18+90 -L-	RT	8	9		2097.9	2096.9	0.05		20						
21+05 -L-	RT	10		2102.5	2009.0										
21+05 -L-	RT	10	11		2009.0	2008.6	0.01		40						
21+00 -L-	LT	11		2102.3	2008.6										
21+00 -L-	LT	11	12		2008.6	2008.5	0.006		16						
SHEET TOTALS									180				60		
SAY															

STATION	FROM	TO	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
13+59 -L-	1															32				
13+83 -L-	2															36				
15+32 -L-	3															20				
15+73 -L-	4																		3.4	
16+85 -L-	5															36				
18+00 -L-	6																			
18+90 -L-	7																			
18+90 -L-	7	8																		
18+90 -L-	8																			
18+90 -L-	8	9																		
21+05 -L-	10																			
21+05 -L-	10	11																		
21+00 -L-	11																			
21+00 -L-	11	12																		
SHEET TOTALS																124			3.4	
SAY																			4	

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	M.D.I. TYPE "A" STD. 840.17 OR 840.26	M.D.I. TYPE "B" STD. 840.18 OR 840.27	M.D.I. TYPE "D" STD. 840.19 OR 840.28	M.D.I. FRAME WITH GRATE STD. 840.22	M.D.I. FRAME WITH TWO GRATES STD. 840.22	M.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	M.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	ADJUSTMENT OF CATCH BASINS	CONVERT EXIST CB TO TBJB	CONVERT EXIST CB TO DI
13+59 -L-	1																				
13+83 -L-	2																				
15+32 -L-	3																				
15+73 -L-	4																				
16+85 -L-	5																				
18+00 -L-	6																				
18+90 -L-	7		1																		
18+90 -L-	7	8																			
18+90 -L-	8		1																		
18+90 -L-	8	9																			
21+05 -L-	10		1																		
21+05 -L-	10	11																			
21+00 -L-	11		1																		
21+00 -L-	11	12																			
SHEET TOTALS			4																		
SAY																					

STATION	FROM	TO	TBDI STD. 840.35	M.H. FRAME AND COVER STD. 840.54	J.B. STD. 840.31 OR 840.33	MANHOLE STD. 840.52	M.H. STD. 840.51 OR 840.54	800.00 STD. 850.10	CPES STD. 310.03	T.B.D.I. STD. 840.35	T.B.D.I. (N.S.) FRAME WITH TWO GRATES STD 840.29					CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
13+59 -L-	1																		40	
13+83 -L-	2																		24	
15+32 -L-	3																		30	
15+73 -L-	4																			
16+85 -L-	5																			
18+00 -L-	6																			
18+90 -L-	7		1								1									
18+90 -L-	7	8																		
18+90 -L-	8		1								1									
18+90 -L-	8	9																		
21+05 -L-	10		1								1									
21+05 -L-	10	11																		
21+00 -L-	11		1								1									
21+00 -L-	11	12																		
SHEET TOTALS			4								4								94	
SAY																				

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
M.D.I.	MEDIAN DROP INLET
M.D.I.(N.S.)	MEDIAN DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

PROJECT REFERENCE NO.	SHEET NO.
B-4291	4

RW SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 1
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 2:1, D, 3:1 or Flatter, Front Ditch Slope
Min. D = 1 Ft

-L- STA 14+50 TO 15+69 (LT)
-L- STA 14+50 TO 15+00 (RT)
-L- STA 16+50 TO 18+00 (LT)
-L- STA 18+00 TO 19+82 (RT)
-L- STA 18+50 TO 19+55 (LT)
-L- STA 20+50 TO 21+00 (LT)
-L- STA 22+50 TO 23+50 (LT)

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Front Ditch Slope, 2:1 or Flatter, D, 2:1, Natural Ground
Min. D = 1.0'

-L- STA 15+00 TO 15+79 (RT)

DETAIL 3
TAIL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, B, Natural Ground
Min. D = 2 Ft
B = 3 Ft

-L- STA 15+85 (RT)

DETAIL 4
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1 or Flatter, Front Ditch Slope
Filter Fabric
Min. D = 1 Ft
Max. d = 1 Ft
Type of Liner= Class 'B' Rip-Rap

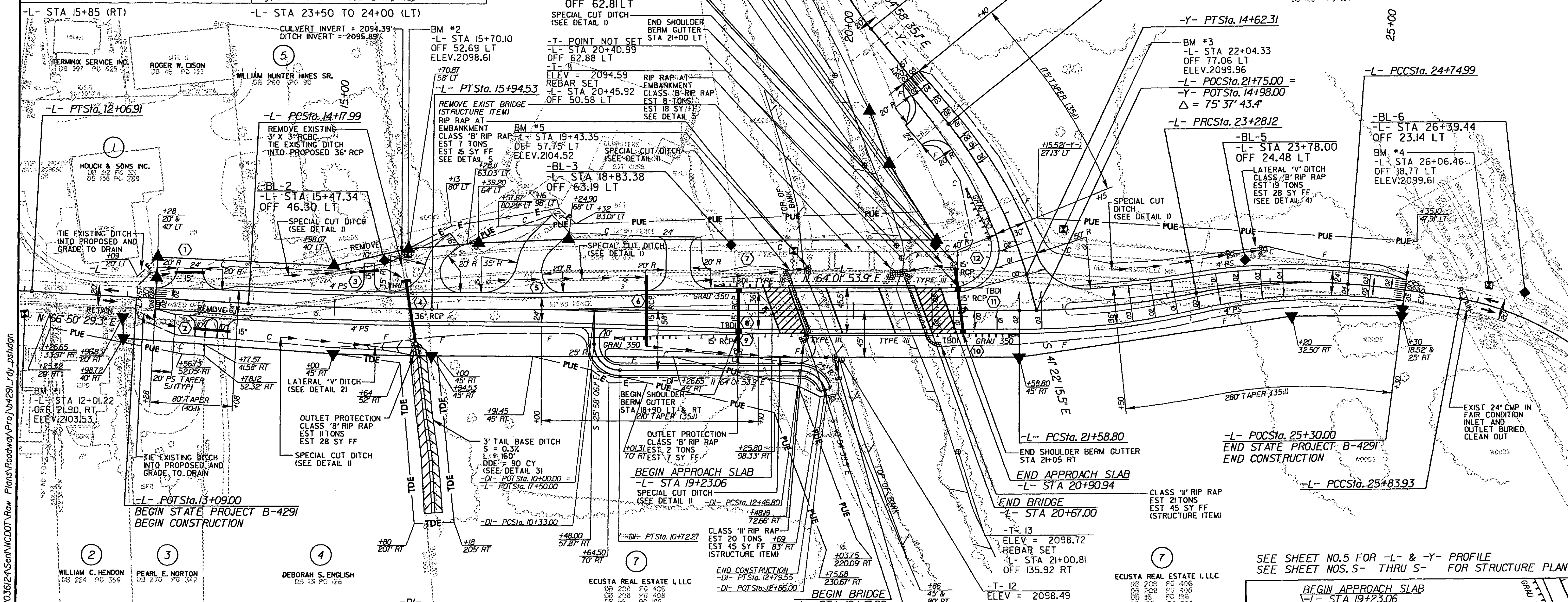
-L- STA 23+50 TO 24+00 (LT)

DETAIL 5
RIP RAP AT EMBANKMENT
(Not to Scale)

Ditch Grade, 6', 1.5', 3.5'

Type of Liner= Class 'B' Rip-Rap

-L- STA 19+55 LT
-L- STA 20+50 LT
-L- STA 19+82 RT



-BY2-8
-L- STA 19+36.20
OFF 434.00 LT
-T- 9
ELEV = 2098.42
REBAR SET
-L- STA 19+82.03
OFF 226.88 LT
-T- 10
ELEV = 2096.39
REBAR SET
-L- STA 20+09.99
OFF 140.16 LT
OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SY FF
-BL-4
-L- STA 20+77.99
OFF 62.81 LT
SPECIAL CUT DITCH (SEE DETAIL 1)
END SHOULDER BERM GUTTER STA 21+00 LT
-T- POINT NOT SET
-L- STA 20+40.99
OFF 62.88 LT
-T- 11
ELEV = 2094.59
REBAR SET
-L- STA 20+45.92
OFF 50.58 LT
RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 8 TONS
EST 18 SY FF
SEE DETAIL 5
TRANSYLVANIA COUNTY
-L- SAG
STA = 17+09.50
EL = 2100.72
CULVERT INVERT = 2094.39'
DITCH INVERT = 2095.89'
BM #2
-L- STA 15+70.10
OFF 52.69 LT
ELEV.2098.61
-L- PT Sta. 15+94.53
REMOVE EXIST BRIDGE (STRUCTURE ITEM)
RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 7 TONS
EST 15 SY FF
SEE DETAIL 5
BM #5
-L- STA 19+43.35
OFF 57.75 LT
ELEV.2104.52
-BL-3
-L- STA 18+83.38
OFF 63.19 LT
TERMINIX SERVICE INC.
ROGER W. CISON
WILLIAM HUNTER HINES SR.
-L- PT Sta. 12+06.91
-L- PC Sta. 14+17.99
REMOVE EXISTING 3' X 3' RCBC
TIE EXISTING DITCH INTO PROPOSED 36" RCP
HOUCH & SONS INC.
-BL-2
-L- STA 15+47.34
OFF 46.30 LT
SPECIAL CUT DITCH (SEE DETAIL 1)
TIE EXISTING DITCH INTO PROPOSED AND GRADE TO DRAIN
N 66° 50' 29.3" E
BM #1
-L- STA 12+01.22
OFF 21.90 RT
ELEV.2103.53
20' PS TAPER 5:1 (TYP)
80' TAPER (40:1)
LATERAL 'V' DITCH (SEE DETAIL 2)
OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 11 TONS
EST 28 SY FF
SPECIAL CUT DITCH (SEE DETAIL 1)
TIE EXISTING DITCH INTO PROPOSED AND GRADE TO DRAIN
-L- POT Sta. 13+09.00
BEGIN STATE PROJECT B-4291
BEGIN CONSTRUCTION
3' TAIL BASE DITCH
S = 0.3%
L = 160'
DDE = 90 CY
(SEE DETAIL 3)
-DI- POT Sta. 10+00.00 =
-L- POT Sta. 17+50.00
-DI- PC Sta. 10+33.00
BEGIN SHOULDER BERM GUTTER STA 18+90 LT & RT
OUTLET PROTECTION
CLASS 'B' RIP RAP
EST 2 TONS
EST 7 SY FF
BEGIN APPROACH SLAB
-L- STA 19+23.06
SPECIAL CUT DITCH (SEE DETAIL 1)
-DI- PC Sta. 12+46.80
-DI- PT Sta. 10+72.27
CLASS 'II' RIP RAP
EST 20 TONS
EST 45 SY FF
(STRUCTURE ITEM)
END CONSTRUCTION
-DI- PT Sta. 12+79.55
-DI- POT Sta. 12+86.00
BEGIN BRIDGE
-L- STA 19+47.00
RIP RAP AT EMBANKMENT
CLASS 'B' RIP RAP
EST 7 TONS
EST 15 SY FF
SEE DETAIL 5
-T- 12
ELEV = 2098.49
REBAR SET
-L- STA 19+89.41
OFF 47.55 RT
-T- 13
ELEV = 2098.72
REBAR SET
-L- STA 21+00.81
OFF 135.92 RT
END BRIDGE
-L- STA 20+67.00
END APPROACH SLAB
-L- STA 20+90.94
END SHOULDER BERM GUTTER STA 21+05 RT
-L- PC Sta. 21+58.80
CLASS 'II' RIP RAP
EST 21 TONS
EST 45 SY FF
(STRUCTURE ITEM)
-Y- POT Sta. 10+00.00
-Y- PC Sta. 10+24.50
-Y- PT Sta. 11+79.38
-Y- POT Sta. 12+40.00
BEGIN CONSTRUCTION
-Y- PC Sta. 12+97.51
-Y- PT Sta. 14+62.31
S 34° 22' 33.2" E
S 64° 58' 35.1" E
175' TAPER (35:1)
N 64° 01' 53.9" E
S 41° 22' 15.5" E
BM #3
-L- STA 22+04.33
OFF 77.06 LT
ELEV.2099.96
-L- POC Sta. 21+75.00 =
-Y- POT Sta. 14+98.00
Δ = 75° 37' 43.4"
-L- PRC Sta. 23+28.12
-BL-5
-L- STA 23+78.00
OFF 24.48 LT
LATERAL 'V' DITCH
CLASS 'B' RIP RAP
EST 19 TONS
EST 28 SY FF
(SEE DETAIL 4)
SPECIAL CUT DITCH (SEE DETAIL 1)
-L- PCC Sta. 24+74.99
-BL-6
-L- STA 26+39.44
OFF 23.14 LT
BM #4
-L- STA 26+06.46
OFF 18.77 LT
ELEV.2099.61
280' TAPER (35:1)
-L- POC Sta. 25+30.00
END STATE PROJECT B-4291
END CONSTRUCTION
-L- PCC Sta. 25+83.93
EXIST 24" CMP IN FAIR CONDITION INLET AND OUTLET BURIED CLEAN OUT
ECUSTA REAL ESTATE I, LLC
NC GRID NAD 83/95
WILLIAM C. HENDON
PEARL E. NORTON
DEBORAH S. ENGLISH

SEE SHEET NO.5 FOR -L- & -Y- PROFILE
SEE SHEET NOS. S- THRU S- FOR STRUCTURE PLANS

TRAFFIC DIAGRAM

-Y- DAVIDSON RIVER ROAD (SR 1518)

2008 ADT / 2030 ADT

1400 / 1900

DHV = 10%
DIR = 60%
TTST = 1%
DUAL = 4%

1100 / 1500 ; 250 / 450 ; 8000 / 12900 ; 7100 / 11900

-L- OLD HENDERSONVILLE HWY (SR 1504)

-DI-

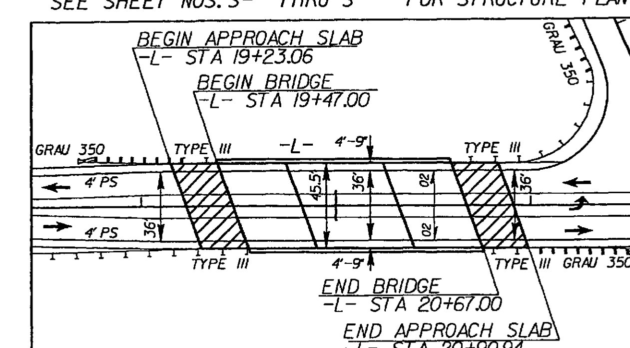
PI Sta 10+58.00	PI Sta 12+66.00
Δ = 90° 00' 00.0" (LT)	Δ = 75° 03' 30.6" (RT)
D = 229° 10' 59.2"	D = 229° 10' 59.2"
L = 39.27'	L = 32.75'
T = 25.00'	T = 19.20'
R = 25.00'	R = 25.00'

-L-

PI Sta 15+06.28	PI Sta 22+43.71	PI Sta 24+02.02	PI Sta 25+29.51	PI Sta 27+06.74
Δ = 2° 48' 35.4" (LT)	Δ = 10° 46' 44.6" (LT)	Δ = 15° 43' 46.0" (RT)	Δ = 5° 40' 28.4" (RT)	Δ = 48° 07' 36.5" (RT)
D = 1° 35' 29.6"	D = 6° 21' 58.3"	D = 10° 42' 34.2"	D = 5° 12' 31.3"	D = 20° 50' 05.4"
L = 176.55'	L = 169.32'	L = 146.87'	L = 108.94'	L = 230.99'
T = 88.29'	T = 84.91'	T = 73.90'	T = 54.52'	T = 122.80'
R = 3,600.00'	R = 900.00'	R = 535.00'	R = 1,100.00'	R = 275.00'
SE = NC	SE = 0.03	SE = 0.04	SE = SEE PLANS	SE = EXISTING
RO = NONE	RO = 63'	RO = 84'	RO = SEE PLANS	RO = EXISTING

-Y-

PI Sta 11+03.83	PI Sta 13+81.10
Δ = 30° 36' 02.0" (LT)	Δ = 23° 36' 19.6" (RT)
D = 19° 45' 25.8"	D = 14° 19' 26.2"
L = 154.88'	L = 164.80'
T = 79.34'	T = 83.58'
R = 290.00'	R = 400.00'
SE = EXISTING	SE = 0.02
RO = EXISTING	RO = 30'



SKETCH SHOWING BRIDGE /PAVEMENT RELATIONSHIP

K:\RAL_Roadway\011036124\Sen\NCDOT\Row Plans\Roadway\Pro\b4291_rdy_psh4.dgn

12/30/2008

BM#1
8" SPIKE SET IN THE BASE OF 24" MAPLE TREE
-L- STA 12+01.22 (21.90 RT)
ELEV 2103.53

BM#2
CHISLED SQUARE IN NORTH SIDE OF CONCRETE WALL
-L- STA 15+70.10 (52.69 LT)
ELEV 2098.61

PIPE HYDRAULIC DATA

④ 36" RCP

DRAINAGE AREA	=	6.0 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	31 CFS
DESIGN HW ELEVATION	=	2098.2 FT
100 YEAR DISCHARGE	=	36 CFS
100 YEAR HW ELEVATION	=	2098.5 FT
OVERTOPPING FREQUENCY	=	> 100 YRS
OVERTOPPING DISCHARGE	=	> 36 CFS
OVERTOPPING ELEVATION	=	> 2101.3 FT

BM #5 - NCGS BENCH MARK DISK (TRA I) SET IN THE WHEEL GUARD AT THE NORTHWEST CORNER OF BRIDGE
-L- STA 19+43.35 (57.75 LT)
ELEV 2104.52

BM#3
8" SPIKE SET IN BASE OF 24" CHERRY TREE
-L- STA 22+04.33 (77.06 LT)
ELEV 2099.96

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	7265 CFS
DESIGN FREQUENCY	=	25 YR
DESIGN HW ELEVATION	=	2101.7 FT
BASE DISCHARGE	=	10,760 CFS
BASE FREQUENCY	=	100 YR
BASE HW ELEVATION	=	2102.2 FT
OVERTOPPING DISCHARGE	=	5560 CFS
OVERTOPPING FREQUENCY	=	410 YR
OVERTOPPING ELEVATION	=	2100.0 FT
DATE OF SURVEY	=	01/10/06
W.S. ELEVATION AT DATE OF SURVEY	=	2092.5 FT

Kimley-Horn and Associates, Inc.
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

PROJECT REFERENCE NO.	SHEET NO.
B-4291	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM#4
CHISLED SQUARE IN BASE OF RAILROAD SIGNAL POST
-L- STA 26+06.46 (18.77 LT)
ELEV 2099.61

BEGIN GRADE
-L- STA 13+28.00 ELEV 2102.55'
TIE PROPOSED PAVEMENT TO EXISTING

PI = 17+42.00
EL = 2100.48'
VC = 130'
K = 65
V = 40 MPH

CL STA 20+07 -L-
1@ 35', 1@ 50', 1@ 35'-
21' CORED SLAB
CL ELEV = 2103.79'
SKEW = 70°

BEGIN BRIDGE
-L- STA 19+47.00
ELEV 2103.52'

PI = 19+98.00
EL = 2104.32'
VC = 140'
K = 47
V = 40 MPH

END BRIDGE
-L- STA 20+67.00
ELEV 2103.28'

PI = 21+58.00
EL = 2101.92'
VC = 100'
K = 100
V > 40 MPH

(-)10.5000%
(-)27.4%(LT)
(-)13.00% (RT)
(+)1.5000%
(-)1.5000%
(-)10.40%
(-)1.70%
(-)10.50%
(+)3.34%
(-)10.50%
(-)16.00%

CLASS II RIP RAP (TYP.)

15" RCP
36" RCP
35' (TYP.)

BEGIN SPECIAL DITCH GRADE LT
-L- STA 14+50.00
ELEV = 2099.30

BEGIN SPECIAL DITCH GRADE RT
-L- STA 14+50.00
ELEV = 2099.30

END SPECIAL DITCH GRADE RT
-L- STA 15+79.00
ELEV = 2095.43

END SPECIAL DITCH GRADE LT
-L- STA 15+69.00
ELEV = 2096.04

BEGIN SPECIAL DITCH GRADE LT
-L- STA 16+50.00
ELEV = 2098.30

END SPECIAL DITCH GRADE LT
-L- STA 18+00
ELEV = 2097.70

BEGIN SPECIAL DITCH GRADE RT
-L- STA 18+00.00
ELEV = 2097.36

END SPECIAL DITCH GRADE RT
-L- STA 19+82.00
ELEV = 2096.45

BEGIN SPECIAL DITCH GRADE LT
-L- STA 18+50.00
ELEV = 2100.10

END SPECIAL DITCH GRADE LT
-L- STA 19+55.00
ELEV = 2098.31

NORMAL W.S.EL = 2092.5 (01/10/06)

BEGIN SPECIAL DITCH GRADE LT
-L- STA 20+50.00
ELEV = 2097.00

END SPECIAL DITCH GRADE LT
-L- STA 21+00.00
ELEV = 2098.67

BEGIN SPECIAL DITCH GRADE LT
-L- STA 22+50.00
ELEV = 2098.50

PI = 23+60.00
ELEV = 2098.00

END SPECIAL DITCH GRADE LT
-L- STA 24+00.00
ELEV = 2095.00

END GRADE
-L- STA 25+30.00 ELEV 2100.06'
TIE PROPOSED PAVEMENT TO EXISTING

-L- OLD HENDERSONVILLE HWY (SR 1504)

SEE SHEET NO.4 FOR -L- PLAN

BEGIN GRADE
-Y- STA 12+40.00 ELEV 2101.09'
TIE PROPOSED PAVEMENT TO EXISTING

PI = 13+89.00
EL = 2102.74'
VC = 110'
K = 46
V = 40 MPH

(+)11.1074%
(-)11.2941%
(+)11.7214%

END GRADE
-L- STA 21+70.29 (18' LT) =
-Y- STA 14+79.41
ELEV 2101.57'

-L- STA 21+75.00 =
-Y- STA 14+98.00
ELEV 2101.89'

-Y- DAVIDSON RIVER ROAD (SR 1518)

SEE SHEET NO.4 FOR -Y- PLAN

-L- STA 17+50.00 =
-DI- STA 10+00.00
ELEV 2100.85'

BEGIN GRADE
-L- STA 17+50.00 (17.43' RT) =
-DI- STA 10+17.43
ELEV 2100.50'

PI = 10+35.00
EL = 2099.79'
VC = 30'

END GRADE
-DI- STA 10+65.00
ELEV 2099.10'

(-)12.0%
(-)4.0%
(-)12.3%

END CONSTRUCTION
-DI- STA 12+79.55
ELEV = EXIST

-DI-

SEE SHEET NO.4 FOR -DI- PLAN

K:\RAL_Roadway\0110361241\Sent\NCDOT\Raw Plans\Roadway\Pro\U4291_rdy_pf1.dgn
12/30/2008

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

PROJ. REFERENCE NO.	SHEET NO.
B-4291	X-1A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

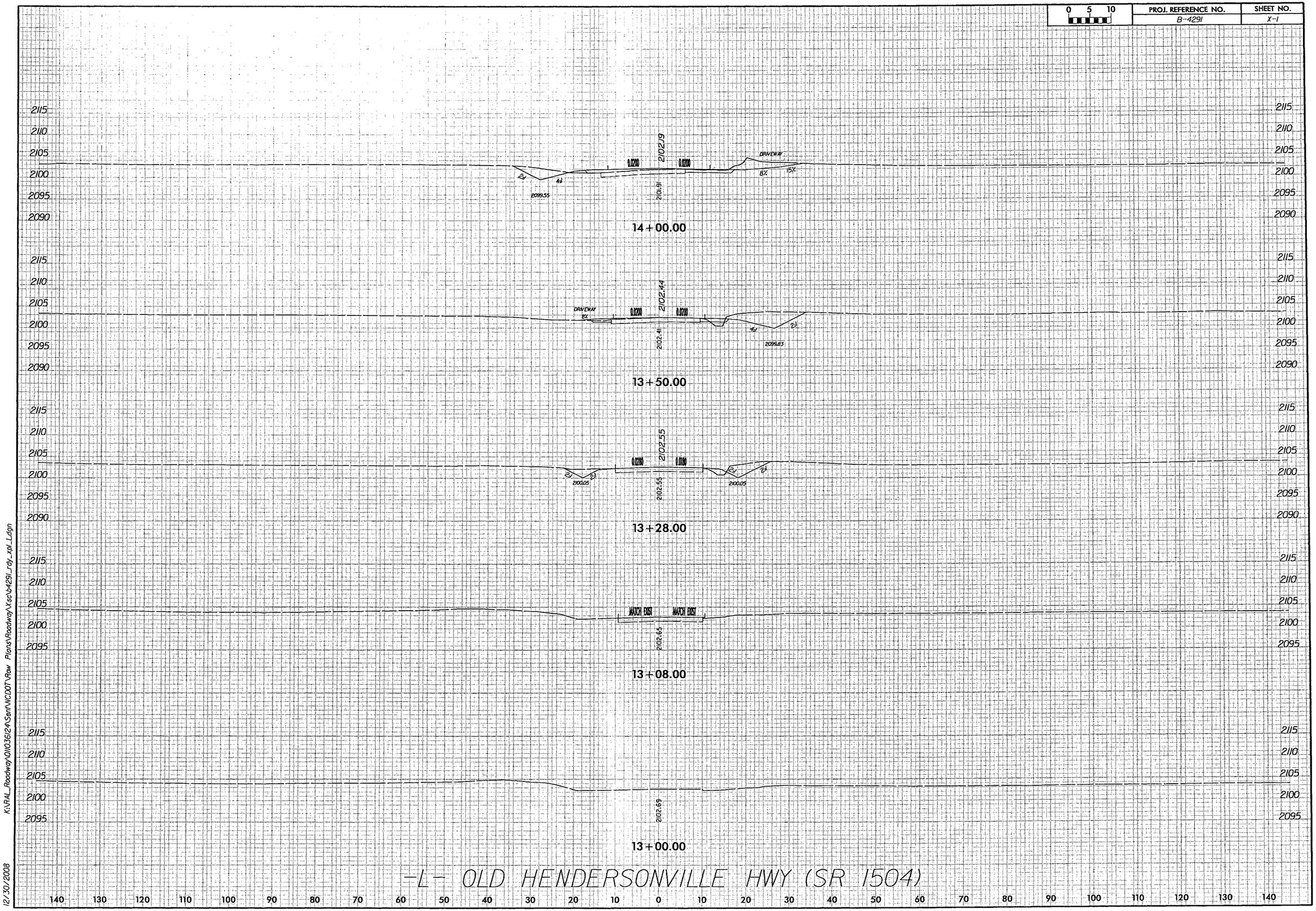
CROSS-SECTION SUMMARY

Note: Embankment Column Does Not Include Backfill For Undercut.

STATION	UNCLASSIFIED EXCAVATION AREAS (SQ. FT.)	EMBANKMENT AREAS (SQ. FT.)	UNCLASSIFIED EXCAVATION VOLUMES (CU. YARDS)	EMBANKMENT VOLUMES (CU. YARDS)	STATION	UNCLASSIFIED EXCAVATION AREAS (SQ. FT.)	EMBANKMENT AREAS (SQ. FT.)	UNCLASSIFIED EXCAVATION VOLUMES (CU. YARDS)	EMBANKMENT VOLUMES (CU. YARDS)	STATION	UNCLASSIFIED EXCAVATION AREAS (SQ. FT.)	EMBANKMENT AREAS (SQ. FT.)	UNCLASSIFIED EXCAVATION VOLUMES (CU. YARDS)	EMBANKMENT VOLUMES (CU. YARDS)
-L-														
13+28	26.59	3.96	0	0										
13+50	43.41	2.76	29	3										
14+00	46.29	1.67	83	4										
14+50	72.56	14.21	110	15										
15+00	39.04	30.24	103	41										
15+50	34.67	128.41	68	147										
16+00	0.00	139.95	32	248										
16+50	4.41	50.25	4	176										
17+00	0.00	45.83	4	89										
17+50	24.05	11.03	22	53										
18+00	52.40	9.51	71	19										
18+50	12.53	49.01	60	54										
19+00	32.35	106.52	42	144										
19+47	19.17	184.53	45	253										
20+67	85.94	186.71	0	0										
21+00	54.15	95.90	86	173										
21+50	0.00	54.90	50	140										
22+00	62.10	25.76	114	75										
22+50	60.82	13.76	114	37										
23+00	31.91	22.03	86	33										
23+50	11.06	12.13	40	32										
24+00	5.98	12.78	16	23										
24+50	2.55	6.54	8	18										
25+00	4.73	5.06	7	11										
25+30	0.00	0.00	3	3										
-Y-														
12+40	0.00	0.00	0	0										
12+50	2.88	1.57	1	0										
12+70	2.41	2.68	2	2										
13+00	1.39	7.61	2	6										
13+50	2.00	10.34	3	17										
14+00	54.03	0.30	52	10										
14+75	106.29	0.00	148	0										

K:\RAL_Roadway\DII\0356124\Serf\NCDOT\Raw Plans\Roadway\Xsc\b4291_rdy_xpl_1.dgn
12/30/2008

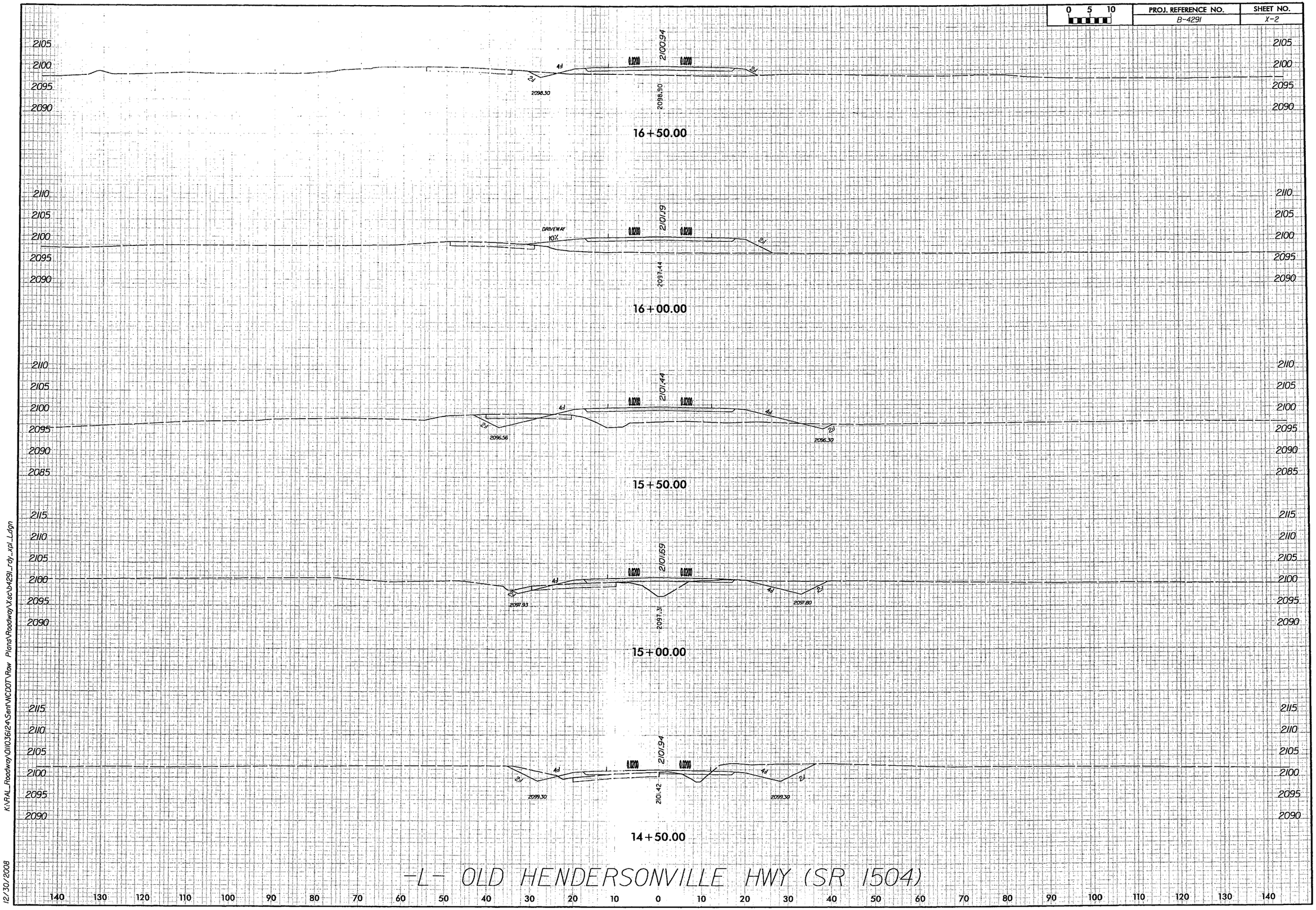
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4291	X-1



K:\PRAL_Roadway\01I036I24\Sen1\NCDOT\Raw Plans\Roadway\Xsc\b4291_rdy_xpl_L.dgn

12/30/2008

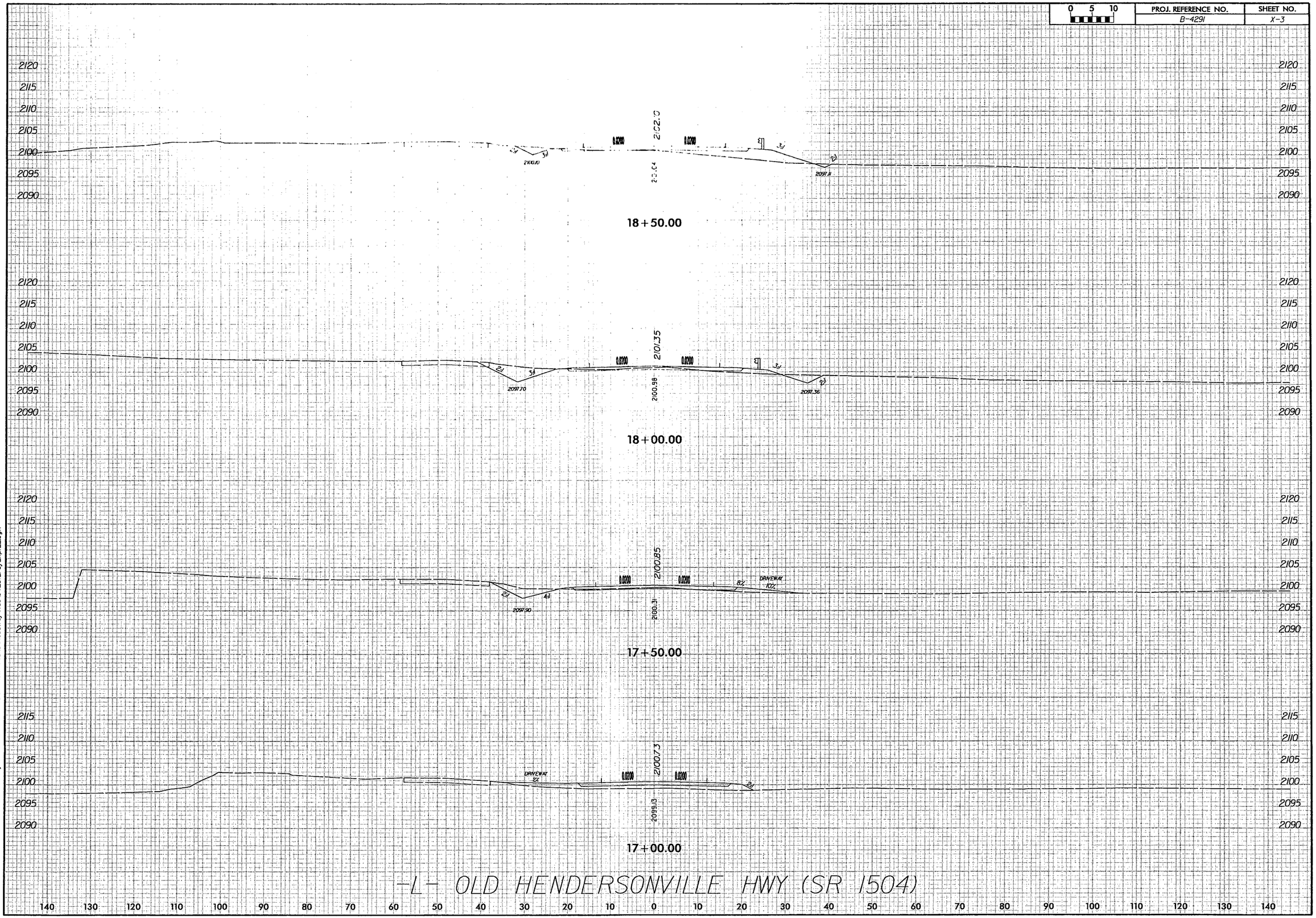
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4291	X-2



K:\RAL_Roadway\0110036124\Sen\NCDOT\Raw Plans\Roadway\X-sc\b4291_rdy_xpl_Ldgn

12/30/2008

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4291	X-3



K:\RAL_Roadway\Dll\36124\Senf\NCDOT\Row Plans\Roadway\Xsc\b4291_rdy_xpl_Ldgn

12/30/2008