STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 19, 2006

Stormwater Section
Division of Water Quality
127 Cardinal Drive Extension
Wilmington, NC 28405

Attention: Ms. Linda Lewis

Dear Madam:

Subject: **Stormwater Permit Request** for the proposed replacement of Bridge No. 72 on NC 179 over Jinnys Branch in Brunswick County. Federal Aid Project No. BRSTP-0179 (2), State Project No. 8.1231701, TIP No. B-4031, Debit WBS 33398.1.1 $420.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 72 on NC 179 over Jinnys Branch in Brunswick County. Brunswick County falls under the jurisdiction of the Coastal Area Management Act (CAMA). The NCDOT is applying for a Clean Water Act (CWA) §404 Department of Army Permit, and a North Carolina CWA §401 Water Quality Certification.

A Stormwater Application Form, the Project Scope Narrative, and the project plans are provided with this request. Please review this project for authorization by your division.

Thank you for your time and consideration. Please contact Mr. Galen Cail, P.E. at (919) 250-4100 if you have any questions or concerns with the stormwater design. If you need any additional information from our staff, contact Mr. John S. Merritt at jsmerritt@dot.state.nc.us or (919) 715-5536.

Sincerely,

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

Cc: w/out attachments:
Mr. Dave Timpy, USACE
Mr. Steve Sollod, NCDCM
Mr. Eric Midkiff, P.E., PDEA
File B-4031

Enclosures (6)

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

OFFICE USE ONLY		
Date Received	Fee Paid	Permit Number

State of North Carolina
Department of Environment and Natural Resources
Division of Water Quality

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
LINEAR ROADWAY PROJECT
This form may be photocopied for use as an original.

DWQ Stormwater Management Plan Review:
A complete stormwater management plan submittal includes this application form, a supplement form for each BMP proposed (see Section V), design calculations, and plans and specifications showing all road and BMP details.

I. PROJECT INFORMATION

NCDOT Project Number: 33398.1.1 (B-4031) County: Brunswick

Project Name: Replace Bridge #72 and approaches

Project Location: On NC 179 over Jinnys Branch

Contact Person: Marshall W. Clawson, PE Phone: 919-250-4100 Fax: 919-250-4108

Receiving Stream Name: Jinnys Branch River Basin: Lumber Class: SA; HQW

Proposed linear feet of project: 950 ft.

Proposed Structural BMP and Road Station *(attach a list of station and BMP type if more room is needed)*:

Infiltration Basin located at –L- Sta. 29+00.00 Rt. +/-

Type of proposed project: *(check all that apply)*:

☐ New ☐Widening ☐2 lane* ☐4 lane* ☐Curb and Gutter ☒Bridge Replacement

☐Other *(Describe)*

**2 lane and 4 lane imply that roadside ditches are used unless Curb and Gutter is also checked.*

II. REQUIRED ITEMS CHECKLIST

Initial in the space provided below to indicate the following design requirements have been met and supporting documentation is attached. Supporting documentation shall, at a minimum, consist of a brief narrative description including (1) the scope of the project, (2) how the items below are met, (3) how the proposed best management practices minimize water quality impacts, and (4) any significant constraints and/or justification for not meeting a, b, c and d to the maximum extent practicable.

Designer's Initials

KBA a. The amount of impervious surface has been minimized as much as possible.

KBA b. The runoff from the impervious areas has been diverted away from surface waters as much as possible.

KBA c. Best Management Practices are employed which minimize water quality impacts.

KBA d. Vegetated roadside ditches are 3:1 slope or flatter.

III. OPERATION AND MAINTENANCE AGREEMENT

I acknowledge and agree by my initials below that the North Carolina Department of Transportation is responsible for the implementation of the four maintenance items listed. I agree to notify DWQ of any operational problems with the BMP's that would impact water quality or prior to making any changes to the system or responsible party.

Maintenance Engineer's Initials

DT a. BMP's shall be inspected and maintained in good working order.

DT b. Eroded areas shall be repaired and reseeded as needed.

DT c. Stormwater collection systems, including piping, inlets, and outlets, shall be maintained to insure proper functioning.

Maintenance Engineer's Name: DAVID L. THOMAS, P.E

Title: DIVISION MAINTENANCE ENGINEER

IV. APPLICATION CERTIFICATION

I, *(print or type name)* Philip S. Harris III of PDEA Branch, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans and that the proposed project complies with the requirements of 15A NCAC 2H .1000.

Title: PDEA - NEU MANAGER

Address: Raleigh, NC

Signature: [signature] Date: 5/18/06

V. SUPPLEMENT FORMS

The applicable state stormwater management permit supplement form(s) listed below must be submitted for each BMP specified for this project. Contact the Stormwater and General Permits Unit at (919) 733-5083 for the status and availability of these forms.

Form SWU-102	Wet Detention Basin Supplement
Form SWU-103	Infiltration Basin Supplement
Form SWU-104	Low Density Supplement
Form SWU-105	Curb Outlet System Supplement
Form SWU-106	Off-Site System Supplement
Form SWU-107	Underground Infiltration Trench Supplement
Form SWU-108	Neuse River Basin Supplement
Form SWU-109	Innovative Best Management Practice Supplement
Form SWU-110	Extended Dry Detention Basin Supplement

Permit No. _____
(to be provided by DWQ)

State of North Carolina
Department of Environment and Natural Resources
Division of Water Quality

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

INFILTRATION BASIN SUPPLEMENT

This form may be photocopied for use as an original

DWQ Stormwater Management Plan Review:
A complete stormwater management plan submittal includes a stormwater management permit application, an infiltration basin supplement for each system, design calculations, soils report and plans and specifications showing all stormwater conveyances and system details.

I. PROJECT INFORMATION

Project Name : B-4031 (Brunswick Co.)
Contact Person: _____ Phone Number: ( )

This worksheet applies to: Basin No. At Jinnus Branch *(as identified on plans)* in Drainage Area _____ *(from Form SWU-101)*

II. DESIGN INFORMATION - Attach supporting calculations/documentation. The soils report must be based upon an actual field investigation and soil borings. County soil maps are not an acceptable source of soils information. All elevations shall be in feet mean sea level (fmsl).

Soils Report Summary

Soil Type: Bt Horizon (Sandy Loam)
Infiltration Rate: 18.6 (in/hr) or cf/hr/sf *(circle appropriate units)*
SHWT Elevation: 5.23 fmsl *(Seasonal High Water Table elevation)*

Basin Design Parameters

Design Storm: 1.5 inch *(1.5 inch event for SA waters, 1 inch event for others)*
Design Volume: 2396 c.f.
Drawdown Time: 0.38 days

Basin Dimensions

Basin Size: 56 (Approx.) ft. x 56 (Approx.) ft. = 3216 sq. ft. *(bottom dimensions)*
Basin Volume Provided: 2412 c.f.

Basin Elevations

Bottom Elevation: 7.30 ft. ~~fmsl~~
Storage Elevation: 9.00 ft. ~~fmsl~~
Top Elevation: 10.00 ft. ~~fmsl~~

III. REQUIRED ITEMS CHECKLIST

The following checklist outlines design requirements per the Stormwater Best Management Practices Manual (N.C. Department of Environment, Health and Natural Resources, February 1999) and Administrative Code Section: 15 A NCAC 2H .1008.

Initial in the space provided to indicate that the following design requirements have been met and supporting documentation is attached. If the applicant has designated an agent in the Stormwater Management Permit Application Form, the agent may initial below. **Attach justification if a requirement has not been met.**

Applicants Initials

KA a. System is located 50 feet from class SA waters and 30 feet from other surface waters.

KA b. System is located at least 100 feet from water supply wells.

KA c. Bottom of system is at least 2 feet above the seasonal high water table.

KA d. Bottom of the system is 3 feet above any bedrock or impervious soil horizon.

X e. System is not sited on or in fill material or DWQ approval has been obtained.
Part of Berm is fill material

KA f. System is located in a recorded drainage easement for the purposes of operation and maintenance and has recorded access easements to the nearest public right-of-way.

KA g. Drainage area for the device is less than 5 acres.

KA h. Soils have a minimum hydraulic conductivity of 0.52 inches per hour and soils report is attached.

KA i. System captures and infiltrates the runoff from the first 1.0 inch of rainfall (1.5 inch event for areas draining to SA waters). Design volume and infiltration calculations attached.

KA j. System is sized to take into account the runoff at the ultimate built-out potential from all surfaces draining to the system, including any off-site drainage. Calculations attached.

KA k. All side slopes stabilized with vegetated cover are no steeper than 3:1 (H:V).

KA l. A pretreatment device such as a catch basin, grease trap, filter strip, grassed swale or sediment trap is provided. Forebay

KA m. Bottom of the device is covered with a layer of clean sand to an average depth of 4 inches or dense vegetative cover is provided.

KA n. Vegetated filter is provided for overflow and detail is shown on plans (Required minimum length is 50 feet for SA waters, 30 feet for other waters).

KA o. Flow distribution mechanism within the basin is provided. Spillway

____ p. A benchmark is provided to determine the sediment accumulation in the pretreatment device.

KA q. Runoff in excess of the design volume bypasses off-line systems (bypass detail provided).

KA r. System is designed to draw down the design storage volume to the proposed bottom elevation under seasonal high water conditions within five days. A soils report and all pertinent draw-down calculations are attached.

KA s. Plans ensure that the installed system will meet design specifications (constructed or restored) upon initial operation once the project is complete and the entire drainage area is stabilized.

IV. INFILTRATION BASIN OPERATION AND MAINTENANCE AGREEMENT

1. After every runoff producing rainfall event and at least monthly inspect the infiltration system for erosion, trash accumulation, vegetative cover, and general condition.
2. Repair eroded areas immediately, re-seed as necessary to maintain adequate vegetative cover, mow vegetated cover to maintain a maximum height of six inches, and remove trash as needed.
3. After every runoff producing rainfall event and at least monthly inspect the bypass, inflow and overflow structures for blockage and deterioration. Remove any blockage and repair the structure to approved design specifications.
4. Remove accumulated sediment from the pretreatment system and infiltration basin annually or when depth in the pretreatment unit is reduced to 75% of the original design depth. The system shall be restored to the original design depth without over-excavating. Over-excavating may cause the required water table separation to be reduced and may compromise the ability of the system to perform as designed. Removed sediment shall be disposed of in an appropriate manner and shall not be handled in a manner that will adversely impact water quality (i.e. stockpiling near a stormwater treatment device or stream, etc.).

   A benchmark shall be established in the pretreatment unit. The benchmark will document the original design depth so that accurate sediment accumulation readings can be taken. The measuring device used to determine the depth at the benchmark shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

   When the design depth reads 0.5 feet in the pretreatment unit, the sediment shall be removed from both the pretreatment unit and the infiltration basin.

5. If the Division determines that the system is failing, the system will immediately be repaired to original design specifications. If the system cannot be repaired to perform its design function, other stormwater control devices as allowed by NCAC 2H .1000 must be designed, approved and constructed.

I acknowledge and agree by my signature below that ~~I am~~ The North Carolina Department of Transportation is responsible for the performance of the five maintenance procedures listed above. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Print Name and Title:_____

Address:_____

Phone:_____ Date:_____

Signature:_____

Note: *The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.*

I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this ____ day of _____, _____, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements.

Witness my hand and official seal,

SEAL My commission expires_____

STORMWATER MANAGEMENT PLAN

Project: 33398.1.1 (B-4031)
Brunswick County, North Carolina
Hydraulics Project Engineer: Jonathan K. Scarce, PE
NCDOT Hydraulics Project Engineer: Marshall W. Clawson, PE

Project Description:

This project consists of replacing NCDOT Bridge #72 over Jinnys Branch on NC 179. The existing 121 foot long bridge will be replaced in its existing location with a 300 foot long bridge. The overall length of the project including the bridge and approaches is 950 feet.

Environmental Description

This project is located in the Shallotte Inlet Basin. The bridge located on this project crosses Jinnys Branch. The creek is listed on the NCDENR classification list as a SA (Market Shellfishing, Salt Water) and HQW (High Quality Waters). The environmental sensitivity map has this area listed as a "Primary Nursery Area". Wetlands are located on all four quadrants of this location. Less than 0.1 acres of wetland are impacted on this site. No buffers were located in the vicinity of this project.

Roadway Description:

The proposed roadway bridge approaches will have 12 foot lanes and 4 foot paved shoulders. The project drainage system consists of grated inlets and associated pipe systems.

Best Management Practices and Major Structures:

- ***Major Structure***

  A bridge will be placed from –L- Station 24+20.00 to –L- Station 27+20.00. In accordance with current guidelines, the bridge is designed so that the spill-thru abutments are located a minimum of 10 feet from the top of bank on the line back side of the bridge. The line ahead spill-thru abutment was set based on a recommended length from the North Carolina Department of Transportations Division Environmental Specialist. This will allow the existing causeway to be removed and the wetlands restored. The bents in the channel were eliminated. The existing bridge had 1 bent in the channel, while the proposed bridge has none. The bridge is also designed so that no deck drains will be used in order to stop any direct

discharges into Jinnys Branch. All deck drainage will be picked up and discharged into the Infiltration Basin.

- ***Infiltration Basin***

  An Infiltration Basin was used in order to treat the first 1.5 inches of storm water drainage picked up in the shoulder berm gutter before and after the bridge. The drainage systems on the bridge approach were piped to the basin where the first 1.5 inches of storm drainage runoff will be treated, instead of letting the storm drainage flow directly into the wetlands/SA waters. All higher flows will be routed to a roadway drainage ditch lined with permanent soil reinforcement matting (PSRM) which ends at a rip rap pad 30 feet away from the wetland. This will allow the water to diffuse before entering the wetlands. This basin is placed the minimum distance of 30 feet away from the wetlands as per DENR requirements. The basin is located at –L- Sta. 29+00 Rt. +/-.

- ***Grass Lined Ditches***

  Grass lined ditches were used from –L- Sta. 22+00 Rt. to Sta. 24+50 Rt. and –L- Sta. 28+50 Lt. to Sta. 30+75 Lt in order to filter pollutants from highway runoff prior to the runoff entering the wetlands. These ditches end outside of the wetlands and rip rap pads are used at the end of the ditches for energy dissipation. The ditch slopes used on these ditches are 3:1 or flatter.

  We were unable to use a grass lined ditch from –L- Sta. 22+00 Lt. to Sta. 24+00 Lt. due to the high ditch velocities. This ditch lined with permanent soil reinforcement matting (PSRM) in order to stabilize the ditch and decrease the chance of ditch erosion. A rip rap pad was placed at the end of the ditch for energy dissipation prior to the runoff entering the wetlands.

Design Details:

Design details for the Infiltration Basin are shown in the Roadway Design plans.

NC 179
Bridge No. 72 over Jinnys Branch
Brunswick County
Federal-Aid Project No. BRSTP-0179(2)
State Project No. 8.1231701
WBS Project No. 33398.1.1
T.I.P. No. B-4031

INTRODUCTION: The replacement of Bridge No. 72 is included in the North Carolina Department of Transportation (NCDOT) 2004-2010 Transportation Improvement Program (T.I.P.) and in the Federal-Aid Bridge Replacement Program. The location of the bridge is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate that Bridge No. 72 has a sufficiency rating of 7.0 out of a possible 100 for a new structure and is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 72 is located on NC 179 over Jinnys Branch between the towns of Shallotte and Ocean Isle Beach (Figure 1). NC 179 in the vicinity of the bridge is classified as a rural major collector by the statewide functional classification system. NC 179 is designated as a Hurricane Evacuation Route.

Jinnys Branch is designated as High Quality Waters (HQW), primary nursery area, primary trust waters, tidal salt waters, coastal waters, and coastal shoreline within the project area. The existing land use within the project vicinity includes a mixture of residential areas and a golf course.

The 2004 estimated average daily traffic (ADT) volume is 8,000 vehicles per day (vpd). The projected ADT is 17,900 vpd by the design year 2030. The percentage of truck traffic is 3% dual tire vehicles (DUALS) and 1% truck-tractor semi trailer (TTST). The posted speed limit is 55 miles per hour (mph).

Bridge No. 72 was built in 1967 (Figure 3). The tangent 121-foot 4-span bridge has an out to out width of 31 feet and a clear roadway width of 29.6 feet. The bridge is located in a sag vertical curve. The superstructure is comprised of 12 prestressed concrete channels. The end bents and interior bents consist of prestressed concrete caps on timber piles. Clearance between the deck and the creek bed is approximately 11 feet. Load carrying capacities on Bridge No. 72 are posted at 20 tons for single vehicle and 23 tons for TTST.

The approach roadway consists of two 12-foot lanes with 6-foot shoulders including 2-foot paved shoulders. The south approach has a 1,400-foot radius curve that abuts to the end of the bridge. The north approach has a 1,400-foot radius curve approximately 300-feet north of the bridge. Approximately

1,200 feet south of Bridge No. 72 at the intersection of SR 1143 (Bricklanding Road), NC 179 has a horizontal curve with a radius of 115-feet and a design speed of 20 mph.

An overhead power line and a buried fiber optic cable are located on the east side of NC 179. A power substation is located approximately 600 feet north of the bridge on the east side of the road.

Approximately four school buses cross Bridge No. 72 twice daily.

No accidents were reported in the project area during the period from September 1, 2000 to August 31, 2003. At

This section of NC 179 is part of North Carolina Bicycling Highway, NC-3 Ports of Call. This is one of the most heavily traveled bicycle routes in the state.

III. ALTERNATIVES

A. Project Description

The recommended replacement structure will be approximately 300 feet in length. The added length will minimize wetland impacts, restore wetlands, allow additional wildlife passage along stream banks and marshlands, and reduce habitat fragmentation (Figure 2). The proposed grade will be raised approximately 4 feet for a vertical alignment design speed of 45 mph. The proposed bridge length may be either increased or decreased as necessary to accommodate peak flows as determined by a detailed hydrologic study during final design. The proposed structure will provide two 12-foot travel lanes with 6-foot shoulders (Figure 4) and bicycle safe rails.

The proposed approach roadway will consist of two 12-foot lanes with 8-foot shoulders, including 4-foot paved shoulders.

B. Build Alternative

The build alternative studied for this project is described below.

Alternative A (Preferred) replaces the bridge at the existing location (Figure 2). During construction, traffic will be maintained by an off-site detour approximately 2.1 miles in length. Traffic will be routed along SR 1154 (Swamp Road) and SR 1155 (Goose Creek Road) or an approved detour route as recommended by the Division (Figure1).

The elevation of the new structure will be raised approximately 1 to 3 feet. A minimum grade of 0.3 percent will be maintained across the proposed structure to facilitate drainage.

C. Alternatives Eliminated From Further Study

Alternative B replaces the bridge at the existing location. During construction, traffic will be maintained by an on-site detour located east of Bridge No. 72. The temporary structure will be approximately 360 feet in length. The detour bridge will consist of two 12-foot lanes with 2-foot shoulders. The approach roadway will provide two 12-foot lanes with 8-foot shoulders. After traffic is routed onto the new bridge, the temporary detour structure and approaches will be removed. The estimated construction cost is $2,533,000. Alternative B was eliminated from further study because of the additional environmental impacts associated with the temporary detour bridge, the longer construction time, and because it is less economical than Alternative A.

The "do-nothing" alternative will eventually necessitate closure of the bridge. This is not desirable because of the heavily used bicycle route and the traffic service provided by NC 179.

Investigation of the existing structure by the Bridge Maintenance Unit indicates that "rehabilitation" of this bridge is not feasible because of its age and deteriorated condition.

D. Preferred Alternative

Alternative A, replacing the bridge at the existing location using an off-site detour, is the preferred alternative. This alternative was chosen because it minimizes impacts to the high quality resources and minimizes impacts to the golf course and transmission lines.

The NCDOT Division Office concurs with Alternative A as the preferred alternative. Brunswick County Emergency Services stated that the road closure will create a delay in response for emergency agencies in the area, but this delay will be a minimal delay and will not affect the service level provided to citizens.

E. Design Exception

A statuary speed limit of 55 mph applies in the project area. However, approximately 1,200-feet south of Bridge No. 72 at the intersection of SR 1143, NC 179 has an existing horizontal curve with a radius of 115 feet and a design speed of 20 mph. The existing sag vertical alignment in the project limits has a design speed of 40 mph. No accidents were reported in the project area during a 3-year period from September 2000 to August 2003. This project is located in high quality resources, such as tidal salt marsh, public trust waters, primary nursery area, and high quality waters.

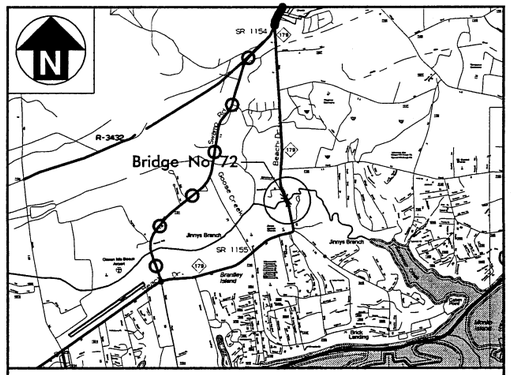
To provide a design speed of 55 mph within the project area will require raising the grade at the structure approximately 6 feet. Reducing the design speed to 45 mph will minimize raising the grade and provide a steeper slope on the structure to minimize the structures deck width for deck drainage. Raising the approach grade will increase impacts to the high quality resources and associated properties. The proposed design is compatible with the existing characteristics of NC 179. Because of the existing alignment conditions, environmental constraints, and no accidents in the project area within a 3-year period, a design exception for the design speed to 45 mph is recommended for the vertical alignment.

09/08/99

TIP PROJECT: B-4031

CONTRACT:

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



VICINITY MAP
(NOT TO SCALE)
DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4031	1	

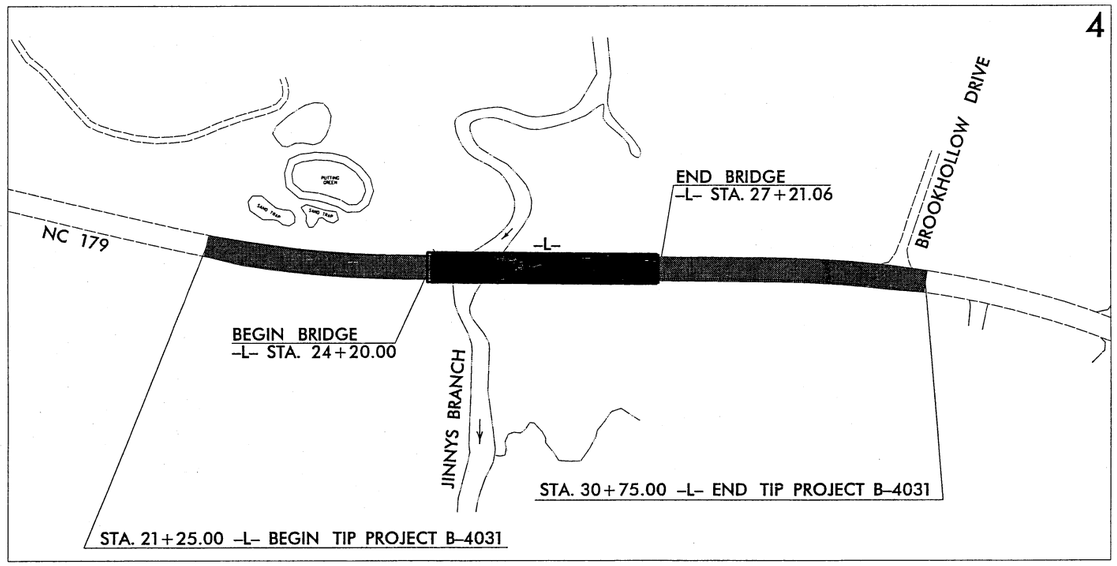
W.B.S. ELEMENT	F. A. PROJ. NO.	DESCRIPTION
33398.1.1	BRSTP-0179(2)	P.E.
33398.2.1	BRSTP-0179(2)	R/W & UTL.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: BRIDGE NO. 72 OVER JINNYS BRANCH ON NC 179

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

NC GRID
NAD 8395



MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 9,100
ADT 2027 = 16,800
DHV = 15%
D = 55%
* T = 4%
** V = 60 mph

* Duals 3% TTST 1%

** Design Exception –
Sag vertical Curve K
Horizontal Curve Radius

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4031 = 0.123 MILE

LENGTH STRUCTURE TIP PROJECT B-4031 = 0.057 MILE

TOTAL LENGTH STATE TIP PROJECT B-4031 = 0.180 MILE

Prepared in the Office of:
Mulkey Engineers & Consultants
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 16, 2006

LETTING DATE:
JUNE 19, 2007

TIM JORDAN, PE
MULKEY E & C
PROJECT MANAGER

JONATHAN SCARCE, PE
MULKEY E & C
HYDRAULICS ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, P.E.
ROADWAY DESIGN - PROJECT 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

4/26/2006
R:\Roadway\Proj\b4031_rdy_tsh.dgn
12:09:13 PM

PROJECT REFERENCE NO.	SHEET NO.
B-4031	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS
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Raleigh, N.C. 27636
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(919) 851-1918 (FAX)
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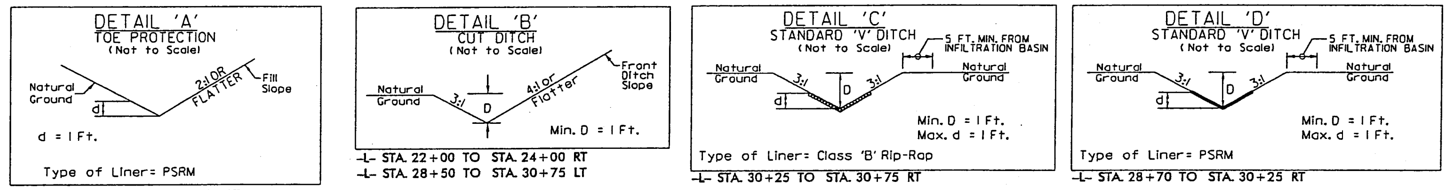
ENGLISH

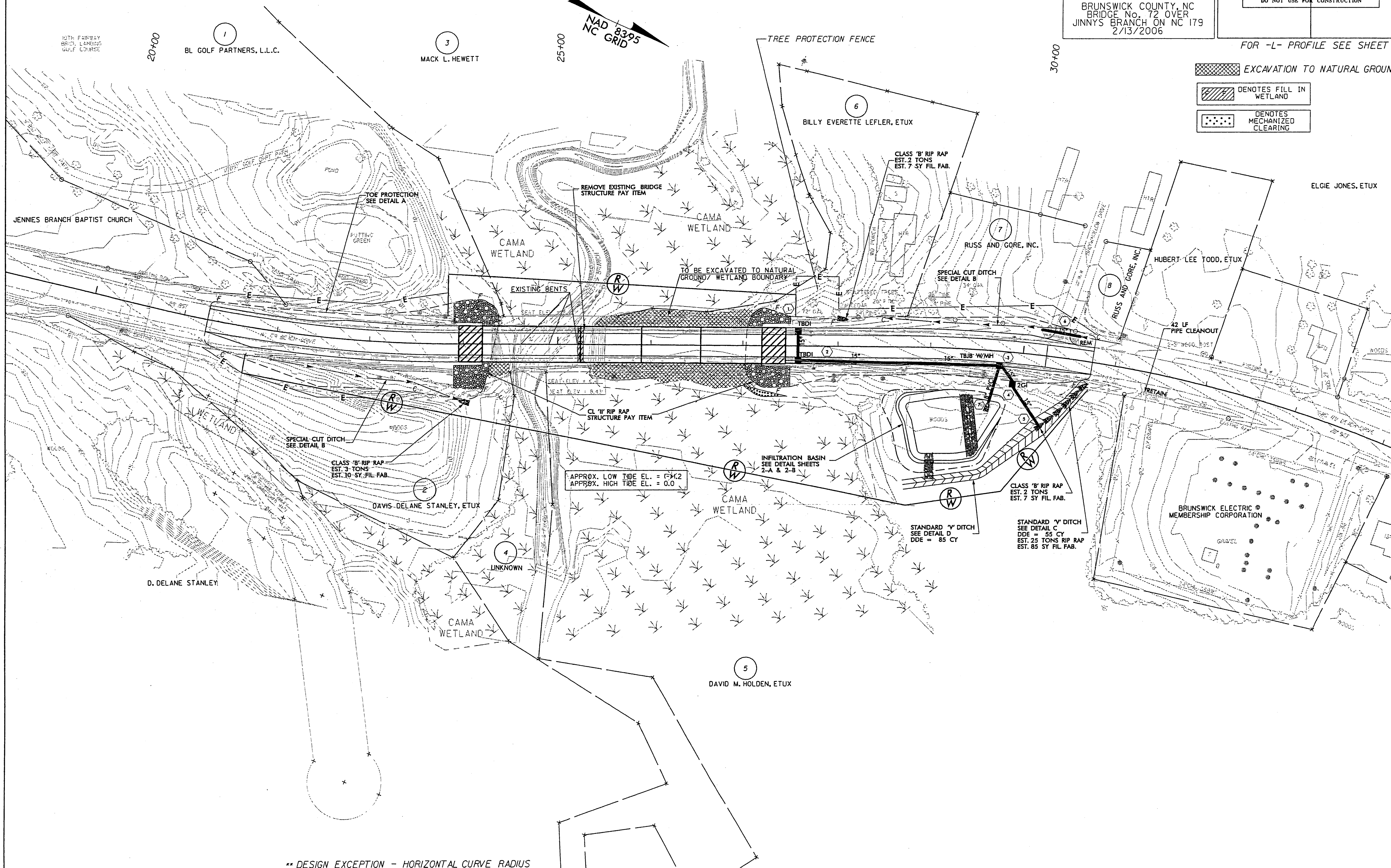
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BRUNSWICK COUNTY, NC
BRIDGE No. 72 OVER
JINNYS BRANCH ON NC 179
2/13/2006



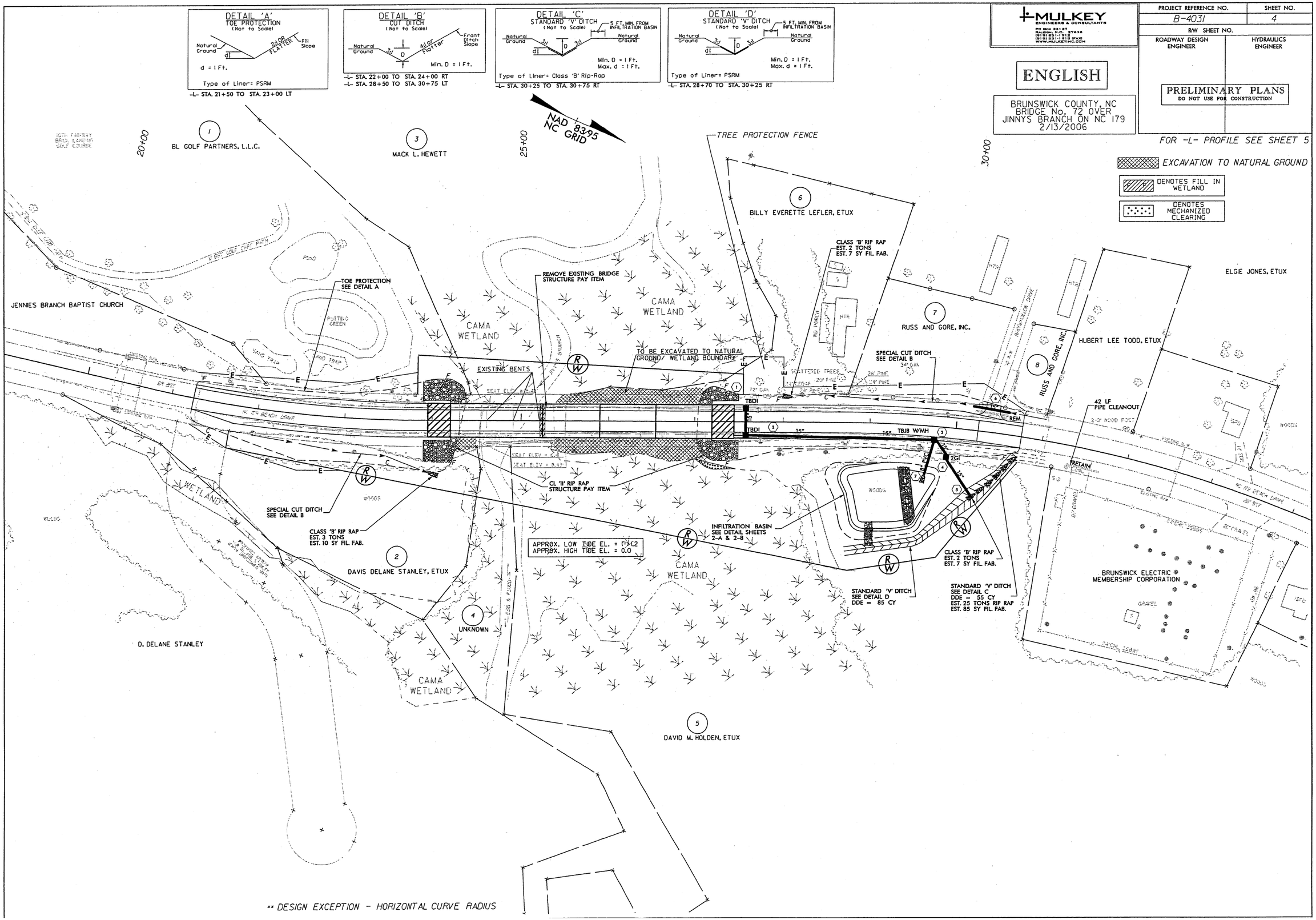
DETAIL 'A'
TOE PROTECTION
(Not to Scale)
Natural Ground
2:1 OR FLATTER
Fill Slope
d = 1 Ft.
Type of Liner= PSRM
-L- STA. 21+50 TO STA. 23+00 LT
DETAIL 'B'
CUT DITCH
(Not to Scale)
Natural Ground
4:1 or Flatter
Front Ditch Slope
Min. D = 1 Ft.
-L- STA. 22+00 TO STA. 24+00 RT
-L- STA. 28+50 TO STA. 30+75 LT
DETAIL 'C'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= Class 'B' Rip-Rap
-L- STA. 30+25 TO STA. 30+75 RT
DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= PSRM
-L- STA. 28+70 TO STA. 30+25 RT

FOR -L- PROFILE SEE SHEET 5



NAD 83/95 NC GRID
EXCAVATION TO NATURAL GROUND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
20+00
25+00
30+00
BL GOLF PARTNERS, L.L.C.
MACK L. HEWETT
BILLY EVERETTE LEFLER, ETUX
ELGIE JONES, ETUX
TREE PROTECTION FENCE
JENNIES BRANCH BAPTIST CHURCH
TOE PROTECTION SEE DETAIL A
REMOVE EXISTING BRIDGE STRUCTURE PAY ITEM
CAMA WETLAND
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL. FAB.
RUSS AND GORE, INC.
HUBERT LEE TODD, ETUX
EXISTING BENTS
TO BE EXCAVATED TO NATURAL GROUND/ WETLAND BOUNDARY
SPECIAL CUT DITCH SEE DETAIL B
42 LF PIPE CLEANOUT
TBDI
TBJB W/MH
2GI
REM
RETAIN
CL 'II' RIP RAP STRUCTURE PAY ITEM
SPECIAL CUT DITCH SEE DETAIL B
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 SY FIL. FAB.
INFILTRATION BASIN SEE DETAIL SHEETS 2-A & 2-B
APPROX. LOW TIDE EL. = -1.2
APPROX. HIGH TIDE EL. = 0.0
DAVIS DELANE STANLEY, ETUX
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL. FAB.
STANDARD 'V' DITCH SEE DETAIL D DDE = 85 CY
STANDARD 'V' DITCH SEE DETAIL C DDE = 55 CY EST. 25 TONS RIP RAP EST. 85 SY FIL. FAB.
BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION
UNKNOWN
D. DELANE STANLEY
DAVID M. HOLDEN, ETUX

** DESIGN EXCEPTION - HORIZONTAL CURVE RADIUS


DETAIL 'A'
TOE PROTECTION
(Not to Scale)
Natural Ground
d
2:1 OR FLATTER
FILL Slope
d = 1 Ft.
Type of Liner= PSRM
-L- STA. 21+50 TO STA. 23+00 LT
DETAIL 'B'
CUT DITCH
(Not to Scale)
Natural Ground
3:1
D
4:1 or Flatter
Front Ditch Slope
Min. D = 1 Ft.
-L- STA. 22+00 TO STA. 24+00 RT
-L- STA. 28+50 TO STA. 30+75 LT
DETAIL 'C'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
3:1
D
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= Class 'B' Rip-Rap
-L- STA. 30+25 TO STA. 30+75 RT
DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
3:1
D
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= PSRM
-L- STA. 28+70 TO STA. 30+25 RT
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PROJECT REFERENCE NO.
B-4031
SHEET NO.
4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
ENGLISH
BRUNSWICK COUNTY, NC
BRIDGE No. 72 OVER
JINNYS BRANCH ON NC 179
2/13/2006
FOR -L- PROFILE SEE SHEET 5
EXCAVATION TO NATURAL GROUND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/95
NC GRID
20+00
25+00
30+00
TREE PROTECTION FENCE
1
BL GOLF PARTNERS, L.L.C.
3
MACK L. HEWETT
6
BILLY EVERETTE LEFLER, ETUX
7
RUSS AND GORE, INC.
8
RUSS AND GORE, INC.
ELGIE JONES, ETUX
HUBERT LEE TODD, ETUX
BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION
JENNIES BRANCH BAPTIST CHURCH
TOE PROTECTION SEE DETAIL A
REMOVE EXISTING BRIDGE STRUCTURE PAY ITEM
CAMA WETLAND
TO BE EXCAVATED TO NATURAL GROUND/ WETLAND BOUNDARY
EXISTING BENTS
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL FAB.
SPECIAL CUT DITCH SEE DETAIL B
42 LF PIPE CLEANOUT
TBDI
TBJB W/MH
REM
RETAIN
ZGI
CL 'II' RIP RAP STRUCTURE PAY ITEM
SPECIAL CUT DITCH SEE DETAIL B
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 SY FIL FAB.
INFILTRATION BASIN SEE DETAIL SHEETS 2-A & 2-B
APPROX. LOW TIDE EL. = 0.2
APPROX. HIGH TIDE EL. = 0.0
STANDARD 'V' DITCH SEE DETAIL D DDE = 85 CY
STANDARD 'V' DITCH SEE DETAIL C DDE = 55 CY
EST. 25 TONS RIP RAP
EST. 85 SY FIL FAB.
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL FAB.
2
DAVIS DELANE STANLEY, ETUX
4
UNKNOWN
D. DELANE STANLEY
5
DAVID M. HOLDEN, ETUX
** DESIGN EXCEPTION - HORIZONTAL CURVE RADIUS

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PROJECT REFERENCE NO.	SHEET NO.
B-4031	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEQUENCE OF CONSTRUCTION FOR INFILTRATION BASIN

1. RELOCATE UTILITY LINES.
2. PUT IN ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
3. EXCAVATE AND CONSTRUCT FOREBAY.
4. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
5. EXCAVATE FOR THE BASIN AND PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
6. CONSTRUCT BERM AROUND BASIN.
7. CONSTRUCT OVERFLOW CHANNEL AND EMERGENCY SPILLWAY.
8. SEE SHEET 2B FOR DETAILS OF SOIL LAYERING SEQUENCE SHOW BELOW FOR MAIN STORAGE BAY
   - LAY GEOFABRIC BELOW THE WASHED STONE LAYER.
   - PLACE 3" OF NO. 57 WASH STONE.
   - LAY GEOFABRIC ABOVE THE STONE LAYER.
   - PLACE AND GRADE 4" OF SAND.
9. LAY COIR FIBER MATTING IN FOREBAY AND GEOFABRIC BELOW THE RIP RAP BERM.
10. ADD GRATES ON ALL BOXES.

GENERAL NOTES FOR INFILTRATION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES OF BERM AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.
2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES
   -INVERTS AT THE HIGH AND LOW POINTS OF THE ENGINEERED SOILS
3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.
4. ANY FILL MATERIAL SHALL BE COMPACTED.
5. PROVIDE A 3" OF NO. 57 STONE AS TRANSITION LAYER UNDER SAND BED. (GEOFABRIC WILL SEPARATE THE TWO MATERIALS)

SAND SPECIFICATIONS

WASHED ASTM C33 OR AASHTO M-6 FINE AGGREGATE CONCRETE SAND.
IN ADDITION TO THESE SPECIFICATIONS, SAND MUST MEET ALL THE FOLLOWING CONDITIONS:

1. SAND MUST BE SILICA BASED ... NO LIMESTONE BASED PRODUCTS MAY BE USED. IF THE MATERIAL IS WHITE OR GRAY IN COLOR, IT IS PROBABLY NOT ACCEPTABLE.
2. SAND MUST BE CLEAN. NATURAL UNWASHED SAND DEPOSITS MAY NOT BE USED. LIKEWISE, SAND THAT HAS BECOME CONTAMINATED BY IMPROPER STORAGE OR INSTALLATION PRACTICES SHALL BE REJECTED.
3. MANUFACTURED SAND OR STONE DUST IS NOT ACCEPTABLE UNDER ANY CIRCUMSTANCES.

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PROJECT REFERENCE NO.	SHEET NO.
B-4031	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SCALE: 1" = 20

SPECIAL CUT DITCH
SEE DETAIL B

27+00

30+00

SCATTERED TREES

34" OAK

20" PINE

24" CEDAR

24" PINE

28" PINE

24" PINE

TBDI

TBDI

15"

GRAU 350

15"

TBJB W/MH

15"

GRAU 350

15"

REM

42 LF
PIPE CLEANOUT

RETAIN

2GI

PVC

15"

EXCAVATION

INFILTRATION BASIN

30' FT. MIN. SETBACK FROM WETLANDS

CAMA WETLAND

EMERGENCY SPILLWAY W/ CLASS 'B' RIP RAP
EST. 10 TONS
EST. 15 SY FF

CLASS 'B' RIP RAP
EST. 20 TONS
EST. 75 SY FF

STANDARD 'V' DITCH
SEE DETAIL D
DDE = 85 CY

CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FF

CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FIL. FAB.

STANDARD 'V' DITCH
SEE DETAIL C
DDE = 55 CY
EST. 25 TONS RIP RAP
EST. 85 SY FIL. FAB.

EX. DEPTH JUNCTION BOX
W/ MANHOLE COVER
NOT TO SCALE

TOP ELEV. OF M.H. COVER= 14.78

BYPASS FOR LARGE STORM EVENTS

15" 8" PVC 15"

ELEV. = 7.40

ELEV. = 7.95

STA. 29+75 -L- RT.

LOW FLOW OUTLET FOR FIRST 1.5" RUNOFF
INV. ELEV. = 7.40

DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)

5 FT. MIN. FROM INFILTRATION BASIN

Natural Ground

Min. D = 1 Ft.
Max. d = 1 Ft.

Type of Liner= Class 'B' Rip-Rap

-L- STA. 30+25 TO STA. 30+75 RT

DETAIL 'E'
STANDARD 'V' DITCH
(Not to Scale)

5 FT. MIN. FROM INFILTRATION BASIN

Natural Ground

Min. D = 1 Ft.
Max. d = 1 Ft.

Type of Liner= PSRM

-L- STA. 28+70 TO STA. 30+25 RT

4 FT. WEIR

EMERGENCY SPILLWAY LINED W/ CLASS 'B' RIP RAP AND FILTER FABRIC
ELEV. = 9.00

SYSTEM PROFILE
NOT TO SCALE

3 FT. BERM

TOP OF BERM ELEV. = 10.00

EMERGENCY SPILLWAY ELEV. = 9.00

GEOFABRIC

N.G.

NATURAL GROUND

ELEV. = 7.30

3" OF NO. 57 STONE AS A TRANSITION LAYER UNDER SAND (MIN.)

4" OF SAND COVER (MIN.)

WATER QUALITY VOLUME STORAGE FOR NC 179 1.5" RUNOFF

3 FT. BERM

TOP OF BERM ELEV. = 9.00

NATURAL GROUND

ELEV. = 7.30

GEOFABRIC

COIR FIBER MATTING

FOREBAY

8" PVC

15" (BYPASS FOR LARGE STORM EVENTS)

EX. DEPTH JUNCTION BOX
W/ MANHOLE COVER
TOP ELEV. OF
M.H. COVER = 14.78

DETAIL OF SOIL LAYERING IN MAIN STORAGE BAY

GEOFABRIC

4" OF SAND

3" OF NO. 57

NATURAL GROUND

INFILTRATION BASIN

-BOTTOM ELEV. = 7.30
-EMERGENCY SPILLWAY ELEV. = 9.00
-BERM ELEV. = 10.00
-DESIGN STORM = FIRST 1.5" RUNOFF
-DESIGN VOLUME = 2396 FT³
-VOLUME PROVIDED = 2412 FT³

GENERAL NOTES:
-ALL SIDE SLOPES ARE TO BE 3:1 OR FLATTER AND STABILIZED WITH VEGETATED COVER
-BOTTOM OF POND IS TO BE COVERED WITH A LAYER OF CLEAN SAND TO AN AVERAGE DEPTH OF 4 INCHES
-FOREBAY MUST RECEIVE REGULAR MAINTENANCE TO REMAIN EFFFECTIVE

MULKEY ENGINEERS & CONSULTANTS

PROJECT REFERENCE NO.	SHEET NO.
B-4031	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

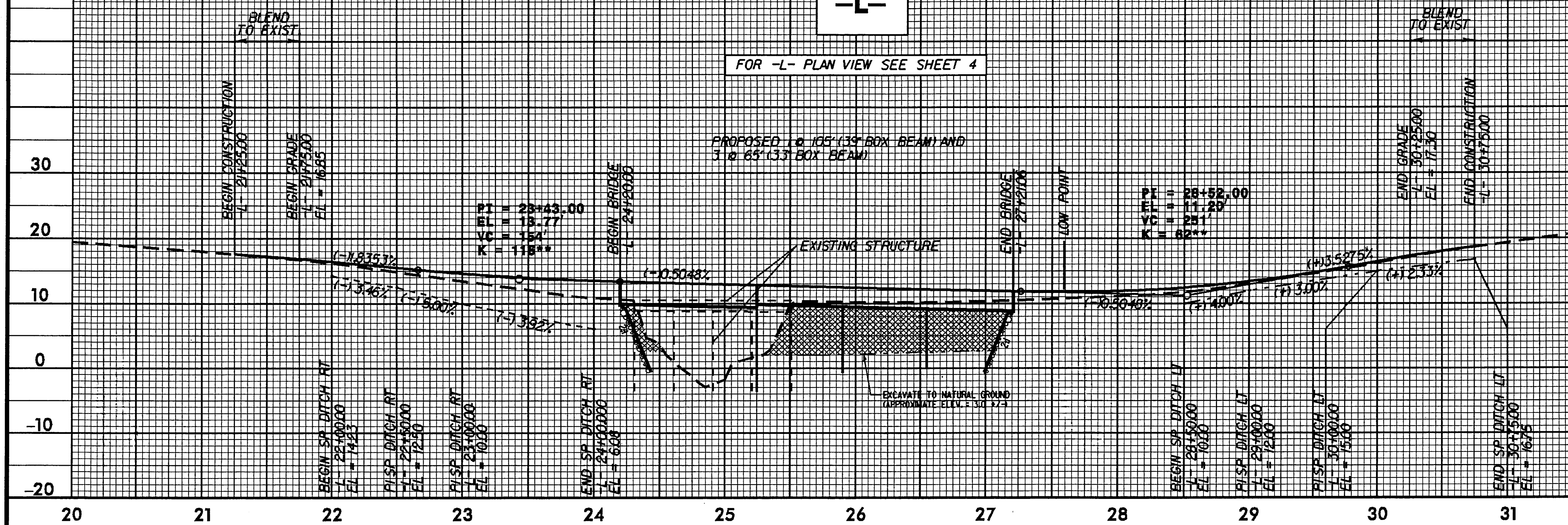
BM-#1
RAILROAD SPIKE IN 18" PINE TREE
-BL- STA 14+45.87 87' LEFT
EL = 16.09'

BM-#2
RAILROAD SPIKE IN 18" PINE TREE
-BL- STA 22+66.54 120' LEFT
EL = 24.51'

** DESIGN EXCEPTION - SAG VERTICAL CURVE K

-L-

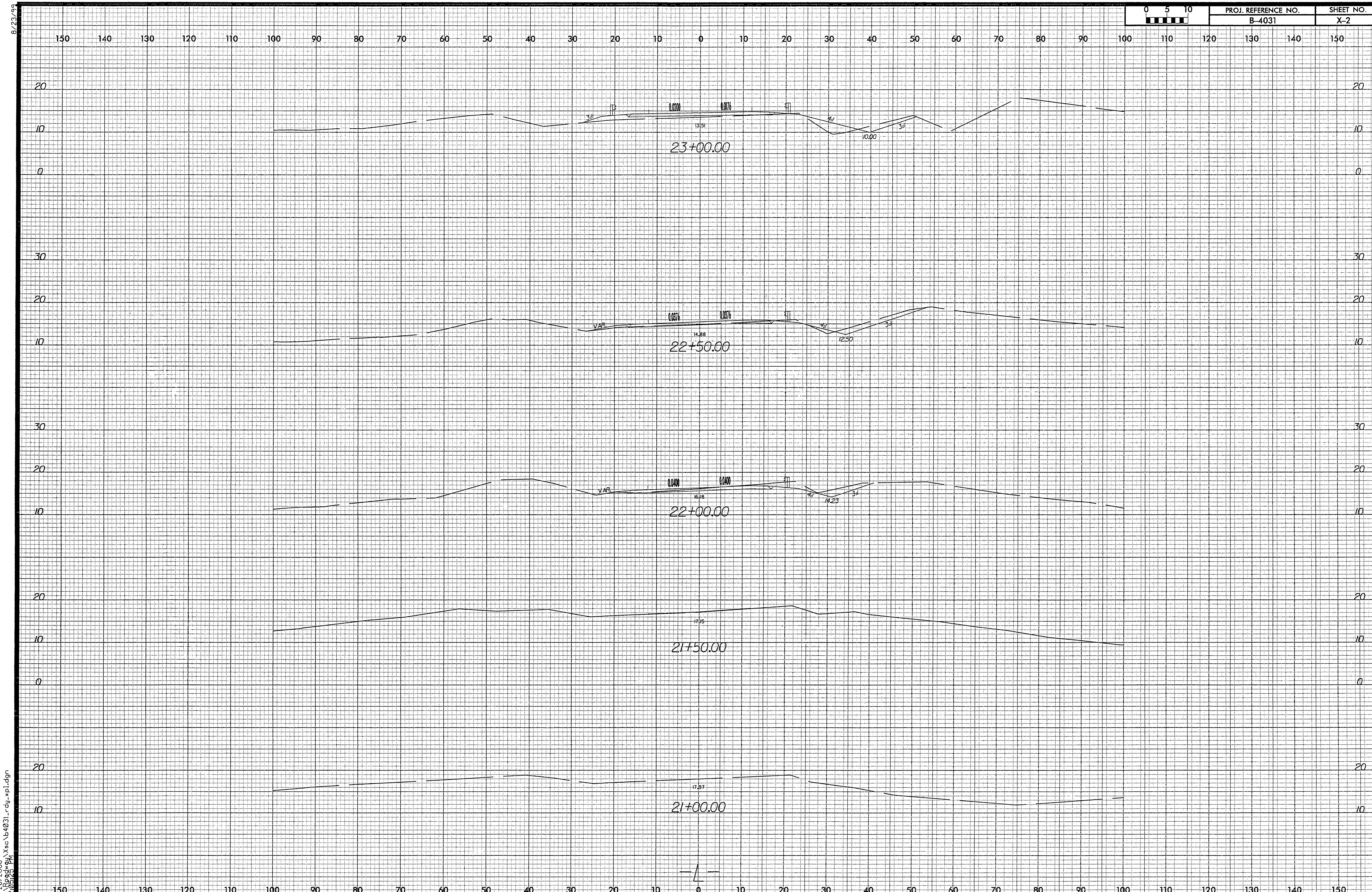
FOR -L- PLAN VIEW SEE SHEET 4



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1100 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 4.8 FT
BASE DISCHARGE	= 1350 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 5.1 FT
OVERTOPPING DISCHARGE	= 17000 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 11.75 FT
DATE OF SURVEY	= 4/28/05
W.S. ELEVATION AT DATE OF SURVEY	= 0.0 FT HT. = -1.2 FT LT.

PROJ. REFERENCE NO.	SHEET NO.
B-4031	X-2



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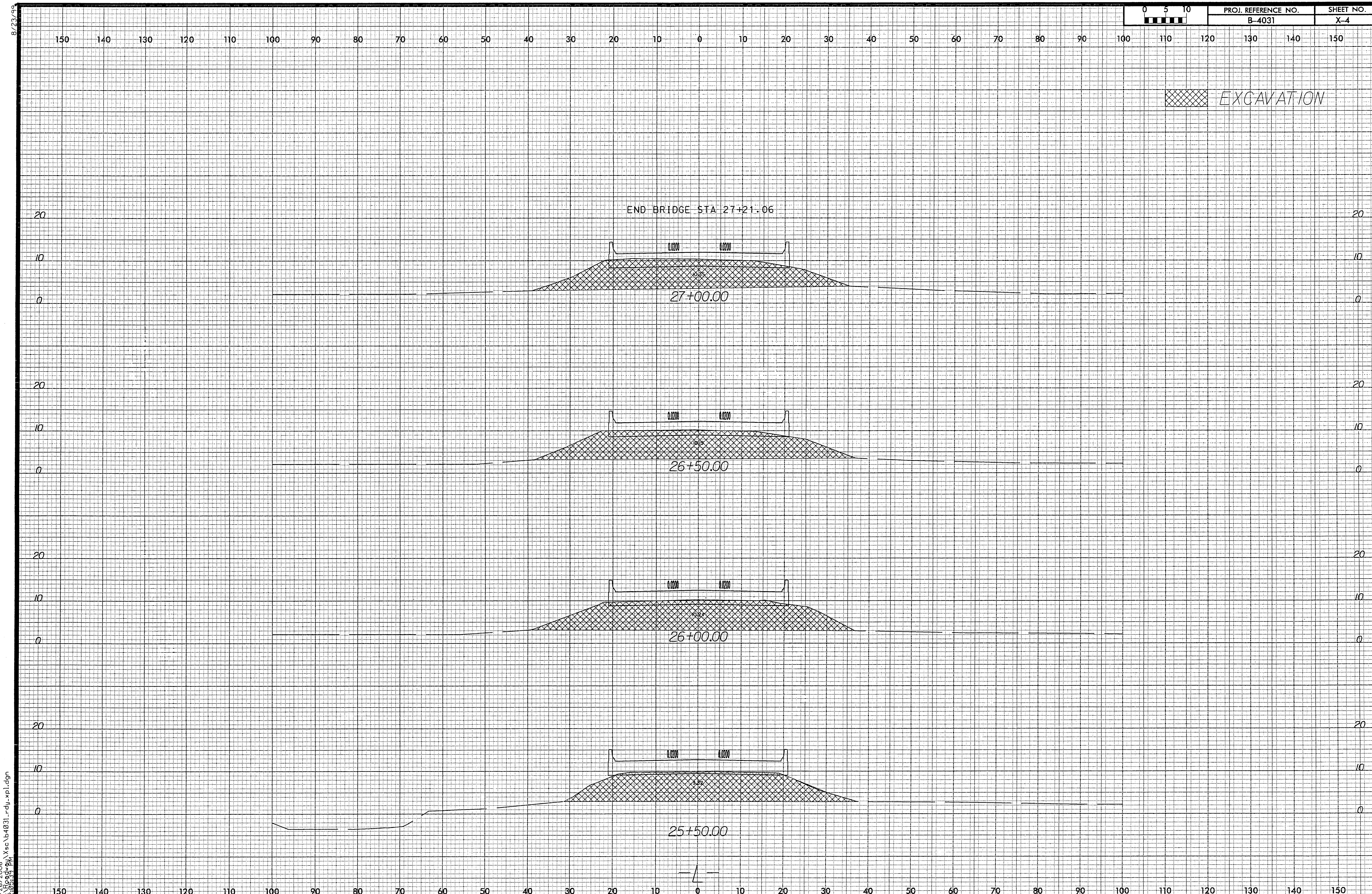
8/23/99

PROJ. REFERENCE NO.	SHEET NO.
B-4031	X-4



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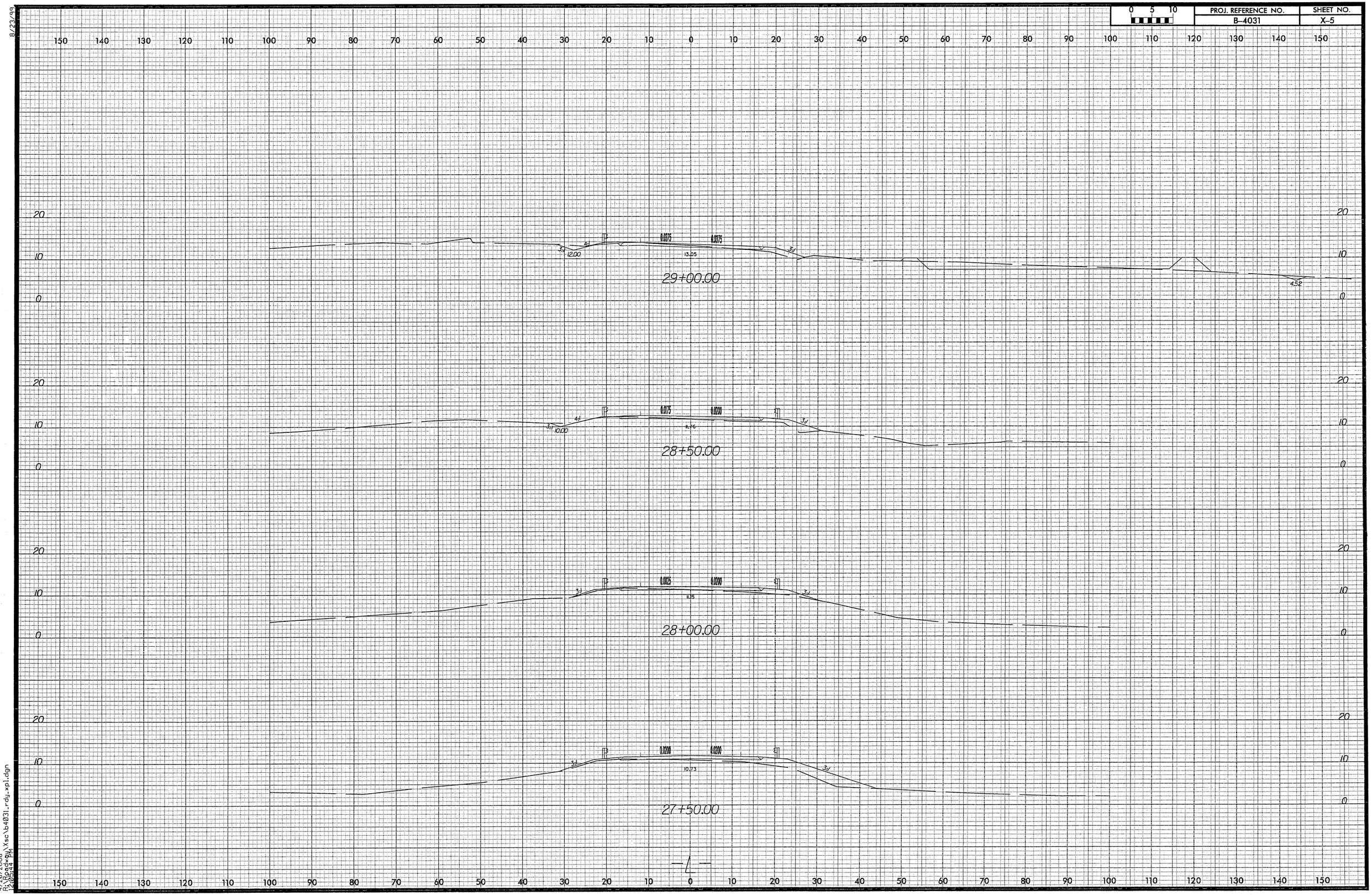
	B-4031	X-5



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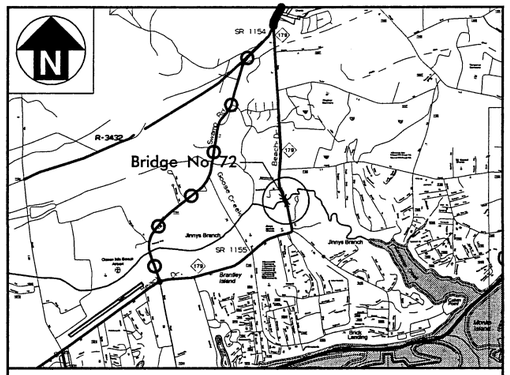
09/08/99

TIP PROJECT: B-4031

CONTRACT:

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



VICINITY MAP
(NOT TO SCALE)
DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4031	1	

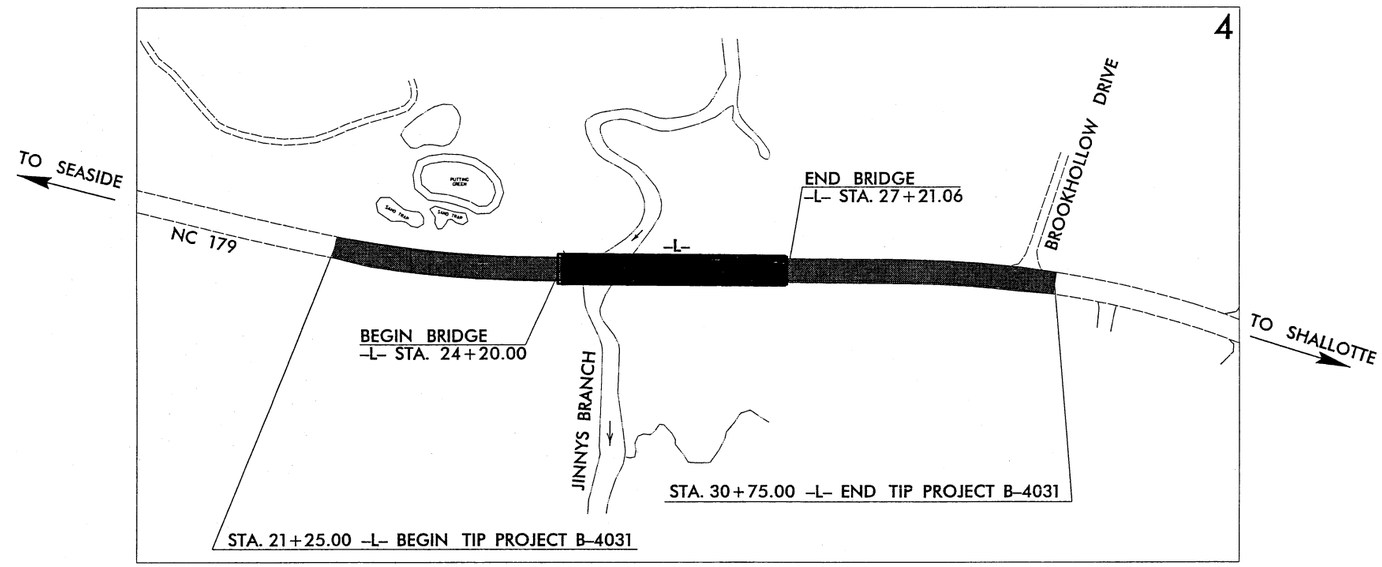
W.S.E. ELEMENT	F. A. PROJ. NO.	DESCRIPTION
33398.1.1	BRSTP-0179(2)	P.E.
33398.2.1	BRSTP-0179(2)	R/W & UTL.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: BRIDGE NO. 72 OVER JINNYS BRANCH ON NC 179

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

NC GRID
NAD 8395



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GRAPHIC SCALES

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

DESIGN DATA

ADT 2007 = 9,100
ADT 2027 = 16,800
DHV = 15%
D = 55%
* T = 4%
** V = 60 mph

* Duals 3% TTST 1%

** Design Exception – Sag vertical Curve K Horizontal Curve Radius

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4031 = 0.123 MILE

LENGTH STRUCTURE TIP PROJECT B-4031 = 0.057 MILE

TOTAL LENGTH STATE TIP PROJECT B-4031 = 0.180 MILE

Prepared In the Office of:
Mulkey Engineers & Consultants
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 16, 2006

LETTING DATE:
JUNE 19, 2007

TIM JORDAN, PE
MULKEY E & C
PROJECT MANAGER

JONATHAN SCARCE, PE
MULKEY E & C
HYDRAULICS ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, P.E.
ROADWAY DESIGN – PROJECT 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

4/26/2006
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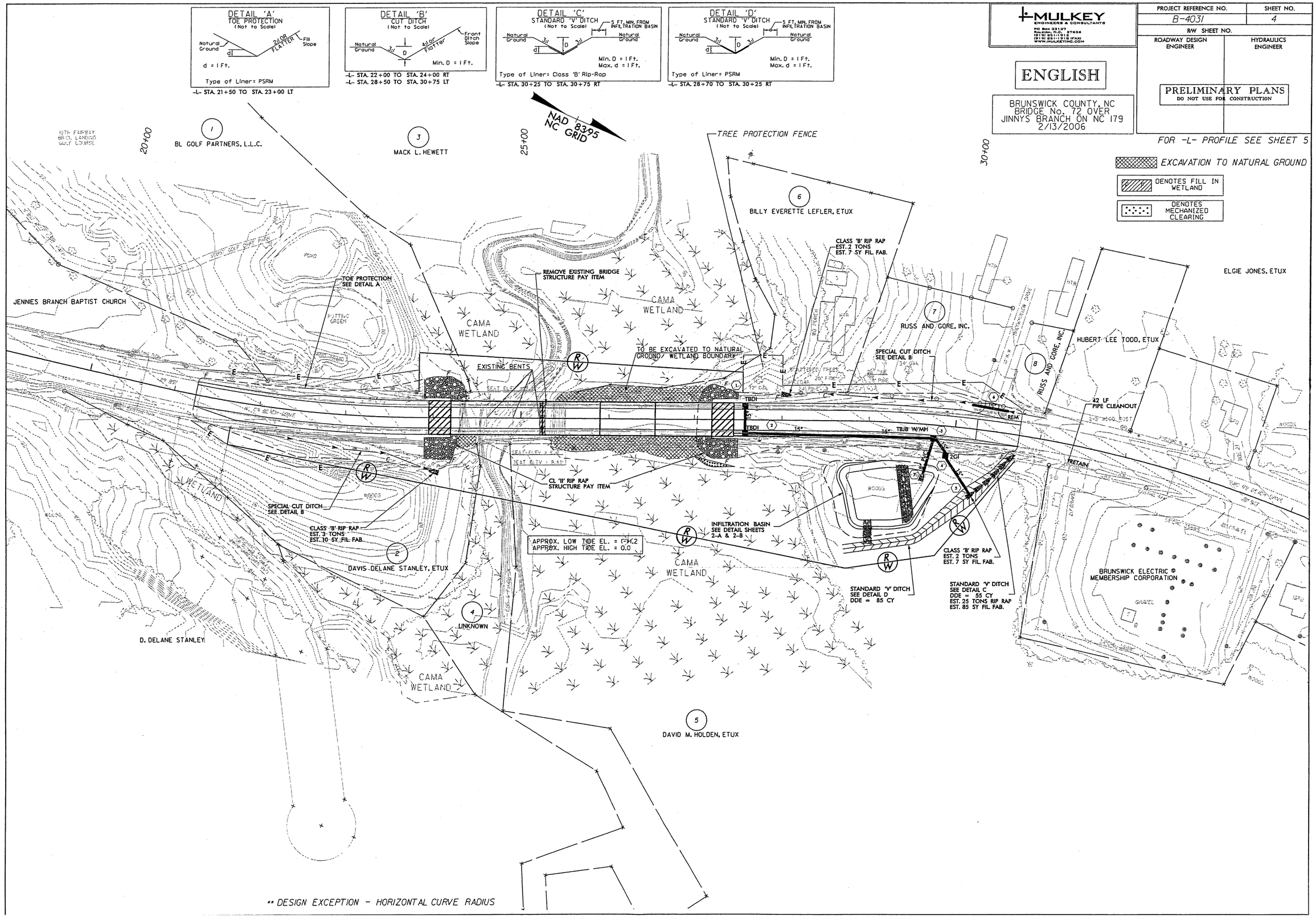
DETAIL 'A'
TOE PROTECTION
(Not to Scale)
Natural Ground
d
2:1 OR FLATTER
Fill Slope
d = 1 Ft.
Type of Liner= PSRM
-L- STA. 21+50 TO STA. 23+00 LT
DETAIL 'B'
CUT DITCH
(Not to Scale)
Natural Ground
3:1
D
4:1 or Flatter
Front Ditch Slope
Min. D = 1 Ft.
-L- STA. 22+00 TO STA. 24+00 RT
-L- STA. 28+50 TO STA. 30+75 LT
DETAIL 'C'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
3:1
D
3:1
d
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= Class 'B' Rip-Rap
-L- STA. 30+25 TO STA. 30+75 RT
DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)
5 FT. MIN. FROM INFILTRATION BASIN
Natural Ground
3:1
D
3:1
d
Min. D = 1 Ft.
Max. d = 1 Ft.
Type of Liner= PSRM
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PROJECT REFERENCE NO.
B-4031
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
ENGLISH
BRUNSWICK COUNTY, NC
BRIDGE No. 72 OVER
JINNYS BRANCH ON NC 179
2/13/2006
FOR -L- PROFILE SEE SHEET 5
EXCAVATION TO NATURAL GROUND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/95
NC GRID
20+00
25+00
30+00
TREE PROTECTION FENCE
1
BL GOLF PARTNERS, L.L.C.
3
MACK L. HEWETT
6
BILLY EVERETTE LEFLER, ETUX
7
RUSS AND GORE, INC.
8
RUSS AND GORE, INC.
HUBERT LEE TODD, ETUX
ELGIE JONES, ETUX
JENNIES BRANCH BAPTIST CHURCH
TOE PROTECTION SEE DETAIL A
REMOVE EXISTING BRIDGE STRUCTURE PAY ITEM
CAMA WETLAND
EXISTING BENTS
TO BE EXCAVATED TO NATURAL GROUND/ WETLAND BOUNDARY
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL. FAB.
SPECIAL CUT DITCH SEE DETAIL B
42 LF PIPE CLEANOUT
CL 'II' RIP RAP STRUCTURE PAY ITEM
SPECIAL CUT DITCH SEE DETAIL B
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 SY FIL. FAB.
APPROX. LOW TIDE EL. = (-)1.2
APPROX. HIGH TIDE EL. = 0.0
INFILTRATION BASIN SEE DETAIL SHEETS 2-A & 2-B
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL. FAB.
STANDARD 'V' DITCH SEE DETAIL D DDE = 85 CY
STANDARD 'V' DITCH SEE DETAIL C DDE = 55 CY
EST. 25 TONS RIP RAP
EST. 85 SY FIL. FAB.
BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION
2
DAVIS DELANE STANLEY, ETUX
4
UNKNOWN
D. DELANE STANLEY
5
DAVID M. HOLDEN, ETUX
** DESIGN EXCEPTION - HORIZONTAL CURVE RADIUS

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PROJECT REFERENCE NO.	SHEET NO.
B-4031	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

BRUNSWICK COUNTY, NC
BRIDGE No. 72 OVER
JINNYS BRANCH ON NC 179
2/13/2006

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

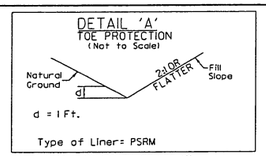
FOR -L- PROFILE SEE SHEET 5

EXCAVATION TO NATURAL GROUND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

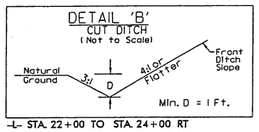
DETAIL 'A'
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

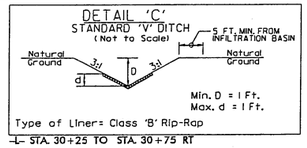
-L- STA. 21+50 TO STA. 23+00 LT

DETAIL 'B'
CUT DITCH
(Not to Scale)



-L- STA. 22+00 TO STA. 24+00 RT
-L- STA. 28+50 TO STA. 30+75 LT

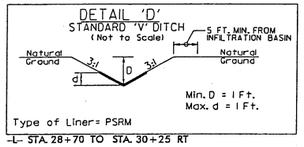
DETAIL 'C'
STANDARD 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

-L- STA. 30+25 TO STA. 30+75 RT

DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)



Type of Liner= PSRM

-L- STA. 28+70 TO STA. 30+25 RT

NAD 83/95
NC GRID

20+00
25+00
30+00

1 BL GOLF PARTNERS, L.L.C.
2 DAVIS DELANE STANLEY, ETUX
3 MACK L. HEWETT
4 UNKNOWN
5 DAVID M. HOLDEN, ETUX
6 BILLY EVERETTE LEFLER, ETUX
7 RUSS AND GORE, INC.
8 RUSS AND GORE, INC.

JENNIES BRANCH BAPTIST CHURCH
ELGIE JONES, ETUX
HUBERT LEE TODD, ETUX
D. DELANE STANLEY
BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION

TREE PROTECTION FENCE
TOE PROTECTION SEE DETAIL A
REMOVE EXISTING BRIDGE STRUCTURE PAY ITEM
EXISTING BENTS
TO BE EXCAVATED TO NATURAL GROUND/ WETLAND BOUNDARY
CL 'II' RIP RAP STRUCTURE PAY ITEM
SPECIAL CUT DITCH SEE DETAIL B
CLASS 'B' RIP RAP EST. 3 TONS EST. 10 SY FIL. FAB.
CLASS 'B' RIP RAP EST. 2 TONS EST. 7 SY FIL. FAB.
INFILTRATION BASIN SEE DETAIL SHEETS 2-A & 2-B
STANDARD 'V' DITCH SEE DETAIL D DDE = 85 CY
STANDARD 'V' DITCH SEE DETAIL C DDE = 55 CY EST. 25 TONS RIP RAP EST. 85 SY FIL. FAB.
42 LF PIPE CLEANOUT
APPROX. LOW TIDE EL. = 0.2
APPROX. HIGH TIDE EL. = 0.0
CAMA WETLAND
WETLAND
WOODS
TBDI
TBJB W/MH
REM
RETAIN
2GI

** DESIGN EXCEPTION - HORIZONTAL CURVE RADIUS

MULKEY
ENGINEERS & CONSULTANTS
PO Box 32127
RALEIGH, NC 27636
(919) 851-1212
(919) 851-1216 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4031	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEQUENCE OF CONSTRUCTION FOR INFILTRATION BASIN

1. RELOCATE UTILITY LINES.
2. PUT IN ALL EROSION CONTROL MEASURES (AS NEEDED THROUGH CONSTRUCTION STAGES).
3. EXCAVATE AND CONSTRUCT FOREBAY.
4. CONSTRUCT AND INSTALL BOXES. CREATE OPENINGS IN BOXES AND CONNECT PIPES WITH BOXES.
5. EXCAVATE FOR THE BASIN AND PREPARE THE BASIN FLOOR AT THE GIVEN GRADE.
6. CONSTRUCT BERM AROUND BASIN.
7. CONSTRUCT OVERFLOW CHANNEL AND EMERGENCY SPILLWAY.
8. SEE SHEET 2B FOR DETAILS OF SOIL LAYERING SEQUENCE SHOW BELOW FOR MAIN STORAGE BAY
   - LAY GEOFABRIC BELOW THE WASHED STONE LAYER.
   - PLACE 3" OF NO. 57 WASH STONE.
   - LAY GEOFABRIC ABOVE THE STONE LAYER.
   - PLACE AND GRADE 4" OF SAND.
9. LAY COIR FIBER MATTING IN FOREBAY AND GEOFABRIC BELOW THE RIP RAP BERM.
10. ADD GRATES ON ALL BOXES.

GENERAL NOTES FOR INFILTRATION BASIN

1. APPLY SEEDING OVER THE SIDE SLOPES OF BERM AND ANY EXPOSED SURFACE THAT NEEDS TO BE PROTECTED AGAINST IMMEDIATE POTENTIAL STORM EVENT.
2. THE SURVEYOR SHALL VERIFY THE INVERTS AND ELEVATIONS AT THE FOLLOWING POINTS AT THE END OF EACH PHASE OF CONSTRUCTION:
   -INVERTS IN THE PIPE AND THE BOXES
   -INVERTS AT THE HIGH AND LOW POINTS OF THE ENGINEERED SOILS
3. THE BERM SHALL BE CONSTRUCTED WITH SUITABLE FILL MATERIAL PER THE ENGINEER.
4. ANY FILL MATERIAL SHALL BE COMPACTED.
5. PROVIDE A 3" OF NO. 57 STONE AS TRANSITION LAYER UNDER SAND BED. (GEOFABRIC WILL SEPARATE THE TWO MATERIALS)

SAND SPECIFICATIONS

WASHED ASTM C33 OR AASHTO M-6 FINE AGGREGATE CONCRETE SAND.
IN ADDITION TO THESE SPECIFICATIONS, SAND MUST MEET ALL THE FOLLOWING CONDITIONS:

1. SAND MUST BE SILICA BASED ... NO LIMESTONE BASED PRODUCTS MAY BE USED. IF THE MATERIAL IS WHITE OR GRAY IN COLOR, IT IS PROBABLY NOT ACCEPTABLE.
2. SAND MUST BE CLEAN. NATURAL UNWASHED SAND DEPOSITS MAY NOT BE USED. LIKEWISE, SAND THAT HAS BECOME CONTAMINATED BY IMPROPER STORAGE OR INSTALLATION PRACTICES SHALL BE REJECTED.
3. MANUFACTURED SAND OR STONE DUST IS NOT ACCEPTABLE UNDER ANY CIRCUMSTANCES.

MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, NC 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4031	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SCALE: 1" = 20

SPECIAL CUT DITCH
SEE DETAIL B

27+00

30+00

TBDI

15"

TBDI

15"

GRAU 350

TBJB W/MH

15"

GRAU 350

2GI

15"

PVC

15"

REM

42 LF
PIPE CLEANOUT

RETAIN

EXCAVATION

INFILTRATION BASIN

30' FT. MIN. SETBACK FROM WETLANDS

CAMA WETLAND

EMERGENCY SPILLWAY W/ CLASS 'B' RIP RAP
EST. 10 TONS
EST. 15 SY FF

CLASS 'B' RIP RAP
EST. 20 TONS
EST. 75 SY FF

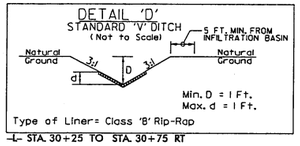
STANDARD 'V' DITCH
SEE DETAIL D
DDE = 85 CY

CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FF

CLASS 'B' RIP RAP
EST. 2 TONS
EST. 7 SY FIL. FAB.

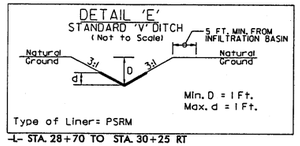
STANDARD 'V' DITCH
SEE DETAIL C
DDE = 55 CY
EST. 25 TONS RIP RAP
EST. 85 SY FIL. FAB.

DETAIL 'D'
STANDARD 'V' DITCH
(Not to Scale)

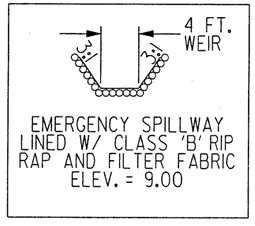


Type of Liner= Class 'B' Rip-Rap
-L- STA. 30+25 TO STA. 30+75 RT

DETAIL 'E'
STANDARD 'V' DITCH
(Not to Scale)

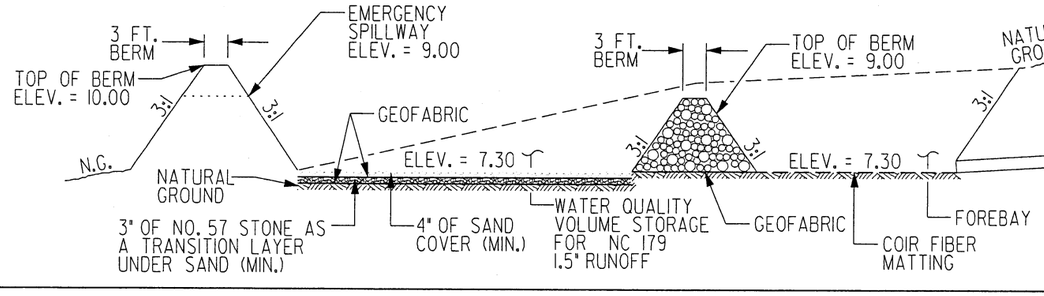


Type of Liner= PSRM
-L- STA. 28+70 TO STA. 30+25 RT

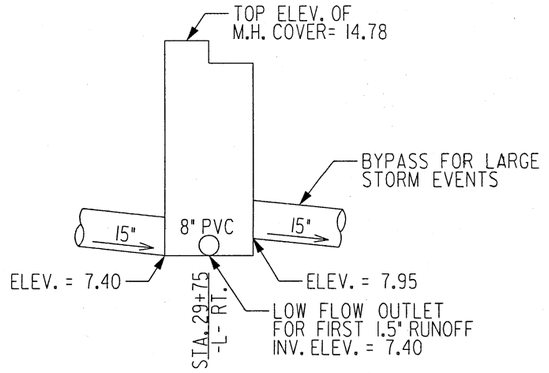


EMERGENCY SPILLWAY LINED W/ CLASS 'B' RIP RAP AND FILTER FABRIC
ELEV. = 9.00

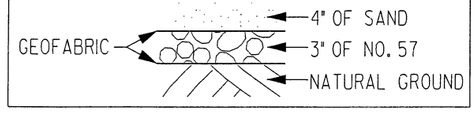
SYSTEM PROFILE
NOT TO SCALE



EX. DEPTH JUNCTION BOX
W/ MANHOLE COVER
NOT TO SCALE



DETAIL OF SOIL LAYERING IN MAIN STORAGE BAY



INFILTRATION BASIN

-BOTTOM ELEV. = 7.30
-EMERGENCY SPILLWAY ELEV. = 9.00
-BERM ELEV. = 10.00
-DESIGN STORM = FIRST 1.5" RUNOFF
-DESIGN VOLUME = 2396 FT³
-VOLUME PROVIDED = 2412 FT³

GENERAL NOTES:
-ALL SIDE SLOPES ARE TO BE 3:1 OR FLATTER AND STABILIZED WITH VEGETATED COVER
-BOTTOM OF POND IS TO BE COVERED WITH A LAYER OF CLEAN SAND TO AN AVERAGE DEPTH OF 4 INCHES
-FOREBAY MUST RECEIVE REGULAR MAINTENANCE TO REMAIN EFFFECTIVE

5/28/99

MULKEY ENGINEERS & CONSULTANTS

PROJECT REFERENCE NO.	SHEET NO.
B-4031	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

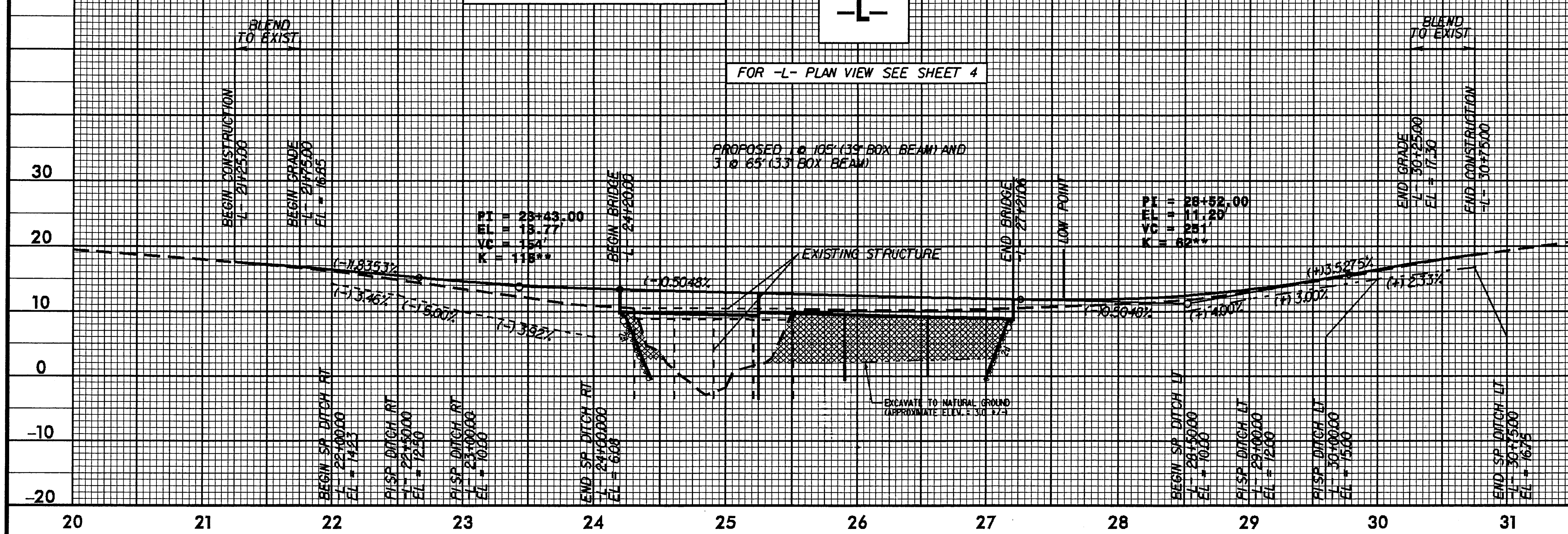
BM-#1
RAILROAD SPIKE IN 18" PINE TREE
-BL- STA 14+45.87 87' LEFT
EL = 16.09'

BM-#2
RAILROAD SPIKE IN 18" PINE TREE
-BL- STA 22+66.54 120' LEFT
EL = 24.51'

** DESIGN EXCEPTION - SAG VERTICAL CURVE K

-L-

FOR -L- PLAN VIEW SEE SHEET 4



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1100 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 4.8 FT
BASE DISCHARGE	= 1350 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 5.1 FT
OVERTOPPING DISCHARGE	= 17000 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 11.75 FT
DATE OF SURVEY	= 4/28/05
W.S. ELEVATION AT DATE OF SURVEY	= 0.0 FT H.T. = -1.2 FT L.T.

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8/23/99

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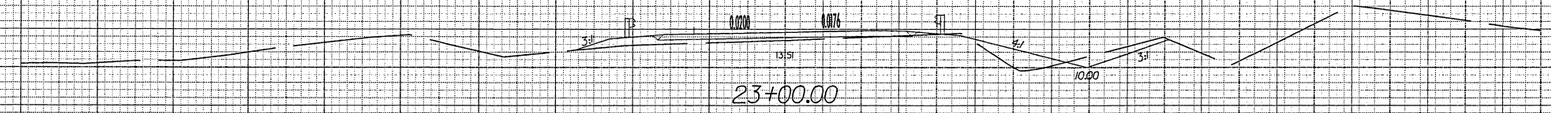

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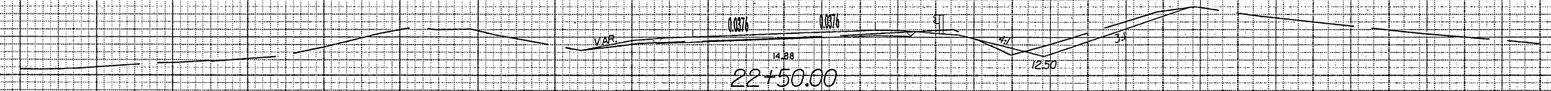

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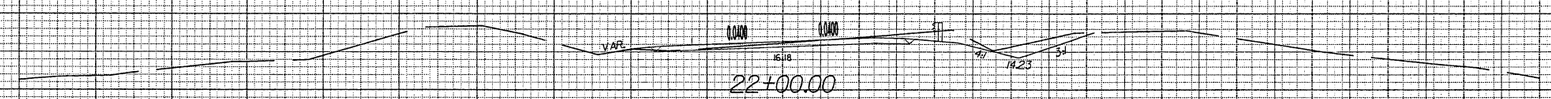

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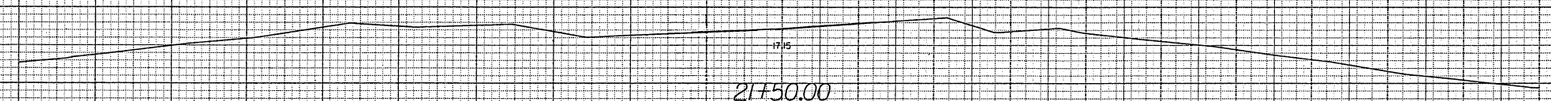

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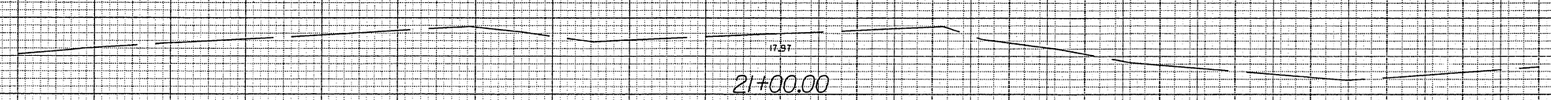

21+00.00

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4031	X-4

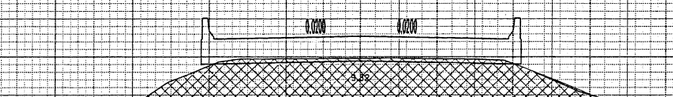
EXCAVATION

END BRIDGE STA 27+21.06

27+00.00

26+50.00

26+00.00



25+50.00

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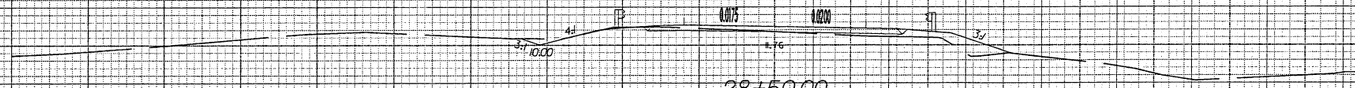
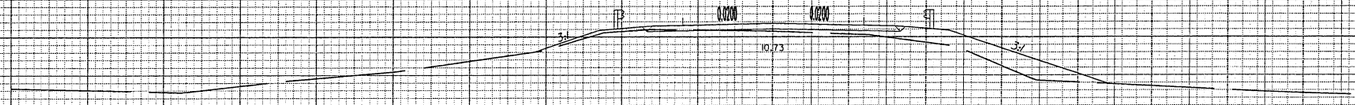
20 10 0

29+00.00



28+50.00

28+00.00



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