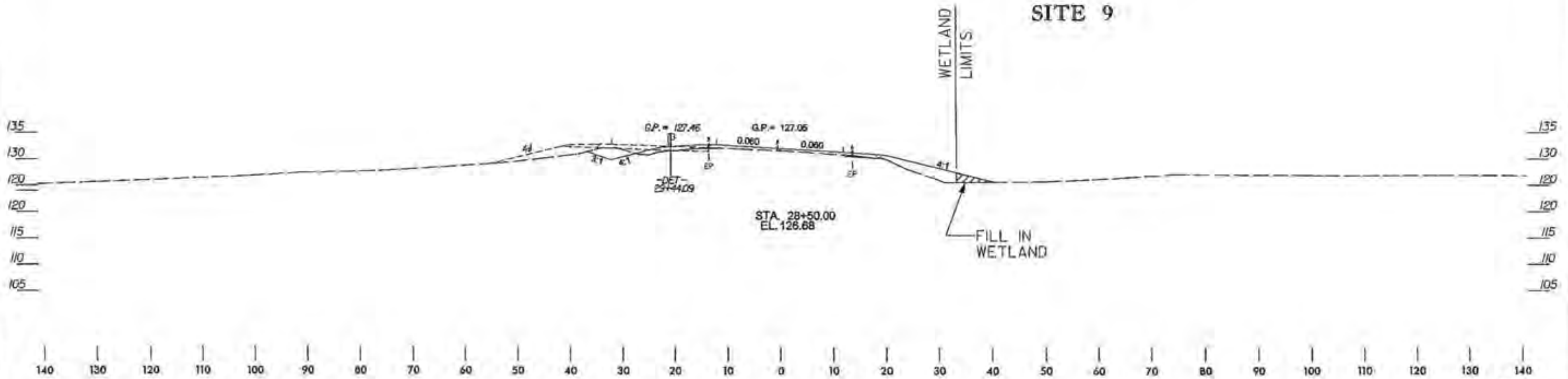
PROJ. REFERENCE NO.	SHEET NO.
B-3693	XSC SITE 9

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SITE 9
X-SECTION
STA 28+50 -L-

LEGEND

DENOTES FILL IN WETLAND

ENGLISH

KO & ASSOCIATES, P.C.
Consulting Engineers
A Florence & Hutcheson, Inc. Company

NCDOT
DIVISION OF HIGHWAYS
ROBESON COUNTY
PROJECT: 33233.1.1 (B-3693)
BRIDGE NO. 207 OVER HOLLY SWAMP AND BRIDGE NOS. 210 AND 211 OVER RAFT SWAMP

Permit Drawing
Sheet 20 of 20

5/8/2009

Wetland Restoration Plan
SR 1527, Pine Log Road
Robeson County

TIP B-3693
Federal Aid Project No. BRZ-1527(2) and State Project No. 8.2462401
WBS No. 33233.1.1

April 1, 2010

The North Carolina Department of Transportation (NCDOT) will perform on-site mitigation for temporary wetland impacts associated with Transportation Improvement Program (TIP) B-3693. This site occurs within and adjacent to the project Right-of-Way of SR 1527, Pine Log Road. It begins approximately at Sta. 14+60 and ends approximately at Sta. 21+12. NCDOT will restore 0.65 acre of riverine wetlands within the Right-of-Way as well as 0.35 acre of riverine wetlands outside of the Right-of-Way.

The 0.65 acre wetland restoration area within NCDOT Right-of-Way will mitigate for 1.29 acres of temporary fill in wetlands due to an onsite detour at a 0.5:1 ratio. The 0.21 acre of excavation in wetlands, reported as Site 4 on the Wetland Permit Impact Summary, is part of the restoration area construction and does not require mitigation (see revised impact summary sheet). The remainder of the temporary construction and temporary utility easement will also be replanted.

EXISTING CONDITIONS

The project is located in Robeson County, approximately 7 miles northwest of Lumberton, NC between NC Hwy 72 W and NC Hwy 211 W. The adjacent land use is primarily comprised of agricultural and forested land with some low and medium-density housing interspersed throughout.

The mitigation area contains both Cypress-Gum Swamp Forest and Bottomland Hardwood Forest community types. Dominate species of the Cypress-Gum Swamp Forest include: bald cypress (*Taxodium distichum*), swamp tupelo (*Nyssa biflora*), red bay (*Persea palustris*), and titi (*Cyrilla recemiflora).* Dominate species of the Bottomland Hardwood Forest include water oak (*Quercus nigra*), swamp tupelo (*Nyssa biflora*), sweet bay (*Magnolia virginiana*) and greenbriar (*Smilax rotundifolia*).

The B-3693 Categorical Exclusion dated February 2008 provides additional details concerning existing roadway and natural resource conditions.

PROPOSED CONDITIONS

The proposed mitigation consists of the restoration of 1.0 acre of riverine wetland (see attached plan sheets 4-5). The restoration activities will involve removal of the temporary detour and existing adjacent roadway fill of SR 1527, Pine Log Road. This

area will be graded to match the existing adjacent reference wetland elevation as well as ripped and disked if necessary. The 0.65 acre restoration within NCDOT Right-of-Way will be placed on the Natural Environment Unit's Mitigation Geo-Database for protection perpetuity.

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

VEGETATION PLANTING

Following the successful completion of site grading and stabilization, the restoration areas as well as the temporary construction and utility easement areas will be planted with species found in both cypress-gum swamp and bottomland hardwood communities including at least three of the following: bald cypress (*Taxodium distichum*), atlantic white cedar (*Chamaecyparis thyoides*), water oak (*Quercus nigra*), and swamp tupelo (*Nyssa biflora*) depending on availability (see attached Wetland Reforestation sheets).

Native grass seeding and mulching will be performed on all disturbed areas within the wetland restoration area for stabilization purposes according to guidance and standard procedures of NCDOT's Roadside Environmental Unit.

MONITORING

Upon successful completion of construction, the following monitoring strategy is proposed for the 0.65 acre restoration within the NCDOT Right-of-Way. NCDOT will document monitoring activities on the site in an annual report distributed to the regulatory agencies.

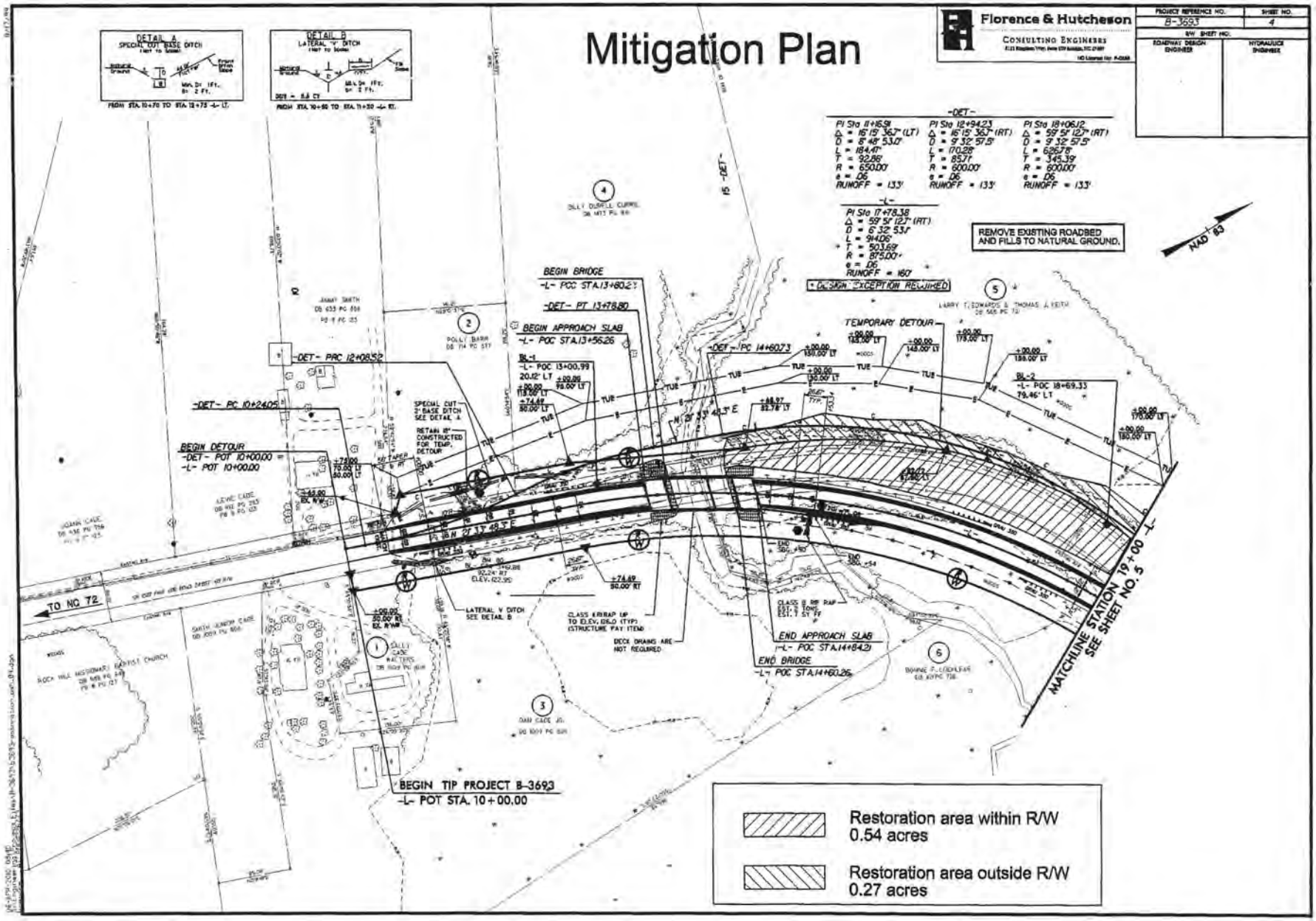
HYDROLOGIC MONITORING

No specific hydrological monitoring is proposed for the wetland restoration area. The target elevation will be based on the reference wetland and verified during construction. Constructing the site at the adjacent wetland elevation will ensure the hydrology in the restored area is similar to the hydrology in the reference area.

VEGETATION SUCCESS CRITERIA

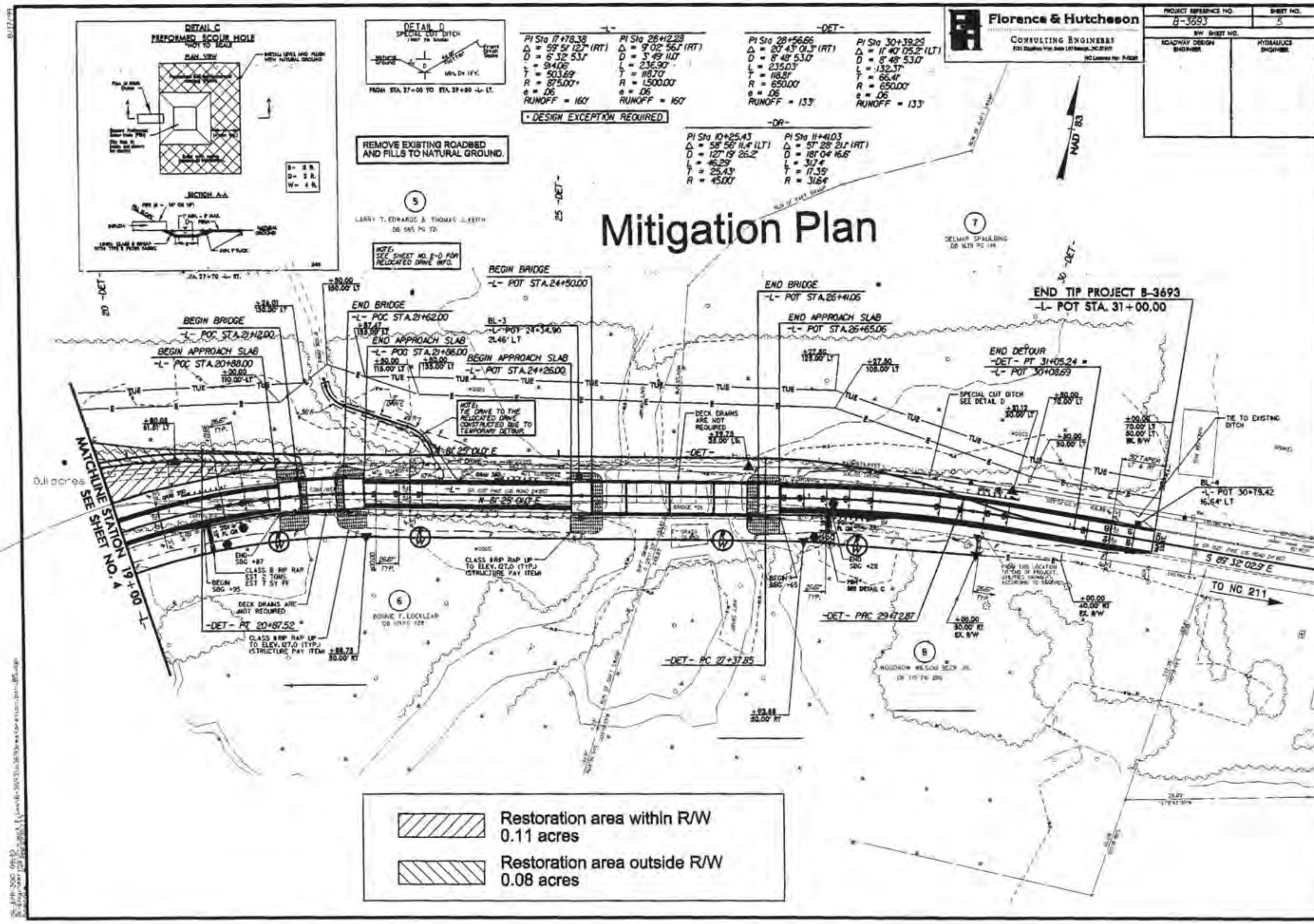
NCDOT shall monitor the restoration site by visual observation and photo points for survival and aerial cover of vegetation. NCDOT shall monitor the site for a minimum of three years or until the site is deemed successful. Monitoring will be initiated upon completion of the site planting.

Mitigation Plan



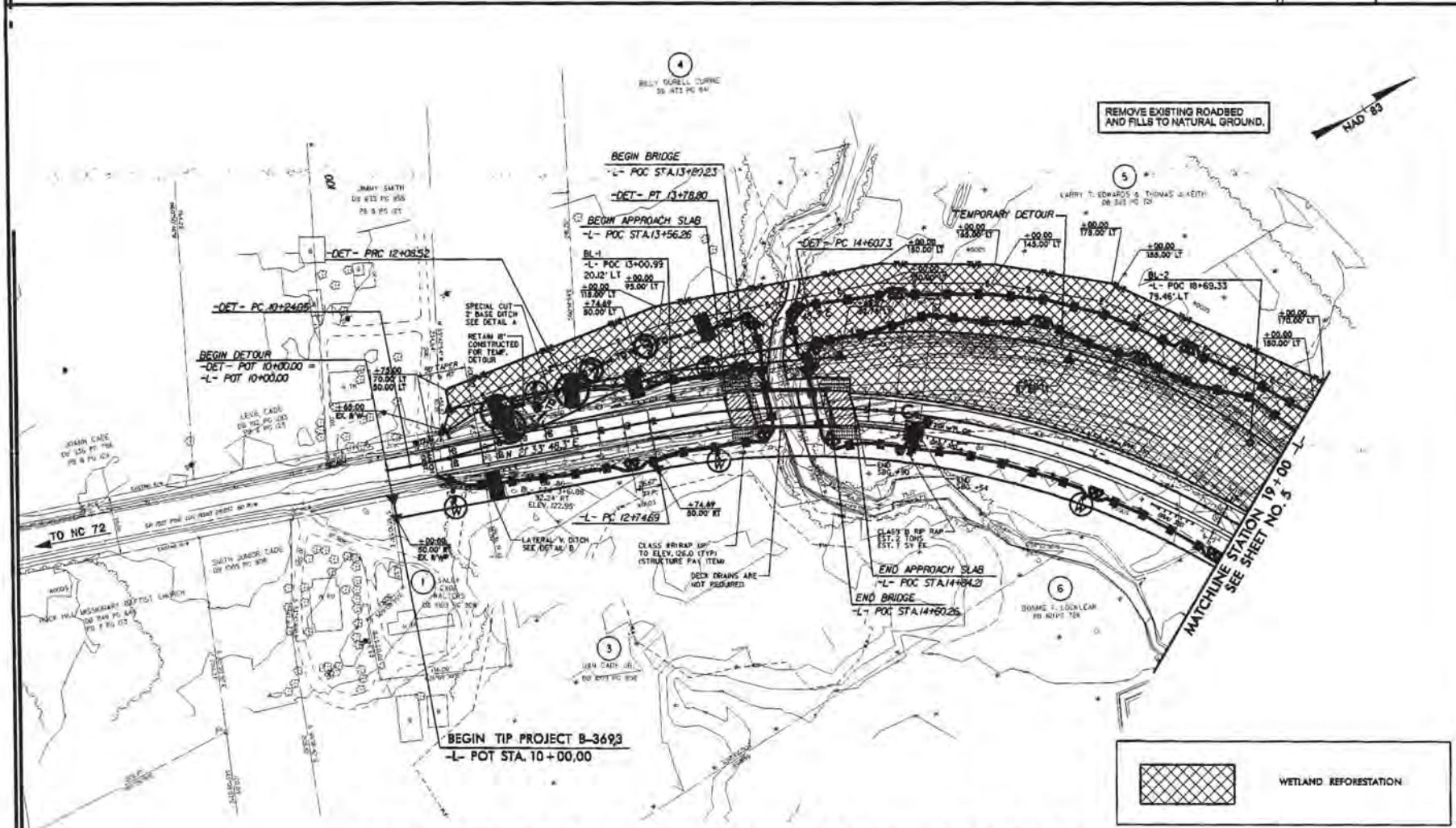
Florence & Hutcheson
CONSULTING ENGINEERS

PROJECT REFERENCE NO.	SHEET NO.
B-3693	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER


Mitigation Plan
Florence & Hutcheson
CONSULTING ENGINEERS
PROJECT REFERENCE NO.
B-3693
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DETAIL C
PREFORMED SCOUR HOLE
DETAIL D
SPECIAL CUT DITCH
REMOVE EXISTING ROADBED AND FILLS TO NATURAL GROUND.
* DESIGN EXCEPTION REQUIRED
BEGIN BRIDGE
-L- POC STA. 21+12.00
BEGIN APPROACH SLAB
-L- POC STA. 20+88.00
END BRIDGE
-L- POC STA. 21+62.00
END APPROACH SLAB
-L- POC STA. 21+86.00
BEGIN APPROACH SLAB
-L- POT STA. 24+26.00
BEGIN BRIDGE
-L- POT STA. 24+50.00
END BRIDGE
-L- POT STA. 26+41.06
END APPROACH SLAB
-L- POT STA. 26+65.06
END TIP PROJECT B-3693
-L- POT STA. 31+00.00
END DETOUR
-DET- PT 31+05.24
-L- POT 30+08.69
-DET- PT 20+87.52
-DET- PC 27+37.85
-DET- PRC 29+72.87
MATCHLINE STATION 19+00 -L-
SEE SHEET NO. 4
TO NC 211
S 89°32'02.9" E
0.11 acres
LARRY T. EDWARDS & THOMAS J. KEITH
DELMAR SPAULDING
BONNIE F. LOCKLEAR
WOODROW WILSON SECK JR.
Restoration area within R/W
0.11 acres
Restoration area outside R/W
0.08 acres

WETLAND REFORESTATION

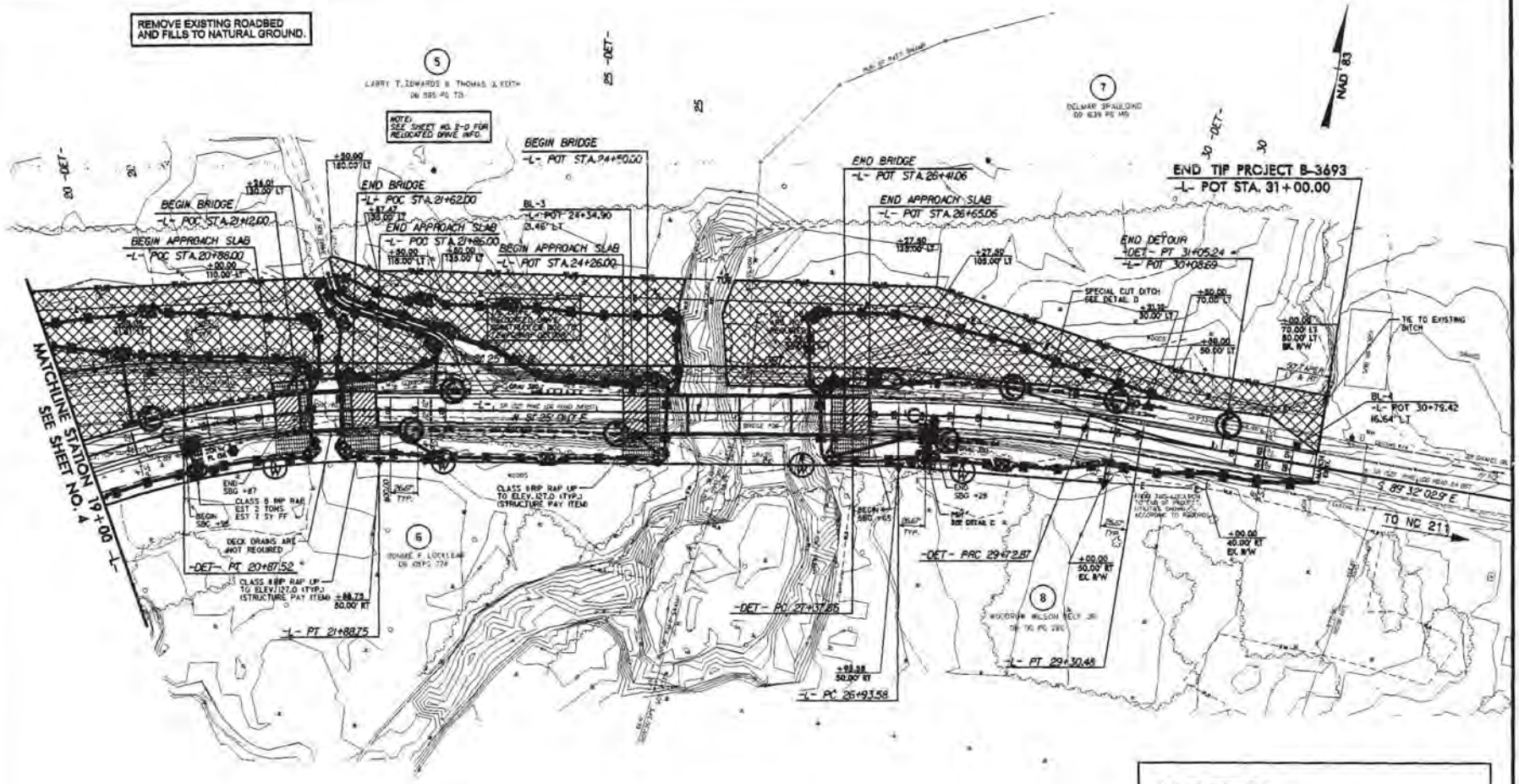
PROJECT REFERENCE NO.	SHEET NO.
B-3693	EC-10/CONST.A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SEE RF-1 AND PROJECT SPECIAL PROVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3693	EC-11/CONST.5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WETLAND REFORESTATION



SEE RF-1 AND PROJECT SPECIAL PROVISIONS

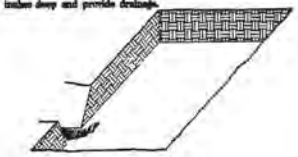
PROJECT REFERENCE NO.	SHEET NO.
B-3693	RF-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PLANTING DETAILS

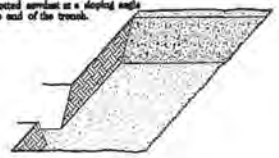
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

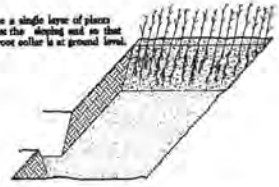
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



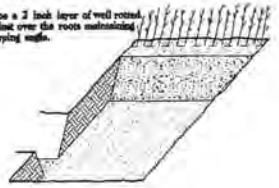
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.



5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.



6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR

1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.

4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave completed hole open. Water thoroughly.

PLANTING NOTES:

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

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

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

WETLAND REFORESTATION

☐ WETLAND REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

WETLAND REFORESTATION

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

25% NYSSA SYLVATICA VAR. BILFLORA	SWAMP TUPELO	12 in - 18 in BR
25% TAXODIUM DISTICHUM	BALD CYPRESS	12 in - 18 in BR
25% CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	12 in - 18 in BR
25% QUERCUS NIGRA	WATER OAK	12 in - 18 in BR

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

WETLAND REFORESTATION DETAIL SHEET

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