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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

February 28, 2014

U. S. Army Corps of Engineers
Regulatory Field Office
69 Darlington Ave.
Wilmington, NC 28403

RECEIVED
MAR 07 2014
REG. WILM. FIELD OFF.

Attn: Mr. Brad Shaver
USACE NCDOT Division 3 Coordinator

Dear Sir:

Subject: **Application for an Individual Section 404 Permit, and Individual Section 401 Water Quality Certification** for the replacement of Bridge Nos. 16 and 20 on NC 211 over Honey Island Swamp in Brunswick County. WBS Element No. 17BP.3.R.26. This application also includes the Preliminary Jurisdictional Determination Request Form.

The North Carolina Department of Transportation (NCDOT), Division of Highways, proposes to construct Bridge Nos. 16 and 20 on NC 211 over the Honey Island Swamp. The project is approximately 0.474 miles in length.

The purpose of this letter is to request approval for a Section 404 Individual Permit, and an Individual Section 401 Water Quality Certification. In addition to this cover letter and ENG Form 4345, this application package includes permit drawings, on-site wetland restoration drawings, half size roadway plans, Preliminary Jurisdictional Determination request form, USACE jurisdictional forms, and NCDWR stream forms.

If you have any questions or need additional information please contact me at (919) 878-9560 or aburnette@rkk.com.

Sincerely,

Audrey Burnette
RK&K – Project Engineer

cc list: Karen Fussell, Division Engineer - NCDOT
Amanda Glynn, Division Bridge Program Manager - NCDOT
Stoney Mathis, Division Environmental Officer - NCDOT

1.0 Purpose and Need

The purpose for this State Project No. 17BP.3.R.26 is to preserve the mobility and safety of the traveling public by replacing the existing 59-year old structurally deficient bridges that can no longer be addressed by maintenance activities. Bridge No. 16 is a 3-span timber bridge, 25.4 feet wide by 52.6 feet long. Bridge No. 20 is a 3-span timber bridge, 25.3 feet wide by 52.4 feet long. They span Honey Island Swamp on paved NC 211. The underground telecommunication and fiber optic cables will be relocated aerial onto the joint use power poles.

2.0 Project Description

The replacement structure for Bridge No. 16 will consist of a single span 45" concrete girder bridge approximately 80 feet long and 34.25 feet wide. The replacement structure for Bridge No. 20 will consist of a single span 45" concrete girder bridge approximately 85 feet long and 34.25 feet wide. These bridge lengths are based on final design information and were set by hydraulic requirements. The bridges will be of sufficient width to provide for two 12-foot lanes with offsets varying from 4.1 feet to 5.0 feet on Bridge No. 20 with 0.06 super elevations across the bridge and 4-foot offsets on Bridge No. 16 on each side in normal crown. The low chord of each new structure will be at approximately the same elevation as the existing low chord. The land use adjacent the swamp is primarily forest and game land. The basin character is Coastal Plain Rural.

3.0 Summary of Impacts

Waters of the U.S.: Proposed permanent impacts to jurisdictional areas total 0.97 acres. The impacts are as follows: 0.463 acres of fill is located in forested wetlands, 0.095 acres of fill is located in herbaceous wetlands due to the proposed roadway alignment, and 0.23 acres of fill is due to sloughing which may occur in the wetlands adjacent to the undercut operations. In addition, there is 0.02 acres of permanent mechanized clearing in wetlands at the bridges and along the roadway and 0.16 acres of mechanized clearing in wetlands adjacent the area of undercutting.

Proposed temporary impacts to jurisdictional areas total 0.08 acres. The impacts are as follows: 0.08 acres of hand clearing at the bridges and along the roadway. All underground and aerial utilities in conflict with the proposed construction will be directionally bored prior to construction.

4.0 Summary of Mitigation

The proposed construction of Bridge Nos. 16 and 20 over Honey Island Swamp will permanently impact 0.97 acres of jurisdictional riparian wetlands that will require mitigation. The unavoidable impacts to jurisdictional riparian wetlands will be offset by mitigation provided by NCDOT through on-site restoration (replacement of the Riverine Swamp Forest community). A total of 1.29 acres of Riverine Swamp Forest community will be restored on-site.

5.0 Project Schedule

Construction phasing of this project will begin with utility relocations then bridge replacement. The existing bridge will remain in service during the construction of the replacement bridges. The on-site mitigation work will begin upon completion of the bridge replacements. Permit drawings are attached. The Construction Date is May 1, 2014.

6.0 SEPA documentation

Information included in this introduction letter, along with attachments is intended to supply documentation necessary to meet the requirements of the State Environmental Policy Act. Bridge Nos. 16 and 20 are located on NC 211. NC 211 is used for through traffic which connects US 17 and US 74, for a total of 24 miles, which takes approximately 26 minutes. A total of four alternatives were studied for replacing Bridge Nos. 16 and 20 in Brunswick County. These alternatives are described as follows:

- ***No-Build Alternative***
- ***Alternate 1*** - Replace both bridges on existing alignment,
- ***Alternate 2*** - Replace Bridge No. 20 on new alignment while replacing Bridge No. 16 on existing alignment using an on-site detour,
- ***Alternate 3*** - Replacing both bridges on new alignment to the east of existing roadway, and
- ***Alternate 4*** - Replacing both bridges on new alignment to the west of existing roadway.

No-Build Alternative

This alternative is not feasible due to the bridges being classified as structurally deficient with sufficiency ratings of 4 (Bridge 16) and 5 (Bridge 20) out 100. Not replacing the bridges will cause safety and mobility issues to the traveling public.

Alternate 1

NCDOT Guidelines for Evaluation of Offsite Detours for Bridge Replacement Projects considers multiple project variables beginning with the additional time traveled by the average road user resulting from the offsite detour. The eastern loop for the offsite detour for this project would include continuing on US 17 to NC 87 to US 74. The detour for the average road user would result in approximately 18 miles additional travel which results in approximately 20 minutes additional travel time. Up to 6-month duration of construction is expected on this project.

Based on the Guidelines, the criteria above indicate that a delay of 20 minutes for the average road user over a 6 month period is unacceptable. Brunswick County Emergency Services has also indicated that an offsite detour is unacceptable. While project costs and environmental impacts will be higher, maintenance of traffic onsite during construction is mandatory. NCDOT Division 3 concurs in these recommendations.

Alternate 2

This alternative maintains existing traffic "on-site" and was initially supported by NCDOT as the best alternative to be implemented. However, after further study of the existing soils, it was determined that significant undercut would be required through adjacent wetlands resulting in permanent impacts not only along the new location alignment but also on the alignment for the temporary detour. Significant undercut and permanent impacts along a temporary facility was deemed "not feasible" which led to the study of Alternatives 3 and 4 which locates the roadway on new location adjacent to the existing bridges. Permanent wetland impacts for this alternative are 1.1 ac.

Alternative 3

This alternative maintains existing traffic "on-site" and replaces both Bridge Nos. 16 and 20 on new alignment just east of existing roadway. The new alignment in the area of Bridge No. 20 is identical to Alternative 2. Permanent wetland impacts for this alternative are 0.97 ac.

Alternative 4

This alternative maintains existing traffic "on-site" and replaces both Bridge Nos. 16 and 20 are on new alignment just west of existing roadway. The alignment for this alternative is approximately 180' longer than Alternative 3 due to connection to existing alignment on the inside of a horizontal curve to the south. Permanent wetland impacts for this alternative are 1.11 ac.

Alternatives 3 and Alternative 4 are very similar alignments and have very similar impacts to the environment. However, Alternative 3 was chosen as the Least Environmentally Damaging Practicable Alternative (LEDPA) because of the following:

- 0.14 ac. less wetland impacts,
- 180' shorter project length,
- Less required undercut, and
- Less utility impacts.

6.1 Independent Utility

State Project 17BP.3.R.26 is in compliance with 23 CFR Part 771.111(f) which lists the FHWA characteristics of the independent utility of a project. The project meets the criteria for independent utility as discussed below:

- The project has logical termini and independent utility and is of sufficient length to address environmental matters on a broad scope;
- The project is usable and a reasonable expenditure of funds, even if no additional transportation improvements are made in the area; and
- The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

7.0 Resource Status

The project is located in the Lumber River Basin and lies within Hydrologic Unit 03040206 (Subbasin 03-07-57). This is within the Middle Atlantic Coastal Plain ecoregion.

7.1 Wetland Delineations

The wetlands within the study area were delineated based on the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Atlantic and Gulf Coastal Plain Supplement) and a roadway design was prepared to avoid and minimize impacts to wetlands to the maximum extent possible. Wetland delineations for the study area were performed on September 07, 2011 by NCDOT staff members Lance Fontaine, John Merritt and Chris Underwood. Chris Manley and Stoney Mathis further defined the jurisdictional areas in early 2013. The wetland area to the far north and right side of the project beginning at approximate Station 42+80 RT was added in late April 2013 by Chris Manley and Stoney Mathis when the scope of the project area was extended. This delineation was later field verified by Mr. Brad Shaver (USACE, Wilmington District) on April 17, 2013. The study area was revisited by Stoney Mathis (NCDOT), Hal Bain (RK&K), Pete Stafford (RK&K) and Audrey Burnette (RK&K) on November 04, 2013.

7.2 Stream Delineations

Data collected for streams were derived from USGS topographic maps, the Brunswick County Soil Survey (USDA, 1990), and site reconnaissance. The data included stream classifications, which are presented in the attached documentation. A stream characterization and delineation was conducted by Hal Bain (RK&K) and Pete Stafford (RK&K) on November 04, 2013. A previous site visit to confirm the presence of jurisdictional streams within the project study area was conducted by Stoney Mathis (NCDOT), Brad Shaver (USACE Wilmington District) and Mason Herndon (NCDWR) on April 17, 2013.

7.3 Characterization of Jurisdictional Sites

7.3.1 Wetlands

There is approximately 2.41 acres of wetlands within the project area. There is one wetland community found within the project study area. Field investigations conducted on September 07, 2011 and revisited on November 04, 2013 identified one wetland community (Riverine Swamp Forest) found within the project study area. This community dominates the project study area and generally begins at the toe of the existing roadway fill section. Information about this wetland complex can be found in the attachments to this letter report which includes a vicinity map, USACE wetland data forms and final design plans depicting the extent of the wetlands within the project study area.

7.3.2 Streams

There is approximately 177 linear feet of stream within the project area. Best Usage Classification for the jurisdictional stream, Honey Island Swamp, is C & Sw (Swamp Waters). Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped watersheds), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area. The two stream segments are not designated as a North Carolina Natural or Scenic River, or as a National Wild and Scenic River. Honey Island Swamp is not listed on the Final 2012 Section 303(d) list of impaired waters.

7.4 Impacts to Jurisdictional Resources

Impacts to jurisdictional wetlands for State Project 17BP.3.R.26 are summarized below:

Permanent Impacts: Proposed permanent impacts for the replacement of Bridge Nos. 16 and 20 include fill in wetlands and mechanized clearing in wetlands totaling 0.97 acres of permanent impacts to riparian wetlands.

Temporary Impacts: There will be 0.08 acres of temporary hand-clearing at the bridges and along the roadway in jurisdictional wetlands due to project construction.

Utility Impacts: All underground and aerial utilities in conflict with the proposed construction will be directionally bored prior to construction.

It is anticipated that no impacts to streams will result from the proposed project construction.

8.0 Protected Species

Plants and animals with federal classification of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended, or by provisions of the Bald and Golden Eagle Act (BGPA). The United States Fish and Wildlife Service (USFWS, 2013) lists 15 federally protected species for Brunswick County as of the November 18, 2013 listing (Table 1).

Table 1 Federally Protected Species in Brunswick County

Common Name	Scientific Name	Federal Status*	Habitat Present	Biological Conclusion
American alligator	*Alligator mississippiensis*	T (S/A)	Yes	N/A
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	E	No	No Effect
Bald eagle	*Haliaeetus leucocephalus*	BGPA	No	No Effect
Green sea turtle	*Chelonia mydas*	T	No	No Effect

Common Name	Scientific Name	Federal Status*	Habitat Present	Biological Conclusion
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	No	No Effect
Leatherback sea turtle	*Dermochelys coriacea*	E	No	No Effect
Loggerhead sea turtle	*Caretta caretta*	T	No	No Effect
Piping plover	*Charadrius melodus*	T	No	No Effect
Red-cockaded woodpecker	*Picoides borealis*	E	No	No Effect
Shortnose sturgeon	*Acipenser brevirostrum*	E	No	No Effect
West Indian manatee	*Trichechus manatus*	E	No	No Effect
Wood stork	*Mycteria americana*	E	No	No Effect
Cooley's meadowrue	*Thalictrum cooleyi*	E	No	No Effect
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	No	No Effect
Seabeach amaranth	*Amaranthus pumilus*	T	No	No Effect

* BGPA = Bald and Golden Eagle Protection Act, E = Endangered, T = Threatened, T(S/A) = Threatened (Similarity of Appearance)

The NC Natural Heritage Program (NCNHP) database (updated November 2013) was also reviewed for recorded occurrences of protected species. No occurrences of federally protected species were recorded within one mile for the project study area. Comments received from the USFWS dated September 15, 2011 are included in the attachments to this package.

8.1 Bald and Golden Eagle Protection Act (BGPA)

In the July 9, 2007 Federal Register (72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered Wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) became the primary law protecting bald eagles. No nesting and/or foraging habitat for the bald eagle is present within the project study area or within 660 feet of the project study area.

8.2 Moratorium

There is no in-water work moratorium recommended for State Project 17BP.3.R.26. The communication with the North Carolina Wildlife Resources Commission (Travis Wilson) is included as an attachment to this package.

9.0 Cultural Resources

The potential effect of the proposed project on cultural resources in the project area was evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. NCDOT Historic Architecture staff communications, dated November 20, 2013 determined that replacement of the existing structures (Bridge Nos. 16 and 20) will Not Adversely Impact any historic buildings or landscapes. The referenced communications are included as attachments to this package.

An archaeological survey of the project's Area of Potential Effect (APE) was conducted by NCDOT archaeologists to determine the project's impact on significant archaeological or historical resources. NCDOT Archaeological staff communications, dated November 06, 2013 indicate that no archaeological sites were found within the project's APE. Therefore, no additional archaeological investigation is recommended for this project. The referenced communications are included as attachments to this package.

10.0 FEMA Compliance

Honey Island Swamp is a FEMA regulated stream. Bridge Nos. 16 and 20 can be found on FIRM maps 37201184 and 37201186, dated June 2, 2006. The replacement of these bridges produced a 0.01 foot increase in the water surface elevation between the Revised Model and the Corrected Effective Model just downstream of the bridge. No existing structures are impacted by this increase. This increase is categorized as a Type 2D MOA, which is a category within the Memorandum of Agreement (MOA) between NCDOT and Floodplain Mapping. This increase has already been approved by the appropriate state and local officials as well as the Federal Emergency Management Agency (FEMA) to assure compliance with federal, state, and local floodway regulations.

11.0 Mitigation Options

The NCDOT has investigated potential on-site wetland mitigation opportunities. However, if on-site mitigation is not feasible, mitigation will be provided by the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (NCEEP). In accordance with the *Memorandum of Agreement* dated July 22, 2003 between NCDOT and U.S. Army Corps of Engineers, the NCEEP may provide off-site mitigation to satisfy the Federal Clean Water Act compensatory mitigation requirements for this project.

Permanent impacts to jurisdictional wetlands totaling 0.97 acres of Riverine Swamp Forest (NCWAM wetland type) will occur as a result of project construction adjacent to the existing roadway/bridge location. NCDOT plans to provide (1.29 acres) on-site replacement (restoration) by removal of the existing roadway bed and roadway fill down to the natural wetland elevation. Please see the cross sections in the "On-Site Wetland Restoration Plan Set" for target elevations. Replanting with species dominant in the adjacent Riverine Swamp Forest (Honey Island Swamp) will be conducted in these areas. Please see the planting details in the "On-Site Wetland Restoration Plan Set". It is anticipated that three years of visual monitoring of vegetation will be conducted.

11.1 Avoidance and Minimization

All jurisdictional features were delineated, field verified and surveyed within the corridor for the NC 211 bridge replacements. Using these surveyed features, the roadway design was adjusted to avoid and/or minimize impacts to jurisdictional areas. NCDOT employs many strategies to avoid and minimize impacts to jurisdictional areas in all of its designs. Many of these strategies have been incorporated into BMP documents that have been reviewed and approved by the resource agencies and which will be followed throughout construction. Individual avoidance and minimization items are as follows:

- No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.
- The project was designed to avoid or minimize disturbance to aquatic life movements by use of single span bridges. The spans were maximized while maintaining the same vertical clearances as the existing bridges. There are no deck drains. The bridge runoff is collected at the low point of each bridge and discharges outside of the jurisdictional waters. A rip rap pad was used to diffuse the velocities before entering the wetlands at the pipe outlet for the drainage structure at Bridge No. 20. A preformed scour hole was used to diffuse the velocities before entering the wetlands at the pipe outlet for the drainage structure at Bridge No. 16. There is a swale from sta. 36+10 to sta. 37+50 LT that dissipates the roadway runoff before it enters the restored wetland area.
- NCDOT will minimize long-term water quality impacts through the use of the most recent Best Management Practices for Protection of Surface Waters, as identified in the Federal Aid Highway Program (FHPM) and North Carolina Administrative Code, Chapter 4.
- NCDOT and its contractors will not excavate, fill, or perform land clearing activities within Waters of the U.S. or any areas under the jurisdiction of the USACE, except as authorized by the USACE. To ensure that all borrow and waste activities occur on high ground, except as authorized by permit, the NCDOT shall require its contractors to identify all areas to be used to borrow material, or to dispose of dredged, fill or waste material. Documentation of the location and characteristics of all borrow and disposal sites associated with the project will be available to the USACE on request.
- The use of reinforced 2:1 fill slopes in jurisdictional areas which will be stabilized with geotextile fabric and vegetation as outlined in the Geotechnical Report dated 12/2013. This report is included as part of the project Contract Documents.
- NCDOT will implement Best Management Practices for Bridge Demolition and Removal. The asphalt-wearing surface of the two bridges and bridge rails will be removed without dropping them into the water prior to bridge demolition.
- Turbidity curtains will be installed around existing interior bents prior to extraction of the piles. The timber piles encased in concrete will be extracted with a vibratory hammer and crane, to minimize disturbance to the natural stream.
- Silt fence and coir fiber wattle barrier will be used during construction to prevent sediment from entering the wetlands and jurisdictional waters.
- All aerial and underground utilities in conflict with the project will be directionally bored below the proposed wetland restoration area prior to construction.
- The use of hand clearing rather than mechanized clearing where possible.

- High visibility fencing will be utilized to identify environmentally sensitive areas that are not to be impacted.

11.2 Compensation

Although NCEEP is available for mitigation by compensation, there are on-site opportunities available. See Section 11.0 Mitigation Options for more information.

12.0 Indirect and Cumulative Effects

Information associated with the subject project study area revealed that no significant impacts to natural, ecological, cultural, scenic, or community resources are expected due to the construction of the subject project. Any direct impacts to resources have been avoided (where possible), minimized, and mitigated. The bridges are being replaced immediately upstream of the existing structures and these replacements are not creating any new development access to adjacent land or offering any significant travel time savings. Therefore, no indirect or cumulative effects are expected due to the construction of State Project 17BP.3.R.26.

13.0 Regulatory Approvals

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

Section 401: We are also requesting a Section 401 Water Quality Certification from the NCDWR. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing electronic copies of this application package to Mason Herndon and Sonia Carrillo (NCDWR), for their approval.

CAMA Consistency Determination: A Federal Consistency Determination letter will be submitted along with project information to Steve Sollod (NCDCM reviewer).

If you have any questions or need additional information, please contact me at 919-878-9860 or aburnette@rkk.com.

On-Site Mitigation Plan
Bridge Nos. 090016 & 090020
over Honey Island Swamp
Brunswick County, North Carolina
State Project No. 17BP.3.R.26
March 2014

1.0 MITIGATION WORK PLAN

The North Carolina Department of Transportation (NCDOT), Division of Highways, proposes to replace existing Bridge Nos. 090016 and 090020 on NC 211 over the Honey Island Swamp. The proposed structures will be located approximately 13 feet downstream of the existing structures. The project is approximately 0.474 miles in length.

The goal of the proposed onsite mitigation is to offset impacts due to construction of State Project 17BP.3.R.26 by restoring the adjacent wetland system to its natural conditions. This will be achieved through restoration of the Riverine Swamp Forest community. The restoration of the wetland area will be accomplished via excavation of the existing road and fill material out to the edge of the existing wetland. The site will be graded to match the target elevations in the adjacent wetland. Those elevations are shown on the cross sections included with the Wetland Restoration Package.

Approximately 1.29 acres of the restoration area will be reforested to match the existing species composition, (Riverine Swamp Forest) of the adjacent wetland preservation area. The area will be planted 3' to 5' on center, random spacing, with an average of 4' center on center at a density of 2,724 stems per acres of bare root seedlings of a mixture as follows: 40% bald cypress (Taxodium distichum), 40% blackgum (Nyssa biflora), 10% Sweetbay (Magnolia virginiana), and 10% Titi (Cyrilla racemiflora).

See the Erosion Control Special Provisions for a description of the soil preparation requirements.

2.0 PERFORMANCE STANDARDS

Success for vegetation monitoring within the restoration area is based on the survival of planted woody vegetation and coverage of native seed vegetation. Upon successful completion of construction, the following monitoring strategies are proposed for the mitigation site.

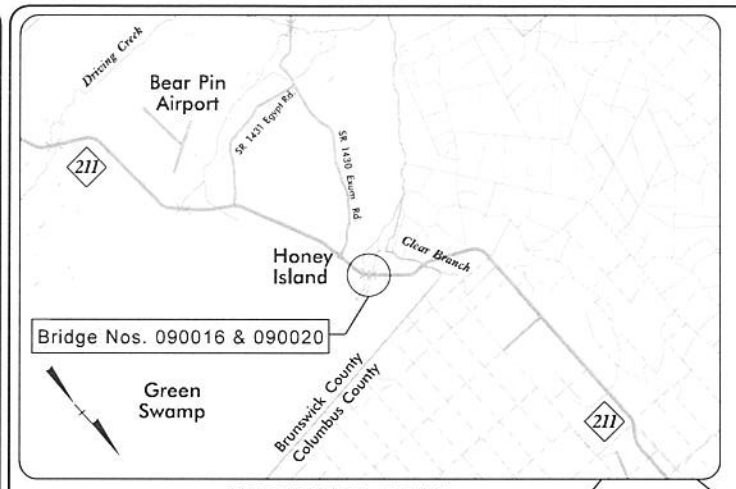
3.0 MONITORING REQUIREMENTS

NCDOT will perform visual inspections of the vegetation for three years and provide an annual report to the regulatory agencies. No specific hydrological monitoring is proposed for the wetland restoration area. 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. The target elevation is based on the adjacent wetland areas and will be verified during construction.

NCDOT shall monitor the restoration area by visual observation and photo points for seedling 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.

BRIDGES 090016 & 090020

CONTRACT: C202942



VICINITY MAP

NOTES:

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

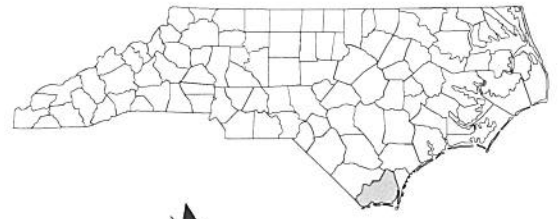
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.3.R.26	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.3.R.26		PE, ROW, UTIL. & CONST.

LOCATION: BRIDGE NOS. 090016 & 090020 OVER HONEY ISLAND SWAMP ON NC 211

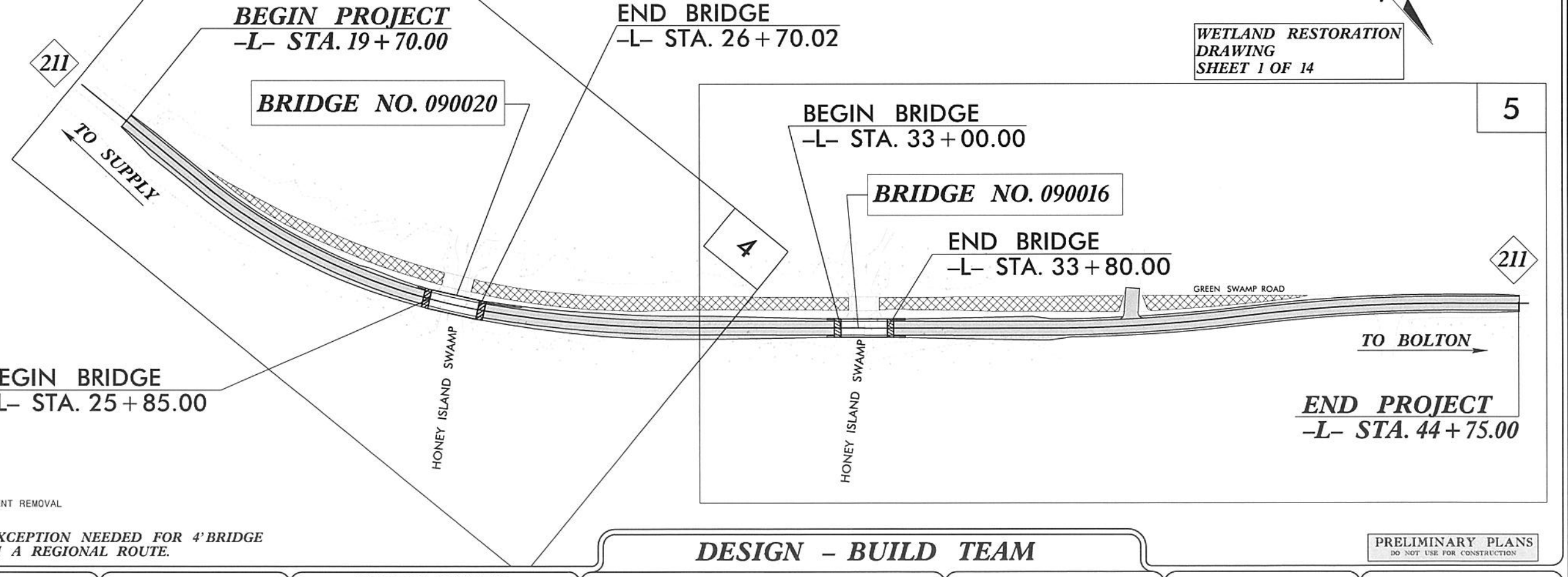
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES AND RESURFACING

ON–SITE WETLAND RESTORATION PLAN



NAD 83/ NSRS 2007

WETLAND RESTORATION DRAWING SHEET 1 OF 14



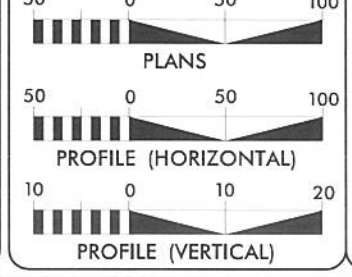
5

** DESIGN EXCEPTION NEEDED FOR 4' BRIDGE OFFSET ON A REGIONAL ROUTE.*

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DESIGN – BUILD TEAM

GRAPHIC SCALES



DESIGN DATA

ADT = 4,400
ADT =
DHV = N/A
D = N/A
T = 7 % *
V = 55 MPH
* TTST = 3% DUAL 4%
FUNC CLASS = COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT 090016&090020..... 0.443 mi
LENGTH STRUCTURE TIP PROJECT 090016&090020..... 0.031 mi
TOTAL LENGTH TIP PROJECT 090016&090020..... 0.474 mi

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560

FOR DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 29, 2012

LETTING DATE: MARCH 29, 2012

B. Keith Skinner, P.E. — *PROJECT ENGINEER*

Michael T. Merritt, P.E. — *PROJECT DESIGN ENGINEER*

NCDOT CONTACT: *Virginia Mabry* — *PRIORITY PROJECTS OFFICE MANAGER*

CONTRACTOR :

S. T. Wooten Corporation

S.T.WOOTEN CORPORATION
P.O.BOX 2408
3801 BLACK CREEK ROAD
WILSON, NORTH CAROLINA 27894

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

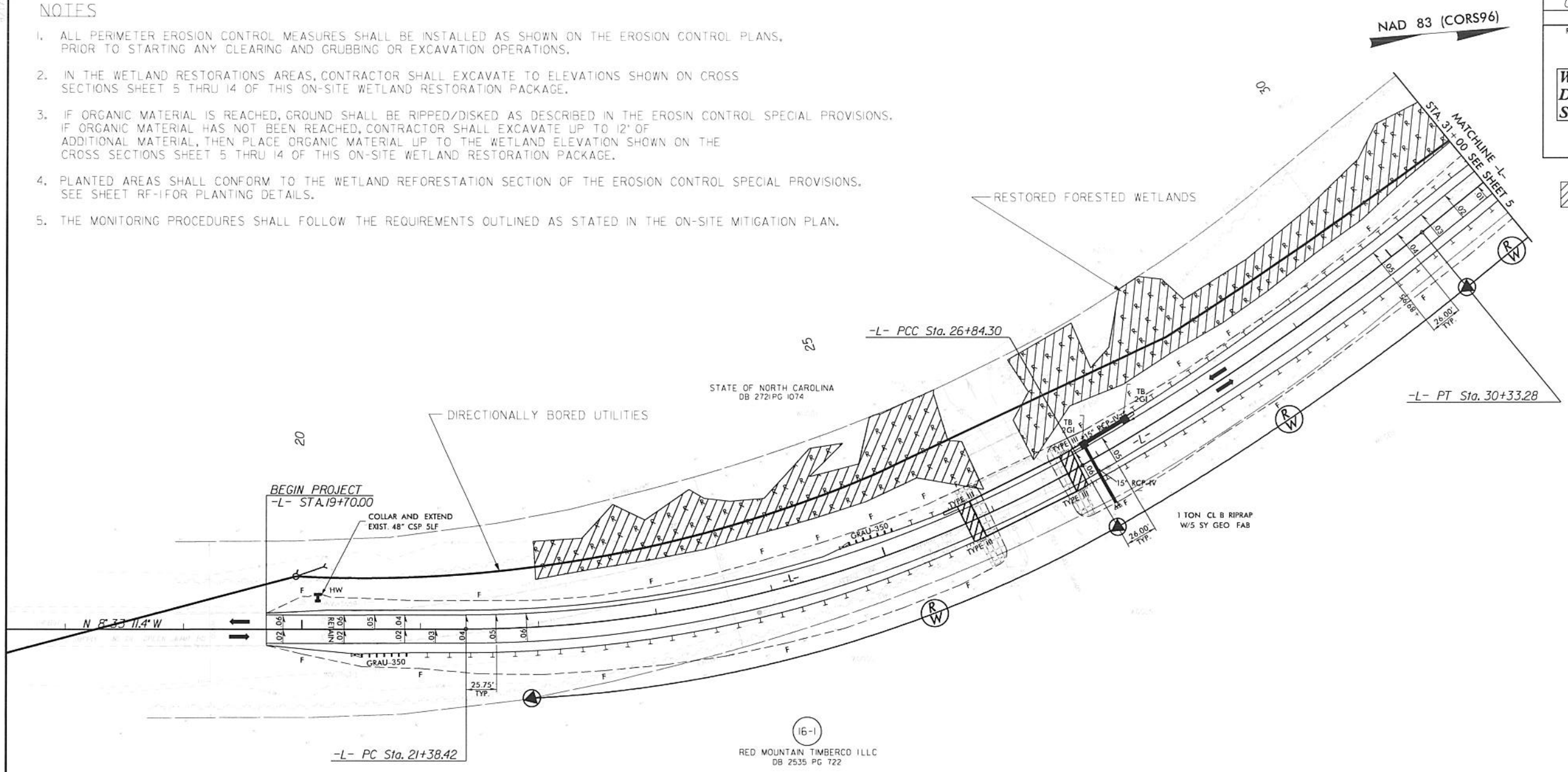
PROJECT REFERENCE NO.	SHEET NO.
090016 & 090020	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

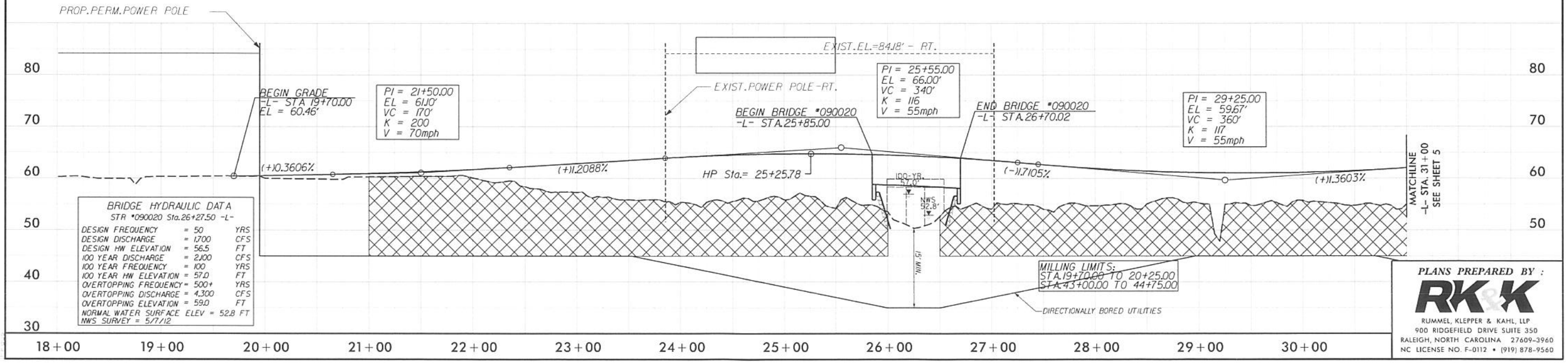
WETLAND RESTORATION DRAWING
SHEET 2 OF 14

R R DENOTES RESTORED FORESTED WETLANDS

NOTES

1. ALL PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLANS, PRIOR TO STARTING ANY CLEARING AND GRUBBING OR EXCAVATION OPERATIONS.
2. IN THE WETLAND RESTORATIONS AREAS, CONTRACTOR SHALL EXCAVATE TO ELEVATIONS SHOWN ON CROSS SECTIONS SHEET 5 THRU 14 OF THIS ON-SITE WETLAND RESTORATION PACKAGE.
3. IF ORGANIC MATERIAL IS REACHED, GROUND SHALL BE RIPPED/DISKED AS DESCRIBED IN THE EROSIN CONTROL SPECIAL PROVISIONS. IF ORGANIC MATERIAL HAS NOT BEEN REACHED, CONTRACTOR SHALL EXCAVATE UP TO 12" OF ADDITIONAL MATERIAL, THEN PLACE ORGANIC MATERIAL UP TO THE WETLAND ELEVATION SHOWN ON THE CROSS SECTIONS SHEET 5 THRU 14 OF THIS ON-SITE WETLAND RESTORATION PACKAGE.
4. PLANTED AREAS SHALL CONFORM TO THE WETLAND REFORESTATION SECTION OF THE EROSION CONTROL SPECIAL PROVISIONS. SEE SHEET RF-1FOR PLANTING DETAILS.
5. THE MONITORING PROCEDURES SHALL FOLLOW THE REQUIREMENTS OUTLINED AS STATED IN THE ON-SITE MITIGATION PLAN.





BRIDGE HYDRAULIC DATA
STR *090020 Sta.26+27.50 -L-

DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1,700	CFS
DESIGN HW ELEVATION	= 56.5	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 57.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4,300	CFS
OVERTOPPING ELEVATION	= 59.0	FT
NORMAL WATER SURFACE ELEV	= 52.8	FT
NWS SURVEY	= 5/7/12	

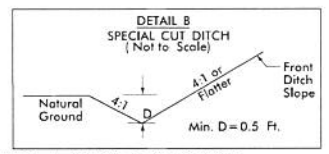
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

NOTES

1. ALL PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLANS. PRIOR TO STARTING ANY CLEARING AND GRUBBING OR EXCAVATION OPERATIONS.
2. IN THE WETLAND RESTORATIONS AREAS, CONTRACTOR SHALL EXCAVATE TO ELEVATIONS SHOWN ON CROSS SECTIONS SHEET 5 THRU 14 OF THIS ON-SITE WETLAND RESTORATION PACKAGE.
3. IF ORGANIC MATERIAL IS REACHED, GROUND SHALL BE RIPPED/DISKED AS DESCRIBED IN THE EROSIN CONTROL SPECIAL PROVISIONS. IF ORGANIC MATERIAL HAS NOT BEEN REACHED, CONTRACTOR SHALL EXCAVATE UP TO 12" OF ADDITIONAL MATERIAL, THEN PLACE ORGANIC MATERIAL UP TO THE WETLAND ELEVATION SHOWN ON THE CROSS SECTIONS SHEET 5 THRU 14 OF THIS ON-SITE WETLAND RESTORATION PACKAGE.
4. PLANTED AREAS SHALL CONFORM TO THE WETLAND REFORESTATION SECTION OF THE EROSION CONTROL SPECIAL PROVISIONS. SEE SHEET RF-1 FOR PLANTING DETAILS.
5. THE MONITORING PROCEDURES SHALL FOLLOW THE REQUIREMENTS OUTLINED AS STATED IN THE ON-SITE MITIGATION PLAN.

NAD 83 (CORS96)

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -L- STA. 36+10 TO 37+50 LT;
Q5=1.1cfs, V=0.5fps, S=0.81%
FROM -L- STA. 38+50 TO 39+50 LT;
Q5=0.4cfs, V=0.3fps, S=0.30%

PROJECT REFERENCE NO.	SHEET NO.
090016&20	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WETLAND RESTORATION DRAWING SHEET 3 OF 14

R R DENOTES RESTORED FORESTED WETLANDS

STATE OF NORTH CAROLINA
DB 2721PG 1074

RESTORED FORESTED WETLANDS

DIRECTIONALLY BORED UTILITIES

EXISTING AERIAL UTILITY CORRIDOR
NEW HAND CLEARING NOT REQUIRED.

MATCHLINE -L- STA. 31+00 SEE SHEET 4

HP
-L- 32+74.09

PREFORMED SCOUR HOLE
SEE DETAIL A

16-1
RED MOUNTAIN TIMBERCO I LLC
DB 2535 PG 722

LP
-L- 37+56.82

-L- PC Sta. 36+47.19

1 TON CL B RIP RAP W/5 SY GEO FAB

1 TON CL B RIP RAP W/5 SY FIL FAB

SPECIAL CUT DITCH SEE DETAIL B

-L- PRC Sta. 39+99.60

HP
-L- 41+66.81

-L- PT Sta. 43+43.23

END PROJECT
-L- STA. 44+75.00

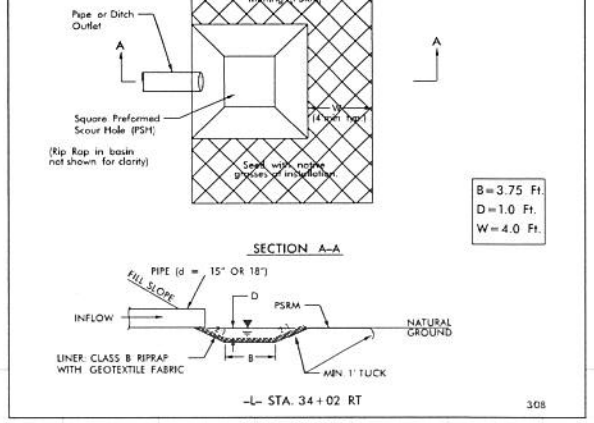
FILL IN WETLANDS

TYPE-III, TYPE-II, TB 2GI, GRAU-350, 15" RCP, 26.25' TYP., 24.69'

PAVEMENT REMOVAL
* NOTE: STA. 37+25.00 TO 38+00.00 LT ONLY PAVEMENT IS TO BE REMOVED SUB-BASE IS TO BE LEFT IN PLACE.

STATE OF NORTH CAROLINA

PREFORMED SCOUR HOLE DETAIL A
*NOT TO SCALE



BM#2 EL = 56.24'
-L- STA. 34+03.82 75.58' LT.
RR SPIKE SET IN 15" OAK

EXIST. EL.=79.18' -LT.
EXIST. POWER POLE - LT
EXIST. POWER POLE-LT.
EXIST. POWER POLE-RT.

BEGIN BRIDGE *090016
-L- STA. 33+00.00

END BRIDGE *090016
-L- STA. 33+80.00

PI = 32+80.00
EL = 64.50'
VC = 330'
K = 117
V = 55mph

PI = 37+15.00
EL = 58.14'
VC = 260'
K = 118
V = 55mph

PI = 41+25.00
EL = 61.22'
VC = 200'
K = 189
V = 55mph

(+)11.3603%
(-)11.4613%
(+)0.8071%
(+)10.7500%
(-)10.3000%
(+)10.7500%
(-)10.3077%

HP Sta.= 32+74.09

100-YR. 57.0'
NWS 52.8'
15' MIN.

END SPECIAL CUT DITCH
-L- STA. 37+50 LT
EL. 57.20'

BEG. SPECIAL CUT DITCH
-L- STA. 38+50 LT
EL. 57.49'

END SPECIAL CUT DITCH
-L- STA. 39+50 LT
EL. 57.19'

BEG. SPECIAL CUT DITCH
-L- STA. 36+10 LT
EL. 56.07'

DIRECTIONALLY BORED UTILITIES

END GRADE
-L- STA. 44+75.00
EL = 60.14'

80 70 60 50 40 30

31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00

BRIDGE HYDRAULIC DATA
STR #090016 Sta. 33+40 -L-

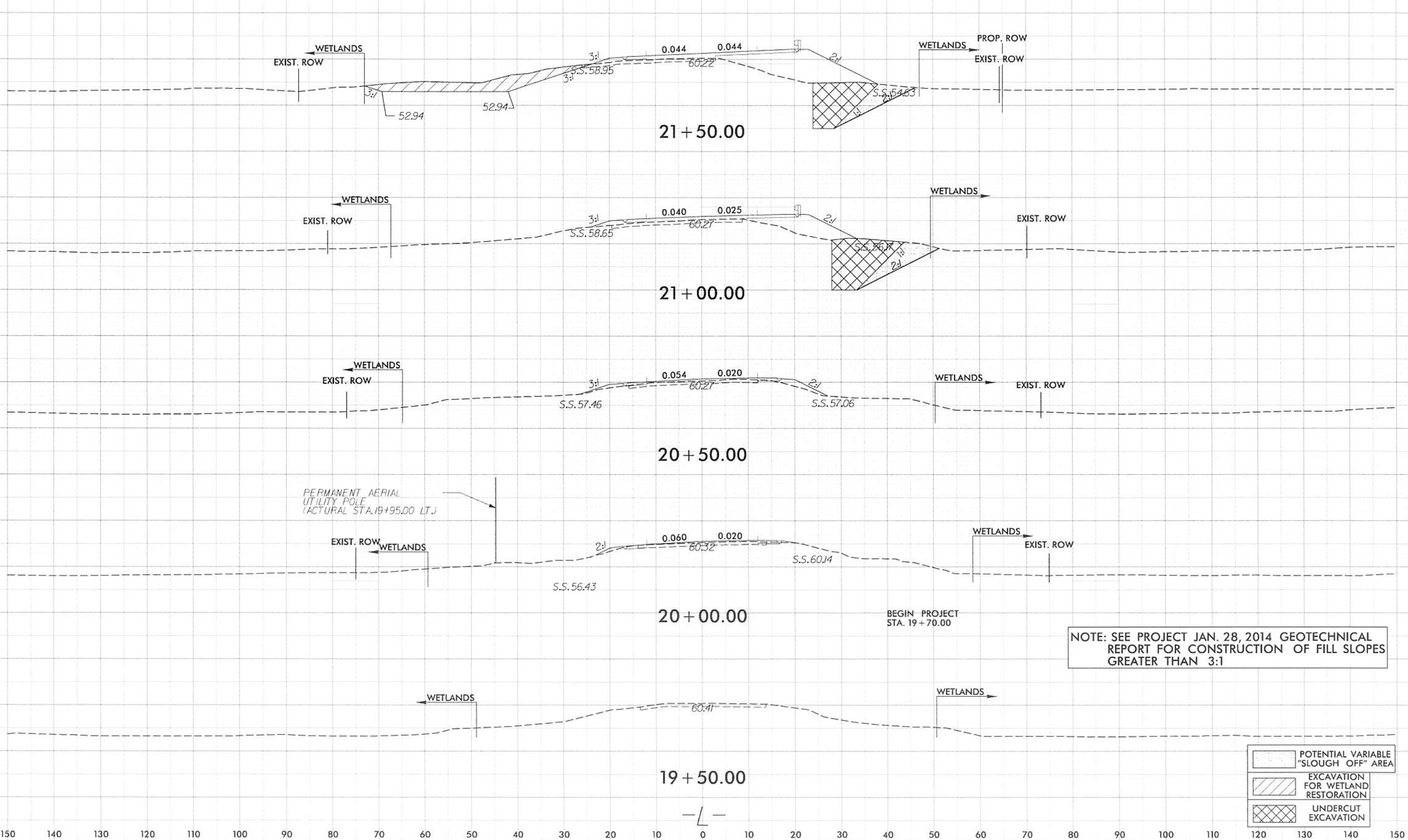
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1,700	CFS
DESIGN HW ELEVATION	= 56.5	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 57.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4,300	CFS
OVERTOPPING ELEVATION	= 59.0	FT
NORMAL WATER SURFACE ELEV	= 52.8	FT
NWS SURVEY	= 5/7/12	

MILLING LIMITS:
STA. 19+70.00 TO 20+25.00
STA. 43+00.00 TO 44+75.00

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-1

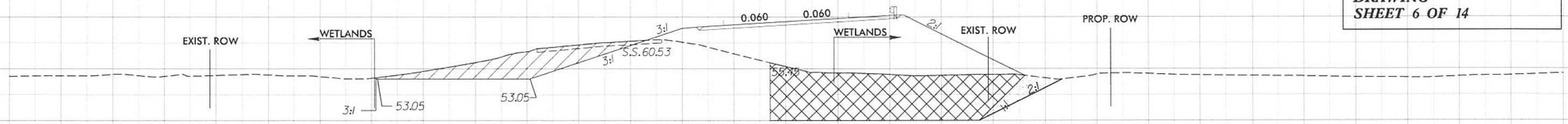
WETLAND RESTORATION DRAWING
SHEET 5 OF 14



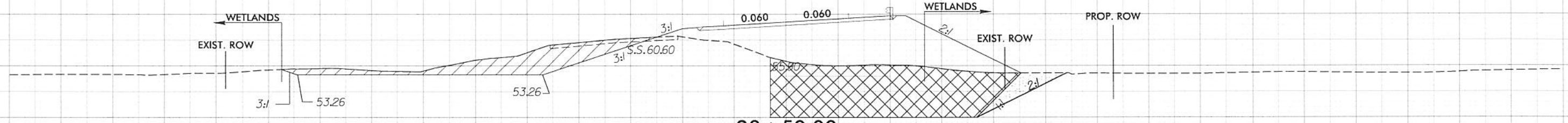
NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-2

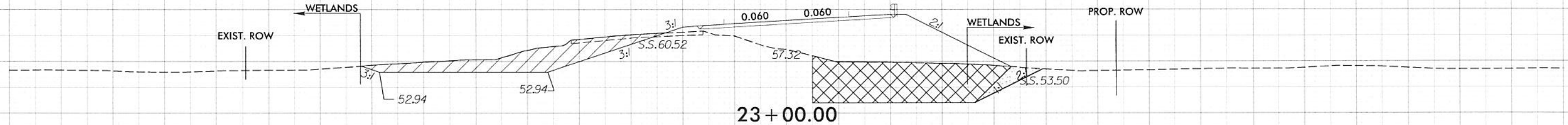
WETLAND RESTORATION DRAWING
SHEET 6 OF 14



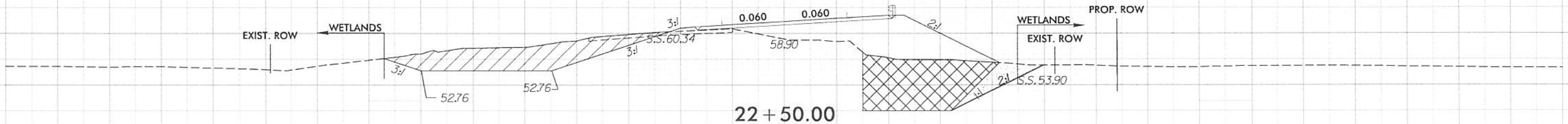
24+00.00



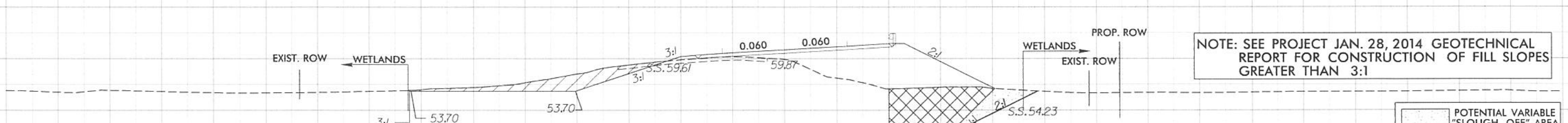
23+50.00



23+00.00



22+50.00



22+00.00

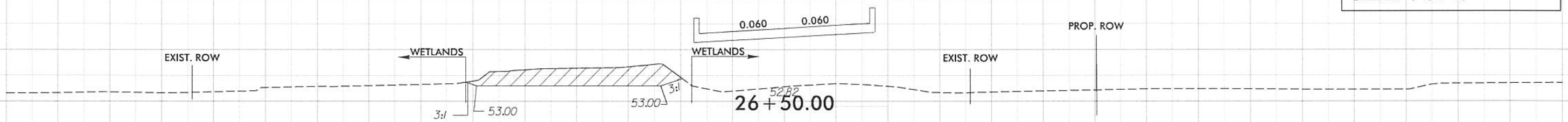
NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

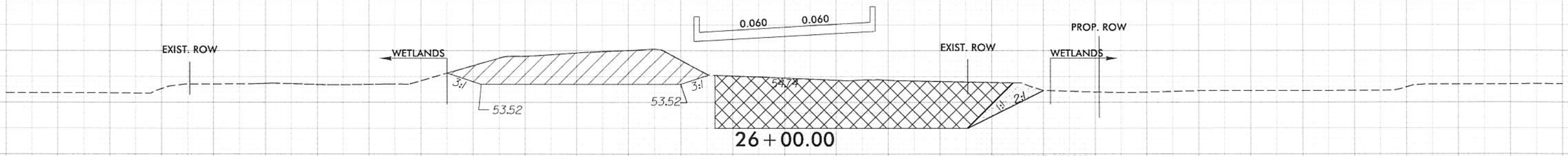
- POTENTIAL VARIABLE "SLOUGH OFF" AREA
- EXCAVATION FOR WETLAND RESTORATION
- UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-3

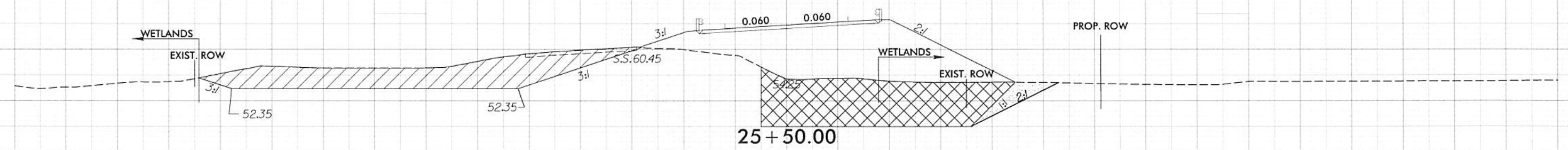
WETLAND RESTORATION DRAWING
SHEET 7 OF 14

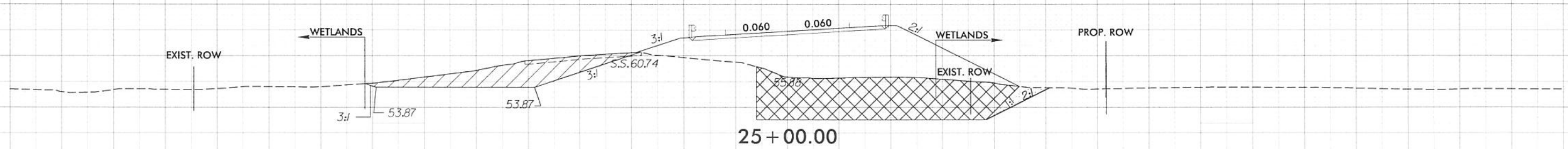
END BRIDGE 090020
STA. 26+70.02

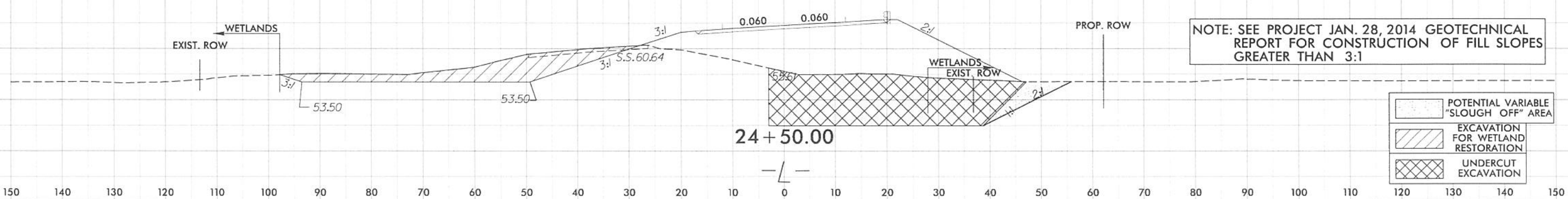




BEGIN BRIDGE 090020
STA. 25+85.00





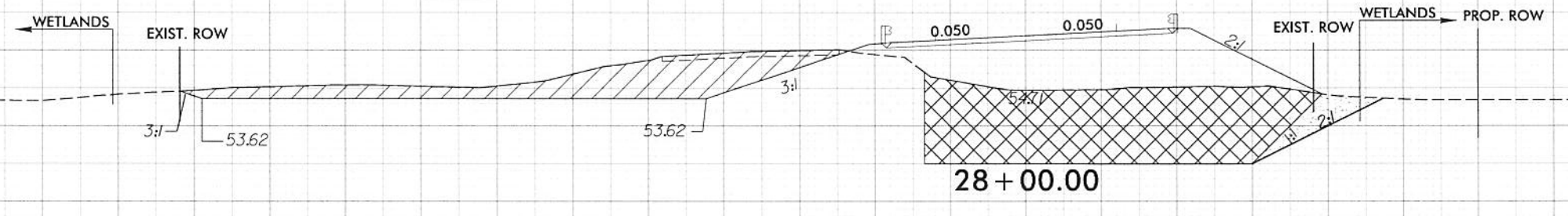


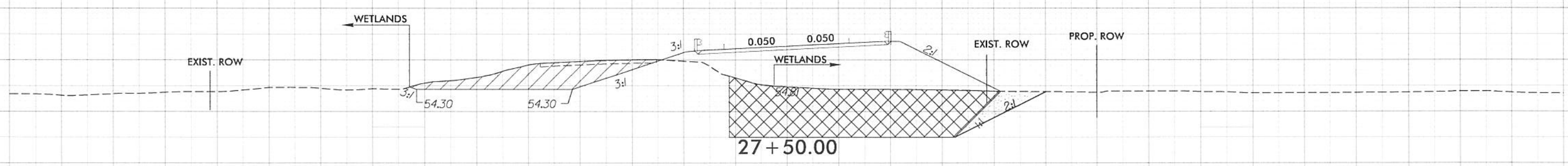
NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

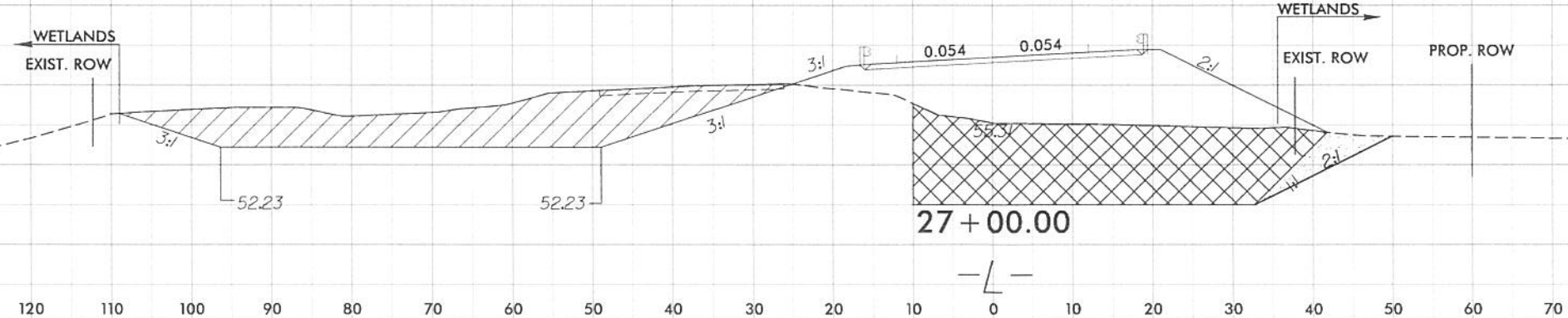
POTENTIAL VARIABLE "SLOUGH OFF" AREA
EXCAVATION FOR WETLAND RESTORATION
UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-4

WETLAND RESTORATION DRAWING
SHEET 8 OF 14





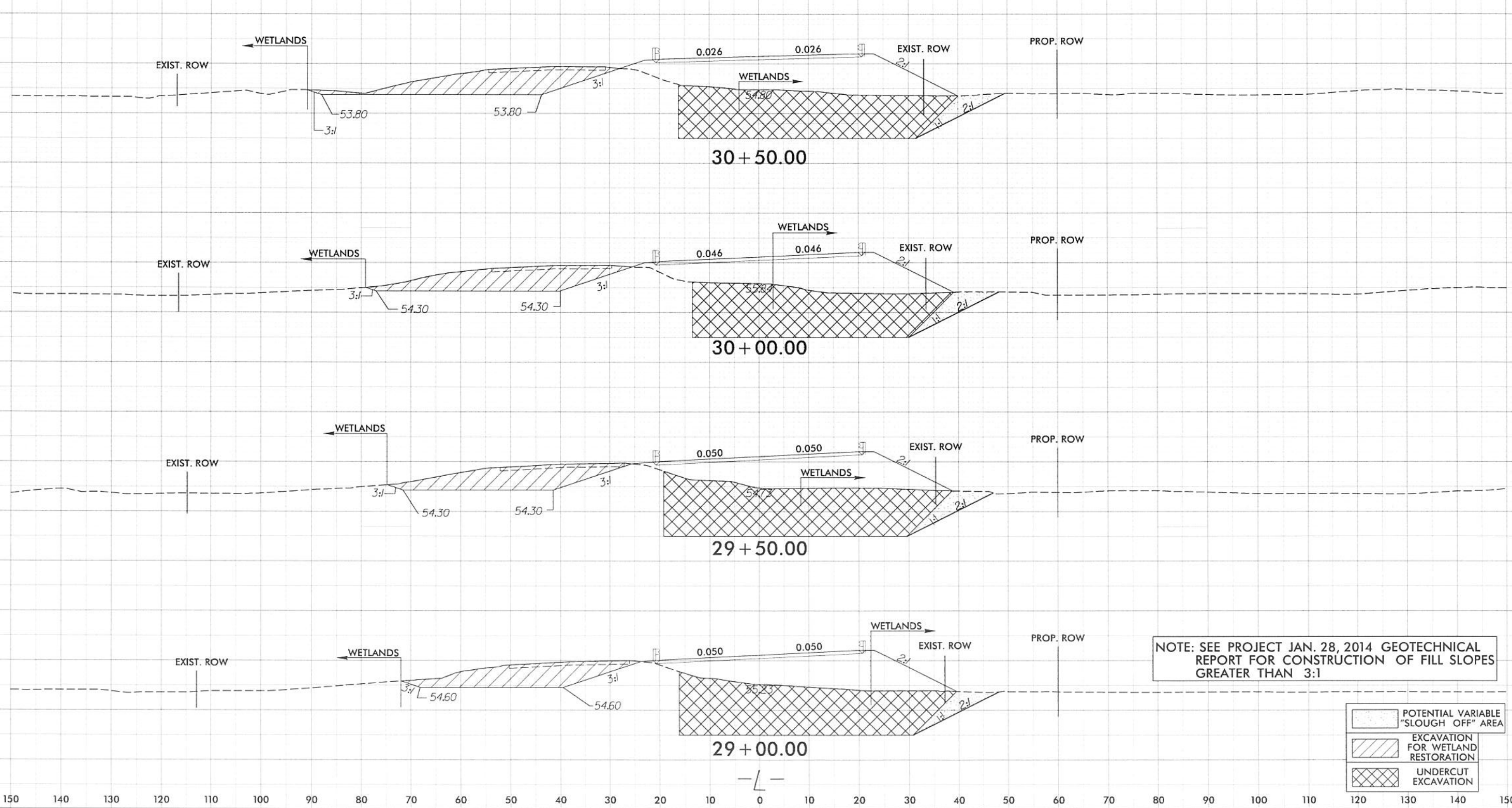


NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

POTENTIAL VARIABLE "SLOUGH OFF" AREA
EXCAVATION FOR WETLAND RESTORATION
UNDERCUT EXCAVATION

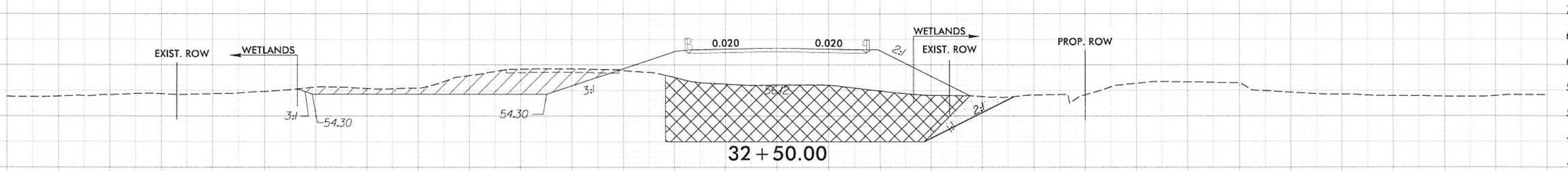
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-5

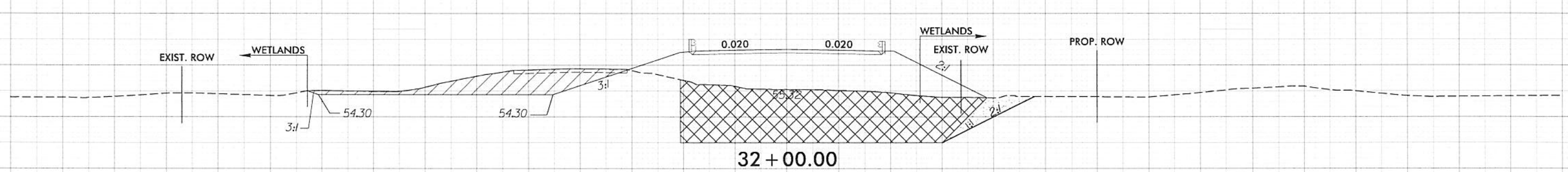
WETLAND RESTORATION DRAWING
SHEET 9 OF 14

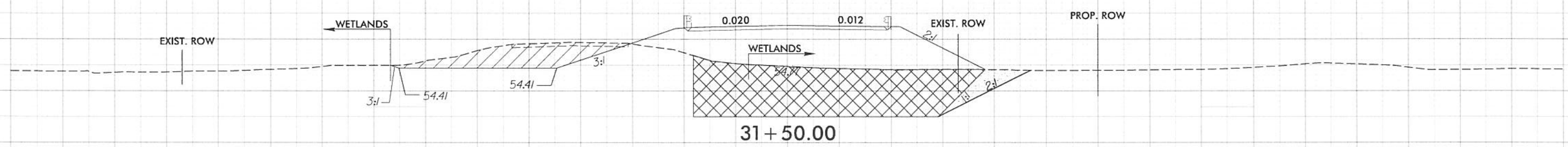


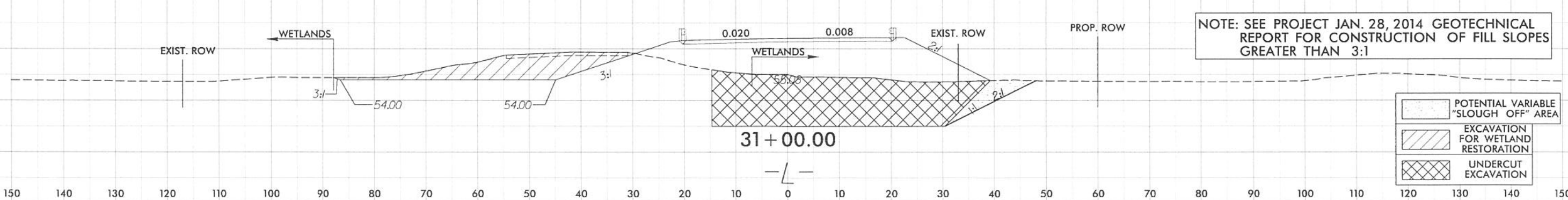
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-6

WETLAND RESTORATION DRAWING
SHEET 10 OF 14







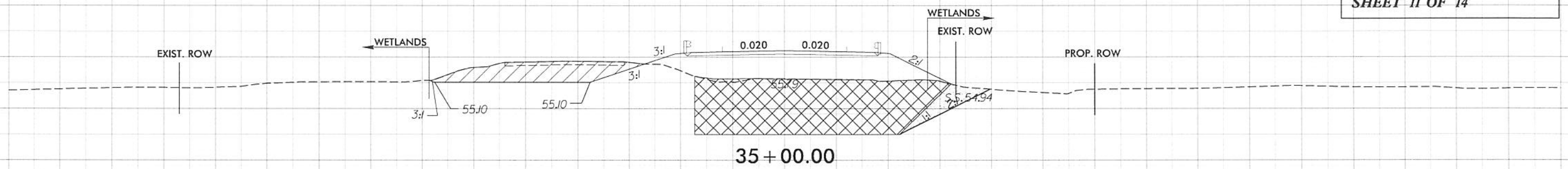


NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

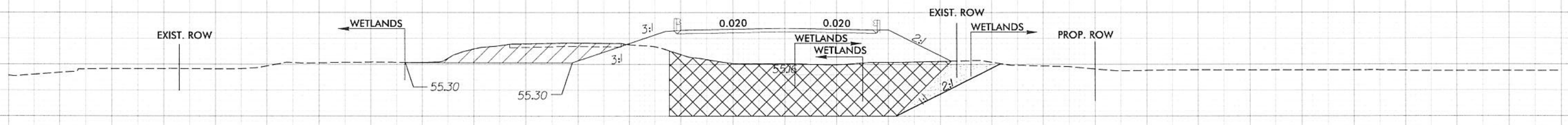
POTENTIAL VARIABLE "SLOUGH OFF" AREA
EXCAVATION FOR WETLAND RESTORATION
UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-7

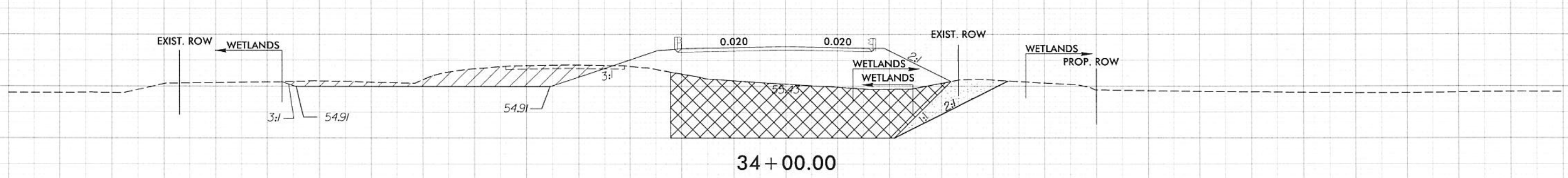
WETLAND RESTORATION DRAWING
SHEET 11 OF 14



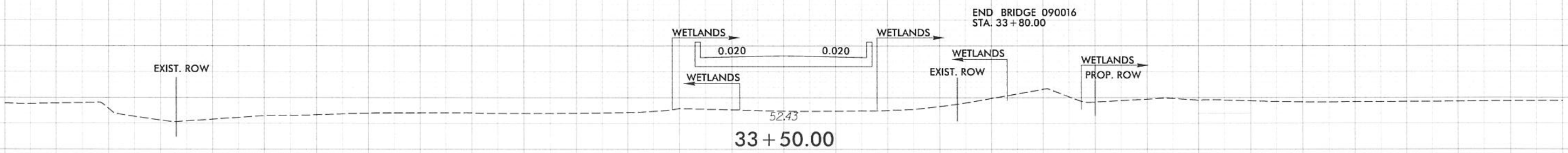
35+00.00



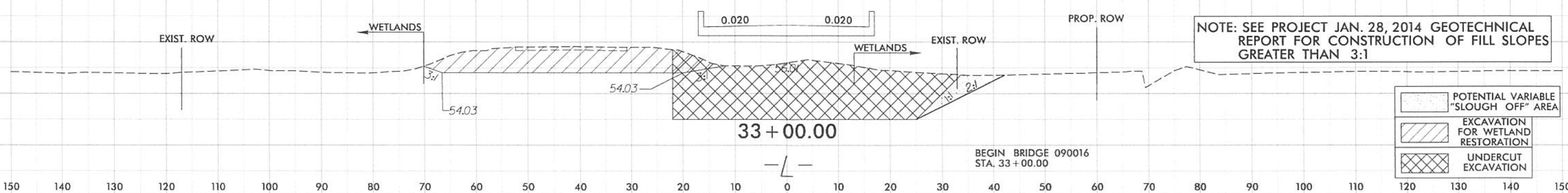
34+50.00



34+00.00



33+50.00



33+00.00

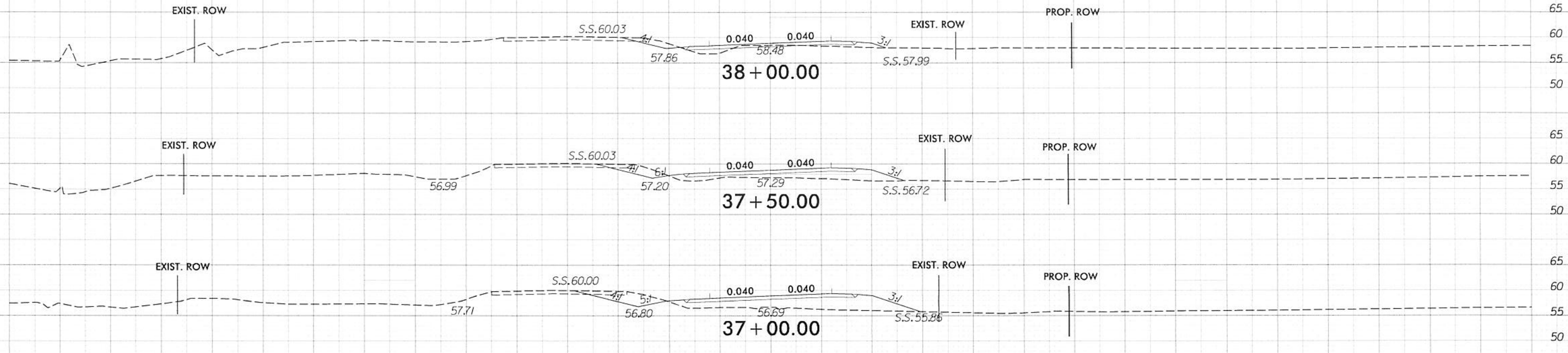
BEGIN BRIDGE 090016
STA. 33+00.00

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

- POTENTIAL VARIABLE "SLOUGH OFF" AREA
- EXCAVATION FOR WETLAND RESTORATION
- UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-8

WETLAND RESTORATION DRAWING
SHEET 12 OF 14

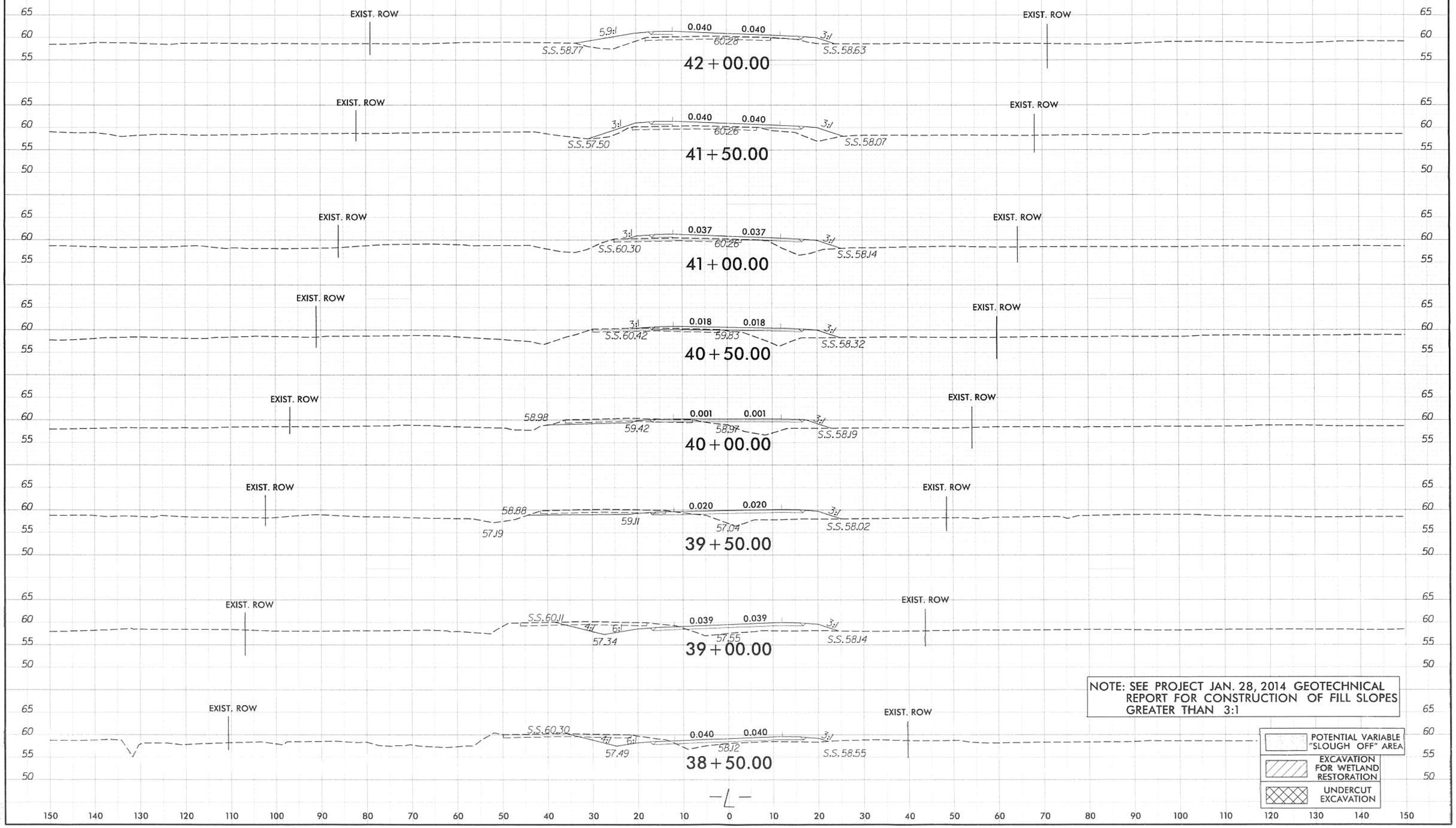


NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

- POTENTIAL VARIABLE "SLOUGH OFF" AREA
- EXCAVATION FOR WETLAND RESTORATION
- UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-9

WETLAND RESTORATION DRAWING
SHEET 13 OF 14

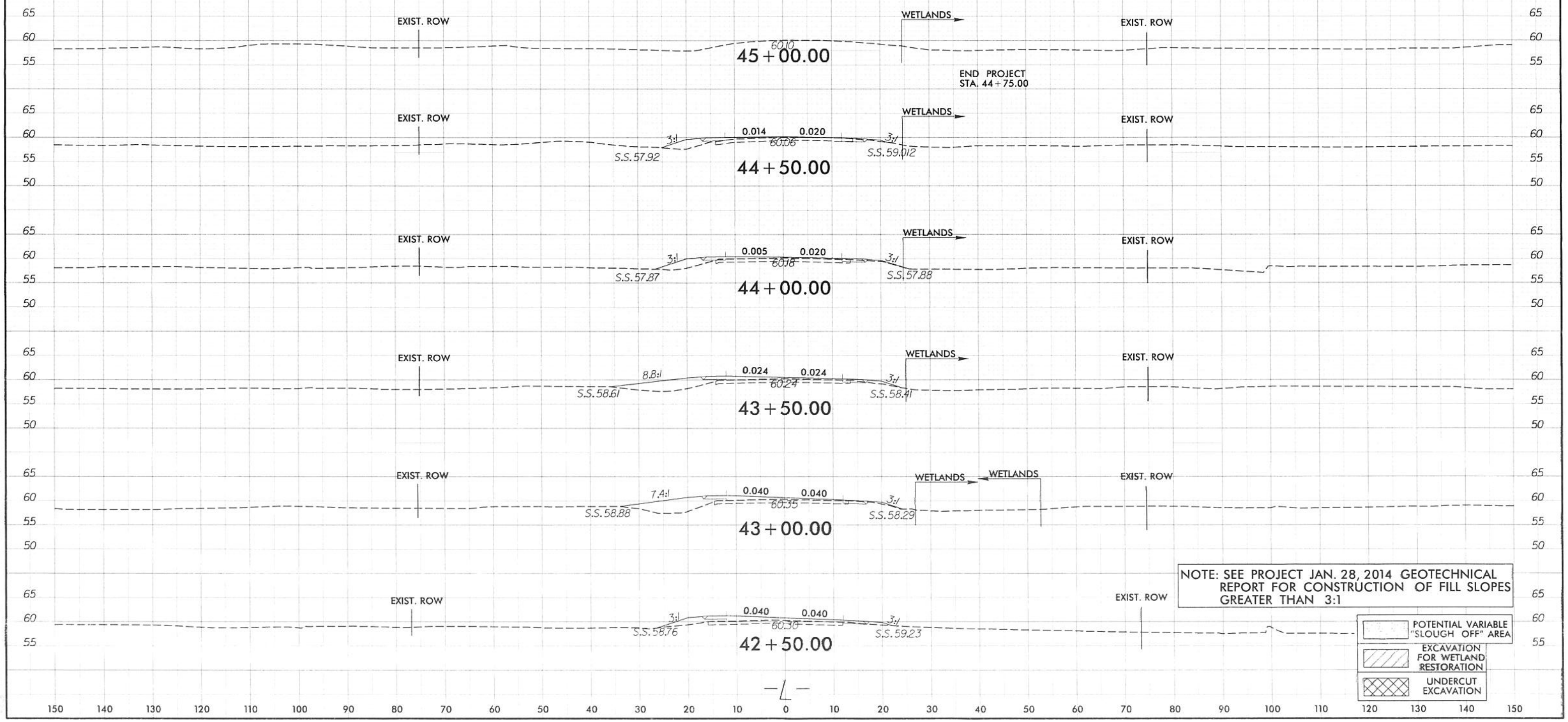


NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

- POTENTIAL VARIABLE "SLOUGH OFF" AREA
- EXCAVATION FOR WETLAND RESTORATION
- UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-10

WETLAND RESTORATION DRAWING
SHEET 5 OF 14



PROJECT REFERENCE NO.	SHEET NO.
SF-0900168,20	RF-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

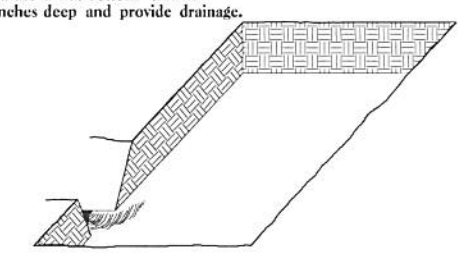
WETLAND RESTORATION DRAWING
SHEET 4 OF 14

PLANTING DETAILS

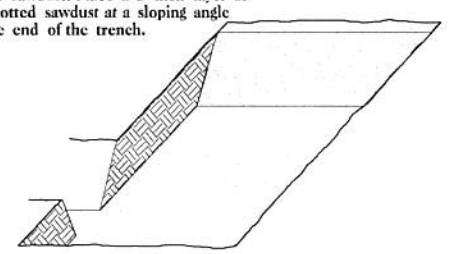
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

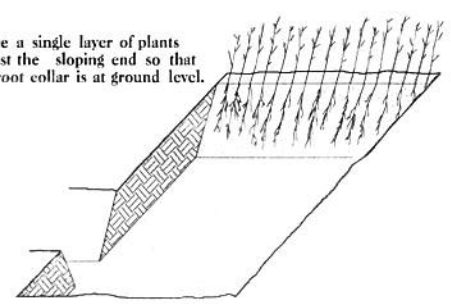
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



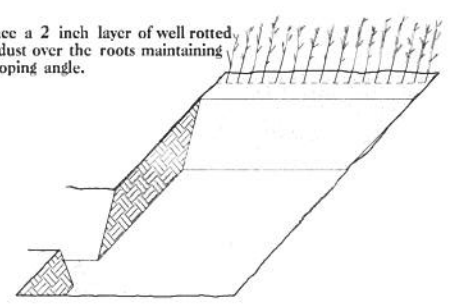
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



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

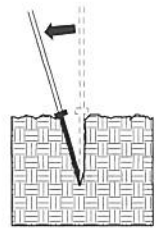


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

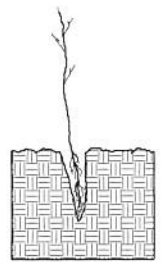


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

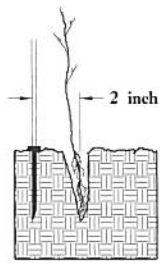
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.

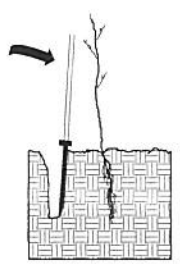


2. Remove planting bar and place seedling at correct depth.

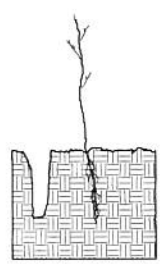


3. Insert planting bar 2 inches toward planter from seedling.

4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction 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

FORESTED WETLAND RESTORATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 12,724 STEMS PER ACRE.

WETLAND REFORESTATION

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

FORESTED WETLAND - COASTAL PLAIN SMALL STREAM SWAMP (BLACKWATER SUBTYPE)

40% TAXODIUM DISTICHUM	BALD CYPRESS	12 in - 18 in BR
40% NYSSA BIFLORA	BLACKGUM	12 in - 18 in BR
10% MAGNOLIA VIRGINIANA	SWEETBAY	10 in - 20 in BR
10% CYRILLA RACEMIFLORA	TITI	10 in - 20 in BR

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

WETLAND REFORESTATION DETAIL SHEET

BRIDGES 090016 & 090020

CONTRACT: C202942

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

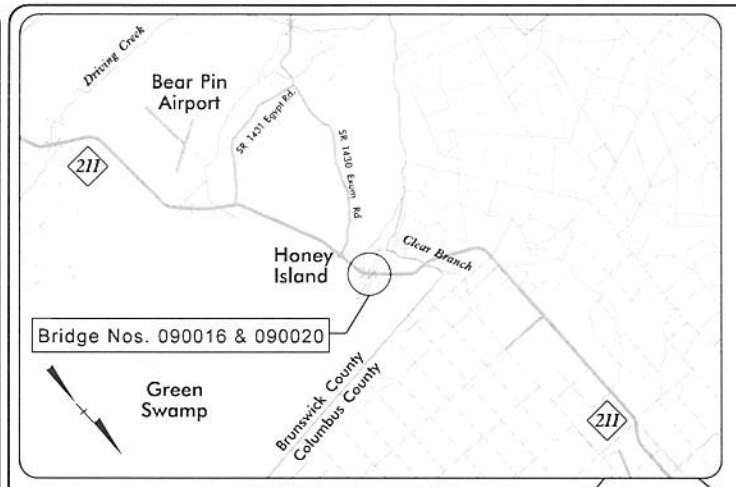
BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.3.R.26	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
17BP.3.R.26		PE, ROW, UTIL. & CONST.	

LOCATION: BRIDGE NOS. 090016 & 090020 OVER HONEY ISLAND SWAMP ON NC 211

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES AND RESURFACING

WETLAND AND SURFACE WATER IMPACTS PERMIT



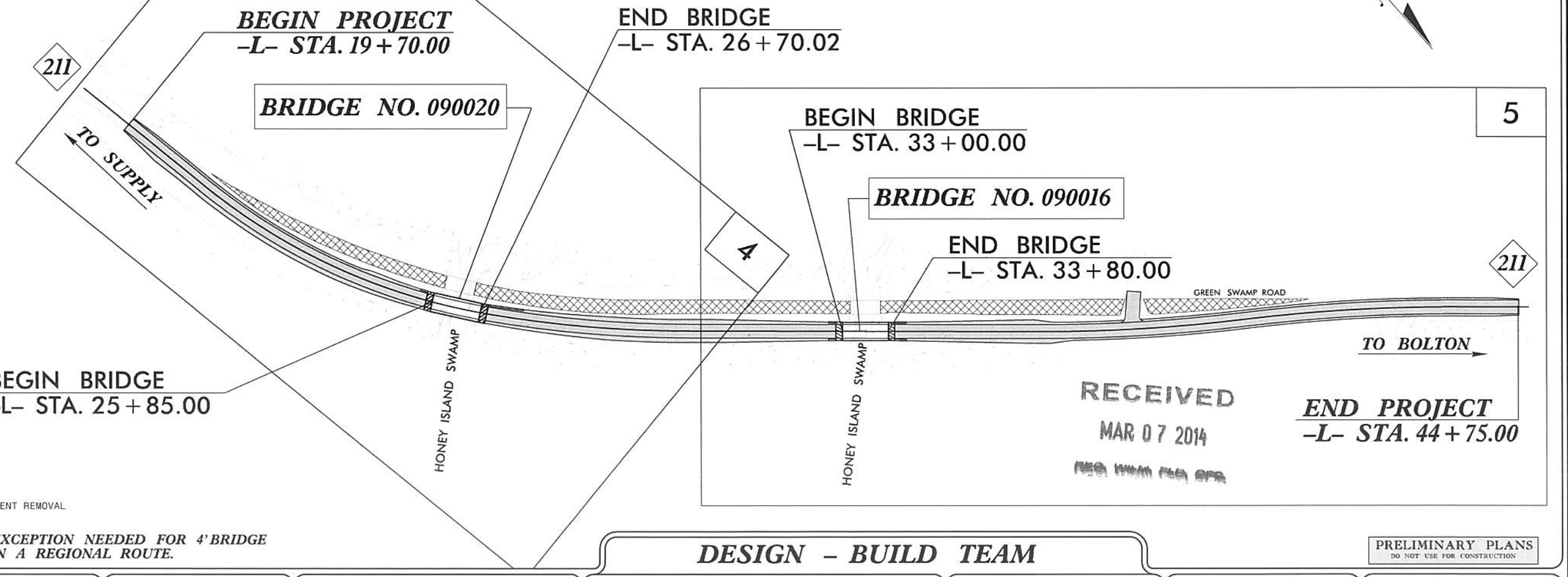
VICINITY MAP

NOTES:

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

NAD 83/ NSRS 2007

PERMIT DRAWING SHEET 1 OF 17



5

RECEIVED
MAR 07 2014

* *DESIGN EXCEPTION NEEDED FOR 4' BRIDGE OFFSET ON A REGIONAL ROUTE.*

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 0 50 100

PROFILE (HORIZONTAL): 50 0 50 100

PROFILE (VERTICAL): 10 0 10 20

DESIGN DATA

ADT = 4,400
ADT =
DHV = N/A
D = N/A
T = 7 % *
V = 55 MPH
* TTST = 3% DUAL 4%
FUNC CLASS = COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT 090016&090020..... 0.443 mi
LENGTH STRUCTURE TIP PROJECT 090016&090020..... 0.031 mi
TOTAL LENGTH TIP PROJECT 090016&090020..... 0.474 mi

DESIGN - BUILD TEAM

RKK

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560

FOR
DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 29, 2012

LETTING DATE: MARCH 29, 2012

B. Keith Skinner, P.E.
PROJECT ENGINEER

Michael T. Merritt, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
Virginia Mabry
PRIORITY PROJECTS OFFICE MANAGER

CONTRACTOR :

S. T. Wooten Corporation

S.T.WOOTEN CORPORATION
P.O.BOX 2408
3801 BLACK CREEK ROAD
WILSON, NORTH CAROLINA 27894

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

PROJECT REFERENCE NO.	SHEET NO.
090016 & 090020	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 2 OF 17

NAD 83 (CORS96)

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC DENOTES HAND CLEARING

MECHANIZED CLEARING

HAND CLEARING

FILL IN WETLANDS

DIRECTIONALLY BORED UTILITIES

-L- PCC Sta. 26+84.30

-L- PT Sta. 30+33.28

MATCHLINE -L- STA. 31+00 SEE SHEET 5

STATE OF NORTH CAROLINA
DB 2721 PG 1074

BEGIN PROJECT
-L- STA.19+70.00

COLLAR AND EXTEND EXIST. 48" CSP. SLF

N 82°33'11.4" W

GRAU-350

1 TON CL B RIPRAP W/5 SY GEO FAB

TYPE III 15" RCP

TYPE III

TB 2CI

26.00' TYP.

25.00' TYP.

FILL IN WETLANDS

-L- PC Sta. 21+38.42

TEMPORARY SHORING

16-1
RED MOUNTAIN TIMBERCO I LLC
DB 2535 PG 722

SCALE
1"=50'

MECHANIZED CLEARING

FILL IN WETLANDS

HAND CLEARING

PROP. POWER POLE

BEGIN GRADE
-L- STA 19+70.00
EL = 60.46'

PI = 21+50.00
EL = 61.10'
VC = 170'
K = 200
V = 70mph

(+)0.3606%

(+)1.2088%

EXIST. EL.=84.18' - RT.

EXIST. POWER POLE

BEGIN BRIDGE #090020
-L- STA.25+85.00

HP Sta.= 25+25.78

100-YR 57.4'

NWS 52.8'

15' MIN.

PI = 25+55.00
EL = 66.00'
VC = 340'
K = 116
V = 55mph

END BRIDGE #090020
-L- STA.26+70.02

(-)1.7105%

PI = 29+25.00
EL = 59.67'
VC = 360'
K = 117
V = 55mph

(+)1.3603%

MATCHLINE -L- STA. 31+00 SEE SHEET 5

MILLING LIMITS:
STA.19+70.00 TO 20+25.00
STA.43+00.00 TO 44+75.00

DIRECTIONALLY BORED UTILITIES

BRIDGE HYDRAULIC DATA
STR #090020 Sta.26+27.50 -L-

DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1,700	CFS
DESIGN HW ELEVATION	= 56.5	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 57.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4,300	CFS
OVERTOPPING ELEVATION	= 59.0	FT

NORMAL WATER SURFACE ELEV = 52.8 FT
NWS SURVEY = 5/7/12

80 70 60 50 40 30

18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00

PLANS PREPARED BY :
RK&K
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900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
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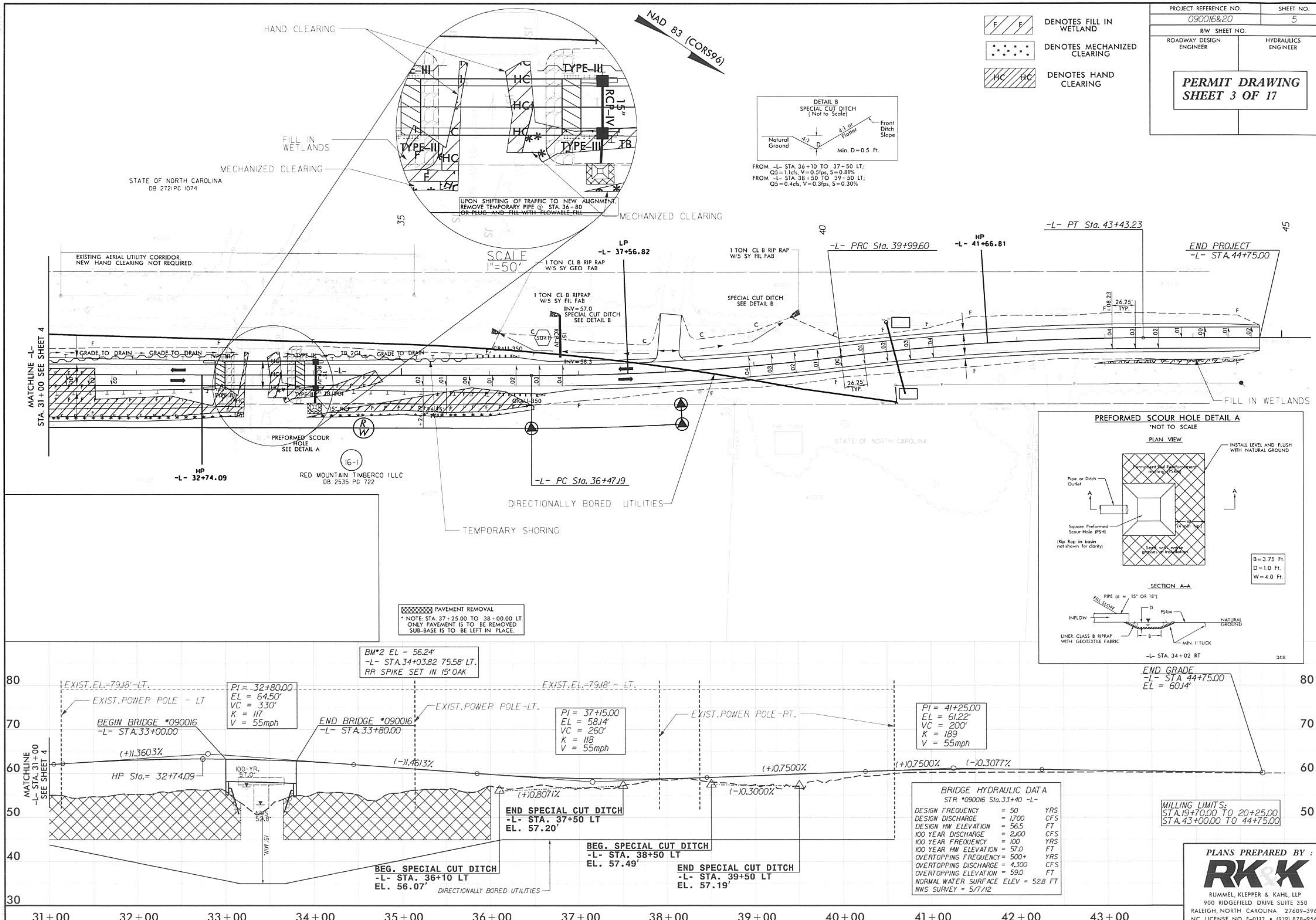
PROJECT REFERENCE NO. 090016&20
SHEET NO. 5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PERMIT DRAWING
SHEET 3 OF 17
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
NAD 83 (CORS96)
HAND CLEARING
FILL IN WETLANDS
MECHANIZED CLEARING
STATE OF NORTH CAROLINA
DB 2721 PG 1074
UPON SHIFTING OF TRAFFIC TO NEW ALIGNMENT, REMOVE TEMPORARY PIPE @ STA. 36+80 OR PLUG AND FILL WITH FLOWABLE FILL
DETAIL B
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
4:1 or Flatter
Min. D=0.5 Ft.
FROM -L- STA. 36+10 TO 37+50 LT; Q5=1.1cfs, V=0.5fps, S=0.81%
FROM -L- STA. 38+50 TO 39+50 LT; Q5=0.4cfs, V=0.3fps, S=0.30%
EXISTING AERIAL UTILITY CORRIDOR.
NEW HAND CLEARING NOT REQUIRED.
SCALE
1"=50'
1 TON CL B RIP RAP W/5 SY GEO FAB
1 TON CL B RIPRAP W/5 SY FIL FAB
INV=57.0
SPECIAL CUT DITCH SEE DETAIL B
LP -L- 37+56.82
1 TON CL B RIP RAP W/5 SY FIL FAB
SPECIAL CUT DITCH SEE DETAIL B
-L- PRC Sta. 39+99.60
HP -L- 41+66.81
-L- PT Sta. 43+43.23
END PROJECT
-L- STA. 44+75.00
MATCHLINE -L- STA. 31+00 SEE SHEET 4
GRADE TO DRAIN
HP -L- 32+74.09
PREFORMED SCOUR HOLE SEE DETAIL A
RED MOUNTAIN TIMBERCO I LLC
DB 2535 PG 722
-L- PC Sta. 36+47.19
DIRECTIONALLY BORED UTILITIES
TEMPORARY SHORING
FILL IN WETLANDS
STATE OF NORTH CAROLINA
PREFORMED SCOUR HOLE DETAIL A
*NOT TO SCALE
PLAN VIEW
INSTALL LEVEL AND FLUSH WITH NATURAL GROUND
Pipe or Ditch Outlet
Square Preformed Scour Hole (PSH)
(Rip Rap in basin not shown for clarity)
B=3.75 Ft.
D=1.0 Ft.
W=4.0 Ft.
SECTION A-A
PIPE (d = 15" OR 18")
FILL SLOPE
INFLOW
NATURAL GROUND
LINER: CLASS B RIPRAP WITH GEOTEXTILE FABRIC
MIN. 1' TUCK
-L- STA. 34+02 RT
PAVEMENT REMOVAL
* NOTE: STA. 37+25.00 TO 38+00.00 LT. ONLY PAVEMENT IS TO BE REMOVED SUB-BASE IS TO BE LEFT IN PLACE.
BM*2 EL = 56.24'
-L- STA.34+03.82 75.58' LT.
RR SPIKE SET IN 15" OAK
EXIST.EL.=79.18'-LT.
EXIST.POWER POLE - LT
PI = 32+80.00
EL = 64.50'
VC = 330'
K = 117
V = 55mph
BEGIN BRIDGE *090016
-L- STA.33+00.00
END BRIDGE *090016
-L- STA.33+80.00
EXIST.POWER POLE-LT.
(+)1.3603%
HP Sta.= 32+74.09
100-YR. 57.0'
NWS 52.8'
15' MIN.
(-)1.4613%
PI = 37+15.00
EL = 58.14'
VC = 260'
K = 118
V = 55mph
EXIST.POWER POLE-RT.
(+)0.8071%
END SPECIAL CUT DITCH
-L- STA. 37+50 LT
EL. 57.20'
BEG. SPECIAL CUT DITCH
-L- STA. 36+10 LT
EL. 56.07'
DIRECTIONALLY BORED UTILITIES
BEG. SPECIAL CUT DITCH
-L- STA. 38+50 LT
EL. 57.49'
END SPECIAL CUT DITCH
-L- STA. 39+50 LT
EL. 57.19'
(-)0.3000%
(+)0.7500%
PI = 41+25.00
EL = 61.22'
VC = 200'
K = 189
V = 55mph
(+)0.7500%
(-)0.3077%
BRIDGE HYDRAULIC DATA
STR *090016 Sta.33+40 -L-
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 1,700 CFS
DESIGN HW ELEVATION = 56.5 FT
100 YEAR DISCHARGE = 2,100 CFS
100 YEAR FREQUENCY = 100 YRS
100 YEAR HW ELEVATION = 57.0 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 4,300 CFS
OVERTOPPING ELEVATION = 59.0 FT
NORMAL WATER SURFACE ELEV = 52.8 FT
NWS SURVEY = 5/7/12
END GRADE
-L- STA 44+75.00
EL = 60.14'
MILLING LIMITS:
STA.19+70.00 TO 20+25.00
STA.43+00.00 TO 44+75.00
31+00
32+00
33+00
34+00
35+00
36+00
37+00
38+00
39+00
40+00
41+00
42+00
43+00
PLANS PREPARED BY :
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RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
090016 & 090020	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 4 OF 17

NAD 83 (CORS96)

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC DENOTES HAND CLEARING

MATCHLINE -L- STA 31+00 SEE SHEET 5

DIRECTIONALLY BORED UTILITIES

MECHANIZED CLEARING

HAND CLEARING

FILL IN WETLANDS

STATE OF NORTH CAROLINA
DB 2721PG 1074

-L- PCC Sta. 26+84.30

-L- PT Sta. 30+33.28

BEGIN PROJECT
-L- STA.19+70.00

COLLAR AND EXTEND EXIST. 48" CSP SLF

N 8°33'11.4" W

GRAU-350

1 TON CL B RIPRAP W/5 SY GEO FAB

TYPE III -15"

FILL IN WETLANDS

-L- PC Sta. 21+38.42

TEMPORARY SHORING

16-1
RED MOUNTAIN TIMBERCO I LLC
DB 2535 PG 722

SCALE
1"=50'

MECHANIZED CLEARING

FILL IN WETLANDS

HAND CLEARING

PROP. POWER POLE

BEGIN GRADE
-L- STA 19+70.00
EL = 60.46'

PI = 21+50.00
EL = 61.10'
VC = 170'
K = 200
V = 70mph

(+)0.3606%

(+)1.2088%

EXIST. EL.=84.18' - RT.

EXIST. POWER POLE-RT.

BEGIN BRIDGE #090020
-L- STA.25+85.00

HP Sta.= 25+25.78

PI = 25+55.00
EL = 66.00'
VC = 340'
K = 116
V = 55mph

END BRIDGE #090020
-L- STA.26+70.02

(-)1.7105%

(+)1.3603%

PI = 29+25.00
EL = 59.67'
VC = 360'
K = 117
V = 55mph

MATCHLINE
-L- STA. 31+00
SEE SHEET 5

BRIDGE HYDRAULIC DATA
STR #090020 Sta.26+27.50 -L-

DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1700	CFS
DESIGN HW ELEVATION	= 56.5	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 57.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4,300	CFS
OVERTOPPING ELEVATION	= 59.0	FT

NORMAL WATER SURFACE ELEV = 52.8 FT
NWS SURVEY = 5/7/12

MILLING LIMITS:
STA.19+70.00 TO 20+25.00
STA.43+00.00 TO 44+75.00

DIRECTIONALLY BORED UTILITIES

80 70 60 50 40 30

18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00

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900 RIDGEFIELD DRIVE SUITE 350
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PROJECT REFERENCE NO.	SHEET NO.
090016&20	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 5 OF 17

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC/HC DENOTES HAND CLEARING

NAD 83 (CORS96)

HAND CLEARING

FILL IN WETLANDS

MECHANIZED CLEARING

STATE OF NORTH CAROLINA
DB 2721PG 1074

SCALE 1"=50'

EXISTING AERIAL UTILITY CORRIDOR. NEW HAND CLEARING NOT REQUIRED.

MATCHLINE -L- STA. 31+00 SEE SHEET 4

HP -L- 32+74.09

RED MOUNTAIN TIMBERCO I LLC
DB 2535 PG 722

16-1

PREFORMED SCOUR HOLE SEE DETAIL A

LP -L- 37+56.82

1 TON CL B RIP RAP W/5 SY GEO FAB

1 TON CL B RIP RAP W/5 SY FIL FAB

SPECIAL CUT DITCH SEE DETAIL B

-L- PRC Sta. 39+99.60

HP -L- 41+66.81

-L- PT Sta. 43+43.23

END PROJECT -L- STA. 44+75.00

-L- PC Sta. 36+47.19

DIRECTIONALLY BORED UTILITIES

TEMPORARY SHORING

FILL IN WETLANDS

STATE OF NORTH CAROLINA

PAVEMENT REMOVAL

* NOTE: STA. 37+25.00 TO 38+00.00 LT. ONLY PAVEMENT IS TO BE REMOVED SUB-BASE IS TO BE LEFT IN PLACE.

PREFORMED SCOUR HOLE DETAIL A
*NOT TO SCALE

PLAN VIEW

Pipe or Ditch Outlet

Square Preformed Scour Hole (PSH)

(Rip Rap in basin not shown for clarity)

Permanent Steel Reinforcement Marking (PSRM)

INSTALL LEVEL AND FLUSH WITH NATURAL GROUND

Stake with notches at grades of installation

B=3.75 Ft.
D=1.0 Ft.
W=4.0 Ft.

SECTION A-A

PIPE (d = 15" OR 18")

FILL SLOPE

INFLOW

PSRM

NATURAL GROUND

LINER: CLASS B RIPRAP WITH GEOTEXTILE FABRIC

MIN. 1' TUCK

-L- STA. 34+02 RT

308

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground

4:1

D

4:1 or Flatter

Front Ditch Slope

Min. D=0.5 Ft.

FROM -L- STA. 36+10 TO 37+50 LT;
Q5=1.1cfs, V=0.5fps, S=0.81%
FROM -L- STA. 38+50 TO 39+50 LT;
Q5=0.4cfs, V=0.3fps, S=0.30%

PROP. PERM. POWER POLE - LT

BM#2 EL = 56.24'
-L- STA. 34+03.82 75.58' LT.
RR SPIKE SET IN 15" OAK

PROP. PERM. POWER POLE - LT

PROP. TEMP. POWER POLE-LT

EXIST. EL.=79.18' - LT.

EXIST. POWER POLE - LT

PI = 32+80.00
EL = 64.50'
VC = 330'
K = 117
V = 55mph

BEGIN BRIDGE #090016
-L- STA. 33+00.00

END BRIDGE #090016
-L- STA. 33+80.00

EXIST. POWER POLE-LT.

PI = 37+15.00
EL = 58.14'
VC = 260'
K = 118
V = 55mph

EXIST. POWER POLE-RT.

PI = 41+25.00
EL = 61.22'
VC = 200'
K = 189
V = 55mph

END GRADE
-L- STA. 44+75.00
EL = 60.14'

(+)11.3603%

(-)11.4613%

(+)10.7500%

(+)10.7500%

(-)10.3077%

(+)10.8071%

(-)10.3000%

HP Sta.= 32+74.09

100-YR. 57.19'

5YR 52.8'

15' MIN.

END SPECIAL CUT DITCH
-L- STA. 37+50 LT
EL. 57.20'

BEG. SPECIAL CUT DITCH
-L- STA. 38+50 LT
EL. 57.49'

END SPECIAL CUT DITCH
-L- STA. 39+50 LT
EL. 57.19'

BEG. SPECIAL CUT DITCH
-L- STA. 36+10 LT
EL. 56.07'

DIRECTIONALLY BORED UTILITIES

MATCHLINE -L- STA. 31+00 SEE SHEET 4

80 70 60 50 40 30

31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00

BRIDGE HYDRAULIC DATA
STR #090016 Sta. 33+40 -L-

DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1,700	CFS
DESIGN HW ELEVATION	= 56.5	FT
100 YEAR DISCHARGE	= 2,100	CFS
100 YEAR FREQUENCY	= 100	YRS
100 YEAR HW ELEVATION	= 57.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4,300	CFS
OVERTOPPING ELEVATION	= 59.0	FT
NORMAL WATER SURFACE ELEV	= 52.8	FT
NWS SURVEY = 5/7/12		

MILLING LIMITS:
STA. 19+70.00 TO 20+25.00
STA. 43+00.00 TO 44+75.00

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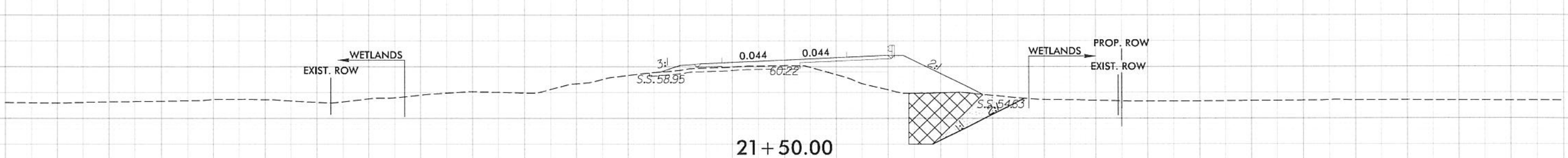
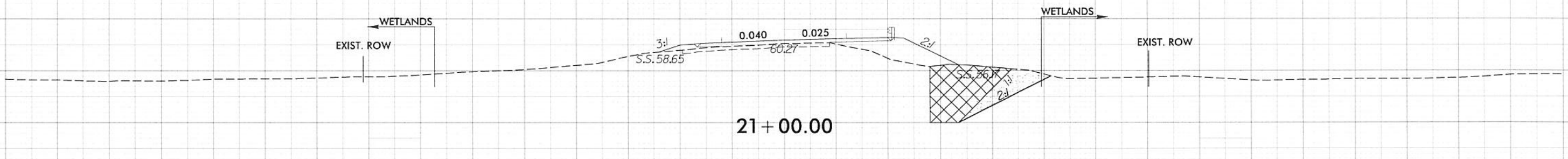
5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-1

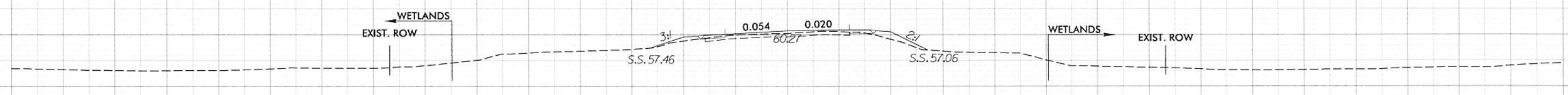
PERMIT DRAWING
SHEET 6 OF 17



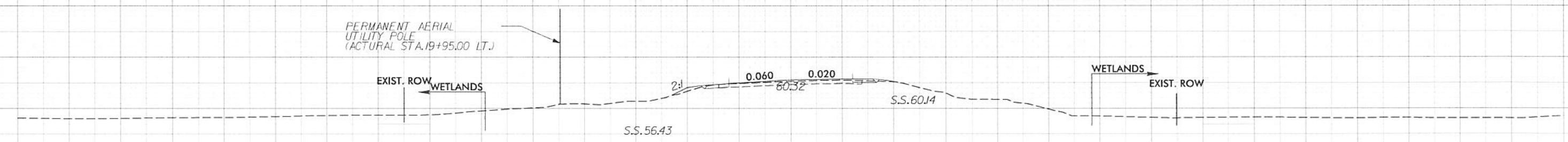
21+50.00



21+00.00



20+50.00

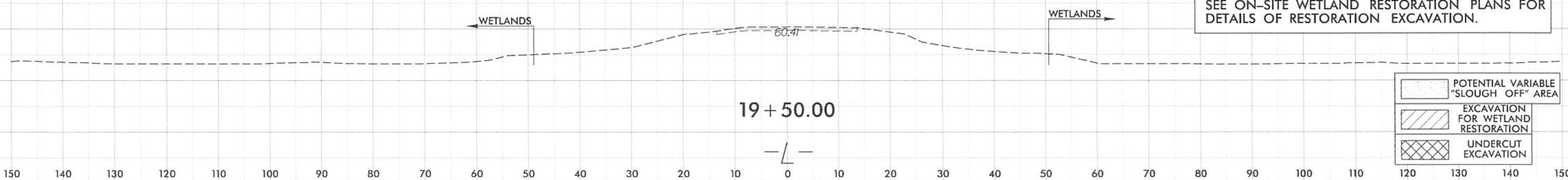


20+00.00

BEGIN PROJECT
STA. 19+70.00

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.



19+50.00

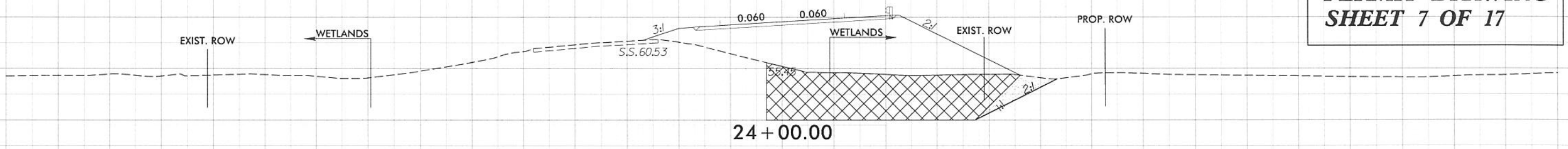
POTENTIAL VARIABLE "SLOUGH OFF" AREA

EXCAVATION FOR WETLAND RESTORATION

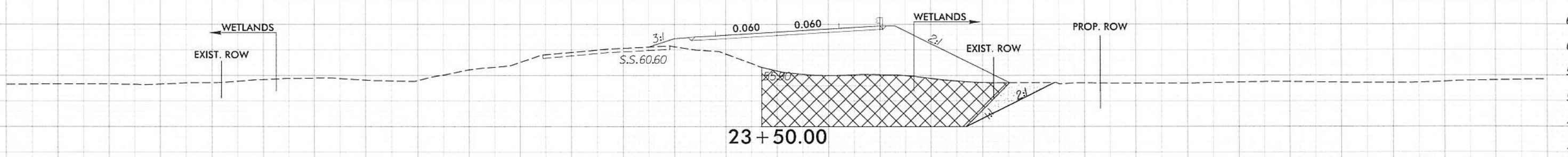
UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-2

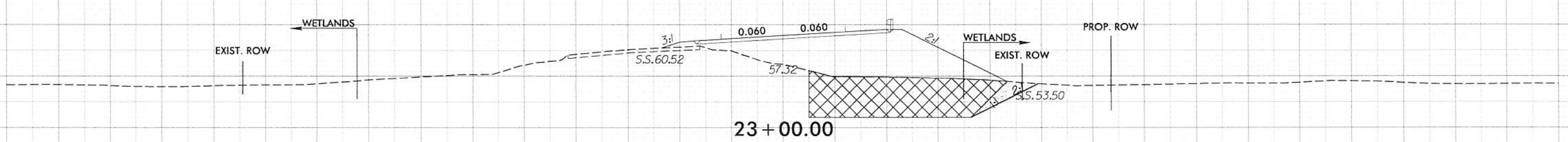
PERMIT DRAWING
SHEET 7 OF 17



24+00.00



23+50.00



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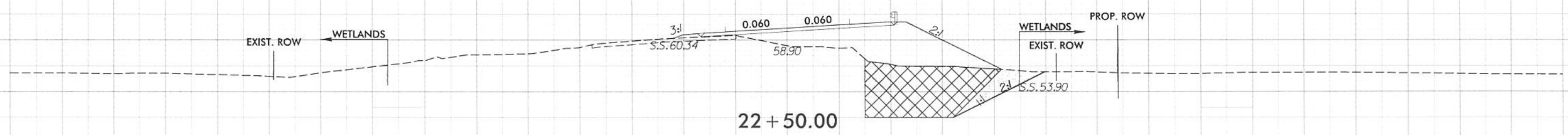
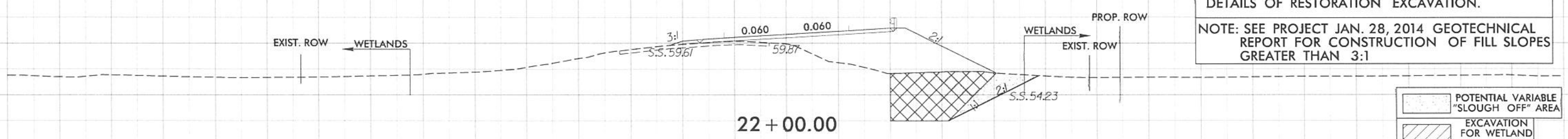


22+50.00



22+00.00

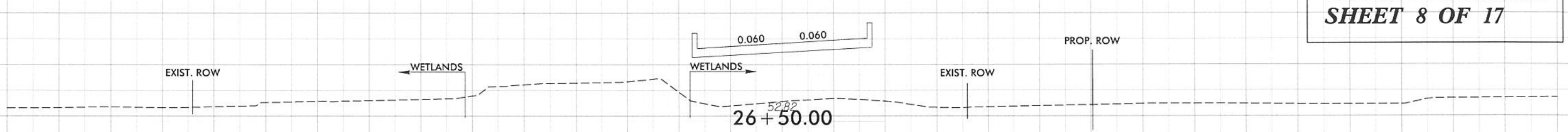
SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

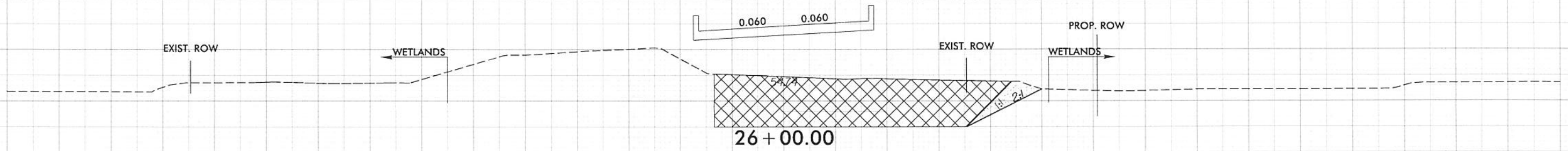
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-3

PERMIT DRAWING
SHEET 8 OF 17

END BRIDGE 090020
STA. 26+70.02

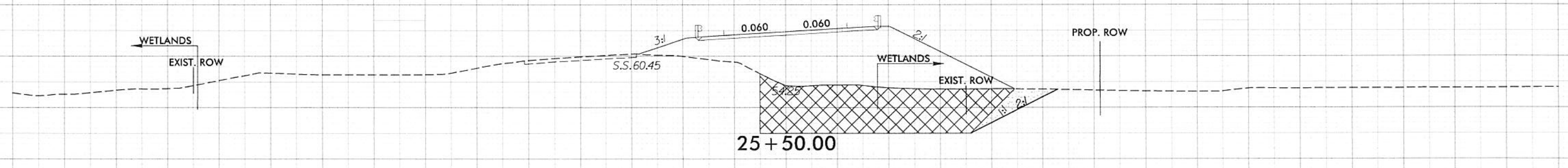


26+50.00

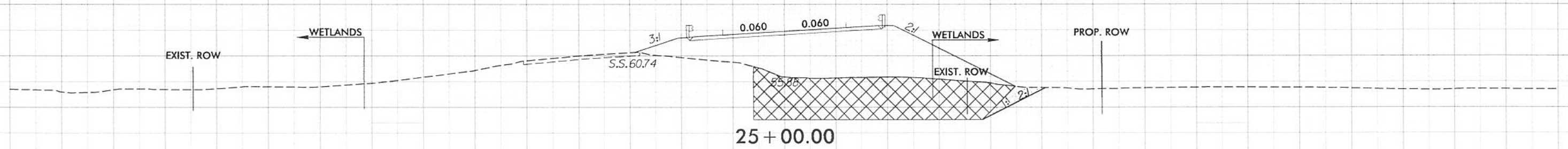


26+00.00

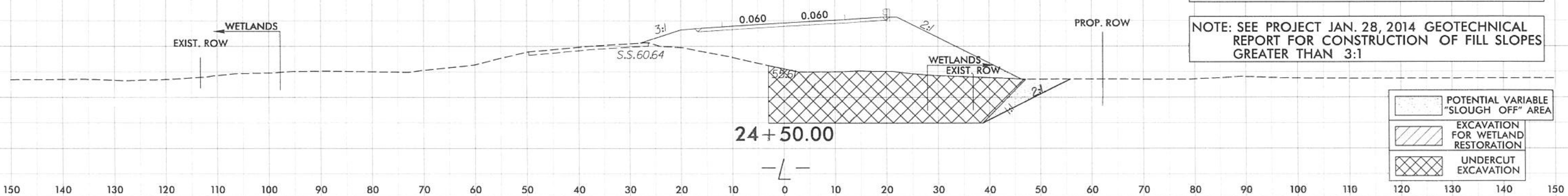
BEGIN BRIDGE 090020
STA. 25+85.00



25+50.00



25+00.00



24+50.00

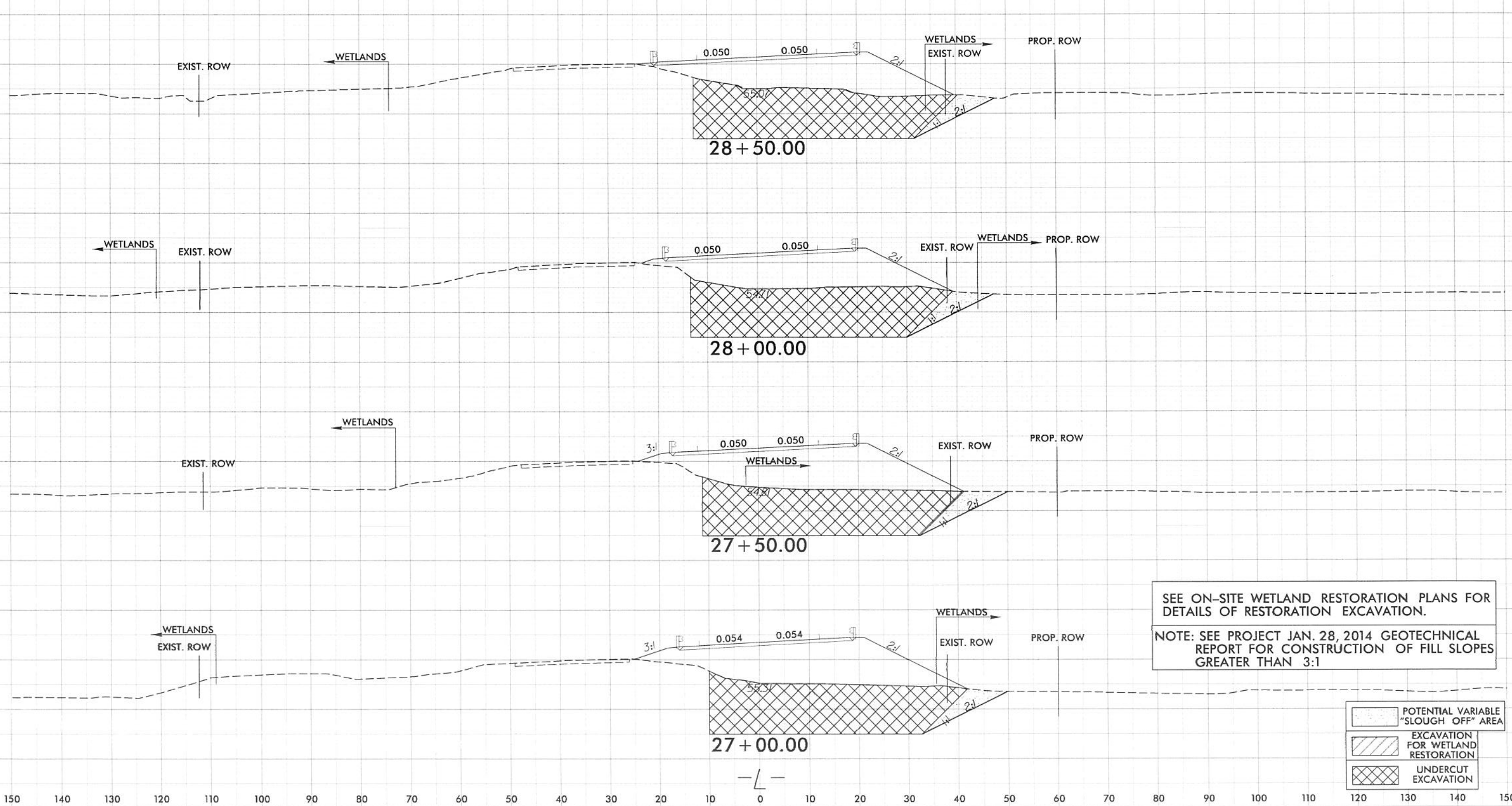
SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

POTENTIAL VARIABLE "SLOUGH OFF" AREA
EXCAVATION FOR WETLAND RESTORATION
UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-4

PERMIT DRAWING
SHEET 9 OF 17



SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

POTENTIAL VARIABLE "SLOUGH OFF" AREA

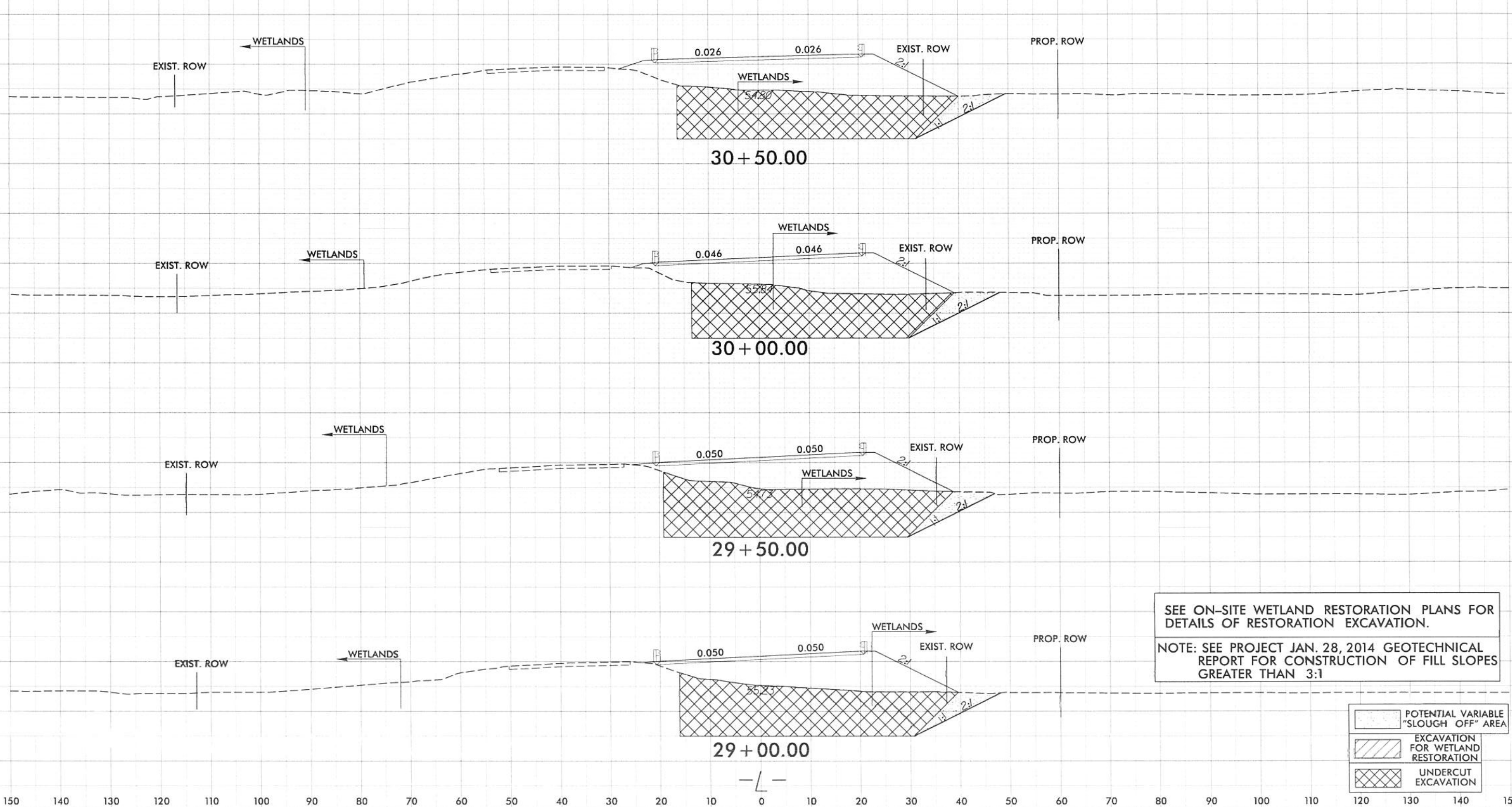
EXCAVATION FOR WETLAND RESTORATION

UNDERCUT EXCAVATION

—L—

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-5

PERMIT DRAWING
SHEET 10 OF 17



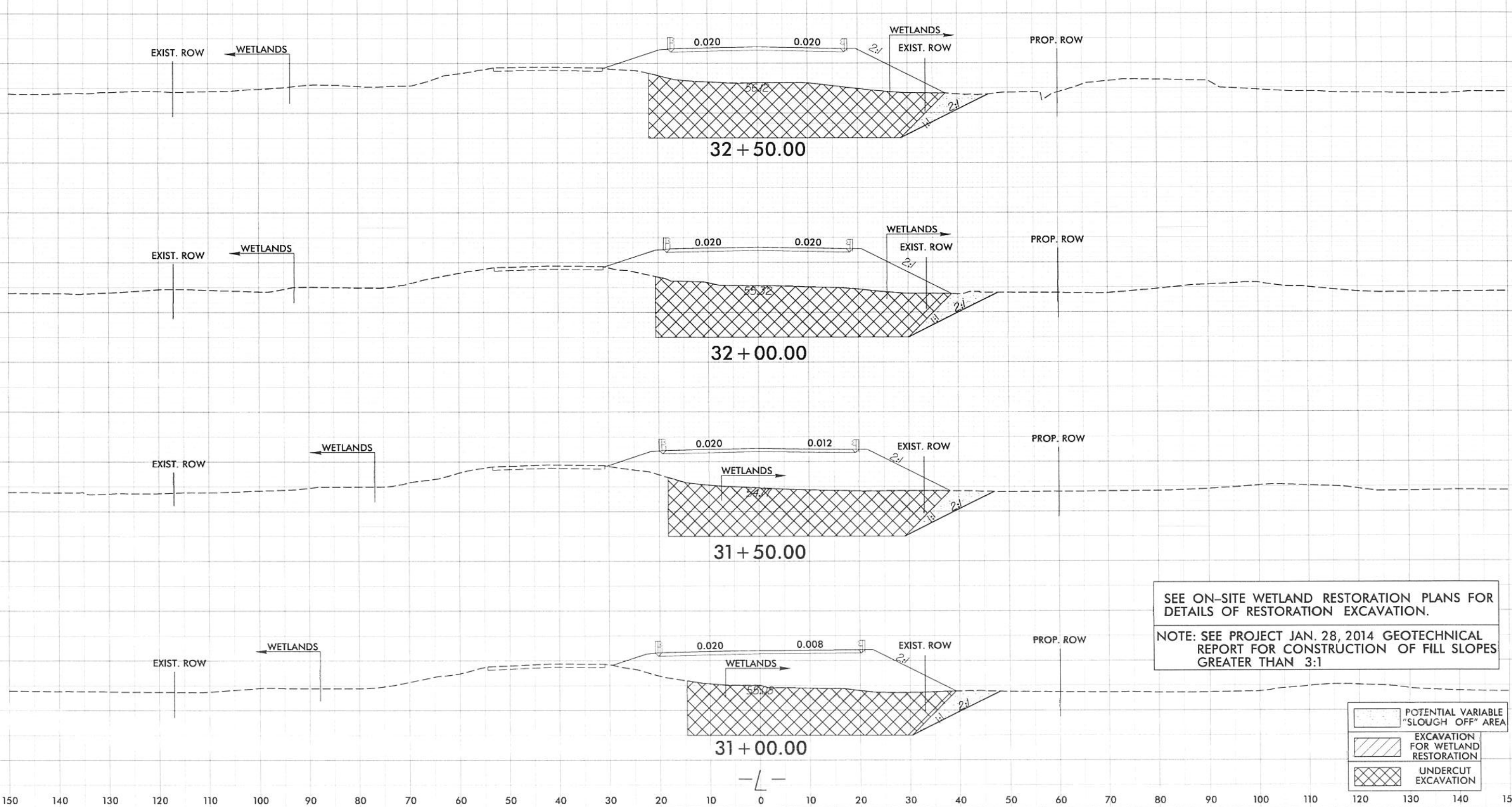
SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

- POTENTIAL VARIABLE "SLOUGH OFF" AREA
- EXCAVATION FOR WETLAND RESTORATION
- UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-6

PERMIT DRAWING
SHEET 11 OF 17



SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

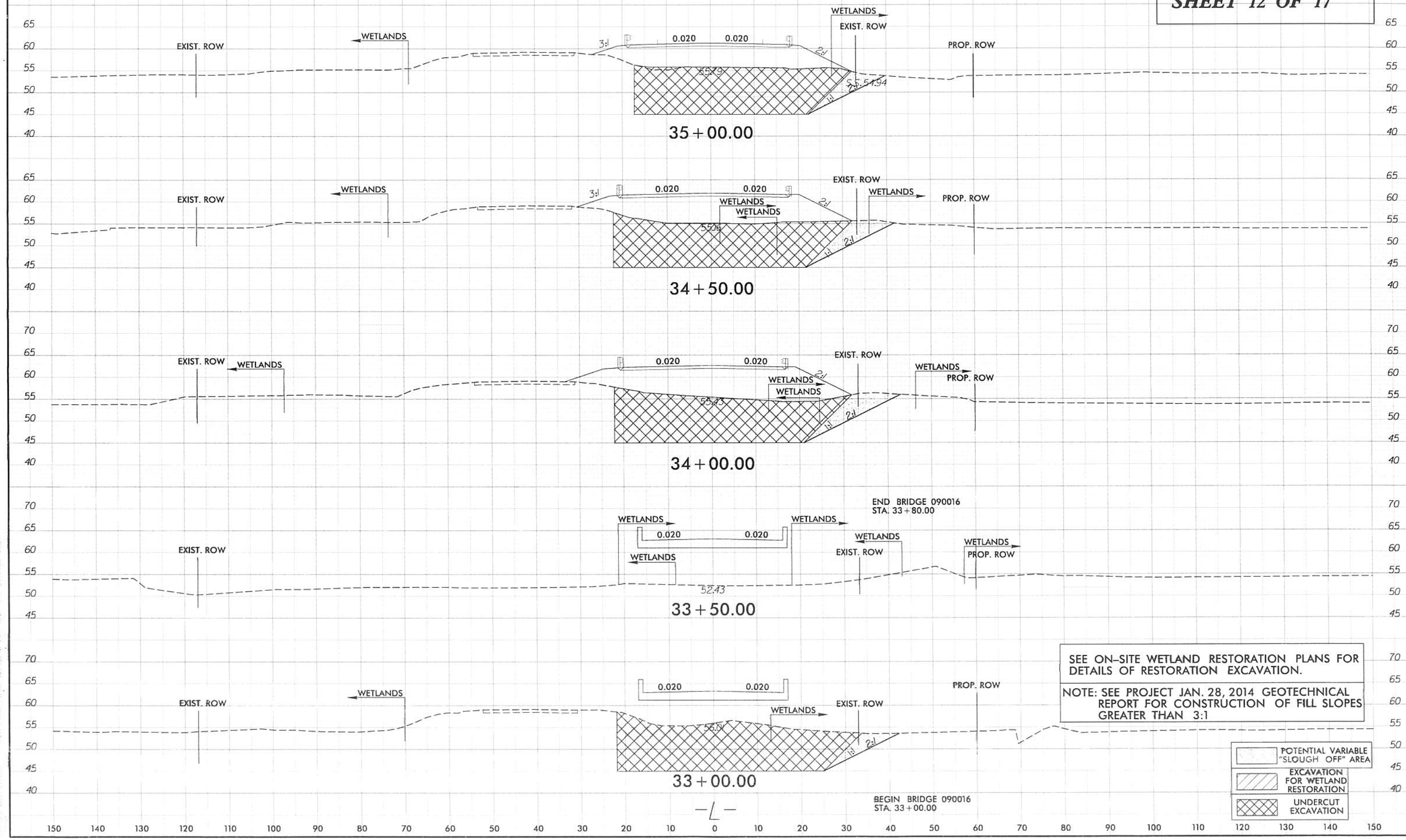
POTENTIAL VARIABLE "SLOUGH OFF" AREA

EXCAVATION FOR WETLAND RESTORATION

UNDERCUT EXCAVATION

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-7

PERMIT DRAWING
SHEET 12 OF 17



SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

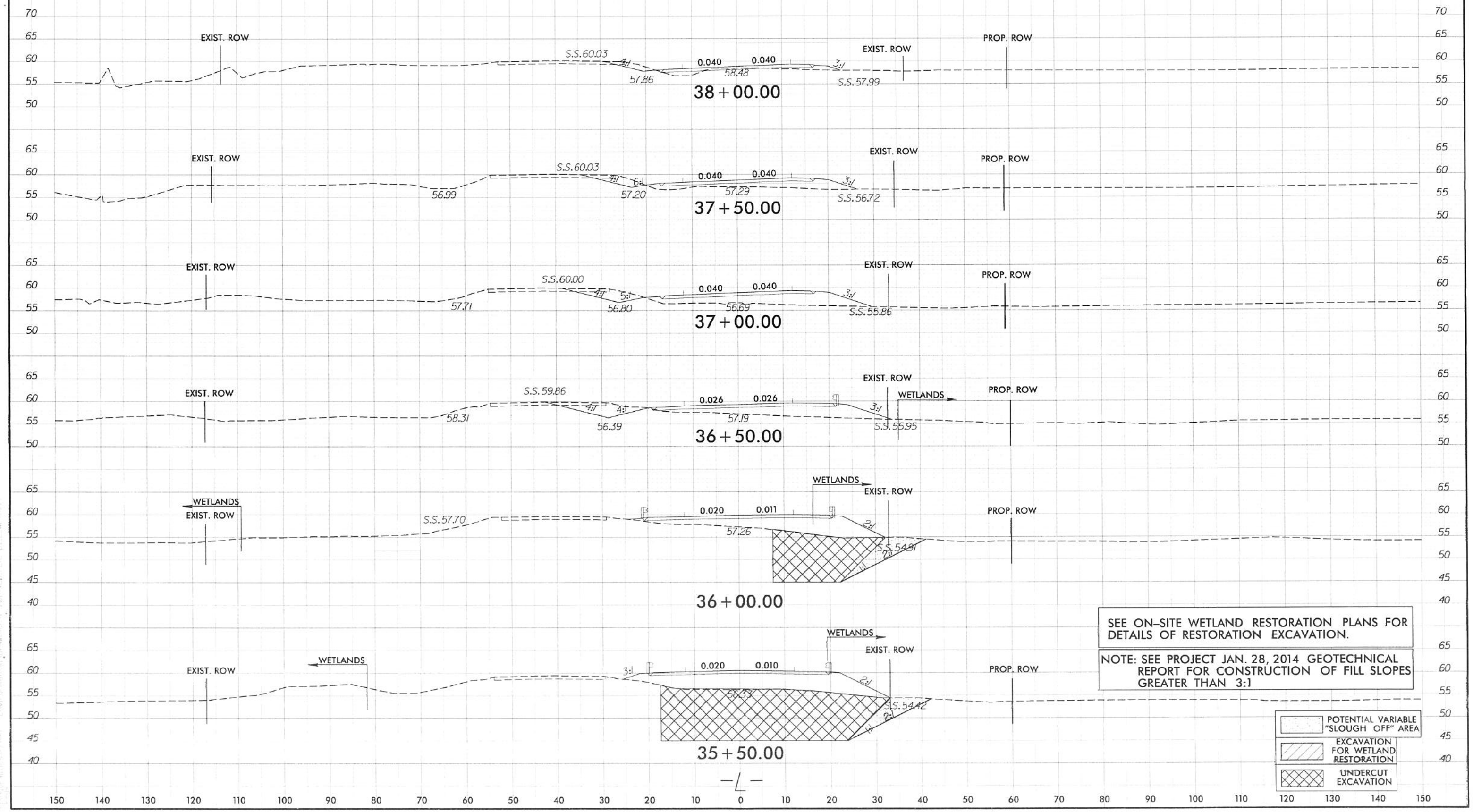
POTENTIAL VARIABLE "SLOUGH OFF" AREA

EXCAVATION FOR WETLAND RESTORATION

UNDERCUT EXCAVATION

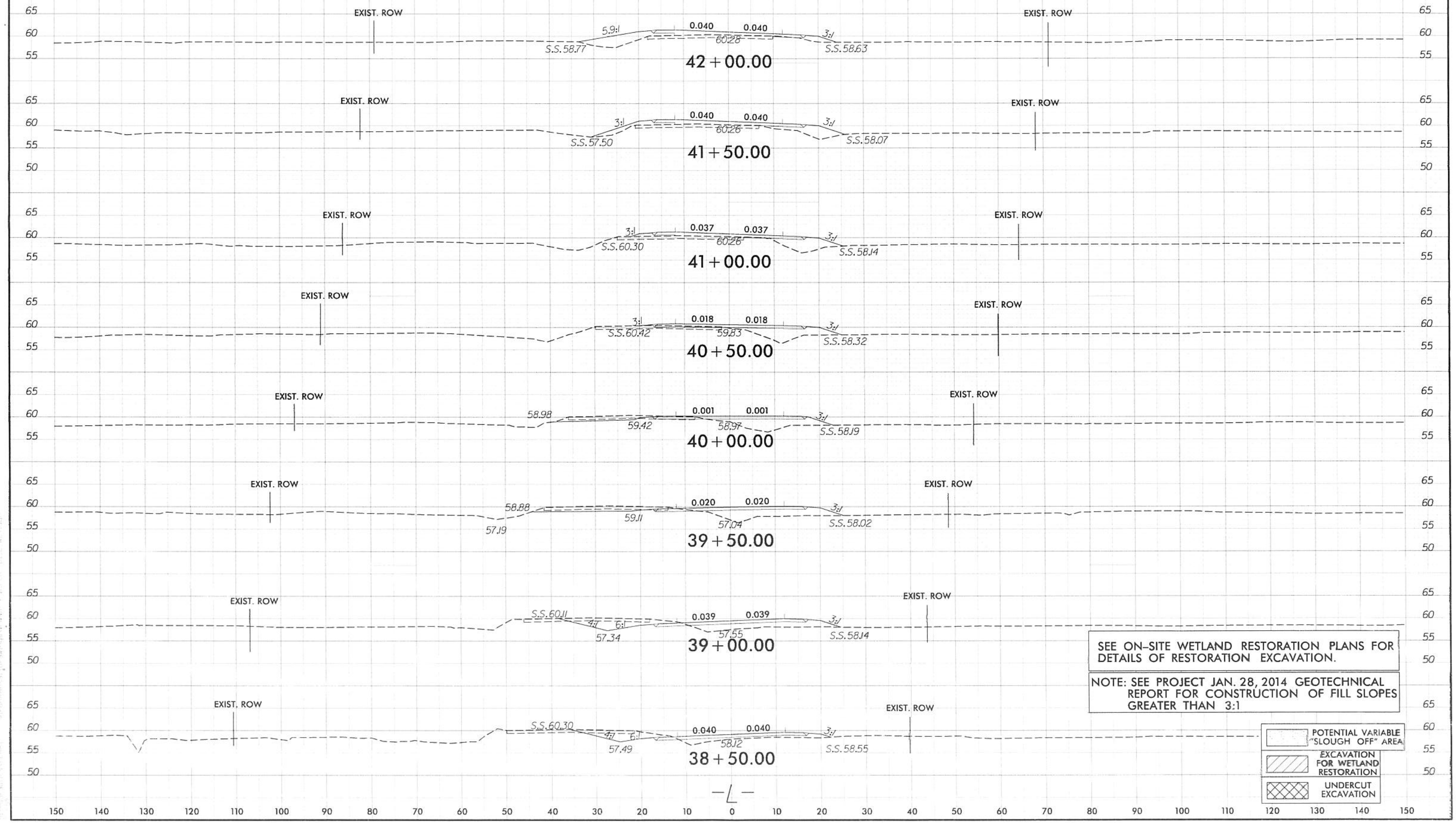
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-8

PERMIT DRAWING
SHEET 13 OF 17



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-9

PERMIT DRAWING
SHEET 14 OF 17

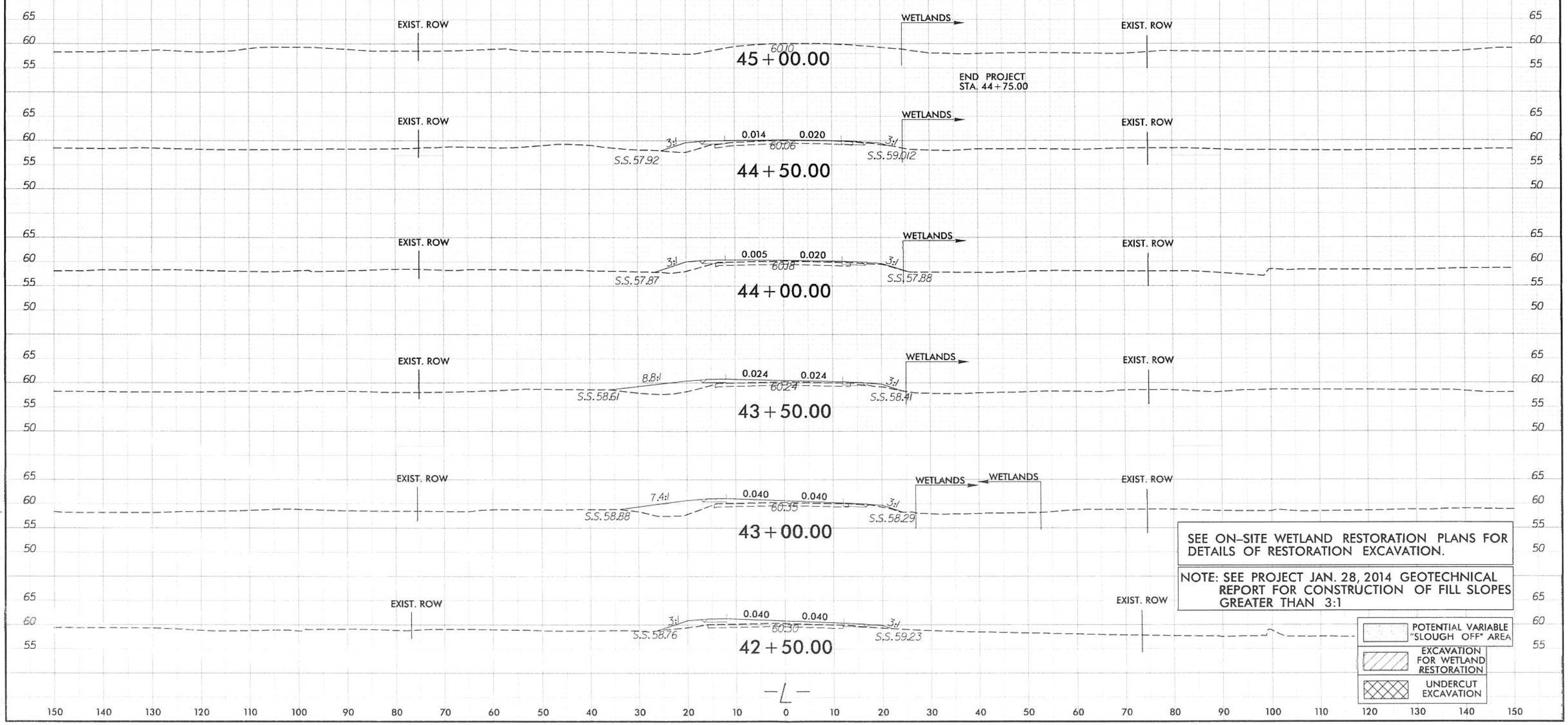


SEE ON-SITE WETLAND RESTORATION PLANS FOR DETAILS OF RESTORATION EXCAVATION.

NOTE: SEE PROJECT JAN. 28, 2014 GEOTECHNICAL REPORT FOR CONSTRUCTION OF FILL SLOPES GREATER THAN 3:1

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	090016 & 090020	X-10

PERMIT DRAWING
SHEET 15 OF 17



WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Restoration in Wetlands (ac)	Permanent Forest Conversion (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	20+50 - 36+50	Roadway *	0.56			0.01	0.02					
	BR 020 &016	Bridges				0.01	0.06					
	20+08 - 35+90	Roadway		1.29								
**	21+00 - 36+00	Roadway	0.23			0.16						
TOTALS:			0.79	1.29		0.18	0.08					

* 0.095 ac of Fill in Herbaceous wetland

**Impacts in Wetlands due to sloughing during undercut operations

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY
WBS - 17BP.3.R.26 (090016 & 020)

SHEET 17 of 17 2/26/2014

ATN Revised 3/31/05