MITIGATION PLAN

Bear Swamp Stream and Wetland Restoration Site

Robeson County, North Carolina

NC DEQ Contract No. 7516
DMS ID No. 100054
USACE Action ID No. SAW-2018-01154
NCDEQ DWR ID: 20180782
RFP No. 16-007337

Lumber River Basin
HUC 03040203

Prepared for:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

March 2020

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

January 30, 2020

Regulatory Division

Re: NCIRT Review and USACE Approval of the NCDMS Bear Swamp Mitigation Site / Robeson Co./ SAW-2018-01154/ NCDMS Project # 100054

Mr. Tim Baumgartner
North Carolina Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Mr. Baumgartner:

The purpose of this letter is to provide the North Carolina Division of Mitigation Services (NCDMS) with all comments generated by the North Carolina Interagency Review Team (NCIRT) during the 30-day comment period for the Bear Swamp Draft Mitigation Plan, which closed on December 8, 2019. These comments are attached for your review.

Based on our review of these comments, we have determined that no major concerns have been identified with the Draft Mitigation Plan, which is considered approved with this correspondence. However, several minor issues were identified, as described in the attached comment memo, which must be addressed in the Final Mitigation Plan.

The Final Mitigation Plan is to be submitted with the Preconstruction Notification (PCN) Application for Nationwide permit approval of the project along with a copy of this letter. Issues identified above must be addressed in the Final Mitigation Plan. All changes made to the Final Mitigation Plan should be summarized in an errata sheet included at the beginning of the document. If it is determined that the project does not require a Department of the Army permit, you must still provide a copy of the Final Mitigation Plan, along with a copy of this letter, to the appropriate USACE field office at least 30 days in advance of beginning construction of the project. Please note that this approval does not preclude the inclusion of permit conditions in the permit authorization for the project, particularly if issues mentioned above are not satisfactorily addressed. Additionally, this letter provides initial approval for the Mitigation Plan, but this does not guarantee that the project will generate the requested amount of mitigation credit. As you are aware, unforeseen issues may arise during construction or monitoring of the project that may require maintenance or reconstruction that may lead to reduced credit.

Thank you for your prompt attention to this matter, and if you have any questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please call me at 919-554-4884, ext 60.

Sincerely,

Kim Browning
Mitigation Project Manager
for Tyler Crumbley

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
Lindsay Crocker– NCDMS
Kevin Tweedy—EPR

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March 4, 2020

Lindsay Crocker
North Carolina Department of Environmental Quality
Division of Mitigation Services (NCDMS)
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: **Mitigation Plan Report and Final Design Plans**
Bear Swamp Stream & Wetland Restoration Project
Lumber River Basin Cataloging Unit 03040203
DMS Project ID #100054
Contract # 7516

Dear Ms. Crocker,

Ecosystem Planning and Restoration (EPR) has reviewed the comments of the Draft Mitigation Plan and Preliminary Plans for the Bear Swamp Stream and Wetland Restoration Project provided by the North Carolina Interagency Review Team (NCIRT) on 1/14/2020. The comments have been addressed as described below to create the Final Mitigation Plan for the Bear Swamp Stream and Wetland Restoration Project.

Comments from the NCIRT are provided on the following pages in italics with our responses immediately following the comment, according to the following format:

Reviewer

1. *NCIRT Comment*
    - EPR Response

Please contact me at the above phone number or address with any questions.
Sincerely,

Kevin Tweedy, PE

Mac Haupt & Erin Davis, NCDWR

1. *Page 1, Section 1.0 – Since 50-foot buffers are not proposed for the wetland systems, please rephrase the last sentence in paragraph three. DWR does appreciate the proposed buffer extent surrounding the majority of Wetland B.*
    - **Response**: The last sentence of paragraph three has been amended to read "Buffers in excess of 50 feet will be established along a majority of the restored stream and wetland systems, and all work will be protected by a perpetual conservation easement."

2. *Page 2, Section 1.1*
    a. *Please confirm the existing farm crossing is culverted; it appears bridged in the Appendix 2 photo.*
        - **Response**: The crossing is culverted, the photo has a minor glare from the water giving the illusion of a bridge, but if you look closer there is a culvert.
    b. *The permanent ford crossing will be 20 feet wide based on the Sheet 2B Detail. However, the easement break appears to be approximately 50-55 feet wide. Please explain the need to have the easement break that much wider than the crossing.*
        - **Response**: The break in the conservation easement at the proposed permanent ford crossing was included at the request of the landowner to facilitate future crossing maintenance and access.

3. *Page 2, Section 1.2 – There is an access road located within the easement shown on the survey in Appendix 1 in "Management Area A" north of Moss Neck Road. Is this road proposed to remain? If so, DWR recommends removing the feature from the easement.*
    - **Response**: Previa Lane is a private road that allows landowner access to Moss Neck Road and cannot be removed. 'Management Area A' was included to provide permanent access to the easement from a public road and is not included for stream or wetland credit. The forested easement boundary will be clearly marked to prevent encroachment of vegetation removal actions from the management area.

4. *Page 4, Section 3.0 – Historic and current land use is briefly discussed. However, future land use is not. Are future watershed changes anticipated? Were available local government and state transportation planning documents for the site vicinity reviewed and/or agencies consulted regarding any potential future projects that may impact the site?*
    - **Response**: No major land use changes are anticipated in the project vicinity or watershed (existing or proposed). The project is in a rural area of NC; the closest larger city is Lumberton, approximately 8.5 miles to the southeast. However, Lumberton is a small city, with a relatively stable population of approximately 20,000. The closest major roadways to the site are I-95 to the east and I-74 to the south. Based on the NC Department of Transportation State Transportation Improvement Program (STIP), neither roadway is scheduled to have its capacity increased over the most recent planning horizon (2030).

5. *Page 9, Section 4 – Was it considered to split the site into two NCSAM assessment reaches based on land cover (active agriculture vs. wooded)?*
    - **Response**: Two NCSAM assessment forms have been completed to better reflect existing site condition and are included in Appendix 5; the text in Section 4 has also been updated to reflect this change.

6. *Page 16, Section 7.1 – Brush piles are mentioned in this section. If they are proposed for the project, please include a design sheet detail.*
    - **Response**: Noted reference to brush piles has been removed from the text.

7. *Page 17, Section 7.2*
    a. *The possible presence of drain tiles was noted in the IRT meeting minutes. If drain tiles are onsite, please address them in the existing conditions and restoration design sections.*
        - **Response**: The following text was added to the first paragraph under Section 3.0 (Baseline and Existing Conditions): "Pieces of what appeared to be broken terracotta drain tiles were observed in the adjacent agricultural fields, but further investigations by EPR, including conversations with the landowner, were unable to confirm the presence of an active drain tile system at the Site." The following text was added to the second paragraph under Section 7.1 (Stream Restoration): "EPR was unable to confirm the presence of an active drain tile system at the Site. Any drain tile system encountered during construction will be decommissioned and removed."
    b. *Potential wetland B restoration is delineated to be 2.49 acres; however, the soil report only delineated 2.1 acres of hydric soil. Please either include additional soil borings showing hydric characteristics south/east of the existing stream channel or include an additional groundwater gauge to be monitored in this area.*
        - **Response**: A soil boring was advanced by EPR staff on the right bank of the existing stream (south) on the boundary of the area proposed as Wetland B. This boring was found to be hydric; information on this boring is provided in Section 3.1 (Landscape Characteristics) and Appendix 4 and the location can be found on Figure 2A. Based on this boring and similar topographic conditions, proposed Wetland B was expanded slightly south of the area covered by the Three Oaks soil investigation.
    c. *Based on the topography of the site and adjacent lands, particularly south of Wetland B (elev. 161) and west of Wetland C (elev. 159), is there a concern about hydrologic trespass?*
        - **Response**: Based on our understanding of the site topography and proposed design, EPR is not concerned about hydrologic trespass at the referenced areas.
    d. *The existing wetland was previously described as "degraded" (page i) and has a "low" NCWAM functional rating. This does not reflect a preservation quality wetland credit area. If some functional uplift can be shown in hydrology and/or vegetation, DWR would consider low level enhancement credit. The ratio would be determined based on proposed uplift and activities.*
        - **Response**: Two NCWAM forms have been completed to account for differences in condition in Wetland A. The part of the wetland that has been proposed for preservation rates as 'high'. Both forms are included in

Appendix 3 and the relevant part of Section 4 (Functional Uplift) has been updated.

e. *Please note that potential wetland restoration credit areas are required to meet wetland hydrologic performance criteria (12%) in addition to showing jurisdiction hydrology.*
   - **Response**: The wetland hydrologic performance criteria has been added to the final paragraph of section 7.2, and now reads "Areas of potential wetland restoration will not be counted as wetland mitigation units unless groundwater gauge data is provided that shows jurisdictional wetland hydrology and wetland hydrologic performance criteria (12%) during the annual monitoring period and consultation with the IRT has occurred."

8. *Page 17, Section 7.3 – Cattail was identified onsite, but is not included in this section or Appendix 9 Is treatment of cattail anticipated?*
   - **Response**: Cattail was identified in a couple of small areas along the existing stream; given the project design, these individuals will be removed during construction. No additional treatment of cattail is anticipated, but if it becomes an issue after construction, we will address with adaptive management.

9. *Page 20, Table 12 – Please include the 30-day consecutive flow requirement in the performance criteria column.*
   - **Response**: Performance criteria added to "Restore self-sustaining stream/wetland headwaters," stating "Stream hydrology success criteria of 30-day consecutive flow."

10. *Page 23, Section 9.2 – Please remove the "or" regarding bud burst. Soil temperature should be corroborated with bud burst. Also, please identify the indicator species for bud burst. A growing season start earlier than March 1st may not be approved by the IRT.*
    - **Response**: This sentence has been re-worded to state that readings of soil temperature should be corroborated with bud burst. However, it is not practical to identify indicator species for bud burst; professional judgement will be used when making bud burst observations (i.e., red maple will not be used). Further information on growing season has also been added to this section; based on the soil survey and WETS data, the growing season is likely to begin in mid-March. Soil temperature readings will not be taken until at least March 1.

11. *Page 23, Table 14 – DWR recommends quarterly data download and inspection of gauges to reduce the risk of data loss due to instrument malfunction.*
    - **Response**: Comment noted.

12. *Page 24, Section 9.4 – Please include photo locations at the ford crossing. Also, visual monitoring should include problem areas concerning encroachment/site boundary.*
    - **Response**: Section 9.4 has been updated to more clearly state where annual photos will be taken, and of what.

13. *Figure 2A – Is it possible to add property lines to this figure? It would be helpful to see how all of the contributing ditches connect across property boundaries.*
    - **Response**: Parcel lines have been added to Figure 2A.

14. *Figure 10 – DWR requests the locations of the two gauges in wetland C be relocated west towards the easement boundary.*
    - **Response**: The two gauges have been moved closer to the easement boundary in Figure 10.

15. *Appendix 1 – It appears a small section of the conservation easement overlaps the NCDOT right- of-way. If so, please shift the site easement boundary to abut the NCDOT boundary.*
    - **Response**: The easement was professionally surveyed using the most up-to-date property line information, so it may be that the property boundary and the NCDOT right-of-way overlap in this area. Regardless, the overlap does not preclude access to the property and this part of the easement is not included for wetland or stream credit; therefore, it will not present an obstacle to the successful completion of the project.

16. *Appendix 4 – Table 2 – Please include dates of annual stream and wetland surveys.*
    - **Response**: All proposed annual monitoring dates have been updated and are filled in on Table 2.

17. *Appendix 6 – Agency correspondence noted in Section 5.2.1 and 5.2.2 were not included in this appendix.*
    - **Response**: As only the CE checklist is required to be included in the mitigation plan, reference to correspondence given in Sections 5.2.1 and 5.2.2 has been deleted.

18. *Sheet 2A – Seven of the eight ditch plugs appear to be approximately 20 feet wide. DWR recommends a minimum ditch width of 50 feet. Also, please confirm whether proposed ditch plugs will have a restrictive material core (clay composition).*
    - **Response**: As noted, each of the proposed ditch plugs are shown on the design plans with a proposed minimum width (length) of 20 feet. The sections of the currently channelized stream where plugs are proposed will also be completely filled between plugs with compacted soil materials and will be graded for valley restoration, as depicted on the grading plan (Plan Sheets 10 through 12). EPR has successfully used this methodology, finding that plugs longer than 20 feet are unnecessary for such low energy systems. The limits and extents of backfilling are shown on the design plans with the “channel fill” shading symbology and the elevations are depicted on the grading plan. The proposed plugs will be installed as shown on the design plans in the Ditch Plug Detail, and the specified compacted backfill material will have a restrictive material core (clay composition).

19. *Sheet 2E – If tree protection fencing is proposed, please show the locations on the plan view sheets.*
    - **Response**: Tree protection fencing, along with other sedimentation and erosion control measures, will be shown on the sedimentation and erosion control plans, once developed.

20. *Sheet 5 – The July 2, 2018 IRT meeting minutes note discussion of level spreaders/linear depressions designed to intercept ditch water and require no long-term maintenance. Is this BMP still being proposed? On Sheet 5 please note how flow entering the easement from the two lateral ditches will be addressed.*
    - **Response**: EPR elected not to utilize level spreaders to intercept lateral ditches in the conservation easement area. The existing lateral ditches within the conservation easement will be graded to sheet flow to the restored valley, as depicted and described on the grading plan (Plan Sheets 10 through 12), which will allow diffuse flow to enter the restored riparian buffer and wetland areas at a slower rate, thereby increasing sediment filtration and nutrient uptake. This simplified proposed approach will also eliminate any concerns regarding potential long-term maintenance considerations.

21. *Please include details for live stake installation and channel filling/partial filling. For partial channel filling, please indicate the maximum depth from top of bank to be filled.*
    - **Response**: Because of the low energy of this system and the small size of the proposed 'pilot' channel, no live stakes are proposed along the stream. Partial filling of the currently channelized stream is not proposed on the design plans. The sections of the currently channelized stream will be *completely filled* between plugs with compacted soil materials and graded for valley restoration, as depicted on the grading plan (Plan Sheets 10 through 12). The limits and extents of backfilling are shown on the design plans with the "channel fill" shading symbology, with elevations as depicted on the grading plan. References to "…partially to completely filled…" in the text have been revised to "…plugged, filled, and graded…" for clarification.

Kim Browning, USACE

1. *When submitting the PCN, please include an estimate of the number of trees, or acres, to be cleared for the NLEB 4(d) Rule.*
    - **Response**: Based on the most recent NLEB range and white-nose syndrome (WNS) maps (November 2019), Robeson County is outside the NLEB and WNS range. Therefore, the NLEB 4(d) rule does not apply in Robeson County.

2. *The Categorical Exclusion section discussed receiving no response from USFWS. Please see attached correspondence, dated July 6, 2018, indicating that the project is expected to have minimal adverse impacts to fish and wildlife resources, and include in the final mitigation plan.*
    - **Response**: The narrative of the mitigation plan has been updated to reflect the findings in this letter, and the letter has been added to Appendix 6.

3. *Appendix 1, page 5: Management Area A, which is cleared and mowed, should not be included within the conservation easement. This area was not discussed during the IRT site visit. This easement exception also contradicts the information provided in Section 1.3, which indicates that site access is accessible via state-maintained Moss Neck Road. Potential exceptions to the easement should be discussed during the planning stages of the project, and considerations should be made for the long-term maintenance of access roads (Section 11).*
    - **Response**: 'Management Area A' was added to the easement after the survey uncovered unclear property boundaries where the original public road access was proposed. Once this area was removed from the easement, another access was required. While the dirt road (Previa Lane) running through Management Area A is private, the easement itself abuts the public right-of-way along Moss Neck Road at this point and can be accessed from there. Previa Lane is maintained by the landowner that uses it for access to Moss Neck Rd. and is not proposed to require maintenance by DMS. Management Area A is not included for stream or wetland credit and the forested easement boundary (vegetation will not be removed during construction) will be clearly marked to prevent encroachment of vegetation removal actions from the management area.

4. *Figure 10: Please add a veg plot in the area to be planted where wetland A currently exists (random is fine).*
    - **Response**: The permanent vegetation monitoring plots have been modified to include one in the part of existing wetland A that will be re-planted after construction.

5. *Figures 2B & 9: Please add the acres of each watershed to the legend.*
    - **Response**: Figures 2B and 9 have been updated to include watershed acreage.

6. *Design Sheets: Please list the length of ditch plugs.*
    - **Response**: The proposed ditch plugs are shown to scale on the design plans with a proposed minimum width (length) of 20 feet, as discussed above.

7. *During the IRT site visit we discussed concerns about level spreaders and how the goal was to function as marsh treatment areas. The concern was regarding a preferential flow pattern forming. Please discuss. Additionally, since these BMPs are within the conservation easement, please discuss their short-term/long-term maintenance, if any.*
    - **Response**: EPR elected not to utilize level spreaders to intercept lateral ditches in the conservation easement area. The existing lateral ditches within the conservation easement will be graded to sheet flow to the restored valley, as depicted and described on the grading plan (Plan Sheets 10 through 12), which will allow diffuse flow to enter the restored riparian buffer and wetland areas at a slower rate, thereby increasing sediment filtration and nutrient uptake. This simplified proposed approach will also eliminate any concerns regarding potential long-term maintenance considerations.

8. *Field tile was noted on site during the IRT site visit. Please discuss in the existing conditions section, and if located during construction, methods proposed to ensure drainage tiles do not negatively affect aquatic resources in the easement.*
    - **Response**: The following text was added to the first paragraph under Section 3.0 (Baseline and Existing Conditions): "Pieces of what appeared to be broken terracotta drain tiles were observed in the adjacent agricultural fields, but further investigations by EPR, including conversations with the landowner, were unable to confirm the presence of an active drain tile system at the Site." The following text was added to the second paragraph under Section 7.1 (Stream Restoration): "EPR was unable to confirm the presence of an active drain tile system at the Site. Any drain tile system encountered during construction will be decommissioned and removed."

9. *Section 7.5: Please include a section on project uncertainties or potential risks. This section provides evidence that the provider has considered potential encroachments, such as DOT road maintenance in DOT right-of-ways. With the increasing number of easement encroachment proposals we are presented with, it seems that future planning will eliminate the potential for encroachments. The IRT was pleased with the previous plan presented by EPR that included a very well thought-out section on project risks. Attached to the end of this memo is an example of risks to consider, similar to what EPR previously presented.*
    - **Response**: Section 7.5 Project Risks and Uncertainties has been added to the mitigation plan to address areas of concern.

10. *Table 12: Where photographic evidence is used, please depict fixed photo stations on the Monitoring Map (Fig 10).*
    - **Response**: Section 9.4 (Visual Assessment Monitoring) has been updated to more clearly state where annual photos will be taken, and of what.

11. *The proposed wetland preservation area appears to be in a different area than originally proposed in the technical proposal. I do recall walking the preservation area, and while it was dry at the site visit, it did contain hydric indicators and vegetation. Restoring the channel to the valley should help improve wetland hydrology here as well. The main concern that I recall in this area was Chinese privet.*
    - **Response**: The area originally identified for wetland preservation had to be removed from the easement due to unclear property lines during the survey. The area currently proposed as wetland preservation is a forested jurisdictional wetland that will remain intact through project construction. There is an element of Chinese privet in this area, though the eastern side of the easement (which will be disturbed during construction) has a bigger privet component compared to the western side. Chinese privet within the mitigation boundary will be managed during monitoring.

12. *Section 14: I don't recall NCWRC representative being present at the IRT site visit.*
    - **Response**: The NCWRC representative was removed from the list.

13. *Credit Release Schedule: While the credit release template for streams includes a 10% reserve of credits until the bankfull standard is met, what is the probability that four separate out of bank events will occur in separate years in a zero-order system? This is probably something that should be addressed in the guidance update, but I would recommend removing this or re- wording this.*
    - **Response**: EPR believes that the referenced performance standard will be met during the monitoring period.

MITIGATION PLAN

Bear Swamp Stream & Wetland Restoration Site
Robeson County, North Carolina
NC DEQ Contract No. 7516
DMS ID No. 100054
USACE Action ID No. SAW-2018-01154
NCDEQ DWR ID: 20180782

Lumber River Basin
HUC 03040203

Prepared for:

NC Department of Environmental Quality
Division of Mitigation Services
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EXECUTIVE SUMMARY

The Bear Swamp Stream & Wetland Restoration Site (Site) is located in the Bear Swamp watershed of the Lumber River Basin, in NCDEQ subbasin 14-9-(1.5) and NC Division of Mitigation Services' (DMS) targeted local watershed 03040203050010. The Project is located in Robeson County off Locklear Road, approximately two miles east of the Town of Pembroke, and will involve the restoration of streams and riparian wetlands adversely affected by ditching for agricultural use. The restoration of the proposed streams and riparian wetlands, as well as their permanent conservation, will ensure their protection from future growth and development in the Lumber River basin.

The Project is comprised of a headwater, unnamed tributary (UT) to Bear Swamp and its adjacent riparian wetlands. The UT was channelized in the past to promote agricultural production and the headwater stream/wetland system currently suffers from extensive ditching, removal of riparian buffers, and intensive agricultural production practices. The project area consists of agricultural land drained by the installation of ditches and the channelization of the UT to Bear Swamp. The restored project reach will be reconnected to a functioning headwater stream and wetland system upstream of Moss Neck Road. In addition, riparian wetland areas will be restored in the north and central portions of the project to supply added hydrology to the stream system and provide greater ecological uplift. Restoration practices will extend into a section of degraded wetlands in the wooded area at the southern end of the project, where the channelized segment of the UT will be filled and allowed to follow the fall of the natural valley, thereby promoting greater hydrologic connectivity. By restoring a headwater stream, as well as its associated riparian riverine wetlands, the Project will likely improve the water quality of receiving waters and improve habitat for biota.

The proposed mitigation activities on the UT to Bear Swamp and its associated wetlands will provide an estimated 2,222 stream mitigation units (SMUs), 2.84 wetland mitigation units (WMUs) from the restoration of riparian wetlands, and 0.04 WMUs from the preservation of riparian wetlands. The mitigation activities will be protected within an approximately 15.3-acre conservation easement.

This mitigation plan has been written in conformance with the requirements of the following:

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).

- NCDEQ Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010

These documents govern North Carolina Division of Mitigation Services (NCDMS) operations and procedures for the delivery of compensatory mitigation.

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1.0 PROJECT INTRODUCTION

Ecosystem Planning and Restoration, PLLC (EPR) is contracted with the NC Department of Environmental Quality (NCDEQ) Division of Mitigation Services (DMS) to provide stream and wetland mitigation units in the Lumber River Basin Hydrologic Unit Code (HUC) 03040203. The project is located in Robeson County off Locklear Road, approximately 2 miles east of the Town of Pembroke (Figure 1). The project is within the NCDEQ Division of Water Resources (NCDWR) sub-basin 14-9-(1.5) and the DMS targeted local watershed 03040203050010 (Figure 3). The Project is in the Atlantic Southern Loam Plains Level IV ecoregion, as defined by the U.S. Environmental Protection Agency (EPA).

The Bear Swamp Stream and Wetland Restoration Site (Site) involves the restoration of an intermittent unnamed tributary (UT) to Bear Swamp and its adjacent riparian wetland system. The UT begins as a channelized, intermittent stream before entering an existing stream-wetland complex towards the downstream end of the project, where the channel is poorly defined. Both the UT and its associated wetlands have been impacted by past channelization, intensive agricultural practices, and removal of riparian buffers.

Instead of constructing a defined channel, the currently channelized stream will be filled, and the streambed raised to topographic contours that approximate the pre-drained condition. Flows will routed initially into a small pilot channel after construction and then be allowed to form their own channel features and flow paths over time, using the techniques and approaches described in the *Information Regarding Stream Restoration with Emphasis on the Coastal Plain, Version 2* (April 2007) guidance document. A permanent ford farm crossing will be installed at the beginning of the restored UT to provide access to an adjacent field and drain water from the restored wetland upstream. The existing ditch system along the UT will be plugged, filled, and graded to raise the groundwater table in support of riparian wetland restoration. Buffers in excess of 50 feet will be established along a majority of the restored stream and wetland systems, and all work will be protected by a perpetual conservation easement.

Site mitigation activities, which will provide 2,222 SMUs and 2.88 WMUs within a 15.3-acre conservation easement, include the following:

- Restoration of 2,222 linear feet of stream channel that has been straightened and channelized for agricultural purposes;
- Restoration of riparian buffers 50 feet in width or wider along the stream reaches; and
- Grading to improve diffuse flow from lateral ditches.

In order to restore a healthy stream-wetland complex, the Project will restore the previously channelized stream along the fall of the valley, through proposed and existing wetlands, and restore woody vegetation along all stream reaches. In so doing, the Project will provide significant improvements to wetland connectivity and function within the riparian buffer.

Table 1. General Project Information

Project Information	
Project Name	Bear Swamp Stream & Wetland Restoration Site
County	Robeson
Easement Area (acres)	15.3
Project Coordinates (latitude and longitude)	34° 40' 49" N, 79° 9' 19" W
Planted Acreage (acres of woody stems planted)	12.3

1.1 Property Ownership and Boundary

The Site will consist of an approximately 15.3-acre easement located inside an 84.7-acre parcel owned by K.M. Biggs Incorporated. A perpetual conservation easement has been prepared that incorporates the results of this Mitigation Plan (Appendix 1). The conservation easement is depicted on a recordable plat, signed by the owner, and recorded in the Robeson County Register of Deeds.

The existing culverted farm crossing will be removed; a permanent ford crossing will be installed approximately 100 feet upstream of the existing crossing to allow farm equipment access to the agricultural fields on either side of the conservation easement (Figure 8). Stabilization practices will ensure a stable crossing while providing required site access.

1.2 Utilities

There are no underground or overhead utilities within the proposed conservation easement boundary. The existing NCDOT culvert at Moss Neck Road will continue to serve as a permanent grade control point for the Project.

1.3 Site Access

All portions of the conservation easement are accessible via state-maintained Moss Neck Road, which will provide perpetual Project access.

2.0 WATERSHED APPROACH AND SITE SELECTION

The Bear Swamp targeted local watershed (03040203050010), shown in Figure 3, is a moderately developed water supply watershed (WS-IV) with an accompanying Swamp Water (Sw) classification. The Bear Swamp Local Watershed Plan (LWP; NCEEP, 2013) was created for the project area due to water quality concerns (e.g., sediment, nutrients, and stormwater) caused by lack of riparian buffers, fragmentation and loss of terrestrial habitat and wetlands, increased impervious surface, and loss of in-stream habitat due to channelization. As such, the Project will provide numerous water quality and ecological benefits within the Bear Swamp and Lumber River watersheds. Major goals for HUC 03040203 (Lumber River), of which Bear Swamp is part, identified in the Lumber River Basin Restoration Priorities document (RBRP; NCEEP, 2008) include:

1) Restoration and enhancement of degraded riparian buffers;
2) Continuation of existing watershed restoration and protection initiatives; and
3) Repairing channelized streams.

The Project will restore a healthy headwater stream-wetland complex in a WS-IV watershed that is 61% agricultural land use. The Project will restore riparian buffers at least 50 feet in width along the project stream reach and provide significant improvements to wetland connectivity and function within the riparian buffer. The existing lateral ditches within the conservation easement will be graded to sheet flow to the restored valley, which will allow diffuse flow to enter the restored riparian buffer and wetland areas at a slower rate, thereby increasing sediment filtration and nutrient uptake. Conveyance of a permanent conservation easement to the State will provide long-term protection of the Site. The Project will continue existing water quality initiatives in the watershed and address each of the above-mentioned watershed goals by:

- Restoring and enhancing adjacent riparian wetlands;
- Reducing storm flow energies and velocities;
- Improving buffer function to promote better denitrification of groundwater flowing to the stream channel; and
- Moving row crop agriculture practices further from the stream system to reduce direct nutrient and sediment inputs.

These goals are reflected in the project goals and objectives outlined in Section 6.0 of this report.

3.0 BASELINE AND EXISTING CONDITIONS

The Project is in a rural area of central Robeson County. Land use within the project watershed is comprised of 61% agricultural lands, 27% deciduous forest lands, 13% low density residential, and <0.1% impervious surfaces. The Site is impacted by farming practices, past stream channelization, and loss of riparian buffers. Pieces of what appeared to be broken terracotta drain tiles were observed in the adjacent agricultural fields, but further investigations by EPR, including conversations with the landowner, were unable to confirm the presence of an active drain tile system at the Site. An analysis of historical imagery of the Site indicate that the UT was channelized and ditched prior to 1971 (Figure 4). The removal of natural woody riparian buffer vegetation, stream channelization, and current agricultural use present a significant opportunity for water quality and ecosystem improvements through the implementation of this Project.

The existing watershed was delineated through field observations of ditch flow and connectedness, with support from site-specific topographic survey data. The Site stream is considered a warm-water channel. Land use and watershed area for the stream reach is provided in Table 2.

Table 2. Project Land Use and Watershed Characteristics

Land Use and Watershed Characteristics	
Physiographic Province	Coastal Plain
Level III, IV Ecoregions	Southeastern Plains, Atlantic Southern Loam Plains
River Basin	Lumber
USGS Hydrologic Units 8-digit, 14-digit	03040203, 03040203050010
DWR Sub-basin	14-9-(1.5)
Reach	**UT to Bear Swamp**
Drainage area (acres)*	59.2
Drainage area (sq. miles)*	0.09
Thermal Regime	Warm

3.1 Landscape Characteristics

The Project lies within the Coastal Plain physiographic province and Southeastern Plains Level III ecoregion, which is characterized by irregular plains with broad interstream areas. Further, the Project is in the Atlantic Southern Loam Plains Level IV EPA ecoregion, which is typified by flat to very gently rolling terrain, with deep, well-drained soils. The area gets approximately 48 inches of annual average precipitation, peaking in the summer months (June-September). The local topography is generally flat, with greater elevational changes near water courses.

Figure 6 shows that the soils in the project area are primarily Bibb series along the UT and its floodplain, while Norfolk and Lynchburg series are found along the adjacent upland fields and within the wooded area at the southern end of the project. Johnston soils are also found in the wooded area and extend outside the easement to Moss Neck Road. Bibb and Johnston soils are derived from sandy and loamy alluvium, while Norfolk loamy sand and Lynchburg sandy loam are derived from

loamy marine deposits. Soil types within the Site mapped by the NRCS Web Soil Survey are described below in Table 3.

Table 3. Project Soil Types and Descriptions

Soil Name	Description	Hydric Status
Bibb	Bibb soils are very deep, poorly drained soils found on floodplains. They have a high water capacity and are frequently flooded.	Hydric
Johnston	Johnston soils are very deep, very poorly drained soils found on floodplains. They have a high water capacity and are frequently flooded.	Hydric
Lynchburg	Lynchburg sandy loam is a very deep, somewhat poorly drained soil located on broad interstream divides and marine terraces. It has a moderately high to high water capacity and is not subject to flooding.	Non-hydric
Norfolk	Norfolk loamy sand is a very deep, well-drained soil located on broad interstream divides and marine terraces. It has a moderately high to high water capacity and is not subject to flooding.	Non-hydric

To further investigate soil conditions on the Site, licensed soil scientists from Three Oaks Engineering conducted a total of sixteen soil borings in areas that showed potential for riparian wetland restoration. The most common hydric indicator observed was S7 – Dark Surface. Approximately 2.1 acres in the northern field area and 1.2 acres in the southern field area contained hydric soils. The soils report developed by Three Oaks Engineering (Appendix 4) indicates that "the mapped hydric soil unit is a prime candidate for wetland restoration, and it is anticipated that through abandoning agriculture management, raising the stream level, limited soil alterations, and re-vegetation, the hydrology will be restored and allow the wetland to regain its normal functions". EPR staff also advanced a soil boring south of the existing stream near proposed Wetland B (upstream end) that was outside the area covered by Three Oaks (Figure 2A). Hydric soil was also found in this location. A description of this boring is found in Appendix 4.

3.2 Existing Vegetation

When not planted with row crops such as soybeans or cotton, existing vegetation in the agricultural fields is typical of fallow crop conditions, consisting mainly of fescue (*Schedonorus spp.)*, and purple henbit (*Lamium purpureum).* The field is commonly mowed up to the top of the stream bank, so woody vegetation is sparse; however, some mid-story species exist along the stream banks, such as black willow (*Salix nigra)*, elderberry (*Sambucus canadensis)*, and tag alder (*Alnus serrulata)*, along with herbaceous and vine species such as giant cane (*Arundinaria gigantea*), geranium (*Geranium* spp.), and blackberry (*Rubus* spp.). Areas immediately adjacent to, or in the stream channel are also vegetated with herbaceous species such as smartweed (*Polygonum pensylvanicum)*, seedbox

(*Ludwigia alterniflora)*, smooth rush (*Juncus effusus)*, and cattail (*Typha latifolia*). The wooded portion of the Site is dominated by red maple (*Acer rubrum),* tulip poplar (*Liriodendron tulipifera)*, and sweetgum (*Liquidambar styraciflua)*, with a mid-story consisting of red maple, water oak (*Quercus nigra)*, wax myrtle (*Morella cerifera)*, sweet bay (*Magnolia virginiana*), Chinese privet (*Ligustrum sinense)*, red bay (*Persea borbonia),* and horse sugar (*Symplocos tinctoria)*. The area is also densely covered in understory and vine species such as giant cane*,* sweet woodreed (*Cinna arundinacea),* netted chain fern (*Woodwardia areolata),* Japanese honeysuckle (*Lonicera japonica)*, and greenbrier *(Smilax rotundifolia*). Photographs of the Site can be found in Appendix 2.

3.3 Project Resources

EPR conducted investigations for jurisdictional waters of the U.S. on February 5 and November 14, 2018. Wetlands were assessed using the U.S. Army Corps of Engineers (USACE) Routine On-site Determination Method, defined by the 1987 USACE Wetland Delineation Manual and the Atlantic and Gulf Coastal Plain Regional Supplement. Potential jurisdictional wetlands were assessed using the USACE Wetland Determination Data Form and the NC Wetland Assessment Method (NCWAM). Ephemeral and intermittent stream transitions of the UT were assessed using the NCDEQ DWR Stream Identification Form Version 4.11. NCWAM rating sheets are found in Appendix 3 and stream forms are found in Appendix 5. One UT to Bear Swamp (Table 4) and one wetland (Table 5) were delineated during the on-site investigations.

A Preliminary Jurisdictional Determination (PJD) package was submitted to the USACE and NCDWR on December 31, 2018. A site visit was conducted on March 19, 2019 to review the water resources delineated by EPR. The meeting was attended by Gary Beecher (USACE), Amy James, (EPR) and Thomas Barrett (EPR). The USACE concurred with the existing stream and wetland delineation boundaries as presented. The notification of PJD dated June 17, 2019 is provided in Appendix 3.

Table 4. Jurisdictional Stream Resources Within the Project Boundary

Reach	UT to Bear Swamp
Existing Length (LF)	2,423
Drainage area (acres)	59.2
Drainage area (sq. miles)	0.09
Valley slope (ft/ft)	0.002
EPR – NCDWR Stream Score	25.5 (intermittent)
EPR – NCSAM score	Low
NCDWR Water Quality Classification	WS-IV; Sw
Rosgen Classification of Existing Conditions	G5/B5c
Simon Evolutionary Stage	II
FEMA Zone Classification	X

Table 5. Jurisdictional Wetland Resources Within the Project Boundary

Wetland	WA
Size of Wetland (Acres)	2.1
Wetland Type (non-riparian, riparian riverine, or riparian non-riverine)	Riparian riverine
Predominant Mapped Soil Series	Johnston soils/ Norfolk loamy sand
Drainage Class	Very poorly drained (Johnston) Well drained (Norfolk loamy sand)
Soil Hydric Status	Hydric (Johnston) Non-hydric (Norfolk loamy sand)
Source of Hydrology	Groundwater, precipitation, and runoff
Hydrologic Impairment	Stream channelization and agricultural practices
Native Vegetation Community	Riverine Swamp Forest
% Exotic Invasive Vegetation	10

4.0 FUNCTIONAL UPLIFT

Based on field evaluations and the proposed mitigation practices described in this document, functional ratings were developed for the existing and proposed conditions of the project stream (Table 6), following the methodology and definitions described in Harman, et al., 2012. This information is provided to assist in communicating project goals and objectives related to functional lift but is not proposed for use in setting performance standards. Performance standards are specifically discussed in Section 8 and follow guidance provided by the NCDMS and USACE Wilmington District.

The UT to Bear Swamp in the project area varies in its existing condition as it moves from an active agricultural field to a forested section at the downstream end of the easement. Approximately 70% of the UT in the project area currently flows through the field and is severely degraded. The most severe impairments include past channelization and the loss of riparian buffers and wetlands, resulting in direct input of nutrients and sediment, channel instability and erosion, loss of wetland function, and lack of riparian vegetation. Functional uplift will come from restoring natural riparian vegetation, restoring the project stream to a stable condition, restoring appropriate stream form and adjacent floodplain wetlands, and reducing the impact of adjacent agriculture. Restored riparian buffers will: 1) provide woody debris and detritus for aquatic organisms; 2) provide shading and reduce water temperatures; 3) increase dissolved oxygen concentrations; and 4) provide a diversity of aquatic and terrestrial habitats appropriate for the ecoregion and landscape setting.

Approximately 30% of the UT in the project area currently flows through the existing wooded area, retaining its riparian buffer and surrounding wetlands. However, the stream in this location has been channelized and relocated away from the valley low point and is affected by concentrated flows from surrounding ditching and a watershed dominated by agricultural land uses. Functional uplift in this section will come from restoring appropriate stream form, improving floodplain dynamics by returning the channel to its natural valley, slowing flow from feeder ditches, and removing agricultural land from production in the upstream watershed.

Table 6. Summary of Existing and Proposed Functional Ratings for the Project Stream

Functional Category	Existing	Proposed
	UT Bear Swamp	All Reaches
Hydrology [1]	NF	FAR
Hydraulics [2]	NF	F
Geomorphology [3]	NF	F
Physicochemical [4]	Assumed	Modest Lift Assumed
Biology [4]		

Note 1: Hydrology – Due to ditching, the beginning of UT to Bear Swamp in the project area is at the top of the watershed and has several points of concentrated flow; therefore, its hydrology is listed as Not Functioning (NF). After restoration, the stream's hydrology will be considered Functioning At-Risk (FAR) due to 1) a restored connection with an upstream watershed that is forested, but still impacted by ditching and silvicultural activities, 2) the restoration of a headwater wetland to feed the system, and 3) the grading of existing ditches in the easement to slow and spread out flow from ditches entering the project area.

Note 2: Hydraulics –The restoration reach is incised and channelized and no longer functionally connected to its adjacent floodplain; therefore, it is listed as Not Functioning (NF). Restoration practices will restore proper floodplain connection and channel hydraulics to a Functioning (F) condition. Upstream surface water connections will also be restored (Figure 9).

Note 3: Geomorphology – The existing reach exhibits a significantly larger and deeper channel than would naturally occur, due to past channelization and ditching. Channel instability is present, but is not severe, due to low slope and smaller watershed size. Along the reach, plan form, bedform diversity, and riparian vegetation are in a Not Functioning (NF) condition for the majority of the reach. Restoration practices will restore a stable, Functioning (F) headwater stream/wetland system that includes riparian buffers and in-stream wood structures that add bedform diversity to this reach.

Note 4: Physicochemical and Biology – These functional categories have not been directly assessed for the restoration reach; however, they can be assumed to be Not Functioning (NF) due to a lack of woody riparian vegetation and bed form diversity, as well as the direct input of nutrients from surrounding agricultural uses. The restored condition is assumed to be Functioning-At-Risk (FAR) since proposed restoration activities (e.g. planting riparian vegetation, increasing the distance between agricultural uses and the project stream, and installing wood structures that provide in-stream habitat) should provide modest functional lift. However, while the reach will be more fully functioning, it would likely still be considered FAR for these categories due to overall watershed stressors.

As a comparison, existing functional condition for the UT to Bear Swamp was also assessed using the NC Stream Assessment Method (NCSAM; SFAT 2015), with the field and forested portions rated separately. Because the UT to Bear Swamp is an intermittent stream, there are two scores for each category and overall, as NCDWR has different rating criteria for intermittent streams. Table 7 shows the NCSAM functional ratings; the NCSAM rating sheets are provided in Appendix 5.

Table 7. Summary of NCSAM Wetland Functional Ratings for Existing Conditions

	Stream Functional Ratings (USACE All Streams/NCDWR Intermittent Stream)	
	UT to Bear Swamp (field)	UT to Bear Swamp (forested)
Hydrology	Low/Low	High/High
Water Quality	Low/Low	Medium/Medium
Habitat	Low/Low	Low/High
Overall	Low/Low	Medium/High

The two areas proposed for wetland restoration do not currently display wetland hydrology indicators due to the channelization of the UT to Bear Swamp and disconnection from the upstream watershed. These areas also do not display hydrophytic vegetative indicators due to conversion to row crop agriculture. The project aims to restore hydrology to the proposed wetland areas by: 1) re-routing flow diverted off-site to the UT to Bear Swamp, re-establishing a connection with the upstream watershed; 2) raising the existing stream elevation; and 3) designing for relatively unconfined stream flows, as would be typical in coastal plain headwater systems. Woody plants adapted to wetland conditions will also be planted to restore native hydrophytic vegetation and provide a riparian buffer.

Table 8 summarizes the NC Wetland Assessment Method (NCWAM) functional ratings (NC WFAT 2010) for the existing forested wetland on the Site, categorized as a riverine swamp forest. The wetland was split into an 'upstream' (0.4 acre) and 'downstream' (1.7 acres) section, to account for the effect of stream channelization on the upstream section that is largely absent in the downstream section. The NCWAM rating sheets for Wetland A are provided in Appendix 3.

Table 8. Summary of NCWAM Wetland Functional Ratings for Existing Conditions

	Wetland Functional Ratings	
	WA (upstream)	WA (downstream)
Hydrology	Medium	High
Water Quality	Low	High
Habitat	Medium	Medium
Overall	Medium	High

5.0 REGULATORY CONSIDERATIONS

Regulatory considerations for the Site are shown in Table 9 and are described in the following sections.

Table 9. Summary of Regulatory Considerations

Regulatory Parameter	Applicable?	Resolved?	Supporting Docs.
Waters of the United States - Section 401/404	Yes	No	Appendix 3
Endangered Species Act	Yes	Yes	Appendix 6
National Historic Preservation Act	Yes	Yes	Appendix 6
Coastal Zone Management Act (CZMA or CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

5.1 401/404

There will be permanent impacts to the existing wetland onsite due to realignment of channel features, as well as temporary impacts resulting from clearing during project construction. The latter impacts are considered temporary in nature since the area will be re-planted and allowed to re-forest. Table 10 shows anticipated wetland impacts; however, it is expected that restoration activities will result in uplift to overall wetland function. A PJD package was submitted to NCDWR and USACE on December 31st, 2018 and a Notification of Jurisdictional Determination was approved on June 17th, 2019. Additionally, existing wetland condition was assessed using NCWAM and was found to be low functioning (see Table 8 in section 4.0 of this report).

Table 10. Wetland Impacts

	Wetland A (permanent)	Wetland A (temporary)
Acreage	0.06	1.7
Square Feet	2,614	74,052

Stream channel impacts will be due to restoration activities and relocation of the restored channel to its historic alignment. Construction activities will be conducted under a Nationwide Permit #27, Aquatic Habitat Restoration, Enhancement, and Establishment Activities with the submittal and approval of a pre-construction notification.

5.2 Categorical Exclusion for Biological and Historical Resources

A Categorical Exclusion (CE) document for the Bear Swamp Stream & Wetland Restoration Project was approved by the Federal Highway Administration (FHWA) on October 10, 2018 and is provided in Appendix 6. The CE document investigates the presence of threatened and endangered species and any historical resources that may occur within the Site.

5.2.1 Biological Resources

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C 1531 et seq.), defines protection for species with the Federal Classification of Threatened (T) or Endangered (E). An "Endangered Species" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range" and a "Threatened Species" is defined as "any species which is likely to become an Endangered Species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C 1532).

EPR submitted a project review certification letter to the U.S. Fish and Wildlife Service (USFWS) Raleigh field office on August 1, 2018 regarding the project's potential impacts to threatened or endangered species. The self-certification letter serves as notice to USFWS that the project is not anticipated to adversely affect endangered species. In addition, in a July 6, 2018 letter to the USACE, the USFWS determined that this project would have minimal adverse impacts to fish and wildlife resources and would not be likely to adversely affect federally listed species or their critical habitat (Appendix 6).

5.2.2 Historical Resources

The CE document investigates the occurrence of any historical resources protected under The National Historic Preservation Act (NHPA) of 1966. The NHPA, as amended (16 U.S.C. 470), defines the policy of historic preservation to protect, restore, and reuse districts, sites, structures, and objects significant in American history, architecture, and culture. Section 106 of the NHPA mandates that federal agencies account for the effect of an undertaking on any property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

A letter from the State Historic Preservation Office (SHPO) dated July 12, 2018, in response to the project's public notice, indicates no historic resources would be affected. Due to their conclusion, SHPO did not have further comments on the project as proposed.

5.3 FEMA Floodplain Compliance and Hydrologic Trespass

Upon review of the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program's Digital Flood Insurance Rate Mapping (DFIRM) panel 3710935300J, effective January 19, 2005, the Site is located in an area of minimal flood hazard (Zone X). Therefore, under the current regulations, work associated with this project is not regulated and a Letter of Map Revision (LOMR) will not be necessary to revise the floodplain mapping of the UT to Bear Swamp (see Appendix 7).

6.0 MITIGATION PROJECT GOALS AND OBJECTIVES

While the ultimate goal of the Project is to restore a self-sustaining headwater stream-wetland complex, more specific project goals and objectives were developed for the Bear Swamp Watershed based on the Lumber River RBRP (NCEEP, 2008) and Bear Swamp Local Watershed Plan (NCEEP, 2013) and are provided in Table 11.

Table 11. Goals and Objectives for the Bear Swamp Stream & Wetland Mitigation Project

Goals	Objectives
Replace Riparian Buffers	▪ Restore minimum 50-foot riparian buffers to filter runoff.
Repair Channelized Streams	▪ Restore appropriate bed form diversity, headwater stream/wetland form, and install in-stream structures to provide appropriate habitat. ▪ Restore self-sustaining stream/wetland headwaters.
Preserve Existing Resources	▪ Place a conservation easement on existing riparian headwater stream/wetland system at southern end of the project.
Improve Water Quality Where Degraded by Pollutant Inputs	▪ Restore and preserve riparian wetland systems. ▪ Restore riparian buffer vegetation to filter runoff and provide organic matter and shade. ▪ Remove cropland from active production.
Improve In-stream habitats	▪ Restore appropriate bed form diversity, headwater stream/wetland form, and install in-stream structures to provide appropriate habitat. ▪ Restore self-sustaining stream/wetland headwaters.
Improve Functions Degraded by Loss of Channel-Riparian Zone Connection	▪ Restore self-sustaining stream/wetland headwaters. ▪ Restore minimum 50-foot riparian buffers that will include riparian wetlands and terrestrial edges.
Protect Against Future Threats	▪ Place a permanent conservation easement on the project area.

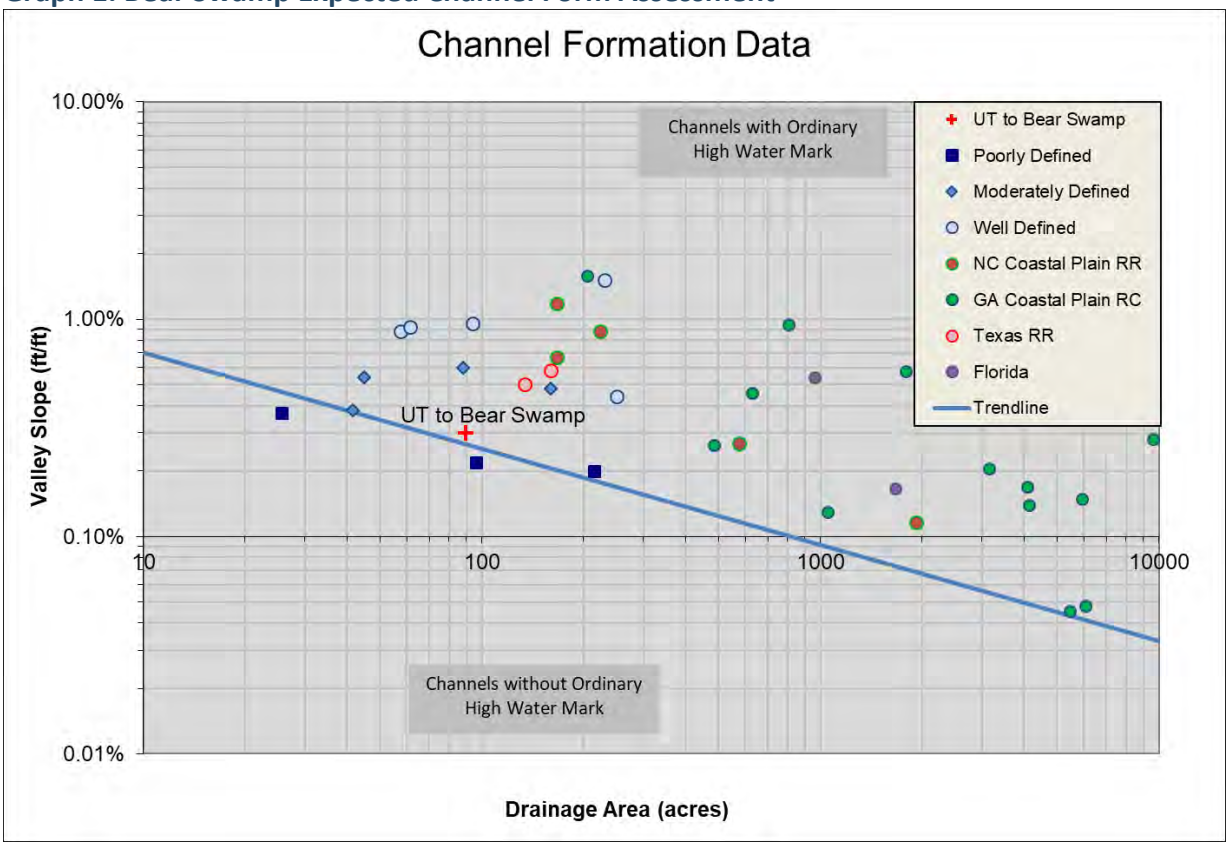
The performance standards associated with these goals and objectives are covered in Section 8.0 of this report.

7.0 DESIGN APPROACH AND MITIGATION WORK PLAN

The Project involves the restoration of an unnamed tributary (UT) to Bear Swamp and associated riverine wetlands. Due to its watershed size and relatively short length, the UT was assessed entirely as one stream reach during stream design. From station 10+00 to 24+55, the UT drains through the existing agricultural fields. From station 24+55 to 32+22, the UT drains through the existing forested area at the downstream end of the project. The UT considered for mitigation is currently classified as intermittent. The entire proposed stream reach is illustrated on the USGS Pembroke, NC Quadrangle map as a dashed blue-line stream.

The Project utilizes a headwater stream design approach as outlined in the *Information Regarding Stream Restoration with Emphasis on the Coastal Plain, Version 2* (April 2007) guidance document. An analysis was performed regarding the likely channel form that would have been present through the Site, prior to its conversion to agriculture. EPR has collected data on headwater stream systems in the Coastal Plain of the Southeastern U.S., and found a strong relationship between channel form, drainage area, and valley slope (Tweedy, 2008). As drainage area and valley slope increase, drainages tend to form more defined stream channels. EPR has used this tool successfully to evaluate the proper design form for Coastal Plain restoration projects. Topography data for the Site were used to evaluate both drainage area and valley slope for the project streams. Data from the UT to Bear Swamp are presented in Graph 1, where proposed drainage area is plotted against the estimated design valley slope.

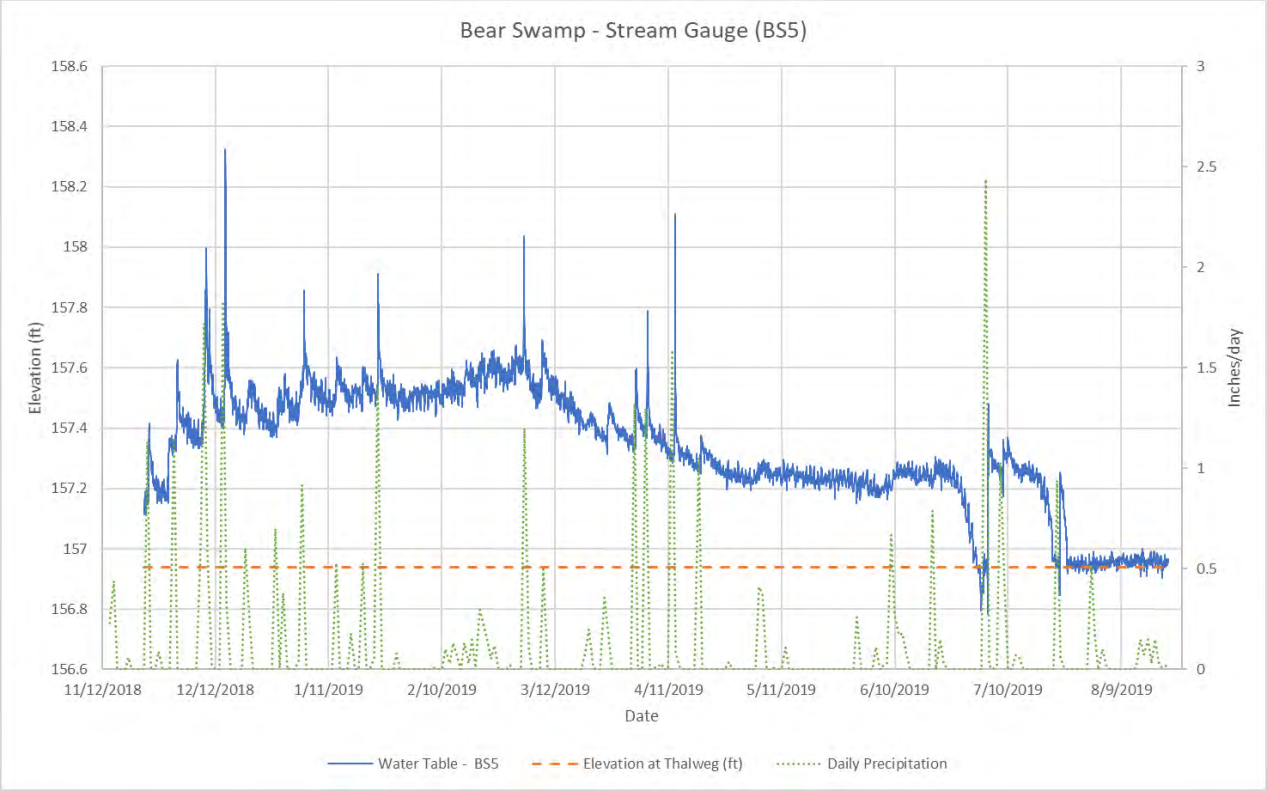
Graph 1. Bear Swamp Expected Channel Form Assessment



The results of this analysis indicate that the UT to Bear Swamp design reach lies just above the trendline that delineates between channels that maintain an ordinary high-water mark and channels that do not. Therefore, the UT to Bear Swamp, as designed using a headwater restoration approach, is expected to display indicators of channel formation and ultimately of an Ordinary High Water Mark.

To investigate the existing hydrology of the UT, two stream gages were installed during November 2018 to document flows in the existing stream. The recorded hydrograph for the most upstream gage is shown in Graph 2. The graph indicates that the stream maintained baseflow from November 2018 through June 2019, going dry for a short period in early July, and then dry for an extended period during late July/August 2019. This information provides additional support that the restored system will support an intermittent stream once restoration is completed, especially considering that its watershed size will increase by approximately 30 acres through the re-connection of a ditch currently diverting water off the property to the UT headwaters.

Graph 2. Hydrograph of Upstream Stream Gauge between November 2018 and August 2019



7.1 Stream Restoration

The UT begins as an ephemeral field ditch on the north end of the agricultural fields at the project headwaters. As the channel progresses downstream it deepens and picks up more groundwater discharge. At a point approximately 438 feet above the existing farm culvert, the stream becomes an intermittent stream channel. Here, the channel is approximately 4 feet deep and hydric soils are

present along both banks. As the channel progresses downstream, channel depth varies from 3 to 5 feet in depth and flow increases with increased groundwater discharge. Two ephemeral lateral field ditches discharge into the channel from adjacent farm fields that are at a higher elevation. As the UT approaches the wooded area downstream, the channel shifts to the woodland edge at a slightly higher elevation than the lowest part of the valley. Within the wooded area, the UT was historically channelized, straightened, and relocated to the east, away from the low point of the natural valley, which is still evident to the west of the existing channel. The UT eventually connects with a functional wetland system in the woods just upstream of Moss Neck Road towards the downstream end of the project. The UT is incised along 100% of its length (BHR > 1.5), with the level of incision increasing in the downstream direction until the channel approaches the woods. Active erosion (mass wasting/toe scour) is evident in only a few locations. BEHI values range from low to moderate along the UT.

Instead of constructing a defined channel, the currently channelized stream will be filled, and the streambed raised to topographic contours that approximate the pre-drained condition. Flows will be routed initially into a small pilot channel after construction and then allowed to form their own channel features and flow paths over time, using the techniques and approaches described in the *Information Regarding Stream Restoration with Emphasis on the Coastal Plain, Version 2* (April 2007) guidance document. A permanent ford farm crossing will be installed at the beginning of the restored UT at station 10+00 to provide access to an adjacent field and drain water from the restored wetland upstream. The majority of the existing ditch system in the agricultural fields along the UT headwaters will be plugged, filled, and graded to raise the groundwater table in support of riparian wetland restoration. EPR was unable to confirm the presence of an active drain tile system at the Site. Any drain tile system encountered during construction will be decommissioned and removed. From station 10+00 to 24+55, where the UT drains through the existing agricultural fields, the existing channelized stream follows the natural valley for the majority of its length, and therefore will be filled along its length. Fill material will be generated from channel grading and the removal of the soil spoil berms associated with the existing ditches.

As the UT enters the wooded section at station 24+55, it has been channelized, straightened, and relocated to the east, away from the natural valley low point. From station 24+55 to 32+22, the UT will be restored by completely abandoning, plugging, and filling the channelized, straightened, and relocated section of stream and redirecting the stream flow to follow the remaining natural valley. Flows will then be allowed to form their own channel features and flow paths along the fall of the valley, using the techniques and approaches described in the earlier referenced guidance document. A defined low flow channel will be carefully excavated along the flow line of the valley only where the existing topography does not exhibit a natural positive drainage pattern. The stream restoration will end where the existing channelized system transitions into a natural stream-wetland complex upstream of Moss Neck Road. The existing ditches in the wooded area will be plugged, filled, and graded to raise the groundwater table in support of riparian wetland restoration. Fill material will be generated from channel grading and the removal of the soil spoil berms associated with the existing ditches.

The proposed stream form for the UT will be most similar to a D_A Rosgen stream type. Due to the size of the channel, its slope, and bed material, restoration activities will utilize wood structures like woody riffle and debris jams to improve bed form diversity and provide refugia for aquatic organisms. Riparian buffer plantings will also provide stabilization and organic matter and refugia to the stream. Wooded riparian buffers in excess of 50 feet will be re-established or left in place along the restored stream reaches and wetland systems, and all work will be protected by a perpetual conservation easement.

7.2 Wetlands

Wetland restoration is proposed in the agricultural fields above the proposed crossing at the north end of the easement and upstream of the existing forested area. These areas are mapped as Bibb and Norfolk loamy sand soils, respectively, though only Bibb is considered hydric (Figure 6). A soil investigation was conducted at the Site by Three Oaks Engineering in January 2018 to determine the approximate boundaries of existing hydric soil indicators and the potential of the Site to support wetland restoration. As depicted in their report included in Appendix 4, hydric soil indicators (best described by S7 Dark Surface) were found to occur in these areas. The soils were also described as not severely altered other than hydrologically from current farming practices (ditching, tilling, etc.).

Potential wetland B is found at the upstream end of the easement, above the proposed crossing. To restore wetland hydrology in this location, the existing stream channel will be plugged, filled and graded and drainage currently bypassing the Site through perimeter ditching will be re-directed on-site (Figure 9). Potential wetland C is located above the current forested wetland and wetland hydrology is proposed to be restored through adjacent stream restoration practices that will elevate the water table (described above). Both potential wetland areas will also be planted with hydrophytic vegetation. In addition, those parts of existing wetland A outside the 50-foot stream buffer are proposed for wetland preservation.

Areas of potential wetland restoration will not be counted as wetland mitigation units unless groundwater gauge data is provided that shows jurisdictional wetland hydrology and wetland hydrologic performance criteria (12%; see Section 8.3) during the annual monitoring period and consultation with the IRT has occurred.

7.3 Vegetation and Planting Plan

Species selection for re-vegetation of the riparian buffer and restored wetland areas will generally follow those suggested by Schafale and Weakley (1990) for Coastal Plain Small Stream Swamp-Blackwater Subtype and Schafale (2012) for Coastal Plain Small Stream Swamp, as well as wetness tolerances cited in *WRP Technical Note VN-RS-4.1* (WRP 1997). Given that the existing and proposed topography is relatively flat, no planting of upland species is proposed. The native species selected for establishment at the Site represent a range of growth rates and varying tolerances to shade and moisture. These range of characteristics were selected to ensure that the appropriate vegetation cover develops over the Site.

The species lists, site preparation, planting density, planting methods, and materials are detailed in the plans included in Appendix 8.

Invasive species identified at the Site include princess tree (*Paulownia tomentosa*) in the field and associated stream side area, with Chinese privet and Japanese honeysuckle generally scattered along the edges of the existing wetland. During construction, the existing invasive vegetation species will be treated using mechanical methods. An invasive species vegetation treatment plan is included in Appendix 9.

7.4 Miscellaneous

A Coastal Plain headwater type channel was selected as the design stream type for the restoration of the UT. The expectation is that the flows in the restored reaches will form their own channel features and flow paths, along the fall of the valley following restoration, predominantly due to vegetation establishment and the associated deposition of sediment. This process is expected to occur over the 5 to 7 years following restoration, before canopy shading becomes widespread across the Site. As noted in the previous sections, excessive sediment supply is not expected to be an issue at the Site; however, there is a sediment supply from upstream eroding banks and adjacent agricultural practices that will allow for desired channel formation without undesired aggradation.

7.5 Project Risks and Uncertainties

Listed below are identified project risks and uncertainties that have been evaluated in the development of design plans for the Site, along with methods that have been/will be used to address these concerns.

- Land use development: There is potential for increased land development around the Site in the future that could lead to additional runoff and changes to watershed hydrology.
    - Methods to Address: The project area has seen little development in recent years and it is unlikely that development will threaten the Site in the foreseeable future. Restoration of the Site to reconnect streams to their floodplains will reduce the likelihood of future degradation from watershed changes, as increased flows will spread over a wider floodplain. Given the Site's position in the watershed and the surrounding topography, the risk of channel instability is low once vegetation is established.

- Easement Encroachment: There is potential for landowner encroachment into the permanent conservation easement.
    - Methods to Address: EPR has had considerable discussions with the landowner regarding the project requirements and limitations of easement access and is confident that the landowner fully understands and will maintain the easement protections. The easement boundaries will be clearly marked per NCDMS requirements. Any encroachments that do occur will be remedied by EPR or the long-

term steward to remedy any damage and provide any other corrections required by NCDMS and/or the NC Interagency Review Team (IRT).

- Drought and Floods: There is potential for extreme climatic conditions during the monitoring period of the project.

    - Methods to Address: EPR will apply adaptive management techniques as necessary to meet the site performance criteria. Such adaptive management may include replanting, channel damage repair, irrigation, or other methods. If adaptive management activities are significant, additional monitoring may be required by the IRT.

- Channel Formation: Since the project involves headwater systems, flow duration and channel formation performance standards may not be met.

    - Methods to Address: The design team is confident that the headwater stream systems will form as designed. This conclusion is based on observations of upstream and downstream wooded reaches, site wetness condition, soils, topography, and watershed sizes. Flow gauges will be installed, and observations of channel formation and ordinary high-water mark features will be recorded. In the first few years, channels may become obscured by dense herbaceous vegetation. Over time as trees grow and provide shade, the herbaceous species will be reduced, and the channels will typically become more defined and pronounced.

8.0 PERFORMANCE STANDARDS

Performance criteria outlined in the *NCDMS Mitigation Plan Template* (ver. 06/2017), and *US Army Corps of Engineers – Wilmington District Public Notice: Notification of Issuance of Guidance for Compensatory Stream and Wetland Mitigation Conducted for Wilmington District* (October 24, 2016), will be followed and are briefly outlined below. Monitoring information can be found in Section 9.0.

8.1 Restored Stream Channels

The required performance criteria for restored headwater stream channels, per USACE Guidance are summarized briefly below:

- Continuous surface flow within the valley or crenulation must be documented each year for at least 30 consecutive days;
- During Monitoring Years 1-4, the preponderance of evidence must demonstrate a concentration of flow indicative of channel formation within the topographic low point of the valley or crenulation as documented by indicators consistent with RGL 05-05 and outlined in the 2016 USACE Guidance;
- During Monitoring Years 5-7, the stream must successfully meet the Year 1-4 requirements and the preponderance of evidence must demonstrate the

development of stream bed and banks (i.e., an ordinary high-water mark) as documented by indicators consistent with RGL 05-05 and outlined in the 2016 USACE Guidance.

8.2 Riparian and Wetland Vegetation

The required performance criteria for planted riparian and wetland vegetation, per USACE Guidance are summarized below:

- Within planted portions of the Site, a minimum of 320 stems per acre must be present at Year 3, a minimum of 260 stems per acre must be present at Year 4, and a minimum of 210 stems per acre must be present at Year 7;
- Trees must average 7 feet in height at Year 5, and 10 feet in height at Year 7;
- Planted and volunteer stems are counted, provided they are included in the approved planting list for the Site;
- Any single species can only account for 50% of the required stems per monitoring plot;
- Vegetation must be planted, and plots established, at least 180 days prior to the initiation of the first year of monitoring; and
- Permanent plots will be randomly located throughout the Site, and random plots will not make up more than 50% of the plots.

Invasive species vegetation will be treated using a combination of chemical and/or mechanical methods. Treatment will continue throughout the project monitoring period.

8.3 Wetlands

All restored wetland areas within the project easement are proposed to have consistent monitoring and success criteria, including an appropriate wetland hydroperiod and vegetation indicative of a jurisdictional wetland as defined by USACE guidelines. Per the 2016 USACE Guidance, Bibb soils, which represent the map unit in the restored wetland at the upstream end of the project, have a hydroperiod of 12% or greater. A hydroperiod standard of 12% will be applied to wetland restoration areas. Wetland hydroperiod will be monitored by continuously recording groundwater gauges and will be presented in annual monitoring reports. Areas that do not exhibit sufficient hydroperiod and/or hydric soil indicators will be not be added to the wetland mitigation units upon completion of the monitoring period.

8.4 Compatibility with Project Goals

The required performance criteria described above, plus project-specific criteria, allow evaluation of whether the project goals have been met after the Site has been completed. In Table 12, the Project objectives are listed, along with the performance criteria that will allow documentation of whether these objectives have been achieved. Fulfillment of these objectives will allow the Project to achieve the goals outlined in Section 6.0.

Table 12. Project Objectives and Associated Performance Criteria

Objective	Performance Criteria
Restore 50-foot riparian buffers to filter runoff and provide organic matter and shade	• Vegetation success criteria of 320 native stems/acre in Year 3, 260 native stems/acre in Year 5 and 210 native stems/acre in Year 7.
Restore appropriate bed form diversity, headwater stream/wetland form, and install woody in-stream structures to provide appropriate habitat	• Documentation of field indicators of channel formation and an ordinary high-water mark using photographs and applicable data sheets. • Visual documentation of in-stream structure stability during annual monitoring.
Restore self-sustaining stream/wetland headwaters	• Water table gauges and wells document high water table conditions. • Wetland hydrology success criteria of saturation or inundation for 12 percent of the growing season. • Stream hydrology success criteria of 30-day consecutive flow.
Restore and preserve riparian wetland systems, including existing system at the southern end of the project	• Recordation of a conservation easement meeting NCDMS guidelines. • Water table gauges and wells document high water table conditions. • Wetland hydrology success criteria of saturation or inundation for 12 percent of the growing season.
Remove cropland from active production	• Protect minimum 50 ft. riparian buffers between project streams and active farming operations with a conservation easement meeting NCDMS guidelines, removing approximately 9.5 acres of land from active agricultural uses.
Restore minimum 50-foot riparian buffers that will include riparian wetlands and terrestrial edges	• Maintenance or development of wetland indicators (vegetation, hydrology, and soil), as defined by the USACE. • Vegetation success criteria of 320 native stems/acre in Year 3, 260 native stems/acre in Year 5 and 210 native stems/acre in Year 7.
Place a permanent conservation easement on the project area	• Recordation of a conservation easement meeting NCDMS guidelines.

9.0 MONITORING PLAN

The monitoring plan for the Site will follow the guidance outlined in the *NCDMS Mitigation Plan Template* (ver. 06/2017), and *US Army Corps of Engineers – Wilmington District Public Notice: Notification of Issuance of Guidance for Compensatory Stream and Wetland Mitigation Conducted for Wilmington District* (October 24, 2016). Monitoring data collected on the Site will include reference photos, plant survival analyses, channel stability analyses, as well as any other data specifically required by permit conditions.

Annual monitoring will be conducted for a period of seven years, unless the USACE, in consultation with the IRT, agrees that monitoring may be terminated early. Early closure will only be provided through written approval from the USACE in consultation with the IRT. Annual monitoring reports will be submitted to the NCDMS no later than November 30 of each monitoring year.

The As-Built Baseline Monitoring Report Template (ver. 06/2017) will be used to document the baseline conditions and to prepare the as-built record drawings for the Site. As-built surveys will be conducted within 60 days after project implementation is completed (following planting and monitoring device installation) to document the recently constructed features and conditions of the Site.

Annual monitoring data will be reported using the NCDMS Monitoring Report Template (ver. 06/2017). The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, population of DMS databases for analysis, and assist in decision making regarding project close-out.

While monitoring reports will be completed annually, not all monitoring reports will include the same information. All monitoring reports will include at least a brief narrative of site developments, a representative photo log, and a Current Condition Plan View (CCPV). Further monitoring measurements are detailed in the following sections.

9.1 Stream Monitoring

Stream monitoring will include monitoring of the hydrologic functions of the UT to Bear Swamp. Monitored parameters, methods, schedule/frequency, and extent are summarized in Table 13. Monitoring parameters follow USACE guidance for headwater streams. The proposed locations of stream gauges are shown in Figure 10.

Table 13. Stream Monitoring Summary

Parameter	Method	Schedule/ Frequency	Number/ Extent
Channel Formation	Documentation of applicable field indicators using photography and data sheets	Yearly	All restored stream reaches
Stream Hydrology	Continuous monitoring water level gauges and photography	Continuous recording through monitoring period	2 flow gauges on UT to Bear Swamp

9.2 Wetland Monitoring

Groundwater monitoring gauges will be installed to take measurements after hydrological modifications are performed at the Site. Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy the jurisdictional hydrology success criteria within each wetland restoration area (USEPA 1990). According to the USDA Soil Survey of Robeson County, the growing season is from March 14 to November 14 (USDA 1978). These growing season dates correspond very closely with those calculated using data collected from the Lumberton weather station, approximately 8 miles southeast of the Site. Using data collected between 1920 and 2019, the estimated growing season was calculated as March 15 to November 15. The WETS data from this station is included in Appendix 4. No other weather stations in the project vicinity had sufficient data (at least 30 years) to use in this analysis. The beginning of the growing season will be confirmed annually by soil temperatures exceeding 41 degrees Fahrenheit at 20 inches (50cm) depth, which will be corroborated with observations of bud burst. Soil temperatures will be collected in early March of each monitoring year and will be reported in the annual monitoring report. Monitored parameters, methods, schedule/frequency, and extent are summarized in Table 14. The proposed locations for groundwater gauges are shown in Figure 10.

Table 14. Wetland Monitoring Summary

Parameter	Method	Schedule/ Frequency	Number/ Extent	Data Collected
Wetland Restoration	Groundwater gauges; Rain gauge	Continuous recording through each growing season	5; two each in both restored wetland areas and one in the existing wetland area	Soil temperature at the beginning of each monitoring period, groundwater and rain data for each monitored period.

9.3 Riparian and Wetland Vegetation Monitoring

Vegetation monitoring will evaluate the establishment of planted and volunteer vegetation across the Site. Monitored parameters, methods, schedule/frequency, and extent are summarized in Table 15. Monitoring parameters follow USACE guidance but will also allow monitoring of parameters to document site performance related to the project goals listed in Section 6.0.

Table 15. Riparian and Wetland Vegetation Monitoring Summary

Parameter	Method	Schedule/ Frequency	Number/ Extent	Data Collected
Vegetation establishment and vigor	Permanent vegetation plots, 0.02 acre in size (minimum)	As-built, Years 1, 2, 3, 5, and 7	6 plots, spread across Site	Species, height, location, planted vs. volunteer, and age.
	Annual random vegetation plots, 0.02 acre in size (minimum)	Between July 1st and leaf drop	6 plots, randomly selected each year	Species, and height.

During quantitative vegetation sampling, sample plots (100 square meters, or 0.02 acre, each) will be installed within the Site as per guidelines established by the Level 1 and 2 Protocols in *CVS-DMS Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph. The proposed locations of permanent vegetation plots are shown in Figure 10.

9.4 Visual Assessment Monitoring

A visual assessment of the entire project will be conducted on an annual basis. The culmination of this data will be presented in the Current Condition Plan View (CCPV) with supporting documentation outlined by DMS's guidance titled *Annual Monitoring Report Format, Data Requirements, and Content Guidance* dated June 2017, and associated excel tables dated May 2019. This assessment includes annual photos of all vegetation plots (permanent and random), all monitored cross sections, all monitoring gauges (stream and wetland), the permanent ford stream crossing, and in-stream structures. The following will also be noted and documented with photos, where needed: 1) problem areas of vegetation; 2) evidence of channel formation and an OHWM; 3) evidence of easement encroachment or beaver presence. After DMS's review of the documentation, additional monitoring protocols may be required to ensure project success can be achieved.

10.0 ADAPTIVE MANANGEMENT PLAN

In the event the mitigation site or a specific component of the mitigation site fails to achieve the necessary performance standards as specified in the mitigation plan, EPR will notify DMS and will assist DMS in working with the IRT to develop contingency plans and remedial actions.

A maintenance plan is provided in Appendix 10, summarizing the types of issues that may arise during monitoring and how those issues would be addressed.

11.0 LONG-TERM MANAGEMENT PLAN

The Site will be transferred to the NCDEQ Stewardship Program. This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the Site to ensure that restrictions required in the conservation easement are upheld. Funding will be supplied by the responsible party on a yearly basis until such time an endowment is established.

The NCDEQ Stewardship Program is developing an endowment system within the non-reverting, interest-bearing Conservation Lands Conservation Fund Account. The use of funds from the Endowment Account will be governed by North Carolina General Statue GS 113A-232(d)(3). Interest gained by the endowment fund may be used for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable.

The Stewardship Program will periodically install replacement or supplemental signage to identify boundary markings, as needed. Permanent crossings will be the responsibility of the landowner of the underlying fee to maintain.

12.0 DETERMINATION OF UNITS

Mitigation units presented in Table 16a. and 16b. are projections based upon the mitigation design. Upon completion of site construction, the project components and unit data will be adjusted, if necessary, to be consistent with the as-built condition, and any changes will be described in the As-built/Baseline Monitoring Report. The project proposes to provide stream mitigation units derived from stream restoration activities shown in Table 16a. and Figure 8. Where possible, stream riparian buffers in excess of the minimum 50-feet have been restored along the stream valley for a total of 15.3 protected acres.

The project proposes to provide wetland mitigation units derived from riparian wetland restoration and preservation as shown in Table 16b. and Figure 8.

Table 16a. Bear Swamp Restoration Project Stream Asset Table

Project Component	Existing Footage	Stationing	Mitigation Plan Footage	Restoration Level	Approach Priority Level	Mitigation Ratio (X:1)	Mitigation Units	Notes/ Comments
UT to Bear Swamp	2,432	10+00 – 32+22	2,222	Restoration	Headwater	1	2,222.000	Full Channel Restoration, Planted Buffer, and Permanent Conservation Easement.
Total Assets Summary: 2,222.000 SMUs*								

* EPR is under contract with the Division of Mitigation Services to provide 2,200 Stream Mitigation Units. Any additional stream mitigation units beyond the contracted amount will not be realized by EPR

Table 16b. Bear Swamp Restoration Project Wetland Asset Table

Asset	Type	Acreage	Wetland Mitigation Type	Mitigation Ratio	Mitigation Units	Notes/ Comments
Existing Wetland A	Riparian Riverine	0.417	Preservation	10:1	0.042	Protect with Permanent Conservation Easement
Potential Wetland B	Riparian Riverine	2.490	Restoration	1:1	2.490	Restore wetland indicators (vegetation, hydrology, and soil), as defined by the USACE.
Potential Wetland C	Riparian Riverine	0.348	Restoration	1:1	0.348	
Total Assets Summary: 2.880 WMUs*						

* EPR is under contract with the Division of Mitigation Services to provide 2.6 Wetland Mitigation Units. Any additional wetland mitigation units beyond the contracted amount will not be realized by EPR

Table 16c. Length and Area Summations by Mitigation Category

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)
		Riverine	Non-Riverine	
Restoration	2,222	2.84		
Enhancement				
Enhancement I				
Enhancement II				
Rehabilitation				
Preservation		0.04		
High Quality Pres				

Table 16d. Overall Assets Summary

Asset Category	Overall Units
Stream	**2,222**
RP Wetland	**2.88**

13.0 FINANCIAL ASSURANCES

A statement regarding the financial assurances for the project can be found in Appendix 12.

14.0 IRT POST-CONTRACT MEETING

Representatives of the USACE, NC DEQ DWR, NC DMS, and EPR attended the IRT Post-Contract (on-site) meeting for the Bear Swamp Stream and Wetland Restoration Site on June 25, 2018. The meeting minutes were distributed on July 2, 2018 and can be found in Appendix 13.

15.0 REFERENCES

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. A function-based framework for developing stream assessments, restoration goals, performance standards and standard operating procedures. US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, DC

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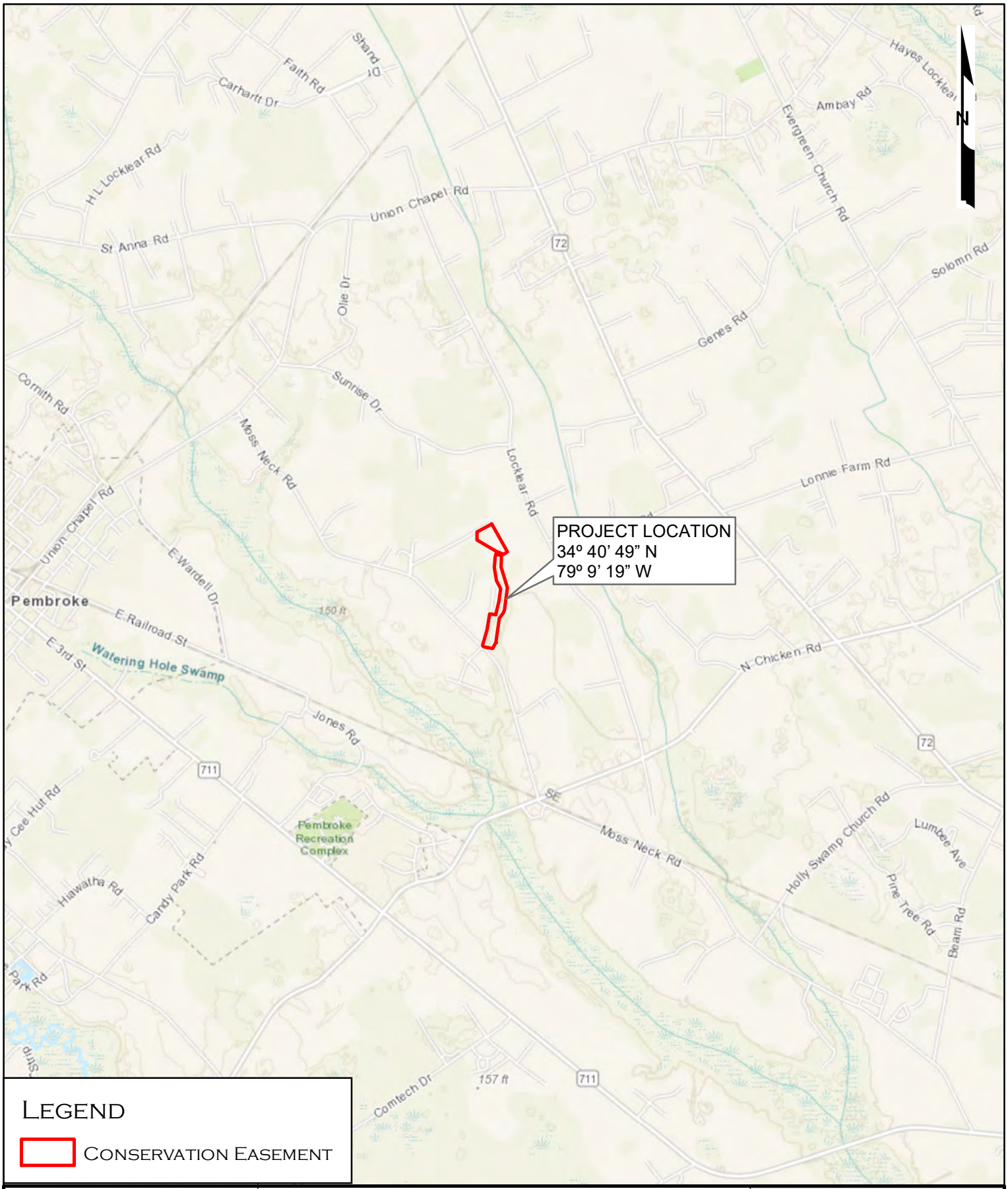
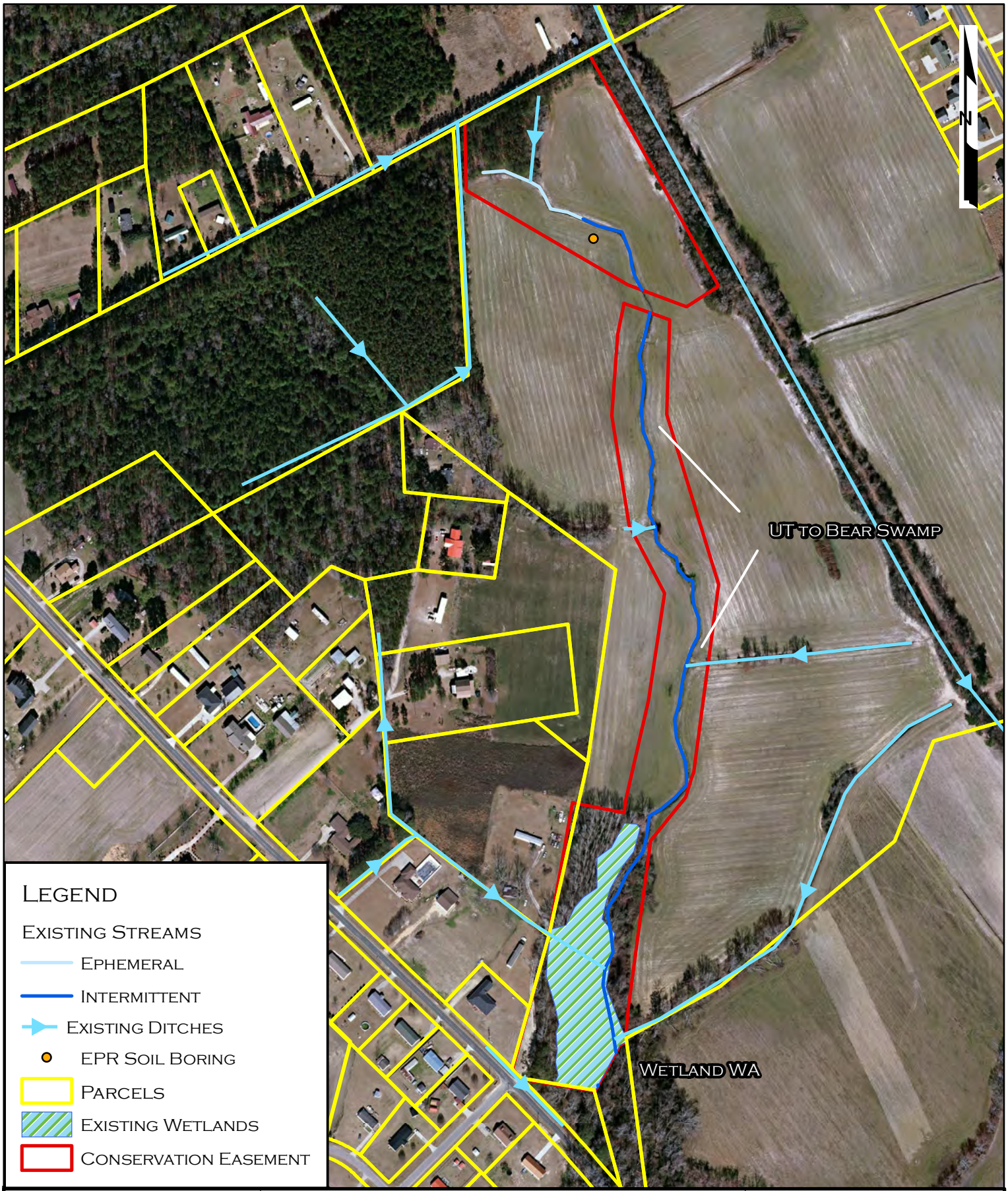
WRP Technical Note VN-RS-4.1. 1997. Species Match Ensures Conversion of Wet Agricultural Fields to Bottomland Hardwood Wetlands.



Legend

Conservation Easement

0 0.25 0.5 Miles	BEAR SWAMP STREAM & WETLAND RESTORATION VICINITY MAP	PREPARED FOR: NCDEQ Division of Mitigation Services
FIGURE 1	ROBESON COUNTY, NC	PREPARED BY: Ecosystem Planning & Restoration



0 400 Feet

Bear Swamp Stream & Wetland Restoration

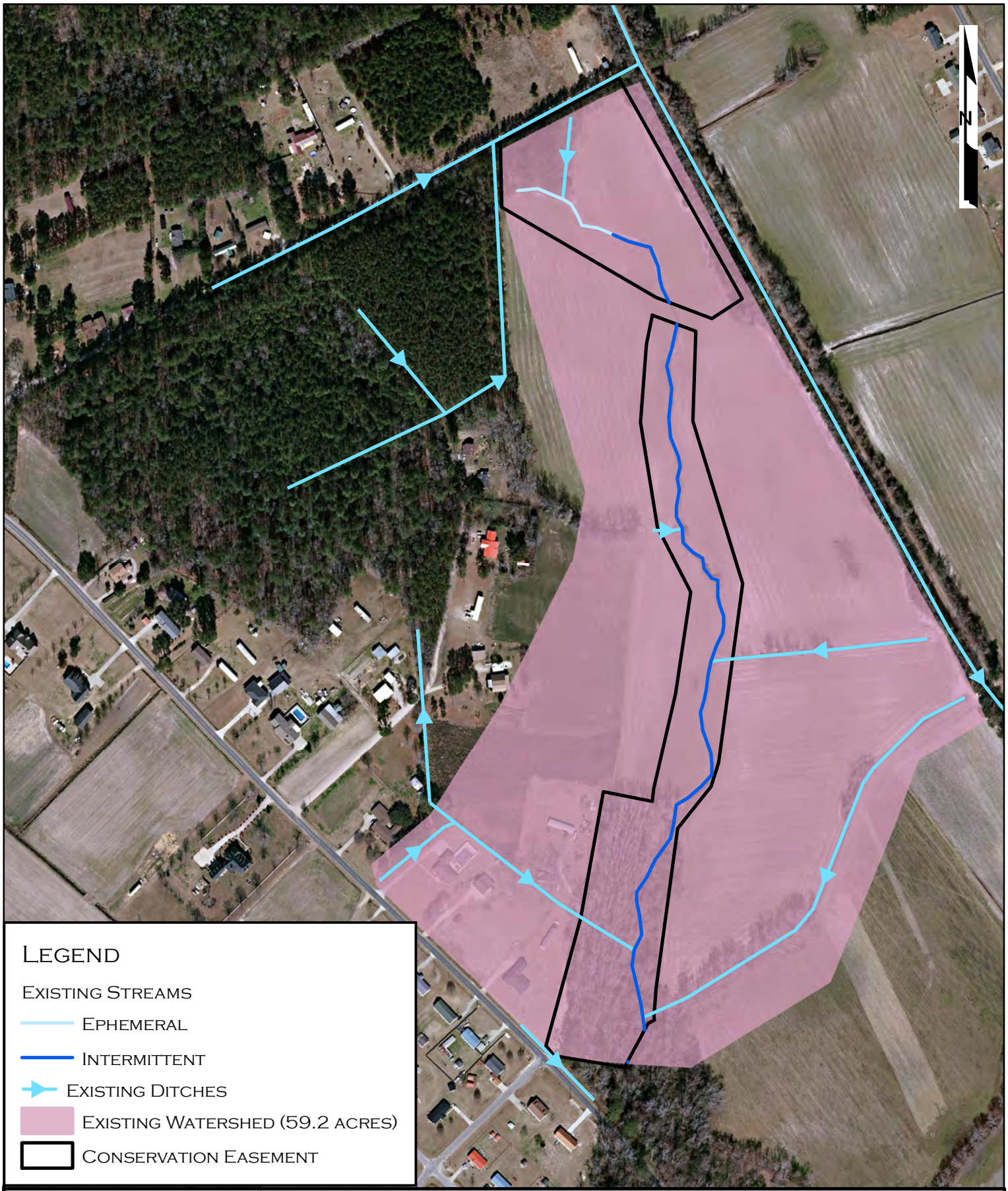
Existing Conditions Map

Figure 2A

Robeson County, North Carolina

Prepared for:
NCDEQ
Division of
Mitigation Services

Prepared by:
Ecosystem Planning & Restoration



0 200 400 Feet

Bear Swamp Stream & Wetland Restoration

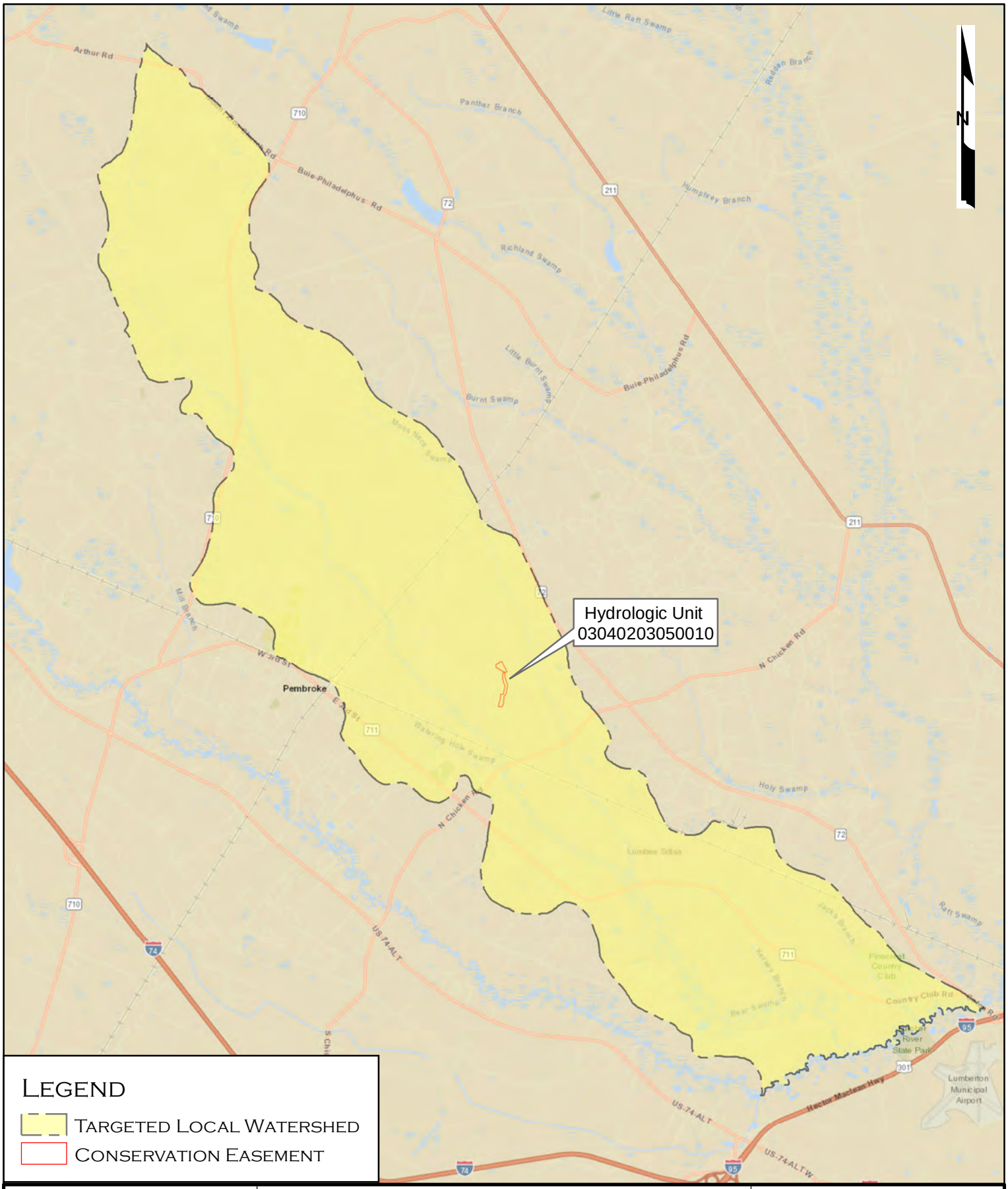
Existing Watershed Map

Figure 2B

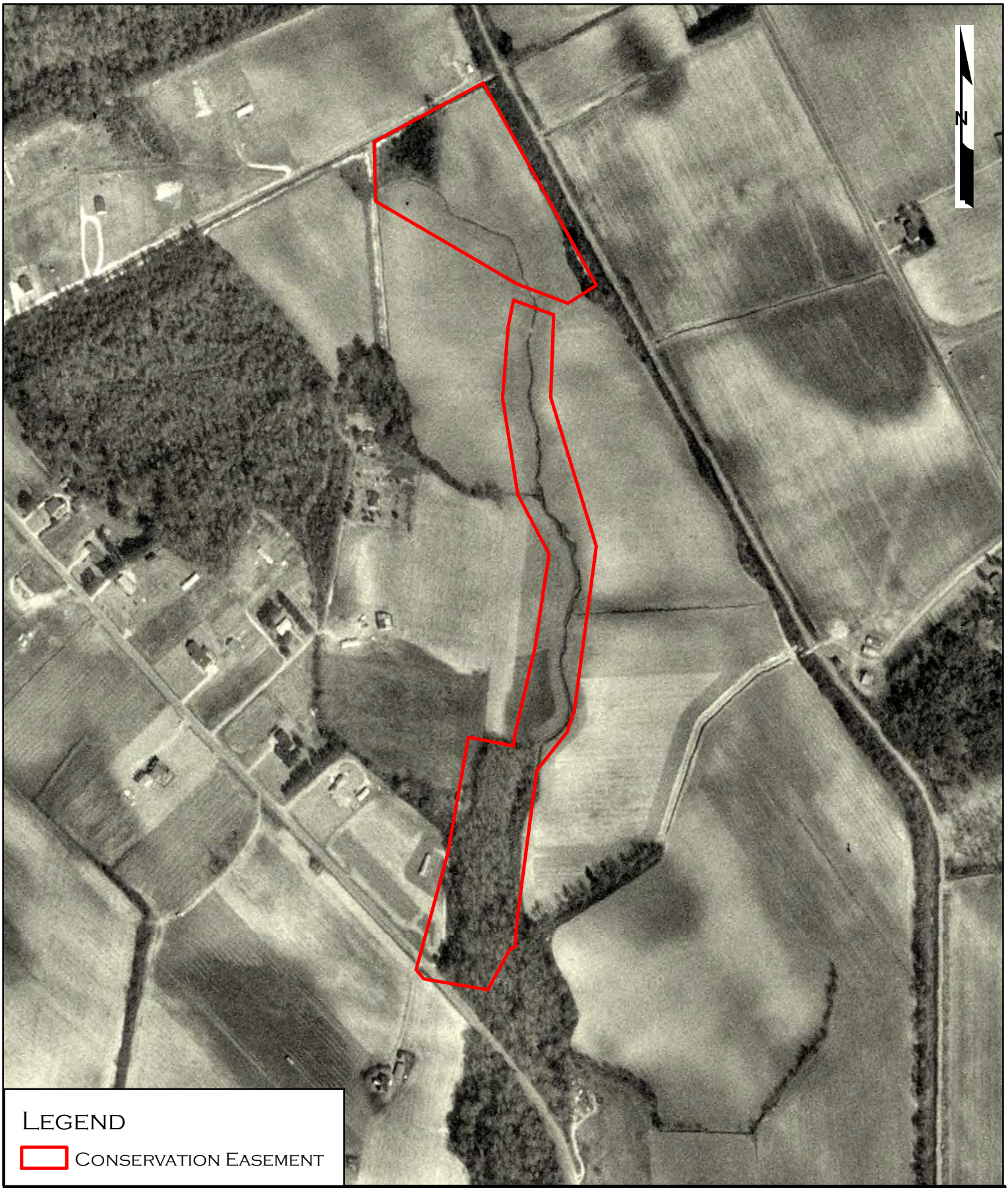
Robeson County, North Carolina

Prepared for:
NCDEQ
Division of
Mitigation Services

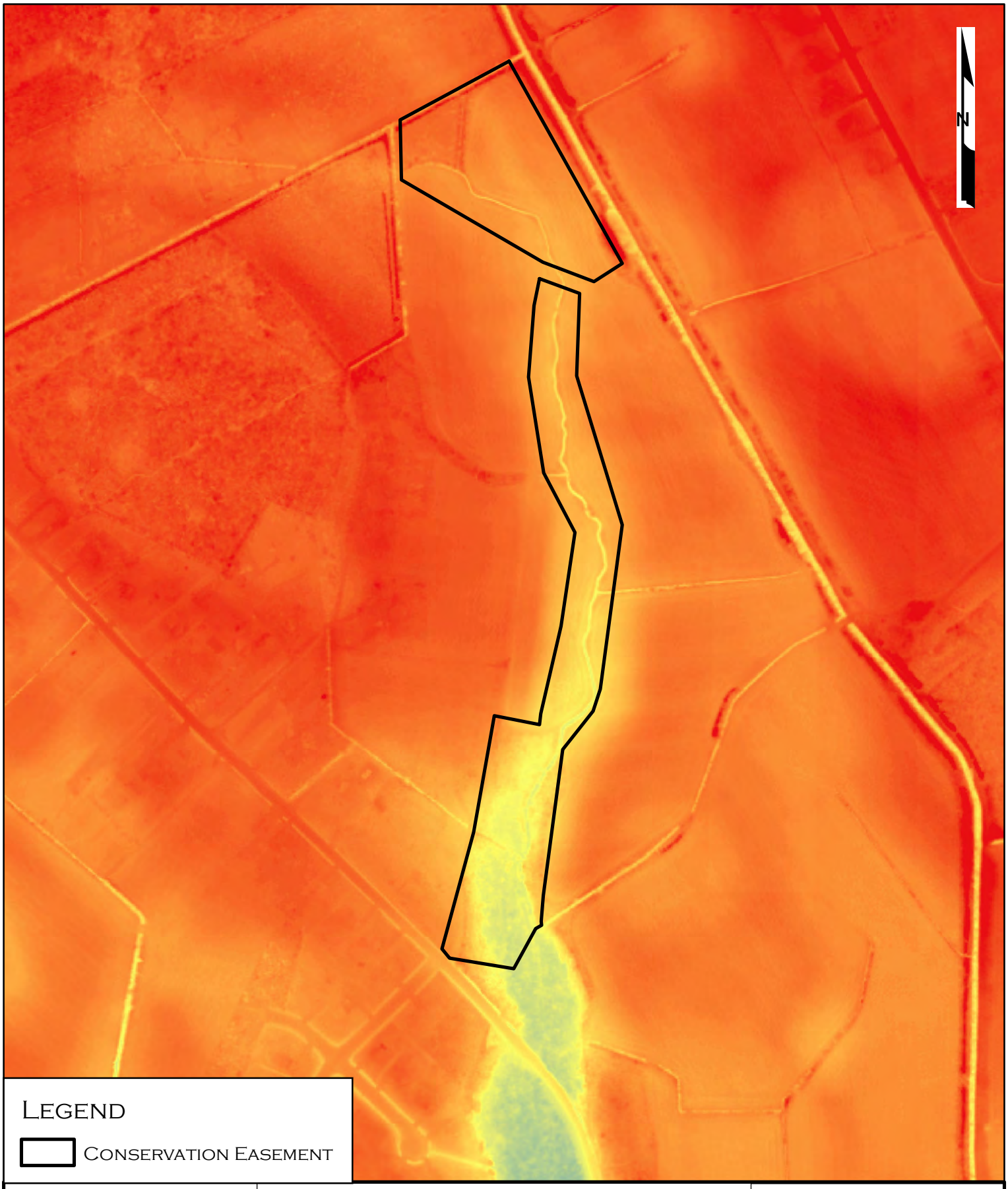
Prepared by:
Ecosystem Planning & Restoration



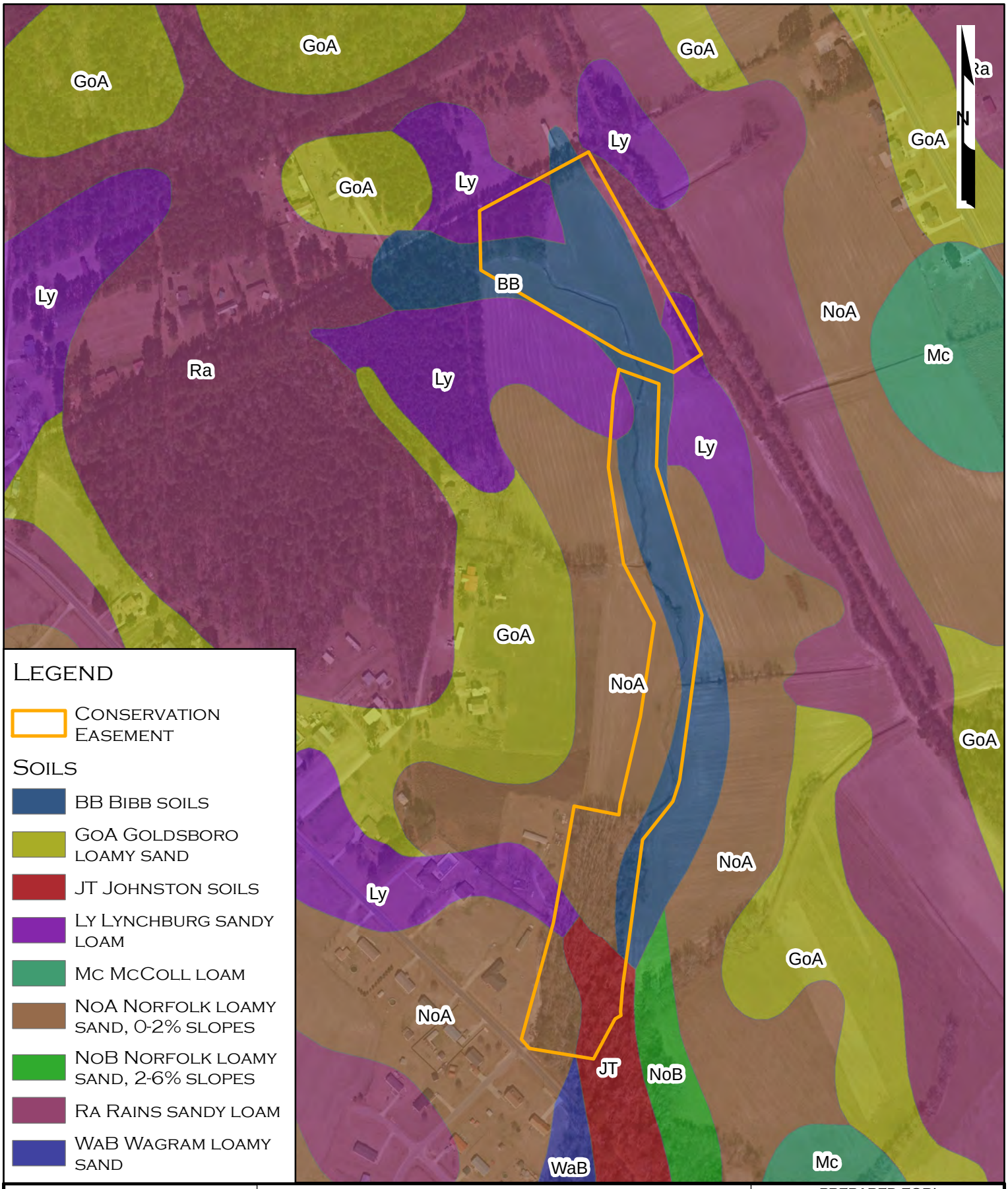
	BEAR SWAMP STREAM & WETLAND RESTORATION HYDROLOGIC UNIT MAP	PREPARED FOR: NCDEQ DIVISION OF MITIGATION SERVICES
FIGURE 3	ROBESON COUNTY, NC	PREPARED BY: ECOSYSTEM PLANNING & RESTORATION



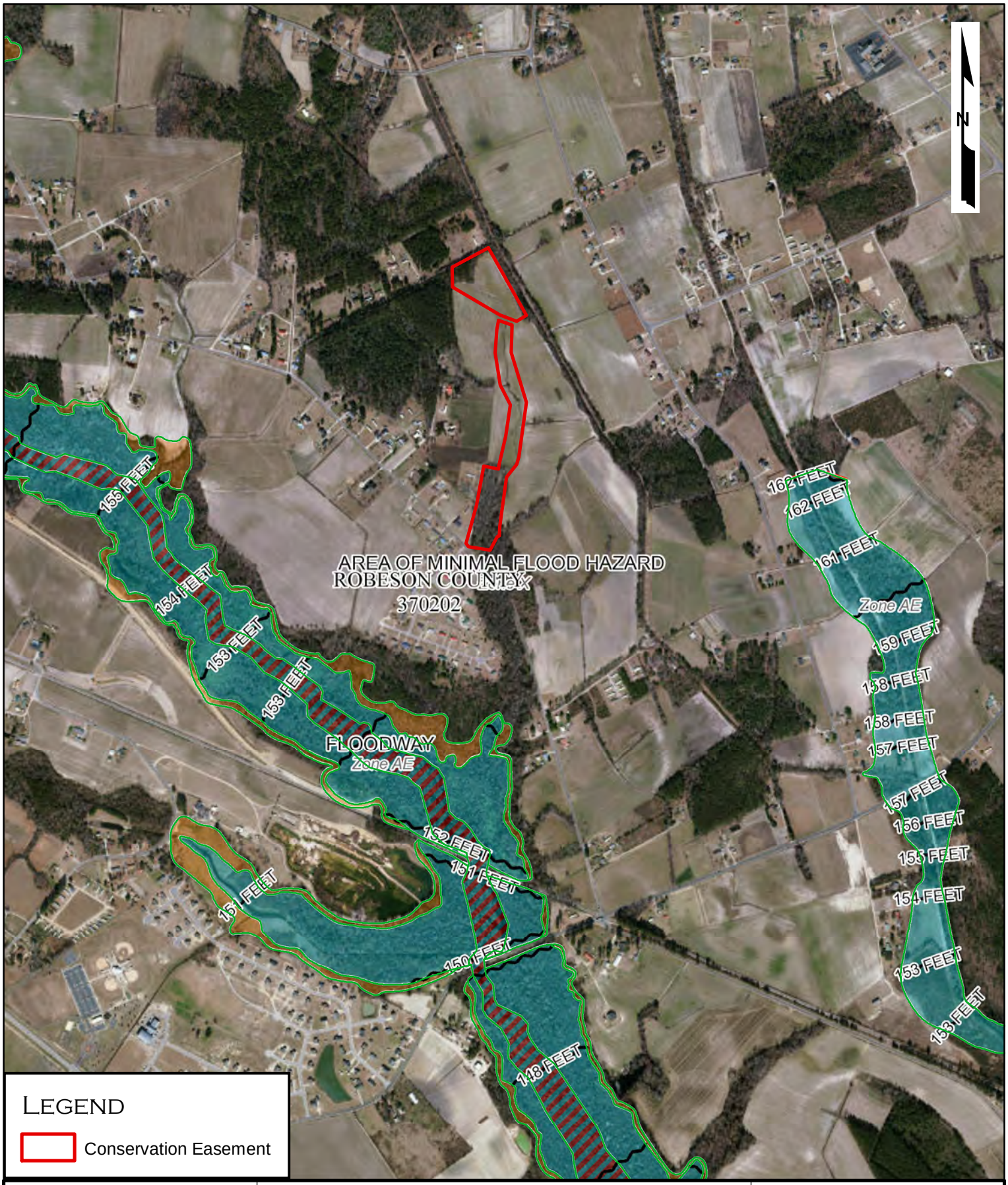
0 400 FEET	BEAR SWAMP STREAM & WETLAND RESTORATION HISTORIC AERIAL MAP (1993)	PREPARED FOR: NCDEQ DIVISION OF MITIGATION SERVICES
FIGURE 4	ROBESON COUNTY, NC	PREPARED BY: ECOSYSTEM PLANNING & RESTORATION



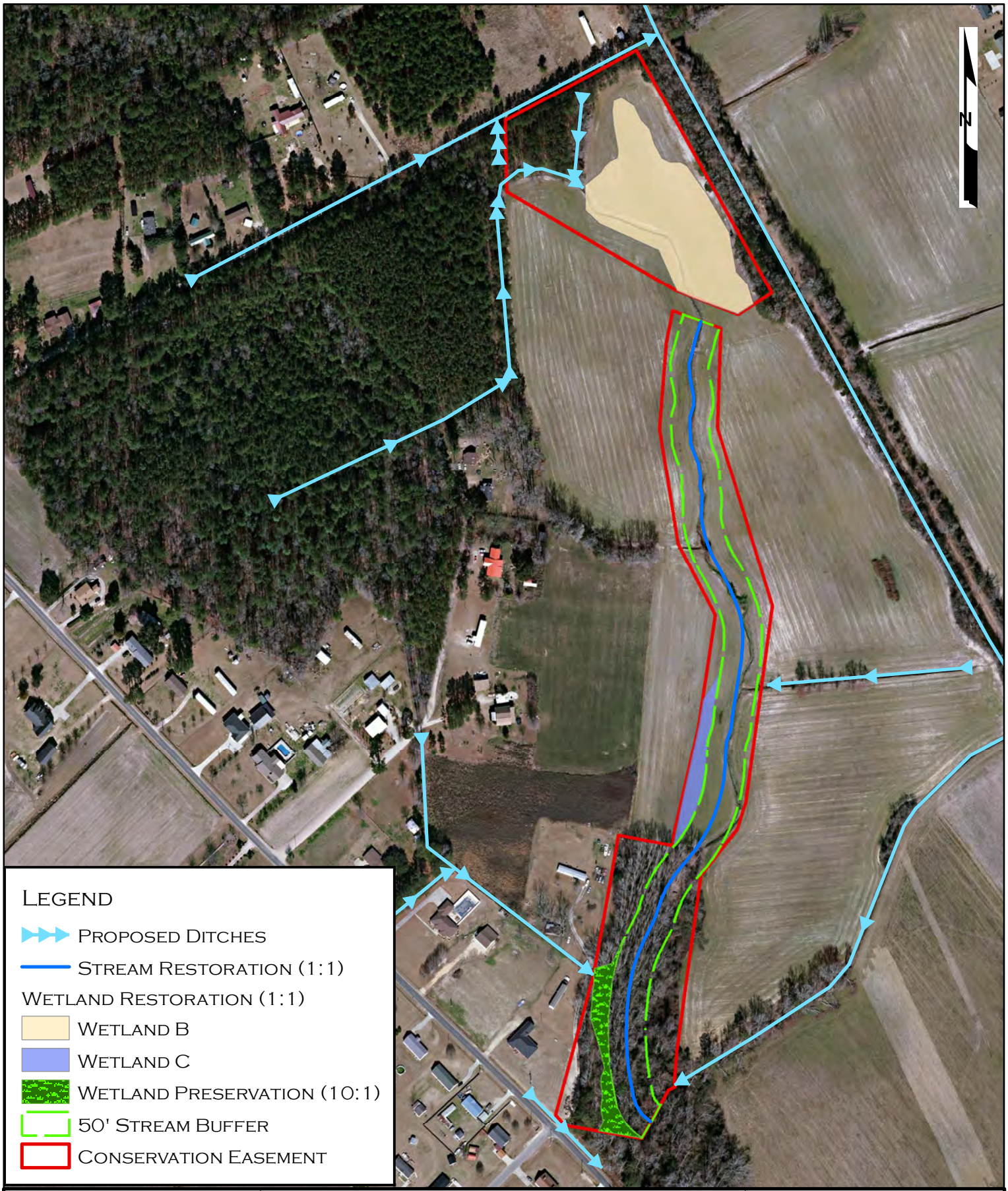
0 400 Feet	BEAR SWAMP STREAM & WETLAND RESTORATION LIDAR MAP	PREPARED FOR: NCDEQ Divsion of Mitigation Services
Figure 5	ROBESON COUNTY, NC	PREPARED BY: Ecosystem Planning & Restoration



0 400 Feet	BEAR SWAMP STREAM & WETLAND RESTORATION Soils Map	Prepared for: NCDEQ Division of Mitigation Services
FIGURE 6	ROBESON COUNTY, NC	Prepared by: Ecosystem Planning & Restoration



	BEAR SWAMP STREAM & WETLAND RESTORATION FEMA FLOODPLAIN MAP	PREPARED FOR: NCDEQ DIVISION OF MITIGATION SERVICES
FIGURE 7	ROBESON COUNTY, NC	PREPARED BY: ECOSYSTEM PLANNING & RESTORATION



0 400 Feet

BEAR SWAMP STREAM & WETLAND RESTORATION

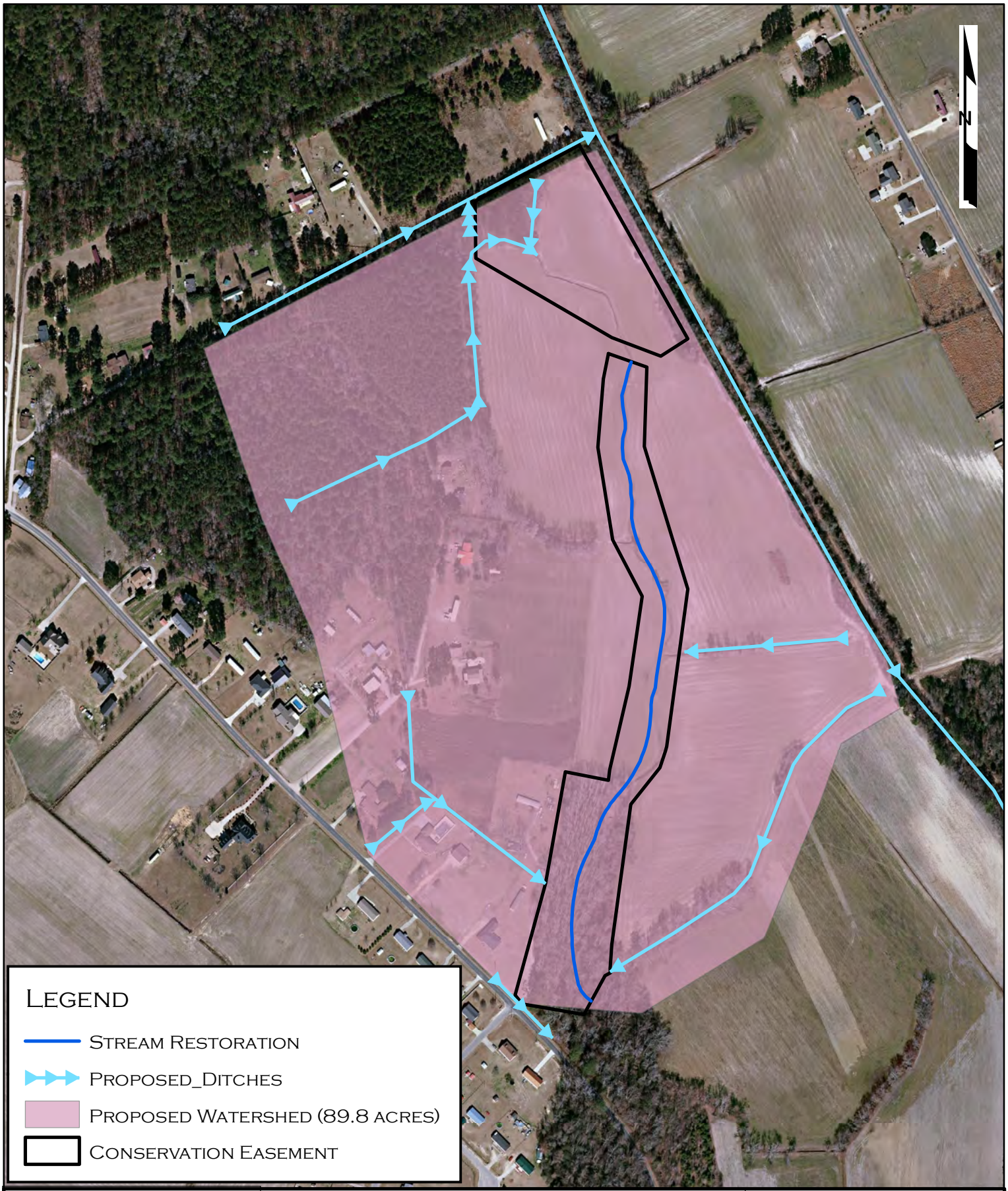
Assets Map

Prepared for: NCDEQ Division of Mitigation Services

Figure 8

Robeson County, North Carolina

Prepared by: Ecosystem Planning & Restoration



0 250 500 Feet

Bear Swamp Stream & Wetland Restoration

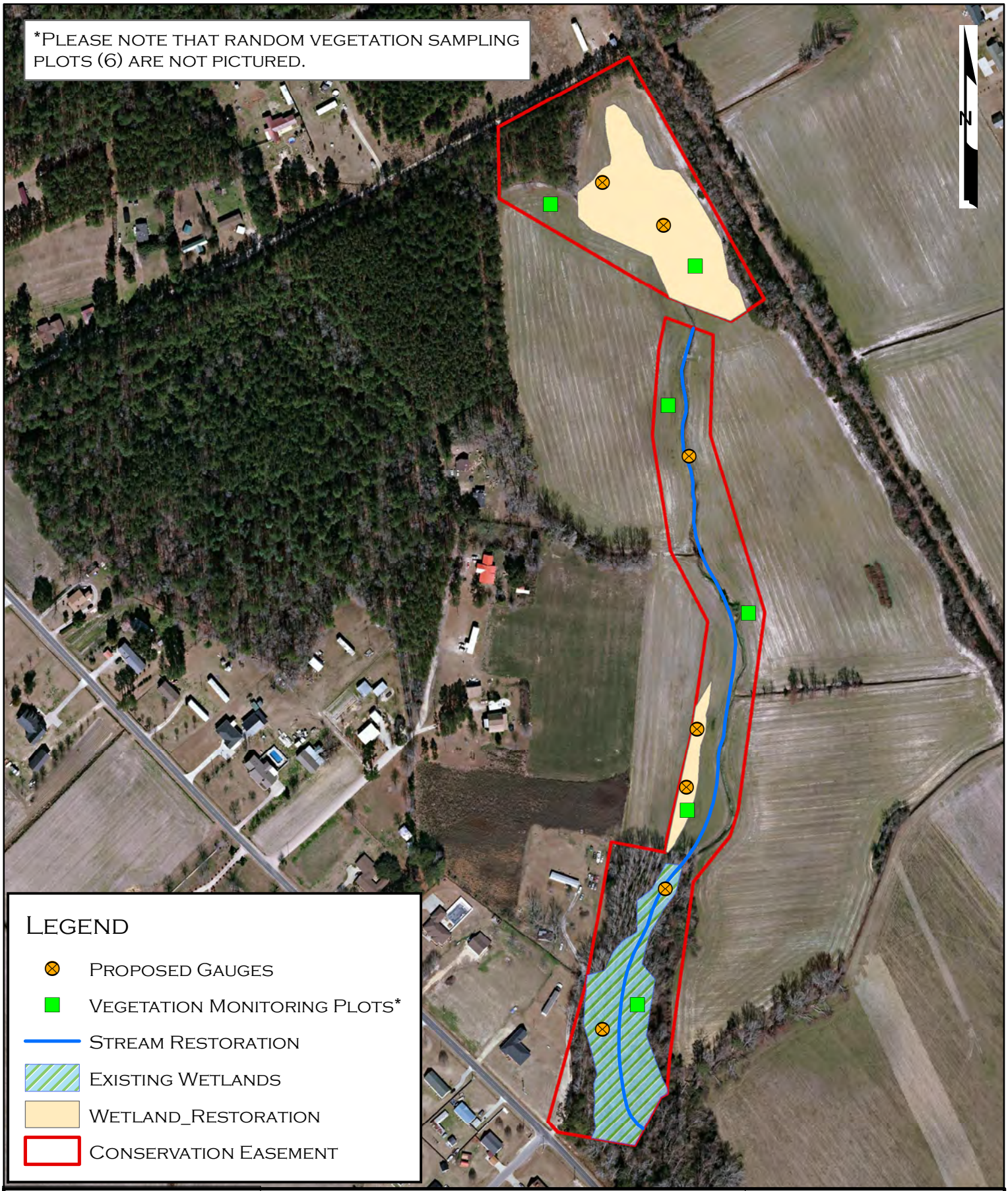
Proposed Watershed Map

Figure 9

Robeson County, North Carolina

Prepared for:
NCDEQ
Division of
Mitigation Services

Prepared by:
Ecosystem Planning & Restoration



0 200 400 Feet

Bear Swamp Stream & Wetland Restoration

Monitoring Features Map

Figure 10

Robeson County, North Carolina

Prepared for:
NCDEQ
Division of
Mitigation Services

Prepared by:
Ecosystem Planning & Restoration

Appendix 1

SITE PROTECTION INSTRUMENT

2019007445
ROBESON CO. NC FEE $26.00
STATE OF NC REAL ESTATE EXT
$340.00
PRESENTED & RECORDED
08/29/2019 04:49:31 PM
VICKI L LOCKLEAR
REGISTER OF DEEDS
BY: KYNIA JOHNSON
DEPUTY
BK: D 2193
PG: 287 - 299

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

ROBESON COUNTY

SPO File Number: 78-CR
DMS Project Number: 100054

Excise Tax: $340.00

Prepared by and return to: Jason A. Brenner, Esq.
310 East Main Street Suite 355
Carrboro, NC 27510

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, made this 29th day of August, 2019, by K. M. Biggs, Incorporated, a North Carolina for profit corporation, ("**Grantor**"), with a mailing address of PO Box 967, Lumberton, NC 28359-0967, to the State of North Carolina, ("**Grantee**"), with a mailing address of State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Division of Mitigation Services (formerly known as the Ecosystem Enhancement Program and Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between ECOSYSTEM PLANNING AND RESTORATION, LLC, a limited liability company with offices at 559 Jones Franklin Road, Suite 150, Raleigh, North Carolina 27606, and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number 7183.

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Department of Environment and Natural Resources and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Understanding, (MOU) duly executed by all parties on November 4, 1998. This MOU recognized that the Wetlands Restoration Program was to provide effective compensatory mitigation for authorized impacts to wetlands, streams and other aquatic resources by restoring, enhancing and preserving the wetland and riparian areas of the State; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the Division of Mitigation Services (formerly Ecosystem Enhancement Program) is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the Department of Environment and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the North Carolina Wildlife Resources Commission, the North Carolina Division of Water Quality, the North Carolina Division of Coastal Management, and the National Marine Fisheries Service entered into an agreement to continue the In-Lieu Fee operations of the North Carolina Department of Natural Resources' Division of Mitigation Services (formerly Ecosystem Enhancement Program) with an effective date of 28 July, 2010, which supersedes and replaces the previously effective MOA and MOU referenced above; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, the Division of Mitigation Services in the Department of Environment and Natural Resources, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being

in Pembroke Township, Robeson County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 84.73 acres and being conveyed to the Grantor by deeds as recorded in **Deed Book 8I at Page 317 and Deed Book 8G at Page 145** of the Robeson County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the areas of the Property subject to the Conservation Easement to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of ***Bear Swamp.***

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Conservation Easement Area consists of the following:

Easement Areas 1 and 2 containing a total of **15.26 acres** as shown on the plat of survey entitled "Conservation Easement Survey for: The State of North Carolina, Division of Mitigation Services," dated August 26, 2019 by Kinder Land Surveying of Mount Airy, NC, PLS Number L-4462.

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Conservation Easement Area."

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Conservation Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Conservation Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Conservation Easement Area shall be restricted from any development or usage that

would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Conservation Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Conservation Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Conservation Easement Area is prohibited except within a Crossing Area(s) or Road or Trail as shown on the recorded survey plat.

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Conservation Easement Area not inconsistent with this Conservation Easement, and the right of access to the Conservation Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

D. Damage to Vegetation. Except within Crossing Area(s) as shown on the recorded survey plat and as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Conservation Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Conservation Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Conservation Easement Area.

F. Agricultural Use. All agricultural uses are prohibited within the Conservation Easement Area including any use for cropland, waste lagoons, or pastureland.

G. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Conservation Easement Area.

H. Roads and Trails. There shall be no construction or maintenance of new roads, trails, walkways, or paving in the Conservation Easement. All existing roads, trails and crossings within the Conservation Easement Area shall be shown on the recorded survey plat.

I. Signs. No signs shall be permitted in the Conservation Easement Area except interpretive signs describing restoration activities and the conservation values of the Conservation Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the

Conservation Easement Area.

J. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or any other material in the Conservation Easement Area is prohibited.

K. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, drilling, hydraulic fracturing; removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

L. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Conservation Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Conservation Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Conservation Easement Area may temporarily be withdrawn for good cause shown as needed for the survival of livestock on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no further subdivision, partitioning, or dividing of the Conservation Easement Area portion of the Property owned by the Grantor in fee simple ("fee") that is subject to this Conservation Easement is allowed. Any future transfer of the Property shall be subject to this Conservation Easement and Right of Access and to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Conservation Easement Area for the purposes set forth herein.

N. Development Rights. All development rights are permanently removed from the Conservation Easement Area and are non-transferrable.

O. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Conservation Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

P. Permitted Exceptions. As approved and accepted by both Grantee and Grantor, the following encumbered easement areas are permitted exceptions to the above recited covenants and restrictions;

(1) The triangular shaped section of land lying to the west of and including the existing soil road as depicted on the recorded plat of survey as Management Area A. As of the date of survey, Management Area A is cleared and mowed. Management A begins at a point named "Previa" in the private 30' soil road right-of-way and runs south to the soil road entrance at a point in SR 1567; then in a western direction along the line of SR 1567 to lands of Linda Faye Johnson; then due northeast along the common line of Linda Faye Johnson to the point of beginning. Grantor and Grantee shall have non-exclusive access rights to the existing 30' wide soil road and private right-of-way.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the Division of Mitigation Services, 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Conservation Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, protect, and monitor the stream, wetland and any other riparian resources in the Conservation Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. Signs. The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. Fences. Conservation Easements are purchased to protect the investments by the State (Grantee) in natural resources. Livestock within conservations easements damages the investment and can result in reductions in natural resource value and mitigation credits which would cause financial harm to the State. Therefore, Landowners (Grantor) with livestock are required to restrict livestock access to the Conservation Easement area. Repeated failure to do so may result in the State (Grantee) repairing or installing livestock exclusion devices (fences) within the conservation area for the purpose of restricting livestock access. In such cases, the landowner (Grantor) must provide access to the State (Grantee) to make repairs.

E. Crossing Area(s). The Grantee is not responsible for maintenance of crossing area(s), however, the Grantee, its employees and agents, successors or assigns, reserve the right to repair crossing area(s), at its sole discretion and to recover the cost of such repairs from the Grantor if such repairs are needed as a result of activities of the Grantor, his successors or assigns.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Conservation Easement Area that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features in the Conservation Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the

Grantee shall, except as provided below, notify the Grantor in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Conservation Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief, if the breach is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Conservation Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury or change in the Conservation Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon

the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

D. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed is subject to the Conservation Easement herein created.

E. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The owner of the Property shall notify the State Property Office and the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property or of any request to void or modify this Conservation Easement. Such notifications and modification requests shall be addressed to:

Division of Mitigation Services Program Manager
NC State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

and

General Counsel
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

G. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the

conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Conservation Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Conservation Easement Area, and the right of quiet enjoyment of the Conservation Easement Area,

TO HAVE AND TO HOLD, the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes,

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same is free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

K.M. Biggs, Incorporated (SEAL)

By: _____

F.K. Biggs, III, President

NORTH CAROLINA
COUNTY OF ROBESON

I, Devon Hodges, a Notary Public in and for the County and State aforesaid, do hereby certify that F.K. Biggs, III, personally appeared before me this day and acknowledged the execution of the foregoing instrument, as President and duly authorized signatory for Grantor.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 27th day of August, 2019.

Devon Hodges
Notary Public

My commission expires: 08/22/2020

DEVON HODGES NOTARY PUBLIC ROBESON COUNTY, NC My Comm. Expires August 22, 2020 (SEAL)

Exhibit A

BEING DESCRIBED AND SHOWN ON A PLAT OF SURVEY SHOWING "CONSERVATION EASEMENT SURVEY FOR: THE STATE OF NORTH CAROLINA, DIVISION OF MITIGATION SERVICES, SPO FILE NO. [78-CR]; DMS PROJECT #100054, BEAR SWAMP STREAM AND WETLAND SITE", DATED AUGUST 26, 2019 BY KINDER LAND SURVEYING OF MOUNT AIRY, NC, PLS NUMBER L-4462; AND RECORDED AT P.B. 54 ; PG. 101 IN THE ROBESON COUNTY REGISTER OF DEEDS, FURTHER BEING DESCRIBED:

"EASEMENT AREA "1"

BEGINNING POINT DESIGNATED AS "A" ON PLAT AS PREVIOUSLY DESCRIBED, POINT BEING A ⅝" CAPPED REBAR, SAID 5/8" REBAR HAVING THE N.C. GRID COORDINATES: North: 340043.96 East : 1952685.41
Thence the following Course: N 61-41-43 E Length: 390.79 to a ⅝"REBAR having N.C. Grid Coordinates: North: 340229.26 East : 1953029.47
Thence the following Course: S 29-11-12 E Length: 732.23 to a ⅝"REBAR having N.C. Grid Coordinates: North: 339589.99 East : 1953386.55
Thence the following Course: S 57-06-59 W Length: 105.29 to a ⅝"REBAR having N.C. Grid Coordinates: North: 339532.83 East : 1953298.13
Thence the following Course: N 69-17-18 W Length: 173.36 to a ⅝"REBAR having N.C. Grid Coordinates: North: 339594.14 East : 1953135.97
Thence the following Course: N 59-41-14 W Length: 517.38 to a ⅝"REBAR having N.C. Grid Coordinates: North: 339855.27 East : 1952689.33
Thence the following Course: N 01-11-26 W Length: 188.73 to a ⅝"REBAR having N.C. Grid Coordinates: North: 340043.96 East : 1952685.41
THIS POINT BEING THE "POINT OF BEGINNING, having a Perimeter: 2107.78
Area: 247,453 Sq Ft or
5.681 Ac.

"EASEMENT AREA "2"

BEGINNING POINT DESIGNATED AS "A" ON PLAT AS PREVIOUSLY DESCRIBED, POINT BEING A ⅝" CAPPED REBAR, SAID 5/8" REBAR HAVING THE N.C. GRID COORDINATES:
Coordinates: North: 339496.39 East : 1953251.83

Thence the following Course: S 01-50-28 W Length: 260.90 to a ⅝"REBAR having N.C. Grid Coordinates: North: 339235.62 East : 1953243.45
Thence the following Course: S 17-00-21 E Length: 491.87 to a ⅝"REBAR having N.C. Grid Coordinates: North: 338765.25 East : 1953387.31
Thence the following Course: S 07-39-49 W Length: 523.69 to a ⅝"REBAR having N.C. Grid Coordinates: North: 338246.24 East : 1953317.47
Thence the following Course: S 17-38-12 W Length: 72.37 to a ⅝"REBAR having N.C. Grid Coordinates: North: 338177.27 East : 1953295.54
Thence the following Course: S 38-29-22 W Length: 154.45 to a ⅝"REBAR having N.C. Grid Coordinates: North: 338056.38 East : 1953199.42
Thence the following Course: S 07-41-03 W Length: 466.59 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337593.98 East : 1953137.03Thence the following Course: S 04-42-22 W Length: 81.21 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337513.04 East : 1953130.36
Thence the following Course: S 07-29-28 E Length: 12.11 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337501.03 East : 1953131.94
Thence the following Course: S 60-29-15 W Length: 20.88 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337490.75 East : 1953113.77
Thence the following Course: S 28-30-17 W Length: 144.83 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337363.47 East : 1953044.65
Thence the following Course: N 80-29-42 W Length: 205.37 to a ⅝"REBAR having N.C. Grid Coordinates: North: 337397.39 East : 1952842.10
Thence the following Course: N 40-04-04 W Length: 38.47 to a ⅝"REBAR having N.C.Grid Coordinates: North: 337426.82 East : 1952817.34
Thence the following Course: N 15-17-59 E Length: 380.82 to a ⅝"REBAR having N.C.Grid Coordinates: North: 337794.15 East : 1952917.83
Thence the following Course: N 10-04-55 E Length: 373.86 to a ⅝"REBAR having N.C.Grid Coordinates: North: 338162.23 East : 1952983.27
Thence the following Course: S 78-54-17 E Length: 144.84 to a ⅝"REBAR having N.C.Grid Coordinates: North: 338134.36 East : 1953125.41
Thence the following Course: N 07-06-44 E Length: 35.38 to a ⅝"REBAR having N.C.Grid Coordinates: North: 338169.47 East : 1953129.79
Thence the following Course: N 12-57-53 E Length: 283.22 to a ⅝"REBAR having N.C.Grid Coordinates: North: 338445.47 East : 1953193.33
Thence the following Course: N 08-28-42 E Length: 298.84 to a ⅝"REBAR having N.C.Grid Coordinates: North: 338741.05 East : 1953237.39
Thence the following Course: N 27-31-46 W Length: 211.53 to a ⅝"REBAR having

N.C.Grid Coordinates: North: 338928.62 East : 1953139.62
Thence the following Course: N 09-02-44 W Length: 307.61 to a ⅝"REBAR having
N.C.Grid Coordinates: North: 339232.41 East : 1953091.26
Thence the following Course: N 04-21-44 E Length: 225.94 to a ⅝"REBAR having
N.C.Grid Coordinates: North: 339457.69 East : 1953108.44
Thence the following Course: N 11-25-19 E Length: 86.01 to a ⅝"REBAR having
N.C.Grid Coordinates: North: 339542.00 East : 1953125.48
Thence the following Course: S 70-09-04 E Length: 134.33 to a ⅝"REBAR having
N.C.Grid Coordinates: North: 339496.39 East : 1953251.83

THIS POINT BEING THE POINT OF BEGINNING; HAVING A Perimeter: 4955.13; Area: 416,813 Sq Ft 9.569 Ac.

2019007446
ROBESON CO. NC FEE $26.00
PRESENTED & RECORDED
08/29/2019 04:49:32 PM
VICKI L LOCKLEAR
REGISTER OF DEEDS
BY: KYNIA JOHNSON
DEPUTY
BK: D 2193
PG: 300 - 304

Prepared by and return to: Jason A. Brenner, Esq.
310 East Main Street Suite 355
Carrboro, NC 27510

NORTH CAROLINA

ACCESS EASEMENT AGREEMENT

ROBESON COUNTY

THIS ACCESS EASEMENT AGREEMENT (the "Agreement") is entered into this 28th day of August, 2019 by and between K. M. Biggs, Incorporated with a mailing address of PO Box 967, Lumberton, North Carolina 28359-0967 Sparger Road, Mt. Airy, North Carolina 27030, (collectively, "Grantors"), in favor of Ecosystem Planning and Restoration, LLC ("Grantee"), with a mailing address of 1150 SE Maynard Rd, Suite 140, Raleigh, North Carolina 27511.

WITNESSETH

WHEREAS, Grantor owns that certain parcel of land consisting of approximately Eighty-Four Point Seven Three (84.73) acres located in Robeson County, North Carolina and having Parcel No. 935339505659 and shown and described more particularly on the recorded plat referenced herein below (the "Property); and

WHEREAS, Grantor desires to grant to Grantee an access easement over the Property in conjunction with Grantor's grant of that certain Deed of Conservation Easement in favor of State of North Carolina, Department of Administration.

AGREEMENT

NOW, THEREFORE, for valuable consideration, the receipt and sufficiency of which is hereby acknowledged by Grantor, and in consideration of the covenants set forth herein, Grantor does hereby give, grant, and convey unto Grantee, its successors and assigns, officers, employees, contractors, subcontractors, and any other authorized representatives of Grantee the following easements:

1. Temporary rights of access, including the associated rights of ingress, egress, and regress, to, on, and over, the portions of the Property depicted as being within the conservation easement areas in that certain plat entitled "Conservation Easement Survey for the State of North Carolina, Division of Mitigation Services" recorded in the Robeson County Registry in Plat Book 54, Page 101, (the "Plat") and as further depicted in the attached **Exhibit A** to perform construction and restore certain easement areas on the Property to

conditions determined by the North Carolina Division of Mitigation Services ("DMS"), including sufficient rights and access to allow movement of vehicles, pedestrians, and heavy equipment over such access area as necessary. Such access area shall extend for twenty (20) feet in width over the entire access area as shown in the attached **Exhibit A**. The rights set forth in this instrument shall terminate eighteen (18) months from this date, or upon the completion of construction activities and project construction phase approval and close-out signified by DMS, whichever is first to occur; and

2. Rights of access, including the associated rights of ingress, egress, and regress, to, on, and over, the portions of the Property depicted as being within the conservation easement areas on the Plat and as further depicted in the attached **Exhibit A**, to monitor site conditions on Grantor's property as required by the North Carolina Division of Mitigation Services ("DMS"), including sufficient rights and access to allow movement of vehicles and pedestrians over such access area as necessary, and, additionally, rights of access, including the associated rights of ingress, egress, and regress to such areas sufficient to allow movement of vehicles, pedestrians, and heavy equipment for the purposes of making repairs, alterations, and additions to the construction site work performed by Grantee on the Property. Such access area shall extend for twenty (20) feet in width over the entire access area as shown in the attached **Exhibit A**. The rights set forth in this instrument shall terminate eight (8) years from this date, or upon the completion of monitoring activities and project close-out signified by DMS, whichever is first to occur.

Grantee agrees to indemnify, protect and defend Grantors, and hold Grantor harmless from and against any loss, claim or damage, including reasonable attorney's fees, resulting from Grantee's use of the Property.

TO HAVE AND TO HOLD the rights, privileges, and easement as aforesaid, across, over and through the Property for the benefit of Grantee and its successors and assigns. Grantor warrants that it has good and indefeasible fee simple title to the Property to all encumbrances of record, and that it has the right to grant this Easement, and it will warrant and defend the title to the same against the lawful claims of all persons whomsoever during the term of this Agreement.

[THIS SPACE INTENTIONALLY LEFT BLANK-SIGNATURE PAGES TO FOLLOW]

IN WITNESS WHEREOF, Grantor and Grantee have caused this instrument to be duly executed, all as of the day and year first above written.

GRANTOR:

K. M. BIGGS, INCORPORATED

By: _____

Name: F.K. Biggs, III

Title: President

STATE OF NORTH CAROLINA §
§
COUNTY OF ROBESON §

I certify that the following person(s) personally appeared before me this day, acknowledging to me that he or she signed the foregoing document as the duly-authorized signatory for K. M. Biggs, Incorporated: **F.K. Biggs, III.**

Date: 08/27/2019

_____
Official Signature of Notary Public

DEVON HODGES
NOTARY
My Comm. Expires
August 22, 2020
PUBLIC
ROBESON COUNTY, NC

GRANTEE:

ECOSYSTEM PLANNING AND RESTORATION, PLLC

By: _____

Name: Kevin Tweedy

Title: Vice-President

STATE OF NORTH CAROLINA §
§
COUNTY OF WAKE §

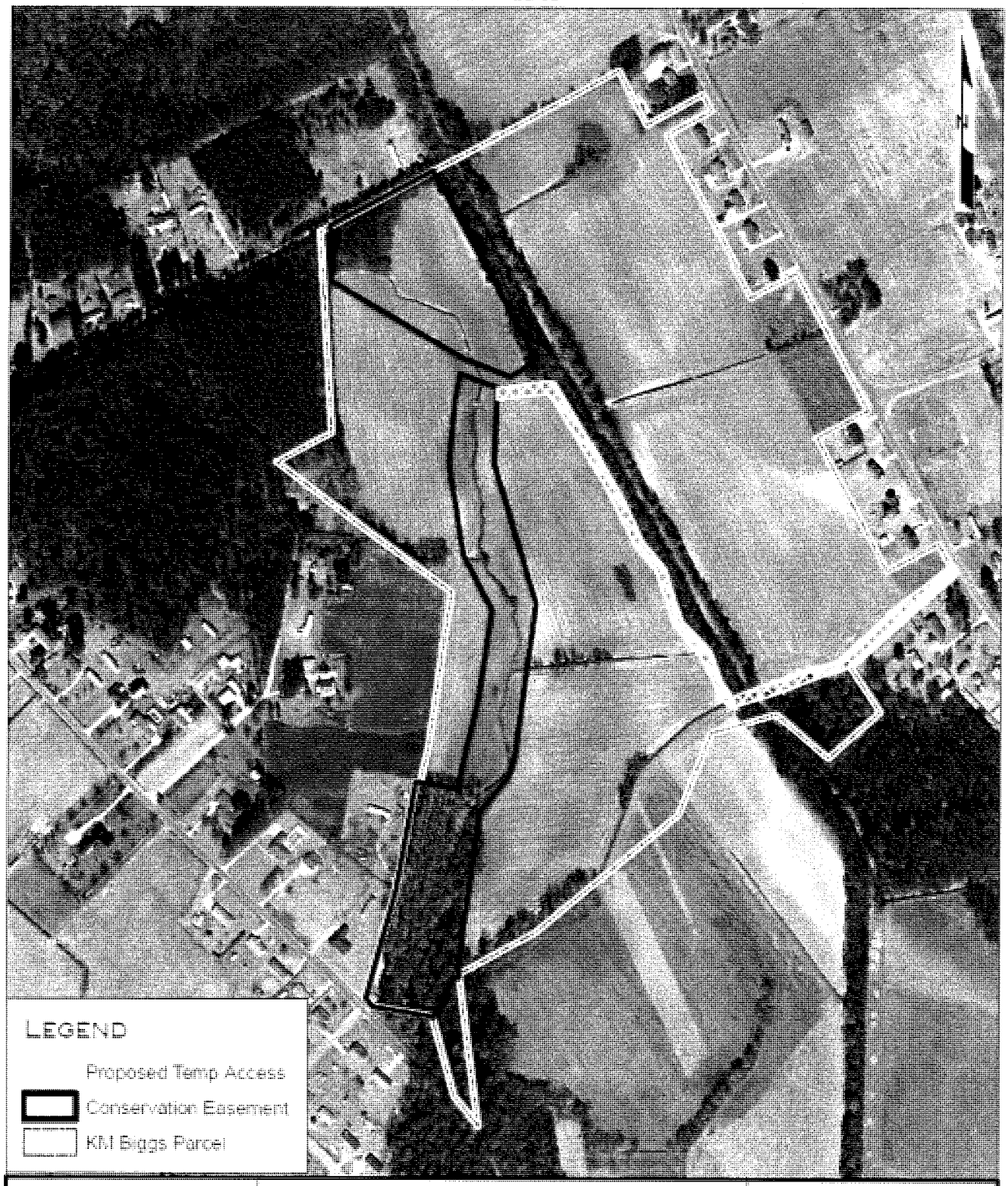
I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: **Kevin Tweedy**.

Date: 8/27/19

_____
Official Signature of Notary Public

WARD E. ELIS
NOTARY PUBLIC
WAKE COUNTY, N.C.
My Commission Expires 2-6-2024.

EXHIBIT A



This map is not a certified survey and has not been reviewed by a local government agency for compliance with any land development regulations.

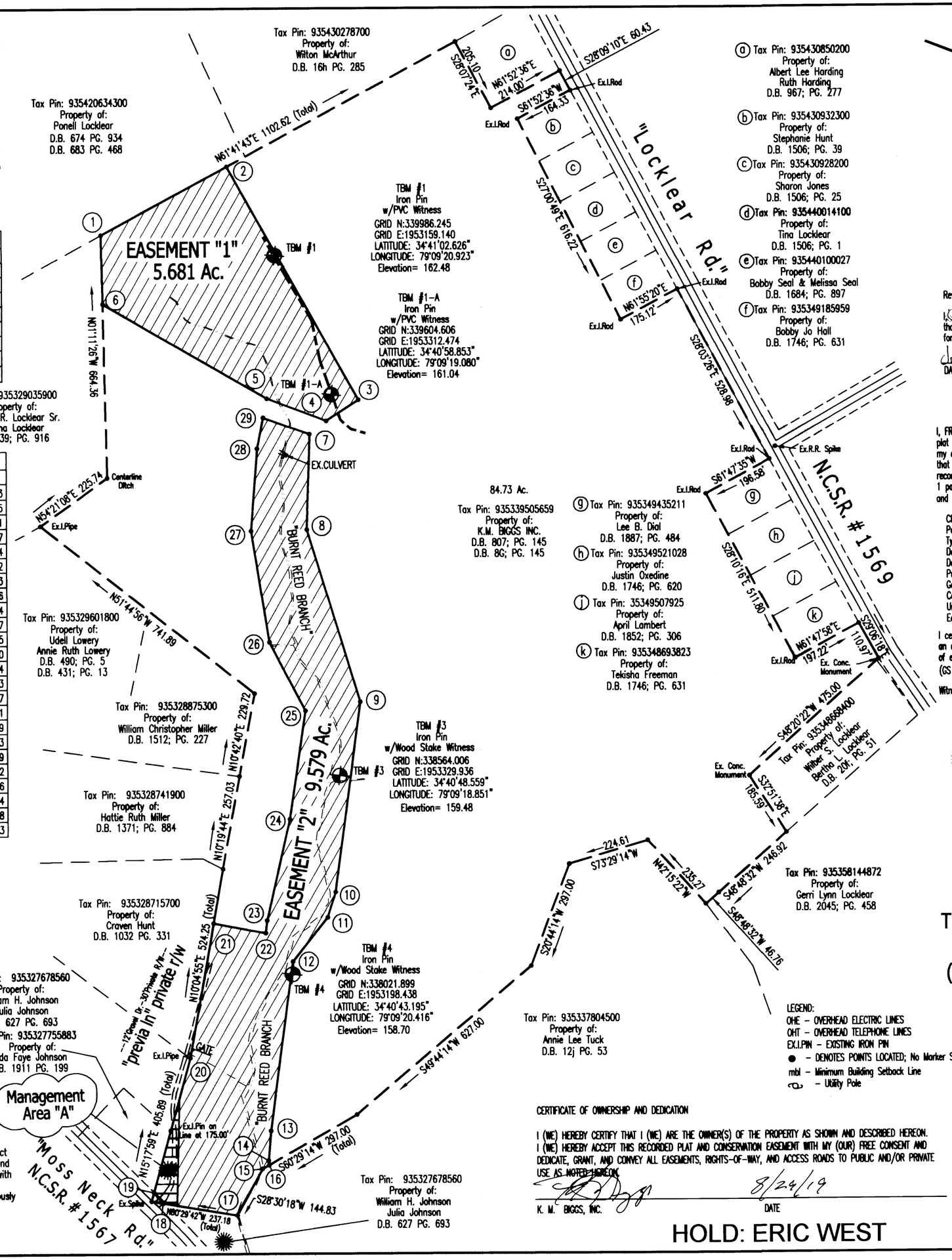
2019007443
ROBESON CO, NC FEE $21.00
PRESENTED & RECORDED:
08-29-2019 03:56:37 PM
VICKI L LOCKLEAR
REGISTER OF DEEDS
BY: CHISA WAINWRIGHT-LOCKLEAR
DEPUTY
BK: M 54
PG: 101-101

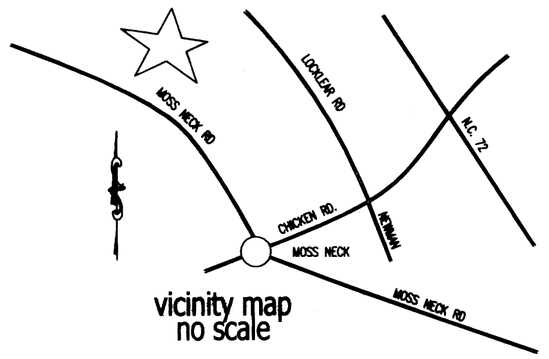
101

North carolina grid nad 83(2011)

"EASEMENT 1"				
LINE	COURSE	DISTANCE	Northing	Easting
			340043.96	1952685.41
1-2	N61°41'43"E	390.79	340229.26	1953029.47
2-3	S29°11'12"E	732.23	339589.99	1953386.55
3-4	S57°06'59"W	105.29	339532.83	1953298.13
4-5	N69°17'18"W	173.36	339594.14	1953135.97
5-6	N59°41'14"W	517.38	339855.27	1952689.33
6-1	N01°11'26"W	188.73	340043.96	1952685.41
5.681 Ac.				

"EASEMENT 2"				
LINE	COURSE	DISTANCE	Northing	Easting
			339496.39	1953251.83
7-8	S01°50'28"W	260.90	339235.62	1953243.45
8-9	S17°00'21"E	491.87	338765.25	1953387.31
9-10	S07°39'49"W	523.69	338246.24	1953317.47
10-11	S17°38'12"W	72.37	338177.27	1953295.54
11-12	S38°29'22"W	154.45	338056.38	1953199.42
12-13	S07°41'03"W	466.59	337593.98	1953137.03
13-14	S04°42'22"W	81.21	337513.04	1953130.36
14-15	S07°29'28"E	12.11	337501.03	1953131.94
15-16	S60°29'15"W	20.88	337490.75	1953113.77
16-17	S28°30'17"W	144.83	337363.47	1953044.65
17-18	N80°29'42"W	205.37	337397.39	1952842.10
18-19	N40°04'04"W	38.47	337426.82	1952817.34
19-20	N15°17'59"E	380.82	337794.15	1952917.83
20-21	N10°04'55"E	373.86	338162.23	1952983.27
21-22	S78°54'17"E	144.84	338134.36	1953125.41
22-23	N07°06'44"E	35.38	338169.47	1953129.79
23-24	N12°57'53"E	283.22	338445.47	1953193.33
24-25	N08°28'42"E	298.84	338741.05	1953237.39
25-26	N27°31'46"W	211.53	338928.62	1953139.62
26-27	N09°02'44"W	307.61	339232.41	1953091.26
27-28	N04°21'44"E	225.94	339457.69	1953108.44
28-29	N11°25'19"E	86.01	339542.00	1953125.48
29-7	S70°09'04"E	134.33	339496.39	1953251.83





vicinity map
no scale

Review Officer Certification G.S. 47-30

I Jackie S. Edson Review Officer of Robeson County, certify that this plat to which this certification is affixed meets all the requirements for recording.

August 28 2019
DATE — REVIEW OFFICER

I, FRANKLIN G. KINDER, Professional Land Surveyor, L-4462, do hereby certify that this plat with this certification affixed was drawn from an actual field survey performed under my direct supervision; from deeds and relative source documents for title as indicated; that the boundaries not surveyed by me are clearly shown as broken linetypes plotted from record deeds or other sources obtained by me; that the ratio of precision is greater than 1 part in 20,000; that this survey was prepared in accordance with G.S. 47-30 as amended. and further that the following information was used to perform the GPS portion of this survey:

Class of survey: B
Positional Accuracy: 0.03 FT - Vert. Accuracy 0.02 FT
Type of GPS field procedure: GNSS North Carolina CORS RTK Network
Dates of survey - FEBRUARY - MARCH 2019
Datum/Epoch - NAD83(2011)
Published Fixed Control Use: NC GEODETIC CONTROL MONUMENT "PEA"
Geoid Model: GEOID12B
Combined Grid Factor(s) 0.99992179
Units: U.S. SURVEY FOOT
Equipment Used: Spectra Precision SP60 ADVANCED GNSS RECEIVER

I certify that this survey does not create a subdivision of land within ROBESON County, which has an ordinance regulating parcels of land; that it is of another category, such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of subdivision. (GS 47-30(f)(11)d).

Witness my original Signature, seal and license number this 26th Day of August, 2019, A.D..

NORTH CAROLINA PROFESSIONAL SEAL L-4462 FRANKLIN G. KINDER LAND SURVEYOR

Professional Land Surveyor
Registration # L-4462

PLAT OF SURVEY
SHOWING

CONSERVATION EASEMENT SURVEY FOR: THE STATE OF NORTH CAROLINA, DIVISION OF MITIGATION SERVICES (SPO FILE #78-CR; DMS PROJECT#100054)

LYING IN THE
PEMBROKE TOWNSHIP
OF
ROBESON COUNTY, NORTH CAROLINA
Tax Pin: 935339505659

D.B. 625; PG. 810
D.B. 8G; PG. 145

Scale: 1"=200' --- Date: 26 August 2019

200 0 100 200 400
1 inch = 200 ft.

NOTES:

1. Property as shown does not fall within the limits of a designated flood hazard zone.
2. This survey was performed without the benefit of a title report and may not reflect all easements or encumbrances hereon.
3. Features such as springs, streams, buildings, roads, etc..... unless otherwise dimensioned are approximate locations.
4. All Distances shown are Horizontal Ground Distances unless otherwise noted.
5. The purpose of this plat is to serve as a reference for the creation of a conservation easement. This plat is not a boundary survey. The land parcels and their boundaries affected by this conservation easement are not changed by this plat. Easement Corners are 5/8"rebar with a 3.5" aluminum Reference cap and a PVC Post Witness.
6. The State of North Carolina, its employees and agents, successors and assigns, are granted and conveyed a perpetual right of access to the easement area over the property at reasonable times to undertake any activities to restore, construct manage, maintain, enhance, and monitor the stream, wetland and other riparian resources in the easement area, in accordance with the restoration activities or a long-term management plan as described in Section III-A of the Deed Recorded contemporaneously with this plat. Preferred Access Routes are shown hereon in Approximate Locations.

LEGEND:
OHE - OVERHEAD ELECTRIC LINES
OHT - OVERHEAD TELEPHONE LINES
EX.I.PIN - EXISTING IRON PIN
● - DENOTES POINTS LOCATED; No Marker Set
mbl - Minimum Building Setback Line
- Utility Pole

CERTIFICATE OF OWNERSHIP AND DEDICATION

I (WE) HEREBY CERTIFY THAT I (WE) ARE THE OWNER(S) OF THE PROPERTY AS SHOWN AND DESCRIBED HEREON. I (WE) HEREBY ACCEPT THIS RECORDED PLAT AND CONSERVATION EASEMENT WITH MY (OUR) FREE CONSENT AND DEDICATE, GRANT, AND CONVEY ALL EASEMENTS, RIGHTS-OF-WAY, AND ACCESS ROADS TO PUBLIC AND/OR PRIVATE USE AS NOTED HEREON.

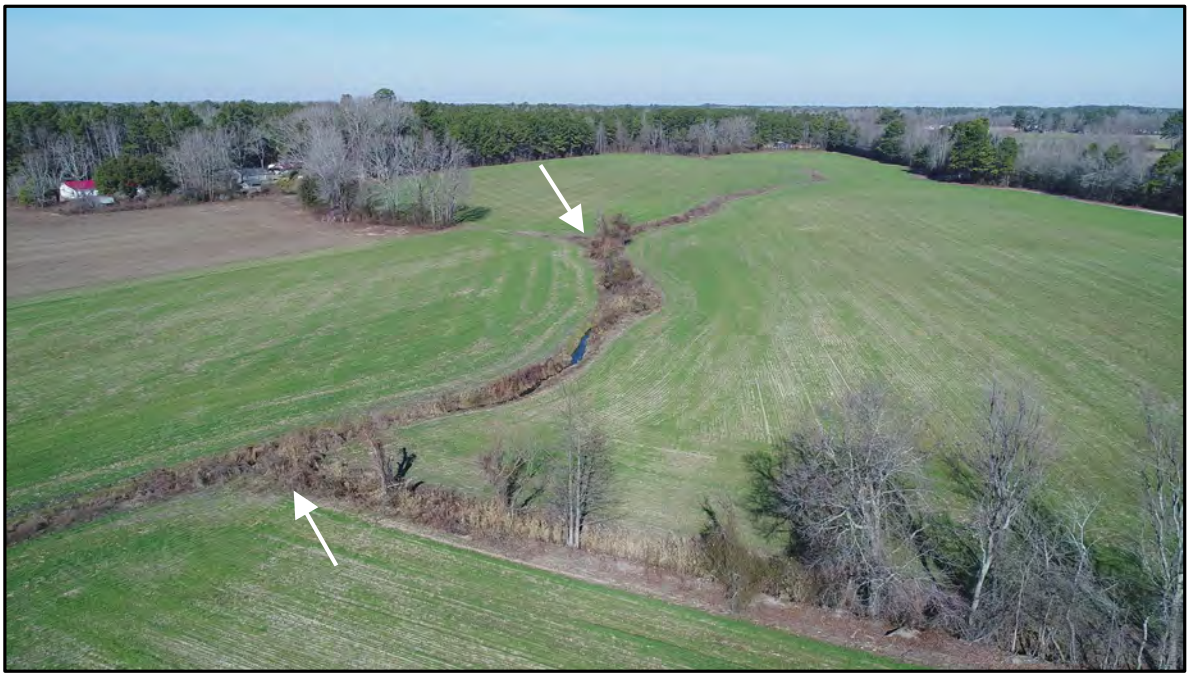
8/24/19
K. W. BIGGS, INC. — DATE

HOLD: ERIC WEST

kinder
LAND SURVEYING
203 W. Lebanon St., Mount Airy N.C. 27030 (336)783-4200

Appendix 2

SITE PHOTOGRAPHS



Overview of northern half of site, looking upstream. Note lack of riparian buffer and two points of concentrated flow entering the reach, denoted by arrows.

View of ephemeral channel at the start of the UT to Bear Swamp, looking upstream.

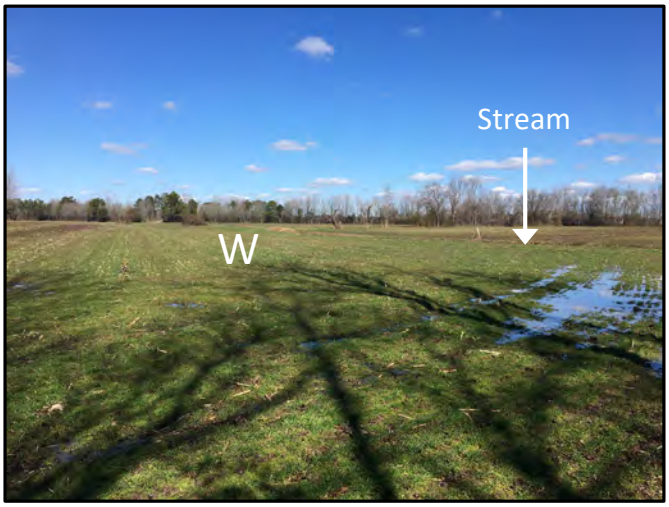
North end of project, showing existing swale where ditch off-site will be reconnected.

View of proposed wetland area at start of reach, approx. location denoted with a 'W'.

View of existing crossing, looking upstream.

View downstream of existing crossing.

UT to Bear Swamp looking downstream to existing forested wetland.



Looking north towards the approx. location of the 2nd proposed wetland area, denoted w/ a 'W'.

View of channelized portion of UT to Bear Swamp at upstream end of existing wetland.

Existing wetland at upstream end.

Conditions become wetter in the existing wetland as you move further downstream .

Ditch that feeds into the existing wetland at the easement boundary, looking west.

Looking down the ditch feature in the previous photo towards the existing wetland.

Downstream end of existing wetland, looking towards crossing under Moss Neck Rd. (outside easement)

Appendix 3

PRELIMINARY JURISDICTIONAL DETERMINATION &

NCWAM RATING FORMS

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2019-00162** County: **Robeson County** U.S.G.S. Quad: **Pembroke**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner/Applicant: **Ecosystem Planning & Restoration (EPR)**
Attn: Kevin Tweedy

Address: **559 Jones Franklin Road, Ste 150**
Raleigh, NC, 27606

Telephone Number: **(919) 388-0789**

E-mail Address: **ktweedy@eprusa.net**

Size (acres)	**16 acres**	Nearest Town	**Pembroke, NC**
Nearest Waterway	**Moss Neck Swamp**	River Basin	**Lower Pee Dee**
USGS HUC	**03040203**	Coordinates	Latitude: **34.680441**
			Longitude: **-79.155383**

Location description: **This 16 acre project is located off Locklear Road near Pembroke, Robeson County, NC.**

Indicate Which of the Following Apply:

A. Preliminary Determination

X There are waters, including wetlands, on the above described project area, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). The waters, including wetlands, have been delineated, and the delineation has been verified by the Corps to be sufficiently accurate and reliable. Therefore this preliminary jurisdiction determination may be used in the permit evaluation process, including determining compensatory mitigation. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction.

_ There are wetlands on the above described property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). However, since the waters, including wetlands, have not been properly delineated, this preliminary jurisdiction determination may not be used in the permit evaluation process. Without a verified wetland delineation, this preliminary determination is merely an effective presumption of CWA/RHA jurisdiction over all of the waters, including wetlands, at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

B. Approved Determination

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are waters of the U.S., including wetlands, on the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We recommend you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

_ The waters of the U.S., including wetlands, on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The waters of the U.S., including wetlands, have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US, including wetlands, without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). Placement of dredged or fill material, construction or placement of structures, or work within navigable waters of the United States without a Department of the Army permit may constitute a violation of Sections 9 and/or 10 of the Rivers and Harbors Act (33 USC § 401 and/or 403). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Gary Beecher at (910) 251-4629 or Gary.H.Beecher@usace.army.mil**.

C. Basis For Determination: **This site exhibits wetland criteria as described in the 1987 Corps Wetland Delineation Manual and the Atlantic and Gulf Coastal Plain Regional Supplement**.

D. Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information for Approved Jurisdiction Determinations **(as indicated in Section B. above)**

If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by August 15, 2019.

SAW-2019-00162

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: 

Date: **June 17, 2019** Expiration Date: **PJD does not expire**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy Furnished to:

K.M Biggs Inc.
PO Box 967
Lumberton, NC 28359
(910) 739-2871

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **Kevin Tweedy** **EPR**	File Number: **SAW-2019-00162**	Date: **June 17, 2019**

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☒ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
District Engineer, Wilmington Regulatory Division, Attn: Gary Beecher	Mr. Jason Steele, Administrative Appeal Review Officer CESAD-PDO U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 10M15 Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Gary Beecher, 69 Darlington Avenue, Wilmington, North Carolina 28403

For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: June 17, 2019

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Kevin Tweedy, Ecosystem Planning & Restoration, 559 Jones Franklin Rd. Ste 150, Raleigh, NC 27606

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Wilmington, Bear Swamp Restoration, SAW-2019-00162

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The project is located in Robeson County off Locklear Road, approximately 2 miles east of the Town of Pembroke (Figure 1). The Bear Swamp Restoration Project involves the restoration of an unnamed tributary (UT) to Bear Swamp and its adjacent riparian wetland system. Potential aquatic resources present on-site are illustrated in Figure 3.

(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: NC County/parish/borough: Robeson City: Pembroke

Center coordinates of site (lat/long in degree decimal

format): Lat.: 34.680441 N Long.: -79.155383 W

Universal Transverse Mercator: 17S

Name of nearest waterbody: Bear Swamp

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): March 19, 2019

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resources in review area (acreage and linear feet, if applicable	Type of aquatic resources (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
UT to Bear Swamp (intermittent)	34.681066	-79.155600	3,002 lf	Non-wetland waters	Section 404
WA (PFO*)	34.67716	-79.156069	4.0 acres	Wetland	Section 404

*= Palustrine Forested

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor.
☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report. Rationale:_____

☐ Data sheets prepared by the Corps:_____

☐ Corps navigable waters' study:_____

☐ U.S. Geological Survey Hydrologic Atlas:_____

☐ USGS NHD data.

☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name: Pembroke 1:24,000

☒ Natural Resources Conservation Service Soil Survey. Citation: Web Soil Survey

☐ National wetlands inventory map(s). Cite name:_____

☐ State/local wetland inventory map(s):_____

☐ FEMA/FIRM maps:_____

☐ 100-year Floodplain Elevation is:_____ (National Geodetic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): NC One Map 2017 Aerial Imagery

or ☐ Other (Name & Date):_____

☐ Previous determination(s). File no. and date of response letter:_____

☒ Other information (please specify): USACE Site visit on March 19, 2019

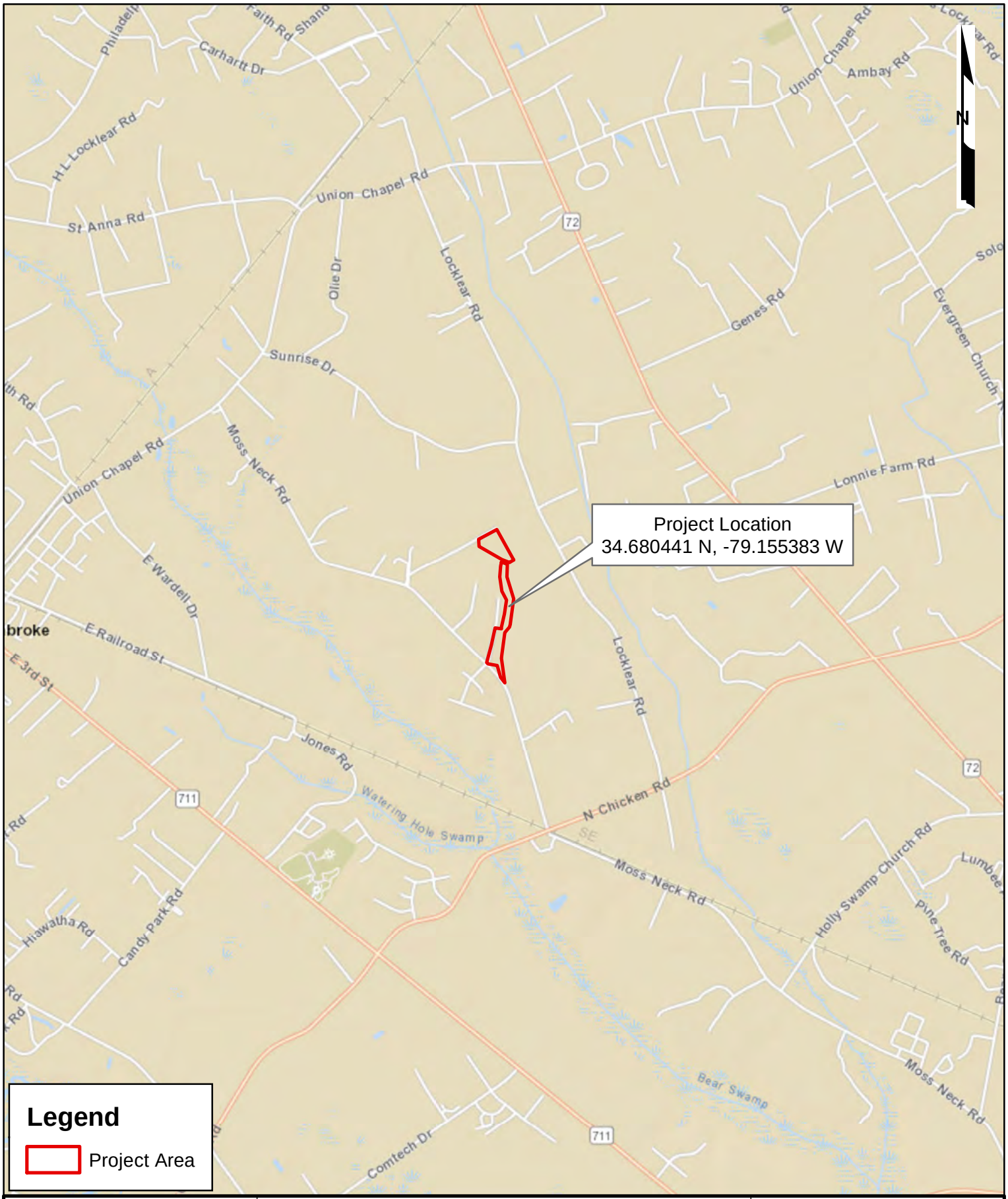
IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of Regulatory staff member completing PJD

Kevin Tweedy Digitally signed by Kevin Tweedy Date: 2018.12.10 12:10:40 -05'00'

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.



BEAR SWAMP RESTORATION SITE

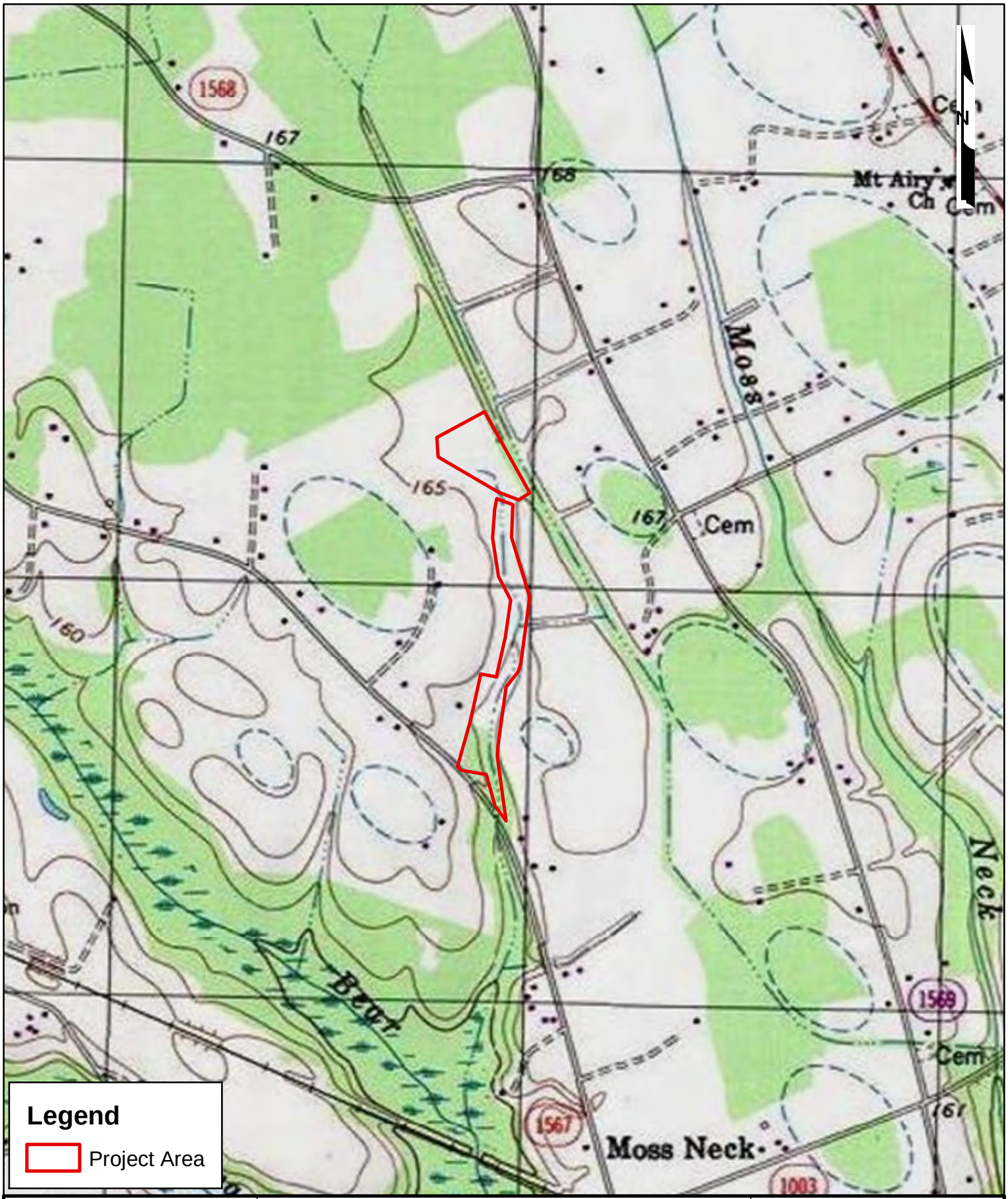
VICINITY MAP

PREPARED BY: ECOSYSTEM PLANNING & RESTORATION

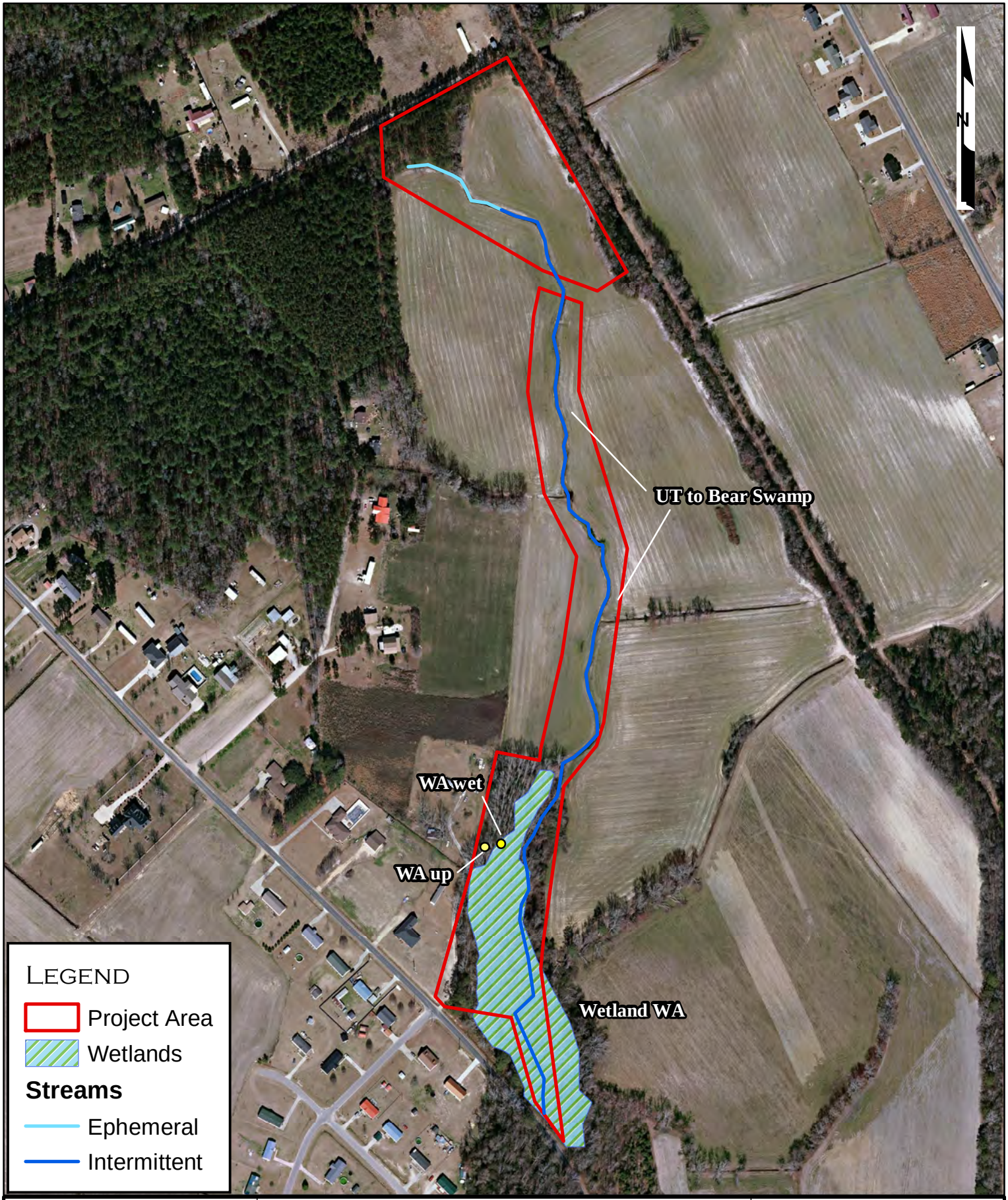
FIGURE 1

ROBESON COUNTY, NC

DECEMBER 2018



0 0.1 0.2 Miles	BEAR SWAMP RESTORATION SITE USGS TOPOGRAPHIC MAP	PREPARED BY: ECOSYSTEM PLANNING & RESTORATION
FIGURE 2	ROBESON COUNTY, NC	DECEMBER 2018



0 200 400 Feet

Bear Swamp Restoration Site

Potential Jurisdictional Resources Map

PREPARED BY: Ecosystem Planning & Restoration

Figure 3

Robeson County, NC

December 2018

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	WA (upstream section)	Date of Assessment	11/14/2018
Wetland Type	Riverine Swamp Forest	Assessor Name/Organization	A. James

Notes on Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**MEDIUM**
	Sub-surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Particulate Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence (Y/N)	**NO**
	Physical Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	**HIGH**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**MEDIUM**

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	**MEDIUM**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence (Y/N)	**NO**
Habitat	Condition	**MEDIUM**

Overall Wetland Rating **MEDIUM**

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	WA (downstream section)	Date of Assessment	11/14/2018
Wetland Type	Riverine Swamp Forest	Assessor Name/Organization	A. James

Notes on Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**HIGH**
	Sub-surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**NO**
	Particulate Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Physical Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	**HIGH**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**MEDIUM**

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	**HIGH**
Water Quality	Condition	**HIGH**
	Condition/Opportunity	**HIGH**
	Opportunity Presence (Y/N)	**YES**
Habitat	Condition	**MEDIUM**

Overall Wetland Rating **HIGH**

Appendix 4

DATA

RIVERMORPH CROSS SECTION SUMMARY

River Name: BearSwamp
Reach Name: Reach 1
Cross Section Name: Section1
Survey Date: 02/05/2018

Cross Section Data Entry

BM Elevation: 100 ft
Backsight Rod Reading: 100 ft

TAPE	FS	ELEV	NOTE
0	4.31	195.69	
13	4.65	195.35	
32	5.08	194.92	LTOB
33.7	6.42	193.58	
34.6	7.36	192.64	LEW
35.2	7.57	192.43	TOE
36.9	7.94	192.06	TWG
38.9	7.74	192.26	TOE
39.7	7.34	192.66	
41.2	6.48	193.52	
42.6	5.63	194.37	RTOB
50	5.12	194.88	
54.5	5.5	194.5	
72	5.48	194.52	

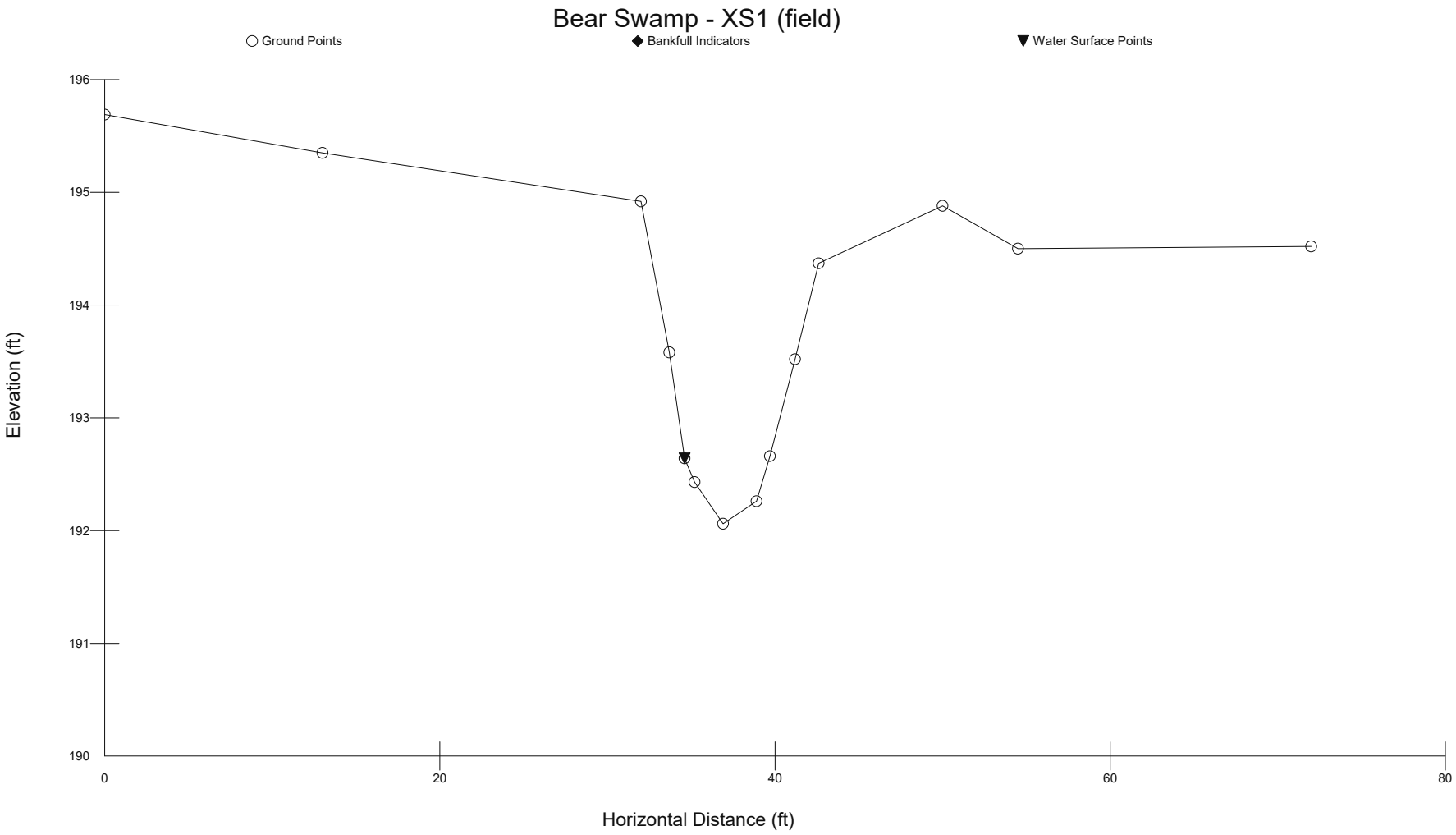
Cross Sectional Geometry

	Channel	Left	Right
Floodprone Elevation (ft)	193.72	-----	-----
Bankfull Elevation (ft)	192.89	-----	-----
Floodprone Width (ft)	8.01	-----	-----
Bankfull Width (ft)	5.74	-----	-----
Entrenchment Ratio	1.39	-----	-----
Mean Depth (ft)	0.56	-----	-----
Maximum Depth (ft)	0.83	-----	-----
Width/Depth Ratio	10.25	-----	-----
Bankfull Area (sq ft)	3.19	-----	-----
Wetted Perimeter (ft)	6.09	-----	-----
Hydraulic Radius (ft)	0.52	-----	-----
Begin BKF Station	34.36	-----	-----
End BKF Station	40.1	-----	-----

Entrainment Calculations

Entrainment Formula: Rosgen Modified Shields Curve

	Channel	Left Side	Right Side
Slope	0	0	0
Shear Stress (lb/sq ft)			
Movable Particle (mm)			


Bear Swamp - XS1 (field)
Ground Points
Bankfull Indicators
Water Surface Points
Elevation (ft)
196
195
194
193
192
191
190
0
20
40
60
80
Horizontal Distance (ft)

RIVERMORPH CROSS SECTION SUMMARY

River Name: BearSwamp
Reach Name: Reach 1
Cross Section Name: Section2
Survey Date: 02/05/2018

Cross Section Data Entry

BM Elevation: 100 ft
Backsight Rod Reading: 100 ft

TAPE	FS	ELEV	NOTE
0	5.88	194.12	
19	5.31	194.69	
33	5.1	194.9	LTOB
35.5	6.36	193.64	BRK
36.7	7.09	192.91	
37.1	7.6	192.4	TOE
38.9	7.87	192.13	TWG
41.5	7.56	192.44	TOE
42.4	7.11	192.89	REW
43.4	6.58	193.42	
45.6	5.2	194.8	RTOB
58	5.69	194.31	
72	5.6	194.4	

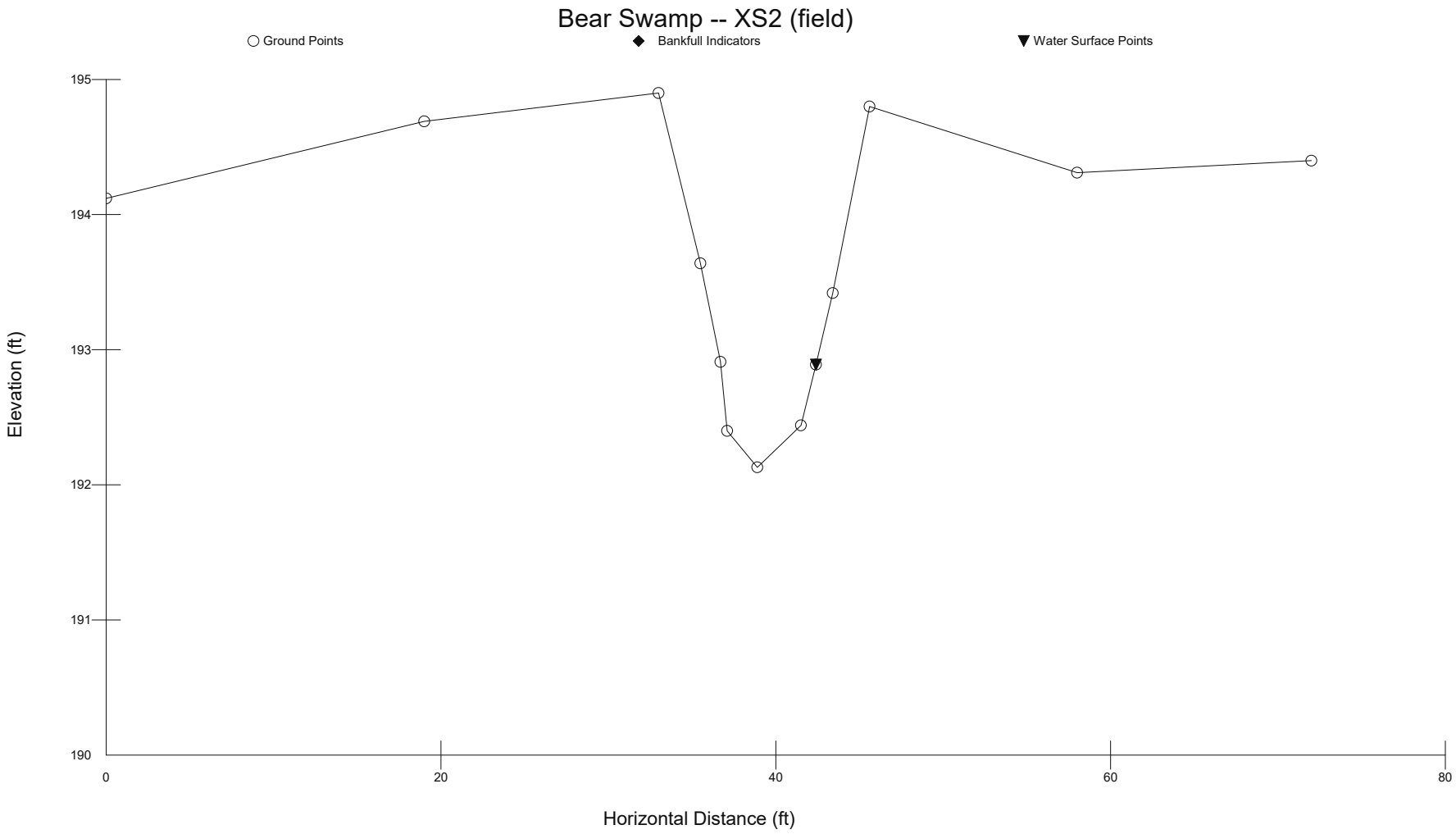
Cross Sectional Geometry

	Channel	Left	Right
Floodprone Elevation (ft)	194.21	194.21	194.21
Bankfull Elevation (ft)	193.17	193.17	193.17
Floodprone Width (ft)	13.29	-----	-----
Bankfull Width (ft)	6.66	3.3	3.36
Entrenchment Ratio	2	-----	-----
Mean Depth (ft)	0.71	0.78	0.64
Maximum Depth (ft)	1.04	1.04	0.96
Width/Depth Ratio	9.38	4.25	5.25
Bankfull Area (sq ft)	4.72	2.56	2.16
Wetted Perimeter (ft)	7.19	4.6	4.51
Hydraulic Radius (ft)	0.66	0.56	0.48
Begin BKF Station	36.27	36.27	39.57
End BKF Station	42.93	39.57	42.93

Entrainment Calculations

Entrainment Formula: Rosgen Modified Shields Curve

	Channel	Left Side	Right Side
Slope	0	0	0
Shear Stress (lb/sq ft)			
Movable Particle (mm)			


Bear Swamp -- XS2 (field)
Ground Points
Bankfull Indicators
Water Surface Points
Elevation (ft)
195
194
193
192
191
190
0
20
40
60
80
Horizontal Distance (ft)

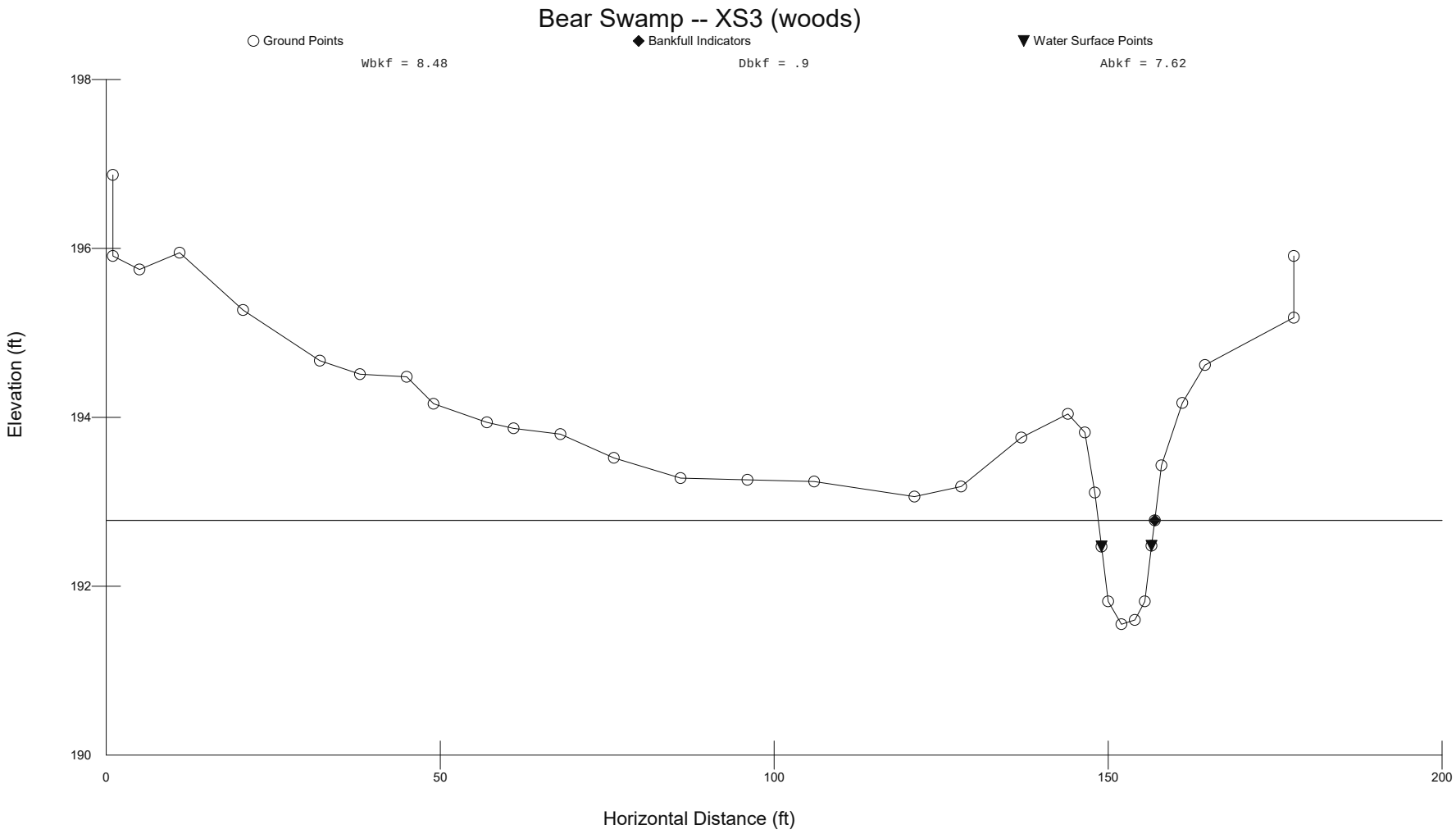

Bear Swamp -- XS3 (woods)
Ground Points
Bankfull Indicators
Water Surface Points
Wbkf = 8.48
Dbkf = .9
Abkf = 7.62
198
196
194
192
190
Elevation (ft)
0
50
100
150
200
Horizontal Distance (ft)

Table 1. Project: Bear Swamp (ID-100054) - Mitigation Assets and Components

Project Component (reach ID, etc.)[1]	Wetland Position and HydroType[2]	Existing Footage or Acreage	Stationing	Mitigation Plan Footage or Acreage	As-Built Footage or Acreage	Restoration Level	Approach Priority Level	Mitigation Ratio (X:1)	Mitigation Credits	Notes/Comments
UT to Bear Swamp		2,432	10+00 – 32+22	2,222	2,222	R	Valley	1	2222.000	Full Channel Restoration, Planted Buffer, and Permanent Conservation Easement.
Wetland A	RR	2.1		0.417	0.417	P		10	0.042	Protect with Permanent Conservation Easement
Wetland B	RR			2.490	2.490	R		1	2.490	Restore Wetland Indicators (vegetation, hydrology, and soil), as defined by the USACE.
Wetland C	RR			0.348	0.348	R		1	0.348	

Length and Area Summations by Mitigation Category

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)
		Riverine	Non-Riverine	
Restoration	2222.000	2.838		
Enhancement				
Enhancement I				
Enhancement II				
Rehabilitation				
Preservation		0.042		
High Quality Pres				

Overall Assets Summary

Asset Category	Overall Credits
Stream	**2,222.000**
Wetland	**2.880**

General Note - The above component table is intended to be a close complement to the asset map. Each entry in the above table should have clear distinction and appropriate symbology in the asset map.

1 - Wetland Groups represent pooled wetland polygons in the map with the same wetland type and restoration level. If some of the wetland polygons within a group are in meaningfully different landscape positions, soil types or have different community targets (as examples), then further segmentation in the table may be warranted. Wetland features impacted by credit modifiers such as utilities shall be listed as a distinct record with the impacted acreage tallied as discreet records in the table (See Wetland 7 above)

2 - Wetland Position and Hydro Type - Indicates Riparian Riverine, (RR) , riparinan non-riverine (RNR) or Non-Riverine (NR)

3- Buffer Assets - due to the complex nature of buffer and nutrient offset assets they are not included in this example table. Please see the DMS buffer mitigation plan template for the required asset table information.

Table 2. Project Activity and Reporting History
Bear Swamp Stream and Wetland Restoration Project (NCDMS Project No. 100054)

Elapsed Time Since grading complete: **0 yrs 0 months**
Elapsed Time Since planting complete: **0 yrs 0 months**
Number of reporting Years[1]: **0**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Institution Date	NA	Jun-18
404 permit date	NA	
Restoration Plan	NA	Mar-20
Final Design – Construction Plans	Jun-20	Jul-20
Construction	NA	Sep-20
Containerized, bare root and B&B plantings for reach/segments 1&2	NA	Dec-20
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	Dec-20	Dec-20
Year 1 Monitoring*	Nov-21	Dec-21
Year 2 Monitoring*	Nov-22	Dec-22
Structural maintenance	N/A	N/A
Year 3 Monitoring*	Nov-23	Dec-23
Supplemental planting of containerized material	N/A	N/A
Year 4 Monitoring*	Nov-24	Dec-24
Year 5 Monitoring*	Nov-25	Dec-25
Year 6 Monitoring*	Nov-26	Dec-26
Year 7 Monitoring*	Nov-27	Dec-27

=these activites have not yet occurred; dates given are estimates only

Bolded items are examples of those items that are not standard, but may come up and should be included

Non-bolded items represent events that are standard components over the course of a typical project, but the one listed may not be all inclusive.

The above are obviously **not** the extent of potential relevant project activities, but are just provided as example as part of this exhibit.

If planting, morphology, or hydrology monitoring are on split schedules for some reason that should be made clear in this table

* Includes quarterly stream and wetland gauge data collection

1 = The number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table Bear Swamp Stream and Wetland Restoration Project (NCDMS Project No. 100054)	
Designer Primary project design POC	Ecosystem Planning and Restoration, PLLC 1150 SE Maynard Road, Suite 140, Cary, NC 27511 Kevin Tweedy, PE (919) 388-0787
Construction Contractor Construction contractor POC	Firm Information / Address POC name and phone
Survey Contractor Survey contractor POC	Kinder Land Surveying 203 W. Lebanon St., Mount Airy, NC 27030 Frank Kinder (336) 783-4200
Planting Contractor Planting contractor POC	Firm Information / Address POC name and phone
Seeding Contractor Contractor point of contact	Company Information / Address POC name and phone
Seed Mix Sources	Company and Contact Phone
Nursery Stock Suppliers	Company and Contact Phone
Monitoring Performers	Firm Information / Address
Stream Monitoring POC	Scott Hunt, EPR (919) 388-0787
Vegetation Monitoring POC	Amy James, EPR (919) 388-0787

Table 4. Project Background Information			
Project Name	Bear Swamp Stream and Wetland Restoration		
County	Robeson		
Project Area (acres)	15.3		
Project Coordinates (latitude and longitude)	latitude 34 deg 40' 549" N, longitude 79 deg 9' 19" W		
Planted Acreage (Acres of Woody Stems Planted)	12.3		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Lumber		
USGS Hydrologic Unit 8-digit	3040203	USGS Hydrologic Unit 14-digit	3040203050010
DWR Sub-basin	14-9-(1.5)		
Project Drainage Area (Acres and Square Miles)	59.2 acres/ 0.09 Sq.Mi. (Total)		
Project Drainage Area Percentage of Impervious Area	<1%		
CGIA Land Use Classification	Agriculture/Pasture 61%, Forest 27%, 13% Residential/Developed		

Reach Summary Information			
Parameters	**UT to Bear Swamp**		
Length of reach (linear feet)	2,432		
Valley confinement (Confined, moderately confined, unconfined)	Unconfined		
Drainage area (Acres and Square Miles)	0.09 Sq.Mi., 59.2 Ac		
Perennial, Intermittent, Ephemeral (NCDWR score)	Intermittent (25.5)		
NCDWR Water Quality Classification	WS-IV; Sw		
Stream Classification (existing)	G5/B5c		
Stream Classification (proposed)	most similar to DA		
Evolutionary trend (Simon)	II		
FEMA classification	X		

Regulatory Considerations			
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404	Yes	No	Appendix 3
Water of the United States - Section 401	Yes	No	Appendix 3
Endangered Species Act	Yes	Yes	Categorical Exclusion Packet
Historic Preservation Act	No	Yes	Categorical Exclusion Packet
Coastal Zone Management Act (CZMA or CAMA)	No	NA	NA
FEMA Floodplain Compliance	No	NA	DMS Floodplain Checklist
Essential Fisheries Habitat	No	NA	NA

HYDRIC SOIL & SITE INVESTIGATION

Biggs Tract

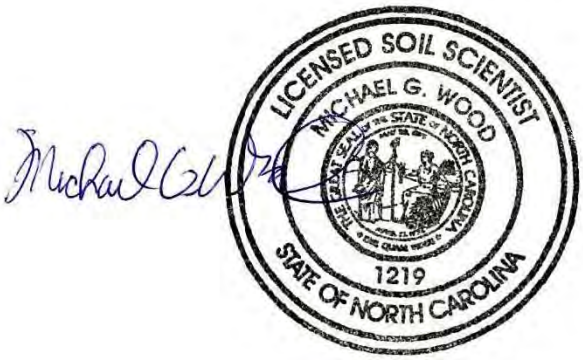
Robeson County, North Carolina

Prepared for:

Ecosystem Planning & Restoration
559 Jones Franklin Road, Suite 150
Raleigh, NC 27606

Prepared by:

324 Blackwell Street, Suite 1200
Durham, NC 27701
(919) 732-1300



Michael G. Wood

January 31, 2018

INTRODUCTION

Ecosystem Planning & Restoration (EPR) is investigating the feasibility of stream and riparian wetland mitigation within the Cape Fear River basin (8-digit HUC 03030004). The project site was accessed from Locklear Road, Robeson County, NC (Figure 1). Three Oaks Engineering (Three Oaks) has been retained to perform a Hydric Soil & Site Investigation that describes and classifies the soil within a portion of the study area to make a determination as to its present and/or past hydric status.

The study area is a managed stream that runs through agricultural fields. The wetland component are adjacent areas at the beginning and ending of the study area, referred to as Area A and Area B, respectively (Figure 1). The soil in Area A and B were evaluated on one side of the stream only. The soil along the stream between these two areas was not evaluated.

METHODOLOGY

Prior to performing the evaluation, NRCS soils maps and USGS topographic maps were reviewed. The field investigation was performed on January 26, 2018, by Michael G. Wood, LSS. Soil descriptions were produced and evaluated via hand-turned soil auger borings. Each boring was classified based on soil characteristics indicating the hydric soil status. Boring locations were located with a GPS Unit with sub-meter accuracy and are shown on the attached figures. Hydric soil status is based upon the *NRCS Field Indicators of Hydric Soils in the United States - A Guide for Identifying and Delineating Hydric Soils (Version 8.1, 2017).*

RESULTS

Sixteen (16) soil borings were advanced within the study area (Figure 1). Soil borings were described and classified based on soil characteristics into one of the two categories below.

Hydric. – Borings rated as Hydric occurred in the lower elevations in relation to the stream feature. In general, the soils do not appear to be severely altered through human manipulation other than hydrologically from current farming practices (shallow tillage, ditching). The Hydric soil unit is approximately 2.1 and 1.2 in Areas A and B, respectively, and is best described by hydric soil indicator S7 Dark Surface. The soil profile description B1 lists the typical soil characteristics noted within the Hydric Soil unit.

> S7 Dark Surface. A layer 10 cm (4 inches) thick, starting at a depth less than or equal to the upper 15 cm (6 inches) from the soil surface, with a matrix value 3 of or less and chroma of 1 or less. At least 70 percent of the visible soil particles must be masked with organic material, viewed through a 10x or 15x hand lens. Observed without a hand lens, the particles appear to be close to 100 percent masked. The matrix color of the layer directly below the dark layer must have the same colors as those described above or any color that has chroma of 2 or less. User Notes: An undisturbed sample must be observed.

Many wet soils have a ratio of about 50 percent soil particles that are masked with organic matter and about 50 percent unmasked soil particles, giving the soils a salt-and-pepper appearance. Where the coverage is less than 70 percent, the Dark Surface indicator does not occur.

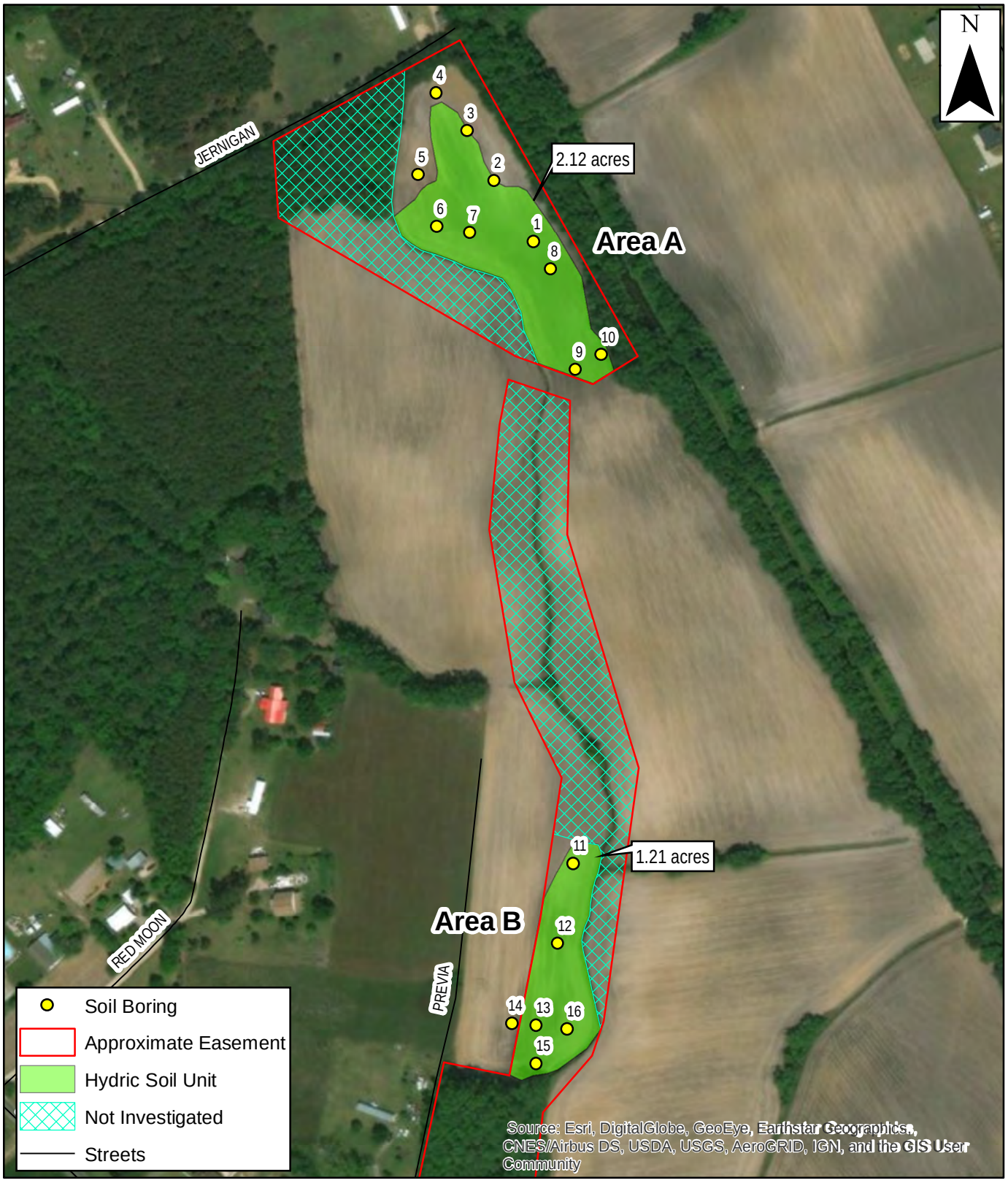
User Notes: If the dark layer is greater than 4 in. (10 cm) thick, then the indicator is met, because any dark soil material in excess of 4 in. (10 cm) meets the requirement that "the layer immediately below the dark layer must have the same colors as those described above… ." If the dark layer is exactly 4 in. (10 cm) thick, then the material immediately below must have a matrix chroma of 2 or less. The organic carbon content of this indicator is slightly less than that required for "mucky." An undisturbed sample must be observed (Figure 20). Many moderately wet soils have a ratio of about 50 percent of soil particles covered or coated with organic matter to about 50 percent uncoated or uncovered soil particles, giving the soil a salt-and-pepper appearance. Where the percent coverage by organic matter is less than 70 percent, a Dark Surface indicator is not present.

Non-Hydric. – Borings rated as Non-Hydric occurred along convex and nearly flat ridge landscape positions. This soil unit was determined to meet no hydric indicators.

CONCLUSION

The mapped Hydric soil unit is a prime candidate for wetland restoration. It is anticipated that through abandoning agriculture management, raising the stream level, limited soil alterations, and re-vegetation, the hydrology will be restored and allow the wetland to regain its normal functions.

The findings presented herein represent Three Oaks' professional opinion based on our Hydric Soil and Site Investigation and knowledge of the current regulations regarding wetland mitigation in North Carolina and national criteria for determining hydric soil.



Prepared For:

Hydric Soil Investigation

Biggs Tract

Robeson County, North Carolina

Date: January 2018

Scale: 0 100 200 Feet

Job No.: 18-707

Drawn By: KEMS

Checked By: MGW

Figure 1

Bear Swamp Soil Boring (EPR)

11/14/18

Conditions: Rain last two days, with light rain during field investigations

Soil bore 1: right bank of existing stream (south), in proposed Wetland B (outside area surveyed by Three Oaks)

Saturation @ 18”

0-10” = sandy loam	2.5Y 3/1	no redox
10- 17” = sandy clay loam	2.5Y 5/1	no redox
17-24” = sandy clay loam	2.5Y 5/1	redox 30% 2.5Y 5/6
24-29” = sandy clay	2.5Y 5/1	redox 40% 2.5Y 5/6

7” from water table to top of hole

Meets F13, umbric surface hydric soil indicator

Appendix 5

NCDWR & NCSAM STREAM ASSESSMENT FORMS

Point #1

NC DWQ Stream Identification Form Version 4.11

Date: 2/5/'18	Project/Site: Bearswamp	Latitude: 34.681116
Evaluator: A. James, B. Lepsic	County: Robeson	Longitude: -79.155547
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 25.5	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other *e.g. Quad Name:* Pembroke

A. Geomorphology (Subtotal = 9)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	(0)	1	2	3
4. Particle size of stream substrate	(0)	1	2	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.5)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 8)				
18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	0.5	1	(1.5)
26. Wetland plants in streambed	FACW = 0.75; (OBL = 1.5) Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: macrobenthos: scud, mosquito larvae
wetland plants: cattail, smartweed

Sketch:

Point #2

NC DWQ Stream Identification Form Version 4.11

Date: 2/5/'18	Project/Site: Bear Swamp	Latitude: 34.683789
Evaluator: A. Jones, B. Lepsic	County: Robeson	Longitude: -79.156759
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 13.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other *e.g. Quad Name:* Pembroke

A. Geomorphology (Subtotal = 7.5)	Absent	Weak	Moderate	Strong
1[a] Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	(0)	1	2	3
4. Particle size of stream substrate	(0)	1	2	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	(0.5)	1	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 3)				
12. Presence of Baseflow	(0)	1	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	0.5	(0)
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 3)				
18. Fibrous roots in streambed	3	2	1	(0)
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Bear Swamp	Date of Assessment	11/14/2018
Stream Category	Ia1	Assessor Name/Organization	Amy James/EPR

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	NO
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**LOW**	**LOW**
(3) Streamside Area Attenuation	**LOW**	**LOW**
(4) Floodplain Access	**LOW**	**LOW**
(4) Wooded Riparian Buffer	**LOW**	**LOW**
(4) Microtopography	**LOW**	**LOW**
(3) Stream Stability	**LOW**	**LOW**
(4) Channel Stability	**HIGH**	**HIGH**
(4) Sediment Transport	**LOW**	**LOW**
(4) Stream Geomorphology	**LOW**	**LOW**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**LOW**	**LOW**
(3) Upland Pollutant Filtration	**LOW**	**LOW**
(3) Thermoregulation	**LOW**	**LOW**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**LOW**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**LOW**	**LOW**
(2) In-stream Habitat	**LOW**	**MEDIUM**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**MEDIUM**	**MEDIUM**
(3) In-stream Habitat	**LOW**	**HIGH**
(2) Stream-side Habitat	**LOW**	**LOW**
(3) Stream-side Habitat	**LOW**	**LOW**
(3) Thermoregulation	**LOW**	**LOW**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall	**LOW**	**LOW**

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Bear Swamp	Date of Assessment	11/14/2018
Stream Category	Ia1	Assessor Name/Organization	Amy James/EPR

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	NO
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**HIGH**	**HIGH**
(2) Baseflow	**HIGH**	**HIGH**
(2) Flood Flow	**HIGH**	**HIGH**
(3) Streamside Area Attenuation	**HIGH**	**HIGH**
(4) Floodplain Access	**MEDIUM**	**MEDIUM**
(4) Wooded Riparian Buffer	**HIGH**	**HIGH**
(4) Microtopography	**HIGH**	**HIGH**
(3) Stream Stability	**MEDIUM**	**MEDIUM**
(4) Channel Stability	**HIGH**	**HIGH**
(4) Sediment Transport	**LOW**	**LOW**
(4) Stream Geomorphology	**MEDIUM**	**MEDIUM**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality		
(2) Baseflow	**HIGH**	**HIGH**
(2) Streamside Area Vegetation		
(3) Upland Pollutant Filtration		
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**NA**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**LOW**	**HIGH**
(2) In-stream Habitat	**LOW**	**MEDIUM**
(3) Baseflow	**HIGH**	**HIGH**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**MEDIUM**	**MEDIUM**
(3) In-stream Habitat	**MEDIUM**	**HIGH**
(2) Stream-side Habitat	**HIGH**	**HIGH**
(3) Stream-side Habitat	**HIGH**	**HIGH**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall		**MEDIUM**

Appendix 6

APPROVED FHWA CATEGORICAL EXCLUSION CHECKLIST

A copy of the entire Categorical Exclusion with supporting documentation is available by request from NC Division of Mitigation Services

Appendix A

Categorical Exclusion Form for Division of Mitigation Services Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Bear Swamp Stream and Wetland Restoration Site
County Name:	Robeson County
NCDMS Number:	100054
Project Sponsor:	Ecosystem Planning and Restoration, PLLC
Project Contact Name:	Kevin Tweedy, PE
Project Contact Address:	559 Jones Franklin Road, Suite 150, Raleigh NC 27606
Project Contact E-mail:	ktweedy@eprusa.net
NCDMS Project Manager:	Lindsay Crocker

Project Description

The project involves headwater stream restoration practices that will raise the local water table and restore a diffuse flow, braided headwater stream system. Riparian wetlands along the stream corridor and wider wetland areas at the north and south ends of the project will be restored, thereby supplying added hydrology to the stream system and increasing ecological uplift. A channelized segment of stream at the southern end of the project will be filled to restore and enhance wetland hydrology into a section of degraded woods.

For Official Use Only

Reviewed By:

10/10/2018

Date

L H Crocker.

NCDMS Project Manager

Conditional Approved By:

Date

For Division Administrator FHWA

☐ **Check this box if there are outstanding issues**

Final Approval By:

10-10-18

Date

For Division Administrator FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☒ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☒ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☒ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☒ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☒ No ☐ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☒ No ☐ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☒ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☒ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☒ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☒ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☒ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☒ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Does the project require the acquisition of real estate?	☒ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☒ No ☐ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☒ Yes ☐ No ☐ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☒ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☒ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☒ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☒ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☒ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☒ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☒ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☒ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☒ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☒ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☒ Yes ☐ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☒ Yes ☐ No ☐ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☒ No ☐ N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☒ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	☐ Yes ☐ No ☒ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☒ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☒ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☒ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☒ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☒ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	☒ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☒ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☒ Yes ☐ No
2. Have the USFWS and the NCWRC been consulted?	☒ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☒ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☒ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☒ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☒ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☒ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☒ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☒ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☒ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☒ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☒ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☒ N/A

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

July 6, 2018

Kim Browning
U.S. Army Corps of Engineers, Wilmington District
Mitigation Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587

Re: Bear Swamp Stream & Wetland Mitigation Site / SAW-2018-01154/ Robeson County

Dear Mrs. Browning:

The U.S. Fish and Wildlife Service (Service) has reviewed the project advertised in the above referenced Public Notice. The project, as advertised in the Public Notice, is expected to have minimal adverse impacts to fish and wildlife resources. Therefore, we have no objection to the activity as described in the permit application.

In accordance with the Endangered Species Act of 1973, as amended, (ESA) and based on the information provided, and other available information, it appears the action is not likely to adversely affect federally listed species or their critical habitat as defined by the ESA. We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied for this project. Please remember that obligations under the ESA must be reconsidered if: (1) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

For your convenience a list of all federally protected endangered and threatened species in North Carolina is now available on our website at <http://www.fws.gov/raleigh>. Our web page contains a complete and updated list of federally protected species, and a list of federal species of concern known to occur in each county in North Carolina.

The Service appreciates the opportunity to review and provide comments on the proposed action. Should you have any questions regarding the project, please contact Kathy Matthews at (919) 856-4520, extension 27.

Sincerely,
for Pete Benjamin,
Field Supervisor

cc: NMFS, Beaufort, NC
EPA, Atlanta, GA
WRC, Raleigh

Appendix 7

DMS FLOODPLAIN REQUIREMENTS CHECKLIST

NCDMS Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program and NC Floodplain Mapping program to be filled out for all NCDMS projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NCDMS.

Project Location

Name of project:	Bear Swamp Stream and Wetland Restoration Project
Name if stream or feature:	Unnamed Tributary (UT) to Bear Swamp (unregulated)
County:	Robeson
Name of river basin:	Lumber
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Robeson County (CID 370202)
DFIRM panel number for entire site:	3710935300J Effective 1/19/2005
Consultant name:	Ecosystem Planning and Restoration
Phone number:	919.388.0787
Address:	1150 SE Maynard Rd. Suite 140 Cary NC 27511

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

The Bear Swamp Stream and Wetland Restoration Project consists of instituting stream restoration practices following valley design techniques along the main stem of the UT to Bear Swamp and restoring two wetland areas.

Summarize stream reaches or wetland areas according to their restoration priority.

Reach/Wetland Area	Length/Area	Priority
UT to Bear Swamp (Unregulated/Backwater of Bear Swamp)	*2,222*	*Valley Restoration*
Wetland A	*0.4*	*Preservation*
Wetland B	*2.49*	*Restoration*
Wetland C	*0.35*	*Restoration*

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

○ Yes ◉ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☐ Detailed Study

☐ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation:

Check if applies:

☐ AE Zone

- ○ Floodway
- ○ Non-Encroachment
- ◉ None

☐ A Zone

- ○ Local Setbacks Required
- ○ No Local Setbacks Required

If local setbacks are required, list how many feet: N/A

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

○ Yes ◉ No

Land Acquisition (Check)

☐ State owned (fee simple)

☐ Conservation easment (Design Bid Build)

☑ Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

◉ Yes ○ No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)

Name of Local Floodplain Administrator: Dixon Ivey
Email: dixon.ivey@co.robeson.nc.us
Phone Number: (910) 671-3303

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

☐ No Action

☐ No Rise

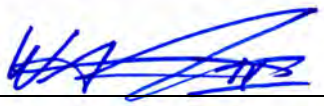
☐ Letter of Map Revision

☐ Conditional Letter of Map Revision

☐ Other Requirements

List other requirements:

Comments:

Name: William Scott Hunt, III, PE Signature: 

Title: Water Resources Engineer Date: September 25, 2019

Appendix 8

DESIGN PLAN SHEETS

PROJECT: BEAR SWAMP STREAM AND WETLAND RESTORATION SITE

NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES

ROBESON COUNTY

LOCATION: LOCKLEAR RD., ROBESON COUNTY, NC

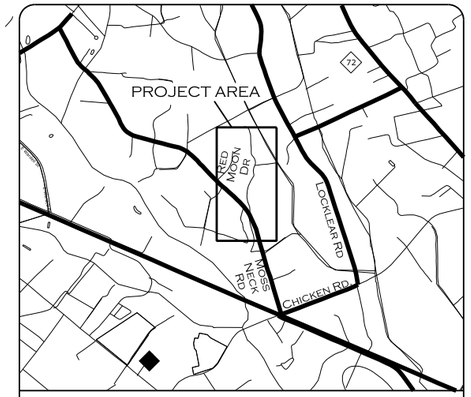
NCDEQ DMS PROJECT ID# 100054

TYPE OF WORK: STREAM RESTORATION AND RIPARIAN WETLAND RESTORATION AND PRESERVATION

STATE	PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	101	1	28

PROPOSED LENGTH

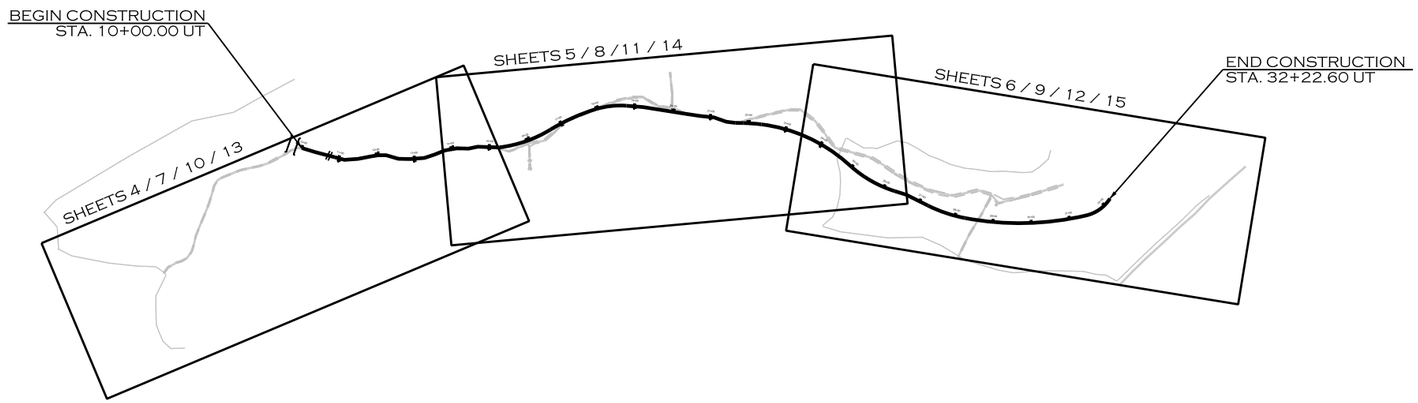
EXISTING STREAM LENGTH	=	2,423 FEET
PROPOSED DESIGN STREAM LENGTH	=	2,223 FEET



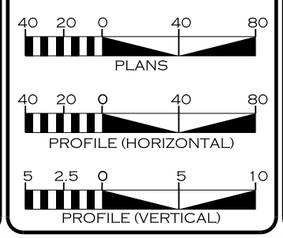
VICINITY MAP

INDEX OF SHEETS

1	TITLE SHEET
1A	STREAM CONVENTIONAL SYMBOLS GENERAL NOTES CONSTRUCTION SEQUENCE
1B - 1C	CONSTRUCTION SEQUENCE (CONT.)
1D - 1E	NCGØ1 REQUIREMENTS
2 - 2F	DETAILS
3	TABLES
3A	VEGETATION SELECTION
4 - 6	PLAN AND PROFILE
7 - 9	VEGETATION PLAN
10 - 12	GRADING PLAN
13 - 16	EROSION AND SEDIMENTATION CONTROL PLAN



GRAPHIC SCALES



REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
2	FINAL DRAFT MITIGATION PLAN	WSH	KLT	11/04/19
3	FINAL MITIGATION PLAN	WSH	KLT	2/17/20
4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:

Mitigation Services
ENVIRONMENTAL QUALITY

NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

LINDSAY CROCKER
PROJECT MANAGER

PREPARED IN THE OFFICE OF:

ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD.
SUITE 140
CARY NC 27511
LICENSE # P-1182

LETTING DATE:

WILLIAM SCOTT HUNT, III, PE
PROJECT ENGINEER

PROJECT ENGINEER

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DO NOT USE FOR CONSTRUCTION

SIGNATURE: P.E.

STREAM CONVENTIONAL SYMBOLS

- GRADE CONTROL WOODY RIFFLE (WR)
- SOD MATS (SM)
- DEBRIS JAM (DJ-T#)
- SF — SAFETY FENCE
- TP — TAPE FENCE
- TEMPORARY SILT FENCE
- (CE) CONSERVATION EASEMENT
- 20 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 20 PROPOSED MAJOR CONTOUR
- 21 PROPOSED MINOR CONTOUR
- LIMITS OF DISTURBANCE
- BANKFULL BENCH (GRADE)
- PROPERTY LINE
- ACCESS ROAD
- 10+00 STREAM THALWEG
- STREAM TOP OF BANKS
- FOOT BRIDGE
- TEMPORARY STREAM CROSSING - WOOD MAT
- PERMANENT FORD STREAM CROSSING (PFC)
- TRANSPLANTED VEGETATION
- TREE REMOVAL
- TREE PROTECTION
- IMPERVIOUS DIKE

- DITCH PLUG
- CHANNEL FILL
- GRADE BANK 2:1 OR FLATTER
- EXISTING WETLANDS
- FLOW DISSIPATOR

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

GENERAL NOTES

1. THE CONTRACTOR IS REQUIRED TO INSTALL INSTREAM STRUCTURES USING A TRACK HOE WITH A HYDRAULIC THUMB OF SUFFICIENT SIZE TO PLACE BOULDERS, AND STRUCTURES.
2. WORK IS BEING PERFORMED AS AN ENVIRONMENTAL RESTORATION PLAN. THE CONTRACTOR SHOULD MAKE ALL REASONABLE EFFORTS TO REDUCE SEDIMENT LOSS AND MINIMIZE DISTURBANCE OF THE SITE WHILE PERFORMING THE CONSTRUCTION WORK.
3. CONSTRUCTION IS SCHEDULED TO BEGIN SUMMER 2020.

CONSTRUCTION SEQUENCE

PROJECT # 101 | SHEET NO. 1A

SYMBOLOGY / NOTES

PHASE 1 – MOBILIZATION/GENERAL SEDIMENTATION & EROSION CONTROL

1. IDENTIFY AND LOCATE STAGING AREAS, STOCKPILE AREAS, CONSTRUCTION ENTRANCES, STREAM CROSSINGS REQUIRED FOR CONSTRUCTION ACCESS; LIMITS OF SILT FENCING, AND CONSTRUCTION ACCESS AND HAUL ROADS AS SHOWN ON THE SEDIMENTATION AND EROSION CONTROL PLANS.

2. INSTALL CONSTRUCTION ENTRANCE.

3. INSTALL STREAM CROSSINGS REQUIRED FOR CONSTRUCTION ACCESS.

4. STOCKPILE MATERIALS IN DESIGNATED AREAS.

5. INSTALL SILT FENCING TO THE LIMITS SHOWN ON THE PLANS AND AT ANY OTHER LOCATIONS AS DIRECTED BY THE ENGINEER. SILT FENCING WILL BE INSTALLED ALONG THE DOWNSLOPE/STREAM SIDE LIMITS OF ALL STAGING AND STOCKPILE AREAS.

6. UPON THE COMPLETION OF PHASE 1, THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE PHASE BY THE ENGINEER. THE CONTRACTOR MUST HAVE WRITTEN APPROVAL FROM THE ENGINEER THAT THE PHASE HAS BEEN COMPLETED TO SATISFACTORY STANDARDS BEFORE BEGINNING ANOTHER PHASE.

7. EMERGENCY CONTACT FOR EROSION AND SEDIMENTATION CONTROL IS:

SCOTT HUNT, PE
ECOSYSTEM PLANNING AND RESTORATION
919-388-0787

NOTE: EACH PHASE WILL BE COMPLETED PRIOR TO BEGINNING WORK ON ANOTHER PHASE. UPON THE COMPLETION OF EACH PHASE, THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE PHASE BY THE ENGINEER. THE CONTRACTOR MUST HAVE WRITTEN APPROVAL FROM THE ENGINEER THAT THE PHASE HAS BEEN COMPLETED TO SATISFACTORY STANDARDS BEFORE BEGINNING ANOTHER PHASE.

ALL EXCAVATED SOIL MATERIALS NOT UTILIZED WILL BE STOCKPILED AND MAINTAINED ACCORDING TO THE PROJECT SPECIFICATIONS. WHILE ONSITE, UNUSED MATERIAL MUST BE LOCATED IN DESIGNATED STOCKPILE LOCATIONS AND MUST BE PROVIDED TEMPORARY OR PERMANENT STABILIZATION WITHIN 14 DAYS OF PLACEMENT.

AFTER THE COMPLETION OF CONSTRUCTION, ALL UNUSED SOIL MATERIALS SHALL BE SPREAD ONSITE IN DESIGNATED AREAS, AT THE DIRECTION OF THE ENGINEER. SPREAD SOIL MUST BE STABILIZED USING SEEDING AND MULCH PER THE PROJECT SPECIFICATIONS WITHIN 14 DAYS OF PLACEMENT.

IF ANY EXCAVATED SOIL MATERIALS NEED TO BE, ARE SPECIFIED TO, AND ACTUALLY ARE DISPOSED OF OFF-SITE BY THE CONTRACTOR, THE CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF SUCH SOIL MATERIALS IN A PERMITTED AREA, AS WELL AS FOR PROVIDING AND IMPLEMENTING AN EROSION AND SEDIMENTATION CONTROL PLAN AND PERMIT, OR ANY OTHER REQUIRED PERMIT(S), FOR THE LOCATION(S) OFF SITE WHERE SUCH MATERIALS ARE DISPOSED.

PHASE 2 – HEADWATER STREAM CHANNEL RESTORATION (IN PLACE)
UT [10+00 (BEGIN CONSTRUCTION) TO 18+00]

1. PERFORM CONSTRUCTION STAKING.

2. INSTALL AND CONDUCT TEMPORARY PUMP-AROUND OPERATION IN ACCORDANCE WITH THE TEMPORARY PUMP-AROUND OPERATION DETAIL AND TO THE LIMITS SPECIFIED FOR THIS PHASE/REACH.

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
2	FINAL DRAFT MITIGATION PLAN	WSH	KLT	11/04/19
3	FINAL MITIGATION PLAN	WSH	KLT	2/17/20
4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:
NC Mitigation Services ENVIRONMENTAL QUALITY
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:
EPR ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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CONSTRUCTION SEQUENCE (CONT.)

PROJECT # 101 | SHEET NO. 1B

CONSTRUCTION SEQUENCE

3. Locate and flag any vegetation transplants, including individual specimens and vegetated mats.

4. Perform required removal and treatment of any and all exotic species vegetation within and adjacent to the specified reach limits. All required removal and treatment (initial treatment) of exotic species vegetation should be completed prior to proceeding with the remaining activities in this phase.

5. Perform clearing and grubbing required under this phase. Segregate and stockpile topsoil and other soil material in accordance with the project specifications.

6. Beginning at the Upstream end of the area of active construction, proceed in the downstream direction with floodplain and channel grading and construction, ditch plugging and removal, ditch spoil removal, existing culvert removal, and in-stream structure installation, as specified on the plans. Ensure that existing ditch outfalls to remain are graded to connect to the restored channel as show on plans, maintaining sheet flow throughout connection.

7. Perform all topsoil replacement, roughening, vegetation transplanting, soil amendment, seeding (temporary and permanent) and mulching, specified on the plans and the project specifications. Associated disturbed areas will have temporary and permanent seed, soil amendments, and mulch, applied to them as work progresses and by the end of each day, according to the project specifications.

8. Remove and dispose of all unused vegetation and excavated materials.

9. All remaining disturbed areas are to be amended, seeded, mulched and matted according to the project plans and specifications and at a minimum within 14 days of disturbance.

10. Upon the completion of this phase, the pump-around operation for this phase shall be removed and normal stream flow shall be permanently diverted and returned to the new reach of channel constructed under this phase. Ensure stable connection of the downstream end of this restored reach/phase to the existing remaining channel to facilitate construction of the next downstream reach/phase.

11. Upon the completion of this phase, the Contractor shall schedule an inspection of the phase by the Engineer. The Contractor must have written approval from the Engineer that the phase has been completed to satisfactory standards before beginning the next phase.

PHASE 3 – HEADWATER STREAM CHANNEL RESTORATION (IN PLACE)
UT [18+00 to 24+55.16]

1. Perform construction staking.

2. install and conduct temporary pump-around operation in accordance with the temporary pump-around operation detail and to the limits specified for this phase/reach.

3. Locate and flag any vegetation transplants, including individual specimens and vegetated mats.

4. Perform required removal and treatment of any and all exotic species vegetation within and adjacent to the specified reach limits. All required removal and treatment (initial treatment) of exotic species vegetation should be completed prior to proceeding with the remaining activities in this phase.

5. Perform clearing and grubbing required under this phase. Segregate and stockpile topsoil and other soil material in accordance with the project specifications.

6. Beginning at the Upstream end of the area of active construction, proceed in the downstream direction with floodplain and channel grading and construction, ditch plugging and removal, ditch spoil removal, and in-stream structure installation, as specified on the plans. Ensure that existing ditch outfalls to remain are graded to connect to the restored channel as show on plans, maintaining sheet flow throughout connection.

7. Perform all topsoil replacement, roughening, vegetation transplanting, soil amendment, seeding (temporary and permanent) and mulching, specified on the plans and the project specifications. Associated disturbed areas will have temporary and permanent seed, soil amendments, and mulch, applied to them as work progresses and by the end of each day, according to the project specifications.

8. Remove and dispose of all unused vegetation and excavated materials.

9. All remaining disturbed areas are to be amended, seeded, mulched and matted according to the project plans and specifications and at a minimum within 14 days of disturbance.

10. Upon the completion of this phase, the pump-around operation for this phase shall be removed and normal stream flow shall be permanently diverted and returned to the new reach of channel constructed under this phase. Ensure stable connection of the downstream end of this restored reach/phase to the existing remaining channel to facilitate construction of the next downstream reach/phase.

11. Upon the completion of this phase, the Contractor shall schedule an inspection of the phase by the Engineer. The Contractor must have written approval from the Engineer that the phase has been completed to satisfactory standards before beginning the next phase.

PHASE 4 – HEADWATER STREAM CHANNEL RESTORATION (OFF-LINE)
UT [24+55.16 to 32+22.60 (END CONSTRUCTION)]

1. Perform construction staking.

2. This existing reach of channel associated with UT will remain active during this phase of construction in order to isolate all active construction work from stream flow. Ensure all work for this phase maintains a 5-foot setback from the existing channel, including, but not limited to leaving the proposed channel completely disconnected from the existing channel.

3. Perform required removal and treatment of any and all exotic species vegetation within and adjacent to the specified reach limits. All required removal and treatment (initial treatment) of exotic species vegetation should be completed prior to proceeding with the remaining activities in this phase.

4. Locate and flag any vegetation transplants, including individual specimens and vegetated mats.

5. Perform clearing and grubbing required only along the proposed UT alignment, minimizing impacts to desirable existing vegetation and jurisdictional wetlands. Segregate and stockpile topsoil and other soil material in accordance with the project specifications.

6. Beginning at the downstream end of the area of active construction, proceed in the upstream direction with floodplain and channel grading and construction, ditch plugging and removal, ditch spoil removal, and in-stream structure installation, as specified on the plans. Ensure that existing ditch outfalls to remain are graded to connect to the restored channel as show on plans, maintaining sheet flow throughout connection.

7. Perform all topsoil replacement, roughening, vegetation transplanting, soil amendment, seeding (temporary and permanent) and mulching, specified on the plans and the project specifications. Associated disturbed areas will have temporary and permanent seed, soil amendments, and mulch, applied to them as work progresses and by the end of each day, according to the project specifications.

8. Remove and dispose of all unused vegetation and excavated materials.

9. All remaining disturbed areas are to be amended, seeded, mulched and matted according to the project plans and specifications and at a minimum within 14 days of disturbance.

10. Upon the completion of this phase, the ditch plug near station 24+55.16 shall be installed, the downstream end of UT and the upstream end of UT shall be per permanently connected, and normal stream flow shall be permanently diverted and returned to UT.

11. Upon the completion of this phase, the Contractor shall schedule an inspection of the phase by the Engineer. The Contractor must have written approval from the Engineer that the phase has been completed to satisfactory standards before beginning the next phase.

PHASE 5 – ABANDONED CHANNEL FILLING (IN PLACE)
ABANDONED CHANNEL ADJACENT TO UT [24+55.16 to 32+22.60 (END CONSTRUCTION)]

1. Perform construction staking.

2. The abandoned reach of channel associated with and adjacent to the restored UT will be permanently plugged and filled.

3. Perform required removal and treatment of any and all exotic species vegetation within and adjacent to the specified reach limits. All required removal and treatment (initial treatment) of exotic species vegetation should be completed prior to proceeding with the remaining activities in this phase.

4. Locate and flag any vegetation transplants, including individual specimens and vegetated mats.

5. Perform clearing and grubbing required only along the reach of abandoned channel to be plugged and filled, minimizing impacts to desirable existing vegetation and jurisdictional wetlands. Segregate and stockpile topsoil and other soil material in accordance with the project specifications.

6. Beginning at the downstream end of the area of active construction, proceed in the upstream direction with installation of remaining ditch plug, channel filling, tributary ditch plugging and removal, ditch spoil removal, as specified on the plans. Ensure that existing ditch outfalls to remain are graded to connect to the restored channel as show on plans, maintaining sheet flow throughout connection.

7. Perform all topsoil replacement, roughening, vegetation transplanting, soil amendment, seeding (temporary and permanent) and mulching, specified on the plans and the project specifications. Associated disturbed areas will have temporary and permanent seed, soil amendments, and mulch, applied to them as

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:
NC Mitigation Services ENVIRONMENTAL QUALITY
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:
EPR ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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CONSTRUCTION SEQUENCE (CONT.)

WORK PROGRESSES AND BY THE END OF EACH DAY, ACCORDING TO THE PROJECT SPECIFICATIONS.

8. REMOVE AND DISPOSE OF ALL UNUSED VEGETATION AND EXCAVATED MATERIALS.

9. ALL REMAINING DISTURBED AREAS ARE TO BE AMENDED, SEEDED, MULCHED AND MATTED ACCORDING TO THE PROJECT PLANS AND SPECIFICATIONS AND AT A MINIMUM WITHIN 14 DAYS OF DISTURBANCE.

10. UPON THE COMPLETION OF THIS PHASE, THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE PHASE BY THE ENGINEER. THE CONTRACTOR MUST HAVE WRITTEN APPROVAL FROM THE ENGINEER THAT THE PHASE HAS BEEN COMPLETED TO SATISFACTORY STANDARDS BEFORE BEGINNING THE NEXT PHASE.

PHASE 6 – WETLAND RESTORATION(IN PLACE)
EXISITNG DITCH [BEGINNING TO 10+00 UT]

1. PERFORM CONSTRUCTION STAKING.

2. INSTALL AND CONDUCT TEMPORARY PUMP-AROUND OPERATION IN ACCORDANCE WITH THE TEMPORARY PUMP-AROUND OPERATION DETAIL AND TO THE LIMITS SPECIFIED FOR THIS PHASE/REACH.

3. LOCATE AND FLAG ANY VEGETATION TRANSPLANTS, INCLUDING INDIVIDUAL SPECIMENS AND VEGETATED MATS.

4. PERFORM REQUIRED REMOVAL AND TREATMENT OF ANY AND ALL EXOTIC SPECIES VEGETATION WITHIN AND ADJACENT TO THE SPECIFIED REACH LIMITS. ALL REQUIRED REMOVAL AND TREATMENT (INITIAL TREATMENT) OF EXOTIC SPECIES VEGETATION SHOULD BE COMPLETED PRIOR TO PROCEEDING WITH THE REMAINING ACTIVITIES IN THIS PHASE.

5. PERFORM CLEARING AND GRUBBING REQUIRED UNDER THIS PHASE. SEGREGATE AND STOCKPILE TOPSOIL AND OTHER SOIL MATERIAL IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

6. BEGINNING AT THE UPSTREAM END OF THE AREA OF ACTIVE CONSTRUCTION, PROCEED IN THE DOWNSTREAM DIRECTION WITH WETLAND GRADING, FLOODPLAIN GRADING AND CONSTRUCTION, DITCH PLUGGING, FILLING, AND REMOVAL, DITCH SPOIL REMOVAL, AND PERMANENT FORD STREAM CROSSING INSTALLATION, AS SPECIFIED ON THE PLANS. ENSURE THAT EXISTING DITCH OUTFALLS TO REMAIN ARE GRADED TO CONNECT TO THE RESTORED FLOODPLAIN AS SHOW ON PLANS, MAINTAINING SHEET FLOW THROUGHOUT CONNECTION.

7. PERFORM ALL TOPSOIL REPLACEMENT, ROUGHENING, VEGETATION TRANSPLANTING, SOIL AMENDMENT, SEEDING (TEMPORARY AND PERMANENT) AND MULCHING, SPECIFIED ON THE PLANS AND THE PROJECT SPECIFICATIONS. ASSOCIATED DISTURBED AREAS WILL HAVE TEMPORARY AND PERMANENT SEED, SOIL AMENDMENTS, AND MULCH, APPLIED TO THEM AS WORK PROGRESSES AND BY THE END OF EACH DAY, ACCORDING TO THE PROJECT SPECIFICATIONS.

8. REMOVE AND DISPOSE OF ALL UNUSED VEGETATION AND EXCAVATED MATERIALS.

9. ALL REMAINING DISTURBED AREAS ARE TO BE AMENDED, SEEDED, MULCHED AND MATTED ACCORDING TO THE PROJECT PLANS AND SPECIFICATIONS AND AT A MINIMUM WITHIN 14 DAYS OF DISTURBANCE.

10. UPON THE COMPLETION OF THIS PHASE, THE PUMP-AROUND OPERATION FOR THIS PHASE SHALL BE REMOVED AND ALL FLOW SHALL BE PERMANENTLY DIVERTED TO THE BEGINNING OF UT.

11. UPON THE COMPLETION OF THIS PHASE, THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE PHASE BY THE ENGINEER. THE CONTRACTOR MUST HAVE WRITTEN APPROVAL FROM THE ENGINEER THAT THE PHASE HAS BEEN COMPLETED TO SATISFACTORY STANDARDS BEFORE BEGINNING THE NEXT PHASE.

PHASE 7 – DEMOBILIZATION AND PROJECT PLANTING

1. COMPLETE REMAINING MINOR GRADING AND SITE PLANTING PREPARATION WORK, INCLUDING RIPPING AND/OR DISKING, AS SPECIFIED IN THE PROJECT SPECIFICATIONS.

2. ALL REMAINING DISTURBED AREAS, INCLUDING AREAS THAT HAVE BEEN RIPPED AND/OR DISKED ARE TO BE AMENDED, SEEDED, MATTED AND/OR MULCHED ACCORDING TO THE PROJECT SPECIFICATIONS AND AT A MINIMUM WITHIN 14 DAYS OF DISTURBANCE.

3. COMPLETE ALL REMAINING PROPOSED PERMANENT VEGETATION PLANTING PER THE PLANS AND PROJECT SPECIFICATIONS.

4. REMOVE AND DISPOSE OF ALL TRASH, METAL, AND DEBRIS FROM THE SITE ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS.

5. RESTORE CONSTRUCTION ACCESS ROADS, STAGING AREAS, AND STOCKPILE AREAS. IMMEDIATELY REGRADE, REPLACE TOPSOIL, AND SEED, AMEND, AND MULCH AS SPECIFIED IN THE PROJECT SPECIFICATIONS. REMOVE ALL TREE PROTECTION FENCING. SILT FENCE SHALL BE REMOVED ONCE THE SITE HAS BEEN STABILIZED WITH VEGETATION.

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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PREPARED FOR:
NC Mitigation Services – Environmental Quality
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BEAR SWAMP STREAM AND WETLAND RESTORATION SITE
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PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days,*** a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,

(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,

(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,

(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,

(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and

(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

NORTH CAROLINA Environmental Quality

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

REVISIONS				
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1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
2	FINAL DRAFT MITIGATION PLAN	WSH	KLT	11/04/19
3	FINAL MITIGATION PLAN	WSH	KLT	2/17/20
4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:
Mitigation Services ENVIRONMENTAL QUALITY
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:
EPR ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

PROGRESS DRAWING
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2/20/2020
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MKOCH

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	**Stabilize within this many calendar days after ceasing land disturbance**	**Timeframe variations**
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

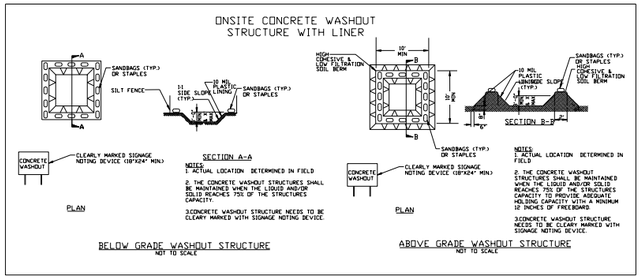
1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NORTH CAROLINA *Environmental Quality*

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

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PROJECT ENGINEER

PROGRESS DRAWING
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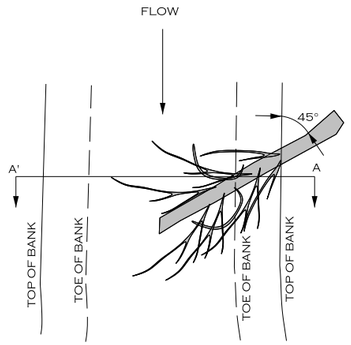
MKOPAN

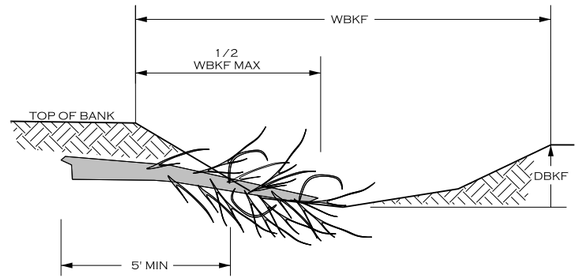
PROJECT # 101 | SHEET NO. 2

DETAILS

DEBRIS JAM TYPE 3 (DJ T3)



PLAN VIEW

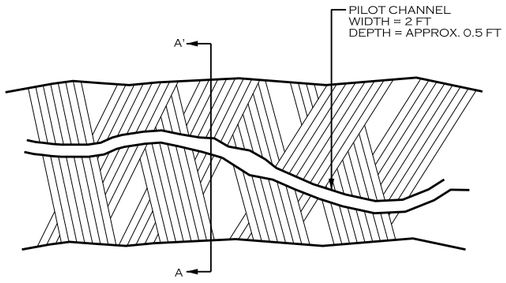


SECTION A - A'

DEBRIS JAM TYPE 3

1. DEBRIS JAM TYPE 3 INSTALLATIONS SHALL BE PLACED WITHIN STREAM RIFFLES OR POOLS TO TRAP DETRITUS AND ORGANIC MATTER AND KEEP IT IN CONTACT WITH FLOWING WATER.
2. TREE SHALL BE ANY NON-EVERGREEN TREE WITH BRANCHES, AT LEAST 8 INCHES DIAMETER, AND NOT ROTTEN.
3. TREE SHALL HAVE CONSIDERABLE NUMBER OF BRANCHES THAT REMAIN EXPOSED AFTER INSTALLATION AND IN CONTACT WITH THE STREAM FLOW TO TRAP LEAVES AND DETRITUS FROM STREAM FLOW.
4. TREE SHALL BE INSTALLED SO THAT THE TRUNK IS IN CONTACT WITH THE STREAM BED. BACKFULL AND COMPACT AROUND THE TRUNK AND INSTALLED TREE TO MINIMIZE VOIDS.

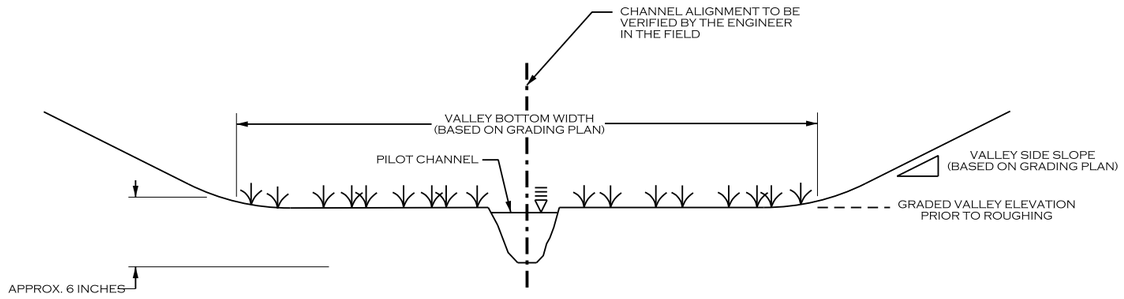
VALLEY AND PILOT CHANNEL DETAIL



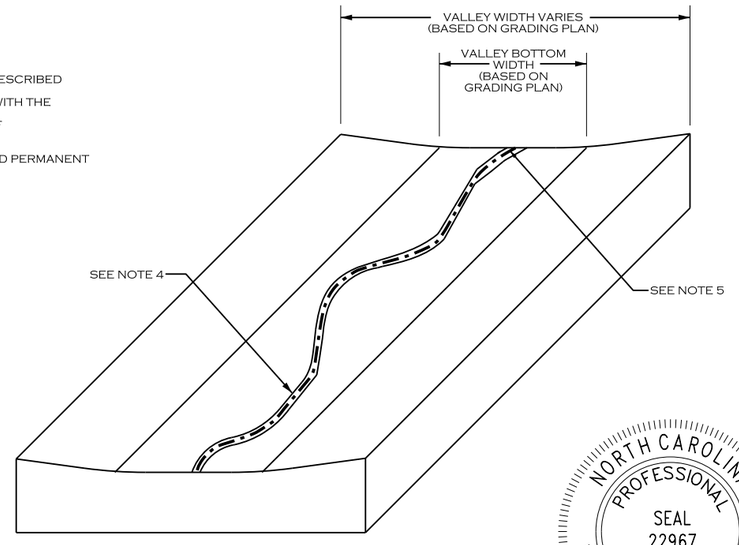
PLAN VIEW OF MICROTOPOGRAPHIC PATTERN

NOTES:

1. FIRST RESTORE VALLEY TOPOGRAPHY AS SHOWN ON THE GRADING PLAN.
2. THE RESTORED VALLEY BOTTOM WILL THEN BE ROUGHENED, USING THE TECHNIQUES DESCRIBED IN THE CONSTRUCTION SPECIFICATIONS FOR RESTORATION OF MICROTOPOGRAPHY.
3. FINAL GRADES WILL BE VERIFIED IN THE FIELD BY THE ENGINEER AND SHALL COINCIDE WITH THE GRADING PLAN.
4. CHANNEL ALIGNMENT WILL BE VERIFIED BY THE ENGINEER FOLLOWING COMPLETION OF THE MICROTOPOGRAPHIC ROUGHING.
5. CHANNEL WILL BE SHAPED TO FORM A SINGLE THREAD CHANNEL.
6. UPON COMPLETION OF CHANNEL CONSTRUCTION, APPLY MULCH TEMPORARY SEED, AND PERMANENT SEED TO THE CONSTRUCTED VALLEY ACCORDING TO CONSTRUCTION SPECIFICATIONS.



SECTION A - A'



ISOMETRIC VIEW

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
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4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

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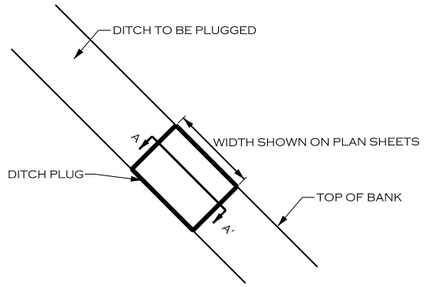
JACKSON

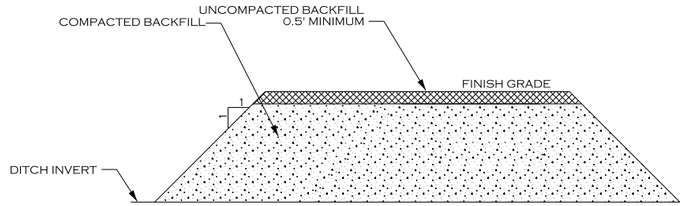
PROJECT # 101 | SHEET NO. 2A

DETAILS

DITCH PLUG



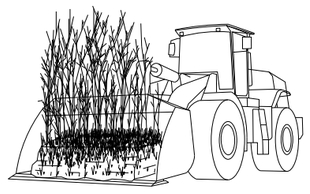
PLAN VIEW



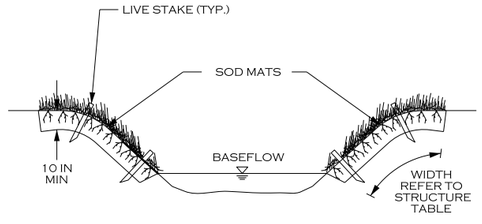
SECTION A - A'

NOTE:
COMPACT BACKFILL USING ON-SITE HEAVY EQUIPMENT IN 10 INCH LIFTS.

SOD MAT (SM)



SOD MAT HARVESTING



SOD MAT PLACEMENT

NOTES:
HARVESTING

1. USE FULL-SIZE LOADER, OR SIMILAR APPROVED EQUIPMENT, FOR EXCAVATING, TRANSPORTING, AND PLACING ON-SITE SOD MATS.
2. DISTURB SOD MATS AS LITTLE AS POSSIBLE AND MAINTAIN SOIL MOISTURE.
3. MINIMUM MAT DEPTH IS 10 INCH.

PLACEMENT

1. PLACE SOD MATS FROM TOE OF STREAMBANK TO TOP OF STREAMBANK
2. SOD MATS CAN BE SUBSITUTED WITH COIR FIBER MATTING AT THE DIRECTION OF THE ENGINEER.
3. SECURE WITH LIVE STAKE

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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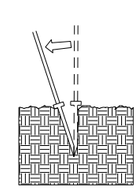
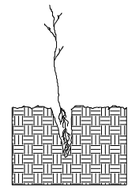
PROJECT # 101 | SHEET NO. 2B

DETAILS

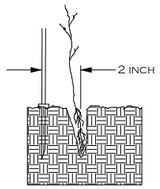
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



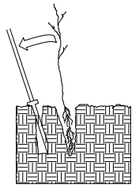
1. INSERT PLANTING BAR AS SHOWN AND PULL HANDLE TOWARD PLANTER.



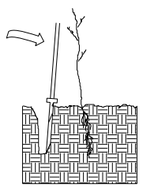
2. REMOVE PLANTING BAR AND PLACESEEDING AT CORRECT DEPTH.



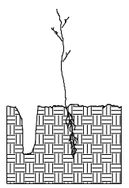
3. INSERT PLANTING BAR 2 INCHES TOWARD PLANTER FROM SEEDING.



4. PULL HANDLE OF BAR TOWARD PLANTER, FIRMING SOIL AT BOTTOM.



5. PUSH HANDLE FORWARD FIRMING SOIL AT TOP.



6. LEAVE COMPATION HOLE OPEN. WATER THOROUGHLY.

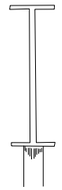
PLANTING NOTES:

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

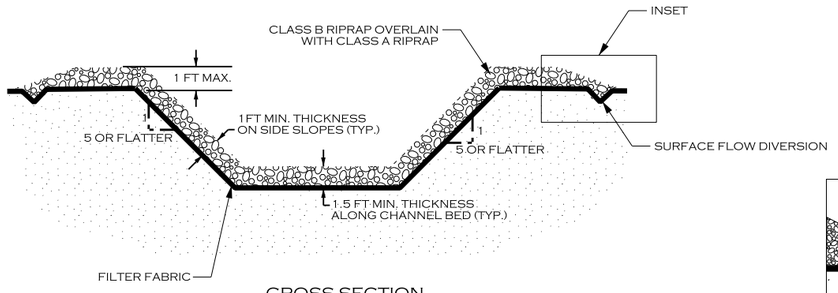
PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.



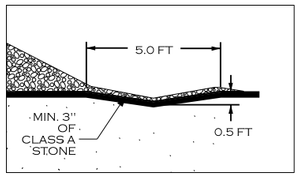
ROOT PRUNING

ALL SEEDLINGS SHALL BE ROOT PRUNED, IF NECESSARY, SO THAT NO ROOTS EXTEND MORE THAN 10 INCHES BELOW THE ROOT COLLAR.

PERMANENT FORD STREAM CROSSING (PFC)



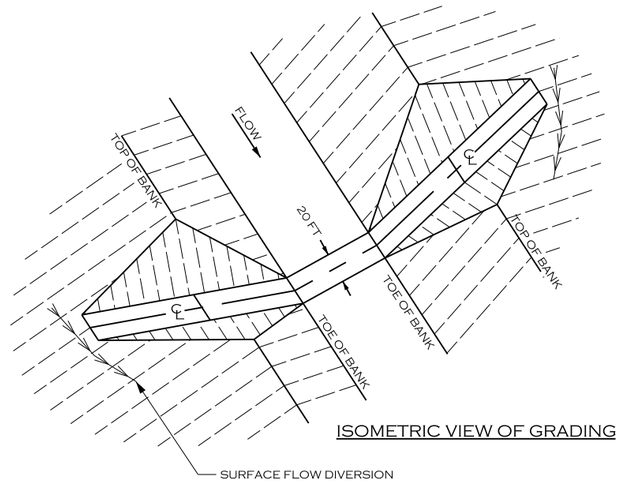
CROSS SECTION



INSET

NOTES:

1. HAVE ALL NECESSARY MATERIALS AND EQUIPMENT ON-SITE BEFORE WORK BEGINS.
2. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. COMPLETE ONE SIDE BEFORE STARTING ON THE OTHER SIDE.
3. INSTALL STREAM CROSSING AT RIGHT ANGLE TO THE FLOW.
4. DIVERT ALL SURFACE RUNOFF FROM CONSTRUCTION SITE ONTO UNDISTURBED AREAS ADJOINING THE STREAM.
5. ALIGN ROAD APPROACHES WITH THE CENTERLINE OF THE CROSSING FOR A MINIMUM DISTANCE OF 30 FEET.
6. GRADE SLOPES TO A 5:1 SLOPE OR FLATTER. TRANSPLANT SOD FROM ORIGINAL STREAMBANK ONTO SIDE SLOPES IF POSSIBLE.
7. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
8. A STABILIZED PAD OF STONE BACKFILL, LINED WITH GEOTEXTILE FABRIC SHALL BE USED OVER ACCESS SLOPES.
9. WIDTH OF THE CROSSING SHALL BE 20FEET.
10. INSPECT STREAM CROSSING AFTER RUNOFF - PRODUCING RAINS TO CHECK FOR BLOCKAGE IN CHANNEL, EROSION OF BANKS, CHANNEL SCOUR, STONE DISPLACMENT, OR PIPING. MAKE ALL REPAIRS IMMEDIATELY TO PREVENT FURTHER DAMAGE TO INSTALLATION.



ISOMETRIC VIEW OF GRADING

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
2	FINAL DRAFT MITIGATION PLAN	WSH	KLT	11/04/19
3	FINAL MITIGATION PLAN	WSH	KLT	2/17/20
4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:

NC Mitigation Services ENVIRONMENTAL QUALITY

NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:

ECOSYSTEM PLANNING & RESTORATION

1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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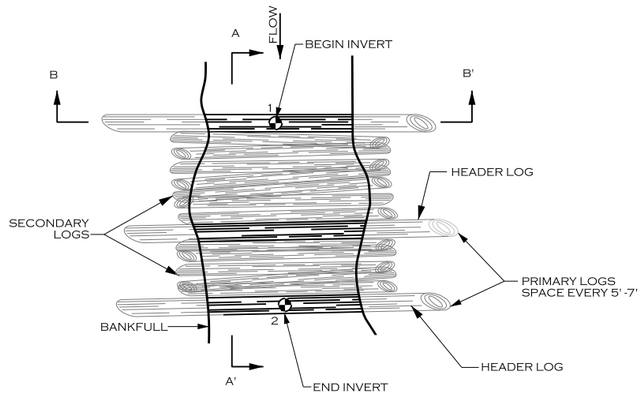
MKOEN

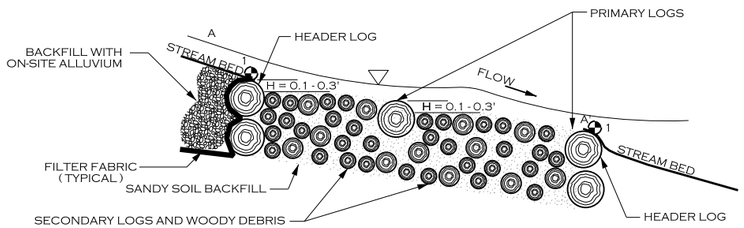
GRADE CONTROL WOODY RIFFLE (WR)

PROJECT # 101 | SHEET NO. 2C

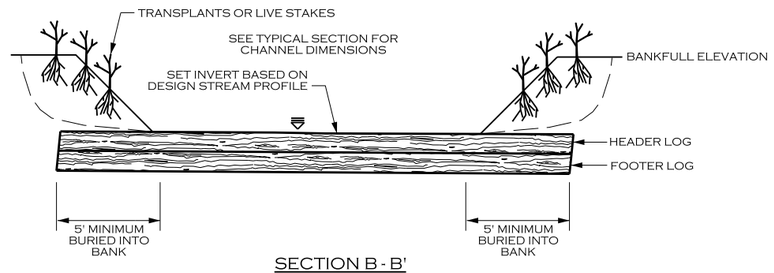
DETAILS



PLAN VIEW



SECTION A - A'



SECTION B - B'

NOTES:

1. PRIMARY LOGS SHOULD BE AT LEAST 12'' OR MORE IN DIAMETER, RELATIVELY STRAIGHT, AND RECENTLY HARVESTED AND EXTENDING INTO THE BANK 5' ON EACH SIDE.
2. SECONDARY LOGS SHOULD BE AT LEAST 1'' IN DIAMETER AND NO LARGER THAN 10'', AND EXTEND INTO THE BANK 2 FEET ON EACH SIDE. WOOD MATERIAL SHALL BE VARYING DIAMETER TO ALLOW MATERIAL TO BE COMPACTED.
3. ROOTWADS AND COIR FIBER MATTING CAN BE USED INSTEAD OF TRANSPLANTS OR LIVE STAKES, PER DIRECTION OF ENGINEER.
4. AFTER TRENCH HAS BEEN EXCAVATED A LAYER OF SECONDARY LOGS AND WOODY DEBRIS SHOULD BE PLACED WITH MINIMAL GAPS. A LAYER OF ON-SITE ALLUVIUM SHOULD BE APPLIED TO FILL VOIDS BETWEEN SECONDARY LOGS BEFORE ADDITIONAL LAYERS ARE PLACED.

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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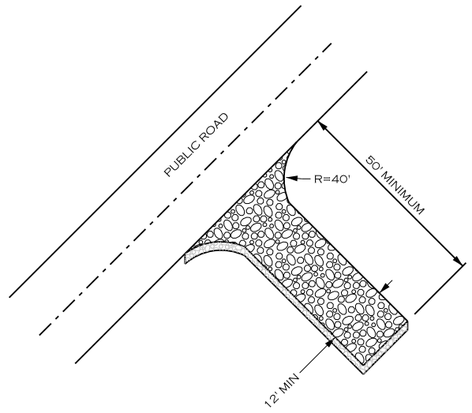
PROJECT # 101 | SHEET NO. 2D

DETAILS

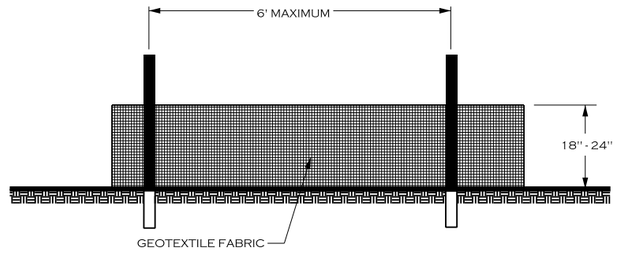
GRAVEL CONSTRUCTION ENTRANCE

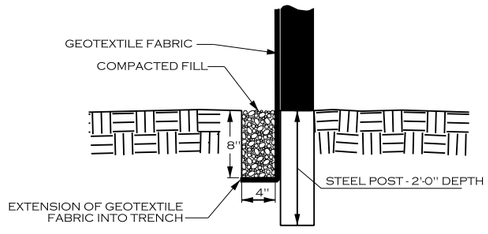


NOTES:

1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE EXPECTED EQUIPMENT.
2. LOCAL ENTRANCES TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. PLACE GEOTEXTILE FABRIC FOR DRAINAGE BENEATH STONE.
4. MUST BE MAINTAINED IN THE CONDITION WHICH WILL PREVENT TRACKING OR DIRECT MUD INTO STREETS.
5. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
6. LOCAL GRAVEL CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS TO THE ENTRANCE AND TIMELY MAINTENANCE.
7. NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES AS SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.
8. USE CLASS "A" STONE OR OTHER COURSE AGGREGATE APPROVED BY THE ENGINEER.
9. INSTALL CONSTRUCTION ENTRANCES IN A WAY TO PREVENT VEHICLES LEAVING THE PROJECT SITE FROM BYPASSING CONSTRUCTION ENTRANCES.

TEMPORARY SILT FENCE





NOTES:

1. USE GEOTEXTILE FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE STEEL POSTS.
2. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.
3. REMOVE ONCE AREA IS STABLE.

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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CARY NC 27511
LICENSE # P-1182

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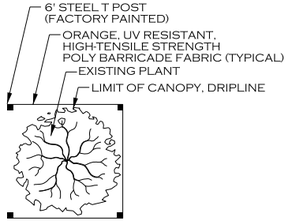
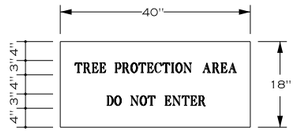
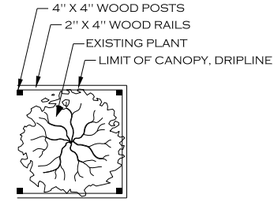
TREE PROTECTION



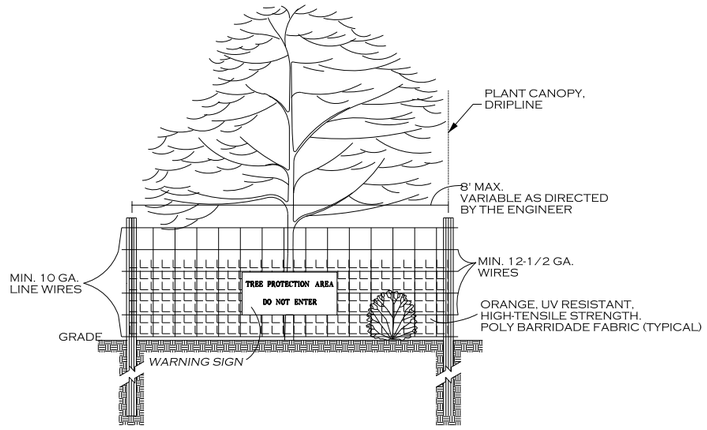
PLAN VIEW OF PROTECTIVE FENCING
AROUND SINGLE TREE- EXPAND AS NECESSARY



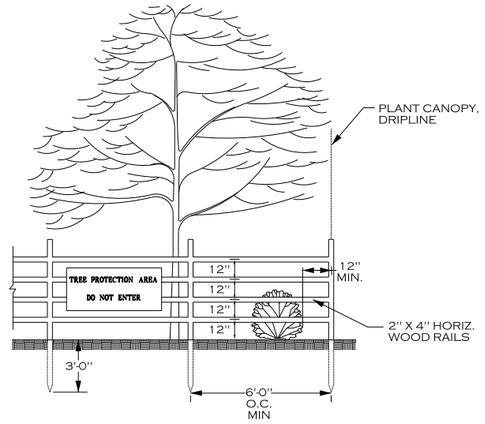
WARNING SIGN DETAIL



PLAN VIEW OF PROTECTIVE FENCING
AROUND SINGLE TREE- EXPAND AS NECESSARY



PERFORATED PLASTIC FENCE DETAIL

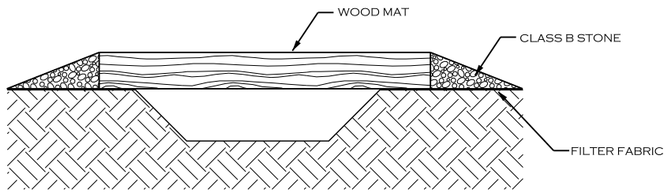


WOOD FENCE DETAIL

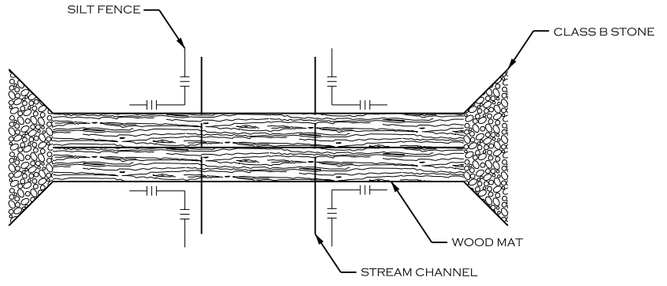
NOTES:

1. ALL PLANTS TO BE SAVED SHALL BE PROTECTED BY FENCING AS SHOWN IN THIS DETAIL.
2. CONTRACTOR SHALL INSTALL FENCING PRIOR TO BEGINNING ANY CONSTRUCTION OR GRADING ACTIVITY.
3. CONTRACTOR SHALL CALL FOR INSPECTION AND APPROVAL OF PROTECTIVE FENCING PRIOR TO BEGINNING ANY CONSTRUCTION OR GRADING.
4. PROTECTIVE FENCING SHALL BE LOCATED AT OR OUTSIDE DRIPLINE OF TREES AND 1' MINIMUM OUTSIDE SHRUBS OR OTHER PLANTS.

TEMPORARY STREAM CROSSING - WOOD MAT



CROSS SECTION



PLAN VIEW

NOTES:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS LOW.
2. HAVE ALL NECESSARY MATERIALS AND EQUIPMENT ON-SITE BEFORE WORK BEGINS.
3. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM.
4. LINE STREAMBANK AND ACCESS RAMP AREA WITH FILTER FABRIC.
5. INSTALL STREAM CROSSING AT RIGHT ANGLE TO THE FLOW.
6. TRANSPLANT SOD FROM ORIGINAL STREAMBANK ONTO SIDE SLOPES FOR LATER USE.
7. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL BY INSTALLING SILT FENCE ON ALL FOUR CORNERS ADJACENT TO THE STREAM. SEE SILT FENCE DETAIL.
8. STABILIZE AN ACCESS RAMP OF CLASS B STONE TO THE EDGE OF THE WOOD MAT.
9. THE WOOD MAT SHALL BE OF SUFFICIENT SIZE AND WIDTH TO SUPPORT THE LARGEST VEHICLE CROSSING THE CHANNEL.
10. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED, RECOMMENDED AT A 5:1 SLOPE.

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

PROJECT # 101 | SHEET NO. 2E

DETAILS

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DIVISION OF MITIGATION SERVICES
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RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:
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CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

PROGRESS DRAWING
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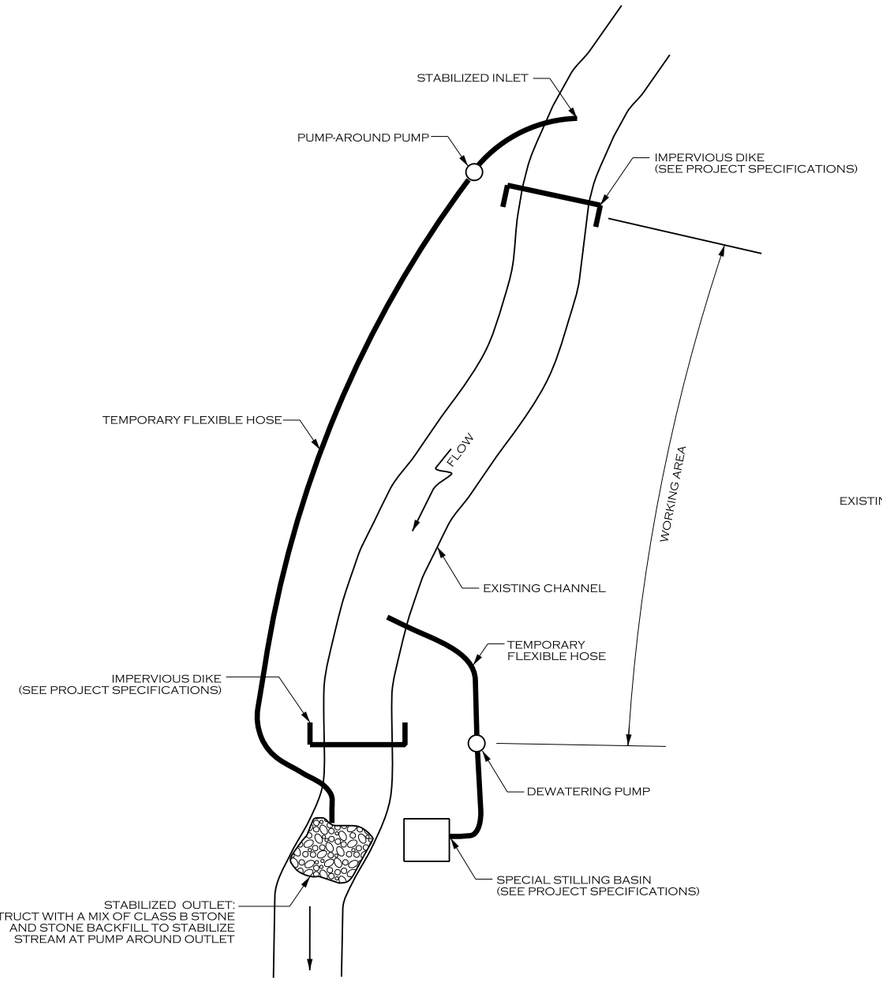
BRICEN

TEMPORARY PUMP - AROUND OPERATION

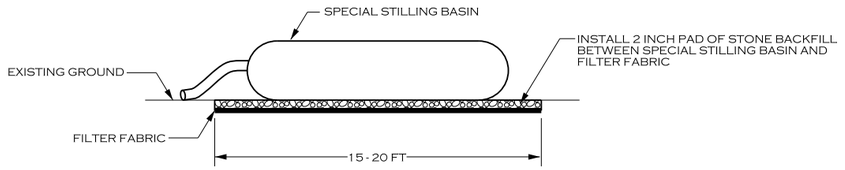
PROJECT # 101 | SHEET NO. 2F

DETAILS



NOTES:

1. EXCAVATION SHALL BE PERFORMED IN ONLY DRY SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES SHOULD BE USED TO ISOLATE WORK AREAS FROM STREAM FLOW.
3. THE CONTRACTOR SHALL NOT DISTURB MORE AREA THAN CAN BE STABILIZED IN ONE WORKING DAY.
4. THE PUMP-AROUND PUMP SHOULD ADEQUATELY CONVEY BASEFLOW.



SEQUENCE OF CONSTRUCTION FOR TEMPORARY PUMP - AROUND OPERATION

1. INSTALL STABILIZED OUTLET AT THE DOWNSTREAM END OF THE DESIGNATED PROJECT WORKING AREA.
2. THE CONTRACTOR WILL INSTALL THE PUMP AROUND PUMP AND THE TEMPORARY FLEXIBLE HOSE THAT WILL CONVEY THE BASE FLOW FROM UPSTREAM OF THE WORK SITE TO THE SPECIAL STILLING BASIN OR STABILIZED OUTLET.
3. INSTALL UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. INSTALL THE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS IF NEEDED TO DEWATER THE ENTRAPPED AREA. THE PUMP AND HOSE FOR THIS PURPOSE SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA. THIS WATER WILL FLOW INTO A SPECIAL STILLING BASIN.
5. THE CONTRACTOR WILL PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLAN AND FOLLOWING THE GENERAL CONSTRUCTION SEQUENCE.
6. THE CONTRACTOR WILL EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF THE IMPERVIOUS DIKE. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE STARTING WITH THE DOWNSTREAM DIKE FIRST.
7. THE CONTRACTOR WILL COMPLETE ALL GRADING AND STABILIZATION IN ONE DAY WITHIN THE PUMP AROUND AREA BETWEEN THE IMPERVIOUS DIKES.
8. ONCE THE WORKING AREA IS COMPLETED, REMOVE THE SPECIAL STILLING BASIN AND STABILIZED OUTLET AND STABILIZE DISTURBED AREAS WITH SEED AND MULCH.

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JRICKEN

TABLES

STRUCTURE TABLES

Grade Control Woody Riffle Structures

Structure #	Point 1		Point 2		Bottom Width	Length	Slope
	Station	Elevation	Station	Elevation			
UT Reach 1A							
WR-1	15+00.00	158.75	15+10.00	158.73	2.0	10.0	0.20%
WR-2	17+50.00	158.25	17+60.00	158.23	2.0	10.0	0.20%
WR-3	21+00.00	157.25	21+10.00	157.23	2.0	10.0	0.20%
WR-4	24+50.00	156.50	24+60.00	156.48	2.0	10.0	0.20%

Debris Jam Type 3

Structure #	Log		
	Station (ft)	Elevation (ft)	Min Length (ft)
UT Reach 1A			
DJ-T-3-1	11+00.00	159.75	10.0
DJ-T-3-2	12+00.00	159.50	10.0
DJ-T-3-3	13+00.00	159.25	10.0
DJ-T-3-4	14+00.00	159.00	10.0
DJ-T-3-5	15+00.00	158.75	10.0
DJ-T-3-6	16+00.00	158.50	10.0
DJ-T-3-7	17+00.00	158.25	10.0
DJ-T-3-8	18+00.00	158.00	10.0
DJ-T-3-9	19+00.00	157.75	10.0
DJ-T-3-10	20+00.00	157.50	10.0
DJ-T-3-11	21+00.00	157.25	10.0
DJ-T-3-12	22+00.00	157.00	10.0
DJ-T-3-13	23+00.00	156.75	10.0
DJ-T-3-14	24+00.00	156.50	10.0

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VEGETATION SELECTION

PROJECT # 101 | SHEET NO. 3A

VEGETATION SELECTION

TEMPORARY SEEDING

Temporary herbaceous seed mixtures for the restoration site shall be planted in all disturbed areas. Temporary seed shall be applied according to the construction specifications and the information specified below.

Scientific Name	Common Name	Rate	Dates
Secale cereale	Cereal Rye Grain	130 lbs/acre	September to March (Cool Season)
Urochloa ramosa	Browntop Millet	30 lbs/acre	April to August (Warm Season)

Total Planting Area for Temporary Seeding **12.3** *acre(s)*

PERMANENT SEEDING - Zones 1 & 2

This permanent herbaceous seed mixture shall be planted in all disturbed areas as specified on the plans as Zones 1 and 2. This permanent herbaceous seed mixture shall be applied with temporary seed, as defined in the construction specifications. Permanent seed for this zone shall be applied at a rate of **20 lbs/acre**.

RIPARIAN AND WETLAND BUFFER SEED MIX

Scientific Name	Common Name	by Species	Indicator Status
Panicum virgatum	Switchgrass	23%	FAC
Elymus riparius	Riverbank Wildrye	20%	FACW
Panicum dichotomiflorum	Smooth Panicgrass	14%	FACW
Carex vulpinoidea	Fox sedge	12%	OBL
Panicum rigidulum	Redtop Panicgrass	8%	FACW
Dichanthelium clandestinum	Deer-tongue	8%	FAC
Bidens frondosa (or aristosa)	Beggars Tick	7%	FACW
Juncus effusus	Soft Rush	4%	FACW
Persicaria pensylvanica	Pennsylvania smartweed	2%	FACW
Sparganium americanum	American Bur Reed	2%	OBL
	Total	**100%**	

Total Planting Area for Permanent Seeding: Zones 1 & 2 **12.3** acre(s)

ZONE 1 - Riparian Buffer

Riparian species (bare-roots) shall be planted in the areas as designated on the plans and details. Species shall be planted at an overall density of 680 stems/acre, using the mixture of species and percentages listed below.

Scientific Name	Common Name	Percent Planted	Wetland Indicator Status
Betula nigra	River Birch	5%	FACW
Carpinus caroliniana	Ironwood	5%	FAC
Liriodendron tulipifera	Tulip Poplar	5%	FACU
Magnolia virginiana	Sweet Bay	5%	FACW
Nyssa biflora	Swamp Black Gum	10%	OBL
Persea palustris	Red Bay	5%	FACW
Quercus laurifolia	Laurel Oak	15%	FACW
Quercus lyrata	Overcup Oak	15%	OBL
Quercus michauxii	Swamp Chestnut Oak	15%	FACW
Taxodium distichum	Bald Cypress	15%	OBL
Ulmus americana	American elm	5%	FAC
	Total	**100%**	

Total Planting Area for Riparian Vegetation **6.0** **acre(s)**

ZONE 2 - Forested Wetlands

Wetland species (bare-roots) shall be planted in the areas as designated on the plans and details. Species shall be planted at an overall density of 680 stems/acre, using the mixture of species and percentages listed below.

Scientific Name	Common Name	Percent Planted	Indicator Status
Diospyros virginiana	Persimmon	5%	FAC
Magnolia virginiana	Sweet Bay	5%	FACW
Nyssa biflora	Swamp Black Gum	15%	OBL
Persea palustris	Red Bay	5%	FACW
Quercus laurifolia	Laurel Oak	15%	FACW
Quercus lyrata	Overcup Oak	15%	OBL
Quercus michauxii	Swamp Chestnut Oak	15%	FACW
Taxodium distichum	Bald Cypress	25%	OBL
	Total	**100%**	

Total Planting Area for Riparian Vegetation **6.3** **acre(s)**

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

2/18/2020
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MKOEN

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	DRAFT MITIGATION PLAN	WSH	KLT	9/27/19
2	FINAL DRAFT MITIGATION PLAN	WSH	KLT	11/04/19
3	FINAL MITIGATION PLAN	WSH	KLT	2/17/20
4	ISSUED FOR ESC PERMITTING	WSH	KLT	2/21/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
LICENSE # P-1182

PROJECT ENGINEER

PROGRESS DRAWING
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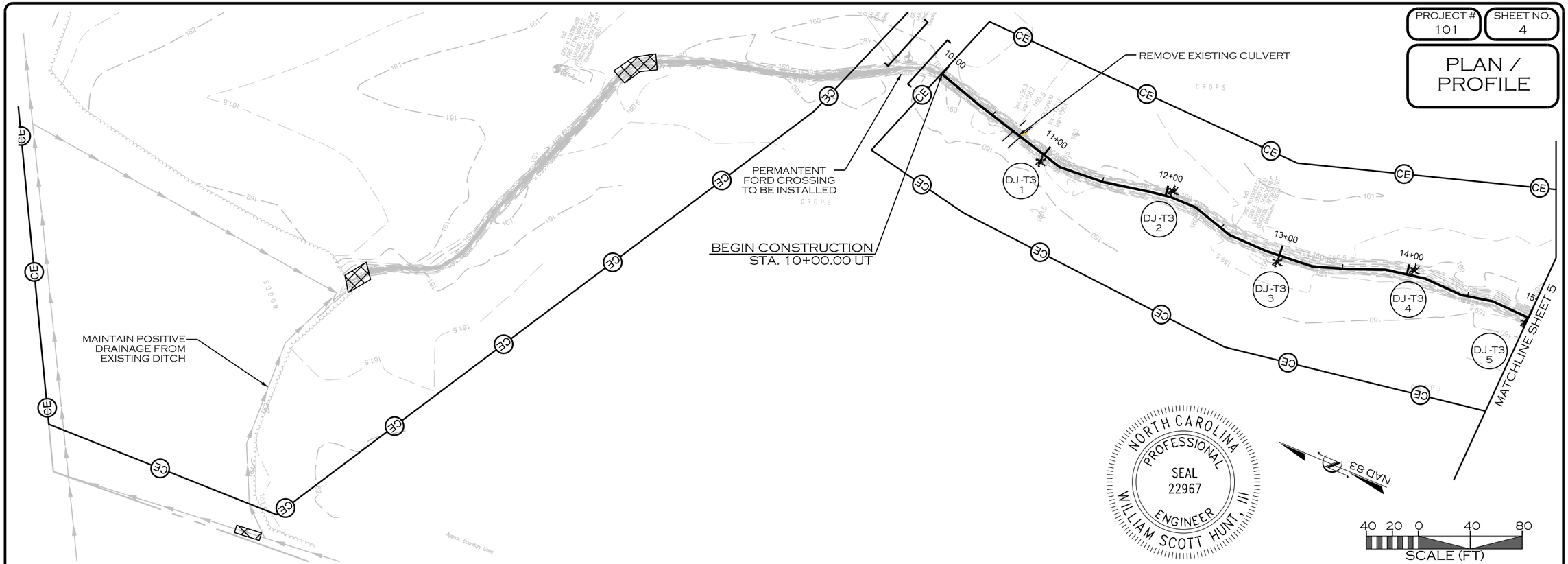
PROJECT #	SHEET NO.
101	4

PLAN / PROFILE



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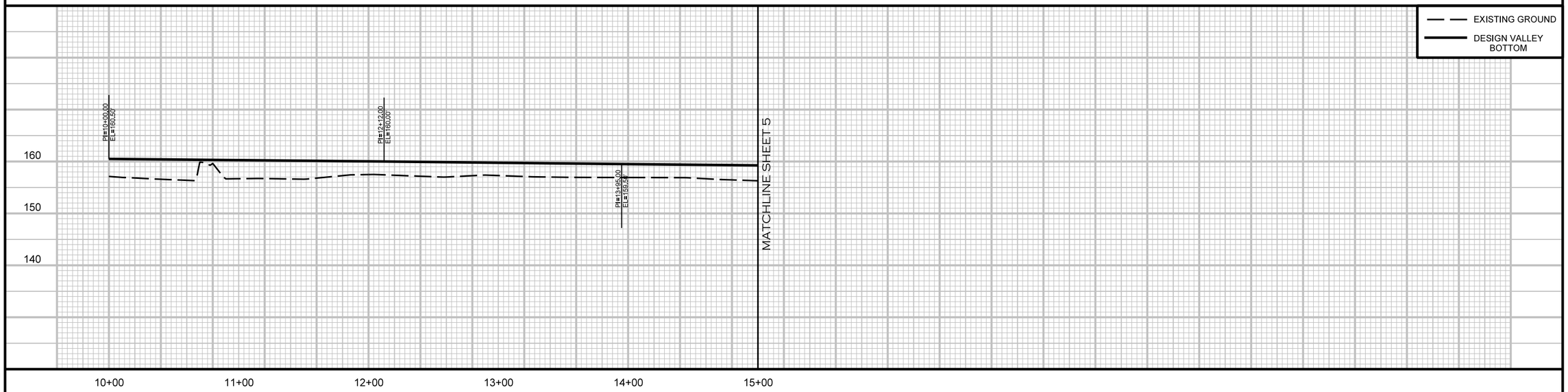

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PREPARED FOR:

NC Mitigation Services ENVIRONMENTAL QUALITY

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BEAR SWAMP STREAM AND WETLAND
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ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

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ECOSYSTEM PLANNING & RESTORATION

1150 SE MAYNARD RD., SUITE 140
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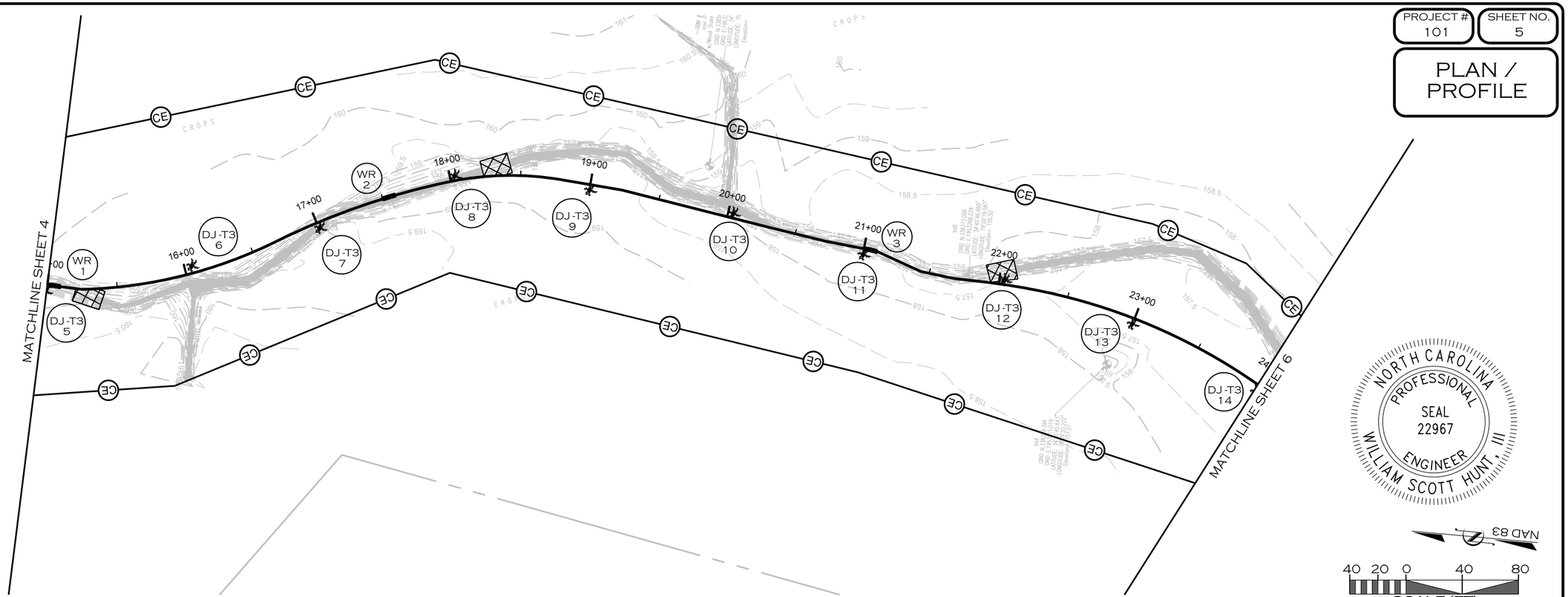
BROWN

PROJECT # 101 | SHEET NO. 5

PLAN / PROFILE



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NAD 83

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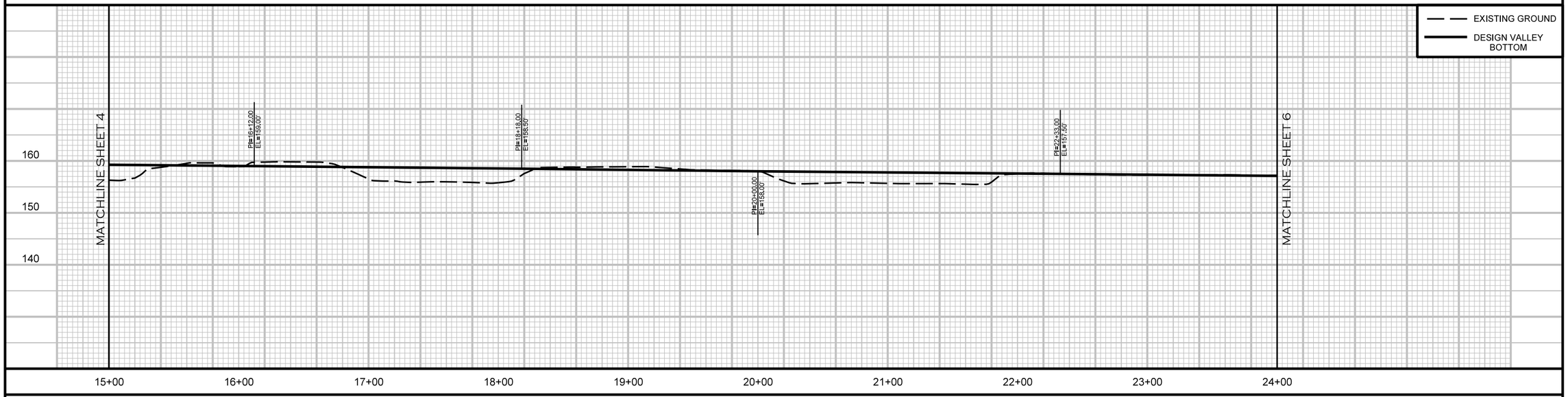
SCALE (FT)



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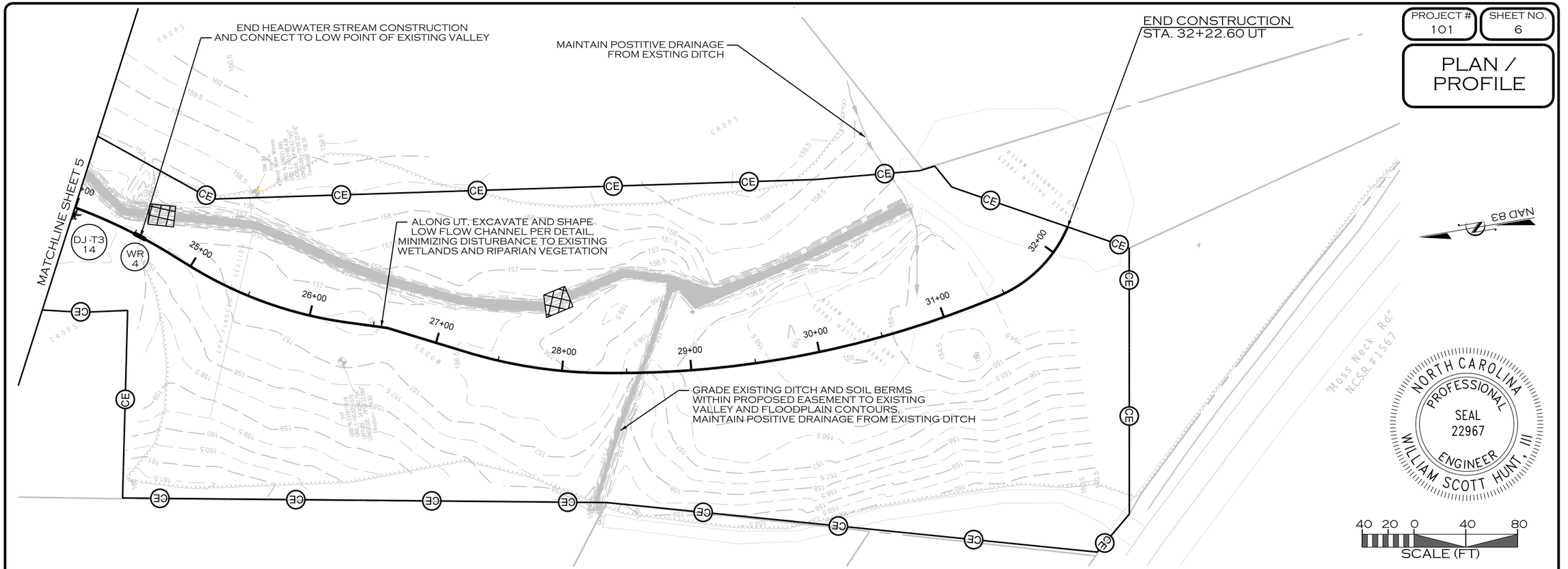
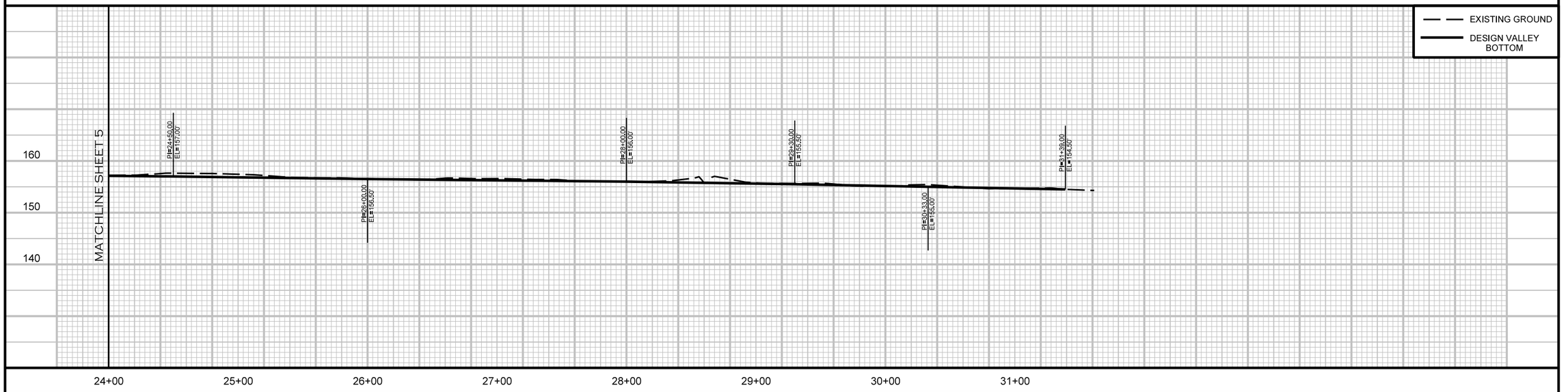
PROJECT #	SHEET NO.
101	6

PLAN / PROFILE





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BEAR SWAMP STREAM AND WETLAND
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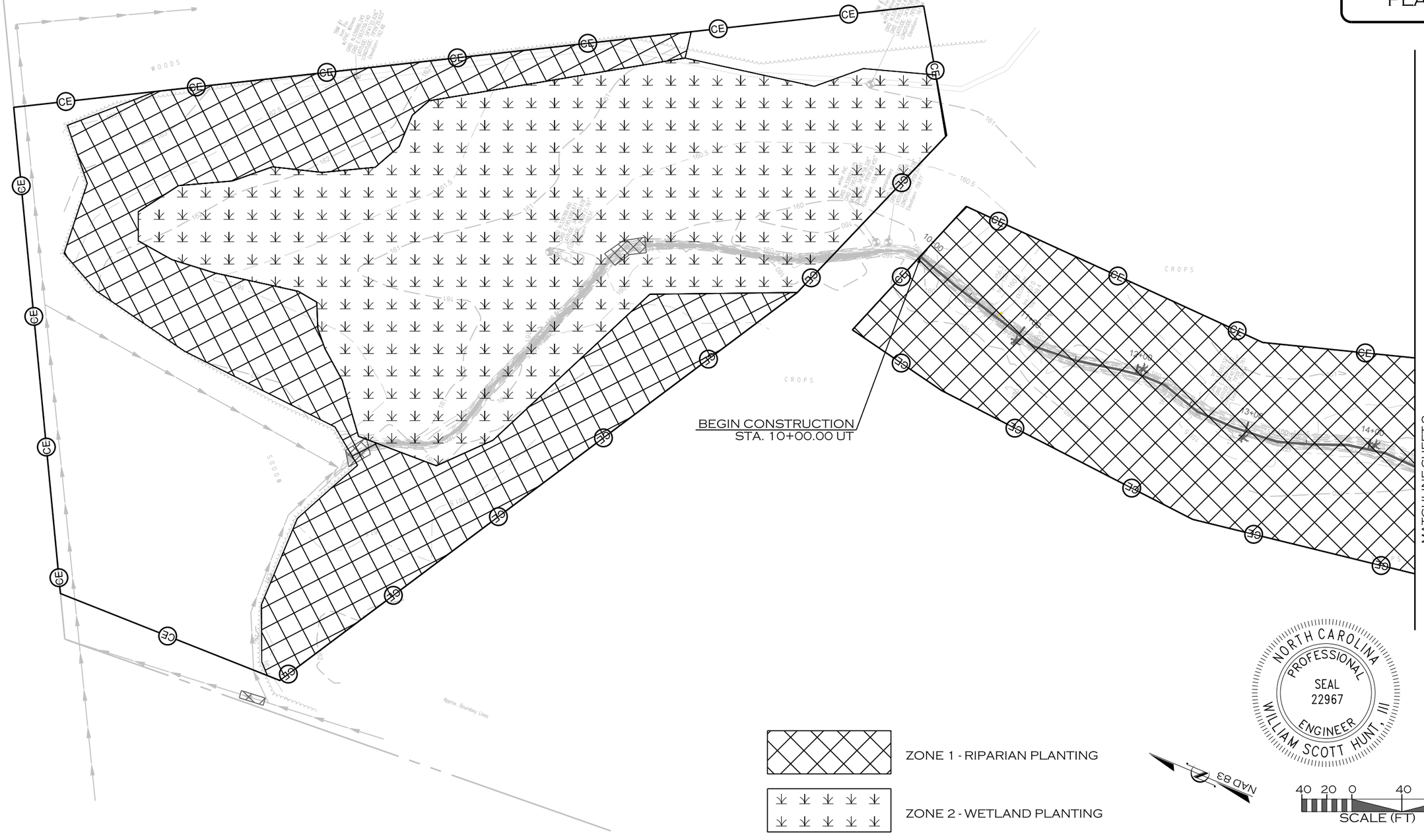
MKOCH

PROJECT #	SHEET NO.
101	7

VEGETATION PLAN



ZONE 1 - RIPARIAN PLANTING

ZONE 2 - WETLAND PLANTING

NAD 83

40 20 0 40 80
SCALE (FT)

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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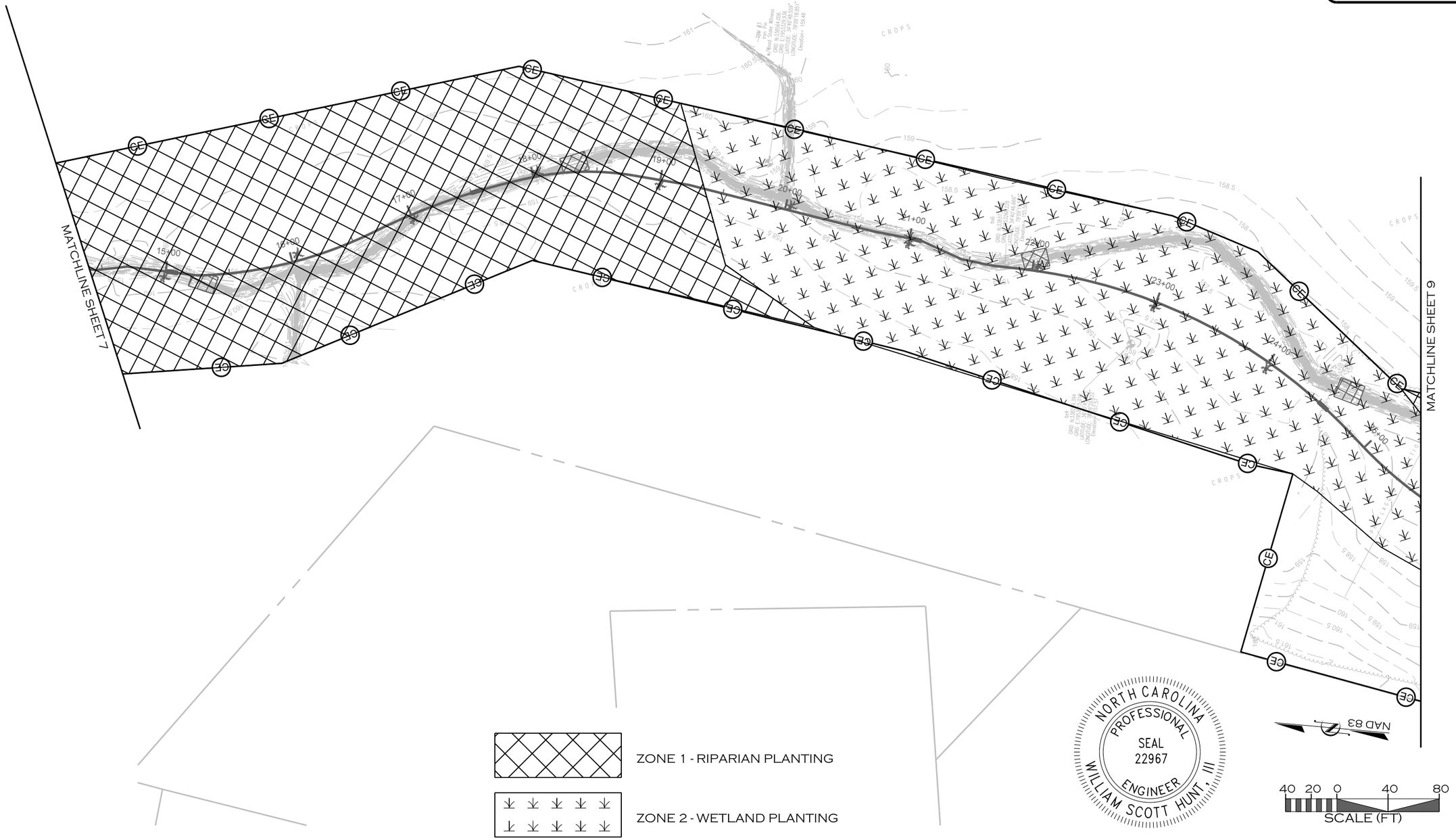
PROJECT #	SHEET NO.
101	8

VEGETATION PLAN



ZONE 1 - RIPARIAN PLANTING

ZONE 2 - WETLAND PLANTING

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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BEAR SWAMP STREAM AND WETLAND
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ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

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LICENSE # P-1182

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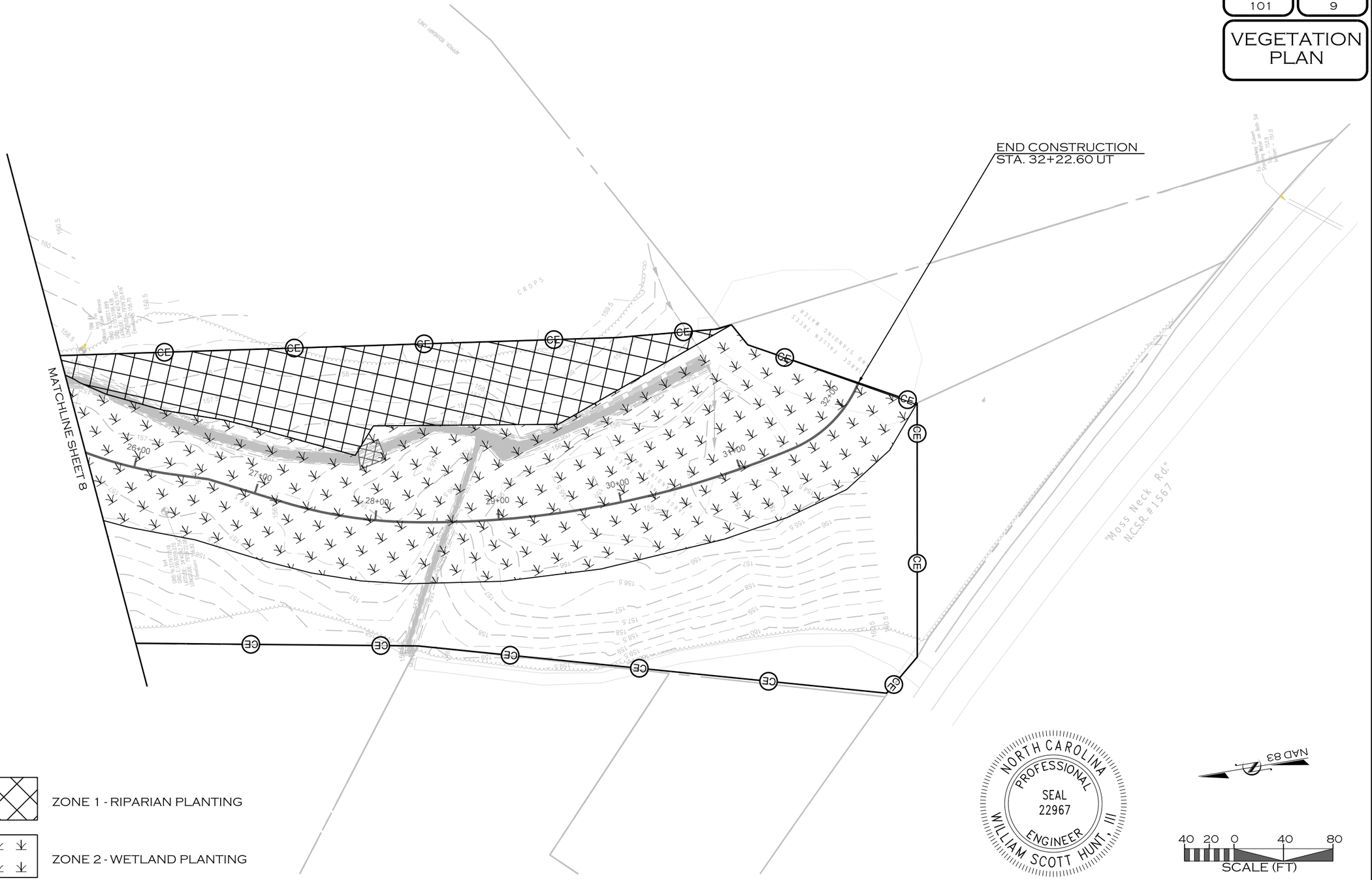
MKOCH

PROJECT #	SHEET NO.
101	9

VEGETATION PLAN



ZONE 1 - RIPARIAN PLANTING

ZONE 2 - WETLAND PLANTING

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

NAD 83

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SCALE (FT)

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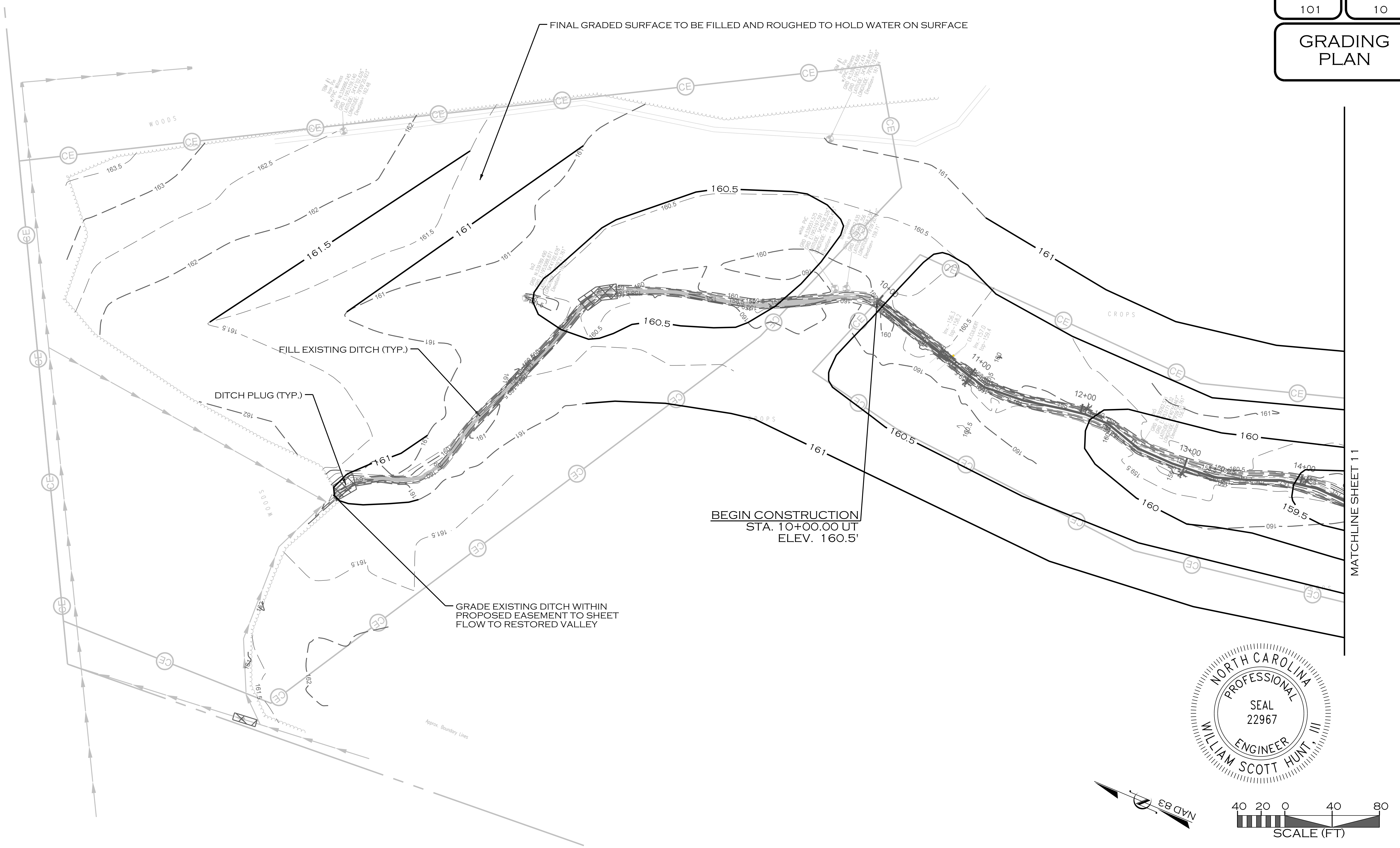
PROJECT # 101

SHEET NO. 10

GRADING PLAN



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PREPARED FOR:

Mitigation Services
ENVIRONMENTAL QUALITY

NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
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BEAR SWAMP STREAM AND WETLAND
RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

PREPARED IN THE OFFICE OF:

EPR Ecosystem Planning & Restoration
1150 SE MAYNARD RD., SUITE 140
CARY NC 27511
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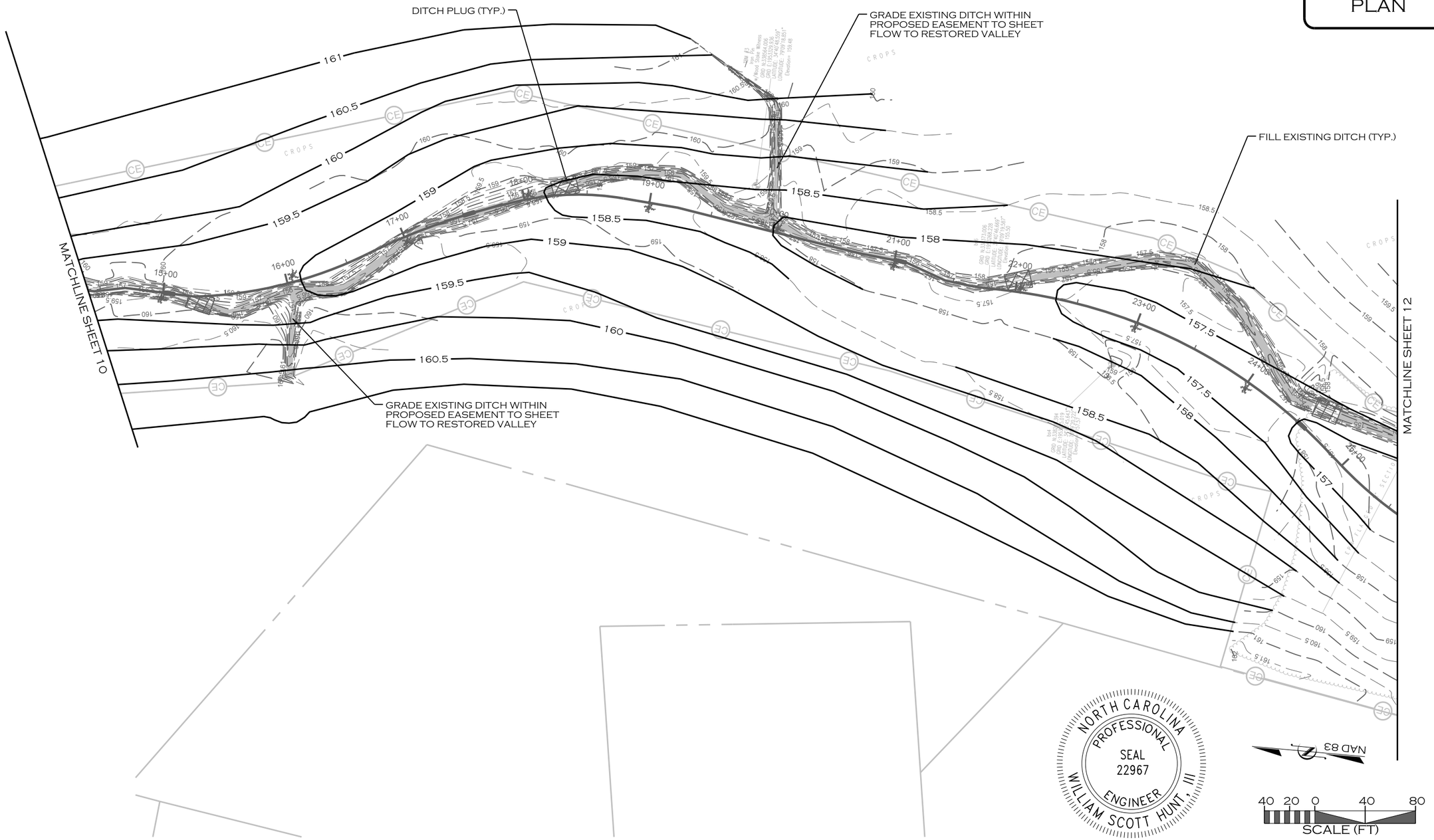
PROJECT # 101 | SHEET NO. 11

GRADING PLAN



NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

REVISIONS				
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PREPARED FOR:
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NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

BEAR SWAMP STREAM AND WETLAND
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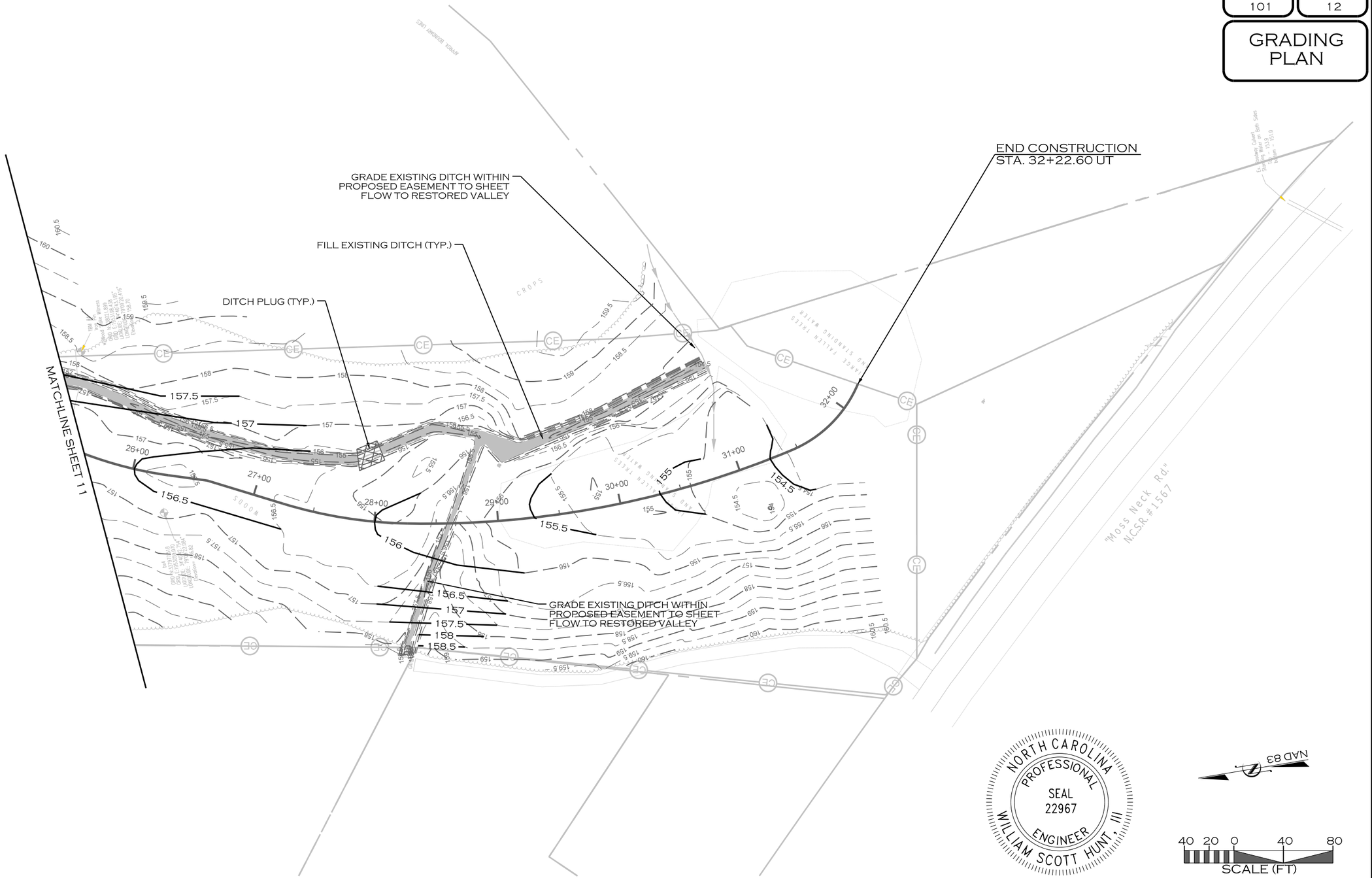
MKOPAN

PROJECT # 101 | SHEET NO. 12

GRADING PLAN



NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

NAD 83

40 20 0 40 80
SCALE (FT)

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BEAR SWAMP STREAM AND WETLAND RESTORATION SITE
ROBESON COUNTY, NC
NCDEQ DMS PROJECT ID# 100054

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LICENSE # P-1182

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MKOEN

PROJECT # 101 | SHEET NO. 13

EROSION AND SEDIMENTATION CONTROL PLAN

END PHASE 6
STA. 10+00.00 UT
(WETLAND RESTORATION)
(DOWNSTREAM IMPERVIOUS
DIKE - PHASE 6)

MATCHLINE SHEET 16

LIMITS OF DISTURBANCE (TYP.)

STAGING / STOCKPILE AREA

STAGING / STOCKPILE AREA

20' ACCESS ROAD

TEMPORARY STREAM CROSSING - WOOD MAT

STAGING / STOCKPILE AREA

IMPERVIOUS DIKE (TYP.)

BEGIN PHASE 6
BEGINNING OF DITCH
(WETLAND RESTORATION)
(UPSTREAM IMPERVIOUS
DIKE - PHASE 6)

STAGING / STOCKPILE AREA

20' ACCESS ROAD
LIMITS OF DISTURBANCE (TYP.)

TEMPORARY SILT FENCE (TYP),

20' ACCESS ROAD

BEGIN PHASE 2
STA. 10+00.00 UT
(UPSTREAM IMPERVIOUS
DIKE - PHASE 2)

MATCHLINE SHEET 14

TAX PIN: 935339505659
PROPERTY OF: K.M. BIGGS INC.
DB 807, PG 145
DB 8G. PG 145

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

NAD 83

40 20 0 40 80
SCALE (FT)

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BEAR SWAMP STREAM AND WETLAND
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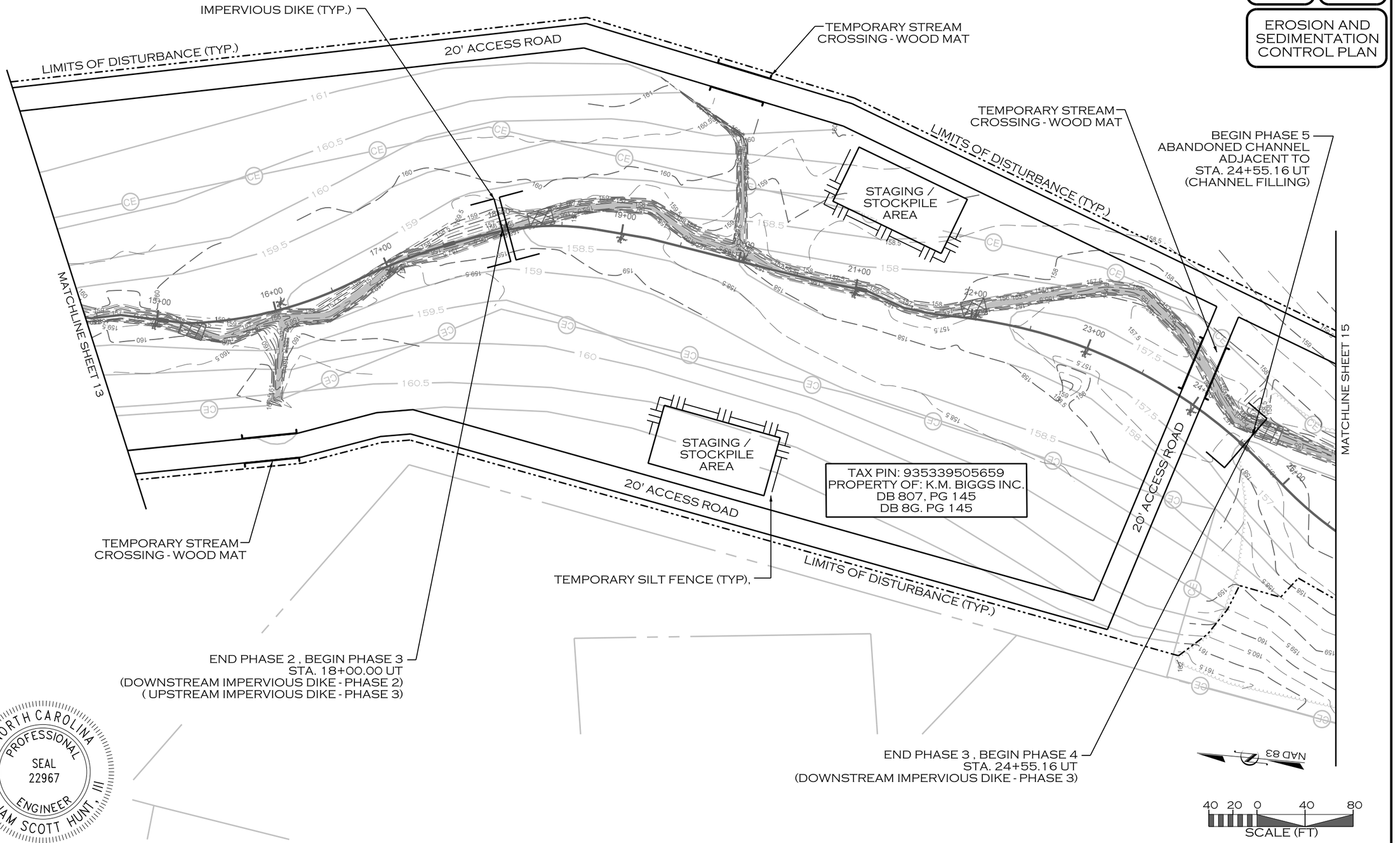
PROJECT # 101 | SHEET NO. 14

EROSION AND SEDIMENTATION CONTROL PLAN



NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

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BEAR SWAMP STREAM AND WETLAND
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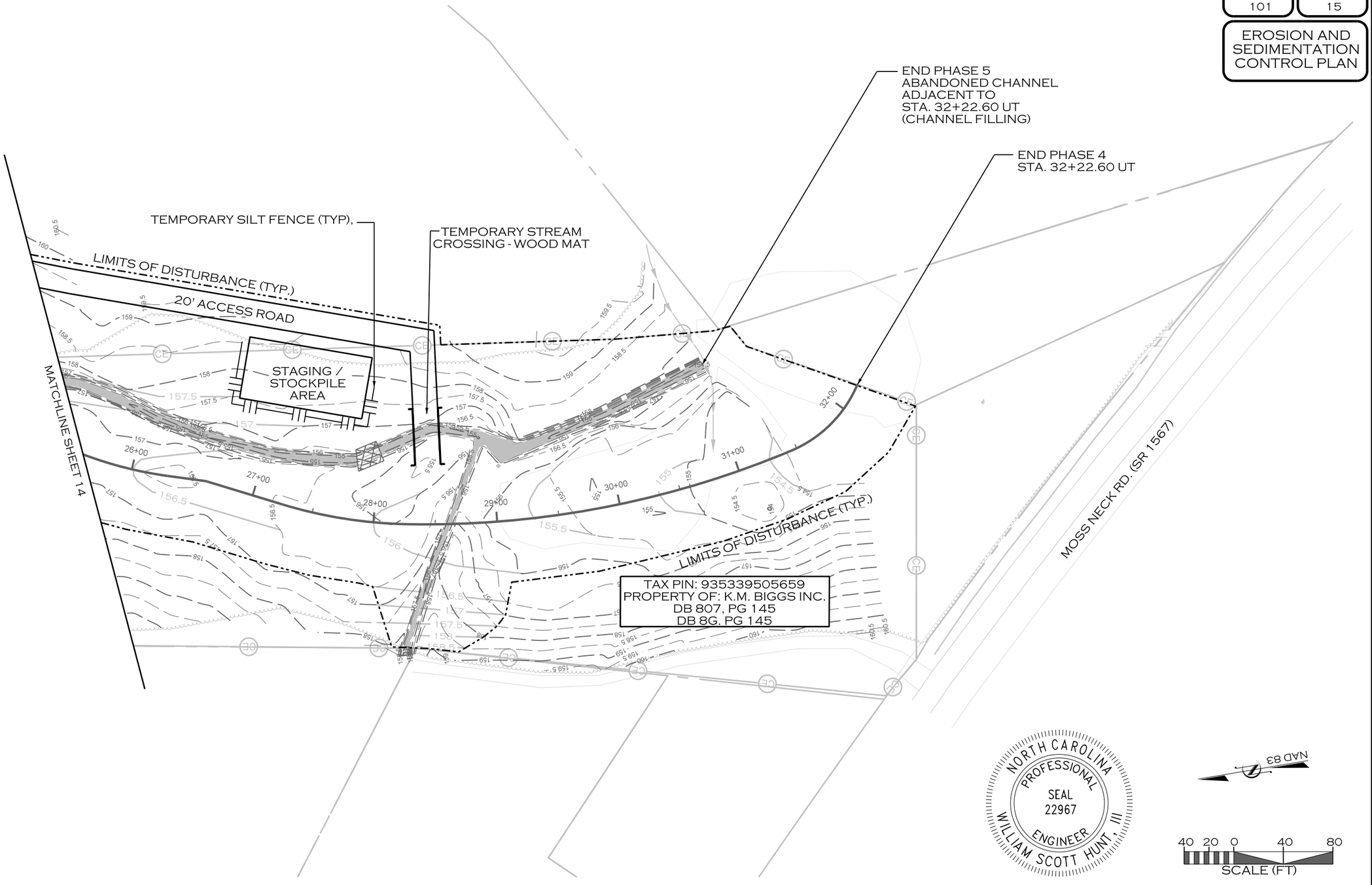
PROJECT # 101 | SHEET NO. 15

EROSION AND SEDIMENTATION CONTROL PLAN



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NAD 83

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SCALE (FT)

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PROJECT # 101 | SHEET NO. 16

EROSION AND SEDIMENTATION CONTROL PLAN

NORTH CAROLINA PROFESSIONAL SEAL 22967 ENGINEER WILLIAM SCOTT HUNT, III

NAD 83

80 40 0 80 160
SCALE (FT)

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2/24/2020
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Appendix 9

INVASIVE SPECIES

Invasive Species Plan

Invasive species vegetation identified at the Site prior to construction included fescue (*Schedonorus* spp.) in the field area, princess tree (*Paulownia tomentosa*) along the stream corridor, and Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*) scattered along the wetland edges. During construction, the existing invasive vegetation species will be controlled using mechanical methods.

During the monitoring period, the Site will be reviewed annually to locate and to quantify any residual invasive species vegetation. If invasive species are identified at the Site during the monitoring period, their location and extent will be shown on the current condition plan view (CCPV). A corresponding discussion will be included in the annual monitoring report outlining the proposed management plan. Invasive species vegetation will be managed and reviewed on all annual basis to minimize its long-term impact to planted native species. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.

Invasive species will be managed and controlled using a combination of chemical and/or mechanical methods to ensure that these species comprise less than 5% of the total easement acreage. Management and control will continue throughout the project until this percentage is achieved.

Appendix 10

MAINTENANCE PLAN

Maintenance Plan

The Site shall be monitored on a regular basis and a physical inspection of the site shall be conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following:

Component/Feature	Maintenance through project close-out
Stream	The Bear Swamp project is a coastal headwater system, and as such, will not have a well-defined channel requiring routine maintenance and repair activities. However, areas where stormwater and floodplain flows intercept the flow path may require maintenance to prevent head-cutting and incision from occurring.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Beaver	Beaver and associated dams are to be removed as they colonize until the project is closed.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.
Farm Road Crossing	Farm road crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

Appendix 11

CREDIT RELEASE SCHEDULE

Credit Release Schedule

All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standards. The release of project credits will be subject to the criteria described as follows:

Stream Credit Release Schedule
Bear Swamp Stream and Wetland Restoration Site – NCDMS Project No. 100054

Credit Release Milestone	Release Activity	ILF/NCDMS	
		Interim Release	Total Released
1	Site Establishment	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	30%	30%
3	Year 1 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	40%
4	Year 2 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	50%
5	Year 3 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	60%
6*	Year 4 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	65% (75%**)
7	Year 5 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	75% (85%**)
8*	Year 6 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	80% (90%**)
9	Year 7 monitoring report demonstrates that channels are stable, and performance standards have been met and project has been approved for closeout	10%	90% (100%**)

* Please note that vegetation data may not be required with monitoring reports submitted during these monitoring years unless otherwise required by the Mitigation Plan or directed by the NCIRT.
**10% reserve of credits to be held back until the bankfull event performance standard has been met.

Wetland Credit Release Schedule
Bear Swamp Stream and Wetland Restoration Site – NCDMS Project No. 100054

Credit Release Milestone	Release Activity	ILF/NCDMS	
		Interim Release	Total Released
1	Site Establishment	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	30%	30%
3	Year 1 monitoring report demonstrates that interim performance standards have been met	10%	40%
4	Year 2 monitoring report demonstrates interim performance standards have been met	10%	50%
5	Year 3 monitoring report demonstrates that interim performance standards have been met	15%	65%
6*	Year 4 monitoring report demonstrates that interim performance standards have been met	5%	70%
7	Year 5 monitoring report demonstrates that interim performance standards have been met	15%	85%
8*	Year 6 monitoring report demonstrates that interim performance standards have been met	5%	90%
9	Year 7 monitoring report demonstrates that channels are stable, and performance standards have been met and project has been approved for closeout	10%	100%

* Please note that vegetation data may not be required with monitoring reports submitted during these monitoring years unless otherwise required by the Mitigation Plan or directed by the NCIRT.

The following conditions apply to the credit release schedule:

a. A reserve of 10% of a site's total stream credits will be released after four bankfull events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than four bankfull events occur during the monitoring period, release of these reserve credits is at the discretion of the NCIRT.

b. After the second milestone, the credit releases are scheduled to occur on an annual basis, assuming that the annual monitoring report has been provided to the USACE and that the monitoring report demonstrates that interim performance standards are being met and that no other concerns have been identified on-site during the visual monitoring. All credit releases require written approval from the USACE.

c. The credits associated with the final credit release milestone will be released only upon a determination by the USACE, in consultation with the NCIRT, of functional success as defined in the Mitigation Plan.

Appendix 12

FINANCIAL ASSURANCES

Financial Assurances

Pursuant to Section IV H and Appendix III of the Division of Mitigation Services' In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environmental Quality has provided the U.S. Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

Appendix 13

MEETING MINUTES FROM IRT ON-SITE MEETING

Meeting Minutes:

Bear Swamp Full Delivery Site IRT Meeting

Date: July 2, 2018

Prepared For: NC Division of Mitigation Services
Ms. Lindsay Cocker

Prepared By: Ecosystem Planning and Restoration, LLC
Mr. Kevin Tweedy, PE – Project Manager

Meeting Attendees: Kimberly Browning – US Army Corps of Engineers
Mac Haupt – NC Department of Environmental Quality
Periann Russell – NC Division of Mitigation Services
Jeff Schaffer – NC Division of Mitigation Services
Kevin Tweedy – Ecosystem Planning and Restoration

The site visit began at approximately 9:00AM. The group first walked to the upstream end of the proposed stream mitigation reach where Kevin showed the group where the proposed stream mitigation would start and where the E/I/P calls were made for the existing stream. The group discussed changes to drainage that would be done as part of the proposed mitigation work. Mac reviewed the soils in the proposed wetland restoration area at the head of the system. Kevin discussed how the existing crossing would be moved upstream approximately 50 feet. During the visit, the existing stream had water in the channel from the existing crossing down through most of the woods.

The group then walked down the existing stream, discussing the mitigation approaches to be used. Kevin indicated that fill material would mostly come from the left bank and floodplain areas, as these areas are higher in elevation than the right bank. Mac asked if at some point along the project EPR thought that the restored stream may form a more defined single thread channel. Kevin stated that its possible, but due to the low slopes and vegetation in the floodplain at the low end, EPR was not concerned about channel formation causing problems. Group discussed the use of proposed level spreaders on the field ditches entering the site. Kevin stated that these would function as linear depressions that intercept the ditch water, fill up, and then spill over into the buffer as sheet flow. The areas would be included in the conservation easement but not necessarily within the 50 foot riparian buffer, and would be designed to not require long-term maintenance. Group noted several pieces of what appeared to be broken terracotta drain tiles in the field – EPR will investigate further into whether drain tiles were ever installed on the property and if so, address these in the mitigation plan and design.

The group then proceeded into the wooded section at the bottom. There was no water in the existing wetland area but there was water in the channel. Group discussed how the channelized stream would be filled to allow water to follow the historic fall of the valley, restoring stream flow and more natural wetland hydrology. Site visit concluded at approximately 10:30AM. No serious concerns regarding the viability of the site were raised, and there was overall agreement on the proposed levels of intervention and the proposed credit strategy.