Final Buffer Mitigation Plan
Strawberry Hill Mitigation Project

DMS Project #: 100094 | Contract #: 7745 | RFP: 16-007576 | DWR #: 2019-0159

Neuse River Basin | HUC 03020201 | Johnston County, North Carolina

December 2020

Prepared For:
NC Department of Environmental Quality
Division of Mitigation Services
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This mitigation plan has been written in conformance with the requirements of the following:

- *The Consolidated Buffer Mitigation Rule, 15A NCAC 02B .0295, effective November 1, 2015*
- *Nutrient Offset Credit Trading Rule, 15A NCAC 02B .0703, effective April 1, 2020*

These documents govern NCDMS operations and procedures for the delivery of compensatory mitigation.

M E M O R A N D U M

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TO: NCDWR and NCDMS

FROM: Jamey McEachran – Project Manager
Resource Environmental Services, LLC

DATE: December 18th, 2020

RE: Response to Strawberry Hill Mitigation Project Buffer Plan NCDWR Comments during the Mitigation Plan Review
DMS Project ID No. 100094, Contract #7745, USACE Action ID #SAW-2019-00124
DWR #20190159

Buffer Mitigation Plan (Appendix A):

NCDWR Comments, Katie Merritt:

Title Page: Since DMS has requested DWR to review the Plan under both 0295 (Buffer Mitigation) & under 0703 (Nutrient Offset), additional rule references and edits will be necessary within the document. I have provided comments where appropriate. Add rule 15A NCAC 02B .0703 "Nutrient Offset Credit Trading" Rule effective April 1, 2020.
The final buffer mitigation plan has been revised accordingly to allow for the flexibility to convert riparian buffer credits to nutrient offset credits, where viable, if DMS ever chooses to do so.

The Nutrient Offset Credit Trading rule reference has been included on the title page. The reference is also now included in **Section 1** and **Section 2.1**.

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- Add another Figure titled "Nutrient Offset Conceptual Map" and add clarification that this Figure only represents areas that are viable for nutrient offsets if ever DMS converted the RBCs. The areas shown in the Figure as being viable for NOC should match the asset table in A1 for what is deemed convertible to Nutrient Offset.
  A Nutrient Offset Conceptual figure has been created and is now **Figure 7**. The areas depicted are those that are convertible to nutrient offset and are viable according to the Buffer Viability letter. Furthermore, the asset table in **Appendix A1** has been revised and corresponds to the areas in the figures appropriately.

- Change Appendix A1 title to "Project Buffer Mitigation Credits."
  Title has been revised accordingly.

- There is no stream determination correspondence in A2. Only the Site Viability Letter. The stream determination letter is found in Appendix H. Correct reference.
  The stream determination letter is now also included in **Appendix A2**. Furthermore, the **Appendix A2** title has been revised to "Buffer Viability & Stream Determination."

Section 1.1:

- Change sentence in 3rd paragraph that starts "Furthermore, the buffers and surrounding riparian areas…" to read "Furthermore, the fifty-foot riparian buffers of all stream channels were determined to be subject to the Neuse buffer protection rules.
  The sentence has been revised accordingly.

- The reference to Appendix A2 in the 3rd paragraph should be Appendix H.
  As mentioned in an above response, the stream determination letter is now also included in **Appendix A2**. Therefore, the reference to **Appendix A2** is now valid.

- Add language to the 4th paragraph acknowledging that the service area for these credits is limited to the Neuse 01 excluding the Falls Lake Watershed.
  The sentence has been revised to read, "The Project will provide significant functional uplift to the watershed and will assist DMS with achieving its mitigation goals in the Neuse 01 watershed, excluding the Falls Lake Watershed."

Table 1:

- Add text "excluding the Falls Lake Watershed" beside Neuse River in the River Basin row.
  Text has been added accordingly.

- Types of Credits row please add additional text "with flexibility to convert to Nutrient Offset if needed."
  Text has been added accordingly.

Section 1.3.4 Landscape Communities

- Part A: With the presence of loblolly pine, eastern baccharis, and sweetgum in the clear cut areas, is there a need to do a thinning of these species before project implementation?
  Yes. As mentioned in **Section 3.1**, one of the site preparation activities will involve the clearing of undesirable scrub-shrub vegetation: This is meant to account for the area in question.

- Part B: There is a statement indicating that the riparian areas within the clear cut area have failed to regenerate trees. What is being proposed within these areas that will promote healthy and successful stem establishment?
  RES believes the areas lacking much tree growth is likely due to site wetness and lack of wet-tolerant seed source. Therefore, RES believes that by incorporating a diverse tree mix that includes many wet-tolerant species in the planting plan, tree growth will be successful in these areas. Furthermore, the statement in question has been revised for clarity and now reads, "Specifically, the buffer and riparian area off the right bank of reach JH1-B was clear-cut sometime around 2014 and is currently in an early successional state of regeneration, although much of the area has failed to regenerate trees, likely due to site wetness and lack of wet-tolerant seed sources."

Section 3:

- Change title to read "Riparian Restoration and Preservation Implementation Plan."
  Title has been revised accordingly.

- 3.1, second paragraph, first sentence: Clarify the meaning here of "restoration activities". Do you mean after "stream restoration activities" are completed or after "riparian restoration activities" are completed?
  It was intended to imply "stream restoration activities." The sentence has been revised accordingly.

- The location where the agricultural buildings are being demolished will likely require grading, soil amendments and ripping to give stems and herbaceous vegetation the best chance at survival and vigor. Therefore, specifically call out this area & include a plan to specifically address this area as part of the riparian restoration. Include a plot in this area as well.
  RES actually intends to rip and add soil amendments to the entire planting area within the Project, including the area in question, which will provide favorable conditions for growth throughout. Further details/language have been added to **Section 3.1** and **Appendix B, P1**.

  A fixed vegetation plot has been moved to the area in question as well. Please note that the Monitoring Plan figure is now **Figure 9**.

- 3.2.1: Remove text in the first paragraph that reads "…are determined based on whether there are less than 25 percent of the tree canopy cover and lack of dense growth of smaller woody stems (i.e. shrubs or saplings) in accordance with the Consolidated Buffer Mitigation Rule 15 NCAC 02B . 0295 (b) (12). Furthermore, these selective areas…"
  Text has been removed accordingly.

- 3.2.1: In the last paragraph correct the rule reference to be 15A NCAC 02B .0295 (l)(2)(3). Also, identify the untreated flow referenced here along JH1-A on Figure 4.
  The rule has been corrected accordingly. Also, please note that this same error was corrected in last paragraph of **Section 3.2.2** and within the footnote of **Table 4**.

  Figure 4 has been revised to include symbology (red crosshatch) to identify each area not receiving credit due to untreated flow (including the area at the top of JH1-A). Also, note that the untreated flow entering at the top of JH1-A is a field-edge ditch along the parcel boundary and is depicted as a "ditch" in **Figure 2 - Existing Conditions**.

- 3.2.2: Riparian restoration adjacent to ditches or streams with less than a 50' riparian zone will not be viable to generate nutrient offset. Since DMS has requested that DWR review this Plan under both 0295 & 0703, please identify any and all areas where a riparian width is less than 50' and show those areas on the Table in A1 and on the Figures that correspond to the asset table. If no areas are less than 50', please confirm that within the text of this plan.
  There is one segment of riparian restoration at the upper end of ditch JH2, along the left bank, that is less than 50' but greater than 30'. Therefore, this area is not viable for nutrient offset credit, and the revised asset table in **Appendix A1** incorporates this segment accordingly. Additionally, a callout has been added to **Figure 4** to identify this area, while the new **Figure 7** (Nutrient Offset Conceptual) omits this area.

- In order to get buffer credit along ditches, compliance of all of (o)(8) must be achieved, including the following: "The perpetual conservation easement ...shall provide language that prohibits future maintenance of the ditch" Explain how this requirement will be met.
  The recorded conservation easements for three of the four landowners are now included in **Appendix D**. The Section L. Water Quality and Drainage Patterns with the easement specifically says "There shall be no channeling, filling. leveling, pumping, impounding or diverting, causing allowing or permitting the diversion of surface or underground water in the Conservation Easement." RES believes this language adequately covers the requirement that prohibits future maintenance of the ditch.

- In the last paragraph of 3.2.2., add the total square feet of the ditch deduction.
  The following sentence has been added to the section: "Ultimately, these areas equate to 13,055 ft^2." This area is also included in the revised asset table in **Appendix A1**.

- 3.2.3: are any areas along ditches or streams less than 50'. If so, DWR needs to see those areas represented in the Appendix A1 (Buffer Credit Calculation) as well as in the corresponding figures. This is only necessary if DWR is requested to review the Plan under 0703 to generate Nutrient Offsets.
  There is one segment of riparian restoration at the upper end of ditch JH2, along the left bank, that is less than 50' but greater than 30'. Therefore, this area is not viable for nutrient offset credit, and the revised asset table in **Appendix A1** incorporates this segment accordingly. Additionally, a callout has been added to **Figure 4** to identify this area, while the new **Figure 7** (Nutrient Offset Conceptual) omits this area.

- 3.3: In order to approve alternative planting plans where softwoods are proposed (like Bald Cypress), I need to know that the Provider is planting this species in areas where site wetness is prevalent. The rule gives two scenarios where allowing alternative planting plans: 1) Site Wetness, and 2) availability. Therefore, on the Planting Sheets, indicate where Bald Cypress will be planted. DWR recommends the Provider stick to planting this species along the clear cut riparian areas along JH1B where wetlands have already been identified and represented in Figure 2.
  RES has decided to propose two planting zones and will only plant bald cypress in the northern easement section where stream restoration will occur (Zone 1), which will surely increase wetness throughout the riparian areas of JH1-A and JH1-B. The following statement has been added to **Section 3.3**: "Notably, although bald cypress (*Taxodium distichum*) is technically considered a softwood tree, it is included in the planting plan due to the significant amount of existing wetland at the Strawberry Hill site and its proven success at other stream, wetland, and buffer mitigation projects with similar site characteristics in Johnston County and the Neuse 01 service area. However, bald cypress will only be planted in the northern easement section along JH1-A and JH1-B where it is anticipated that stream restoration activities will increase wetness throughout the riparian area, especially considering that much of the area is currently jurisdictional wetland and within the hydric Rains sandy loam soil map unit. Therefore, there will be two planting zones: Zone 1 will encompass the northern easement section (which is associated with stream restoration) and Zone 2 will encompass the southern easement section (where no stream restoration is proposed)." In addition, **Table 5**, **Figure 9**, and Appendix **B, P1** have been updated to reflect these changes.

Table 5: All these trees are Canopy trees. It is best to include some sub-canopy species in the mix. Explain how the Provider intends to meet this expectation.
RES has added two sub-canopy species to the mix that are appropriate for the site conditions: wax myrtle (*Morella cerifera*) and buttonbush (*Cephalanthus occidentalis*). Table 5 has been updated to include these species and has added a column to label canopy versus sub-canopy species.

Section 4.1: What is your anticipated planting density to ensure you meet the 260 by Year 5?
The anticipated initial planting density will be approximately 807 trees per acre, based on a 9x6 foot spacing. This is stated in **Section 3.3** and **Appendix B, P1**.

Table 6: Reference Appendix K in the Invasive and Nuisance Vegetation row.
Reference to **Appendix K** has been added.

Section 4.2: Correct the rule reference in the 3rd paragraph. The Neuse Buffer Protection Rule is now referenced as 15A NCAC 02B 0714 as of June 15, 2020.
The rule reference has been updated accordingly.

Figure 1: This is more of a Vicinity Map, even though titled "Service Area". Modify this figure to include only the Neuse 01 service area excluding the Falls Watershed. You will need to Zoom out to show the entire service area provided by this Project. Since DMs has requested DWR to review this Plan under both 0295 and 0703, please add "Nutrient Offset & Buffer Mitigation Service Area to the Title. These two credit types share the same service area for this Plan.
Figure 1 has been revised accordingly.

Figure 4:

- There was a statement in the text regarding non-diffused flow at the upper reach of JH1. Can you show where that is?
  Figure 4 has been revised to include symbology (red crosshatch) to identify each area not receiving credit due to untreated flow (including the area at the top of JH1-A). Also, note that the untreated flow entering at the top of JH1-A is a field-edge ditch along the parcel boundary and is depicted as a "ditch" in **Figure 2 - Existing Conditions**.

- In the legend, call out the areas that not receiving credit due to clear cut in buffer.
  Figure 4 has been updated accordingly – a red hatch symbol is now included to represent the uncreditable area due to clear-cut of the buffer.

- For this particular site and plan, it is recommended that the widths 0-50, 51-100, 101-200 be outlined and shown around all features, even if the width outline extends beyond the CE boundary. This will help DWR ensure compliance with width requirements for buffer credit & nutrient offset potential. I recommend a thin outline (color coded) to represent each width. You may include this information in a separate Figure if that is preferred.
  A new figure has been created accordingly and is titled "Riparian Zones." Please note this **Figure 8**.

- Add the word "Riparian" to each mitigation approach category in the Legend, i.e., Riparian Restoration, 0-100.
  Legend has been revised accordingly.

- Don't see 101-200' Preservation represented on the Figure. Please point out where this width is represented for Preservation.
  The 101-200' Preservation area is very small and almost unnoticeable at the scale of this figure. Therefore, a callout has been added to identify this area.

Figure 7:

- Move a plot to the area where the buildings will be demolished.
  A plot has been moved to the area.

- Add word "Riparian" as described for Figure 4 in the Legend.
  Legend has been revised accordingly.

Table 1, Project Credits (Appendix A1):

- Add the following statement to this table somewhere appropriate: "Credit conversions must be calculated using the guidance provided in the Clarified Procedures for Calculating Buffer Mitigation Credits and Nutrient Offset Credits letter issued by the DWR in November 2020" and located at:
  https://files.nc.gov/ncdeq/Water%20Quality/Surface%20Water%20Protection/401/Mitigation/Issues---Resolutions-Ver-1.0-buffer-mitigation-nutrient-offset.pdf
  Statement has been added to the page, below the table.

- If DMS is expecting to have the flexibility to convert to nutrient offset as indicated by this table, please add text below the table that speaks to that directly. Using a text box may be the easiest way to add that Text.
  The following language has been added to the page, below the table: "Department of Mitigation Services (DMS) will have the flexibility to convert Riparian Buffer Mitigation Credits to Nutrient Offset Credits, where viable, in accordance with this table."

- Provide a figure to support this table where it says "YES" for convertible to Nutrient Offset. This table needs to be replaced with the newest version on our website.
  A Nutrient Offset Conceptual figure has been created and is now **Figure 7**. The areas depicted are those that are convertible to nutrient offset and are viable according to the Buffer Viability letter. Furthermore, the asset table in **Appendix A1** (using the latest version from the DWR website, last revised October 2020) has been revised and corresponds to the areas in the figures appropriately.

- Where a particular feature and width is viable for NOC (check viability letter), please check "YES" in "Convertible to Nutrient Offset" column.
  The table has been updated accordingly.

- Add a row to show the features receiving deductions for lack of Diffused flow. Title that Feature Name "Diffused Flow Deductions (JH4, JH2, etc). then, enter the Total Area for the deductions. Leave the "Total Creditable Area" as -0- and Check "No" for both columns for Buffer & Nutrient Offset.
  The table has been updated accordingly.

Appendix A2: There is no stream determination correspondence in A2, only the Site Viability Letter. The stream determination letter is found in Appendix H.
The stream determination letter is now also included in Appendix A2. Furthermore, the Appendix A2 title has been revised to "Buffer Viability & Stream Determination."

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FIGURES

APPENDIX

1 MITIGATION PROJECT SUMMARY

Environmental Banc & Exchange – Neuse I, LLC (EBX-Neuse I), a wholly-owned subsidiary of Resource Environmental Solutions (RES), is pleased to provide this Buffer Mitigation Plan as a component of the Strawberry Hill Mitigation Project (Project), a full-delivery stream and buffer mitigation project for the Division of Mitigation Services (DMS) (DMS #100094). This buffer component of the Project is designed to provide riparian buffer mitigation credits for unavoidable impacts due to development within the Neuse River Basin, United States Geological Survey (USGS) 8-digit Cataloguing Unit 03020201 (Neuse 01) (**Figure 1**). This Buffer Mitigation Plan is in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and Nutrient Offset Credit Trading Rule 15A NCAC 02B .0703. The Buffer Mitigation Plan is designed in concurrence with the Strawberry Hill Stream Mitigation Project (SAW-2019-00124).

1.1 Project Overview

The conservation easement of the Strawberry Hill Project will total approximately 22.12 acres and includes two unnamed tributaries and three ditches that drain into Polecat Branch and eventually the Neuse River. Current land use within the Project is primarily crop production and disturbed riparian forest. The Project area has been used extensively for agricultural and forestry purposes for over 80 years. Currently, the Project reaches and adjacent areas are in either crop production or forest regeneration. Water quality stressors currently affecting the Project include pollution from crop production and lack of forested riparian buffer (**Figure 2).** Current buffer conditions demonstrate significant degradation with the loss of stabilizing vegetation because of continued crop production and recent clear cut of adjacent riparian forest.

The goal of the buffer component of the Project is to restore and preserve ecological function to the existing streams and their associated riparian buffer areas by establishing appropriate plant communities while minimizing temporal and land disturbing impacts. Buffer and surrounding riparian area improvements will filter runoff from agricultural fields, thereby reducing nutrient and sediment loads to Project channels and provide water quality benefit to the overall watershed.

The easement is comprised of two main sections: a northern and a southern. The northern section can be accessed by either Yelverton Grove Road or Brogden Road, while the southern section can be accessed by Yelverton Grove Road (**Figure 3**). The Strawberry Hill Project is composed of two intermittent stream channels: JH1 (divided into JH1-A and JH1-B) and JH5; and three ditches: JH2, JH3, and JH4 **(Figure 2)**. Furthermore, the fifty-foot riparian buffers of all stream channels were determined to be subject to the Neuse buffer protection rules. There will be three easement breaks: two of which account for the Yelverton Grove Road crossing and one that accounts for an upgraded agricultural crossing. All streams and ditches have been straightened and are incised; however, reaches JH1-A and JH1-B will be restored via stream restoration as part of the stream mitigation component of the Project. Stream determinations were verified by the DWR site visit on February 27th, 2019. Correspondence regarding this determination is in **Appendix A2**.

Buffer and riparian area mitigation efforts along the Project streams and ditches will be accomplished through the planting, establishment, and protection of a hardwood forest community. The result will be a riparian area that functions to mitigate nutrient and sediment inputs from the surrounding uplands. The buffer mitigation plan proposed is being submitted for review under the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and Nutrient Offset Credit Trading Rule

15A NCAC 02B .0703. In addition to traditional riparian restoration, the Project will also incorporate the alternative buffer mitigation options: Preservation of Buffers on Subject Streams, as outlined in 15A NCAC 02B .0295 (o) (5), and Restoration and Enhancement of Ditches, as outlined in 15A NCAC 02B .0295 (o) (8). DWR staff performed an onsite viability assessment for buffer mitigation on February 27th, 2019. Correspondence regarding this assessment is provided in **Appendix A2** and dated April 30th, 2019. The Project will provide significant functional uplift to the watershed and will assist DMS with achieving its mitigation goals in the Neuse 01 watershed, excluding the Falls Lake Watershed. The Project presents the opportunity to provide up to 656,593.451 ft^2 (15.07 acres) of riparian buffer mitigation units (BMU). These will be derived from restoration and preservation of the riparian buffer and surrounding riparian areas. Project attributes are summarized in **Table 1.**

Table 1. Project Attributes

Project Name	Strawberry Hill
Hydrologic Unit Code	03020201140010 (14 digit)
River Basin	Neuse River (excluding the Falls Lake Watershed)
Geographic Location (Lat, Long)	35.469579, -78.323896
Site Protection Instrument (DB, PG)	5199, 272 Johnston (Hill) 5111, 571 Johnston (Hill) 3754, 814 Johnston (Carpenter) 3960, 792 Johnston (Davis) 4060, 391 Johnston (Haas)
Total Credits (BMU)	656,593.451
Types of Credits	Riparian Buffer (with flexibility to convert to Nutrient Offset if needed)
Mitigation Plan Date	June 2020
Initial Planting Date	December 2021
Baseline Report Date	January 2022
MY1 Report Date	December 2022
MY2 Report Date	December 2023
MY3 Report Date	December 2024
MY4 Report Date	December 2025
MY5 Report Date	December 2026

The riparian buffer mitigation credits will be produced by establishing a native forested and herbaceous riparian plant community and protecting buffers in perpetuity with a conservation easement. For stream channels, buffers will have a minimum width of 50 feet and a maximum of 200 feet from the edge of the channels. These will be derived from 496,540 ft^2 (11.40 acres) from the top of bank to 100 feet of Restoration; 16,097 ft^2 (0.37 acres) of 101 to 200 feet of Restoration; 80,893 ft^2 (1.86 acres) from the top of bank to 100 feet of Preservation; and 792 ft^2 (0.02 acres) from 101 to 200 feet of Preservation. For ditch channels, buffers will have a minimum width of 30 feet and maximum of 50 feet from the edge of the channel. These will be derived from 146,626 ft^2 (3.37 acres) from the top of bank to 50 feet of Restoration. The new plant community will be established in conjunction with the treatment of any existing exotic or undesirable plant species. **Figure 4** shows the Conceptual Design Plan for Buffer and Credit Determination Map and **Section 2.1** provides details of the mitigation determination on the Strawberry Hill Project.

1.1.1 Parcel Ownership

The land required for the construction, management, and stewardship of this Project includes portions of the parcels listed in **Table 2**. EBX-Neuse I has obtained and will obtain conservation easements from the current landowners. The easement deeds and survey plats were submitted to DMS and the State Property Office (SPO) for approval and are held by the State of North Carolina. The easement deeds followed the DMS Full Delivery Conservation Easement Template dated May 5, 2017 and are included in **Appendix D**. The recorded easement allows EBX-Neuse I to proceed with the Project development and protect the mitigation assets in perpetuity. A finalized copy of the land protection instruments are included in **Appendix D**.

Table 2. Parcel and Landowner Information

Landowners	Pin or Tax Parcel ID	Agreement Type	County
Jan Penny Hill	260200-26-4743 260200-45-0227 260200-36-4485 260200-35-1474	Easement	Johnston
William Christian Carpenter	260200-36-4710	Easement	Johnston
Melrose Haas	260200-46-0253	Easement	Johnston
Bridgette Edwards Davis	260200-46-1831	Easement	Johnston

1.2 Project Location

The Strawberry Hill Project is within the Neuse River Basin within the 8-digit HUC 03020201, 14-digit HUC 03020201140010 and DWR Sub-basin Number 03-04-02.

The Strawberry Hill Project is located in Johnston County in Smithfield, NC at the crossroads of Yelverton Grove Road and Brogden Road (**Figure 1**). To access the Project from Raleigh, take I-40 East to US-70 East. Then take US-70 BUS West until taking a right onto South 3rd Street in downtown Smithfield. Then take a left onto Brogden Road. Follow Brogden Road for 2.9 miles and the downstream extent of reach JH1-B will be on your left. The coordinates are 35.469579 °N and -78.323896 °W.

1.3 Existing Conditions

1.3.1 Surface Water Classification

The Project's tributaries drain directly to Polecat Branch, which has been assigned class C and Nutrient Sensitive Waters (NSW). Class C waters are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. NSW designation is intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation (NCDWQ 2011).

1.3.2 Physiography and Soils

The Project is located within the Rolling Coastal Plain Level IV ecoregion within the Southeastern Plains Level III ecoregion and is characterized by greater relief, elevation, and stream gradients compared to the Mid-Atlantic Coastal Plain to the east with better drained soils and a slightly cooler and shorter growing season. However, it is a productive agricultural region with typical crops of corn, soybeans, tobacco, cotton, sweet potatoes, peanuts, and wheat. (Griffith et al. 2002). Elevations range from 133 to 141 feet above mean sea level (NAD 83) based upon topographic survey (**Figure 5**).

The Natural Resources Conservation Service (NRCS) depicts four soil map units across the Project (**Figure 6**). The Project area is dominated by Rains sandy loam, with successively smaller proportions of Goldsboro sandy loam, Lynchburg sandy loam, and Cowarts loamy sand. Rains sandy loam, Goldsboro sandy loam, and Lynchburg sandy loam are zero to two percent slopes and not flooded, while Cowarts loamy sand is two to six percent and not flooded. The soil characteristics of these map units are summarized in **Table 3**.

Table 3. Project Mapped Soil Series

Map Unit Symbol	Map Unit Name	Percent Hydric	Drainage Class	Hydrologic Soil Group	Landscape Setting
CoB	Cowarts loamy sand, 2-6% slopes, not flooded	0%	Well Drained	C	Coastal plains, low ridges on marine terraces
GoA	Goldsboro sandy loam, 0-2% slopes, not flooded	2%	Moderately Well Drained	B	Flats on marine terraces, coastal plains
Ly	Lynchburg sandy loam, 0-2% slopes, not flooded	8%	Somewhat Poorly Drained	B/D	Marine terraces, coastal plains
Ra	Rains sandy loam, 0-2% slopes, not flooded	90%	Poorly Drained	A/D	Marine terraces on coastal plains

1.3.3 Wetlands

A detailed wetland delineation was completed February 5th, 2020. Wetland boundaries were delineated using current methodology outlined in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory 1987). Soils were characterized and classified using the Field Indicators of Hydric Soils in the United States, Version 7.0 (NRCS, 2010). Within the boundaries of the Project, four jurisdictional wetlands are present (**Figure 2**). Wetlands are labeled as WA (Wetland A)

through WD (Wetland D). A preliminary jurisdictional determination (PJD) request was sent to the USACE on February 14th, 2020 and a confirmed PJD was received, signed May 4th, 2020 (**Appendix J)**.

The US Fish and Wildlife Service (USFWS) National Wetland Inventory Map (NWI) does not depict any additional wetland areas within the Project (**Figure 2**).

1.3.4 Landscape Communities

A. Existing Vegetation Communities

Current land use around the Project is primarily composed of row crops, forest, and early successional forest. Fields rotating soybean and corn directly abut most of the banks of Project streams and ditches. Part of the uppermost portion of the main Project reach (JH1-A) contains a forest along the left bank that resembles a disturbed Mesic Mixed Oak-Hickory Forest (Coastal Plain Subtype) that consists of red maple (*Acer rubrum*), loblolly pine (*Pinus taeda*), southern red oak (*Quercus falcata*), water oak (*Quercus nigra*), laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), sweetgum (*Liquidambar styraciflua*), common persimmon (*Diospyros virginiana*), mockernut hickory, (*Carya tomentosa*), Chinese privet (*Ligustrum sinense*), roundleaf greenbriar (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), muscadine (*Vitis rotundifolia*), Japanese honeysuckle (*Lonicera japonica*), evening trumpetflower (*Gelsemium sempervirens*), giant cane (*Arundinaria gigantea*), and Nepalese browntop (*Microstegium vimineum*). The other distinct community type within the Project is regenerating forest that resembles a disturbed Coastal Plain Small Stream Swamp. The area along reach JH1-B was clear-cut approximately six to seven years ago and contains a mosaic of scrub-shrub and emergent wetland areas with upland pockets and berms. Species in these areas include loblolly pine, water oak, red maple, sweetgum, American sycamore (*Platanus occidentalis*), sweetbay, redbay (*Persea borbonia*), common sweetleaf (*Symplocos tinctoria*), swamp titi (*Cyrilla racemiflora*), eastern baccharis (*Baccharis halimifolia*), black elderberry (*Sambucus nigra*), sawtooth blackberry (*Rubus argutus*), muscadine, winged sumac (*Rhus copallinum*), big bluestem (*Andropogon gerardii*), giant cane, common rush (*Juncus effuses*), seedbox (*Ludwigia alterniflora*), common reed (*Phragmities australis*), woolgrass (*Scirpus cyperinus*), dogfennel (*Eupatorium capillifolium*), and goldenrod (*Solidago* sp.). Also, stream and ditch channels contain locally dense areas of murdannia (*Murdannia* sp.) and narrowleaf cattail (*Typha angustifolia*).

Notable exotic invasive species include Chinese privet, Japanese honeysuckle, Nepalese browntop, and narrowleaf cattail.

B. Riparian Vegetation

In general, all of the reaches within the Strawberry Hill Project do not function to their full potential. Current conditions demonstrate significant habitat degradation with a loss of stabilizing vegetation as a result of impacts from ongoing crop production and forestry. Specifically, the buffer and riparian area off the right bank of reach JH1-B was clear-cut sometime around 2014 and is currently in an early successional state of regeneration, although much of the area has failed to regenerate trees, likely due to site wetness and lack of wet-tolerant seed sources. Also, notably, the clear-cut violated the Neuse Buffer Rules; therefore, any clear-cut area within 50 feet of the existing stream channel is not eligible for buffer mitigation credit. Throughout the Project there are scattered invasive plant species that will be treated to the extent practicable.

1.3.5 Existing Conditions Photos

Looking Upstream along JH1-A
January 16, 2020

Looking Downstream along JH1-A
January 16, 2020

Looking Upstream along JH1-B
January 16, 2020

Looking Downstream along JH1-B
January 16, 2020

Looking Upstream at JH2 (Ditch)
January 16, 2020

Looking Upstream along JH3 (Ditch)
January 16, 2020

Looking Upstream at JH4 (Ditch)
January 16, 2020

Looking Upstream along JH5
January 16, 2020

2 REGULATORY CONSIDERATIONS

2.1 Determination of Credits

This Project has the potential to generate up to 656,593.451 ft^2 (15.07 acres) riparian buffer mitigation credits within a 22.12-acre conservation easement as depicted in **Figure 4**. These will be derived from buffer restoration and buffer preservation. The riparian buffer mitigation credits generated will service the Neuse 01 watershed, excluding the Falls Lake Watershed. Also, some of these buffer mitigation credits, where viable, can be converted to nutrient offset credit in accordance with the Nutrient Offset Credit Trading Rule, 15A NCAC 02B .0703. The total potential buffer mitigation credits that the Strawberry Hill Mitigation Project will generate are summarized in **Table 4** and the detailed Project credit breakdown, including buffer credits that are convertible to nutrient offset credit, utilizing the DWR "Project Credit Table Template (Updated October 2020)," is provided in **Appendix A1**. In addition, **Figure 7** depicts buffer restoration areas that are convertible to nutrient offset credit. This total area that is convertible to nutrient offset amounts to 521,050 ft^2 which would deliver 27,189.085 lbs of Nitrogen offset. Furthermore, **Figure 8** depicts riparian zones of 50, 100, and 200 feet from stream and ditch top of banks to demonstrate width requirements for crediting.

Table 4. Strawberry Hill Project (DMS #: 100094) Riparian Buffer Mitigation Summary

Total Riparian Buffer Mitigation Credits		
Mitigation Totals	**Square Feet**	**Credits**
Restoration	659,263	648,478.015
Preservation	81,685	8,115.436
Total Riparian Buffer	**740,948**	**656,593.451**

Note: Stipulation for untreated flow entering riparian buffer restoration areas according to 15A NCAC 02B .0295 (l) (2) (3) and Buffer Interpretation/Clarification #2008-019 Memorandum dated 08/19/2008 were accounted for in the riparian buffer credit area and calculations. These areas are depicted in **Figure 4**.

2.2 Other regulatory considerations

2.2.1 Environmental Screening and Documentation

Because DMS mitigation projects are considered to be a category of activities that do not individually or cumulatively have an impact on the human environment, they do not require preparation of an environmental assessment or environmental impact statement. To ensure that a project meets the "Categorical Exclusion" criteria, the Federal Highways Administration (FHWA) and NCDMS have developed a categorical exclusion (CE) checklist that is included as part of each mitigation project's Environmental Screening process. The CE Approval Form for the Strawberry Hill Project is included in **Appendix L** and was approved by DMS and FHWA in August 2019.

2.2.2 Threatened and Endangered Species

Plants and animals with a federal classification of endangered or threatened are protected under provisions of Sections 7 and 9 of the Endangered Species Act of 1973, as amended. According to the United States Fish and Wildlife IPAC database review tool (USFWS 2018) and the self-certification process conducted by RES and submitted to the USFWS on June 12th, 2019 the list of threatened and endangered species includes the Red-cockaded woodpecker (*Picoides borealis*), the Atlantic Pigtoe (*Fusconaia masoni*), the Tar River Spinymussel (*Elliptio steinstansana*), and Michaux's Sumac (*Rhus michauxii*). Two additional species on the list submitted to USFWS are proposed for listing, the Neuse River Waterdog (*Necturus lewisi*) and the Carolina Madtom (*Noturus Furiosus*). The Strawberry Hill Mitigation Project does not contain any suitable habitat for the Red-cockaded woodpecker, the Atlantic Pigtoe, the Tar River Spinymussel, the Neuse River Waterdog, the Carolina Madtom, nor the Michaux's Sumac. A self-certification letter sent to USFWS (on August 2nd, 2019) A copy of this letter is enclosed. No response was provided by USFWS which is typical as the certification letter (provided) is their official response unless they do not concur with the determination. This consultation was conducted as part of the CE process and supporting documentation and correspondence can be found in **Appendix L**

The Fish and Wildlife Coordination Act requires consultation with state fish and wildlife agencies when "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified. The North Carolina Wildlife Resources Commission (NCWRC) was consulted during the CE process and the NCWRC did not comment on any state or federally listed species; however, they did recommend the use of biodegradable and wildlife-friendly sediment and erosion control devices and to treat invasive species as part of the Project. Documentation is included in **Appendix L.**

2.2.3 Cultural Resources

A review of North Carolina State Historic Preservation Office (SHPO) GIS Web Service (accessed 14 August 2018) database did not reveal any registered occurrences within the Project area; however, there is one nationally registered house (JT0994 - the Watson-Sanders House) on Brogden Road just west of the Project and one "Determined Eligible" house (JT1920 - Stevens Sausage Company Homeplace/Office) on Stevens Sausage Road just south of the Project. RES consulted with the SHPO during the CE process and the SHPO had "conducted a review of the project and are aware of no historic resources which would be affected by the project." Cultural Resources screening met the Categorical Exclusion Criteria for FHWA and DMS projects and documentation is included in **Appendix L**.

2.2.4 Federal Emergency Management Agency (FEMA)/ Hydrologic Trespass

The Project is not within a mapped FEMA Regulatory Floodway or 100-year floodplain (**Figure 2**). While designing the Strawberry Hill Project, appropriate measures were taken to eliminate hydrologic trespass of the adjacent agricultural fields. The adjacent land use will not be affected by the proposed design, and no detrimental impacts are expected beyond the easement limits. The DMS Floodplain Requirements Checklist can be found in **Appendix M**.

2.2.5 Clean Water Act - Section 401/404

Because this Project also includes a stream mitigation component that involves stream restoration and culvert work, impacts to jurisdictional streams and wetlands and protected buffer will be unavoidable due to the restoration activities proposed. All stream, wetland, and buffer impacts will be accounted for in the Pre-Construction Notification form. Information about impacts and permitting are discussed further in **Section 3.4** of the Strawberry Hill Mitigation Plan.

3 RIPARIAN RESTORATION AND PRESERVATION IMPLEMENTATION PLAN

Riparian restoration and preservation areas adjacent to streams are shown in **Figure 4** and were approved by the DWR in the letter dated April 30th, 2019 (**Appendix A2**).

3.1 Site Preparation

Preparation at the Project will involve spraying crops and exotic invasive species, clearing undesirable scrub-shrub vegetation, contoured ripping, soil amendments, seeding, and planting. Additionally, culverts, agricultural building structures, and old, abandoned irrigation pipes will be removed from buffer restoration areas. Prior to construction a Pre-construction Notification for the Nationwide Permit 27, under Section 404 of the Clean Water Act, and a DWR 401 Water Quality Certification, under Section 401 of the Clean Water Act, will be obtained. Following the issuance of the Nationwide Permit, an erosion and sediment control permit will be obtained. Stabilization and implementation of dispersal techniques will be utilized where surface flows have become concentrated to minimize the chances of non-diffuse flow. A combination of silt fencing, erosion control wattles, temporary seeding, and erosion control matting will be used to reduce erosion and stabilize soil in riparian areas during any land disturbance activities. These erosion control measures shall be inspected and properly maintained at the end of each working day to ensure measures are functioning properly until permanent vegetation is established.

Immediately following completion of stream restoration activities, disturbed areas will be stabilized to prevent erosion by seeding with a mixture of temporary and permanent seed mix within ten working days upon completion of final grading. The proposed seed mix was chosen to maximize successful herbaceous growth in upland and wetland riparian areas, as both are characteristic of the site, while also incorporating valuable pollinator species (**Appendix B, P1**). All riparian planting areas will ripped and disked prior to seed mix application and tree planting. Temporary and permanent riparian seeding shall be done in accordance with the erosion control plan. Soil amendments will be provided across the entire planted area based on the results of soil fertility tests or at a rate of 2,000 lbs/acre limestone and 1,000 lbs/acre 10-10-10 fertilizer. After construction activities, the subsoil will be scarified, and any compaction will be deep tilled before the topsoil is placed back over the site. Any topsoil that is removed during construction will be stockpiled and placed over the site during final soil preparation. This process should provide favorable soil conditions for plant growth. Bare root plantings and live stakes shall be planted according to detail shown in the planting plan (**Appendix B, P1**).

All riparian buffer restoration activities will commence in concurrence with the stream mitigation activities and not before. The riparian restoration areas will be surveyed, and information will be provided in the As-Built report.

3.2 Methods

Riparian buffer mitigation activities will include restoration and preservation along streams and restoration along viable ditches. All restoration and preservation areas were determined by the mitigation determination performed during the viability assessment by DWR (**Appendix A2**).

3.2.1 Riparian Restoration Activities - Streams

For stream channels, the Project will provide riparian buffer and surrounding area restoration in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (n). Restoration activities

will include the planting of bare root plantings as described in **Section 3.3**. These restoration activities will begin from the tops of the proposed stream banks and extend a minimum of 50 feet from the stream outward to a maximum of 200 feet perpendicular to the stream channel. Restoration will occur where cropland is currently present as well as selective areas of early successional, regenerating forest that lack suitable density and composition. In the early successional, regenerating forested areas, the buffer restoration areas were determined by the mitigation determination performed during the viability assessment by DWR (**Appendix A2**). Also, as determined in the viability assessment, all recently cleared areas within Zone 1 (0-30 feet) and Zone 2 (31-50 feet) of the existing stream channel are not eligible for riparian buffer credit due to violation of the Neuse Buffer Rules; however, these areas will still be planted and protected within the conservation easement (**Figure 4**). Specifically, reaches JH1-A, JH1-B, and JH5 will include riparian buffer restoration (**Figure 4**). Notably, JH5 contains a small portion of recently cleared, regenerating forest off the right bank that is not eligible for riparian buffer credit within Zones 1 and 2 due to circumstances described above. Therefore, this area will not be part of the Project, although the entire stream channel will still be included within the conservation easement in order to maintain protection of the entire stream channel: this conservation easement boundary will be offset approximately five feet from the right top of bank (**Figure 4**). Additionally, there is an approximate 90º bend on JH5 that has been stabilized with concrete that will be removed and disposed of offsite and replaced with appropriately sized rip rap and livestakes to provide longterm stabilization of this bend.

Since the northern easement section is also proposed for stream restoration as part of the stream mitigation component of the Project, buffer mitigation activities along reaches JH1-A and JH1-B will coincide with stream restoration. The stream design approach will include constructing a meandering stream channel within the natural valley and stabilizing stream banks using a combination of grading, erosion control matting, live-stake planting, native material revetment techniques (i.e. bioengineering), structure placement, and sod transplants where possible. These activities will also include backfilling the abandoned stream channels to the elevation of the floodplain and planting (**Appendix B**).

Also, as denoted in **Section 2.1**, there will be credit deductions for untreated flow entering riparian buffer restoration areas according to 15A NCAC 02B .0295 (l) (2) (3) and Buffer Interpretation/Clarification #2008-019 Memorandum dated 08/19/2008. Specifically, there is untreated flow that enters reach JH1-A, laterally, at its upstream extent. Therefore, where untreated flow enters the easement boundary, a 120º angle wedge, drawn 50 feet below the easement boundary, was removed from the associated buffer area for crediting purpose (**Figure 4**). However, this area of exemption will still be planted and contained within the conservation easement.

3.2.2 Riparian Restoration Activities – Ditches

The southern easement section of the Project includes three ditch reaches: JH2, JH3, and JH4 (**Figure 4**). These ditches are proposed for riparian buffer restoration in accordance with the alternative mitigation option of Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o) (8) and the DWR buffer viability assessment (**Appendix A2**). As no stream work is proposed on these ditches, the only restoration activities will include the planting of bare root trees as described in **Section 3.3** and the other activities mentioned in **3.2.4**. These restoration activities will begin from the tops of the ditch banks and extend a minimum of 30 feet from the ditch outward to a maximum of 50 feet perpendicular to the ditch channel. All these riparian areas are currently cropland except for a small segment along the left bank of JH3, which contains portions of dilapidated agricultural structures, which will be demolished as part of the Project (**Figure 4**).

The ditch features meet criteria for riparian buffer restoration according to Rule 15A NCAC 02B .0295 (o) (8) in the following ways:

(A) Each ditch drains directly to reach JH5, an intermittent stream.
(B) The stream (JH5) and all ditches, including their confluence, will be protected by a contiguous, perpetual conservation easement that will prevent any future maintenance or manipulation of the ditches.
(C) Stormwater runoff and overland flow drain toward the ditches.
(D) Each ditch is between one and three feet in depth (as measured during the DWR buffer viability site visit and depicted in the issued buffer viability letter (**Appendix A2**):
    - JH2 – 2.50 feet
    - JH3 – 2.95 feet
    - JH4 – 2.70 feet
(E) The entire length of each ditch has been in place prior to the effective date of the Neuse Buffer Rule (see **Strawberry Hill Mitigation Plan, Figure 6**).

Additionally, the watersheds (DA) draining to each ditch were delineated (**Figure 5**) and determined to be at least four times (multiplier of 4) larger than the restored area along their corresponding ditches, as expressed in the following calculations:

- JH2/JH3: (71 ac. DA) / (2.79 ac. restored area)= 25 multiplier
- JH4: (20 ac. DA) / (0.58 ac. restored area)= 34 multiplier

Also, as denoted in **Section 2.1**, there will be credit deductions for untreated flow entering ditches according to 15A NCAC 02B .0295 (l) (2) (3) and Buffer Interpretation/Clarification #2008-019 Memorandum dated 08/19/2008. Specifically, there will be untreated ditch flow that enters reaches JH2 and JH4 from upstream, out of the proposed easement, and there is an untreated, lateral ditch that enters JH2 further downstream. Therefore, where these untreated ditches enter the easement boundary, a 120º angle wedge, drawn 50 feet below the easement boundary, were removed from the associated buffer area for crediting purpose (**Figure 4**). Ultimately, these areas equate to 13,055 ft^2. However, these areas of exemption will still be planted and contained within the conservation easement.

3.2.3 Riparian Preservation Activities

Preservation will take place in limited forested areas within the Project where existing tree growth was determined adequate, and in accordance with the alternative mitigation option of Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o) (5) and the DWR buffer viability assessment (**Appendix A2**). Specifically, reaches JH1-A and JH1-B contain forested areas that will be preserved (**Figure 4**). A portion of riparian area off the left bank of JH1-A is mostly mature forest, while selective portions of riparian area along JH1-B contain regenerating forest that has sufficient growth of tree saplings and shrubs that are adequate for preservation. Because these preservation areas are associated with proposed stream restoration under the stream mitigation component of the Project, some of these areas may need to be cleared during construction of the new stream corridor. Therefore, these impacted areas will be planted using the same criteria as restoration areas; however, will still only generate preservation credit. Also, as mentioned above in **Section 3.2.1**, all recently cleared areas within Zone 1 (0-30 feet) and Zone 2 (31-50 feet) of the existing stream channel are not eligible for riparian buffer credit due to violation of the Neuse Buffer Rules;

however, these areas will still be planted and protected within the conservation easement (**Figure 4**). In addition, preservation activities will include the permanent protection of the riparian area from cutting, clearing, filling, grading, and similar activities that would affect the functioning of the buffer through a conservation easement that will have clearly visible easement markers and signs (see **Section 3.4** for further description of the easement boundaries).

3.2.4 Other Activities

Other activities involved with the buffer mitigation component of the Project include culvert removal, debris removal, irrigation piping removal, demolition of building structures, and local livestaking (**Figure 4**). Three culverts currently used as agricultural crossings will be removed in the southern easement section: two on reach JH2 and one at the transition of JH3 to JH5. Upon removal of these culverts, the banks will be graded to match the existing channel dimensions and stabilized. Debris removal will occur throughout the Project where piles of brick and concrete have been used by landowners as makeshift erosion control structures. The debris will be removed from the conservation easement and any remaining rills or areas of concentrated flow entering the easement will be stabilized. Along reaches JH2, JH3, and JH4, there are exposed, abandoned irrigation piping that will be removed from buffer restoration areas and disposed of off-site as well. Along reach JH3, there are abandoned, dilapidated agricultural building structures that will be demolished, and the debris materials will be stockpiled away from the conservation easement for future disposal to be conducted by the landowner. Upon completion of the demolition activities, the riparian area will be planted as specified above in **Section 3.3.2**. Livestakes will be planted on stream and ditch banks where stability is compromised, such as existing areas of erosion and areas where culverts and irrigation pipe are removed. See **Appendix B, S1-S9** for more detail regarding these activities.

3.3 Planting Plan

All riparian restoration areas will be planted from top of bank back at least 30 feet from ditches and 50 feet from mitigated streams (and in the case of JH5, the existing stream) with bare root tree seedlings on a nine by six-foot spacing to achieve an initial density of approximately 807 trees per acre. Planting of the Project where riparian buffer restoration is being performed will meet the performance standards outlined in the Rule 15A NCAC 02B .0295. The vegetation data will be collected no earlier than late August of each year. This includes treating invasive species and planting at least four species of native hardwood bare root trees. The buffer mitigation planting plan and species composition will also be consistent with the stream mitigation planting plan. Coastal Plain Small Stream Swamp (Schafale 2012) will be the target community type and will be used for all areas within the Project. This community composition is highly diverse and is suitable for wet tolerances from somewhat wet to very wet that will ultimately prove successful given the Project's soil and landscape characteristics and will provide water quality and ecological benefits. Notably, although bald cypress (*Taxodium distichum*) is technically considered a softwood tree, it is included in the planting plan due to the significant amount of existing wetland at the Strawberry Hill site and its proven success at other stream, wetland, and buffer mitigation projects with similar site characteristics in Johnston County and the Neuse 01 service area. However, bald cypress will only be planted in the northern easement section along JH1-A and JH1-B where is anticipated that stream restoration activities will increase wetness throughout the riparian area, especially considering that much of the area is currently jurisdictional wetland and within the hydric Rains sandy loam soil map unit. Therefore, there will be two planting zones: Zone 1 will encompass the northern easement section (which

is associated with stream restoration) and Zone 2 will encompass the southern easement section (where no stream restoration is proposed). The initial planting of bare root trees will occur either before Spring 2021 or after November 2021. The list of bare root tree species to be planted and their percentage of total species composition can be found in **Table 5**. Wherever possible, mature vegetation will be preserved and incorporated into the buffer. Some areas adjacent to the forested areas may require maintenance due to the rapid regeneration of some species, such as red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), and loblolly pine (*Pinus taeda*). Additionally, the livestake plantings mentioned above in **Section 3.2.4** will consist of black willow (*Salix nigra*) and silky dogwood (*Cornus amomum*). Furthermore, the planting plan is depicted in **Appendix B, P1**.

Table 5. Tree Planting List

Bare Root Planting Tree Species						
Species	**Common Name**	**Spacing (ft)**	**Unit Type**	**Canopy or Sub-canopy**	**% of Total Species Composition (Zone 1)**	**% of Total Species Composition (Zone 2)**
Platanus occidentalis	American sycamore	9X6	Bare Root	Canopy	10	10
Betula nigra	River birch	9X6	Bare Root	Canopy	10	10
Liriodendron tulipifera	Yellow poplar	9X6	Bare Root	Canopy	10	10
Taxodium disticum	Bald cypress	9X6	Bare Root	Canopy	10	0
Quercus phellos	Willow oak	9X6	Bare Root	Canopy	10	10
Quercus michauxii	Swamp chestnut oak	9X6	Bare Root	Canopy	10	10
Quercus nigra	Water oak	9X6	Bare Root	Canopy	10	10
Quercus lyrata	Overcup oak	9X6	Bare Root	Canopy	10	10
Nyssa biflora	Swamp tupelo	9X6	Bare Root	Canopy	5	5
Quercus laurifolia	Laurel oak	9X6	Bare Root	Canopy	5	10
Morella cerifera	Wax myrtle	9X6	Bare Root	Sub-canopy	5	10
Cephalanthus occidentalis	Buttonbush	9X6	Bare Root	Sub-canopy	5	5

3.4 Easement Boundaries

Easement boundaries will be identified in the field to ensure clear distinction between the Project and adjacent properties. Boundaries may be identified by marker, bollard, post, tree-blazing, or other means as allowed by Project conditions and/or conservation easement. Boundaries will be marked with signs identifying the property as a mitigation project and will include the name of the long-term steward and a contact number. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis. The easement boundary will be checked annually as part of monitoring activities and the conditions as well as any maintenance performed will be reported in the annual monitoring reports to DWR.

4 MONITORING PLAN

4.1 Monitoring Protocol and Success Criteria

Annual vegetation monitoring and visual assessments will be conducted. Riparian vegetation monitoring where riparian buffer mitigation credits are being generated will be based on the "Carolina Vegetation Survey-Ecosystem Enhancement Program Protocol for Recording Vegetation: Level 1-2 Plot Sampling Only Version 4.2". Annual vegetation monitoring will occur each year for a minimum of five years and will be conducted during the fall season with the first year occurring at least 6 months from initial planting. Monitoring plots will be installed a minimum of 100 meters squared in size and will cover at least two percent of the planted mitigation area. The entire planted area of the Project will generate riparian buffer mitigation credits in the form of restoration and preservation; however, only the planted area within the riparian buffer restoration areas will be monitored for vegetative success. Therefore, the creditable restoration planted area is 15.13 acres, and there will be 13 vegetation plots measuring riparian buffer mitigation success. These plots will be randomly placed throughout the planted riparian restoration area and will be representative of the riparian community (**Figure 9**). The following data will be recorded for all trees in the plots: species, height, planting date (or volunteer), and grid location. All stems in plots will be flagged with flagging tape.

The measures of vegetative success for the Project will be the survival of at least four native hardwood tree species, where no one species is greater than 50 percent of stems, at a density of at least 260 stems per acre at the end of Year 5. Native volunteer species may be included to meet the performance standards upon approval by DWR. Invasive and noxious species will be monitored and treated so that none become dominant or alter the desired community structure of the site.

Photos will be taken from all photo points each monitoring year and provided in the annual reports. Visual inspections and photos will be taken to ensure that applicable areas are being maintained and compliant.

A visual assessment of the conservation easement will also be performed each year to confirm:

- Easement markers are in good condition throughout the site;
- no encroachment has occurred;
- no invasive species occur in areas were invasive species were treated,
- diffuse flow is being maintained in the conservation easement areas; and
- there has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

A summary of project monitoring and maintenance activities can be found in **Table 6**.

Table 6. Summary of Project Monitoring and Maintenance Activities

Component/ Feature	Monitoring	Maintenance through project close-out
Vegetation	Annual vegetation monitoring	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 treated by mechanical and/or chemical methods. Any vegetation requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. Vegetation maintenance activities will be documented and reported in annual monitoring reports. Vegetation maintenance will continue through the monitoring period.
Invasive and Nuisance Vegetation	Visual Assessment	Invasive and noxious species will be monitored and treated so that none become dominant or alter the desired community structure of the Project. Locations of invasive and nuisance vegetation will be mapped. Also, see **Appendix K** for more details.
Project Boundary	Visual Assessment	Project boundaries shall be identified in the field to ensure clear distinction between the mitigation project and adjacent properties. Boundaries will be marked with signs identifying the property as a mitigation project and will include the name of the long-term steward and a contact number. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by Project conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis. Easement monitoring and staking/ signage maintenance will continue in perpetuity as a stewardship activity.

4.2 Adaptive Management Plan and Project Maintenance

Adaptive measures will be developed, or appropriate remedial actions taken if in the event that the project, or a specific component of the project, fails to achieve the defined success criteria. DMS must approve all adaptive management plans prior to submittal to DWR.

Remedial actions will be designed to achieve the success criteria specified in this Mitigation Plan, and will include identification of the causes of failure, remedial design approach, work schedule, and monitoring criteria that will consider physical and climatic conditions.

Initial plant maintenance may include a one-time mowing, prior to initial planting to remove undesirable species. If mowing is deemed necessary by RES during the monitoring period, RES must first receive approval by DMS and then by DWR prior to any mowing activities to ensure that no buffer violations will be committed. Failure to receive approval to mow within the Neuse River buffer, as defined in 15A NCAC 02B .0714 by DWR, could result in Neuse River buffer violations and violations of the conservation easement. If necessary, RES will develop a species-specific control plan.

5 STEWARDSHIP

The Project will be transferred to the NCDEQ Stewardship Program. NCDEQ Stewardship Program shall serve as the conservation easement holder and entity responsible for long term stewardship of the Project. This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the Project to ensure that restrictions required in the conservation easement are upheld. 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 Statute 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 signage to identify boundary markings as needed. Any livestock or associated fencing or permanent crossings will be the responsibility of the owner of the underlying fee to maintain.

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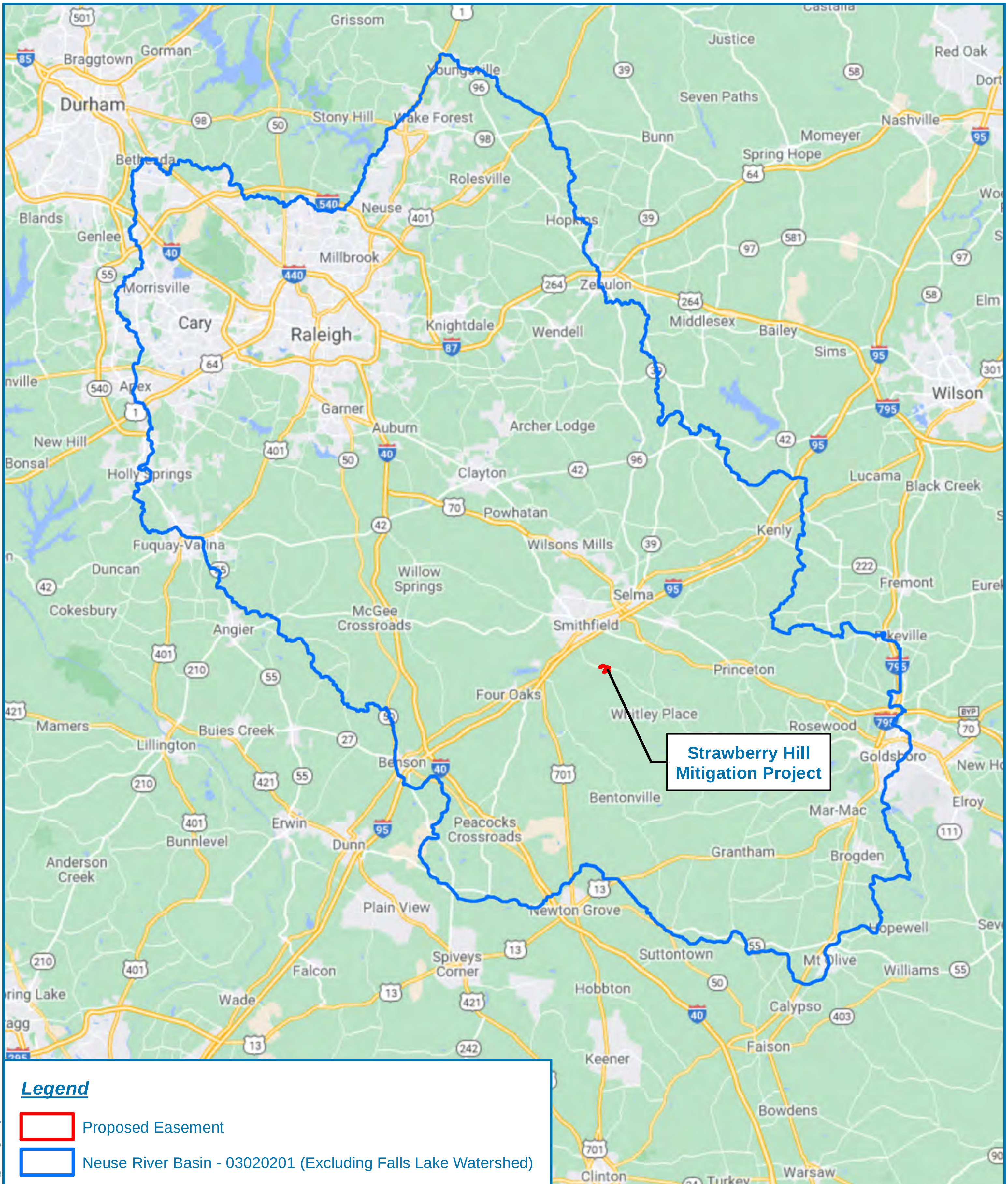
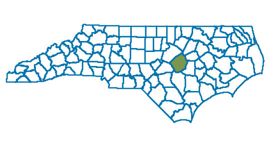
Figures





N
W E
S
0 4 8
Miles

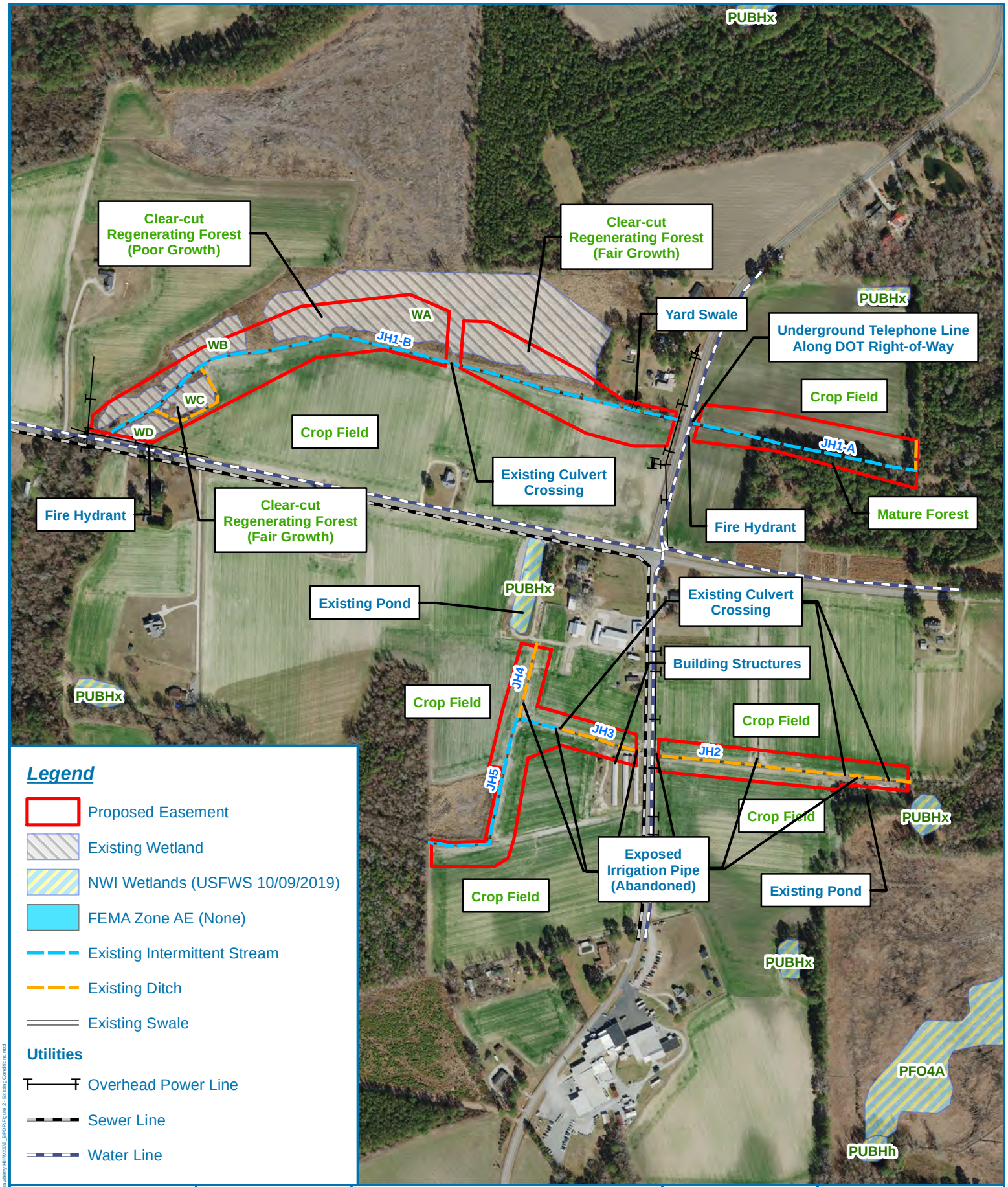
Figure 1
Nutrient Offset & Buffer Mitgation Service Area

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 12/2/2020
Drawn by: MDD
Checked by: JRM
1 inch = 8 miles

res

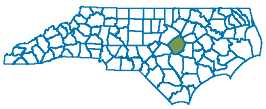


Legend

- Proposed Easement
- Existing Wetland
- NWI Wetlands (USFWS 10/09/2019)
- FEMA Zone AE (None)
- Existing Intermittent Stream
- Existing Ditch
- Existing Swale

Utilities

- Overhead Power Line
- Sewer Line
- Water Line



N W E S

0 250 500

Feet

Figure 2 - Existing Conditions

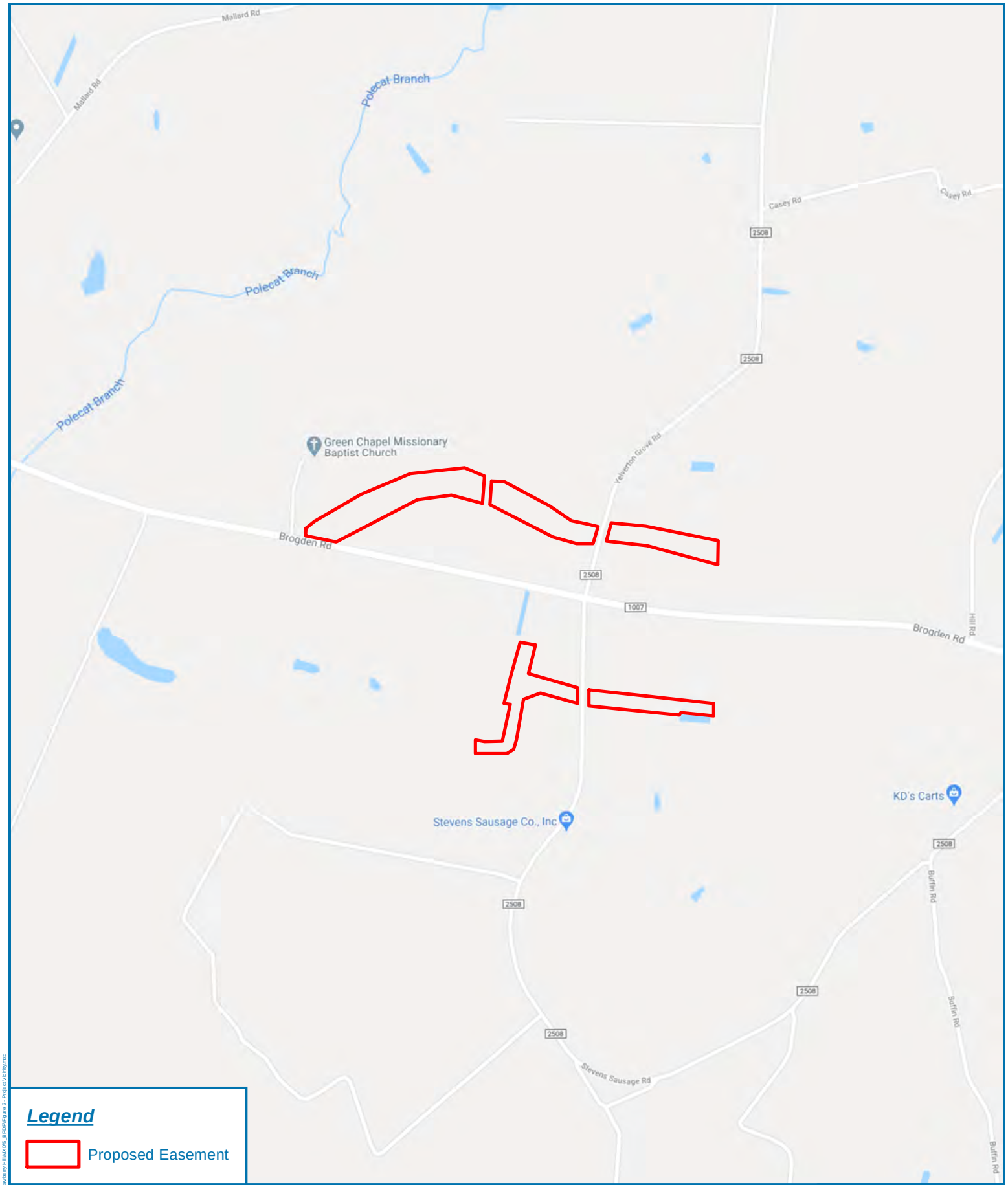
Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date:	7/23/2020
Drawn by:	MDD
Checked by:	JRM
	1 inch = 500 feet

res

Document Path: R:\Projects\Outputs\projects\NC\Strawberry Hill\MXD\5_BPDP\Figure 2 - Existing Conditions .mxd



Legend

Proposed Easement

N
W
E
S

0 500 1,000

Feet

Figure 3 - Project Vicinity

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 6/16/2020

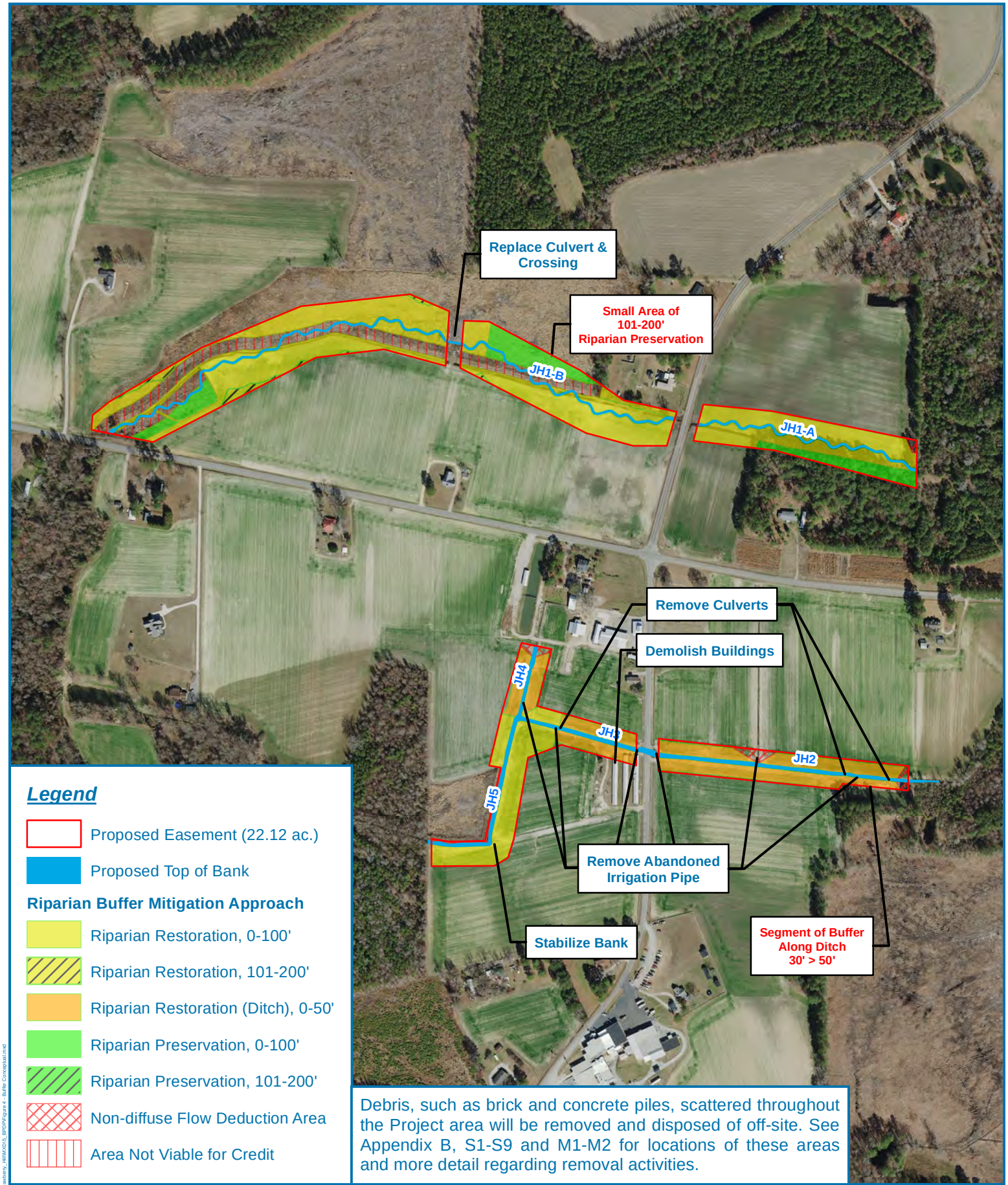
Drawn by: MDD

Checked by: JRM

1 inch = 1,000 feet

res

Document Path: R:\Projects\Johnston\Projects\NC\Strawberry Hill\MXD\5_BPDP\Figure 3- Project Vicinity.mxd



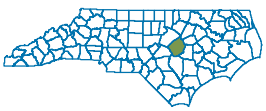
Legend

- Proposed Easement (22.12 ac.)
- Proposed Top of Bank

Riparian Buffer Mitigation Approach

- Riparian Restoration, 0-100'
- Riparian Restoration, 101-200'
- Riparian Restoration (Ditch), 0-50'
- Riparian Preservation, 0-100'
- Riparian Preservation, 101-200'
- Non-diffuse Flow Deduction Area
- Area Not Viable for Credit

Debris, such as brick and concrete piles, scattered throughout the Project area will be removed and disposed of off-site. See Appendix B, S1-S9 and M1-M2 for locations of these areas and more detail regarding removal activities.



N W E S

0 250 500

Feet

Figure 4 - Buffer Mitigation Conceptual

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 12/17/2020

Drawn by: MDD

Checked by: JRM

1 inch = 500 feet

res

Document Path: R:\Regulatory\Projects\101038_Strawberry_Hill\MXD\5_BPO\PFigure 4 - Buffer Conceptual.mxd

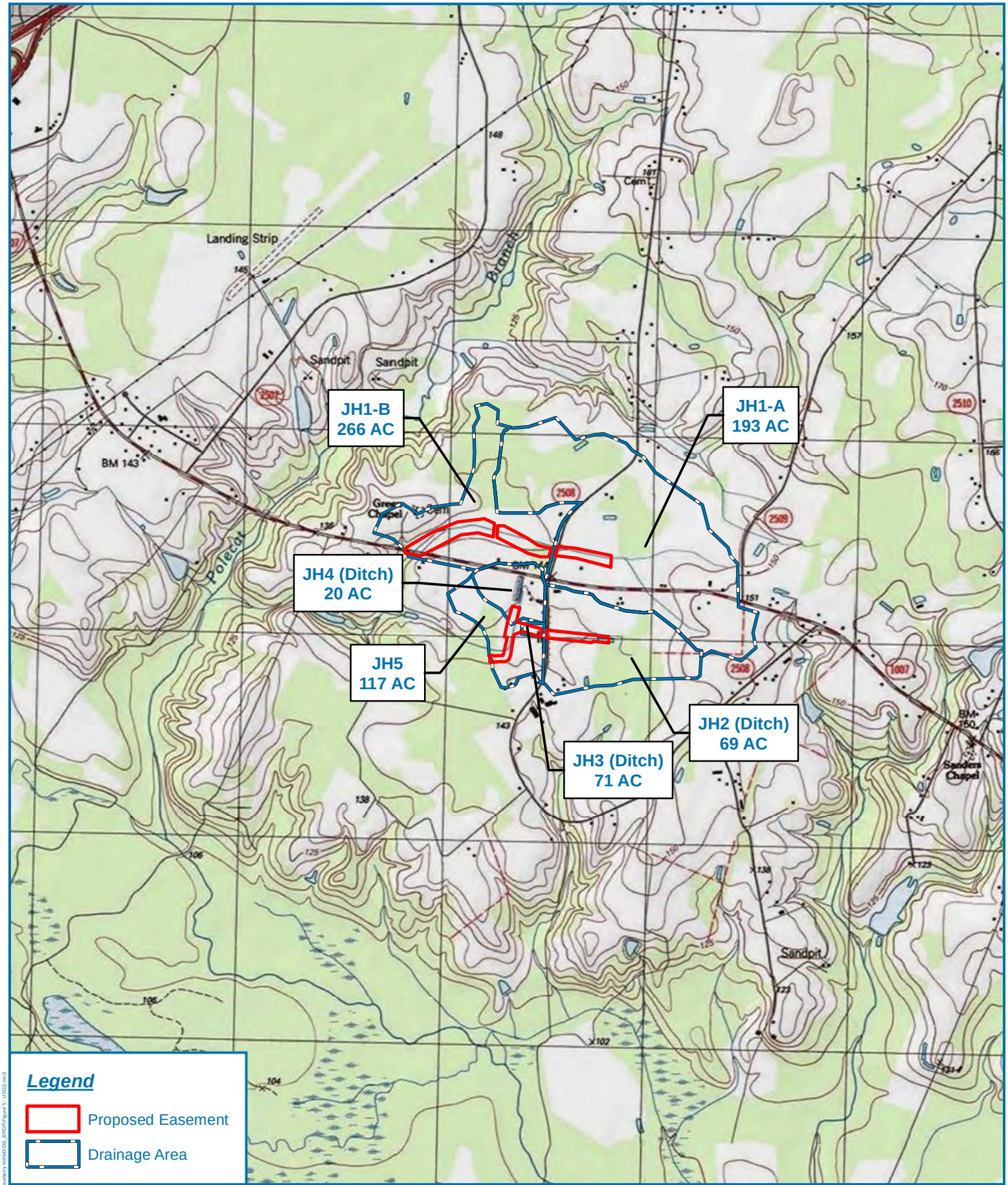


Figure 5 - USGS
Four Oaks NE (1997)

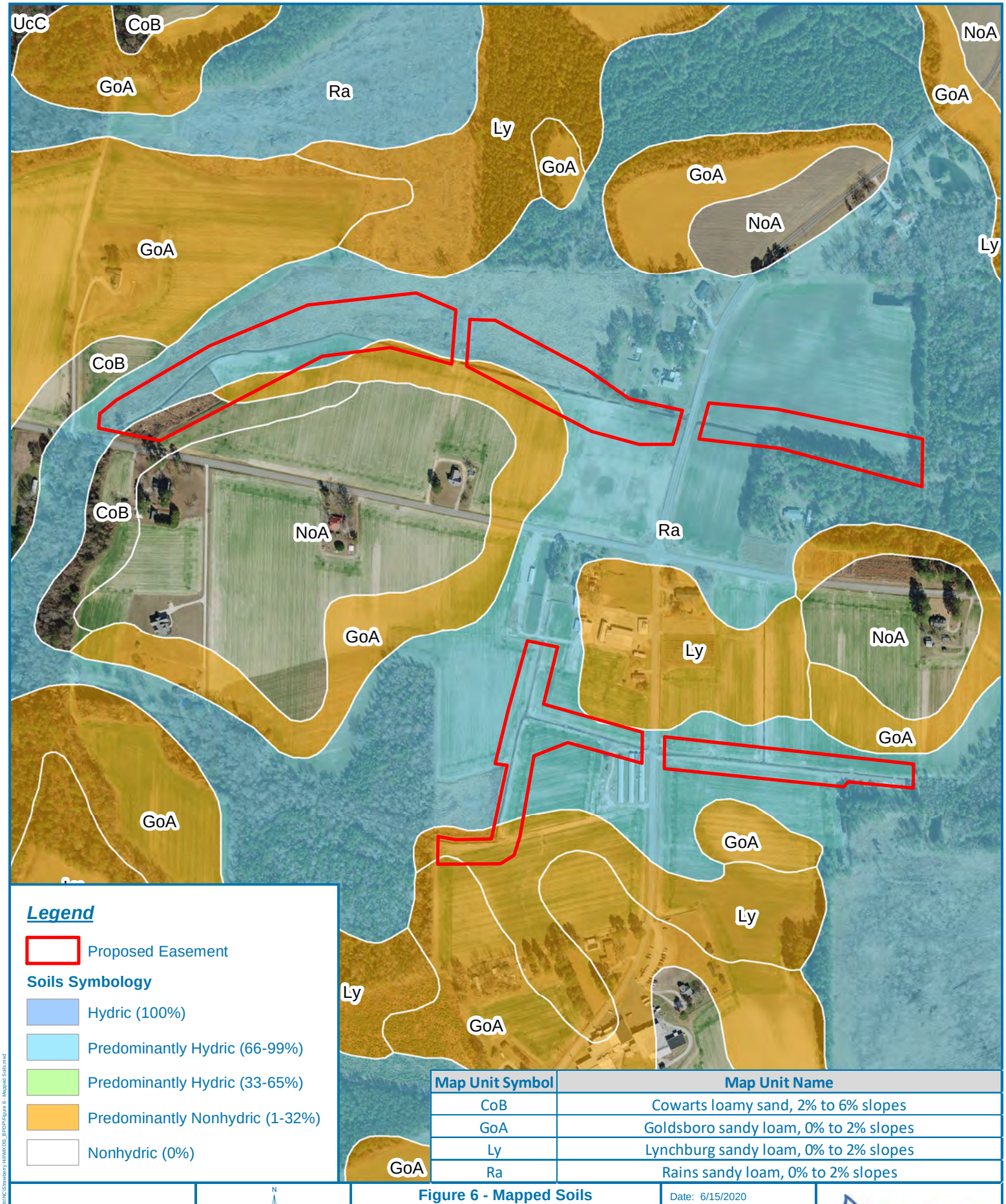
Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 6/11/2020
Drawn by: SCF
Checked by: JRM
1 inch = 2,000 feet

res

Document Path: R:\Projects\dbo\projects\NC\Strawberry Hill\MXD\5_BPDP\Figure 5 - USGS.mxd



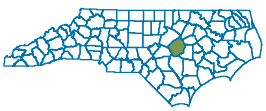
Legend

Proposed Easement

Soils Symbology

- Hydric (100%)
- Predominantly Hydric (66-99%)
- Predominantly Hydric (33-65%)
- Predominantly Nonhydric (1-32%)
- Nonhydric (0%)

Map Unit Symbol	Map Unit Name
CoB	Cowarts loamy sand, 2% to 6% slopes
GoA	Goldsboro sandy loam, 0% to 2% slopes
Ly	Lynchburg sandy loam, 0% to 2% slopes
Ra	Rains sandy loam, 0% to 2% slopes



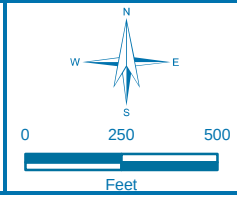


Figure 6 - Mapped Soils

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 6/15/2020

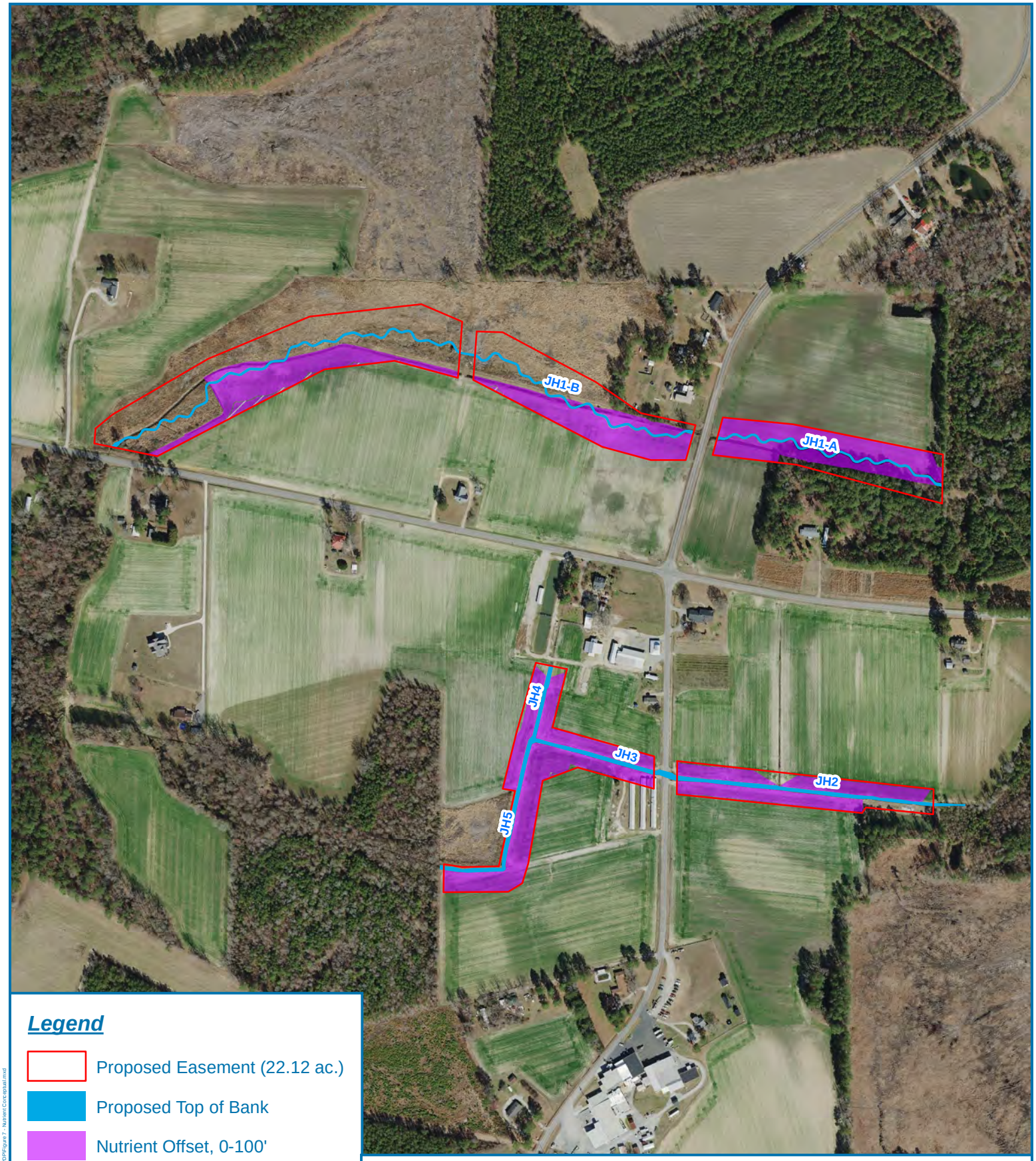
Drawn by: SCF

Checked by: JRM

1 inch = 500 feet

res

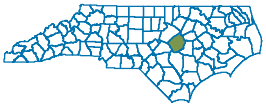
Document Path: R:\Projects\Johnston\projects\NC\Strawberry Hill\MXD\5_BP2\P\Figure 6 - Mapped Soils.mxd



Legend

- Proposed Easement (22.12 ac.)
- Proposed Top of Bank
- Nutrient Offset, 0-100'
- Nutrient Offest, 101-200'

This figure only represents areas that are viable to be converted from Riparian Buffer Credits to Nutrient Offset Credits.



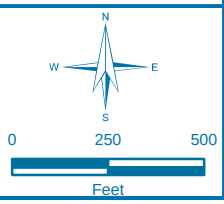


Figure 7 - Nutrient Offset Conceptual

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date:	12/17/2020
Drawn by:	MDD
Checked by:	JRM
	1 inch = 500 feet

res

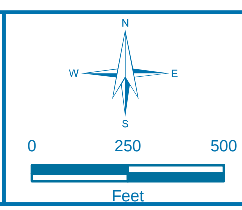


Figure 8 - Riparian Zones

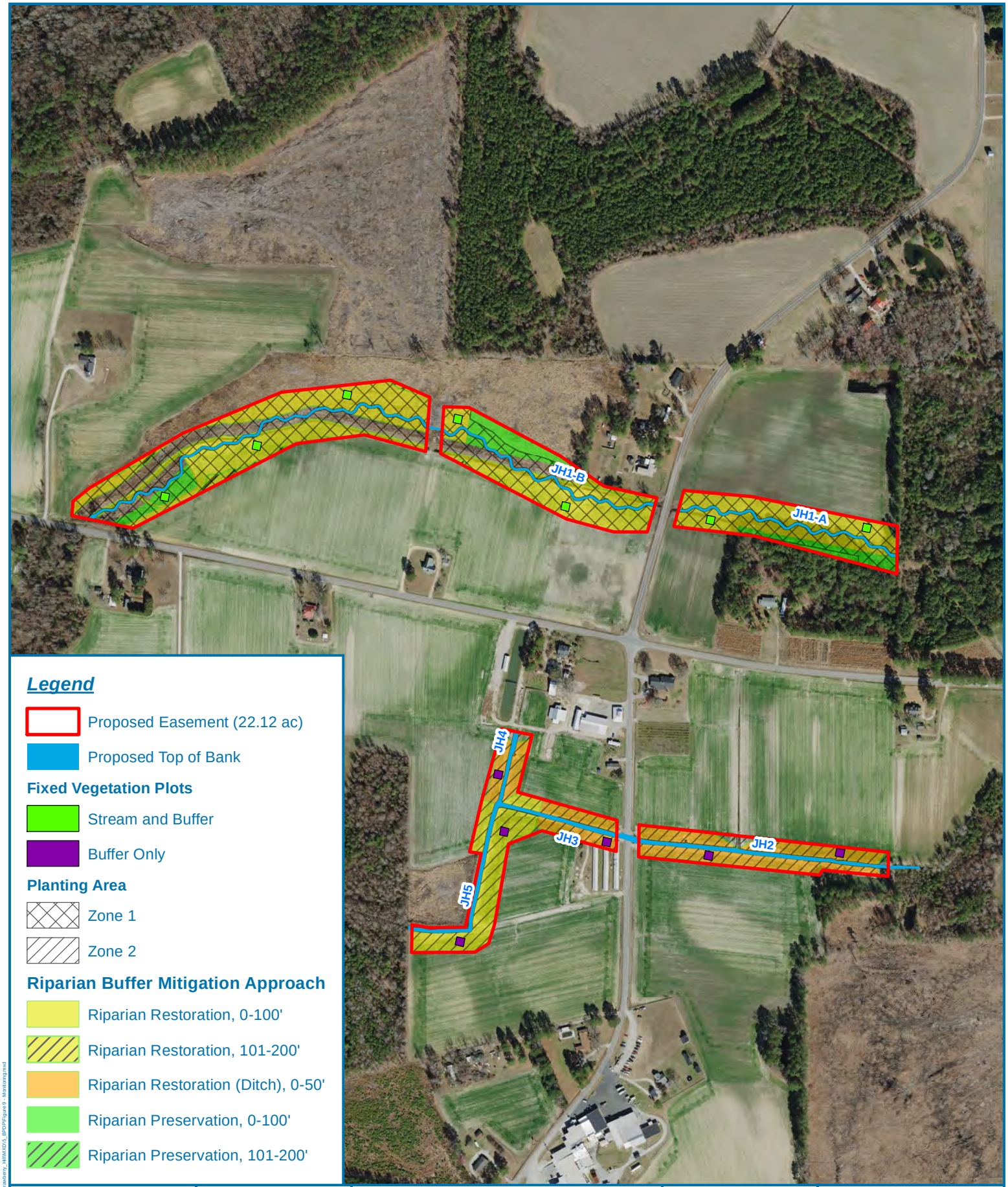
Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 12/17/2020	
Drawn by: MDD	
Checked by: JRM	
1 inch = 500 feet	

res

Document Path: R:\Resgis\entgis\Projects\101038_Strawberry_Hill\MXD\5_BPDP\Figure 8 - Riparian Zones.mxd



Legend

- Proposed Easement (22.12 ac)
- Proposed Top of Bank

Fixed Vegetation Plots

- Stream and Buffer
- Buffer Only

Planting Area

- Zone 1
- Zone 2

Riparian Buffer Mitigation Approach

- Riparian Restoration, 0-100'
- Riparian Restoration, 101-200'
- Riparian Restoration (Ditch), 0-50'
- Riparian Preservation, 0-100'
- Riparian Preservation, 101-200'

N W E S

0 250 500

Feet

Figure 9 - Buffer Monitoring Plan

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 12/14/2020

Drawn by: MDD

Checked by: JRM

1 inch = 500 feet

res

Document Path: R:\Regulatory\Projects\101038_Strawberry_Hill\MXD\5_BPOP\Figure 9 - Monitoring.mxd

Appendix A1

Project Buffer Mitigation Credits

Table 1. Strawberry Hill, DMS# 100094, Project Credits

Neuse 03020201 - Outside Falls Lake	**Project Area**
19.16394	**N Credit Conversion Ratio (ft^2/pound)**
N/A	**P Credit Conversion Ratio (ft^2/pound)**

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft^2)	Total (Creditable) Area of Buffer Mitigation (ft^2)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?	Delivered Nutrient Offset: N (lbs)	Delivered Nutrient Offset: P (lbs)
Buffer	Rural	Yes	I / P	Restoration	0-100	Cropland (JH1, JH5)	372,663	372,663	1	100%	1.00000	Yes	372,663.000	Yes	19,446.053	—
Buffer	Rural	Yes	I / P	Restoration	0-100	Timberland (JH1)	123,877	123,877	1	100%	1.00000	Yes	123,877.000	No	—	—
Buffer	Rural	Yes	I / P	Restoration	101-200	Cropland (JH1, JH5)	9,342	9,342	1	33%	3.03030	Yes	3,082.863	Yes	487.478	—
Buffer	Rural	Yes	I / P	Restoration	101-200	Timberland (JH1)	6,755	6,755	1	33%	3.03030	Yes	2,229.152	No	—	—
Buffer	Rural	No	Ditch	Restoration	0-50	JH2, JH3, JH4	139,045	139,045	1	100%	1.00000	Yes	139,045.000	Yes	7,255.554	—
Buffer	Rural	No	Ditch	Restoration	0-50	Segment Less than 50' (JH2)	7,581	7,581	1	100%	1.00000	Yes	7,581.000	No	—	—
Buffer	Rural	No	Ditch	Restoration	0-100	Non-diffused Flow Deductions (JH1, JH2, JH4)	13,055	0	1	100%		No	—	No	—	—
													—		—	—
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													—		—	—
						Totals (ft2):	**672,318**	**659,263**					**648,478.015**		**27,189.085**	**0.000**
						Total Buffer (ft2):	**672,318**	**659,263**								
						Total Nutrient Offset (ft2):	**0**	**N/A**								

Total Ephemeral Area (ft^2) for Credit:	**0**	**0**	
Total Eligible Ephemeral Area (ft^2):	**188,501**	**0.0%**	**Ephemeral Reaches as % TABM**
Total Eligible for Preservation (ft^2):	**224,106**	**9.1%**	**Preservation as % TABM**

Enter Preservation Credits Below

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (ft^2)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
	Rural	Yes	I / P		0-100	JH1, JH5	80,893	80,893	10	100%	10.00000	8,089.300
	Rural	Yes	I / P		101-200	JH1, JH5	792	792	10	33%	30.30303	26.136
												—
												—
												—
						Preservation Area Subtotals (ft^2):	**81,685**	**81,685**				

TOTAL AREA OF BUFFER MITIGATION (TABM)			
Mitigation Totals		**Square Feet**	**Credits**
Restoration:		659,263	648,478.015
Enhancement:		0	0.000
Preservation:		81,685	8,115.436
Total Riparian Buffer:		740,948	656,593.451
TOTAL NUTRIENT OFFSET MITIGATION			
Mitigation Totals		**Square Feet**	**Credits**
Nutrient Offset:	**Nitrogen:**	0	0.000
	Phosphorus:		0.000

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Credit conversions must be calculated using the guidance provided in the Clarified Procedures for Calculating Buffer Mitigation Credits and Nutrient Offset Credits letter issued by the DWR in November 2019.

1. The Randleman Lake buffer rules allow some ditches to be classified as subject according to 15A NCAC 02B .0250 (5)(a).

last updated 08/03/2020

Appendix A2

Buffer Viability & Stream Determination

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

April 30, 2019

Jamey McEachran
Resource Environmental Solutions, LLC
302 Jefferson Street, Suite 110
Raleigh, NC 27605
(via electronic mail: jmceachran@res.us)

DWR# 2019-0159
Johnston County

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Strawberry Hill Site
Located near 3105 Brogden Rd, Smithfield
Neuse 03020201

Dear Ms. McEachran,

On February 25, 2019, Katie Merritt, with the Division of Water Resources (DWR), received a request from Resource Environmental Solutions, LLC (RES) for an onsite mitigation determination near the above-referenced site (Site). The Site is located within the Neuse River Basin in the 8-digit Hydrologic Unit Code 03020201. The Site is being proposed as part of a full-delivery nutrient offset, stream and riparian buffer mitigation project for the Division of Mitigation Services (RFP #16-007576). Staff from the Division of Mitigation Services were also present onsite. At your request, on February 27, 2019, Ms. Merritt performed an onsite assessment of riparian land uses adjacent to streams and ditches onsite, which are shown on the attached map labeled "Figure 3-Existing Conditions". Additionally, on March 18, 2019, RES provided ditch parameters showing the channel depths per Ms. Merritt's request. This information is included with this letter.

Ms. Merritt's evaluation of the features onsite and their associated mitigation determination for the riparian areas are provided in the table below. This evaluation was made from Top of Bank (TOB) and landward 200' from each feature for buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015) and for nutrient offset credits pursuant to 15A NCAC 02B .0240.

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273.02 lbs-N per acre	[6]Mitigation Type Determination w/in riparian areas
JH1A	Stream	Yes	Mostly non-forested agriculture fields with areas of mature forest along the left bank	[3]Yes	Yes (non-forested fields only)	Fields - **Restoration Site** per 15A NCAC 02B .0295 (n) Forested Areas - **Preservation Site** per 15A NCAC 02B .0295 (o)(5)

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273.02 lbs-N per acre	[6]Mitigation Type Determination w/in riparian areas
JH1B	Stream	Yes	Left Bank – Mostly non-forested agriculture fields w/ timbered areas downstream (near road) Right Bank – combination of timbered disturbed forest and cleared areas not in agriculture. Neuse riparian buffers shown in Figure 3 were impacted from timbering between 2014-2016 in violation of the Neuse Buffer rules. Therefore, no buffer credit can be generated within Zone 1 or Zone 2 of the Neuse riparian buffer that was timbered.	[3]Yes	*Yes (non-forested ag fields only)*	Fields - **Restoration Site** per 15A NCAC 02B .0295 (n) Timbered Neuse Buffer (Zone 1 & Zone 2)- no credit Timbered & Cleared areas (beyond the Neuse Buffer) - **Restoration Site** per 15A NCAC 02B .0295 (n) Timbered & Regenerated forest (beyond the Neuse Buffer) - **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
JH2	Ditch	No	Mostly non-forested agriculture fields with a pond located on the left side. Area beyond pond is forested	*see note	Yes *(non-forested ag fields only & excluding the pond footprint)*	Fields - **Restoration Site** per 15A NCAC 02B .0295 (o)(8) Forested Areas – no credit ***Buffer Mitigation Note –** Assessment concludes the ditch meets 15A NCAC 02B .0295 (o)(8) (A, B, C, D & E). More information on the watershed is required to be provided in a mitigation plan for complete assessment. See rule. Areas of impeded flow from collapsed or compromised culverts must be restored.
P	Irrigation pond planned to be drained, backfilled & planted	No	Combination of grass and mature forest around pond perimeter. Not in agriculture	*see note	No	***Buffer Mitigation Note** - If pond is drained, backfilled and planted, it can become a restored riparian area along JH2 and this area will be viable for **Restoration** per 15A NCAC 02B .0295 (o)(8)
Feature	**Classification onsite**	**[1]Subject to Buffer Rule**	**Riparian Land uses adjacent to Feature (0-200')**	**Buffer Credit Viable**	**[2]Nutrient Offset Viable at 2,273.02 lbs-N per acre**	**[6]Mitigation Type Determination w/in riparian areas**

JH3 (Starts at Rd and ends at JH5 DWR flag)	Ditch	No	non-forested agriculture fields	Yes	Yes *(non-forested ag fields only))*	Fields - **Restoration Site** per 15A NCAC 02B .0295 (o)(8) ***Buffer Mitigation Note –** Assessment concludes the ditch meets 15A NCAC 02B .0295 (o)(8) (A, B, C, D & E). More information on the watershed is required to be provided in a mitigation plan for complete assessment. See rule. Culvert is partially compromised and needs to be replaced or removed. Irrigation piping observed parallel to channel & needs to be removed
JH5 From DWR flag- Easement boundary (see map)	Stream	Yes	Left Bank – Ag field Right Bank – mostly non-forested agriculture with some areas timbered & regenerated forest not in agriculture. Neuse riparian buffers shown in Figure 3 were impacted from timbering between 2014-2016 in violation of the Neuse Buffer rules. Therefore, no buffer credit can be generated within Zone 1 or Zone 2 of the Neuse riparian buffer that was timbered.	[3]Yes	Yes *(non-forested ag fields only)*	Fields - **Restoration Site** per 15A NCAC 02B .0295 (n) Timbered Neuse Buffer (Zone 1 & Zone 2)- no credit Timbered & Regenerated forest (beyond the Neuse Buffer) - **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
JH4	Ditch	No	Non-forested agriculture fields	*see note	Yes	Fields - **Restoration Site** per 15A NCAC 02B .0295 (o)(8) ***Buffer Mitigation Note –** Assessment concludes the ditch meets 15A NCAC 02B .0295 (o)(8) (A, B, C, D & E). More information on the watershed is required to be provided in a mitigation plan for complete assessment. See rule.
A	Ditch	No	Non-forested agriculture fields	N/A	N/A	N/A *Located outside of proposed easement boundary and not assessed*

This viability assessment will expire on April 30, 2021 or upon the submittal of an As-Built Report to the DWR, whichever comes first.

Please contact Katie Merritt at (919) 707-3637 if you have any questions regarding this correspondence.

Sincerely,

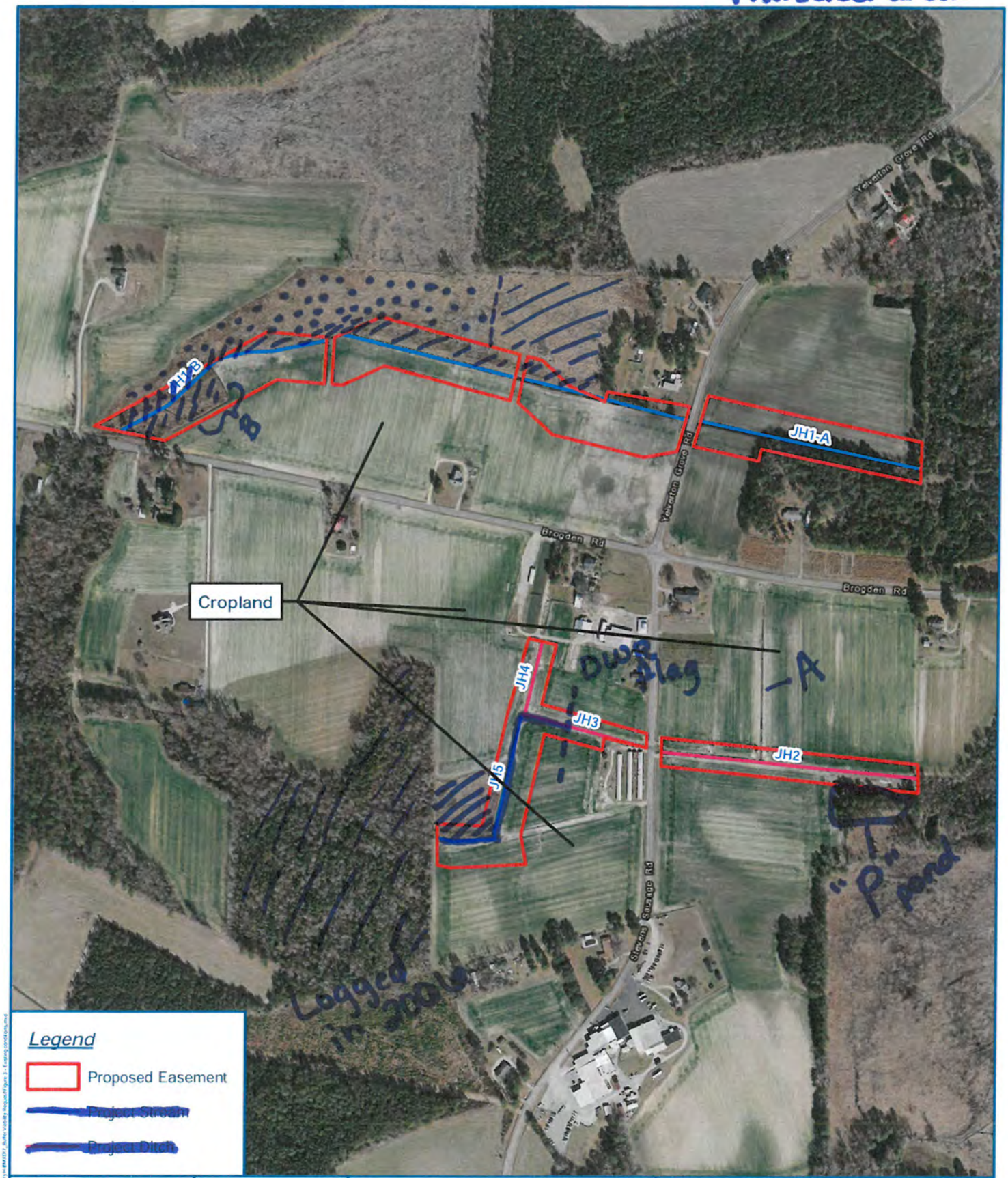
Karen Higgins

Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/*km*
Attachments: Figure 3-Existing Conditions Map, Ditch Parameters Figure

cc: File Copy (Katie Merritt)
Jeff Schaffer- DMS (via electronic mail)

▨ = Disturbed / timbered areas ⁘ = Restoration areas w/in timbered areas



Legend

Proposed Easement

Project Stream

Project Ditch

0 250 500

Feet

Figure 3 - Existing Conditions

Strawberry Hill Mitigation Project

Johnston County, North Carolina

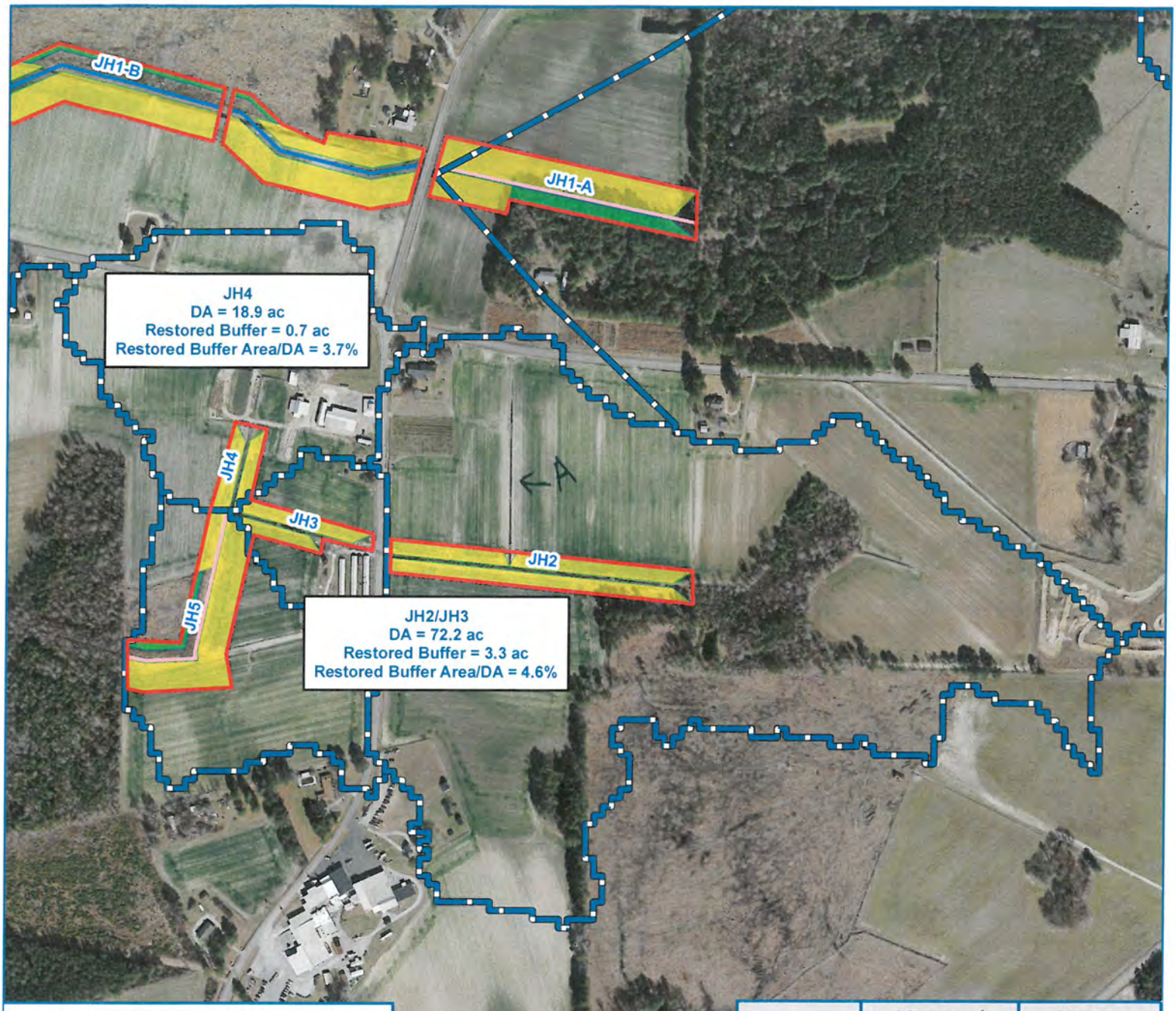
Date: 2/22/2019

Drawn by: MDE

Checked by: JRM

1 inch = 500 feet

res



Legend

- Proposed Easement (21.81 ac +/-)
- Drainage Area

Buffer Mitigation

- Restoration 0-100
- Preservation 0-100

Stream Mitigation

- Restoration
- Enhancement II

Ditch Reach	Measured Channel Depth (ft.)	Average Channel Depth (ft.)
JH2	2.4	2.5
	1.8	
	2.5	
	2.6	
	2.8	
	2.9	
JH3	3	2.95
	2.9	
JH4	2.8	2.7
	2.6	

N W E S

0 250 500

Feet

Buffer Viability
Requested Ditch Parameters

Strawberry Hill Mitigation Site

Johnston County, North Carolina

Date: 3/18/2019
Drawn by: MDD
Checked by: BPB
1 inch = 500 feet

res

4/30/19

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

April 23, 2019

DWR Project # 2019-0159
Johnston County

Bridgette Edwards
3200 Brogden Rd.
Smithfield, NC 27577

Jan Hill
3188 Stevens Sausage Rd.
Smithfield, NC 27577

William Carpenter
3032 Yelverton Grove Rd.
Smithfield, NC 27577

Melrose Haas
3299 Brogden Rd.
Smithfield, NC 27577

Subject: On-Site Determination for Applicability to the Neuse Buffer Rules (15A NCAC 02B .0233)
Project Name: Strawberry Hill Mitigation Project
Parcel ID Number(s): 260200-46-1831; 260200-26-4743; 260200-45-0227; 260200-35-1474; 260200-46-0253; 260200-36-4710
Address/ Location: 3105 Brogden Rd., Smithfield, NC
Stream(s) Evaluated: Unnamed Tributaries to Polecat Branch
Determination Date: 3/14/2019 **Staff:** Shelton Sullivan

Dear Sir / Madam:

On March 14, 2019, Shelton Sullivan of the Division of Water Resources (DWR) Central Office conducted an on-site review of features located on the subject properties at the request of Jamey McEachran of Resource Environmental Solutions to determine the presence or absence of streams on the site and their ephemeral/ intermittent/ perennial (E/I/P) characteristics and transition points and the applicability to the Neuse Riparian Area Protection Rules (15A NCAC 02B .0233).

The enclosed map (s) depict the features evaluated and this information is also summarized in the table below. Streams that are considered "Subject" have been located

on the most recently published NRCS Soil Survey of Johnston County and/or the most recent copy of the USGS Topographic (at 1:24,000 scale) map(s), have been located on the ground at the site, and possess characteristics that qualify them to be at least intermittent streams. Features that are considered "Not Subject" have been determined to not be at least intermittent or not present on the property or not depicted on the required maps. There may be other streams or features located on the property that do not appear on the maps referenced above but may be considered jurisdictional according to the US Army Corps of Engineers and subject to the Clean Water Act.

See the following table for the features rated during the DWR site visit:

Feature ID	Feature Type	*E/I/P/ Other	Subject to Buffer Rules	Start @	Stop @	Depicted on Soil Survey	Depicted on USGS Topo
JH1-A	Stream	"I" at least	Yes	At eastern property and wood line	Continues throughout to property line at Brogden Rd.	No	Yes
JH1-B	Stream	"I" at least	Yes	Continuation of JH1-A	Continues throughout to property line at Brogden Rd.	Yes	Yes
JH5	Stream	"I" at least	Yes	JH5 Start at culvert, see map	Continues throughout	No	Yes
JH4	Ditch	n/a	No	On the property, see map	Confluence with JH5	No	Yes
JH3	Ditch	n/a	No	Stevens Sausage Rd.	At JH5 Start	No	Yes
JH2	Ditch	n/a	No	Eastern property boundary	Stevens Sausage Rd.	No	Yes

* E: Ephemeral
I: Intermittent
P: Perineal

This on-site determination shall expire five (5) years from the date of this letter. Landowners or affected parties that dispute a determination made by the DWR may request a determination by the Director. An appeal request must be made within sixty (60) calendar days of the date of this letter to the Director in writing.

If sending via U.S. Postal Service:
DWR- 401 & Buffer Permitting Branch
c/o Karen Higgins
1617 Mail Service Center
Raleigh, NC 27699-1617

If sending via delivery service (UPS, FedEx, etc.)
DWR- 401 & Buffer Permitting Branch
c/o Karen Higgins
512 N Salisbury St
Raleigh, NC 27604

This determination is final and binding as detailed above, unless an appeal is requested **within sixty (60) calendar days**.

This determination only addresses the applicability to the buffer rules and does not approve any activity within buffers or within waters of the state. If you have any additional questions or require additional information, please call Shelton Sullivan at (919) 707-3636. This determination is subject to review as provided in Articles 3 & 4 of G.S. 150B.

Sincerely,

Karen Higgins, Supervisor
401 & Buffer Permitting Branch

KAH/*sos*

Enclosures: Site Map(s), USGS Topo, Soil Survey

cc: Resource Environmental Solutions, Jamey McEachran, jmceachran@res.us
Resource Environmental Solutions, Brad Breslow, bbreslow@res.us
401 & Buffer Permitting Branch files

Filename: 20190159_StrawHillStreamBufferDetLetter_4-23-2019.docx

DWR #20190159 Strawberry Hill Mitigation Project Stream Calls 3/14/2019

JH5 Start Point looking upstream

JH5 continuing downstream

JH1-A Start Point looking upstream

JH1-A continuing downstream toward JH1-B

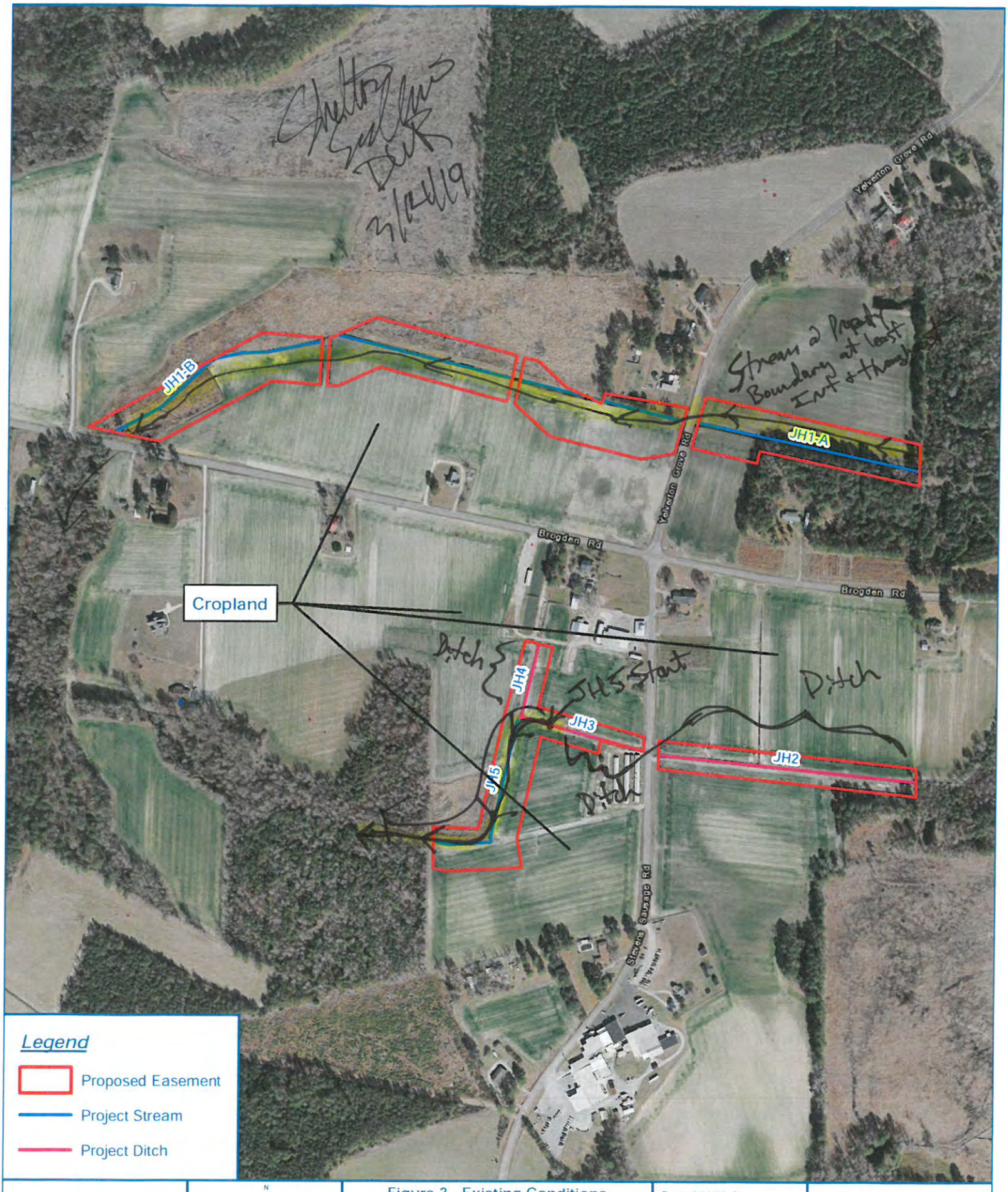


Figure 3 - Existing Conditions

Strawberry Hill Mitigation Project

Johnston County, North Carolina

Date: 2/22/2019

Drawn by: MDE

Checked by: JRM

1 inch = 500 feet

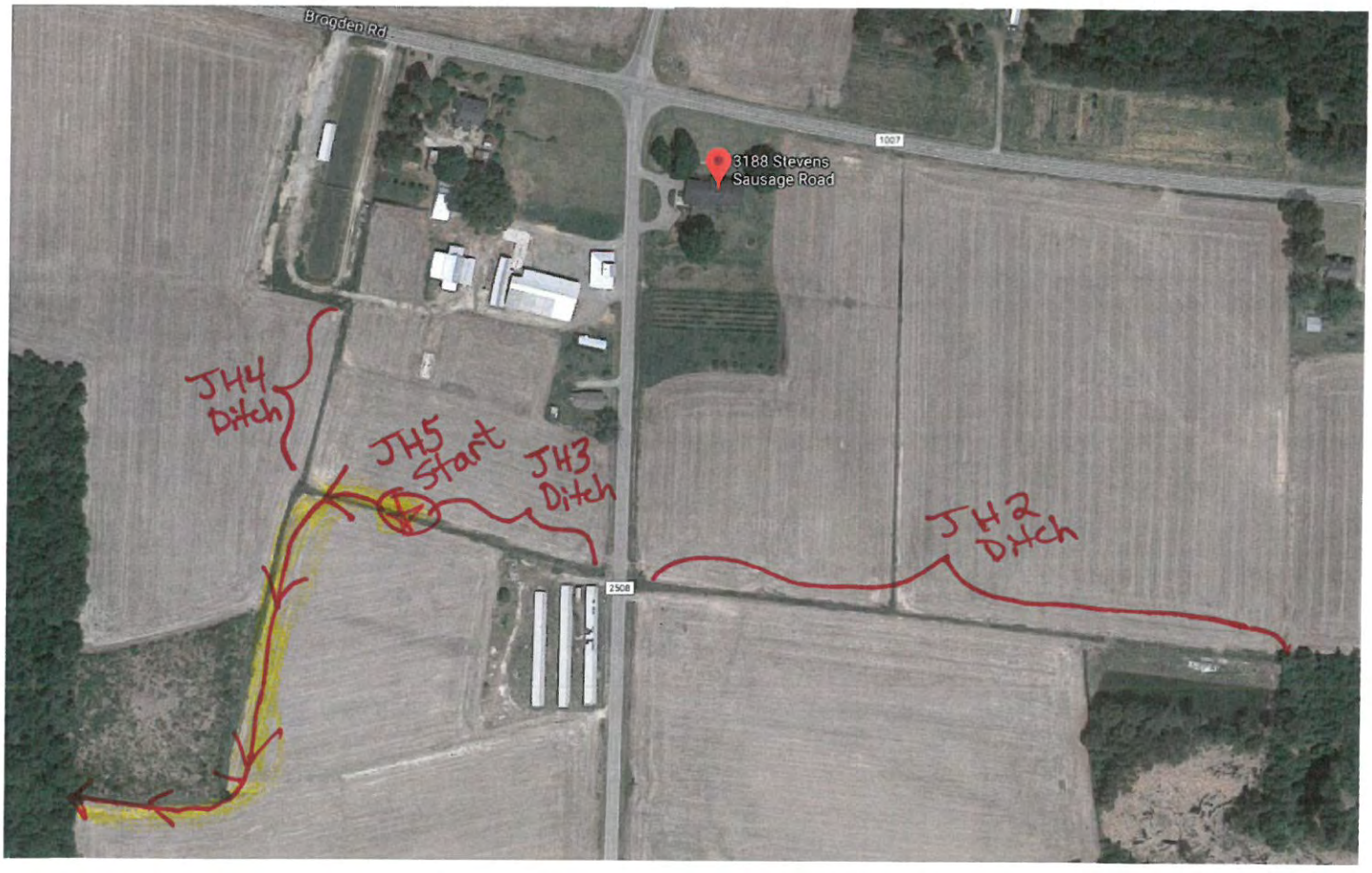
res

Strawberry Hill Aerials

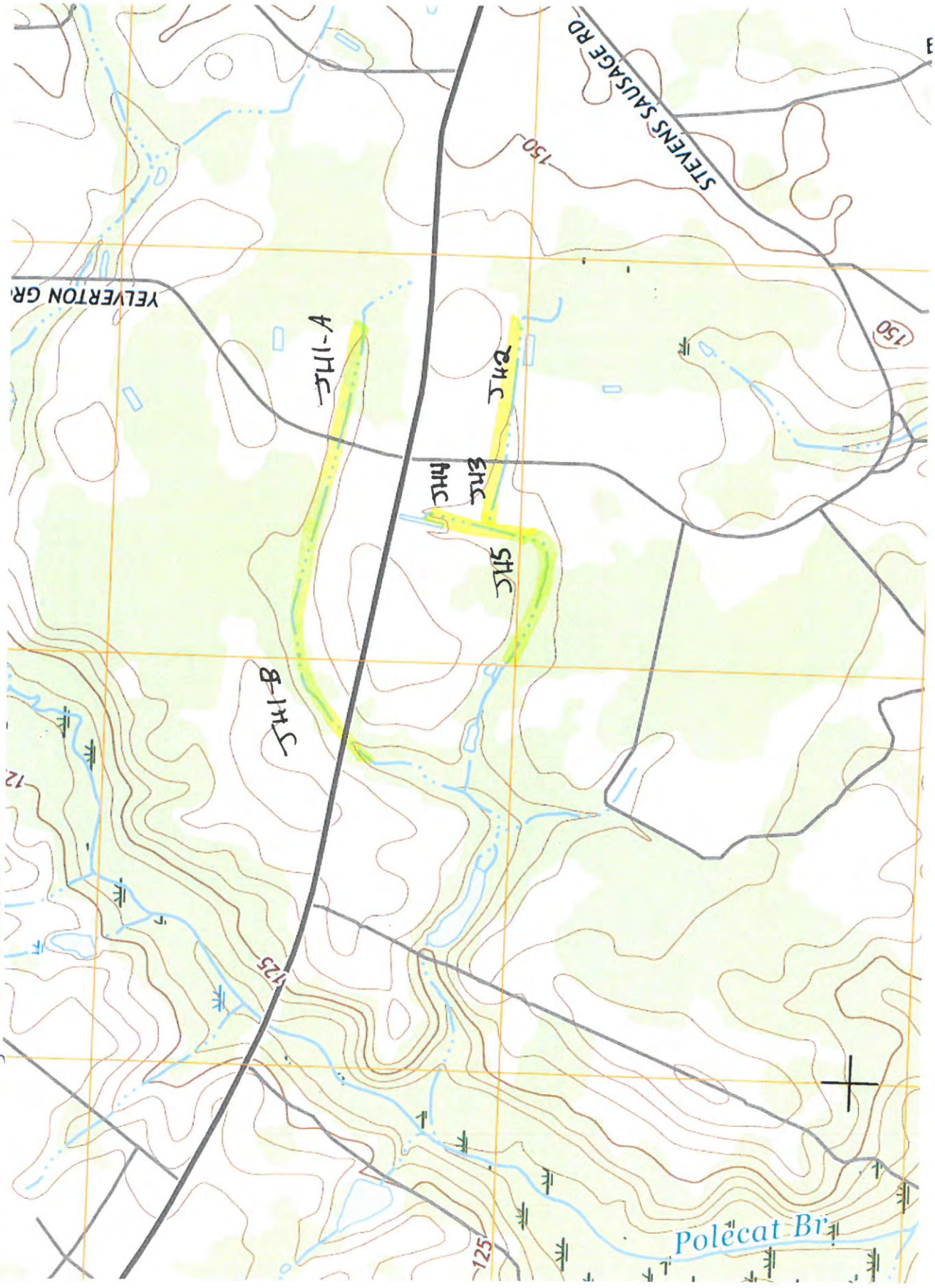
Shelton Sullivan DWR 3/14/19

North of Brogden Road

South of Brogden Road

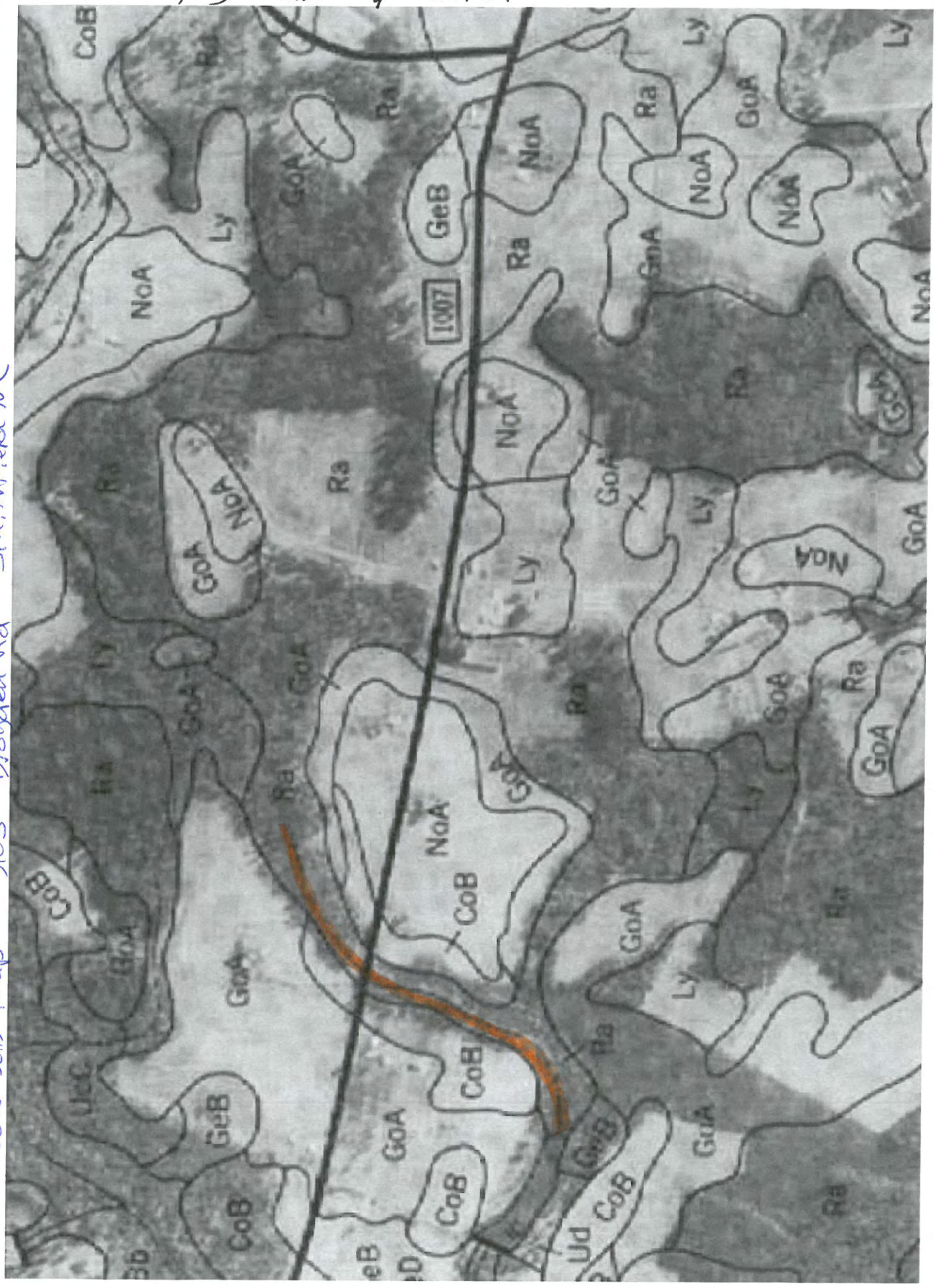


USGS Map



2016 Map 3105 Braxton Rd Smithfield NC

NRCS Soils Map Jo.Co.



Jo Co Soils Map 3105 Broaden Rd Smithfield NC