

Baseline Monitoring Report

BOSEMAN BUFFER MITIGATION SITE

Edgecombe County, NC

NCDEQ Contract No. 7872

DMS ID No. 100119

DWR Project No. 2019-0800

RFP No. 16-007711

Prepared for:



Mitigation Services
ENVIRONMENTAL QUALITY

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

May 9th, 2020





Mitigation Services
ENVIRONMENTAL QUALITY

ROY COOPER
Governor

MICHAEL REGAN
Secretary

May 28, 2020

Sent via email to: scott@ecoterra.com and ted@ecoterra.com

Scott Frederick
EcoTerra

Subject: DMS Comments on the Draft Baseline/As-Built Report
Boseman, Project ID #100119, DMS Contract #0007872

Scott,

After receiving the draft Baseline Report on 5/18 and conducting a site visit 5/28/2020, DMS observed that the site was planted as described and all monitoring devices and easement boundary markers meet contractual requirements and satisfy the Mitigation Plan approved by DWR. DMS offers the following comments on the baseline report:

1. Page 2, remove second bullet about requirements of In-Lieu Fee Instrument as this is N/A to this report.
 2. Page 2 contributing staff, correct typo for landowner title
 3. Page 4, 1st paragraph- if you intend to put the credits in the text of the report, ensure they are shown as credits (riparian buffer mitigation units- BMU), not in an area (SF).
 4. As discussed in the field, please add/clarify in the report details planned in the mitigation plan and if/how they were carried out in the baseline report / baseline conditions section:
 - a. Planting Zones
 - b. Installation of temporary and permanent seed mix
 - c. Pre-emergent/post spray planting
 5. Remove N and P columns in the asset table or zero out those columns per DWR previous comments.
1. Provide CVS datafile with resubmission

Thanks for your work,

A handwritten signature in black ink that reads 'Lindsay Crocker'.

Lindsay Crocker, DMS

BASELINE MONITORING REPORT
BOSEMAN BUFFER MITIGATION SITE

Edgecombe County, NC
NCDEQ Contract No. 7872
DMS ID No. 100119

Tar-Pamlico River Basin
HUC 03020101

Prepared For:



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

Prepared By:



1117 Peachtree Walk NE, Suite 126
Atlanta, GA 30309
404.840.2697

This Baseline Monitoring Plan has been written in conformance with the requirements of the following:

- 15A NCAC 02B.0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers.

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

Contributing Staff

Ted Griffith, Principal in Charge	Ryan Perry, Landowner Liaison
Michael Bienenson, Quality Assurance Lead	Scott Frederick, Construction and Baseline Monitoring Lead, SWE
Jamey O'Shaughnessey, Quality Assurance and Construction Oversight	Heather Smith, QA/QC, VHB

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1.0 Mitigation Project Summary

The Boseman Buffer Mitigation Site (Site) is a riparian buffer and adjacent riparian areas restoration project located approximately 2.5 miles southeast of the Town of Rocky Mount in Edgecombe County, NC (Appendix 1: Figure 1). The Site is approximately 14.91 acres (649,889 ft²) of a total 276 ac tract situated along two unnamed tributaries to the Tar River (Appendix 1: Figure 2). The project is located in a targeted local watershed (TLW) within the Tar-Pamlico River basin hydrologic unit code (HUC) 03020101120030 and Subbasin 03-03-02. The unnamed tributaries flow into the Tar River approximately one and half miles downstream of the project. According to the as-built survey and most recent DWR Buffer Mitigation Calculation Tool V.2 (Updated 1/17/20), the Site is expected to generate 617,518.702 riparian buffer credits.



The Boseman Buffer Mitigation Site will help to reduce future sediment and nutrient loading into the unnamed tributaries and downstream Tar River. It will also improve terrestrial habitats along this stream by establishing a riparian corridor and allowing the land to convert to forested communities. The surrounding area is primarily agricultural fields. The project restored forested riparian buffers and adjacent riparian areas to a maximum of approximately 115 feet from the top of bank of the streams and removed rotating crops and fertilizer inputs. The restored Tar-Pamlico riparian buffer and adjacent

riparian areas will filter runoff from the surrounding farm fields and provide shading to improve stream temperatures and aquatic habitat. Invasive vegetation will be treated as needed within the project area to promote native vegetation.

1.1 Project Goals

According to the N.C. Division of Mitigation Services' (DMS) 2010 Tar-Pamlico River Basin Restoration Priorities (RBRP) document, amended 2018, the project will support the identified goals for the TLW, as well as the overall HUC. As stated in the RBRP, restoration of riparian buffers and adjacent riparian areas to address agricultural runoff is a high priority for this 14-digit TLW HUC.

The major goals of the proposed buffer restoration project are to address agricultural runoff, including nutrients and sediment, protect the project site in perpetuity, and restore terrestrial habitat. The detailed goals and objectives are:

Reduce Nutrient Levels – Nutrient inputs will be decreased by filtering runoff and sequestering nutrients dispersed from stormwater flows from agricultural fields. These nutrients will be absorbed through the 30-115 ft wide riparian buffer and adjacent riparian areas restored with native woody vegetation. This goal is supported by both the TLW and RBRP for reducing nutrient inputs to the Tar-Pamlico River Basin.

Reduce Sediment Levels – Sediment inputs will be decreased by filtering runoff and attenuating flood flows from agricultural fields through 30-115 ft wide riparian buffer and adjacent riparian areas restored with native woody vegetation. This goal is supported by both the TLW and RBRP for reducing sediment inputs to the Tar-Pamlico River Basin.

Project Protection in Perpetuity – Implement a project in a TLW and record a conservation easement. This goal is supported by the RBRP to protect aquatic habitat and surface waters.

Restore Terrestrial Habitat – Riparian buffer and adjacent riparian areas will be restored with native vegetation and invasive vegetation will be managed. This goal is supported by the RBRP and is a DMS Programmatic Goal (NCGS 143-214.10).

1.2 Existing Site Conditions

The buffer restoration project contains approximately 14.9 acres of agricultural fields along two unnamed tributaries (hereinafter referred to as UT 1, and UT 2). The fields have historically been in rotating row crops and early successional herbaceous vegetation since at least 1955 as noted on historical aerial photographs. The property owner also states the land has been in agricultural use including row crops for at least 75 yrs.

UT 1 enters the project site along the western property boundary and flows in an eastward direction. UT 1 meets the definition of at least intermittent per the NCDWR On-Site Determination for Applicability to the Tar-Pamlico Buffer Rules Letter dated July 9, 2019 (Appendix 1). UT 2 originates within the property boundary as an ephemeral channel (Reach 2a) and transitions to an intermittent channel (Reach 2b) prior to its confluence with UT 1. There is a third tributary with a stream origin point within the property boundary and flows in an eastward direction to the confluence with UT1. This tributary is at least intermittent per the Buffer Letter, but is not being used to produce riparian buffer credit for this project.

NCDWR visited the Site on June 14, 2019 to determine subjectivity of on-site resources to the Tar-Pamlico buffer rules and their suitability for riparian buffer mitigation per the Consolidated Buffer Mitigation Rule (15A NCAC 02B .0295). The two unnamed tributaries and land use within the project boundary were found suitable for riparian buffer mitigation in the Tar-Pamlico River Basin. The resulting NCDWR letters are included in Appendix 2.

2.0 Determination of Credits

Riparian buffer and adjacent riparian area restoration was accomplished in accordance with the Consolidated Buffer Mitigation Rule (15A NCAC 02B .0295) including the alternative

mitigation option of restoration activities along ephemeral streams. Restoration was accomplished specifically by:

Buffer Restoration on Ephemeral Channels (15A NCAC 02B .0295(o)(7)):

- a.) NCDWR conducted an on-site stream determination of subject streams and ephemeral channels on the property
- b.) Ephemeral channels are directly connected to intermittent or perennial stream channels
- c.) Total mitigation area of ephemeral channels is less than 25% of the total buffer mitigation area (Table 2, Appendix 1).

All areas within 115 ft of the top of bank of subject streams as measured from the top of bank landward, will be devoted to generating riparian buffer mitigation credits. Total mitigation area on ephemeral channels is 12.7% of total buffer mitigation area. Mitigation credits generated are found in Table 2 and Figure 2 in Appendix 1 and are based upon the most recent DWR Buffer Mitigation Calculation Tool v 2 (Updated 1/17/20) and as-built survey (Appendix 3).

3.0 Baseline Summary

The project construction was completed in early March 2020, following mitigation plan approval. Eco Terra and supporting team members successfully planted and restored the proposed areas dedicated for riparian buffer and adjacent riparian area restoration with high quality native trees and shrubs.

3.1 Site Preparation

All requests to prepare the site per the NCDWR Site Viability for Buffer Mitigation and Nutrient Offset Letter (Date: July 17, 2019) were addressed. A telephone pole and steel girder used as a bridge for the center-pivot wheel on the agricultural field were removed. One small pipe noted in the initial site visit, providing drainage from upslope and under a farm access road outside of the project, was examined and confirmed that diffuse flow toward the conservation easement was occurring through an existing rip rap dissipater, also located outside the conservation easement. Temporary and permanent seed mix was installed in any disturbed soil areas following debris removal and planted with native trees to secure sediment from entering surface waters. Temporary and permanent seed mixtures planted included Foxtail millet (*Setaria italica*) and Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and big bluestem (*Andropogon gerardii*), respectively. No invasive species were noted for herbicide treatment prior to construction. No disking or tilling was necessary to prepare the site or remove any historic plow pan in the soil.

3.2 Riparian Area Restoration Activities

Restoration of the riparian areas involved planting bare root one to two-year-old trees and shrubs in designated planting zones based on soil wetness and in accordance with the mitigation plan. In addition, five to six-year-old trees were planted at representatively selected areas designated for plots to aid in identifying plot locations. These trees are not included in any individual plot tree count. However, they are an overall beneficial component of stem diversity and age-class in the

restored forest ecology and serve as important components in restored habitat, nutrient sequestration, leaf litter for trapping sediment, and soil health. A combination of machine and manual planting techniques were used depending on site conditions. Older trees were planted by a combination of hand and machine.

Species planted within the riparian areas included: overcup oak (*Quercus laurifolia*) 2,500 stems, laurel oak (*Quercus lyrata*) 1,000 stems, water oak (*Quercus nigra*) 3,000 stems, willow oak (*Quercus phellos*) 3,000 stems, green ash (*Fraxinus pennsylvanica*) 500 stems, silky dogwood (*Cornus amomum*) 1,000 stems, button bush (*Cephalanthus occidentalis*) 500 stems, and swamp blackgum (*Nyssa sylvatica* var. *biflora*) 300 stems. Approximately 12,300 stems (825 stems/ac) were planted within the riparian areas designated for restoration. Differences in stem density and quantities occurred relative to the proposed planting list in the mitigation plan due to plant availability at the time.

In accordance with 15A NCAC 02B .0295, a sufficient density of stems was planted to achieve 260 trees/ac at the end of a minimum five-year project monitoring period whereby no one tree species planted was greater than 50% of the planted stems, and a minimum of four native hardwood tree and native shrub species were planted. In total, eight species were selected and planted in specific areas depending on soil type, landscape position, soil wetness, community type, and reference forest stands nearby. Initial vegetation management post planting included specific preemergent herbicide band application over planted trees for herbaceous competition that may compete with planted stems, conducted by a North Carolina licensed applicator.

4.0 Annual Monitoring and Performance Criteria

The Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers (15A NCAC 02B .0295) and RFP 16-007711 set forth specific performance criteria for the successful development and close-out of the Boseman Buffer Mitigation Site. Performance criteria monitoring includes standardized vegetation plot establishment and annual monitoring for planted stems including individual plot photo documentation, overall site photo documentation, biannual visual assessments for project status and easement integrity including herbaceous and/or invasive species competition, stem mortality, stand health, incidental damage from agricultural equipment, and stem loss or damage from natural causes such as fire, disease, or animal predation. Figure 3 (Appendix 1) illustrates the location of project easement, permanent vegetation plots/photo points, as well as overall site photo points.

4.1 Vegetation

Twelve permanent vegetation plots were established according to the most recent Carolina Vegetation Survey (CVS) protocol within the restored buffer area. Representative vegetation plots were established at a minimum density of 2% of the planted area. Specifically, vegetation monitoring was obtained for all plots according to Level 1-2 protocols from the CVS-EEP Protocol for Recording Vegetation V4.2 (2008) manual. Baseline, or monitoring year zero (MY0) vegetation stem data is included in Appendix 5, Table 3.

4.2 Photo Reference Stations

Individual plot photos taken at the southwest corner (origin) of each plot are included in this baseline monitoring report. Additional Site reference photos were taken at designated points along the conservation easement boundary providing an overall view of the project success

(Appendix 1: Figure 3). All photo points were located by survey and georeferenced for map production to provide a consistent means for photo replication annually and in the event a plot or photo location must be reestablished during the monitoring period. Photo orientation (direction and bearing) were recorded as well as approximate vertical position for consistency in photo logging.

4.3 Visual Assessments

Additional observations were made of site conditions and vegetation conditions outside of monitoring plots. This biannual effort will be made in order to appropriately monitor changing site conditions and address any issues to ensure Site success and performance criteria are met after the monitoring period. Any Site problems will be noted and discussed in the annual reports and monitored biannually to ensure performance criteria are met following any remedial action.

4.4 Annual Reporting Performance Criteria

All monitoring reports, including this baseline report, will be compiled and submitted to DMS annually in accordance with the Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template Ver. 2.0 (May 2017). Annual monitoring will occur for a minimum of five years or until performance criteria are met.

4.5 Maintenance and Contingency Plans

Any Site observations identified through vegetation plots or visual assessments, whereby the performance criteria is not met, will be noted and discussed in the annual reports and addressed with a contingency plan as necessary. DMS/NCDWR will be notified, and if necessary, collaborate with Eco Terra to develop a contingency plan with remedial action steps to correct the performance criteria deficiency. Any contingency plan and remedial actions will occur within an agreed timeframe and monitoring adjusted accordingly, if necessary. Site problem areas will be monitored biannually to ensure performance criteria are met following any remedial action.

5.0 References

15 NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers. 2015.

Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. <http://cvs.bio.unc.edu/protocol/cvs-EEP-protocol-v4.2-lev1-2.pdf>

Natural Resources Conservation Service (NRCS). Web Soil Survey of Edgecombe County. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

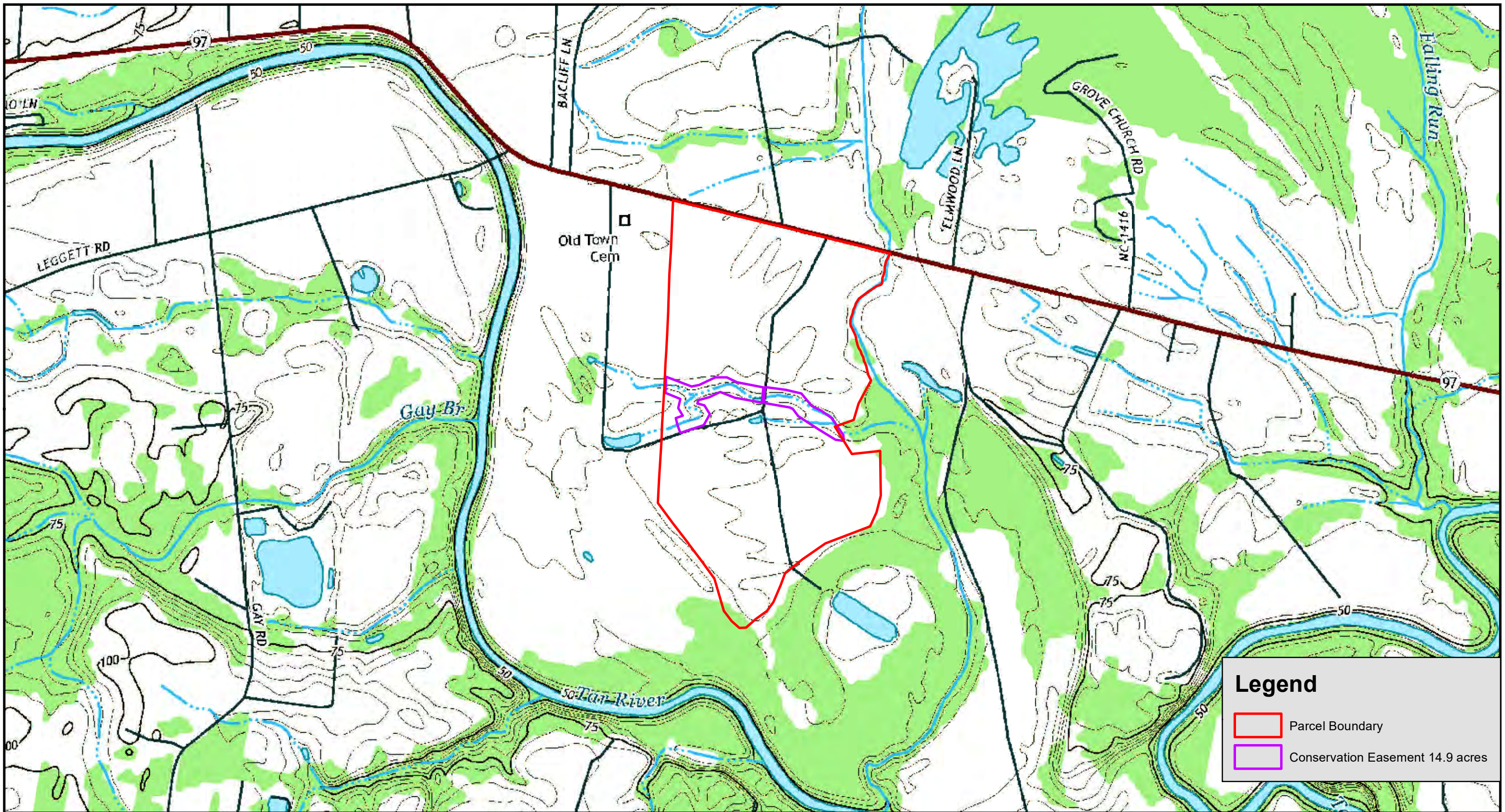
North Carolina Department of Environmental Quality. Division of Mitigation Services (NCDMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template Version 2.0.

North Carolina Department of Environmental Quality. Division of Mitigation Services (NCDMS). 2018. Tar-Pamlico River Basin Restoration Priorities.



APPENDIX 1

FIGURES AND TABLES



Vicinity Map
 Boseman Buffer Mitigation Site
 Baseline Monitoring Report (MY 0)
 Tar-Pamlico 03020101
 Edgecombe County, North Carolina
 May 2020



2013 Hartsease USGS Quadrangle

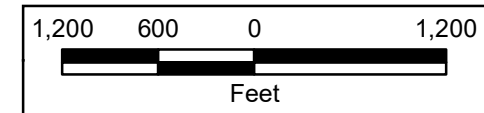
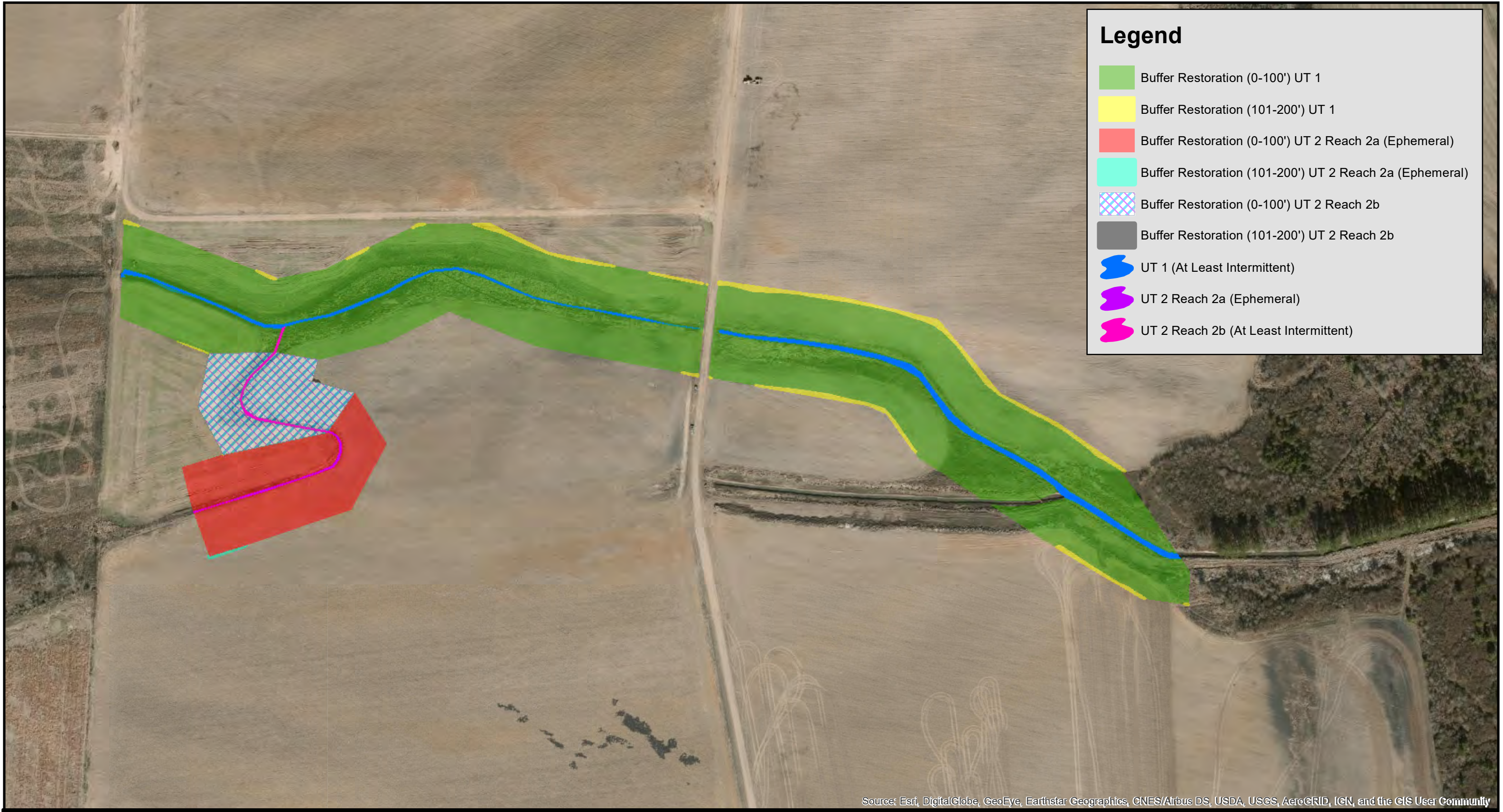


Figure
1



Legend

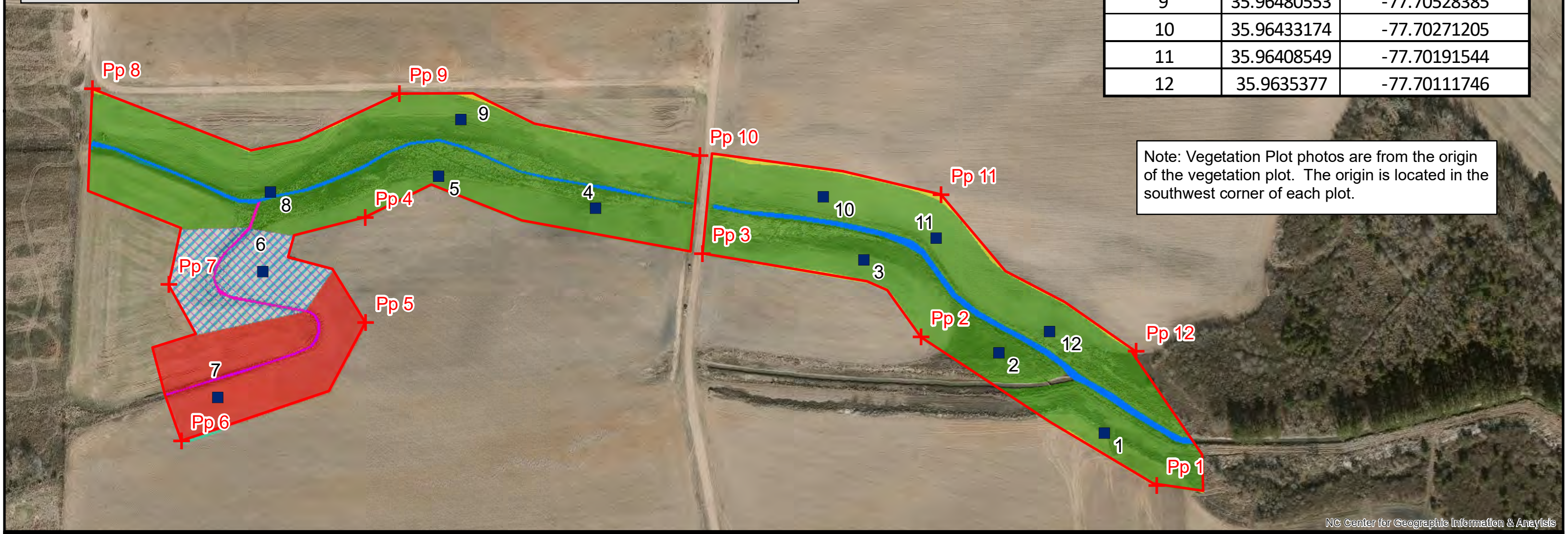
- Buffer Restoration (0-100') UT 1
- Buffer Restoration (101-200') UT 1
- Buffer Restoration (0-100') UT 2 Reach 2a (Ephemeral)
- Buffer Restoration (101-200') UT 2 Reach 2a (Ephemeral)
- Buffer Restoration (0-100') UT 2 Reach 2b
- Buffer Restoration (101-200') UT 2 Reach 2b
- UT 1 (At Least Intermittent)
- UT 2 Reach 2a (Ephemeral)
- UT 2 Reach 2b (At Least Intermittent)

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Vegetation Plot (N=12)
- + Photo Points
- Conservation Easement 14.9 acres
- ~ UT 1 (At Least Intermittent)
- ~ UT 2 Reach 2a (Ephemeral)
- ~ UT 2 Reach 2b (At Least Intermittent)
- Buffer Restoration (0-100') UT 1
- Buffer Restoration (101-200') UT 1
- Buffer Restoration (0-100') UT 2 Reach 2a (Ephemeral)
- Buffer Restoration (101-200') UT 2 Reach 2a (Ephemeral)
- Buffer Restoration (0-100') UT 2 Reach 2b
- Buffer Restoration (101-200') UT 2 Reach 2b

Origin Latitude/Longitude (Decimal Degrees)		
Plot Number	Y Coordinate	X Coordinate
1	35.96294899	-77.70073591
2	35.96341822	-77.70147906
3	35.96396443	-77.70243013
4	35.964284	-77.70433461
5	35.96448024	-77.70544498
6	35.96394198	-77.70670793
7	35.96322236	-77.7070397
8	35.96440173	-77.70664643
9	35.96480553	-77.70528385
10	35.96433174	-77.70271205
11	35.96408549	-77.70191544
12	35.9635377	-77.70111746



NC Center for Geographic Information & Analysis



Monitoring Plan View Map
Boseman Buffer Mitigation Site
Baseline Monitoring Report (MY0)
Tar-Pamlico 03020101
Edgecombe County, North Carolina
May 2020
 2017 Aerial from NCOneMap

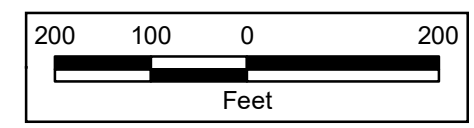
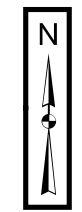


Figure 3

Table 1: Buffer Project Attributes
 Boseman Buffer Mitigation Site
 DMS ID No. 100119
 DWR Project No. 2019-0800
 Monitoring Year 0 – 2020

Project Name	Boseman Buffer Mitigation Site
Hydrologic Unit Code	03020101
River Basin	Tar-Pamlico
Geographic Location (decimal degrees)	35.96451, -77.705926
Site Protection Instrument (BK, PG)	1707/675
Total Credits (BMU)	617,518.702
Types of Credits	Riparian Buffer
Mitigation Plan Date	January 2020
Initial Planting Date	March 2020
Baseline Report Date	May 2020
MY1 Report Date	November 2020
MY2 Report Date	November 2021
MY3 Report Date	November 2022
MY 4 Report Date	November 2023
MY 5 Report Date	November 2024
Close out Report Date/Visit	May 2025

Table 2: Buffer Project Components and Assets

Boseman Buffer Mitigation Site

DMS ID No. 100119

DWR Project No. 2019-0800

Monitoring Year 0 – 2020

BOSEMAN BUFFER MITIGATION SITE, PROJECT NO. 2019-0800, 617,518.702 CREDITS

Tar-Pamlico 03020101		Project Area														
19.16394		N Credit Conversion Ratio (ft ² /pound)														
297.54099		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	UT1	484,072	484,072	1	100%	1.00000	Yes	484,072.000	N/A	0.000	0.000
Buffer	Rural	Yes	I / P	Restoration	101-200	UT1	6,496	6,496	1	33%	3.03030	Yes	2,143.682	N/A	0.000	0.000
Buffer	Rural	No	Ephemeral	Restoration	0-100	UT2 (Reach 2a)	78,631	78,631	1	100%	1.00000	Yes	78,631.000	N/A	0.000	0.000
Buffer	Rural	No	Ephemeral	Restoration	101-200	UT2 (Reach 2a)	82	82	1	33%	3.03030	Yes	27.060	N/A	0.000	0.000
Buffer	Rural	Yes	I / P	Restoration	0-100	UT2 (Reach 2b)	52,641	52,641	1	100%	1.00000	Yes	52,641.000	N/A	0.000	0.000
Buffer	Rural	Yes	I / P	Restoration	101-200	UT2 (Reach 2b)	12	12	1	33%	3.03030	Yes	3.960	N/A	0.000	0.000
Totals:							621,934	621,934								

Enter Preservation Credits Below

								Eligible for Preservation (ft ²):		207,311		
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
Buffer				Preservation								—
												—
Preservation Area Subtotal (ft²):								0				
Preservation as % Total Area of Buffer Mitigation:								0.0%				
Ephemeral Reaches as % Total Area of Buffer Mitigation:								12.7%				

TOTAL AREA OF BUFFER MITIGATION (TABM)		
Mitigation Totals	Square Feet	Credits
Restoration:	621,934	617,518.702
Enhancement:	0	0.000
Preservation:	0	0.000
Total Riparian Buffer:	621,934	617,518.702
TOTAL NUTRIENT OFFSET MITIGATION		
Mitigation Totals	Square Feet	Credits
Nutrient Offset:		
Nitrogen:	0	0.000
Phosphorus:		0.000

1. The Randleman Lake buffer rules allow some ditches to be classified as subject according to 15A NCAC 02B .0250 (5)(a).
last updated 01/17/2020

APPENDIX 2

DWR CORRESPONDENCE

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

LINDA CULPEPPER
Director



NORTH CAROLINA
Environmental Quality

July 9, 2019

DWR Project # 2019-0800 V2
Edgecombe County

Eco Terra Partners, LLC
Attention: Ted Griffith
1117 Peachtree Walk NE,
Suite 126
Atlanta, GA 30309

Subject: On-Site Determination for Applicability to the Tar-Pamlico Buffer Rules (15A NCAC 02B .0259)

Project Name: Boseman Buffer Mitigation Site

Parcel ID Number: 388038633500; PIN 3880-38-6335

Address/ Location: 7488 NC 97, Battleboro, NC 27809, Edgecombe County
Lat. 35.963791, Long. -77.703655

Stream(s) Evaluated: Unnamed Tributaries to Tar River, Classified as C; NSW

Determination Date: 6/14/2019

Staff: DWR, Shelton Sullivan

Dear Mr. Griffith,

On June 14, 2019, Shelton Sullivan of the Division of Water Resources (DWR) Central Office conducted an on-site review of features located on the subject property at the request of Ted Griffith of Eco Terra Partners, LLC. The purpose of the inspection was 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 of the Tar-Pamlico Riparian Area Protection Rules (15A NCAC 02B .0259) within the proposed project easement.

The enclosed maps depict the features evaluated and this information is also summarized in the table below. Streams that are "Subject" are shown on the most recently published NRCS Soil Survey of Edgecombe County and/or the most recent copy of the USGS Topographic (at 1:24,000 scale) maps, have been located on the ground at the site, and possess characteristics that qualify them to be at least intermittent streams. Features that are "Not Subject" are not depicted on the required maps, not present on the property, or have been determined to not be at least intermittent.



North Carolina Department of Environmental Quality | Division of Water Resources
512 North Salisbury Street | 1617 Mail Service Center | Raleigh, North Carolina 27699-1617
919.707.9000

Please note that there may be other streams or features located on the property beyond the proposed project easement that may be subject to the Tar-Pamlico Riparian Area Protection Rules, 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
R1	Stream	"I" at least	Yes	Labeled as R1 on aerial map provided, at northwestern project boundary	Continues downstream to the eastern project boundary	Yes	Yes
R2A	Stream	"E"	No	Labeled as R2A on aerial map provided, on the southwestern project boundary	Continues to the flagged point R2B where the stream becomes intermittent	Yes	Yes
R2B	Stream	"I" at least	Yes	Labeled R2B on aerial map provided	Continues downstream to confluence with R1	Yes	Yes
R3	Stream (not in the current proposed project boundary)	"I" at least	Yes	Labeled R3 on aerial map provided; Begins on the eastern side of the main path	Continues downstream to confluence with R1	Yes	Yes

* E: Ephemeral, I: Intermittent P: Perennial

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**.

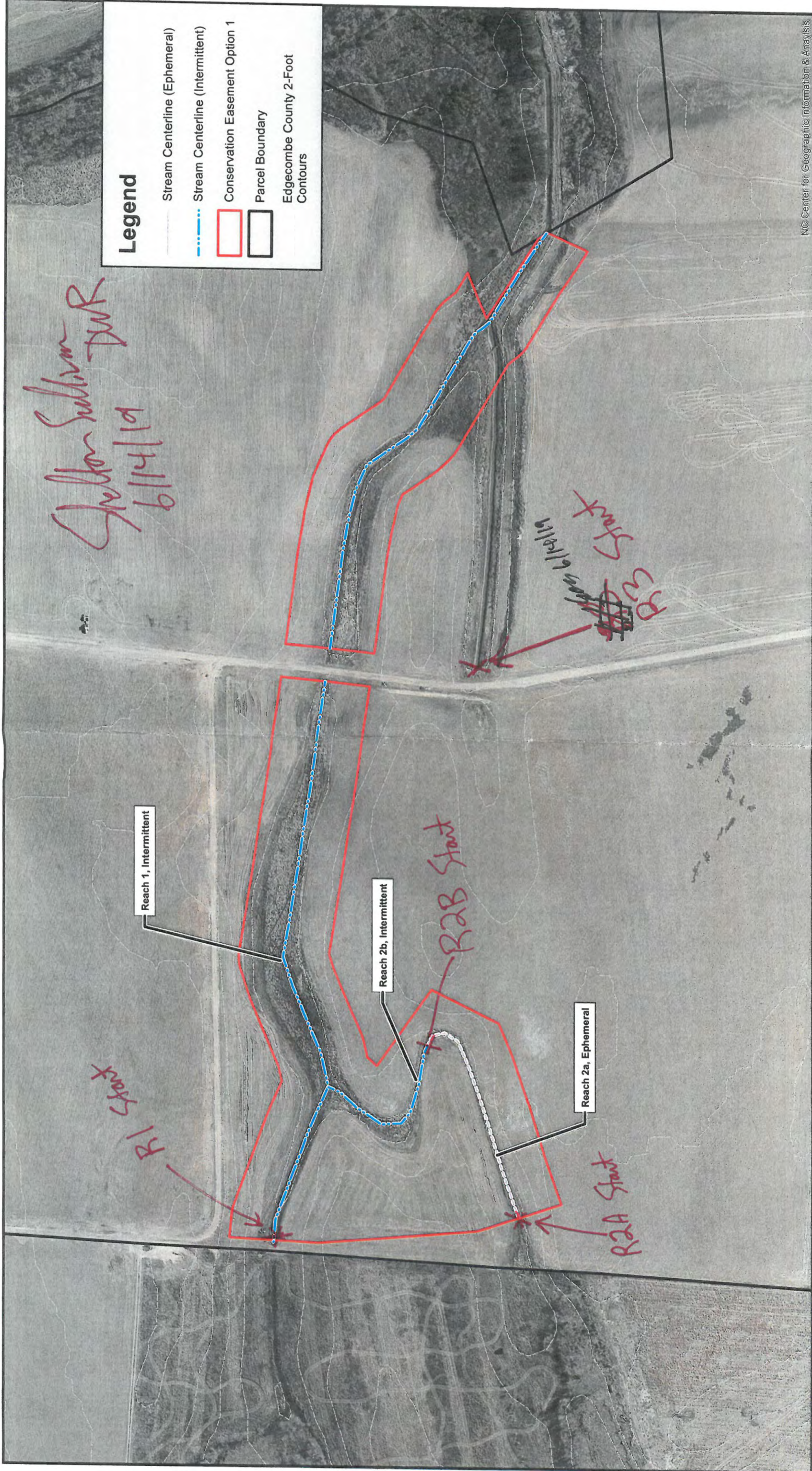
This letter only addresses the stream features on the subject property and within the proposed easement and the applicability of the buffer rules and does not approve any activity within buffers or within waters of the state. If you have any additional questions or require additional information, please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

Sincerely,


for
Karen Higgins, Supervisor
401 & Buffer Permitting Branch

Enclosures: Photographs with Description; Site Map, Soil Survey, USGS Topo

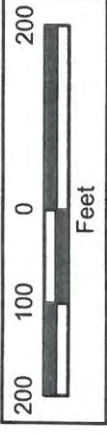
cc: Joel Boseman, P.O. Box 550, Battleboro, NC 27809
Joel Boseman via email bosemanforms@yahoo.com
Ted Griffith, Eco Terra Partners, LLC via email ted@ecoterra.com
401 & Buffer Permitting Branch files



Legend

- Stream Centerline (Ephemeral)
- Stream Centerline (Intermittent)
- ▭ Conservation Easement Option 1
- ▭ Parcel Boundary
- ▭ Edgemcombe County 2-Foot Contours

NC Center for Geographic Information & Analysis

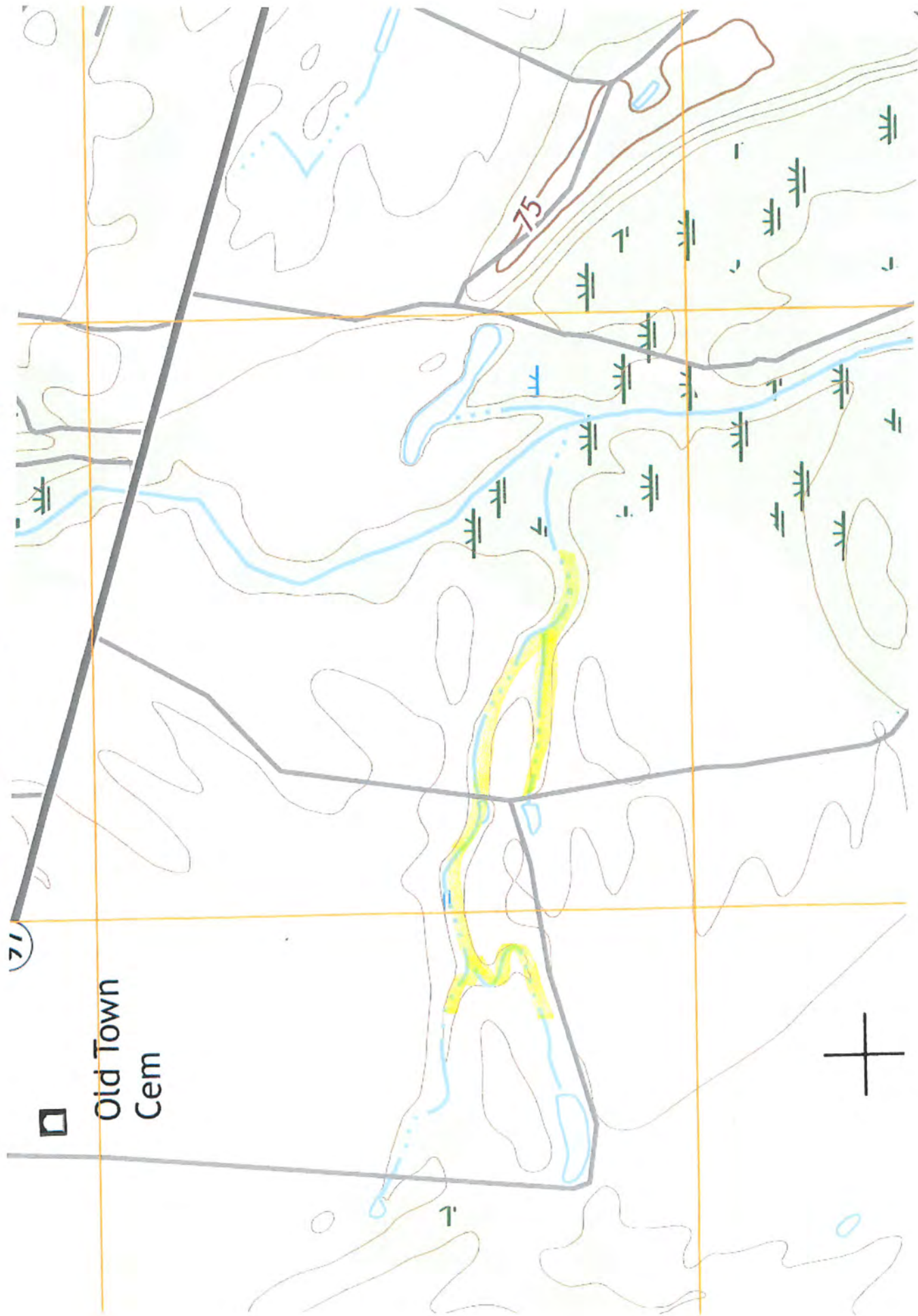


Existing Conditions
 Boseman Buffer Mitigation Site
 Tar-Pamlico 03020101
 Edgemcombe County, North Carolina
 January 2019
 2017 Aerial from NCOneMap

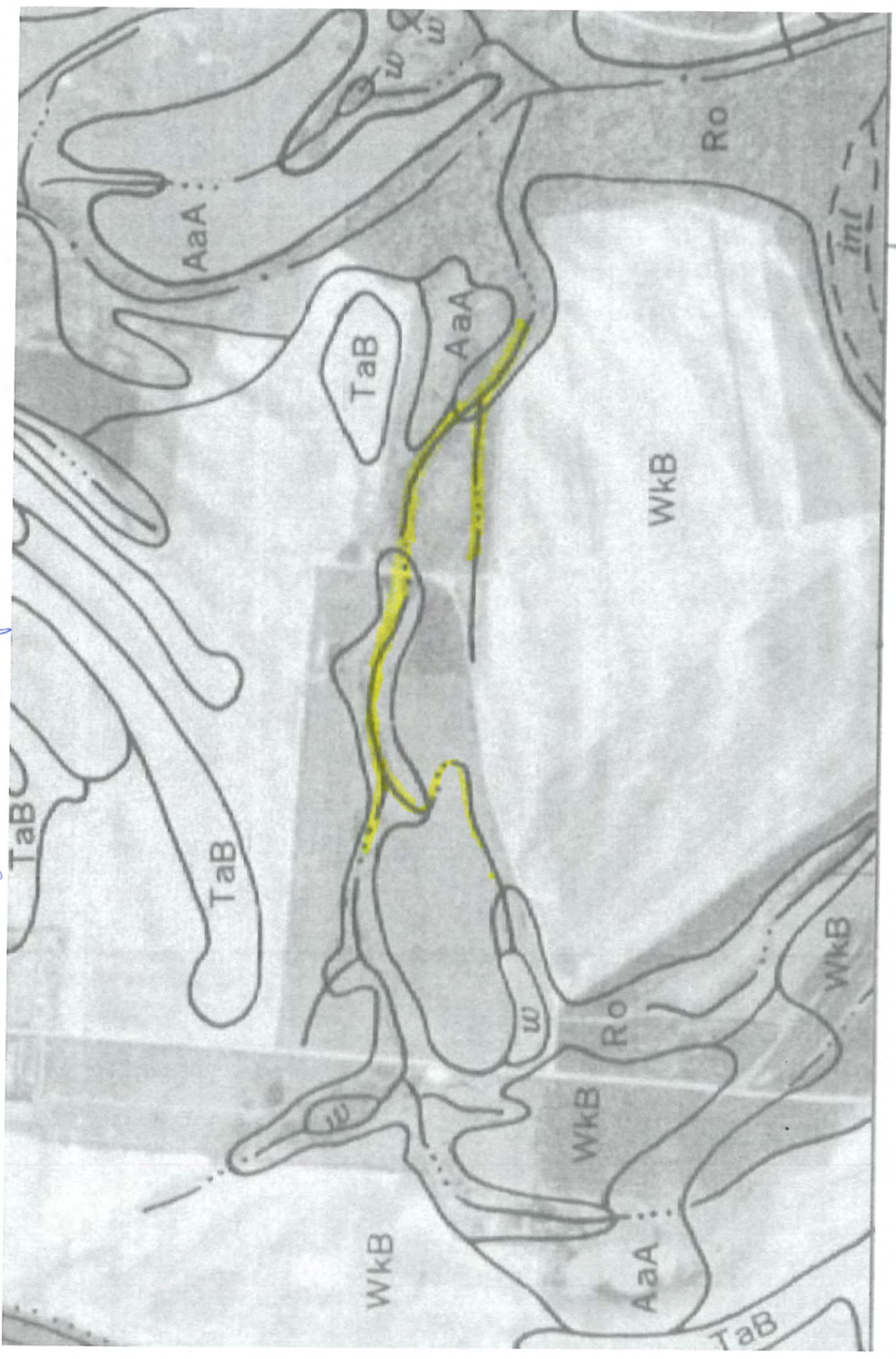


Figure 1B

GPS 6-21-11
USGS Great Edgemonte Co. Map



NRCS Edgcombe Co. Map



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

LINDA CULPEPPER
Director



NORTH CAROLINA
Environmental Quality

July 17, 2019

Ted Griffith
Eco Terra Partners, LLC
1117 Peachtree Walk NE, Suite 126
Atlanta, GA 30309
(via electronic mail: Ted@EcoTerra.com)

DWR# 2019-0800
Edgecombe County

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Boseman Site
Located near 8019-7621, NC 97, Battleboro, NC
Tar-Pamlico 03020101

Dear Mr. Griffith,

On June 7, 2019, Katie Merritt, with the Division of Water Resources (DWR), received a request from Eco Terra Partners, LLC (ETP) for an onsite mitigation determination near the above-referenced site (Site). The Site is located within the Tar-Pamlico River Basin in the 8-digit Hydrologic Unit Code 03020101. The Site is being proposed as part of a full-delivery nutrient offset and riparian buffer mitigation project for the Division of Mitigation Services (RFP #16-007711). Staff from the Division of Mitigation Services were also present onsite. At your request, Ms. Merritt performed an onsite assessment of riparian land uses adjacent to streams and channels onsite, which are shown on the attached map labeled "Figure 1B-Existing Conditions".

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.

<u>Feature</u>	<u>Classification onsite</u>	<u>¹Subject to Buffer Rule</u>	<u>Riparian Land uses adjacent to Feature (0-200')</u>	<u>Buffer Credit Viable</u>	<u>²Nutrient Offset Viable</u>	<u>⁵Mitigation Type Determination w/in riparian areas</u>
R1	Stream	Yes	Non-forested row crop fields with areas forested downstream @ confluence w/ R3	³ Yes	Yes (<i>non-forested ag fields only</i>)	Non-forested areas - Restoration Site per 15A NCAC 02B .0295 (n) Forested Areas - Preservation Site per 15A NCAC 02B .0295 (o)(5) <i>Drain tiles shall be removed to restore diffused flow</i>
R2A	Ephemeral	No	Non-forested row crop fields	⁴ Yes	Yes	Restoration Site per 15A NCAC 02B .0295 (o)(7)



<u>Feature</u>	<u>Classification onsite</u>	<u>¹Subject to Buffer Rule</u>	<u>Riparian Land uses adjacent to Feature (0-200')</u>	<u>Buffer Credit Viable</u>	<u>²Nutrient Offset Viable</u>	<u>⁵Mitigation Type Determination w/in riparian areas</u>
R2B	Stream	Yes	Non-forested row crop fields	Yes	Yes	Restoration Site per 15A NCAC 02B .0295 (n)
R3	Stream	Yes	Non-forested row crop fields	Yes	Yes	Restoration Site per 15A NCAC 02B .0295 (n)

¹Subjectivity calls for the features were determined by DWR in correspondence dated July 9, 2019 using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS .

² NC Division of Water Resources - Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment

³The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 0295 (o)(5) and 15A NCAC 0295 (o)(4). Site cannot be a Preservation Only site to comply with this rule.

⁴The area of the mitigation site on ephemeral channels shall comprise no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 02B .0295 (o)(7).

⁵All features proposed for buffer mitigation or nutrient offset, must have a conservation easement established that includes the tops of channel banks when being measured perpendicular and landward from the banks, even when no credit is viable within the 50' riparian buffer.

The maps attached to this letter were prepared by ETP and were initialed by Ms. Merritt on July 17, 2019.

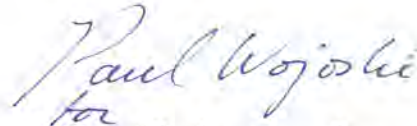
This letter does not constitute an approval of this site to generate mitigation credits. Pursuant to 15A NCAC 02B .0295, a mitigation proposal and a mitigation plan shall be submitted to DWR for written approval **prior** to conducting any mitigation activities in riparian areas and/or surface waters for buffer mitigation credit. Pursuant to 15A NCAC 02B .0240, a proposal regarding a proposed nutrient load-reducing measure for nutrient offset credit shall be submitted to DWR for approval prior to any mitigation activities in riparian areas and/or surface waters.

All vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and/or nutrient offset mitigation credits. For any areas depicted as not being viable for nutrient offset credit above, one could propose a different measure, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset in accordance with 15A NCAC 02B .0240.

Boseman Site
Eco Terra
July 17, 2019

This viability assessment will expire on July 17, 2021 or upon the submittal of an As-Built Report to the DWR, whichever comes first. **This letter should be provided in all stream and wetland, buffer and/or nutrient offset mitigation plans for this Site.**

Sincerely,

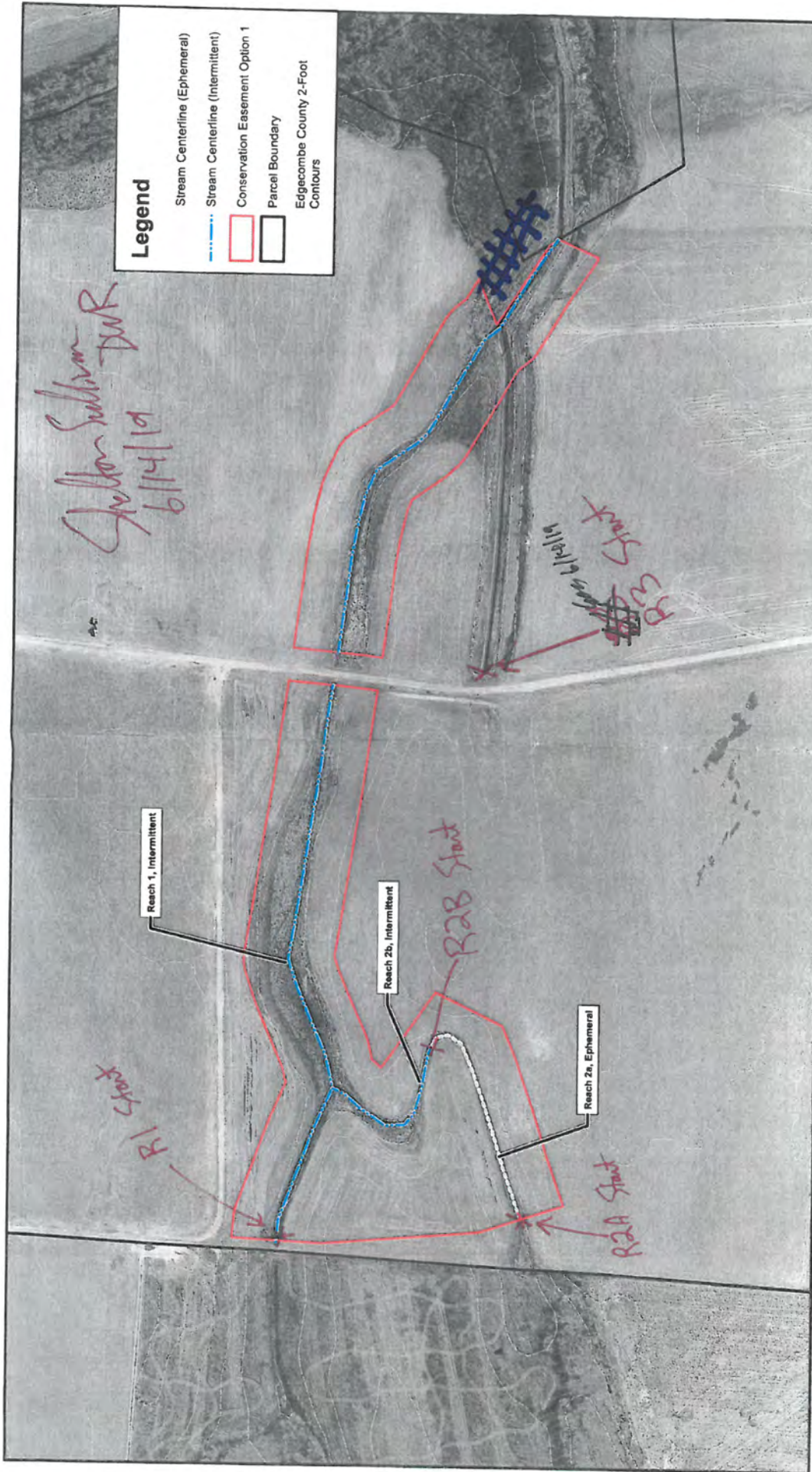


for
Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/km

Attachments: Figure 1B-Existing Conditions Map/Stream Determination

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



Legend

- Stream Centerline (Ephemeral)
- Stream Centerline (Intermittent)
- Conservation Easement Option 1
- Parcel Boundary
- Edgecombe County 2-Foot Contours

NC Computer for Geographic Information Systems

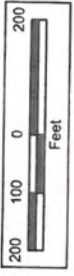


Figure 1B

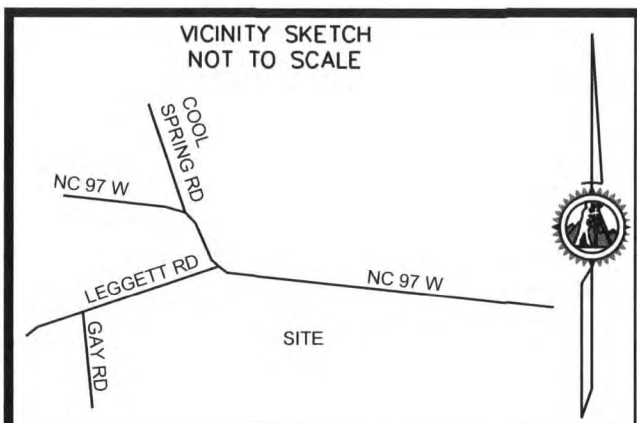
Existing Conditions
 Boseman Buffer Mitigation Site
 Tar-Pamlico 03020101
 Edgecombe County, North Carolina
 January 2019
 2017 Aerial from NCOneMap



6/14/19
 ### = Forested

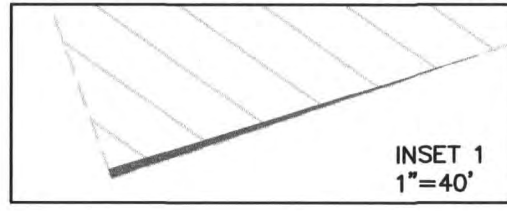
APPENDIX 3

AS-BUILT SURVEY

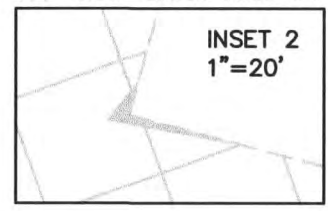


THIS MAP IS NOT FOR RECORDATION, SALES OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

101'-200' Credit Area UT 2 Reach 2a



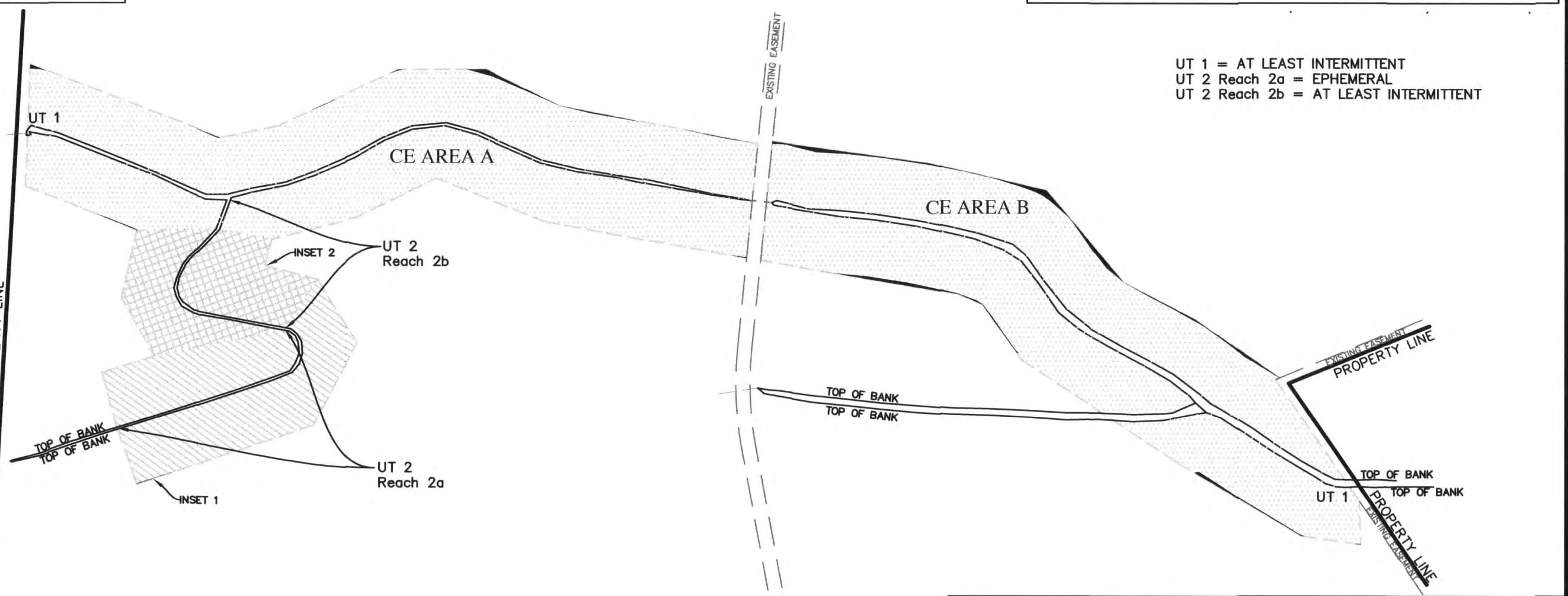
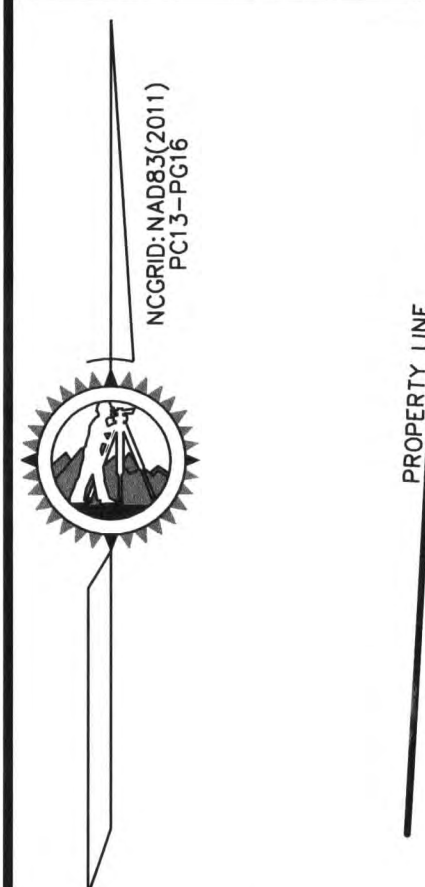
101'-200' Credit Area UT 2 Reach 2b



	= 0'-100' Credit Area UT 1 = 484072 SF/11.1127 AC
	= 101'-200' Credit Area UT 1 = 6496 SF/0.1491 AC
	= 0'-100' Credit Area UT 2 Reach 2a = 78631 SF/1.8051 AC
	= 101'-200' Credit Area UT 2 Reach 2a = 82 SF/0.0019 AC
	= 0'-100' Credit Area UT 2 Reach 2b = 52641 SF/1.2084 AC
	= 101'-200' Credit Area UT 2 Reach 2b = 12 SF/0.0003 AC
PLANTED AREA= 621933 SF/ 14.2776 AC	
TOTAL CE AREA (INCLUDING STREAM)= 649889 SF/ 14.9194 AC	

LINE TYPE LEGEND

	BOUNDARY
	TOP OF STREAM BANK
	CONSERVATION EASE.
	EXISTING EASE.



UT 1 = AT LEAST INTERMITTENT
 UT 2 Reach 2a = EPHEMERAL
 UT 2 Reach 2b = AT LEAST INTERMITTENT

- NOTES:
- 1- ALL DISTANCES ARE HORIZONTAL GROUND IN US SURVEY FEET.
 - 2- METHOD OF COMPUTATION: AREA IS CALCULATED WITH CAD SOFTWARE METHODS.
 - 3- BOUNDARY SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. THERE ARE NO KNOWN CHANGES IN RIGHT OF WAY & THERE MAY BE EASEMENTS AND ENCUMBRANCES, EITHER RECORDED OR UNRECORDED, NOT SHOWN HEREON.
 - 4- THE PURPOSE OF THIS PLAT IS TO SHOW THE AS-BUILT AREAS FOR RIPARIAN BUFFER CREDITS WITHIN THE 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.
 - 5- REFERENCE CONSERVATION EASEMENT PLAT RECORDED IN PC 13 PG 16 AT EDGEcombe COUNTY REGISTER OF DEEDS.

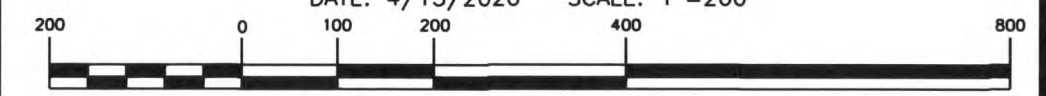
I, TIMOTHY P. MURRAY, AS DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, CERTIFY THAT THIS BUFFER MAP WAS DRAWN UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, THAT THE EASEMENT BOUNDARY IS BASED ON PLAT CABINET 13 PAGE 16 RECORDED IN EDGEcombe COUNTY REGISTER OF DEEDS OFFICE, AND THAT THE BUFFER AREAS SHOWN ARE CALCULATED FROM AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON, WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 30th DAY OF APRIL, 2020.

Timothy P. Murray
 Timothy P. Murray, PLS L-4833



AS-BUILT SURVEY

BOSEMAN BUFFER MITIGATION SITE DMS # 100119
 PREPARED FOR
ECO TERRA PARTNERS, LLC
 TAR-PAMLICO RIVER BASIN HUC 03020101
 NO. 7 TOWNSHIP, EDGEcombe COUNTY, NC
 DATE: 4/15/2020 SCALE: 1"=200'



BAR GRAPH 1 inch = 200ft.
 BOSEMAN-NC-97-W-ASBUILT.DWG

TERRESTRIAL SURVEYING PC
 Professional Land Surveying / License C-3903
 P.O. Box 91041 / Raleigh North Carolina 27675
 p: 919.219.4278 / e: info@TerrestrialSurveying.com

APPENDIX 4

SITE PHOTOGRAPHS

Photo-points



Pp 1



Pp 2



Pp 3



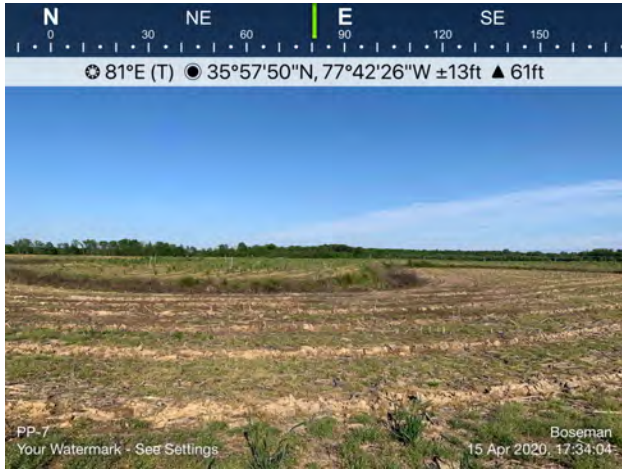
Pp 4



Pp 5



Pp 6



Pp 7



Pp 8



Pp 9



Pp 10



Pp 11



Pp 12

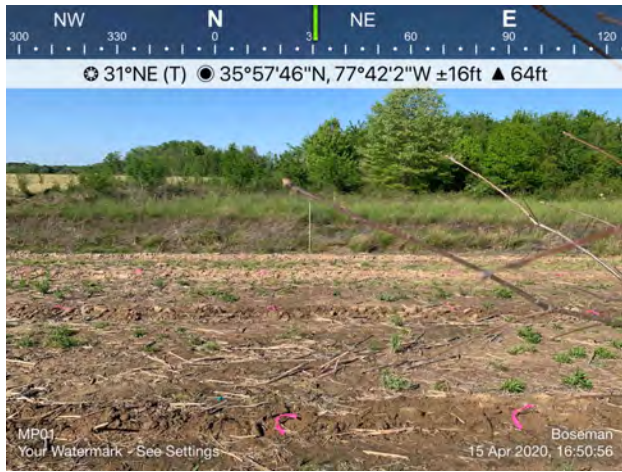
APPENDIX 5

VEGETATION PLOT DATA
VEGETATION PLOT PHOTOGRAPHS

Table 3: Planted and Total Stems
 Boseman Buffer Mitigation Site
 DMS ID No. 100119
 DWR Project No. 2019-0800
 Monitoring Year 0 – 2020

Current Plot Data (MY-0 2020) - Total Stems														
Scientific Name	Common Name	Species Type	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	VP11	VP12
<i>Quercus laurifolia</i>	laurel oak	Tree	1	4	2			2	1		5	2	2	1
<i>Quercus lyrata</i>	overcup oak	Tree				9	5		5	4			1	
<i>Quercus nigra</i>	water oak	Tree	5	2	10	1	2	3	1		3	5	2	2
<i>Quercus phellos</i>	willow oak	Tree	10	2	4	2		9	7	6	3	9	9	12
<i>Fraxinus pennsylvanica</i>	green ash	Tree								2	2			
<i>Cornus amomum</i>	silky dogwood	Tree		12		1	1		4	6				
<i>Cephalanthus occidentalis</i>	butonbush	Shrub												
<i>Nyssa sylvatica var. biflora</i>	swamp blackgum	Tree					11							
		Stem Count	16	20	16	13	19	14	18	18	13	16	14	15
		Species #	3	4	3	4	4	3	5	4	4	3	4	3
		Vigor	3.6	3.8	3.8	3.8	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.6
		Stems/ac	648	810	648	526	769	567	729	729	526	648	567	607
Annual Summary														
<i>Quercus laurifolia</i>	laurel oak	Tree	Total			Exceeds criteria (260 stems/ac) by 10%								
<i>Quercus lyrata</i>	overcup oak	Tree	24			Exceeds criteria (260 stems/ac), but by less than 10%								
<i>Quercus nigra</i>	water oak	Tree	36			Fails to meet criteria (260 stems/ac), by less than 10%								
<i>Quercus phellos</i>	willow oak	Tree	73			Fails to meet criteria (260 stems/ac) by more than 10%								
<i>Fraxinus pennsylvanica</i>	green ash	Tree	4			Plot Size (ares/ac): 1 / 0.0247								
<i>Cornus amomum</i>	silky dogwood	Tree	24											
<i>Cephalanthus occidentalis</i>	butonbush	Shrub	0											
<i>Nyssa sylvatica var. biflora</i>	swamp blackgum	Tree	11											
		Total Stems	192											
		Species #	8											
		Avg Vigor	3.8											
		Total Stems/ac	648											

Vegetation Plot Photos



Plot 1



Plot 2



Plot 3



Plot 4



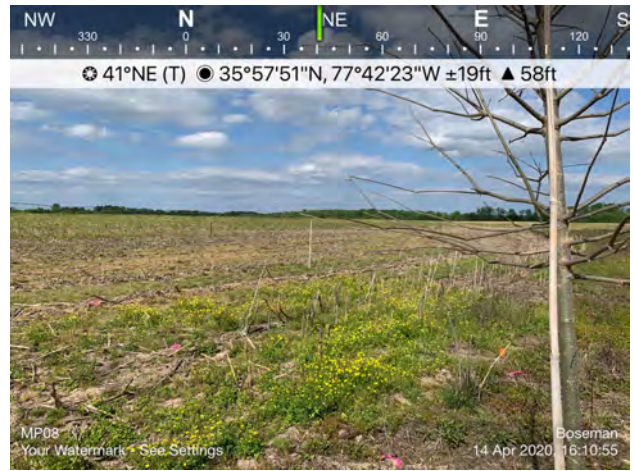
Plot 5



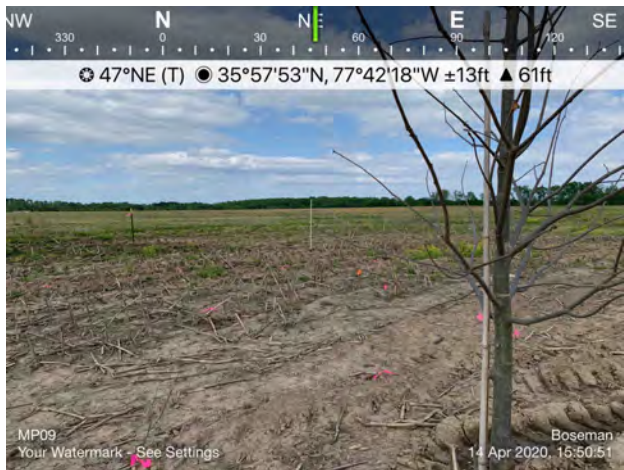
Plot 6



Plot 7



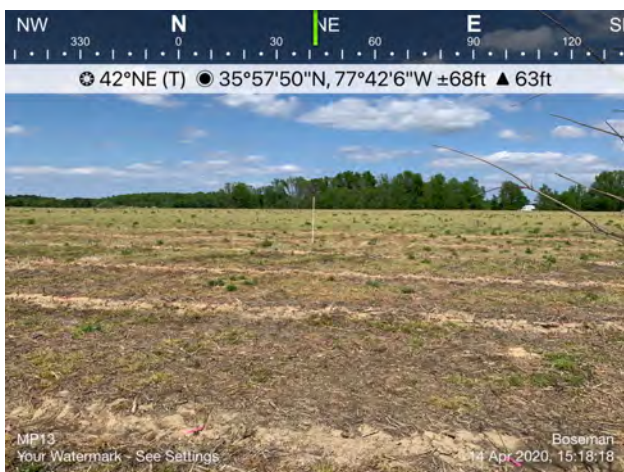
Plot 8



Plot 9



Plot 10



Plot 11



Plot 12