

# Neville Farms Buffer and Nutrient Offset Bank Parcel Development Package

(Revised to Reflect Project Phasing)

Jordan Lake Nutrient Strategy - Upper New Hope Subwatershed

Orange County, NC

DWR# 2015-0636



June 1st, 2016

Prepared by:  
Watershed Investments NC, LLC  
1630 Weatherford Circle  
Raleigh, NC 27604  
Phone: 919.533.9195



# Contents

LIST OF ATTACHMENTS .....	ii
<b>1.0 Introduction .....</b>	<b>1</b>
1.1 Bank Sponsor.....	1
1.2 Project Location and Description.....	1
1.3 Directions to the Site.....	1
Tract 1 (Gambill Property): .....	1
Tract 2 (McGee Property): .....	1
<b>2.0 PROJECT SITE DESCRIPTION .....</b>	<b>1</b>
2.1 Land Use.....	1
2.2 Watershed Setting .....	2
2.2 Surface Hydrology and Watershed Area .....	2
2.3 Surface Water Determination for the Site.....	2
2.4 Floodplain Assessment.....	2
2.5 Geology & Soils .....	3
2.6 Cultural Constraints .....	4
2.8 Rare, Threatened and Endangered Species .....	4
2.9 Existing/Historic Vegetation.....	5
<b>3.0 PROJECT PLANTING PLAN.....</b>	<b>5</b>
3.1 Riparian Restoration Activities .....	5
3.2 Planting Plan.....	6
3.3 Riparian Preservation Activities.....	6
3.4 Site Preparation and Invasive Species Control.....	6
3.5 Easement Boundaries.....	7
<b>4.0 PROJECT MONITORING AND PERFORMANCE STANDARDS .....</b>	<b>7</b>
4.1 Project Monitoring Plan .....	7
4.2 Adaptive Management Plan.....	8
4.3 Long Term Management Plan .....	8
<b>5.0 FINANCIAL ASSURANCE.....</b>	<b>8</b>
<b>6.0 MITIGATION POTENTIAL .....</b>	<b>13</b>
<b>7.0 REFERENCES:.....</b>	<b>17</b>

## LIST OF ATTACHMENTS

### Attachment A. Supporting Figures

Figure 1. USGS Topographic Map

Figure 2. Project Site Map

Figure 3. Watershed Setting

Figure 4. Soils Map

Figure 5. Historic Use

Figure 6-A. Tract 1/Phase 1 Tract Mitigation Area

Figure 6-B. Tract 2/Phase 2 Tract Mitigation Area

### Attachment B. Orange County Stream Determination

### Attachment C. Orange County Floodplain and Project Review

### Attachment D. State Historic Preservation Office Review

### Attachment E. Natural Heritage Program Review

### Attachment F. Division of Water Resource Project Viability Letter

### Attachment G. Division of Water Resource Financial Assurance Guidance Memo

### Attachment H. Division of Water Resource Nutrient Credit Calculation for Phase 2

### Attachment I. Delivery Factor determination for the Site

### Attachment J. Site Photos

This revised Neville Farms Bank Parcel Development Package (BPDP) is being submitted to allow for the development of the project in two phases. The original BPDP, submitted to the Division on August 18<sup>th</sup>, 2015, did not reflect phased development of the site. After revisions, that plan was placed on public notice January 13<sup>th</sup>, 2016 and approved by the Division on January 29<sup>th</sup>, 2016.

## 1.0 Introduction

As described in this plan, the Neville Farms Bank Parcel (Site) presents approximately 5.1 and 1.2 acres of riparian restoration and preservation, respectively, for a total of 6.3 acres of permanent conservation easements in Orange County, North Carolina. The Site is comprised of two separate tracts owned by two different land owners. The Site will be mitigated in two phases. Phase 1 is comprised of Tract I and is approximately 4.5 acres and Phase 2 is comprised of Tract 2 and is approximately 1.8 acres. Each phase will have its own credit release schedule for milestones met in accordance with the Neville Farms Mitigation Banking Instrument (MBI). Details of the phasing of the Site are provided in Sections 3.0 and 6.0.

The purpose of this project is to generate Jordan Lake riparian buffer restoration and preservation mitigation credits as well as nutrient offset credits. The Neville Farms Bank Parcel is included in the Neville Farms Mitigation Banking Instrument (MBI) for Riparian Buffer Mitigation and Nutrient Offset Credits signed between Watershed Investments NC, LLC and the NC Division of Water Resources (DWR) and effective on January 29<sup>th</sup>, 2016. This MBI is in accordance with 15A NCAC 02B .0295 (Temporary Consolidated Buffer Mitigation Rule, effective October 24, 2014) and 15A NCAC 02B .0240 (Nutrient Offset Payments Rule). The site shall be planned and designed encompassing land along Neville Creek, a tributary to University Lake south of Chapel Hill in Orange County North Carolina. For the purposes of this Bank Parcel Development Package (BPDP) the project Site is divided into the following two tracts:

- Tract 1 – Main project area on the north side of Neville Creek and accessible from Old Greensboro Highway.
- Tract 2 – Area south of Neville Creek and accessible from Stansbury Road.

Though the properties are adjacent, the division of the site is necessary based on land use, land planning, project crediting, and for more clear referencing within this document.

The purpose of both rural tracts is to establish forest adjacent to surface water features to reduce nutrients that flow into Neville Creek, University Lake, and ultimately, Jordan Lake. The project will have ancillary benefits that include reducing sediment runoff, reducing nutrients to streams through agricultural runoff, and thus, improving aquatic and terrestrial habitat. Any nutrient offset or riparian buffer mitigation generated from this Bank Parcel would be available to offset impacts from development, both existing and proposed, within the Upper New Hope Subwatershed of Jordan Lake, as verified by DWR staff onsite and in their letter dated April 6, 2015 (Attachment F). All mitigation shall be provided in compliance with 15A NCAC 02B .0295 (Temporary Consolidated Buffer Mitigation Rule, effective October 24, 2014) and 15A NCAC 02B .0240 (Nutrient Offset Payments Rule).

### 1.1 Bank Sponsor

The Site is proposed by Watershed Investments NC, LLC (WINC) Contact information for WINC is provided below.

Watershed Investments NC  
Attn: Mike Herrmann  
1630 Weatherford Circle  
Raleigh, NC 27604

Phone: 919-559-6264  
Email: [mherrmann@watershedinvestmentsnc.net](mailto:mherrmann@watershedinvestmentsnc.net)

## 1.2 Project Location and Description

**Attachment A-Figure 1** provides the USGS 1:24,000 Topo map showing the location for the Site, nearby roads, and the surrounding vicinity. Surface water drainage features at the Site feed into the Upper New Hope subwatershed of Jordan Lake. The Site is in the Cape Fear River Basin approximately 3 miles southwest of Chapel Hill, NC and one mile upstream of University Lake. More specifically, the Site's longitude and latitude in decimal degrees are -79.129 W and 35.892 N, respectively.

## 1.3 Directions to the Site

### Tract 1 (Gambill Property):

- i. From Raleigh, go West on I-40 and take the Hwy 54-West Exit to Chapel Hill
- ii. From Hwy-54, take the Jones Ferry Rd Exit, turn left to go South and proceed 0.9 miles.
- iii. Turn Right onto Old Greensboro Highway after passing University Lake. Proceed 1.8 miles. Site entrance is on the left through a driveway right-of-way at address 1426 Old Greensboro Road, Chapel Hill

### Tract 2 (McGee Property):

- i. Follow the above directions but instead of turning into the entrance for Tract 1, proceed another 0.5 miles and turn left onto Bowden Road.
- ii. Follow Bowden Road for 1.2 miles and turn Left onto Stansbury Road.
- iii. Property is at the end of the road. Address is 2201 Stansbury Rd, Chapel Hill, NC

## 2.0 PROJECT SITE DESCRIPTION

### 2.1 Land Use

**Attachment A-Figure 2** has a map of the Site. The Site consists of two separate tracts of land which will be mitigated in two phases, Phase 1 and Phase 2: **Attachment A-Figure 2** provides a 2013 aerial of the Site while **Attachment J** contains on the ground photos of the site. These two tracts are further described below:

1. **Tract 1** (Gambill Property) –Part of a 112 acre farm that includes livestock pasture, woodlots, and hay production. The proposed conservation easement is approximately 4.56 acres and is located on an area dedicated to hay production, which is classified as an agricultural practice. Annual nitrogen application rates for the property are approximately 100 lbs/ac. Portions of the riparian area currently have a narrow buffer of trees (10-15ft) immediately adjacent to the stream. The majority of the proposed reforestation is in the 100 year floodplain for Neville Creek. Runoff from the Site flows directly to Neville Creek. Approximately 4.4 acres of land are proposed for the generation of nutrient offset or buffer mitigation credit on this property (Note: As planned, a 0.20 acre portion of the conservation easement will extend beyond 200 ft. from the stream and not be eligible for nutrient or buffer mitigation). This tract will be constructed as Phase 1 of the total project site
2. **Tract 2** (McGee Property) – Part of a 9 acre single-family residential property with the pervious areas maintained as a fescue grassed lawn, which is not classified as an agriculture practice. The proposed conservation easement is approximately 1.8 acres. Portions of the proposed easement area currently have a narrow forested buffer of 10-15 ft. An area at the lower end of the project site has grown over in blackberry and honeysuckle and is planned to be cleared and reforested to help restore the native tree buffer. Surface water leaves the site directly through drainage to Neville Creek. This tract will be constructed as Phase 2 of the total project site.

## 2.2 Watershed Setting

**Attachment A-Figure 3** provides a map of the Site in context with its watershed setting. Neville Farms is in Jordan Lake’s Upper New Hope subwatershed. In addition, the Site is upstream of University Lake, a designated Water Supply Watershed. University Lake is used by the Orange County Water and Sewer Authority to provide water to municipalities that include Chapel Hill and Carrboro. **Table 2.2** provides summary of watershed information on the Site.

**Table 2.2.** Site Watershed Information.

Watershed Unit	Number
HUC 8	03030002
Jordan Subwatershed	Upper New Hope
WBD 12-Digit ID	030300020606
WBD Name	University Lake
NC DWR Watershed Classifications	Water Supply II High Quality Water Nutrient Sensitive Water

## 2.2 Surface Hydrology and Watershed Area

The surface water from the Site drains directly to Neville Creek at Assessment Unit (AU) 16-41-2-2-1-(1) which subsequently flows to University Lake and then Jordan Lake. As shown in **Table 2.3**, this AU was not rated in NC DWR’s 2014 Water Quality Assessment (NC DWR 2014).

**Table 2.3.** Neville Creek use classification for the project stream at the Site (Source: NC DWR 2014).

Assessment Unit	Surface Water Classification
16-41-2-2-1-(1)	Not Rated

## 2.3 Surface Water Determination for the Site

Orange County is delegated authority by the NC Environmental Management Commission to conduct determinations on whether drainage features in their jurisdiction are surface waters and subject to the buffer rules of the State found in 15A NCAC 02B .0267 Protection of Existing Riparian Buffers. Orange County Planning and Inspections assessed the Site and on February 9<sup>th</sup>, 2015 provided their determination that the surface water features on the site are subject to the Rule. **Attachment B** provides a copy of this determination.

## 2.4 Floodplain Assessment

The majority of the Site is in the floodplain. The project, however, will not affect areas of the stream and no actions associated with the project are expected to be in conflict with the County or State floodplain management requirements. Orange County’s floodplain administrator was notified of the project and requested to review the proposed project activities and determine if additional actions are needed for project approval.

**Attachment C** contains the Orange County Floodplain Manager’s determination that the project “will not require additional floodplain analysis as the reestablishment of vegetation is not deemed to create/impact

existing floodways.” Further County staff issue “approval for the project from both a zoning and flood permitting standpoint” (Orange County, 2015).

## 2.5 Geology & Soils

The Site is located in the Carolina Slate Belt Level 3 Ecoregion. According to Griffin et. al (2002), this region contains mineral rocks along with silty and silty clay soils. Also, low water yielding rock in the ecoregion lead to streams drying up in the summer months.

**Attachment A-Figure 4** provides a map of the soil at the Site. These soils data are summarized in **Table 2.4**. The predominant soils on the site are Congaree which are well drained loamy alluvium. These have a seasonally high water table and are prone to flooding. Other soils on the site (Appling, Georgeville, and Goldston) are deep, well drained, and have little organic matter. Ridges in the hay fields of Tract 1 contain sporadic areas of shallow rock along the steeper slope faces. The shallow rock is not expected to preclude the establishment of forest within the mitigation area and therefore will not be removed as part of the mitigation plan.

**Table 2.4.** Site Soil Types and Descriptions. (Source: USDA. 2015)

Soil Unit	Project Area (%)	Hydric Soil	Hydrologic Soil Group	Soil Description
ApC Appling sandy loam, 6 to 10 percent slopes	19.0%	No	B	Soils are found on slopes and ridges. Deep, well drained soils whose parent material consists of saprolite. These soils have little organic matter, are not flooded or ponded, and with no saturation within a depth of 72 inches.
Cp Congaree fine sandy loam, 0 to 2 percent slopes, frequently flooded	62.0%	No	C	Dominant soil for the site. The soil is found in flood plains with a parent material of loamy alluvium. Soils are moderate in organic matter, deep and moderately well drained. Soil is frequently flooded with a water table depth of 39 inches during winter months.
GeB Georgeville silt loam, 2 to 6 percent slopes	9.0%	No	B	Upland and interfluvial soil. The parent material consists of weathered argillite. The soils are deep and well drained. These soils have little organic matter, are not flooded or ponded, and have no saturation within a depth of 72 inches.
GeB Georgeville silt loam, 6 to 10 percent slopes	4.5%	No	B	This soil is found on hillslopes and ridges. The parent material consists of weathered argillite. The soils are deep and well drained. These soils have little organic matter, are not flooded or ponded, and have no saturation within a depth of 72 inches.
GIF Goldston channery silt loam, 15 to 45 percent slopes	5.5%	No	D	This soil is found on hillslopes and ridges. The parent material consists of weathered argillite. The soils may have bedrock within 10-20 inches of the surface but are otherwise well drained. These soils have little organic matter, are not flooded or ponded, and have no saturation within a depth of 72 inches.

## 2.6 Cultural Constraints

Cultural resources include historic and archeological resources located in or near the project parcel. The evaluation of cultural focused primarily on the presence of cultural resources as determined by the North Carolina State Historic Preservation Office (SHPO) and through field observations. The SHPO GIS Web Service database did not reveal any listed or potentially eligible historic or archeological resources in the proposed project area (NC SHPO 2015). No architectural structures or archeological artifacts have been observed or noted during surveys of the site. The State Historic Preservation Office (SHPO) has been notified of the proposed project and confirmed that their database contains no record of important cultural resources in the easement area. A copy of their review and response letter is provided in **Attachment D**.

## 2.8 Rare, Threatened and Endangered Species

Plants and animals with a federal classification of endangered (E) or threatened (T) are protected under provisions of Sections 7 and 9 of the Endangered Species Act of 1973, as amended. The US Fish and Wildlife Service (USFWS) database for Orange County, NC (updated 12/27/2012) lists the following one endangered species classified as Current and 2 as Historic (USFWS 2012):

- Dwarf wedgemussel (*Alasmidontabeterodon*) - Current;
- Michaux's sumac (*Rhusmichauxii*) – Historic;
- Smooth coneflower (*Echinacea laevigata*) - Historic;

The USFWS database also lists the Bald eagle (*Haliaeetus leucocephalus*) for the County. This species is protected under the Bald and Golden Eagle Protection Act (BGPA) and prohibits take of bald and golden eagles. No protected species or potential habitat for protected species was observed during preliminary Site evaluations.

In addition to the USFWS database, the NC Natural Heritage Program (NHP) was contacted to determine whether previously cataloged occurrences of protected species were mapped within one mile of the project site. A copy of the correspondence with the NHP is included in **Attachment E**. Results from NHP indicate the following two species have were observed in the year 1940 within a mile of the project area.

- Pursh's Wild-petunia (*Ruellia purshiana*) – A plant species with a status of Special Concern-Vulnerable (SC-V) observed in 1940. Its habitat is woodlands, mostly over mafic or calcareous rocks (NHP 2014).
- Coppery Emerald (*Somatochlora georgiana*) – A dragonfly *Somatochlora georgiana* lacked specific location information so it's observation has low accuracy but it has been observed in Orange County. This species prefers “small, sand, forest streams” as habitat (Paulson 2011).

Pursh's Wild-petunia's habitat is predominantly woodland's and on rocks. Existing woodlands and rocks will not be areas subject to planting activities with this project. The dragonfly species *Somatochlora georgiana* habitat is forested streams. Most of the Site's riparian areas have a narrow mature tree buffer. Planting activities will remain outside of that buffer with tree planting activities associated with this mitigation project expanding on the tree cover favored as habitat for this species. Based on initial site investigation and species habitat preferences, no impacts to state protected species are anticipated as a result of the proposed project.

## 2.9 Existing/Historic Vegetation

The majority of Tract 1 is currently planted in fescue and rye grass for hay production. Tract 2 is a mostly managed fescue lawn with a mix of other native and planted grasses. Most areas on both sides of Neville Creek have a narrow (10-15 ft) tree buffer adjacent to the stream that provides some buffer functions. This thin buffer area has a mix of native trees (Gum, Red Cedar, Ironwood, Tulip Poplar) along with some invasive shrubs (Chinese Privet, Autumn Olive). Historical imagery from 1993 confirms that this land use occurred prior to the existence of buffer protection rules for the area (See Attachment A-Figure5).

Table 2.5 provides a summary of the dominant woody vegetation found in the streamside buffer area. Based on feedback from the Division of Water Resources staff, those areas with existing tree cover will be considered as Buffer Preservation for mitigation purposes.

**Table 2.5.** Observed Native Tree and Shrub Species

Common Name	Scientific Name	Common Name	Scientific Name
Tulip Poplar	<i>Liriodendron tulipifera</i>	Ironwood	<i>Carpinus caroliniana</i>
Sweet Gum	<i>Liquidambar styraciflua</i>	Loblolly Pine	<i>Pinus taeda</i>
Red Cedar	<i>Juniperus virginiana</i>	Spicebush	<i>Lindera benzoin</i>
Box Elder	<i>Acer Negundo</i>	Coralberry	<i>Symphoricarpos arbutulata</i>

Invasive plants are present in the existing woodland buffer but are not predominant at the site. Table 2.6 lists invasive species observed at the site. Discussion on the control of existing invasive can be found in the Project Planting Plan in Section 3.

**Table 2.6.** Observed Invasive Species

Common Name	Scientific Name
Chinese Privet	<i>Ligustrum sinense</i>
Autumn Olive	<i>Elaeagnus umbellata</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>

## 3.0 PROJECT PLANTING PLAN

### 3.1 Riparian Restoration Activities

The riparian restoration will be conducted according to the temporary rule 15A NCAC 02B .0295. The restoration of plant communities within the Site will provide stabilization and improve water quality within the parcel. The protected buffer easements will be planted up to 200 feet back from the top of the stream bank, with appropriate native species observed in the surrounding forest and species known to occur in similar environmental settings. Fencing will not be installed as neither tract is used for pasture and livestock will not have access to the area adjacent to the established easement. The buffered channels will provide water quality and habitat functions within the Nutrient Sensitive Waters of Jordan Lake.

Some areas of the easement may require maintenance to prevent the establishment of invasive and/or exotic species. Pre-planting treatment will be used to help remove these species limit the need for these maintenance activities.

### 3.2 Planting Plan

Revegetation of the Site will include planting 2,500 bare root trees and controlling invasive species growth. Site preparation and planting of bare root stems on both phases is anticipated to occur between December 2016 and March 2017. Phase 1 consists of Tract 1 and will be planted with 1,800 stems, while Phase 2, which consists of Tract 2, will be planted with 700 stems. To achieve a minimum stem density of 260 stems/acre after 5 years, planting density will be at least 436 stems/acre on 10foot x 10 foot spacing. Volunteer species at the Site may be considered by the Division to count toward meeting these performance standards. Recruitment of volunteer species in the floodplain is anticipated due to forests that exist upstream and on the stream bank.

An As-Built report/s will be submitted to DWR for both phases documenting the completion of Site construction. WINC reserves the right to submit one As-Built Report to document the completion of Site construction for both Phase 1 and Phase 2 if the construction of each phase begins and ends at the same time. Or, WINC must submit two separate As-Built Reports to document the completion of Site construction for Phase 1 and for completion of Site construction for Phase 2 if construction of the phases occurs at different times. All As-Built Reports shall reflect the Phase for which it is being submitted.

The Site consists predominantly of bottomlands which will be planted as Piedmont Alluvial Forest. When planting, at least four (4) species from **Table 3.1** will be selected for the site with no one species comprising more than 50% of the total planted stems. Planted stock will be high quality bare root plants approximately 24 inches in height. Seedlings will be hand-planted using KBC planting bars and will be pretreated with an endo/ ectomycorrhizal spore root treatment.

**Table 3.1.** Planned Tree Species for Phase 1 and Phase 2 Riparian Planting. (Note: Species availability may result in the substitution of regionally appropriate native species.)

Common Name	Scientific Name	Common Name	Scientific Name
Yellow Poplar	<i>Liriodendron tulipifera</i>	Swamp Chestnut Oak	<i>Quercus michauxii</i>
Eastern Redbud	<i>Cercis Canadensis</i>	Cherrybark Oak	<i>Quercus pagoda</i>
River Birch	<i>Betula nigra</i>	Sycamore	<i>Platanus occidentalis</i>
Green Ash	<i>Fraxinus pennsylvanica</i>		

### 3.3 Riparian Preservation Activities

A narrow fringe of mature trees exists throughout the site along portions within the Neville Creek riparian buffer. The riparian buffer, as defined in 15A NCAC 02B .0267, extends a maximum distance of 50 feet from the top of stream bank. The preservation area was reviewed by the Division of Water Resources and determined eligible for Buffer Preservation (see **Attachment F**). Preservation areas will be included in the conservation easement and invasive species populations that threaten the integrity of the native hardwood community will be controlled. There will be no planting in these areas.

### 3.4 Site Preparation and Invasive Species Control

Soil conditions in floodplain areas, which are predominant at the site, are not compacted and not in need of disking to rip and loosen the soil. A focus of site preparation will be to treat and manage invasive species listed in **Table 2.6** in buffer preservation and restoration areas. Invasive species management of existing woody invasive plants within the woodland buffer will take place during the first year post planting. Larger invasive shrubs may be treated as a cut stump treatment while smaller vegetation is sprayed. Any applications will be completed by a NC licensed pesticide applicator.

In addition, within the planting areas of Tract 1 and Tract 2 herbaceous competition management will be conducted as necessary during the first full growing season. Herbaceous competition management will consist of mowing as well as targeted herbicide spraying of such species as blackberry, honeysuckle, and Johnson grass.

### **3.5 Easement Boundaries**

Two separate easements, one on Tract 1 and one on Tract 2, will be secured along with any access easements that may be necessary to provide permanent access to the conservation easement areas. Easement boundaries will be identified in the field to ensure clear distinction between the Site and adjacent properties. Boundaries may be identified by marker, bollard, post, tree- blazing, or other means as allowed by site conditions and/ or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/ or replaced on an as needed basis. The easement boundaries will be checked annually as part of monitoring activities with the status of the boundaries reported in annual monitoring reports.

## **4.0 PROJECT MONITORING AND PERFORMANCE STANDARDS**

Pursuant to criteria found in the Temporary Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and Neville Farms Mitigation Banking Instrument (MBI), the measures of vegetative success for the Site will be the survival of at least 260 planted trees per acre at the end of Year 5 based on monitoring data compiled for the site and site visits by the DWR. Natural recruits will not count towards annual achievement of performance standards; however they may be taken into account during review by the NC DWR.

Invasive and noxious species will be monitored and controlled so that none become dominant or alter the desired community structure of the site.

### **4.1 Project Monitoring Plan**

Riparian vegetation monitoring for Phase 1 and Phase 2 will be based on the CVS-EEP Protocol for Recording Vegetation Level 2 Plot Sampling Only Version 4.2. Annual vegetation monitoring will occur each year during the fall season with the first year for each Phase occurring at least 5 months after initial planting of the Tract/s. Vegetation monitoring plots will be a minimum of 0.02 acres in size and cover between 2% and 2.5% of the planted area. Accordingly, four (4) permanent vegetative plots will be used to monitor Phase 1 and two (2) permanent vegetative plots will be used to monitor Phase 2. A reference photo will be taken from the southwestern corners of each plot. All planted stems in the plots will be marked with flagging tape and recorded. Data collected will include: species, height, planting type (planted stem or volunteer), and grid location.

The Sponsor shall submit to NCDWR an annual monitoring report for each phase, no later than December 31 of each year for five consecutive years. Reports will document the success of the vegetation and any maintenance, supplemental planting, or encroachment within the easement areas. WINC reserves the right to submit one Monitoring Report each year for at least 5 years to document the above requirements for both Phase 1 and Phase 2, if the monitoring of each phase begins at the same time. Or, WINC must submit two separate Monitoring Reports each year for 5 years to document the above requirements for Phase 1 and for Phase 2 if the monitoring of each phase begins at different times. All Monitoring Reports shall reflect the Phase for which it is being submitted. . Monitoring bonds shall be renewed with confirmation of renewal provided to DWR with each annual monitoring report for each phase. DWR reserves the right to alter the credit release schedule if monitoring reports are submitted without proof of bond renewals.

## 4.2 Adaptive Management Plan

In the event that the Site, or a specific component of the Site, fails to achieve the defined performance standards, WINC will develop necessary adaptive management plans and/or implement appropriate remedial actions for the Site in coordination with the NC DWR. Remedial actions will be designed to achieve the performance standards specified previously, and will include identification of the causes of failure, remedial design approach, work schedule, and monitoring criteria that will take into account physical and climatic conditions.

## 4.3 Long Term Management Plan

WINC, acting as the Bank Sponsor, will establish a Conservation Easement for Tract 1 and Tract 2 separately. The Bank Sponsor will monitor and maintain Tract 1 and Tract 2 for a minimum of five years post planting, or until NC DWR approval has been given. Prior to the submission of the 4<sup>th</sup> year monitoring reports for each Tract, Tract 1 and Tract 2 will both be transferred to a responsible third party. The third party shall be responsible for periodic inspections of Tract 1 and Tract 2 to ensure that restrictions required in the Conservation Easements are upheld. Endowment funds required to uphold easement conditions shall be negotiated prior to site transfer to the responsible parties.

The Bank Sponsor will ensure that the Conservation Easements will allow for the implementation of the construction and monitoring period, which will be developed during the design phases and conducted by the Bank Sponsor. The Conservation Easements will allow for yearly monitoring and, if necessary, maintenance of the Site. These activities will be conducted in accordance with the terms and conditions of the Neville Farms MBI.

## 5.0. FINANCIAL ASSURANCE

The Sponsor shall provide financial assurance acceptable to the Division in the form of Performance Bonds sufficient to assure completion of all mitigation work, required reporting and monitoring, and any remedial work required. The amounts of the assurances are driven in part by the Site meeting requirements outlined by the Division in a memo released on 4-2-14 (See **Attachment G**). In the memo, the Division outlines criteria that allow for a site to seek performance bond amounts commensurate with project costs. To qualify, sites must meet all of the following criteria:

- Project is for riparian restoration by approved private mitigation bank;
- Proposed mitigation area is 10 acres or less in size;
- Project does not require fencing; and
- Project does not include stream and/or wetland mitigation.

The Neville Farms Bank Parcel (Site) meets all of the above criteria for both phases. As a result, performance bond amounts will be based, in part, on project specific costs. **Table 5.1** summarizes the construction, monitoring, and financial assurances amounts required for the Site. Detailed information on monitoring and construction costs for Phase 1 and Phase 2 can be found in **tables 5.2 through 5.5**. **Table 5.6** provides a list of the consultants and contractors who are planned to work on the Site.

To comply with the MBI, a performance bond will be acquired to cover 100% of construction costs or \$50,000, whichever is greater for the entire Site. For monitoring, the bond must cover the monitoring costs for the entire site, or, at a minimum, be in the amount of \$25,000. Alternatively, in lieu of posting the Construction Bond, the Sponsor (WINC) may elect to construct the project prior to the first credit release.

WINC will provide a performance bond/s to cover 100% of the costs associated with the construction of the Site. WINC reserves the right to acquire one performance bond to cover 100% of the costs of construction for both Phase 1 and Phase 2, or two performance bonds to cover 100% of the costs of Phase 1 construction and 100% of the Phase 2 construction, separately. Neither bond shall be less than \$50,000, but may expire upon DWR confirmation of the completion of Task 2 in the MBI for the applicable Phase and DWR approval of the applicable As-Built Report. All performance bonds shall specify which Phase/s of the Neville Farms Bank Parcel is/are being bonded.

WINC will provide a monitoring bond/s to cover all costs associated with the monitoring of the Site for 5 years. WINC reserves the right to acquire one monitoring bond to cover the costs of monitoring for both Phase 1 and Phase 2, or two monitoring bonds to cover the costs of Phase 1 monitoring and Phase 2 monitoring, separately. Neither bond shall be less than \$25,000. Each bond shall be renewed annually for at least 5 years, or until DWR approval of the Site’s success criteria. All monitoring bonds shall specify which Phase/s of the Neville Farms Bank Parcel is/are being bonded. Upon DWR approval, the monitoring bond/s may be lowered each year based on the adjusted cost to complete the monitoring.

Financial assurances shall be payable at the direction of the NC DWR to his designee or to a standby trust.

**Table 5.1.** Project Cost Summary and Associated Bond Requirement.

		<b>Project Cost</b>	<b>Bond Amount</b>
<b>Phase 1</b>	<b>Construction</b>	\$27,700	\$50,000 <sup>1</sup>
	<b>Monitoring</b>	\$32,000	\$32,000 <sup>2</sup>
<b>Phase 2</b>	<b>Construction</b>	\$17,550	\$50,000 <sup>1</sup>
	<b>Monitoring</b>	\$12,000	\$25,000 <sup>2</sup>

<sup>1</sup> WINC reserves the right to acquire one performance bond to cover 100% of the construction cost for both Phase 1 and Phase 2, or two performance bonds to cover 100% of the costs of Phase 1 construction and 100% of the Phase 2 construction, separately.

<sup>2</sup> WINC reserves the right to acquire one monitoring bond to cover the 100% of the monitoring costs for both Phase 1 and Phase 2, or two monitoring bonds to cover 100% the costs of Phase 1 monitoring and Phase 2 monitoring, separately.

**Table 5.2.** Phase 1 Planned Construction Costs

Activity	Quantity	Cost per Unit	Application/ Handling Fees	Attorney Fees Other Changes	Total Cost
Mitigation Banking Document	1	\$1,750	\$50	\$0	\$1,800
Bank Parcel Development Package Document	1	\$3,750	50	\$0	\$3,800
As-Built Report	1	\$3,000			\$3,000
Establishment of Vegetation Plots	4	\$350			\$1,400
GIS / Mapping	1	\$2450			\$2,450
Survey	1	\$2,500			\$2,500
Filing of Conservation Easement/Deed	1	\$550			\$550
Site Preparation	1	\$4,800			\$4,800
Herbicide	1	\$500			\$500
Plants/Planting	1800	\$3			\$5,400
Fertilizer	0				0
Planting Contractor	1	\$1,500			\$1,500
Equipment Costs		\$0			\$0
<b>Total Planned Construction Costs</b>					<b>\$27,700</b>

**Table 5.3.** Phase 1 Monitoring & Maintenance Costs

Monitoring Tasks	Quantity	Cost (per Unit)	Consultant Fees	Total Cost
Vegetation Plot Data Collection	4 plots	\$1,500	\$5,000	\$11,000
Data Analysis	5 years	\$600		\$3,000
Report Documentation	5 reports	\$1,800		\$6,000
<b>Total</b>				<b>\$20,000</b>
<b>Maintenance &amp; Adaptive Management Tasks (if needed)</b>				
Herbicide / Vegetation Control	4	\$1,500		\$6,000
Herbivory Control	2	\$1,000		\$2,000
Replanting	1	\$2,000		\$2,000
<b>Total</b>				<b>\$10,000</b>
<b>Stewardship</b>				
Inspections	10	\$200		\$2,000
<b>Total</b>				<b>\$2,000</b>
<b>Monitoring and Maintenance Costs Total</b>				<b>\$32,000</b>

**Table 5.4.** Phase 2 Planned Construction Costs

Activity	Quantity	Cost per Unit	Application/ Handling Fees	Attorney Fees Other Changes	Total Cost
Mitigation Banking Document	1	\$1000	\$50	\$0	\$1,050
Bank Parcel Development Package Document	1	\$3,750	50	\$0	\$3,800
As-Built Report	1	\$1,400			\$1,400
Establishment of Vegetation Plots	2	\$400			\$800
GIS / Mapping	1	\$1,100			\$1,100
Survey	1	\$2,000			\$2,000
Filing of Conservation Easement/Deed	1	\$550			\$550
Site Preparation	1	\$3,500			\$3,500
Herbicide	1	\$250			\$250
Plants/Planting	700	\$3			\$2,100
Fertilizer	0				0
Planting Contractor	1	\$1,000			\$1,000
Equipment Costs		\$0			\$0
<b>Total Planned Construction Costs</b>					<b>\$17,550</b>

**Table 5.5.** Phase 2 Monitoring & Maintenance Costs

Monitoring Tasks	Quantity	Cost (per Unit)	Consultant Fees	Total Cost
Vegetation Plot Data Collection	2 plots	\$1,500	\$2,000	\$5,000
Data Analysis	5 years	\$200		\$1,000
Report Documentation	5 reports	\$600		\$3,000
<b>Total</b>				<b>\$9,000</b>
<b>Maintenance &amp; Adaptive Management Tasks (if needed)</b>				
Herbicide / Vegetation Control	4	\$250		\$1000
Herbivory Control		\$0		\$0
Replanting	1	\$1,000		\$1000
<b>Total</b>				<b>\$2,000</b>
<b>Stewardship</b>				
Inspections	10	\$100		\$1,000
<b>Total</b>				<b>\$1,000</b>
<b>Monitoring and Maintenance Costs Total</b>				<b>\$12,000</b>

**Table 5.6.** Contractors/Consultants for completion, monitoring and construction of the Site.

<p><b>Site Prep and Planting Contractor</b>          Bruton Natural Systems          PO Box 1197          Fremont NC 27830          naturalsystems@embarqmail.com          919-242-6555</p>	<p><b>Surveying</b>          K2 Design Group          5688 US Hwy 70 East          Goldsboro, NC 27534          k2design@suddenlink.net          919-751-0075</p>
<p><b>Conservation Easement Preparation</b>          Harriss&amp; Marion, PLLC          3326 Durham-Chapel Hill Blvd          P.O Box 51009          Durham, NC 27717          joe@hmmattorneys.net          919-493-8421</p>	<p><b>Banking Documents and Reports Preparation</b>          Watershed Investments NC          1630 Weatherford Circle          Raleigh NC 27604          mherrmann@watershedinvestmentsnc.net          919-559-6264</p>
<p><b>Monitoring Services</b>          Axiom Environmental          218 Snow Avenue          Raleigh, NC 27603          919-215-1693          glewis@axiomenvironmental.org</p>	

## 6.0 MITIGATION POTENTIAL

As noted in the Neville Farms MBI, buffer credit determination is subject to the Temporary Buffer Rule 15A NCAC 02B .0295(h) and (i). Figures 6-A and 6-B identify the riparian areas and credit types sought for Phase 1 and Phase 2, respectively. Buffer credit will be generated from both Preservation and Restoration activities. Details of the planting and restoration activities planned for the Site are outlined in Section 3.0

In accordance with Rule 15A NCAC 02B .0295, the width of the buffer/nutrient credit generation area will begin at the most landward limit of the top of bank or the rooted herbaceous vegetation and extend landward to a maximum distance of 200 feet. Nutrient offsets will not be generated within the areas described as Preservation. Preservation areas meet the requirements described in .0295 (m)(2)(D) – Preservation of Buffers on Subject Streams. Restoration areas meet the requirements of .0295(i) – Riparian Restoration or Enhancement. Nutrient Offset credits sought are consistent with rules 15A NCAC 02B .0240 and .0273.

The Site will be constructed consistent with the Neville Farms MBI, but will be completed in two phases. Following approval of the revised BPDP, conservation easement surveys for Tract I and Tract 2 will be submitted to the Division for approval prior to being recorded with the Orange County Register of Deeds office. Final surveys of the mitigation areas on tracts 1 and 2 will also be conducted after construction has been completed and will be submitted to the Division for approval with both the Phase 1 and Phase 2 as-built reports.

**Tables 6.1 through 6.4** provide a summary of the Jordan Lake riparian buffer credits and nutrient offset credit calculations for phases 1 and 2 of the Site. The following credits are requested with the approval of the Neville Farms BPDP:

### **Phase 1 (Tract 1)**

- Riparian Buffer Preservation: 0.62 acres for a credit of 2,700.7 square feet (ft<sup>2</sup>)
- Nutrient Offset: 3.70 acres (7,143.38 lbs-N delivered and 420.34 lbs-P delivered)

### **Phase 2 (Tract 2)**

- Riparian Buffer Restoration: 1.20 acres for a credit of 51,400.8 square feet (ft<sup>2</sup>)
- Riparian Buffer Preservation: 0.64 acres for a credit of 2,787.8 square feet (ft<sup>2</sup>)

**Table 6.1. Phase 1 Neville Farms Buffer Credit Generation Summary**

<b>Buffer Zone</b>	<b>Mitigation Type</b>	<b>Ratio</b>	<b>Phase 1 Area (ac)</b>	<b>Credit Per Acre</b>	<b>Total Buffer Credit</b>
Zone A (0-50 ft)	Buffer Preservation	10:1	0.62	4,356	2,700.7
<b>Total Riparian Preservation for Buffer credit</b>			0.62	n/a	2,700.7

**Table 6.2. Phase 1 Neville Farms Nutrient Offset Credit Generation Summary**

<b>Buffer Zone</b>	<b>Mitigation Type</b>	<b>Phase 1 area (ac)</b>	<b>Generated Nutrient Offset Credit Yield (lb/30yr/ac)</b>		<b>Generated Offset Credit</b>		<b>Delivery Factor for Offsets</b>		<b>Delivered Offset Credit</b>	
			<b>N lbs/ac</b>	<b>P lbs/ac</b>	<b>N lbs</b>	<b>P lbs</b>	<b>%N</b>	<b>%P</b>	<b>N lbs</b>	<b>P lbs</b>
Zone A (0-50 ft)	Buffer Restoration	0.68	2,169.26	143.81	1,475.10	97.79	89	79	1,312.84	77.25
Zone B (51-100 ft)	Riparian Restoration	1.29			2798.35	185.51			2490.53	146.55
Zone C (101-200)	Riparian Restoration	1.73			3,752.82	248.79			3,340.01	196.54
<b>Total Riparian Restoration for Nutrient Offset Credit</b>		<b>3.70</b>			<b>8,026.27</b>	<b>532.09</b>			<b>7,143.38</b>	<b>420.34</b>

**Table 6.3. Phase 2 Neville Farms Buffer Credit Generation Summary**

Buffer Zone	Mitigation Type	Ratio	Phase 2 Area (ac)	Credit Per Acre	Total Buffer Credit
Zone A (0-50 ft)	Buffer Restoration	1:1	0.68	43,560	29,620.8
	Buffer Preservation	10:1	0.55	4,356	2,395.8
Zone B (51-100 ft)	Riparian Restoration	1:1	0.48	43,560	20,908.8
	Riparian Preservation	10:1	0.09	4,356	392.0
Zone C (101-200)	Riparian Restoration	1:1 & 50%	0.04	21,780	871.2
<b>Total Riparian Restoration for Buffer credit</b>			1.20	n/a	51,400.8
<b>Total Riparian Preservation for Buffer credit</b>			0.64	n/a	2,787.8

**Table 6.4. Phase 2 Neville Farms Nutrient Offset Credit Generation Summary**

Buffer Zone	Mitigation Type	Phase 2 area (ac)	Generated Nutrient Offset Credit Yield (lb/30yr/ac)		* Generated Offset Credit		Delivery Factor for Offsets		*Delivered Offset Credit	
			N	P	N lbs	P lbs	%N	%P	N lbs	P lbs
Zone A (0-50 ft)	Buffer Restoration	0.68	909.25	202.50	618.29	137.70	89	79	550.28	108.78
Zone B (51-100 ft)	Riparian Restoration	0.48			436.44	97.20			388.43	76.79
Zone C (101-200)	Riparian Restoration	0.04			36.37	8.10			32.37	6.40
<b>Total Riparian Restoration for Nutrient Offset Credit</b>		<b>1.20</b>			<b>1091.10</b>	<b>243.0</b>			<b>971.08</b>	<b>191.97</b>

\*Note: In the BPDP, WINC is requesting buffer mitigation from Phase 2 and is providing this information for supporting documentation in case a request is made to transfer credit from buffer to nutrient offset. Any transfer of credit from buffer to nutrient must be reviewed and approved by the Division prior to transfer.

To comply with the requirements of 15A NCAC 02B .0273(2)(d)(i), nutrient credit sales (nitrogen (N) and phosphorous (P)) will need to “account for differences in instream nutrient losses between the location of the reduction need and excess loading reduction in reaching the affected arm of Jordan Reservoir”. To accomplish this, delivery factors are applied to nutrient offsets generated at Neville Farms to calculate the nutrient pounds delivered to Jordan Lake. Nutrient offset credits, therefore, take into account nutrient deliveries to the lake. **Attachment I** provides the Division’s determination of delivery factors that apply to this Site. Neville Farms falls into Zone 9 for N and Zone 8 for P resulting in delivery factors of 89% and 79%, respectively.

As indicated in the Site’s MBI, credits generated from riparian buffer restoration activities can be converted and transferred from buffer credits to nutrient offset credits with Division approval and from nutrient offset credits to buffer credits. However, when converting from nutrient offsets to buffer, all applicable ratios and percentages of full credit will apply according to 15A NCAC 02B .0295.

As indicated in the Neville Farms MBI, Tract 2, which will be constructed in Phase 2, requires differing methods to develop available nutrient credits than Tract 1. At the Division’s direction, WINC used the Jordan-Falls Stormwater Accounting Tool (JFSAT) to calculate nutrient offsets for Tract 2. Based on the application of the JFSAT, the generated nutrient offset credits available for land conversion of 1.20 acres from residential managed turf to riparian forest and reduction of the runoff from approximately 30 acres of land draining to Tract 2 are 1,091.10 lbs N and 243.00lbs P. With application of the delivery factor 89% for nitrogen and 79% for phosphorous, the delivered nutrient offset credits available for 1.20 acres riparian restoration on Tract 2 are 971.08 N lbs and 191.97 P lbs. **Attachment H** provides a summary of the Division’s approval of Tract 2’s credit calculation along with a summary of the methods used in the calculation.

Neville Farms’ Nutrient Offset and Riparian Buffer credits will not be debited within the same area (not stacked). The Neville Farms Bank will service impacts within the Upper New Hope Subwatershed of Jordan Lake.

## 7.0 REFERENCES:

- Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R., and MacPherson, T.F., 2002, Ecoregions of North Carolina, U.S. Environmental Protection Agency, Corvallis, OR.
- NC Natural Heritage Program. 2014. NC Natural Heritage Program List of Rare Plant Species of North Carolina. Online at [http://portal.ncdenr.org/c/document\\_library/get\\_file?uuid=4eaa9f2-e30b-4c19-809b-fcb12e0daff1&groupId=61587](http://portal.ncdenr.org/c/document_library/get_file?uuid=4eaa9f2-e30b-4c19-809b-fcb12e0daff1&groupId=61587). Accessed 4/24/15.
- NC State Historic Preservation Office. 2015. HPOWEB GIS Service. Online at <http://gis.ncdcr.gov/hpoweb/> (Accessed 4/7/15)
- NC Division of Water Resources. 2014. 2014 NC Water Quality Assessment for 305(b). Online at: <http://portal.ncdenr.org/web/wq/ps/mtu/assessment>.
- NC Division of Water Resources. 2015. Site Viability Response Letter. 4/6/15.
- Orange County, NC. 2015. Orange County Flood Determination Response Letter. 4/9/2015.
- Paulson, D. 2011. Dragonflies and Damselflies of the East. Princeton University Press. 544pg.
- Shafale, M. P., and Weakley, A.S. 1990. Classification of the natural communities of North Carolina, third approximation. NC Department of Environment and Natural Resources, Natural Heritage Program. Raleigh, NC.
- U.S. Department of Agriculture. 2015. Web Soil Survey Report. Accessed online 3/15/15 <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>
- U.S. Fish and Wildlife Service. 2012. Endangered and Threatened Species and Species of Concern by County for North Carolina. Online at <http://www.fws.gov/raleigh/species/cntylist/orange.html> (Accessed 4/8/15).

# ATTACHMENTS

# ATTACHMENT A. Supporting Figures

**Figure 1.** USGS 1:24,000 Topo Map & Site Location

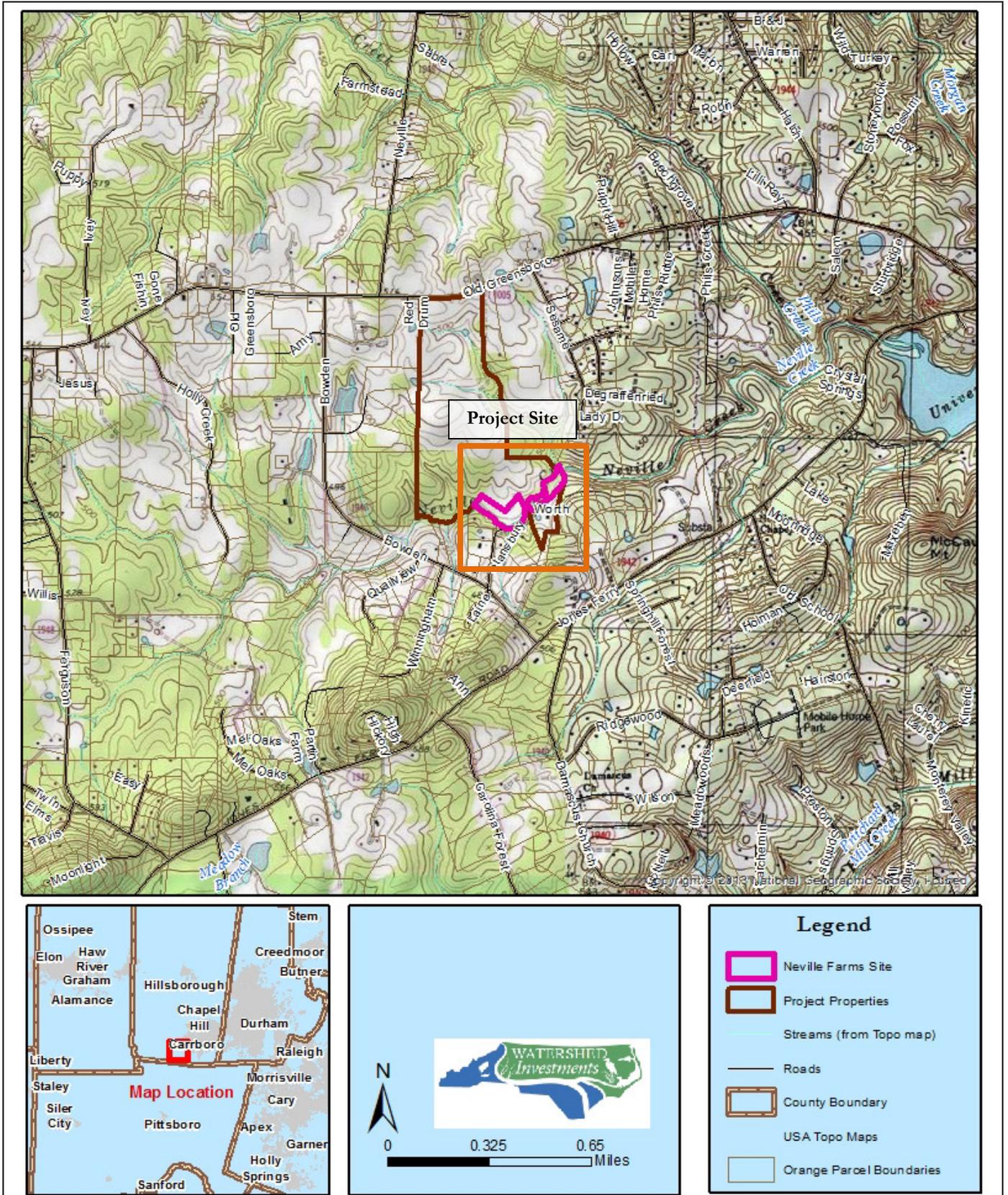


Figure 2. Project Site Map. (See Attachment I for photos associated with photo points.)

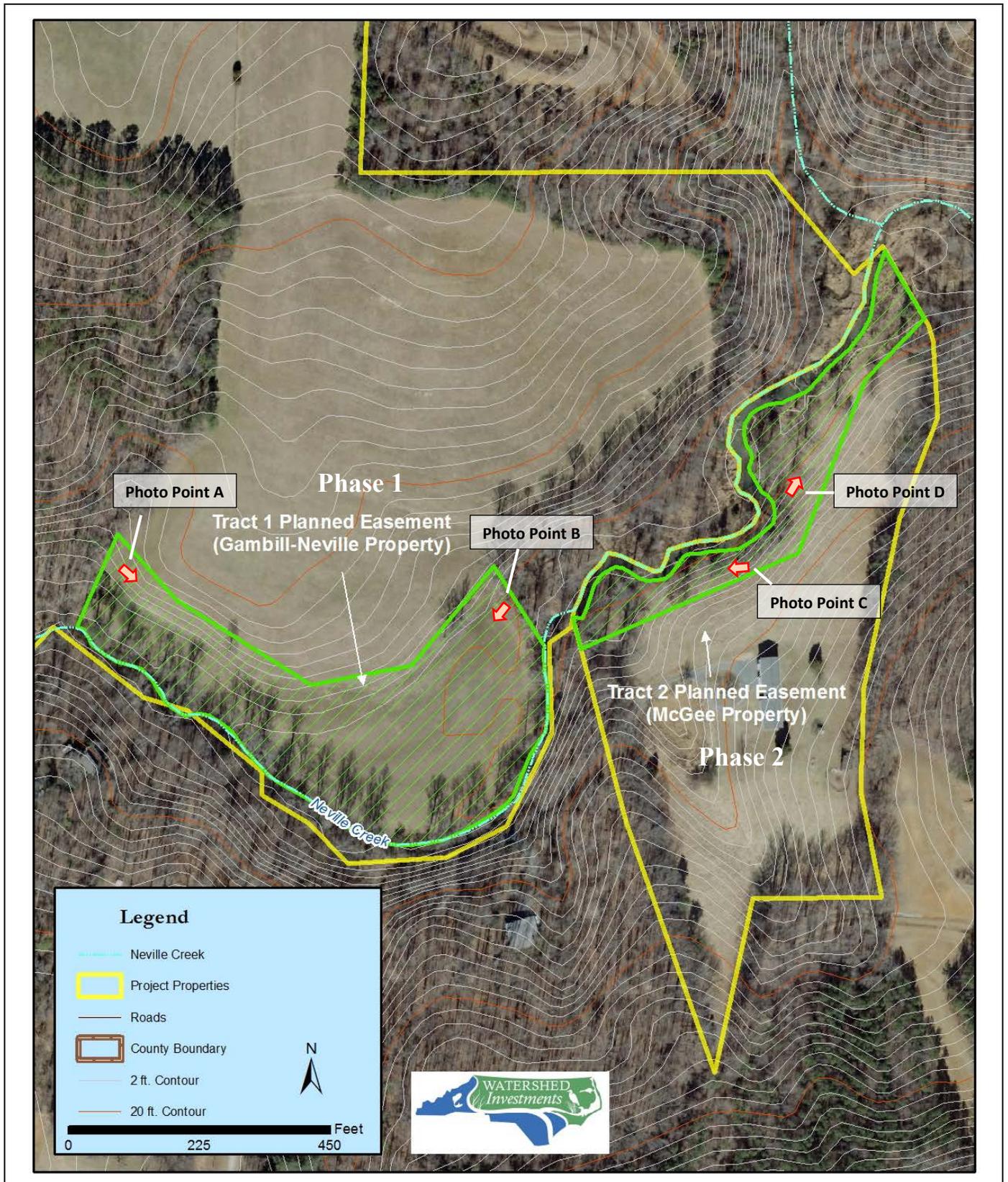
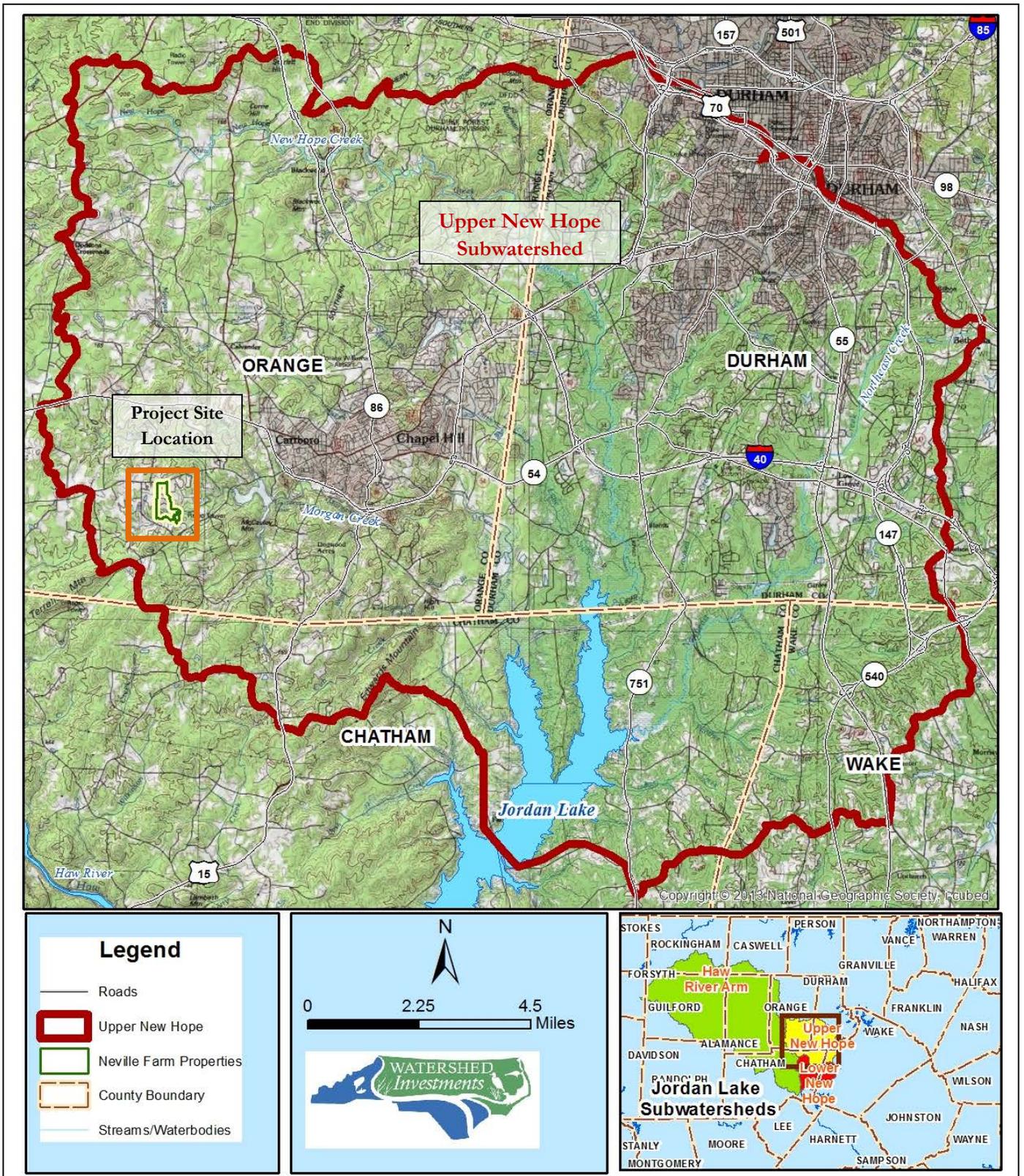


Figure 3. Neville Farm Watershed Setting/Service Area.



**Figure 4.** Neville Farm SSURGO Soils Map (Source: USDA 2015)

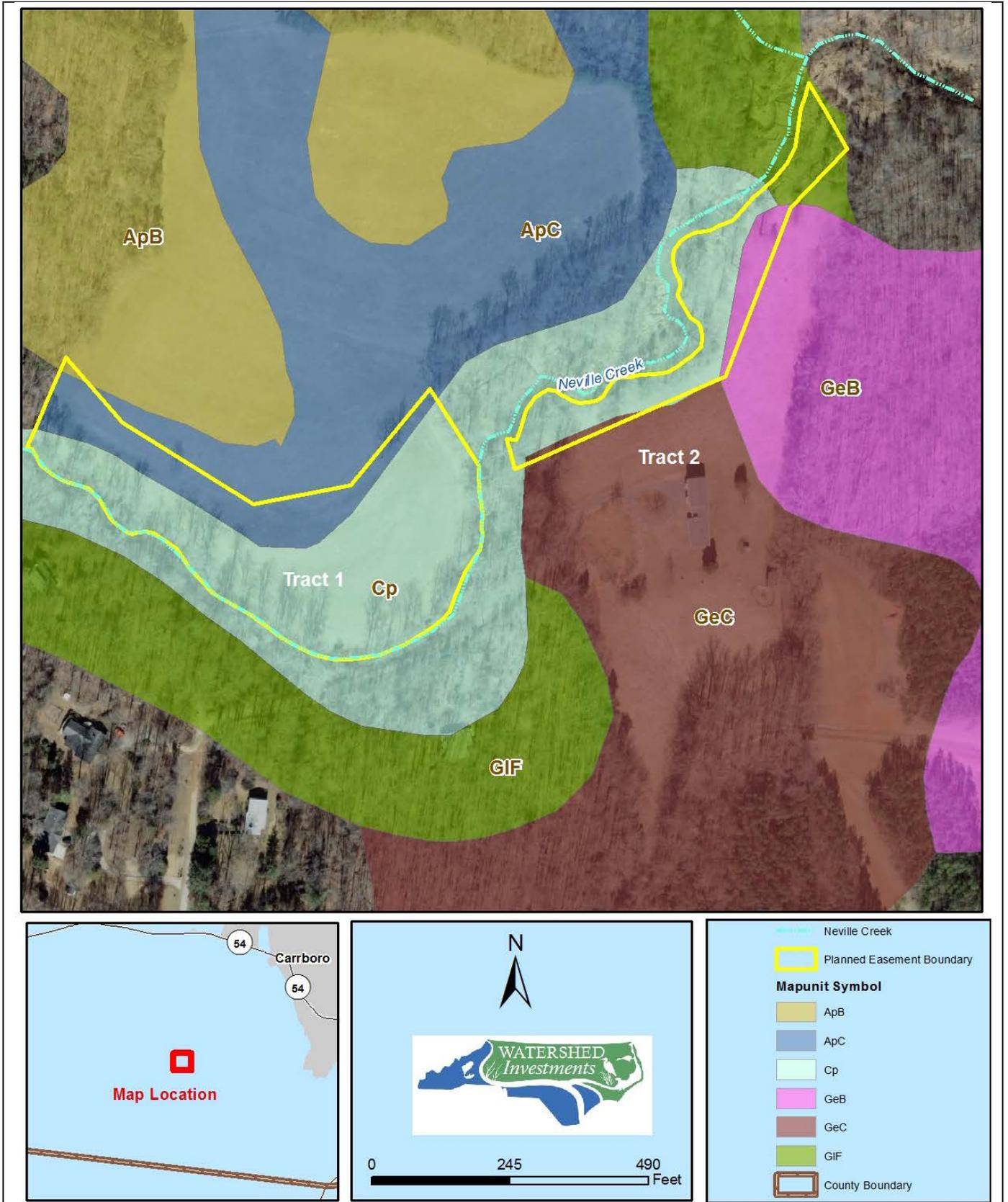


Figure 5. Historic Land Use – 1993 Aerial Imagery.

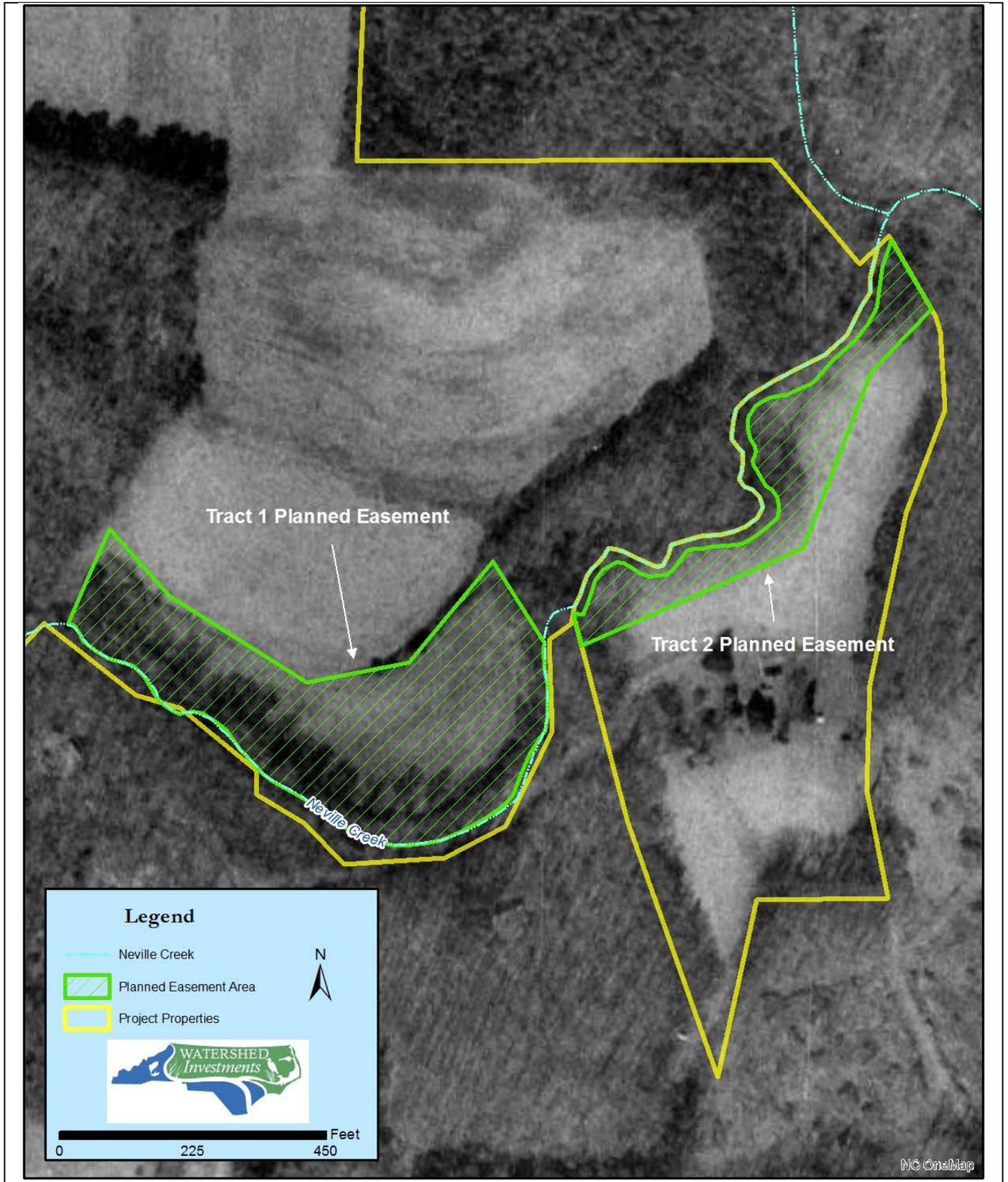


Figure 6-A. Neville Farms Phase 1 Buffer Mitigation and Nutrient Offset Riparian Zones.

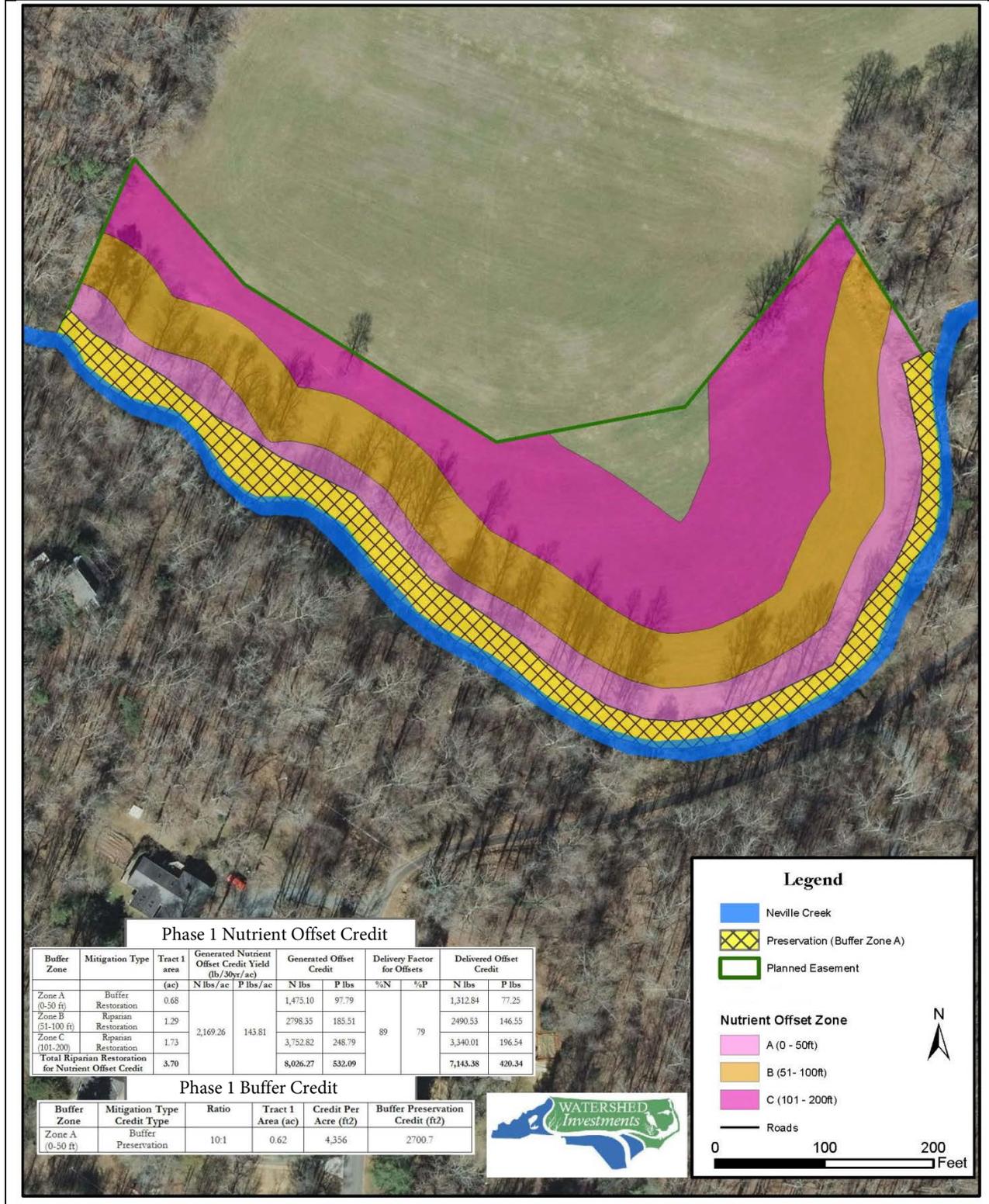
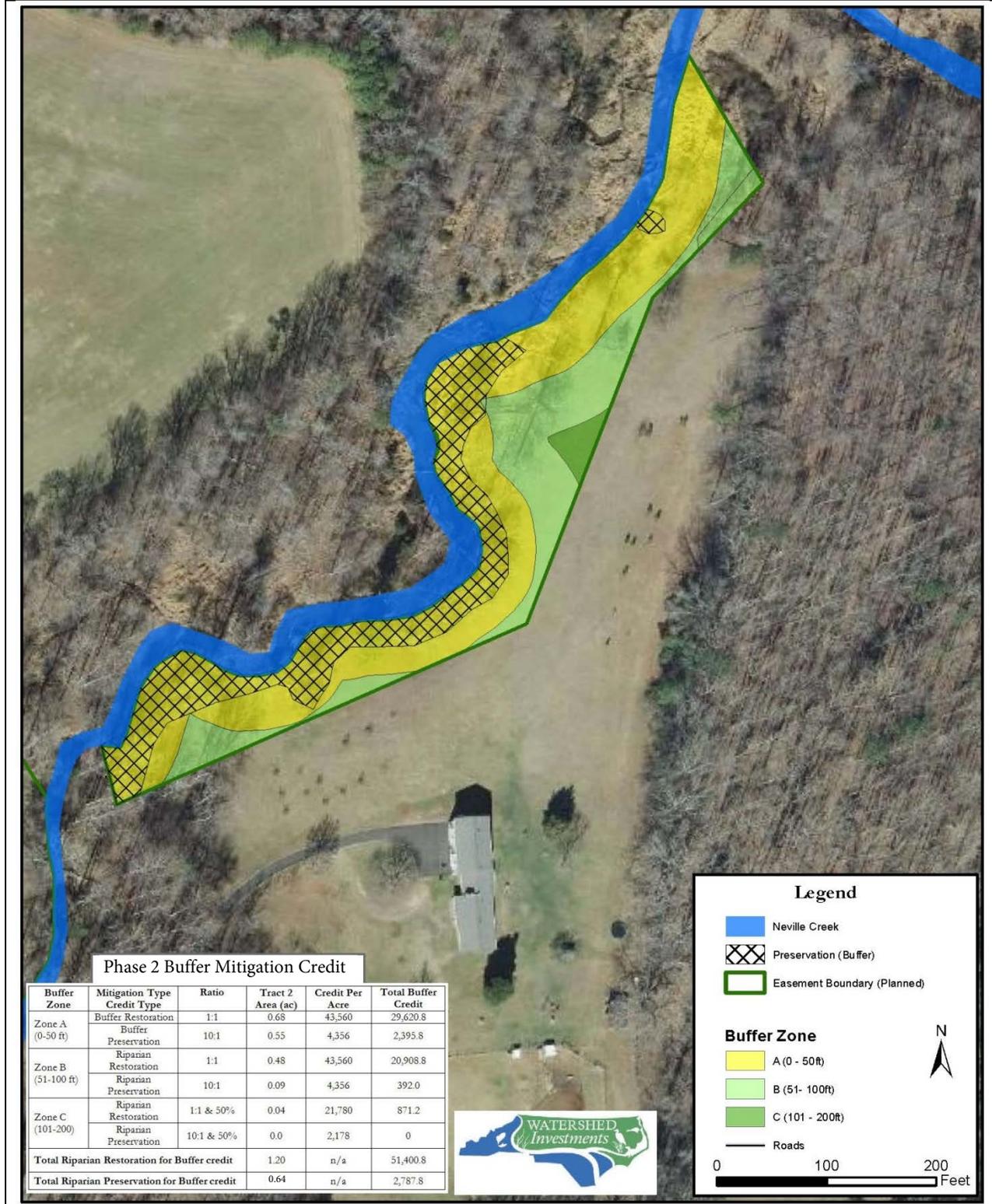


Figure 6-B. Neville Farms Phase 2 Buffer Mitigation and Riparian Zones.



**Attachment B.** Orange County Stream Determination Documentation

**From:** Wesley Poole <wpoole@orangecountync.gov>  
**Sent:** Monday, February 9, 2015 4:55 PM  
**To:** 'mherrmann'  
**Cc:** 'katie.merritt@ncdenr.gov'; Howard W. Fleming  
**Subject:** RE: Orange County - Jordan Lake Stream Call for potential Nutrient Offset/Buffer Credit - Neville Farm  
**Attachments:** Site Assessment Map (PIN 9767295479 ) 2 SMS 02-09-15.pdf

Mike / Katie,

I had our Current Planning Division here at Orange County put together the attached “Site Assessment” showing current environmental conditions on the southernmost property bordering the stream in question. This is a standard document given to citizen’s inquiring about parcels of land. Our system is organized by PINs instead of physical addresses or latitudes / longitudes, but you should be able to easily cross reference the supplied data. The stream in question is shown on both the USGS and Soil Survey, hence portrayal on our GIS System. It also has associated floodway / floodplain with approximate required Orange County stream buffers as shown.

With regards to the question of it being a jurisdictional stream subject to buffer rules...Orange County is delegated by DWR to conduct Surface Water Determinations and our protocol is as follows: a stream is considered as jurisdictional if it shows up on the Orange County GIS System (a collection of both USGS and Soil Survey Streams) and can only be removed by staff certified in Surface Water Identification after a jurisdictional call of removal is made at the required cost for assessment (\$200 for 1-2 Determinations/Site ). Our aerial imagery clearly shows the section of Neville Creek in question as a “water flowing” feature, so I saw no reason for a site visit at the expense of the client. This imagery can be viewed at the following link:

<http://server2.co.orange.nc.us/OrangeNCGIS/default.aspx>

Please advise if further verification is needed.

Thanks,  
Wesley Poole  
Erosion Control & Stormwater Officer II  
Orange County Planning & Inspections Dept.  
(919) 245-2587

---

**From:** mherrmann [<mailto:mherrmann@watershedinvestmentsnc.net>]  
**Sent:** Monday, February 09, 2015 8:05 AM  
**To:** Wesley Poole  
**Subject:** FW: Orange County - Jordan Lake Stream Call for potential Nutrient Offset/Buffer Credit - Neville Farm

Hi Wesley – Would you be able to provide the documentation that Katie mentions? I think the assessment you referenced would be good supporting evidence but I’ll also need documentation from you or someone else at the county who can make stream determinations that the stream section on

Neville Creek is subject to the buffer rules. The lat/long for the site that I've been using is 35.891902 N, -79.128051 W.

-Mike

---

**From:** Merritt, Katie [<mailto:katie.merritt@ncdenr.gov>]  
**Sent:** Friday, February 6, 2015 3:09 PM  
**To:** mherrmann  
**Cc:** [wpoole@orangecountync.gov](mailto:wpoole@orangecountync.gov)  
**Subject:** RE: Orange County - Jordan Lake Stream Call for potential Nutrient Offset/Buffer Credit - Neville Farm

Hi Mike,  
An email from Orange County will suffice. Ask for the exact location (physical) and long/lat of the feature they are making the jurisdictional call on.

Thank you,  
katie

---

**From:** mherrmann [<mailto:mherrmann@watershedinvestmentsnc.net>]  
**Sent:** Friday, February 06, 2015 12:39 PM  
**To:** Merritt, Katie  
**Cc:** [wpoole@orangecountync.gov](mailto:wpoole@orangecountync.gov)  
**Subject:** FW: Orange County - Jordan Lake Stream Call for potential Nutrient Offset/Buffer Credit - Neville Farm

Hi Katie –

I contacted Wesley Poole from Orange County Soil and Water about the Neville Farm site I reference in the email I'm forwarding. Due to the size of the stream he observed on aerial photography and its presence on the 1:24,000 topographic map, Mr. Poole determined that the stream section in question would be jurisdictional and subject to the buffer rule and that a field determination was not necessary.

What information would you like me to have to document his determination?

-Mike

p.s. I left you a voicemail this morning regarding this. Please feel free to respond via email or phone.

Mike Herrmann  
1630 Weatherford Circle  
Raleigh, NC 27604  
(p) 919-559-6264  
[mherrmann@watershedinvestmentsnc.net](mailto:mherrmann@watershedinvestmentsnc.net)  
[www.watershedinvestmentsnc.net](http://www.watershedinvestmentsnc.net)

This electronic mail communication may contain privileged, confidential, and/or proprietary information which is the property of Watershed Investments NC, LLC or one of its affiliates. If you are not the intended recipient or an authorized agent of the intended recipient please delete this communication and notify the sender that you have received it in error.

**Site Assessment for PIN:9767-29-5479**

**Site Data**

Zoning: RB  
 Acreage: 8.79 acres within Orange County  
 Overlay Districts: University Lake Protected  
 Plat/Legal Description: DB 4978 / PG 491 Plat Book 497 / PG 591  
 Recorded Declarations/Covenants:

**Zoning Requirements**

Min. Lot Size: 87,120 sq. ft.  
 Min. lot width: 130'  
 Maximum height: 25'  
 Building Setbacks:  
 -Front (and Corner lots) = 40' from public rights-of-way  
 -Side Setbacks = 20' from side lot lines  
 -Rear Yard Setback = 20' from rear lot lines

Note: Lot size, building setbacks and stream buffers may increase based on Private Road Justification (UDO 7.8.5).

**Environmental Features**

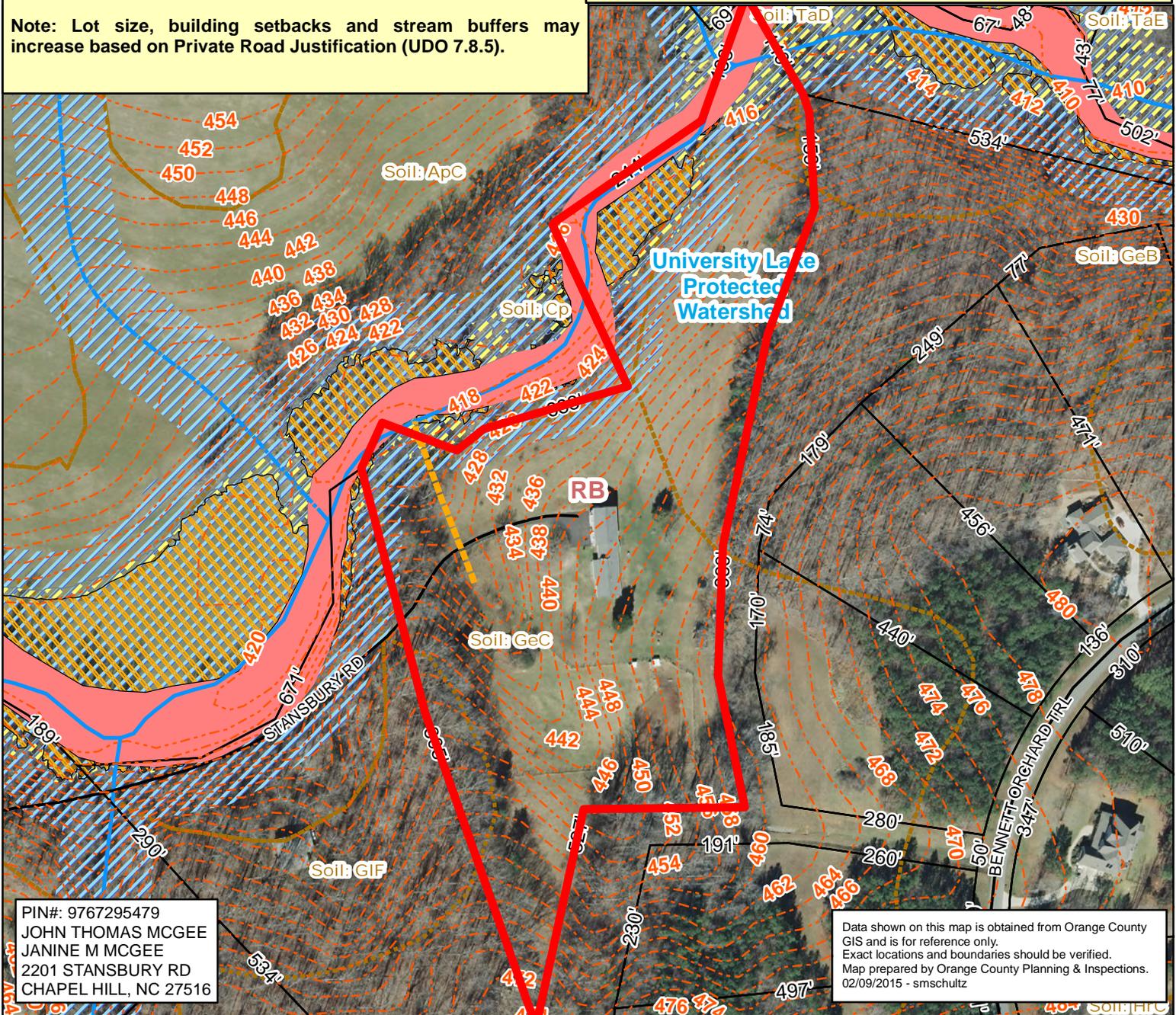
-Stream buffer and/or Floodplain located on lot. 200' grass stream buffer. Some wooded areas on northern property may qualify for 100' woods buffer.  
 -Base Flood Elevation (BFE) is: 422  
 -Finished Floor Elevation (FFE) is : 424

Impervious Surface Limits: 6% max. (22,973.5 sq ft. max based on 8.79 acres).

**Land Disturbance Thresholds**

1) Environmental Control Permit required if disturbing more than 10,000 sq.ft.; and  
 2) Stormwater Management Permit required if disturbing more than 43,560 sq. ft. for residential structures.

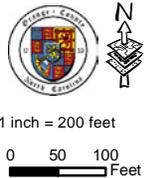
Date Site Assessment Completed: 2/9/2015 by SMS



PIN#: 9767295479  
 JOHN THOMAS MCGEE  
 JANINE M MCGEE  
 2201 STANSBURY RD  
 CHAPEL HILL, NC 27516

Data shown on this map is obtained from Orange County GIS and is for reference only. Exact locations and boundaries should be verified. Map prepared by Orange County Planning & Inspections. 02/09/2015 - smschultz

- Streams (Deleted)
- USGS Stream
- Soils Survey Stream
- Floodplain Buffer 65ft
- Stream Buffer 65ft
- 2' Contours (NCDOT)
- Parcels
- Zoning
- Watershed
- Soils
- 100 YR Floodplain (Effective 02/02/07)
- Floodway (Effective 02/02/07)
- 500 Year Floodplains (Effective 02/02/07)



**ORANGE COUNTY PLANNING & INSPECTIONS DEPARTMENT**  
**Craig N. Benedict, AICP, Director**

**Current Planning**  
**(919) 245-2575**  
**(919) 644-3002 (FAX)**  
**www.co.orange.nc.us**



**131 West Margaret Lane**  
**P O Box 8181**  
**Hillsborough,**  
**North Carolina, 27278**



April 9, 2015

Mike Herrmann  
1630 Weatherford Circle  
Raleigh, NC 27604

RE: ORANGE COUNTY FLOOD PERMIT DETERMINATION – proposed establishment of conservation area and replanting of vegetation within identified Special Flood Hazard Area (SFHA) Overlay District for 2 parcels of property (PINs 9768-11-1753 and 9767-29-5479)

To Whom It May Concern:

Orange County is in receipt of a Floodplain Development Permit proposing the reforestation of property within an identified floodplain. Specifically, the project will involve the planting of native trees along Neville Creek to on the following parcels:

1. An approximately 112 acre parcel of property owned by Nettie Gambill, no assigned physical address, identified utilizing Orange County Parcel Identification Number (PIN) 9768-11-1753, and
2. An approximately 8.7 acre parcel of property owned by John and Janine McGee with a physical street address of 2201 Stansbury Road further identified utilizing Orange County Parcel Identification Number (PIN) 9767-29-5479.

The parcels identified herein are both zoned:

- Rural Buffer (RB),
- University Lake Protected Watershed Protection Overlay District, and
- Special Flood Hazard Area Overlay District (SFHA)

The SFHA district, as you are already aware, indicates there is identified floodplain on the 2 properties, as denoted on Federal Insurance Rate Maps (FIRM) number 3701983100J panel(s) 9768 and 9767 J respectively with an effective date of February 2, 2007 (hereafter ‘the property’).

The project is intended to reestablish protective vegetative cover along the aforementioned waterway. According to the information supplied to staff the project will not involve the excavation existing land, or the depositing of fill material, within the floodplain. The submitted map does not indicate the presence of wetlands within the project area (hereafter ‘the project’).

As a result of the properties being located within the SFHA district, development projects are required to demonstrate compliance with established flood regulations as embodied within the Orange County Unified Development Ordinance (UDO). The County also has regulations requiring the protection of the natural areas around water features (i.e. stream buffers) regulations as detailed within Article 6 of the UDO.

Staff has been asked to review the proposal and determine compliance with applicable County regulations. This project involves the review of several agencies, most notably the NC Department of Environment and Natural Resources (DENR), in determining the viability of the project. This letter only focuses on any local (i.e. Orange County) permit standards and does not presume to identify requirements associated with any other permitting process.

Upon review of the proposal, staff would like to offer the following comments:

1. The request has been submitted in accordance with the provisions of Section 2.6.2 *Floodplain Development Permit and Certificate Requirements – Plans and Application Requirements* of the UDO.
2. Per Section 6.13.6 *Stream Buffers – Uses Allowable Within Stream Buffers* of the UDO ‘restoration of stream buffers’ is allowed as a ‘matter of right’ within identified stream buffers.
3. In reviewing the submitted plan the project does not call for the depositing of fill material within the identified floodplain or the floodway.

Grading activities will be limited to those portions of the project requiring the actual disturbance of land area for the purpose of re-establishing native vegetation.

4. In reviewing the submitted site plan there does not appear to be any alteration of existing grade or the ‘mass grading’ of property to accommodate the project.
5. Per Section 6.6.1 (14) of the UDO disturbance projects within identified floodplains shall: ‘*minimize flood damage consistent with these and other applicable County regulations*’.

Based on the submitted documentation it would appear the project will comply with applicable development guidelines associated with the SFHA Overlay District and is consistent with FEMA regulations governing land disturbance activities within identified floodplain areas.

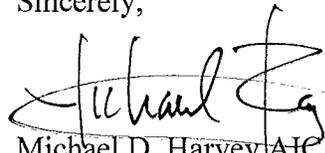
Based on the submitted documentation, and in accordance with Section 2.6.2 of the UDO, staff can issue **approval** for the project, from both a zoning and flood permitting standpoint. The project **will not** require additional floodplain analysis as the reestablishment of

vegetation is not deemed to create/impact existing floodways. The project, in fact, will help to bring the property back into compliance with applicable stream buffer regulations and further stabilize the banks of Neville Creek.

Please note land disturbing activities shall be permitted to commence once **all other required permitting processes** have been adhered to, including any applicable Erosion Control permits issued by Orange County and any required State/Federal permits, with copies of said authorizations being provided to the County for our records.

The Orange County Planning department looks forward to continue working with you on this project. Please contact staff at (919) 245-2575 for additional assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael D. Harvey". The signature is stylized with a large, sweeping initial "M" and a long horizontal stroke extending to the right.

Michael D. Harvey AICP, CFO, CZO  
Current Planning Supervisor  
Orange County

CC: Craig Benedict, Planning Director  
Howard Fleming Jr, Erosion Control  
Wesley Poole, Erosion Control  
James Bryan, Staff Attorney  
File



**North Carolina Department of Cultural Resources  
State Historic Preservation Office**

Ramona M. Bartos, Administrator

Governor Pat McCrory  
Secretary Susan Kluttz

Office of Archives and History  
Deputy Secretary Kevin Cherry

March 10, 2015

Mike Herrmann  
Watershed Investments  
1630 Weatherford Circle  
Raleigh, NC 27604

Re: Neville Farm Nutrient and Buffer Mitigation Bank Site, Orange County, ER 15-0389

Dear Mr. Herrmann:

Thank you for your letter of February 21, 2015, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or [environmental.review@ncdcr.gov](mailto:environmental.review@ncdcr.gov). In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

A handwritten signature in blue ink that reads "Renee Gledhill-Earley".

for Ramona M. Bartos



North Carolina Department of Environment and Natural Resources  
Office of Land and Water Stewardship

Pat McCrory  
Governor

Bryan Gossage  
Director

Donald R. van der Vaart  
Secretary

February 27, 2015

Mr. Mike Herrmann  
Watershed Investments NC  
1630 Weatherford Circle  
Raleigh, North Carolina 27604  
[mherrmann@watershedinvestmentsnc.net](mailto:mherrmann@watershedinvestmentsnc.net)

RE: Neville Farms Nutrient and Buffer Mitigation Bank Site, Orange County, North Carolina

Dear Mr. Herrmann:

Thank you for the opportunity to provide information from the North Carolina Natural Heritage Program (NCNHP) database for the proposed project referenced above. The NCNHP database shows a record for a rare species – Pursh’s Wild-petunia – that may occur within or nearby the proposed project area, and also a property owned by Orange County and considered to be Orange County open space immediately east and adjacent to the project area along Neville’s Creek.

Within one mile of the project area, the NCNHP database shows element occurrence records for the following rare species:

SCIENTIFIC NAME	COMMON NAME	ELEMENT OCCURRENCE STATUS	ACCURACY	STATE STATUS	FEDERAL STATUS
<i>Ruellia purshiana</i>	Pursh’s Wild-petunia	Historical	Low	SC-V	---
<i>Somatochlora georgiana</i>	Coppery Emerald	Historical	Very Low	SR	---

\*For status and accuracy definitions, please see the Rare Species Status Definitions and Element Occurrences documents at <https://ncnhde.natureserve.org/content/help>.

The occurrence record for Pursh’s Wild-petunia is from a dry road bank in the vicinity of Neville’s Creek near University Lake, and is mapped in the NCNHP database as potentially occurring within your project area. Although the record for Pursh’s Wild-petunia is considered to be historical, the last observation was made in 1940 by Al Radford and according to the NCNHP database the area has not been surveyed since the original observation. The occurrence record for Coppery Emerald has very low accuracy due to the lack of site-specific locational information associated with the record, but this species has been documented in Orange County.

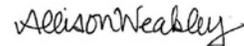
In addition, the NCNHP database shows several conservation/managed areas within one mile of the project area, including the property owned by Orange County adjacent to the eastern portion of the project area as noted above, as well as other Orange County open space properties upstream and downstream from the project, a conservation easement managed by the Triangle Land Conservancy ca. 0.45 miles east of the project, and properties under conservation easement managed by Earthmark North Carolina, LLC, located ca. 0.9 miles northwest of the project area.

The locations of natural areas and conservation/managed areas near the project area may be viewed by accessing the Natural Heritage Data Explorer online map viewer, or by downloading and using Geographic Information System (GIS) data; both options are available from the NCNHP Data Services webpage ([www.ncnhp.org](http://www.ncnhp.org)).

Please note that occurrences of rare species documented within one mile of the proposed project area increase the likelihood that these species may be present within the project area if suitable habitat exists. The use of Natural Heritage Program data should not be substituted for actual field surveys if needed, particularly if the project area contains suitable habitat for rare species. If rare species are found during field surveys, the NCNHP would appreciate receiving this information so that we may update our database.

Thank you for your inquiry, and please feel free to contact me at [Allison.Weakley@ncdenr.gov](mailto:Allison.Weakley@ncdenr.gov) or 919-707-8629 if you have questions or need additional information.

Sincerely,



Allison Schwarz Weakley, Conservation Planner  
NC Natural Heritage Program



North Carolina Department of Environment and Natural Resources

Pat McCrory  
Governor

Donald R. van der Vaart  
Secretary

April 6, 2015

Mike Hermann  
Watershed Investments NC, LLC  
1630 Weatherford Circle  
Raleigh, NC 27604  
(via electronic mail)

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Neville Creek  
Near 1501 Old Greensboro Rd, Chapel Hill, NC  
Orange County

Dear Mike,

On February 13, 2015, Katie Merritt, with the Division of Water Resources (DWR), received a request from Watershed Investments NC, LLC (WI) for a site visit near the above-referenced site to determine the potential for nutrient offset and Jordan riparian buffer mitigation. On March 24, 2015, Ms. Merritt performed a site assessment of two properties near the subject site, which are more accurately described in the attached aerial map. If approved, mitigating these properties could provide riparian buffer credits and/or nutrient offset credits within the Upper New Hope Watershed of the Cape Fear River Basin.

Ms. Merritt's evaluation of the two properties' for buffer and nutrient offset mitigation is shown below:

**Gambill Property**

- Stream onsite is Neville Creek and was determined to be at least Intermittent by the Town of Chapel Hill (email from Wesley Poole with Orange County on February 9, 2015).
- The narrow forest fringe along Neville Creek was described to be mature with a closed canopy the entire length of Zone 1 of the proposed mitigation area. Therefore, Zone 1 is viable for buffer preservation only and suitable for buffer mitigation credit only.
- The existing land use condition within Zone 2 of the Jordan buffer (21-50') was determined to be active hay crop cultivation. Therefore, Zone 2 is viable for buffer restoration and suitable for either buffer mitigation credit or nutrient offset credit.
- The existing land use of the riparian area located outside of the Jordan buffer (51-200') was determined to be active hay crop cultivation. Therefore, this area is viable for riparian restoration and suitable for either buffer mitigation credit or nutrient offset credit.

**McGee Property**

- Stream onsite is Neville Creek and was determined to be at least Intermittent by the Town of Chapel Hill (email from Wesley Poole with Orange County on February 9, 2015).

Division of Water Resources - 401 and Buffer Permitting Unit  
1617 Mail Service Center, Raleigh, North Carolina 27699-1617  
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604  
Phone: 919-807-6300 \ FAX: 919-807-6494  
Internet: [www.ncwaterquality.org](http://www.ncwaterquality.org)

- The existing land use condition within Zone 1 and Zone 2 of the Jordan buffer (0-50') was determined to be a mixture of mature hardwood trees with a disturbed understory dominated by invasives. The area within the Jordan buffer was determined to be viable for buffer restoration and suitable for buffer mitigation credit only. Site preparation will be needed to manually remove the invasives. Additionally, all of the erosional gullies and holes must be filled and stabilized to promote diffuse flow of stormwater runoff within the buffer. All trees must be surveyed out of the total square footage of the proposed mitigation area.
- The existing land use condition outside of the Jordan buffer (51-200') was determined to be a maintained lawn and not in agriculture. This area is viable for riparian restoration and suitable for only buffer mitigation.

A map showing the project site is provided and signed by Ms. Merritt on April 6, 2015. For any areas depicted as not being viable for nutrient offset credit above, WI 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 according to 15A NCAC 02B .0240.

Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

Sincerely,

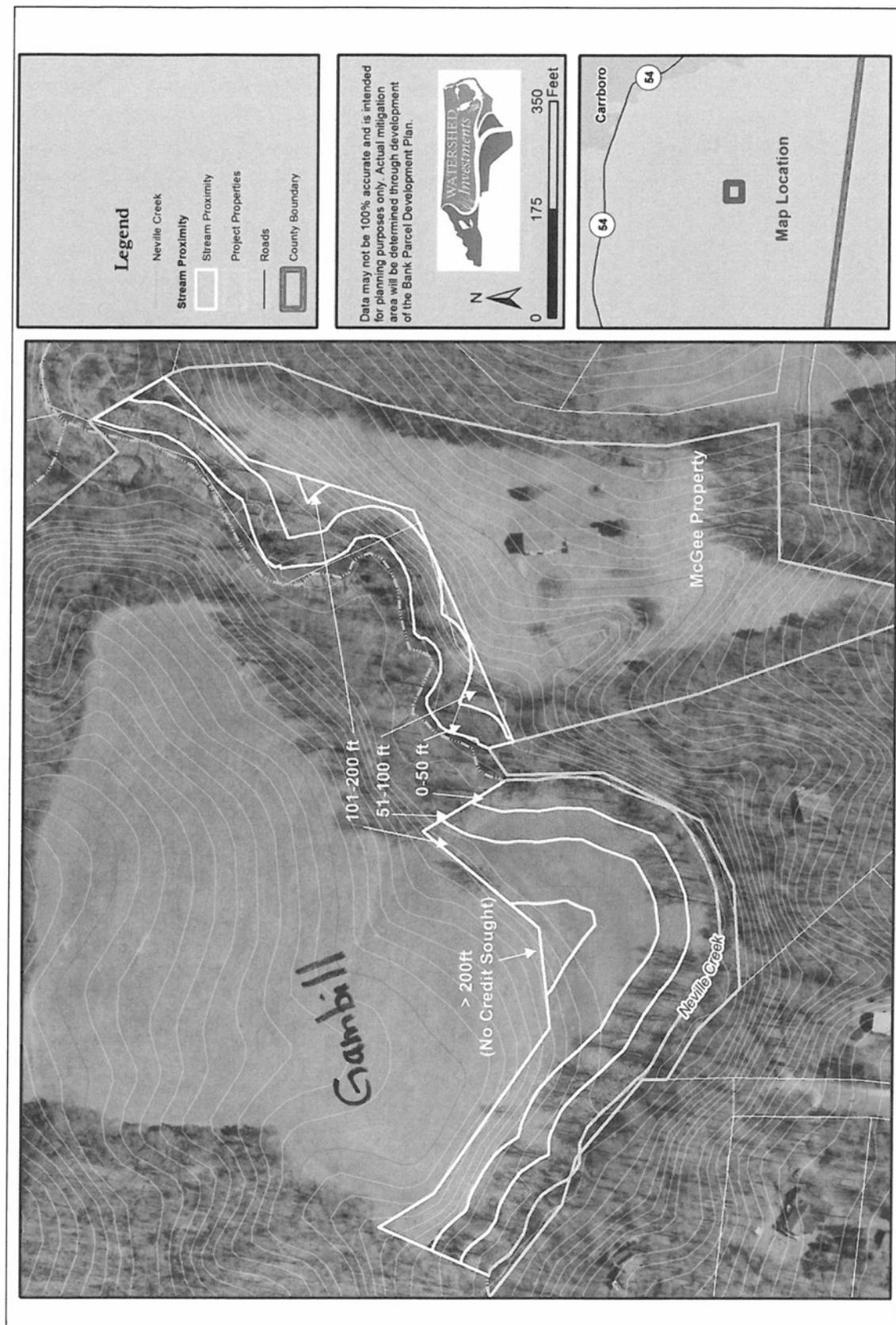


Karen Higgins, Supervisor  
401 and Buffer Permitting Unit

KAH/km

Attachments: Site Aerial Map

cc:File Copy (Katie Merritt)



**Figure 2. Neville Farm Drainage Features and Potential Buffer**

*Kym (DNR)  
4/6/15*

Neville Farms Prospectus – Upper New Hope  
Watershed Investments NC



North Carolina Department of Environment and Natural Resources

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

April 2, 2014

MEMORANDUM

TO: Approved Nutrient Offset & Riparian Buffer Mitigation Banks in NC

FROM: Katie Merritt *KM*  
Nutrient Offset & Buffer Banking Coordinator – Division of Water Resources

THROUGH: Karen Higgins *KH*  
401 and Buffer Permitting Unit – Division of Water Resources  
Supervisor

SUBJECT: **Notification of potential changes to performance bond requirements for construction and monitoring costs of nutrient offset and riparian buffer mitigation banks in NC**

On February 19, 2014, Assistant Secretary of the North Carolina (NC) Department of Environment & Natural Resources, Mitch Gillespie, responded to a concerned citizen's letter requesting staff within the Division of Water Resources (DWR) re-evaluate the minimum requirements of performance bonds for nutrient offset and riparian buffer mitigation banks in NC. Currently, the requirements are a minimum of \$150,000 and \$100,000 for construction and monitoring costs respectively. Staff within the 401 & Buffer Permitting Unit of the DWR, conducted a thorough review of information received from mitigation providers and consultants and determined that performance bonds less than the current minimum bond requirements may be accepted on a case by case basis. Restrictions to the changes in bonding amounts are as follows:

- Applicable for riparian restoration projects conducted by approved private mitigation banks only;
- Applicable for projects 10 acres or less in size as shown on a survey;
- Applicable for projects that do not include fencing as part of the approval for mitigation;
- Not applicable for projects that include stream and/or wetland mitigation; and
- No bond shall be less than \$50,000 and \$25,000 for construction and monitoring costs respectively.

In accordance with the statement provided in Mr. Gillespie's response letter, the following applies:

- *"Operational procedures that are not in direct compliance with existing Umbrella Mitigation Banking Instruments (UMBI) will need to be approved prior to implementation"*.

Therefore, mitigation bank sponsors who would like to modify the performance bond requirements on buffer/nutrient offset riparian restoration projects may submit a modification of their existing UMBI for review and approval by the Director of the Division of Water Resources (DWR), prior to implementation.

Please contact Katie Merritt at 919-807-6371 or [katie.merritt@ncdenr.gov](mailto:katie.merritt@ncdenr.gov) for UMBI modification requests or questions regarding this correspondence.

Division of Water Resources – 401 & Buffer Permitting Unit  
1650 Mail Service Center, Raleigh, North Carolina 27699-1650  
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604  
Phone: 919-807-6300 \ FAX: 919-807-6494  
Internet: [www.ncwaterquality.org](http://www.ncwaterquality.org)

An Equal Opportunity \ Affirmative Action Employer – Made in part by recycled paper

**Attachment H.** NC DWR Approval Notice and Support Materials for Tract 2's Nutrient Credit Calculation.

**From:** Davis, Amin <amin.davis@ncdenr.gov>  
**Sent:** Thursday, July 23, 2015 1:22 PM  
**To:** mike\_herrmann@hotmail.com; mherrmann  
**Cc:** Gannon, Rich; Merritt, Katie  
**Subject:** RE: Neville Farms Tract 2 Nutrient Credit Calculation

MIKE – I have reviewed your information and it appears to adequately document the site and associated offset credit calculations. Rich informed me that you and he spoke yesterday and the processing of your site information through DWR will take a couple of months. I'm sure we'll be in touch as things move forward.

Amin

---

**From:** Davis, Amin  
**Sent:** Tuesday, July 21, 2015 2:44 PM  
**To:** 'mike\_herrmann@hotmail.com'; 'mherrmann'  
**Cc:** Gannon, Rich  
**Subject:** RE: Neville Farms Tract 2 Nutrient Credit Calculation

MIKE – Thank you for sending this updated information. I will be in touch with you later this week regarding confirmation and next steps.

Amin

---

Amin Davis  
Watershed Restoration Specialist  
NCDENR Division of Water Resources  
Nonpoint Source Planning Branch  
1617 Mail Service Center, Raleigh NC 27699-1617  
919-807-6439  
[amin.davis@ncdenr.gov](mailto:amin.davis@ncdenr.gov)  
<http://portal.ncdenr.org/web/wq/ps/nps>

**From:** [mike\\_herrmann@hotmail.com](mailto:mike_herrmann@hotmail.com) [[mailto:mike\\_herrmann@hotmail.com](mailto:mike_herrmann@hotmail.com)]  
**Sent:** Friday, July 17, 2015 4:20 PM  
**To:** Davis, Amin  
**Subject:** Fwd: Neville Farms Tract 2 Nutrient Credit Calculation

Hi Amin,

Attached are the nutrient calculation materials for Tract 2. The edits you suggested have been made to Attachment A. The remaining materials remain the same. If you are satisfied that these materials adequately document the site and offset credit calculation, I'll need a communication from your Branch stating that.

Thank you,



July 16, 2015

Amin Davis  
Nonpoint Source Planning Branch  
1617 Mail Service Center  
Raleigh, NC 27699-1617

Subject: Nutrient Offset Credit Calculation Materials for Neville Farms – Tract 2

Mr. Davis

Attached for your review is the nutrient offset credit calculation and supporting materials for the Tract 2 (McGee Site) of the Neville Farms Riparian Buffer and Nutrient Offset Mitigation Bank. The following attachments are included in this submission:

- A. Summary of Project and Nutrient Offset Calculation
- B. Copy of Jordan Falls Stormwater Tool Data Sheets
- C. Map of Tract 2 Portion the Neville Farms Nutrient Offset and Buffer Mitigation Bank
- D. 401 & Buffer Unit Determination Letter **Removed in the Attachment as it is duplicated in Attachment F.**

Would you please review these materials and respond as to whether you agree with the attached offset credit calculation? The awarding of that credit will also be determined by whether the project is developed in accordance with its Bank Parcel Development Package (BPDP) and if it meets the regulatory requirements established in the project's mitigation banking instrument. These are currently being developed in consult with the Division of Water Resource's 401 & Buffer Permitting Unit.

Also, pursuant to 15A NCAC 02B .0273(2)(d)(i), the project will need to "account for differences in instream nutrient losses between the location of the reduction need and excess loading reduction in reaching the affected arm of Jordan Reservoir". In past communications, you've indicated that the Division is currently preparing to release delivery factors that will be applicable to this project. When those become available, will you please forward them so that they can be included in both the project's mitigation banking instrument and BPDP?

Thank you for your help in the review for offset crediting of this site. I understand that it presented a departure from the traditional crediting sought for sites and, consequently, required additional review and consideration. I appreciate the timely manner with which you have conducted your review.

Sincerely,

Mike Herrmann

## ATTACHMENT H. Attachments

### ATTACHMENT A. Tract 2 of Neville Farms Nutrient Offset Calculation Summary

#### Project Overview

Tract 2 is part of a larger restoration project identified as Neville Farms in the Bank Parcel Development Plan that is currently being developed. Located adjacent to Neville Creek, a perennial stream in Orange County, Tract 2 is on an 8.8 acre property owned by John McGee. The watershed draining through the project site encompasses 31.6 acres. The proposed Tract 2 conservation easement is approximately 1.7 acres with 1.20 acres anticipated for reforestation. The remaining 0.5 acres, a narrow, mature buffer ranging between 10 and 20 feet exists in portions of the easement area, will be considered as buffer preservation with no proposed nutrient reduction benefit. **Attachment C** provides a map of the Site including the land draining to it.

For areas of the conservation easement lacking a forested buffer or with forests less than 50 feet, residential lawn will be replaced with native trees to create a buffer with widths varying between 50 and 150 feet. In accordance with current DWR policy, success criteria on the project will be based on a minimum planted stem density survival of 260 stems/acre after 5 years.

Currently, the majority of Tract 2 consists of residential lawn. While it is eligible for buffer credit, staff from the 401 and Buffer Unit directed me to work with the Planning Section to develop the nutrient offset crediting because the site falls outside of the typical practice for generating nutrient offset credit (i.e., riparian reforestation of agricultural land). **Attachment D** contains a copy of the letter summarizing their determination.

#### Nutrient Reduction Calculation Summary

The calculated nutrient credit available for the site is 1091.10 N lbs and 243.00 P lbs. This is based on an annual nutrient offset crediting for the site of 36.37 N pound (lbs)/year and 8.10 lbs/year multiplied by 30 years. The method used to quantify nutrient offset credits has been developed through coordination and communication with the NC DWR Planning Unit staff. The agreed on approach involves the use of site-specific factors and the Jordan-Falls Stormwater Accounting Tool (JFSAT) Version 3.0. Supporting printouts from the tool are included in **Attachment B**. A summary of the nutrient offset calculation is included below.

Table A-1 provides a summary of the estimated reduction from the JFSAT. The JFSAT accounts for both land conversion for nutrient removal from upland sources. The upland area is 29.93 acres. This area includes The Orchard, a development under construction that contains a mix of residential and forest land use with 2 ac residential lots being the predominant parcel type. Parameters used to run the tool along with its output are contained in **Attachment B**.

**Table A-1.** Land Conversion and Upland Source Reduction.

Nutrient	Pre-project load (lbs/yr)	Post-project load (lbs/yr)	Nutrient reduction (lbs/yr)	Nutrient Credit (lbs/30 yrs)
Nitrogen	80.52	44.15	36.37	<b>1091.10</b>
Phosphorus	16.08	7.98	8.10	<b>243.00</b>

**ATTACHMENT H. Attachments**

Attachment B. Jordan Falls Stormwater Accounting Tool Data Sheets.

# *Jordan/Falls Lake Stormwater Nutrient Load Accounting Tool*

Version 3.0

<b>Date:</b>	July 9, 2015	
<b>Project Name:</b>	Neville Farms - Tract 2	<b>Print</b>
<b>Development Area (ft<sup>2</sup>):</b>	1,377,644	<b>Clear All Entries</b>
<b>Physiographic Region:</b> <a href="#">Regional Map</a>	Piedmont	<b>Import An Existing Project</b>
<b>Project Latitude Coordinates:</b>	N	
<b>Project Longitude Coordinates:</b>	W	
<b>Precipitation Location:</b> <a href="#">Precip Map</a>	Raleigh	<b>Help &amp; Documentation</b>
<b>Project Designer:</b>	Watershed Investments NC	
<b>Contact Phone Number/Email:</b>		
<b>Project Description:</b>	Nutrient Offset Calculation Summary for Neville Farms-Tract 2	

**Introduction**

**Watershed**

**BMP**

**Individual BMP**

**Overall Summary**

# Watershed Characteristics

- Introduction
- Project Information
- BMP Characteristics
- Overall Summary
- Individual BMP Summary

WATERSHED LAND USES				
	TN EMC (mg/L)	TP EMC (mg/L)	Pre- Development (ft <sup>2</sup> )	Post- Development (ft <sup>2</sup> )
<b>COMMERCIAL</b>				
Parking lot	1.44	0.16		
Roof	1.08	0.15		
Open/Landscaped	2.24	0.44		
<b>INDUSTRIAL</b>				
Parking lot	1.44	0.39		
Roof	1.08	0.15		
Open/Landscaped	2.24	0.44		
<b>TRANSPORTATION</b>				
High Density (interstate, main)	3.67	0.43		
Low Density (secondary, feeder)	1.4	0.52		
Rural	1.14	0.47		
Sidewalk	1.4	1.16		
<b>PERVIOUS</b>				
Managed pervious	2.65	0.735		
Unmanaged (pasture)	3.61	1.56		
Forest	1.47	0.25		
<b>RESIDENTIAL - COMPOSITE LAND USES</b>				
¼-ac lots	2.02	0.43		
½-ac lots	2.07	0.43		
¾-ac lots	2.11	0.43		
1-ac lots	2.15	0.4		
2-ac lots	2.22	0.44	1,303,592	1,303,592
Multi-family	1.92	0.41		
Townhomes	1.94	0.42		
Custom Lot Size	--	--		
<b>RESIDENTIAL - INDIVIDUAL LAND USES</b>				
Roadway	1.4	0.52		
Driveway	1.0	1.44	0.39	
Parking lot	1.44	0.39		
Roof	1.08	0.15		
Sidewalk/Patio	1.4	1.16		
Lawn	2.65	0.735	52,272	
Managed pervious	2.65	0.735		
Forest	1.47	0.25		
<b>JURISDICTIONAL LANDS</b>				
Natural wetland	1.47	0.25		
Riparian buffer - Zone 1 (Forested)	1.47	0.25	21,780	21,780
Riparian buffer - Zone 2	2.65	0.735		
Open water	--	--		
LAND TAKEN UP BY BMPs	1.08	0.15		52,272

- Clear All Entries
- Print Watershed Characteristics

## Supporting Calculations

### SIMPLE METHOD

Runoff Coefficient, Rv

$$Rv = 0.05 + (0.009 * I)$$

where I = percent impervious (%)

**Pre-Development Watershed:**

$$I = 7\%$$

$$Rv = 0.11$$

**Post-Development Watershed:**

$$I = 11\%$$

$$Rv = 0.15$$

Stormwater Runoff Generated, V

$$V = Rv * A * (P/12)$$

where A = area of catchment (ft<sup>2</sup>)

P = average annual rainfall depth

**Pre-Development Watershed:**

$$A = 31.63 \text{ ac}$$

$$P = 45.41 \text{ in.}$$

$$V = 580321 \text{ ft}^3$$

**Post-Development Watershed:**

$$A = 31.63 \text{ ac}$$

$$P = 45.41 \text{ in.}$$

$$V = 758346 \text{ ft}^3$$

Average Annual Pollutant Loading Leaving a Catc

$$L = ((P * Pj * Rv) \div (12)) * (C * A * A)$$

where Pj = fraction of rainfall events that

C = event mean concentration of

**Pre-Development Watershed:**

$$Pj = 1$$

$$C_{TN} = 2.22 \text{ mg/L}$$

$$C_{TP} = 0.44 \text{ mg/L}$$

$$L_{TN} = 80.52 \text{ lb/yr}$$

$$L_{TP} = 16.08 \text{ lb/yr}$$

**Post-Development Watershed:**

$$Pj = 1$$

$$C_{TN} = 1.93 \text{ mg/L}$$

$$C_{TP} = 0.37 \text{ mg/L}$$

$$L_{TN} = 91.55 \text{ lb/yr}$$

$$L_{TP} = 17.38 \text{ lb/yr}$$

### LAND USE AREA CHECK

Total Development Area Entered (ft<sup>2</sup>): 1,377,644

Total Pre-Development Calculated Area (ft<sup>2</sup>): 1,377,644

Total Post-Development Calculated Area (ft<sup>2</sup>): 1,377,644

# BMP Characteristics

- Introduction
- Project Information
- Watershed Characteristics
- Overall Summary
- Individual BMP Summary

Clear All Entries

Print BMP Characteristics

Add 2nd Catchment

----- CATCHMENT 1 -----						
	BMP #1	BMP #2	BMP #3			
Type of BMP:	Other Custom BMP					
Select predominant hydrologic soil group (HSG) for the location of the BMP.	B					
Description of Custom BMPs	LSFS HYDRO: Buffer EMCs					
Under- or Over-sized Percentage:						
Hydrologic Values (Value must be entered by user for Water Harvesting or Custom BMPs) <span style="border: 1px solid gray; border-radius: 5px; padding: 2px;">Hydrologic Values</span>	Overflow %:	% Treated	Overflow %:	% Treated	Overflow %:	% Treated
	5%	55%				
Nutrient Effluent EMC Values (Value must be entered by user for custom BMPs)	TN EMC (mg/L):	TP EMC (mg/L):	TN EMC (mg/L):	TP EMC (mg/L):	TN EMC (mg/L):	TP EMC (mg/L):
	1.47	0.25				
Does BMP accept the outflow from another Catchment? If so, indicate which one(s). (Land use areas entered below are in addition to the watershed areas treated by contributing catchment(s).)						
Catchment 1:						
Drainage Area Land Use	Area Treated by BMP (ft <sup>2</sup> )	Area treated by BMP #2 that is not treated by BMP #1 (ft <sup>2</sup> )	Area treated by BMP #3 that is not treated by BMPs #1 or #2 (ft <sup>2</sup> )	Total Land Use Area Treated By All BMPs (ft <sup>2</sup> )	Allowable Total Land Use Area to be Treated Based on Post-Dev. Areas (ft <sup>2</sup> )	
COMMERCIAL						
Parking lot				0	0	0
Roof				0	0	0
Open/Landscaped				0	0	0
INDUSTRIAL						
Parking lot				0	0	0
Roof				0	0	0
Open/Landscaped				0	0	0
TRANSPORTATION						
High Density (interstate, main)				0	0	0
Low Density (secondary, feeder)				0	0	0
Rural				0	0	0
Sidewalk				0	0	0

MISC. PERVIOUS					
Managed pervious				0	0
Unmanaged (pasture)				0	0
Forest				0	0
RESIDENTIAL					
2-ac lots	1,303,592			1,303,592	1,303,592
1-ac lots				0	0
½-ac lots				0	0
¼-ac lots				0	0
⅙-ac lots				0	0
Townhomes				0	0
Multi-family				0	0
Custom Lot Size				0	0
Roadway				0	0
Driveway				0	0
Parking lot				0	0
Roof				0	0
Sidewalk				0	0
Lawn				0	0
Managed pervious				0	0
Forest				0	0
JURISDICTIONAL LAND USES					
Natural wetland				0	0
Riparian buffer - Zone 1				0	21,780
Riparian buffer - Zone 2				0	0
LAND TAKEN UP BY BMP	52,272			52,272	52,272
<b>TOTAL AREA TREATED BY BMP (ft<sup>2</sup>):</b>	<b>1,355,864</b>	<b>0</b>	<b>0</b>		
<b>TOTAL AREA TREATED BY SERIES (ft<sup>2</sup>):</b>	<b>1,355,864</b>				

Development Name:  
 Total Development Area (ft<sup>2</sup>):  
 Designer:  
 Date:

Neville Farms - Tract 2  
 1,377,644  
 Watershed Investments NC  
 July 9, 2015

## Development Summary

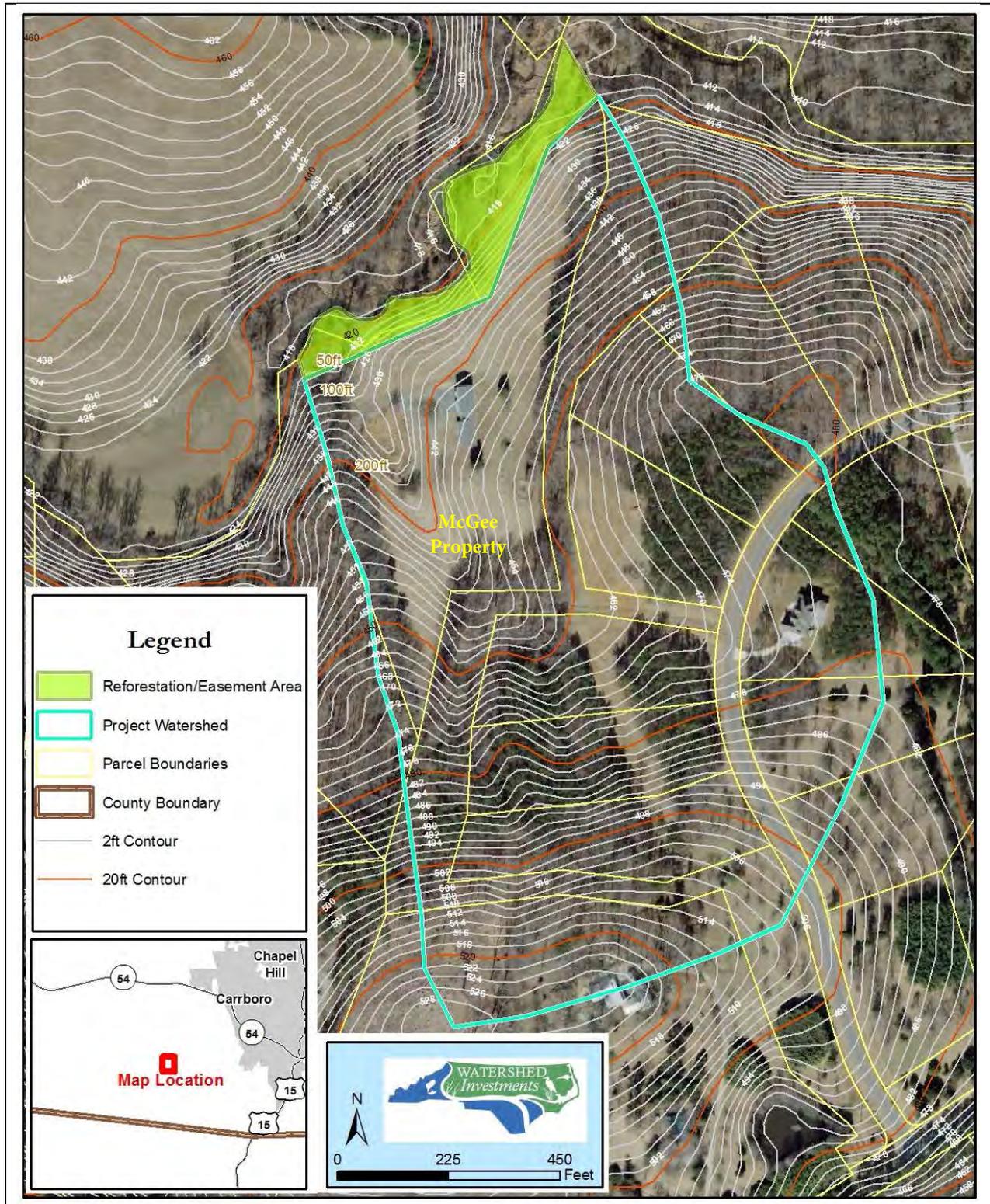
	Pre-Development Conditions	Post-Development Conditions	Post-Development w/ BMPs
<b>Percent Impervious (%)</b>	6.8%	10.6%	10.6%
<b>Annual Runoff Volume (c.f.)</b>	580,321	758,346	462,590
<b>Total Nitrogen EMC (mg/L)</b>	2.22	1.93	1.53
<b>Total Nitrogen Loading (lb/yr)</b>	80.52	91.55	44.15
<b>Total Nitrogen Loading (lb/ac/yr)</b>	<b>2.55</b>	<b>2.89</b>	<b>1.40</b>
<b>Total Phosphorus EMC (mg/L)</b>	0.44	0.37	0.28
<b>Total Phosphorus Loading (lb/yr)</b>	16.08	17.38	7.98
<b>Total Phos. Loading (lb/ac/yr)</b>	<b>0.51</b>	<b>0.55</b>	<b>0.25</b>

## Overall BMP/Catchment Summary

	Area Treated (ft <sup>2</sup> )	Volume Reduction (%)	Outflow TN (mg/L)	Outflow TP (mg/L)	Outflow TN (lbs/ac/yr)	Outflow TP (lbs/ac/yr)	TN Reduction (%)	TP Reduction (%)
Catchment 1	1,355,864	40.0%	1.53	0.28	1.41	0.25	58.69%	71.20%
BMP 1	1,355,864	40.0%	1.53	0.28	1.41	0.25	58.69%	71.20%
BMP 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 3	0	NA	NA	NA	NA	NA	NA	NA
Catchment 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 1	0	NA	NA	NA	NA	NA	NA	NA
BMP 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 3	0	NA	NA	NA	NA	NA	NA	NA
Catchment 3	0	NA	NA	NA	NA	NA	NA	NA
BMP 1	0	NA	NA	NA	NA	NA	NA	NA
BMP 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 3	0	NA	NA	NA	NA	NA	NA	NA
Catchment 4	0	NA	NA	NA	NA	NA	NA	NA
BMP 1	0	NA	NA	NA	NA	NA	NA	NA
BMP 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 3	0	NA	NA	NA	NA	NA	NA	NA
Catchment 5	0	NA	NA	NA	NA	NA	NA	NA
BMP 1	0	NA	NA	NA	NA	NA	NA	NA
BMP 2	0	NA	NA	NA	NA	NA	NA	NA
BMP 3	0	NA	NA	NA	NA	NA	NA	NA
Catchment 6	0	NA	NA	NA	NA	NA	NA	NA

ATTACHMENT H. Attachments

ATTACHMENT C. Tract 2 Restoration Area and Watershed Map



**Attachment I.** Site Delivery Factor Determination

**From:** Davis, Amin <amin.davis@ncdenr.gov>  
**Sent:** Monday, October 5, 2015 4:51 PM  
**To:** mherrmann  
**Cc:** Gannon, Rich  
**Subject:** RE: Jordan Lake - Updated Jordan Delivered Factors

MIKE – Below are the delivery factors you can use for the Neville-McGee nutrient offset site per our correspondence with you. We plan on sending out a memo to interested parties by Wednesday concerning these updated delivery factors/zones. We appreciate your patience.

TN: 89% (Zone 9)

TP: 79% (Zone 8)

Thank You,

Amin

---

Amin Davis, PWD  
Watershed Restoration Specialist  
NCDEQ - Division of Water Resources  
Nonpoint Source Planning Branch  
1617 Mail Service Center, Raleigh NC 27699-1617  
919-807-6439  
[amin.davis@ncdenr.gov](mailto:amin.davis@ncdenr.gov)  
<http://portal.ncdenr.org/web/wq/ps/nps>

---

**Attachment J.** Neville Farms Site Photographs

Photo A. Tract 1. Upstream looking downstream at Neville Creek Floodplain



Photo B. Tract 1 Downstream end looking upstream at floodplain area.



Photo C. Tract 2. Sloped areas looking upstream



Photo D. Tract 2 Looking downstream toward Neville Creek floodplain.

