

**As-Built Baseline Monitoring Report**

**FINAL**

**RES Randleman Group A  
Riparian Buffer Mitigation Project**

**DMS Project # 100046 (Contract # 7427)**

**DWR Project # 2018-1330**

Randolph County, North Carolina

Cape Fear River Basin

HUC 03030003



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**May 2019**



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May 31, 2019

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RE: RES Randleman Group A: As-Built Baseline Monitoring Report (NCDMS ID 100046)

Listed below are comments provided by DMS on May 28, 2019 regarding the RES Randleman Group A: Draft As-Built Monitoring Report and RES' responses.

**CCPVs** – Please add fencing to all CCPVs and As-built maps where it was installed.  
[New fencing was only installed at Sunbeam. The CCPV and As-built map have been updated.](#)

**Section 1.2** – Please insert Table 7 from the Mitigation Plan that summarizes monitoring and maintenance activities at the end of this section.  
[Done.](#)

**Section 2.3, Paragraph 3** – references “sewer easement along the right bank of BF3...” The easement appears to be along the left bank. Please verify.  
[The sewer easement is along the left bank of BF3. This has been corrected in the document.](#)

**General** – Throughout the document are references to “BPDP” that should be changed to “mitigation plan.”  
[Done.](#)

**Table 2a & Table 2c** – Please verify the data collection date for As-built (Year 0 Monitoring – baseline).  
[The dates have been corrected to “Apr-19”.](#)

**Figure 3a** – Please correct spelling error in map legend (Sewer Easement spelled incorrectly).  
[Done.](#)

**Appendix D** – Please remove Appendix D from this report and please provide a digital copy of the CVS Entry Tool (Access table).  
[Done.](#)

**General** – RES is under contract to provide 1,682,287.20 Buffer Mitigation Credits. The Baseline Report indicates that the site will only provide 1,671,826.35 Buffer Mitigation Credits, a shortfall of 10,460.85 credits. Task 3 payment should be \$358,327.17 (15% of the total contract value). However, the 10,460.85 buffer shortfall below the contracted amount reduces the contract value by \$14,854.41 (at \$1.42/buffer credit). In order to reconcile the difference



resulting from the 10,460.85 buffer credit shortfall, please adjust the Task 3 payment downward to a revised amount of \$345,700.94.

Please make the requested revisions and provide one (1) pdf copy of the revised report, the required digital data and a response to comments letter for DMS review. Once DMS verifies all revisions have been made and the required digital files have been submitted, RES will be instructed when to submit the final copies of the Task 3 deliverable. Also include a letter stating RES notes the shortfall in credits, explains the shortfall, and agrees with adjusting the Task 3 and subsequent payments accordingly. At this time, the contract will not be amended to reflect the expected credit shortfall.

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### **Pequod**

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Table 5b: Schmid Creek Planted Species Summary

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Table 7b: Schmid Creek Stem Count Total and Planted by Plot Species

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## **Appendix C: Vegetation Monitoring Plot Photos**

Pequod Vegetation Monitoring Plot Photos

Schmid Creek Vegetation Monitoring Plot Photos

Sunbeam Vegetation Monitoring Plot Photos

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# 1 PROJECT SUMMARY

## 1.1 Project Overview

Environmental Banc & Exchange, LLC (“EBX”), a wholly-owned subsidiary of Resource Environmental Solutions (“RES”), is pleased to provide this Monitoring Report for the RES Randleman Group A Riparian Buffer Mitigation Project (“Project”) as a full-delivery buffer mitigation project for the Division of Mitigation Services (“DMS”) (DMS #100046). The RES Randleman Group A includes three sites: Pequod, Schmid Creek, and Sunbeam. These sites provide riparian buffer mitigation credits for unavoidable impacts due to development within the Randleman Lake Watershed of the Cape Fear River Basin, United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC – 03030003). The Mitigation Plan was approved in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and the Randleman Lake Water Supply Watershed Buffer Rule 15A NCAC 02B .0250.

The Project provides significant functional uplift to the watershed and assists DMS with achieving its mitigation goals in the Randleman Lake Watershed. The Project provides up to 1,671,826 ft<sup>2</sup> (38.38 acres) of riparian buffer mitigation assets. These are derived from restoration, enhancement, and preservation of riparian buffers in the Randleman Lake Watershed.

Site	Riparian Buffer Credits
Pequod	812,086 ft <sup>2</sup> (18.64 ac)
Schmid Creek	273,737 ft <sup>2</sup> (6.28 ac)
Sunbeam	586,003 ft <sup>2</sup> (13.45 ac)
<b>Total</b>	<b>1,671,826 ft<sup>2</sup> (38.38 ac)</b>

The conservation easement of the three sites combined totals approximately 50 acres. Primary land use within the watershed is largely residential, agricultural, commercial and forested. The goal of the Project is to restore, enhance and preserve ecological function to the existing stream and riparian buffer by establishing appropriate plant communities while minimizing temporal and land disturbing impacts. Buffer improvements and the removal of livestock, helps to filter runoff from agricultural fields, thereby reducing nutrient and sediment loads to Project channels and the overall watershed. Restoration, enhancement and preservation of the Randleman Lake riparian buffer (as defined in 15A NCAC 02B .0250) results in a reduction of the water quality stressors affecting the Project: livestock access and a lack of riparian buffer. Immediate water quality benefits and pollutant removal within the vicinity of the Project include the exclusion of livestock access to streams and reduction in nutrient loads from agricultural land-uses. This Project is consistent with the management strategy for maintaining and protecting riparian areas in the Randleman Lake watershed.

## 1.2 Monitoring Protocol and Project Success Criteria

Annual vegetation monitoring and visual assessments are to be conducted annually throughout the five-year monitoring period. Riparian buffer vegetation monitoring for all three sites is based on the “Carolina Vegetation Survey-Ecosystem Enhancement Program Protocol for Recording Vegetation: Level 1-2 Plot Sampling Only Version 4.2”. Monitoring plots are to be installed a minimum of 100 meters squared in size and cover at least two percent of the planted mitigation area. These plots are to be randomly placed throughout the planted riparian buffer mitigation area and be representative of the riparian buffer restoration and enhancement areas where applicable (i.e. when enhancement credit is being generated from supplemental planting under 15A NCAC 02B .0295 (n)). The following data is to be recorded for all trees in the plots: species, height, planting date (or volunteer), and grid location. All stems in plots are to be

flagged with flagging tape. The Pequod Site has 17 monitoring plots (16 designated to restoration, one designated to enhancement), the Schmid Creek Site has eight monitoring plots, and the Sunbeam Site has 12 monitoring plots.

Photos are to be taken from all photo points each monitoring year and provided in the annual reports. Visual inspections and photos are to be taken to ensure that enhancement areas are being maintained and compliant. The measure of vegetative success for the Project Sites is the survival of at least four native hardwood tree species, where no one species is greater than 50 percent of the established stems, established at a density of at least 260 planted trees per acre at the end of Year 5. Native volunteer species may be included to meet the performance standards as determined by NC Division of Water Resources (DWR).

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

- Fencing is in good condition throughout the site (if applicable);
- no cattle access within the conservation easement area;
- no encroachment has occurred;
- no invasive species in areas where invasive species were treated,
- diffuse flow is being maintained in the conservation easement areas; and
- there has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

<b>Component/ Feature</b>	<b>Monitoring</b>	<b>Maintenance through project close-out</b>
Vegetation	Annual vegetation monitoring	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing.
Invasive and Nuisance Vegetation	Visual Assessment	Invasive and noxious species shall be monitored and treated so that none become dominant or alter the desired community structure of the site. Locations of invasive and nuisance vegetation will be mapped.
Site Boundary	Visual Assessment	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries will be marked with signs identifying the property as a mitigation site and will include the name of the long-term steward and a contact number. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis. Easement monitoring, and staking/signage maintenance will continue in perpetuity as a stewardship activity.
Road Crossing	Visual Assessment	Road crossings within the site may be maintained only as allowed by conservation easement or existing easement, deed restrictions, rights of way, or corridor agreements. Crossings in easement breaks are the responsibility of the landowner to maintain.
Livestock Fencing (if applicable)	Visual Assessment	Livestock fencing is placed outside the easement limits. Maintenance of fencing is the responsibility of the landowner.

## 2 PEQUOD SITE

### *2.1 Project Location and Description*

The Pequod Site is within the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 0303003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Pequod Site is located in Randolph County approximately five miles northwest of Archdale, North Carolina (**Figure 1a**). To access the Site head South on Main Street from I-85 and turn immediately left on Aldridge Road, after about a half mile turn right onto Huff Road, in about 0.4 miles the Site is on the left. The coordinates are 35.9107 °N and -79.9381 °W.

The easement is comprised of three sections, separated by two crossings, one of which is co-located with a gas easement. There is also an existing sanitary sewer easement within the Site area. The Pequod Site is composed of six stream channels: BF1, BF2, BF3, BF4, BF5, and BF6. BF1 flows directly into Muddy Creek approximately one mile downstream of the site. Reaches BF2, BF3, and BF5 drain to BF1. Reach BF6 drains to Reach BF2 and Reach BF4 drains to reach BF3. BF1 is a perennial unnamed tributary that is the primary feature onsite and has a drainage area of approximately 2,295 acres. The channel runs through pasture from the northern property boundary to the south before entering a culvert under Huff Road. BF1 is approximately 1,047 linear feet. A sanitary sewer easement runs parallel to this channel along the right bank. BF1 exhibits portions of bank instability and erosion from continued cattle access and the lack of a riparian buffer. BF2 is a perennial tributary that flows into BF1. This channel runs from the west to east for approximately 1,455 linear feet. BF2 has a drainage area of approximately 34 acres. BF3 is a perennial tributary that flows from northeast to southwest across the Site property and empties into BF1. A sanitary sewer easement runs parallel to this channel along the left bank. BF3 is approximately 1,463 linear feet and has a drainage area of approximately 65 acres. BF4 is an ephemeral tributary that runs through pasture from the northern property boundary to the south before draining to reach BF3. BF4 is approximately 233 linear feet and has a drainage area of approximately 11 acres. BF5 is a perennial tributary that originates at the southern property boundary before flowing north to its confluence with BF1. BF5 is approximately 328 linear feet and has a drainage area of approximately 10 acres. Reach BF6 is an intermittent stream that originates just downstream of a farm pond and drains to the north to its confluence with Reach BF2 just upstream of an existing gas easement. BF6 is approximately 418 linear feet and has a drainage area of approximately 11 acres. Stream identifications were verified by the DWR site visit on March 26, 2018.

### *2.2 Project Components*

This Site generates approximately 799,887 ft<sup>2</sup> (18.36 acres) of riparian buffer restoration credits on existing non-forested pasture and 33,254 ft<sup>2</sup> (0.76 acres) of buffer enhancement credits. The riparian buffer restoration and enhancement adjacent to the ephemeral Reach B4 comprises 1.32 acres (57,464 ft<sup>2</sup>) which is in compliance with 15A NCAC 02B .0295 (o)(7) in that it is only 6.5 percent of the total area of buffer mitigation, which is less than 25 percent of the total area of buffer mitigation (20.45 total acres) that is allowed. The riparian buffer mitigation credits generated will service Randleman Lake buffer impacts within the USGS 8-digit HUC 0303003 of the Cape Fear River Basin. The total mitigation credits that the RES Randleman Group A - Pequod Site will generate are summarized in **Table 1a**.

### *2.3 Riparian Restoration and Enhancement Approach*

Since this Site was mostly non-forested pasture, per 15A NCAC 02B .0295 (n), buffer restoration activities occurred in the majority of the Site with a few patches of enhancement. Along the upstream left bank of

BF3, the densely populated cluster of tree-of-heaven was removed and the area was replanted with hardwoods. Large individual tree-of-heaven trees were cut down, smaller trees or saplings had herbicide applied to the foliage. A rigorous invasive management plan for these areas is to be followed during the following monitoring years. There is a fixed vegetation monitoring plot located in this area so that any re-sprouts can be identified quickly.

Some additional restoration activities were conducted along BF2 to address the observed trash, pipes and culverts found in the streams and a side gully with no flow that enters the stream. These activities included upgrading the crossing, removing an old box culvert, removing other debris within the buffer, and bank stabilization and grading where banks were compromised. Other restoration activities included the removal of the small non-subject pond above reach BF6. The pond was drained, filled and planted.

A sanitary sewer easement runs parallel to reaches BF3 and BF1 and crosses reaches BF1, BF2, and BF5. The sewer easement along the left bank of BF3 is located outside of Zone 1 and in full compliance with 15A NCAC 02B .0295 (l)(4)(A-C), and therefore was included in the buffer restoration activities. Pursuant to 15A NCAC 02B .0295 (l) (4), sewer easements in Zone 2 may be suitable for buffer mitigation credit if: the applicant or mitigation provider restores or enhances the forested buffer in Zone 1 adjacent to the sewer easement, the sewer easement is maintained in a condition that meets the vegetative requirements of the collection system permit, and diffuse flow is provided across the entire buffer width. As part of the restoration approach, all of these criteria were met. Due to bank instability and erosion there are sections of the sewer easement along the left bank of BF1 that are now within Zone 1, along with the section of the sewer easement that crosses BF1, BF2, and BF5. These 0.1 acres are not viable for buffer credit.

Enhancement occurred in the limited forested areas within the Site, found in small patches along BF1, BF3, BF4, and BF5, in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (n). These areas include supplemental planting. Enhancement also occurs in BF3 per 15A NCAC 02B .0295 (n) where there is currently clumps of densely populated early-successional (two to four year) sweetgum saplings combined with invasives. The enhancement activities included thinning the sweetgums to the extent necessary, treating the invasives and planting hardwood stems to add diversity to the riparian buffer. There was also a small area along BF1 that was considered enhancement after further site evaluation conducted by RES on December 4<sup>th</sup>, 2018. After further discussions with DWR, it was agreed upon that these areas could be used for enhancement under 15A NCAC 02B .0295 (n) with supplemental planting, instead of preservation at 10:1 as was stated in the Site Viability letter.

Reach BF4 was classified as an ephemeral stream (per Buffer Viability) and, therefore, the restoration and enhancement of this channel do not comprise more than 25 percent of the total area of buffer mitigation per 15A NCAC 02B .0295 (o)(7). In response to comments from DWR, RES conducted vegetation transect surveys on December 4<sup>th</sup>, 2018 to ensure that this area was indeed eligible for restoration credit. It was determined that the areas that were already enhancement should remain as enhancement, at the confluence of BF3 and BF4, and the other areas that were determined to be restoration should remain as restoration.

## ***2.4 Construction and As-Built Conditions***

Revegetation of the site included treating invasive species and planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement as well as thinning sweetgum in enhancement areas. The planting of bare root trees occurred in April 2019. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 5a**. The other construction work included removing debris, an old culvert, and a farm pond as well as improving a crossing. This work was also completed in April 2019. The conservation easement is marked every 150-200 feet with NCDEQ Stewardship Program signs attached to either fences or t-posts. There was no easement change between the final mitigation plan and as-built, however there was a change in credits. This

change was a result of an error in the buffer zones submitted with the mitigation plan. The result was an increase in 750 ft<sup>2</sup> (0.02 ac).

### **3 SCHMID CREEK SITE**

#### ***3.1 Project Location and Description***

The Schmid Creek Site is located in the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 0303003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Site is located in Randolph County approximately five miles northwest of Randleman, North Carolina (**Figure 1b**). To access the Site head West on Cedar Square Road from I-74 and turn right on Davis Country Road, after about a mile turn right onto Gilbert Davis Drive, in about 0.4 miles the Site is on the left. The coordinates of the Site are 35.8726 °N and -79.8726 °W.

The conservation easement totals approximately 9.99. The majority of the Site was grazed, non-forested pasture. The riparian buffer was devoid of trees or shrubs and cattle were allowed access within the existing channels

The easement is comprised of two sections, separated by one farm access crossing. The Schmid Creek Site is comprised of one stream channel, SC1, which begins downstream of a pond and then flows from northeast to the southwest eventually draining directly into Randleman Lake approximately 1,500 feet downstream of the site. SC1 is an intermittent unnamed tributary that is the primary drainage feature onsite and has a drainage area of approximately 57 acres. This channel begins downstream of an existing culvert at the eastern property boundary and runs through active pasture before passing through two more culverts on the property. SC1 is approximately 1,022 linear feet. This channel is mostly stable throughout, however, it does exhibit some areas of active erosion from cattle access. There is one linear wetland onsite that drains directly to SC1. DWR Stream Identification Forms were completed and verified by DWR during a site visit on April 12, 2017.

#### ***3.2 Project Components***

This Site generates approximately 273,737.545 ft<sup>2</sup> (6.28 acres) of riparian buffer restoration credits on existing non-forested pasture. The riparian buffer mitigation credits generated will service Randleman Lake buffer impacts within the USGS 8-digit HUC 0303003 of the Cape Fear River Basin. The total mitigation credits that the RES Randleman Group A – Schmid Creek Mitigation Site generates are summarized in **Table 1b**.

#### ***3.3 Riparian Restoration Approach***

Since this Site was all non-forested pasture, per 15A NCAC 02B .0295 (n), buffer restoration activities included planting throughout the entire Site. Some additional restoration activities included the removal of debris found within the Site and updating the farm crossing culvert. Specifically, the debris removal included the removal of a drain tile and culvert at the most upstream section of the Reach SC1 and removal of a culvert and earthen berm at the downstream section of Reach SC1. The crossing was improved with properly sized and embedded corrugated pipe, and embankment stabilization to facilitate future landowner access to both sides of the property. These areas were stabilized with coir matting, permanent and temporary seeding, and live stakes after culvert removal.

### ***3.4 Construction and As-Built Conditions***

Revegetation of the site included planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement. The planting of bare root trees occurred in April 2019. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 5b**. The other construction work included removing debris (culverts, drain tile, and earthen berm) as well as improving a crossing. This work was also completed in April 2019. The conservation easement is marked every 150-200 feet with NCDEQ Stewardship Program signs attached to either fences or t-posts. There was no easement or credit change between the final mitigation plan and as-built.

## **4 SUNBEAM SITE**

### ***4.1 Project Location and Description***

The Sunbeam Site is within the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 0303003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Site is located in Randolph County approximately six miles southeast of Archdale, North Carolina. The easement is located on both sides of Interstate Highway 74. To access the Site from Interstate Highway 85 travel south on US 311 (toward Asheboro), then take exit 79 for Cedar Square Road, then turn right. Travel on Cedar Square Road for approximately a quarter of a mile, then turn left onto SR 1009. Travel on SR 1009 for approximately one and a quarter mile, and the Site will be on the right. The coordinates are 35.8631 °N and -79.8911 °W.

The Sunbeam Site easement is made up of four sections, separated by two farm access crossings and a highway, and is comprised of four stream reaches: ZF1, ZF2, ZF3, and ZF4 (**Figure 1c**). ZF1 flows directly into Randleman Lake approximately 5,500 linear feet downstream of the Site. Both ZF2 and ZF3 flow into ZF1 near the downstream end of the Site. ZF1 is a perennial unnamed tributary that is the primary drainage feature onsite and has a drainage area of approximately 540 acres. This channel runs through pasture from the western property corner to the east side of the Site before entering a culvert under I-74. ZF1 is approximately 1,614 linear feet. This channel is mostly stable throughout, however, it did exhibit portions of vertical banks and erosion from cattle. There is also a ditch that discharges into ZF1. The ditch was graded out and a diffuse flow structure was built on the easement boundary to ensure that diffuse flow of runoff is maintained within the riparian buffer. ZF2 is an intermittent to perennial tributary that begins downstream of a farm pond, roughly 260 linear feet off the Site property and then flows into ZF1. This channel runs from the south to north for approximately 1,530 linear feet. ZF2 has a drainage area of approximately 55 acres. This stream channel is stable and exhibits bedrock features at the downstream end. The stream channel was bound by active cattle pasture on the right bank and agriculture hay fields on the left bank. There is currently an existing fence line along the stream channel of ZF2 to prevent cattle from crossing into the left bank riparian buffer. ZF3 is an intermittent to perennial tributary that flows from northwest to southeast across the Site property and empties into ZF1. ZF3 has a drainage area of approximately 98 acres. ZF3 exhibits multiple segments of bedrock providing grade control and streambed stability. This stable tributary lies within a valley bottom and is bound by active cattle pasture. The channel is approximately 1,224 linear feet. ZF4 is an intermittent tributary located on the Site east of Interstate 74. This channel runs from north to south for approximately 529 linear feet before draining to ZF1 downstream of the Site. The drainage area is approximately 16 acres. This stable channel is bound by a mature forest on the left bank and hay field on the right. Stream identifications were verified by the DWR site visit on March 26, 2018.

## ***4.2 Project Components***

This Site generates approximately 577,098.433 ft<sup>2</sup> (13.25 acres) of riparian buffer restoration credits on existing non-forested pasture, 3,311.971 ft<sup>2</sup> (0.08 acres) of buffer enhancement credits via cattle exclusion, and 5,592.634 ft<sup>2</sup> (0.13 acres) of riparian buffer preservation credits on subject streams. Due to the removal of a small section of the easement, a very small piece of the buffer along ZF1 now has a buffer that is less than 30 feet but greater than 20 feet and therefore only receives 75 percent of the credit in that area. The riparian buffer mitigation credits generated, service Randleman Lake buffer impacts within the USGS 8-digit HUC 0303003 of the Cape Fear River Basin. The total mitigation credits that the RES Randleman Group A – Sunbeam Site generates are summarized in **Table 1c**.

## ***4.3 Riparian Restoration, Enhancement, and Preservation Approach***

Since a majority of the Sunbeam Site was non-forested actively grazed pasture, per 15A NCAC 02B .0295 (n), buffer restoration activities occurred throughout the Site. Some additional restoration activities included minor bank stabilization and grading where needed based on compromised banks and where erosional rills and gullies were observed. Minimal grading and benching was performed to stabilize the confluence of ZF1 and ZF3, and to provide spot stabilization along ZF1. Stabilizing these areas provide functional uplift to the stream system by stopping the mass bank wasting that is currently a problem and by reducing instream sediment loads. In order to maintain diffuse flow in the riparian buffer, the ditch that drains to ZF1 was graded out and a diffuse flow structure was built along the boundary of the easement. Another restoration activity was the upgrading of the existing crossing This crossing is necessary for property access and is fenced to prevent cattle access. The crossing was constructed such that farm equipment has access and to prevent future degradation. These areas were stabilized with coir matting, permanent and temporary seeding, and live stakes after culvert removal.

Enhancement occurred in the very limited forested areas within the Site, found in small patches along ZF1, where grazing occurred adjacent to the stream in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o)(6). All livestock were removed from the easement and the fence was installed to exclude access to riparian areas and their associated streams.

Buffer preservation was performed along Reach ZF4 in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o)(5). The current land use in this area is mature hardwood in the forested area on the left bank of ZF4. Preservation activities consist of permanently protecting the buffer from cutting, clearing, filling, grading, and similar activities that would affect the functioning of the buffer through a conservation easement that has clearly visible easement markers and signs.

## ***4.4 Construction and As-Built Conditions***

Revegetation of the site included planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement. The planting of bare root trees occurred in April 2019. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 5c**. The other construction work included bank stabilization and spot treatments on ZF1 and improving the crossing on ZF1. The crossing on ZF1 was originally planned to be a culvert crossing but due to the bedrock in the proposed area, the crossing was installed as a ford. Additionally, a rill entering the easement at the top of ZF1 was graded and planted. This work was also completed in April 2019. A Buffer Impacts Authorization was approved in January 2019 for the temporary impacts in Zone 1 from the bank stabilization work on ZF1 (**Appendix D**). The conservation easement is marked every 150-200 feet with NCDEQ Stewardship Program signs attached to either fences or t-posts. Fences were installed in the western portion of the site where livestock is present. There was no easement or credit change between the final mitigation plan and as-built.



## 5 BASELINE MONITORING PERFORMANCE

The RES Randleman Group A Baseline Monitoring activities were completed in April 2019. All Baseline Monitoring data is present below and in the appendices. The Site is on track to meeting interim success criteria.

Monitoring of the 37 permanent vegetation plots was completed during April 2019. Vegetation tables are in **Appendix B** and associated photos are in **Appendix C**. 17 of 17 plots at Pequod are exceeding the interim success criteria of 320 planted stems per acre. Planted stem densities ranged from 809 to 1,093 planted stems per acre with a mean of 809 planted stems per acre across all plots. 8 of 8 plots at Schmid Creek are exceeding the interim success criteria and the planted stem densities range from 890 to 1,255 with a mean of 1,077 stems per acre across all plots. And 12 of 12 plots at Sunbeam are exceeding the interim success criteria and the planted stem densities range from 647 to 1,416 with a mean of 941 stems per acre across all plots. A total of 10 species were documented within the plots. Volunteer species were only noted in VP15 at Pequod which is in an enhancement area. The average tree height observed was 1.7 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout all three sites.

## 6 REFERENCES

- Lee Michael T., Peet Robert K., Roberts Steven D., and Wentworth Thomas R., 2008. *CVS-EEP Protocol for Recording Vegetation Level*. Version 4.2
- NC Environmental Management Commission. 2014. Rule 15A NCAC 02B.0295 - Mitigation Program Requirements for the Protection and Maintenance of Riparian Buffers.
- Resource Environmental Solutions, LLC (2019). Randleman Group A – Final Mitigation Plan.
- Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDENR, Raleigh, NC.

# **Appendix A**

## **Project Background Tables and Site Maps**

Table 1a. Pequod Mitigation Site Buffer Project Areas and Assets

RIPARIAN BUFFER (15A NCAC 02B.0295)													If Converted to Nutrient Offset			
Location	Jurisdictional Streams	Restoration Type	Reach ID/Component	Buffer Width (ft)	Creditable Area (acreage)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acreage)	Convertible to Nutrient Offset (Yes or No)	Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)		
Rural	Subject	Restoration	BF1	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000		
				30-100	3.35	145,904.931		100%	1.00000	145,904.931	3.35	0.000	0.000			
				101-200	0.24	10,236.688		33%	3.00000	3,378.107	0.08	No	0.000	0.000		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00	0.000	0.000	No	0.000	0.000
				30-100	0.05	2,032.169		100%	2.00000	1,016.084	0.02	No	0.000	0.000		
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
Rural	Subject	Restoration	BF2	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000		
				30-100	5.49	239,200.774		100%	1.00000	239,200.774	5.49	No	0.000	0.000		
				101-200	0.18	7,966.179		33%	3.00000	2,628.839	0.06	No	0.000	0.000		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00	0.000	0.000	No	0.000	0.000
				30-100	0.00	0		100%	2.00000	0.000	0.00	No	0.000	0.000		
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
Rural	Subject	Restoration	BF3	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000		
				30-100	4.88	212,392.571		100%	1.00000	212,392.571	4.88	No	0.000	0.000		
				101-200	0.99	43,258.421		33%	3.00000	14,275.279	0.33	No	0.000	0.000		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00	0.000	0.000	No	0.000	0.000
				30-100	0.64	27,860.078		100%	2.00000	13,930.039	0.32	No	0.000	0.000		
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
Rural	Subject	Restoration	BF5	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000		
				30-100	1.11	48,185.441		100%	1.00000	48,185.441	1.11	No	0.000	0.000		
				101-200	0.04	1,849.573		33%	3.00000	610.359	0.01	No	0.000	0.000		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00	0.000	0.000	No	0.000	0.000
				30-100	0.08	3,362.221		100%	2.00000	1,681.11	0.04	No	0.000	0.000		
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
Rural	Subject	Restoration	BF6	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000		
				30-100	1.85	80,602.565		100%	1.00000	80,602.565	1.85	No	0.000	0.000		
				101-200	0.24	10,290.071		33%	3.00000	3,395.723	0.08	No	0.000	0.000		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00	0.000	0.000	No	0.000	0.000
				30-100	0.00	0		100%	2.00000	0.000	0.00	No	0.000	0.000		
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
<b>SUBTOTALS</b>					<b>19.13</b>	<b>833,141.682</b>							<b>0.000</b>	<b>0.000</b>		
										<b>767,201.82</b>	<b>17.61</b>		<b>0.000</b>	<b>0.000</b>		

ELIGIBLE PRESERVATION AREA													
Location	Jurisdictional Streams	Restoration Type	Reach ID/Component	Buffer Width (ft)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acreage)			
Rural	Subject	Preservation		20-29			10	75%	13.33333	0.000	0.00		
				30-100				100%	10.00000	0.000	0.00		
				101-200				33%	30.00000	0.000	0.00		
				Nonsubject	20-29			5	75%	6.66667	0.000	0.00	
					30-100				100%	5.00000	0.000	0.00	
					101-200				33%	15.00000	0.000	0.00	
<b>SUBTOTALS</b>					<b>0</b>				<b>0.000</b>	<b>0.000</b>			

\*Area eligible for preservation may be no more than 25% of total area, where total area is back-calculated with the equation R+E/0.75.

\*All buffers eligible for credit must be at minimum 20' wide

\*When preservation areas exceed the total eligible preservation area, select the areas with the best credit ratios as the creditable areas.

ELIGIBLE EPHEMERAL AREA*													
Location	Jurisdictional Streams	Restoration Type	Reach ID/Component	Buffer Width (ft)	Creditable Area (acreage)*	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acreage)		
Rural	Ephemeral	Restoration	BF4	20-29	0.00	0	1	75%	1.33333	0.000	0.00		
				30-100	0.87	37,838.047		100%	1.00000	37,838.047	0.87		
				101-200	0.37	16,278.095		33%	3.00000	5,371.771	0.12		
		Enhancement		20-29	0.00	0	2	75%	2.66667	0.000	0.00		
				30-100	0.08	3,348.248		100%	2.00000	1,674.124	0.04		
				101-200	0.00	0		33%	6.00000	0.000	0.00		
<b>SUBTOTALS</b>					<b>1.32</b>	<b>57,464.391</b>				<b>44,883.94</b>	<b>1.03</b>		
<b>TOTALS</b>					<b>20.45</b>	<b>890,606.073</b>				<b>812,085.766</b>	<b>18.64</b>		

\* The area of the mitigation site on ephemeral channels shall comprise no more than 25 percent of the total area of buffer mitigation. Total area is back-calculated with the equation R+E/0.75.

Regulatory direction for Riparian Buffer in this table follows NCAC rule 15A NCAC 02B .0295, effective November 1, 2015

Regulatory direction for Nutrient Offset in this table follows Nutrient Offsets Payments Rule 15A NCAC 02B. 0240, amended effective September 1, 2010 and

DWR – 1998. Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment

N.O. calculation based on effectiveness in 30 years, with 146.40 lb/ac P; and 2,273.02 lb/ac N. The N credit ratio used is 19.16325 sf per pound. The P credit ratio used is 297.54098 sf per pound

**Table 2a. Project Activity and Reporting History  
Pequod Site**

**Elapsed Time Since grading complete:           NA**  
**Elapsed Time Since planting complete:        1 month**  
**Number of reporting Years<sup>1</sup>:                 0**

<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Containerized, bare root and B&B plantings	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

<sup>1</sup> = The number of reports or data points produced excluding the baseline

**Table 3a. Project Contacts Table  
Pequod Site**

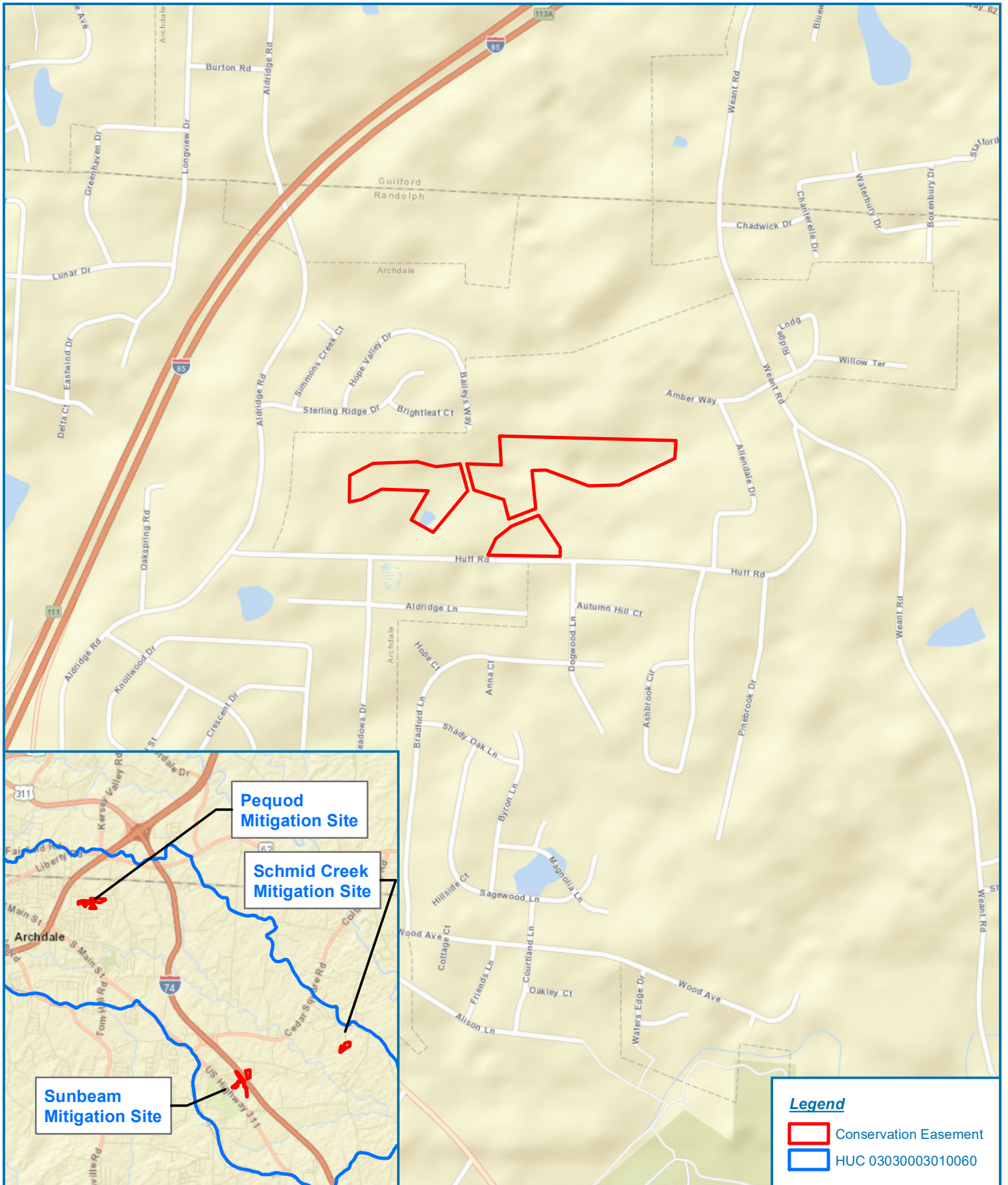
<b>Planting Contractor</b>	H&J Forestry
Planting contractor POC	Matt Hitch
<b>Nursery Stock Suppliers</b>	Claridge Nursery 1-(888) 628-7337
<b>Monitoring Performers</b>	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605
Vegetation Monitoring POC	Ryan Medric (919) 741-6268

**Table 4a. Project Background Information**

Project Name	Pequod
County	Randolph
Project Area (acres)	22.14
Project Coordinates (latitude and longitude)	Latitude: 35.9107 N Longitude: -79.9381 W
Planted Acreage (Acres of Woody Stems Planted)	19.6

**Project Watershed Summary Information**

Physiographic Province	Southern Outer Piedmont		
River Basin	Cape Fear		
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin	03-06-08		
Project Drainage Area (Acres)	2,295		
CGIA Land Use Classification	Forest; Agricultural; Residential		



**Legend**

- Conservation Easement
- HUC 03030003010060

Figure 1a - Site Location Map

**RES Randleman Group A -  
Pequod Mitigation Site**

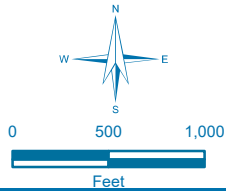
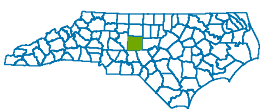
Randolph County, North Carolina

Date: 5/3/2019

Drawn by: RTM

Checked by: BPB

1 inch = 1,000 feet





Note: Enhancement Areas Under 15A NCAC 02B .0295(n)

Plot is in area where *Ailanthus altissima* was located

Crossing upgraded

Box culvert removed

Pond removed

Debris removed

**Legend**

- Conservation Easement
- Vegetation Plot
- Top of Bank

**Buffer Mitigation**

- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- No Credit (Sewer Easement)
- Ephemeral Channel

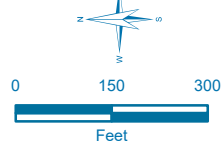
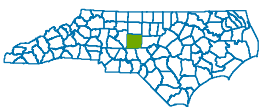


Figure 2a. Current Conditions Plan View

### RES Randleman Group A - Pequod Mitigation Site

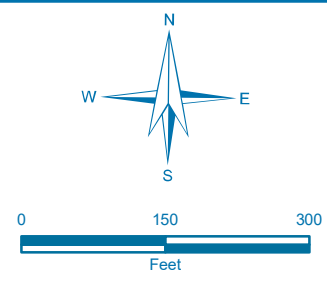
Randolph County, North Carolina

Date: 5/9/2019
Drawn by: RTM
Checked by: BPB
1 inch = 300 feet



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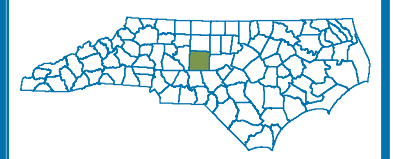
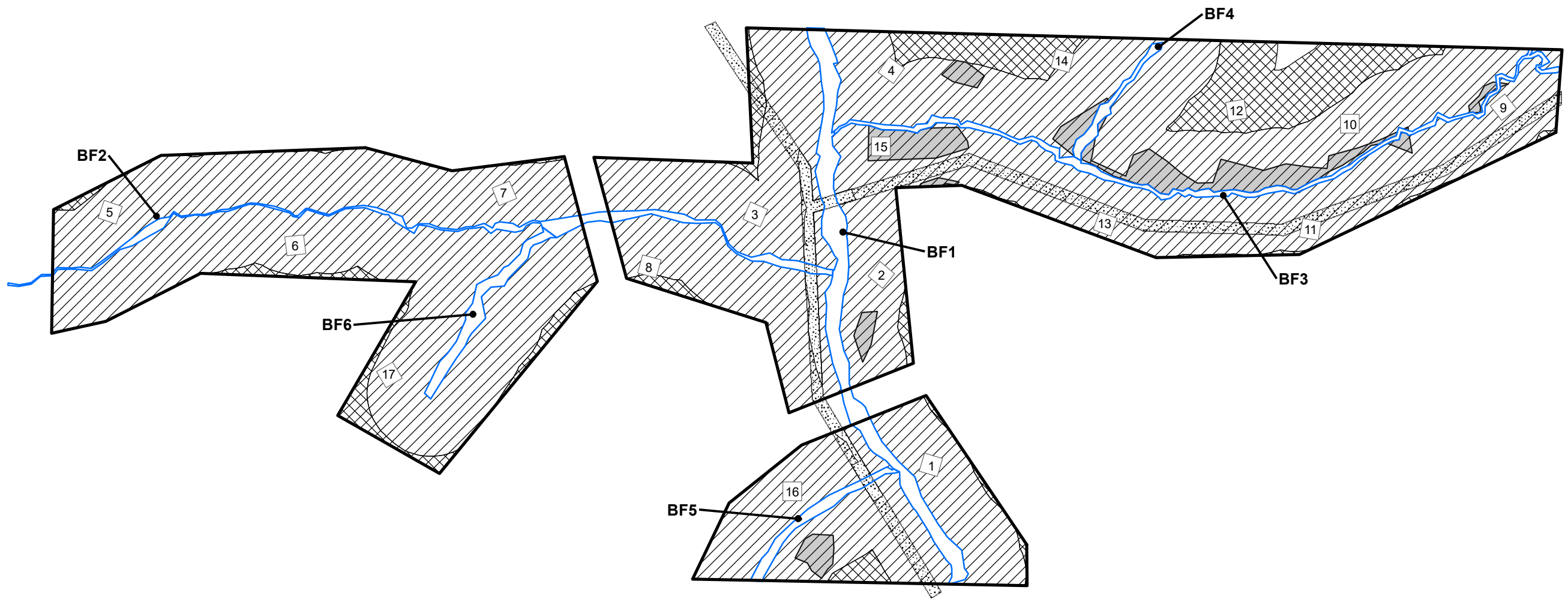


**Figure 3a**  
**As-Built Map**  
**RES Randleman Group A**  
**Pequod Site**  
**Randolph County, NC**

Date: 5/29/2019      Drawn by: RTM  
 1 in = 200 feet

**LEGEND**

- Conservation Easement
- Top of Bank
- Vegetation Plot
- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- Enhancement, 101-200
- Sewer Easement
- Sewer Easement (Zone 1)



Sealed Conservation Easement Boundaries were provided by GC Mapping, PLLC (FIRM # P-1311, GUY V. COOKE, PLS, L-4596), dated 10/11/18. Top of bank linework is based on field measurements also performed by GC Mapping, PLLC dated 10/11/18.

**Table 1b. Schmid Creek Mitigation Site Buffer Project Areas and Assets**

RIPARIAN BUFFER (15A NCAC 02B.0295)													If Converted to Nutrient Offset	
Location	Jurisdictional Streams	Restoration Type	Reach ID/Component	Buffer Width (ft)	Creditable Area (acres)*	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acres)	Convertible to Nutrient Offset (Yes or No)	Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural	Subject	Restoration	SC1	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	4.80	209,182.414		100%	1.00000	209182.414	4.80	No	0.000	0.000
				101-200	4.49	195,621.609		33%	3.00000	64555.131	1.48	No	0.000	0.000
	Enhancement	20-29	0.00	0	2	75%	2.66667	0.000	0.00	No	0.000	0.000		
		30-100	0.00	0		100%	2.00000	0.000	0.00	No	0.000	0.000		
		101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000		
<b>SUBTOTALS</b>					<b>9.29</b>	<b>404,804.023</b>				<b>273,737.54</b>	<b>6.28</b>		<b>0.000</b>	<b>0.000</b>

ELIGIBLE PRESERVATION AREA							134934.6743								
Location	Jurisdictional Streams	Restoration Type	Reach ID/Component	Buffer Width (ft)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acres)					
Rural	Subject	Preservation	20-29		0	10	75%	13.33333	0.000	0.00					
			30-100		0		100%	10.00000	0.000	0.00					
			101-200		0		33%	30.00000	0.000	0.00					
	Nonsubject		20-29		0	5	75%	6.66667	0.000	0.00					
			30-100		0		100%	5.00000	0.000	0.00					
			101-200		0		33%	15.00000	0.000	0.00					
Urban	Subject or Nonsubject	20-29		0	3	75%	4.00000	0.000	0.00						
		30-100		0		100%	3.00000	0.000	0.00						
		101-200		0		33%	9.00000	0.000	0.00						
<b>SUBTOTALS</b>					<b>0</b>			<b>0.000</b>	<b>0.00</b>						
<b>TOTALS</b>					<b>9.29</b>	<b>404,804.02</b>			<b>273,737.545</b>	<b>6.28</b>					

\*Area eligible for preservation may be no more than 25% of total area, where total area is back-calculated with the equation R+E/0.75

\*All buffers eligible for credit must be at minimum 20' wide

\*When preservation areas exceed the total eligible preservation area, select the areas with the best credit ratios as the creditable areas

FILLIBLE CELLS, leave blank if N/A

Regulatory direction for Riparian Buffer in this table follows NCAC rule 15A NCAC 02B .0295, effective November 1, 2015

Regulatory direction for Nutrient Offset in this table follows Nutrient Offsets Payments Rule 15A NCAC 02B. 0240, amended effective September 1, 2010 and

DWR – 1998. Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment

N.O. calculation based on effectiveness in 30 years, with 146.40 lb/ac P; and 2,273.02 lb/ac N. The N credit ratio used is 19.16325 sf per pound. The P credit ratio used is 297.54098 sf per pound

**Table 2b. Project Activity and Reporting History  
Schmid Creek Site**

**Elapsed Time Since grading complete:           NA**  
**Elapsed Time Since planting complete:       1 month**  
**Number of reporting Years<sup>1</sup>:               0**

<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Containerized, bare root and B&B plantings	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

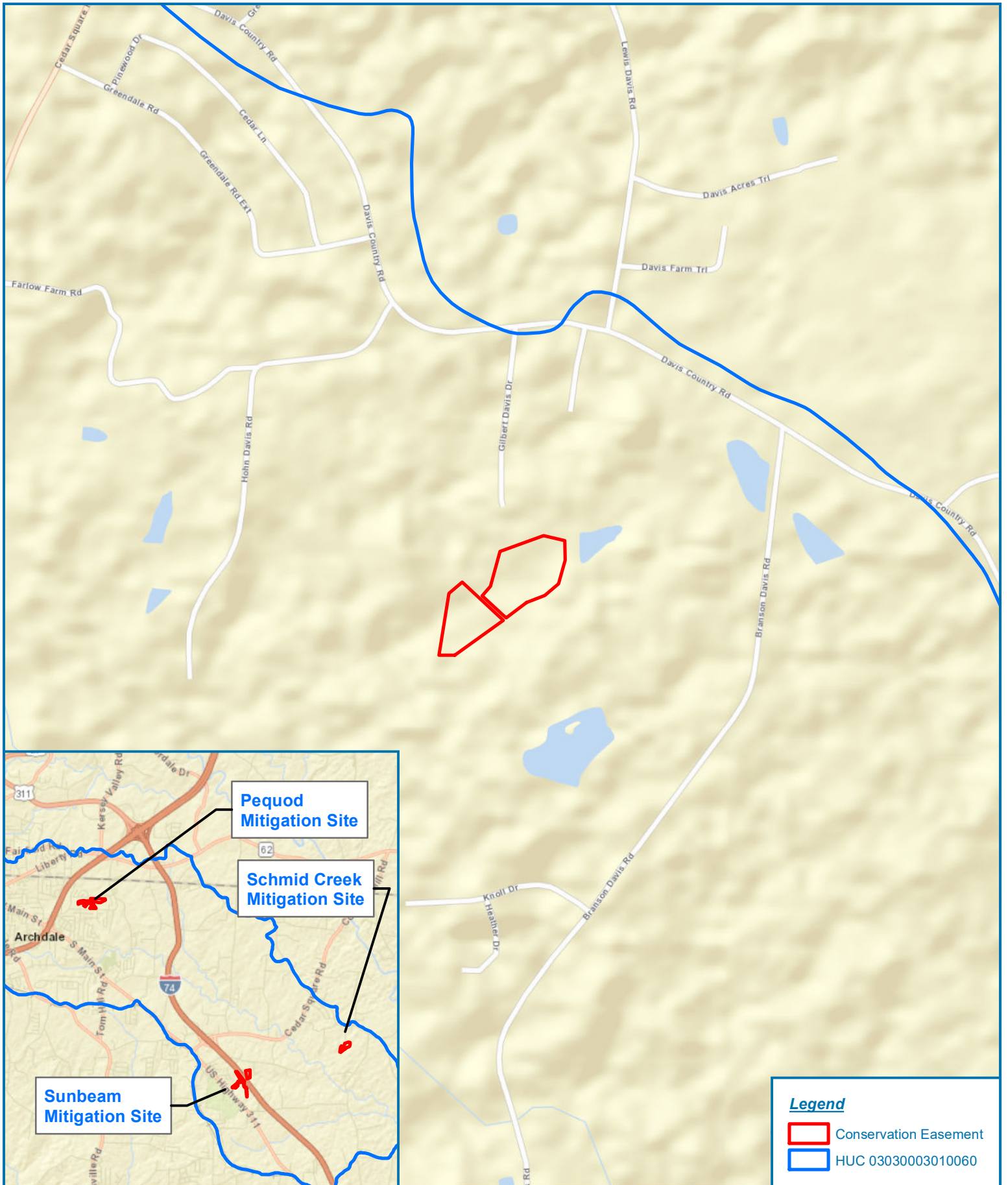
<sup>1</sup> = The number of reports or data points produced excluding the baseline

**Table 3b. Project Contacts Table  
Schmid Creek Mitigation Site**

<b>Planting Contractor</b>	H&J Forestry
Planting contractor POC	Matt Hitch
<b>Nursery Stock Suppliers</b>	Arborgen / 2011 Broadbank Court, Ridgeville, SC 29472
<b>Monitoring Performers</b>	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605
Vegetation Monitoring POC	Ryan Medric (919) 741-6268

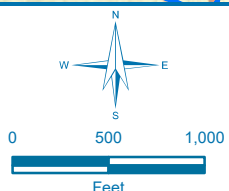
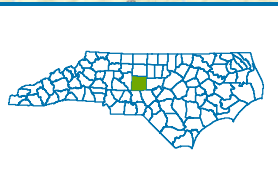
**Table 4b. Project Background Information**

Project Name	Schmid Creek		
County	Randolph		
Project Area (acres)	9.99		
Project Coordinates (latitude and longitude)	Latitude: 35.8726 N Longitude: -79.8726 W		
Planted Acreage (Acres of Woody Stems Planted)	9.3		
<b>Project Watershed Summary Information</b>			
Physiographic Province	Southern Outer Piedmont		
River Basin	Cape Fear		
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin	03-06-08		
Project Drainage Area (Acres)	57		
CGIA Land Use Classification	Forest; Agricultural; Residential		



**Legend**

- Conservation Easement
- HUC 03030003010060



**Figure 1b - Site Location Map**

**RES Randleman Group A - Schmid Creek Mitigation Site**

Randolph County, North Carolina

Date: 5/3/2019

Drawn by: RTM

Checked by: BPB

1 inch = 1,000 feet

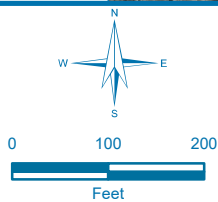






**Legend**

- Conservation Easement
- Vegetation Plot
- Buffer Mitigation**
- Restoration, 0-100
- Restoration, 101-200
- Top of Bank



**Figure 2b - Current Conditions Plan View**

**Schmid Creek Mitigation Site**  
**MY0 2019**  
**Randolph County, North Carolina**

Date: 5/9/2019

Drawn by: RTM

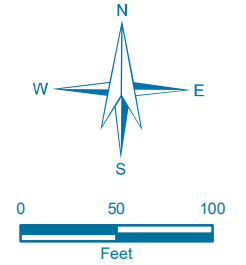
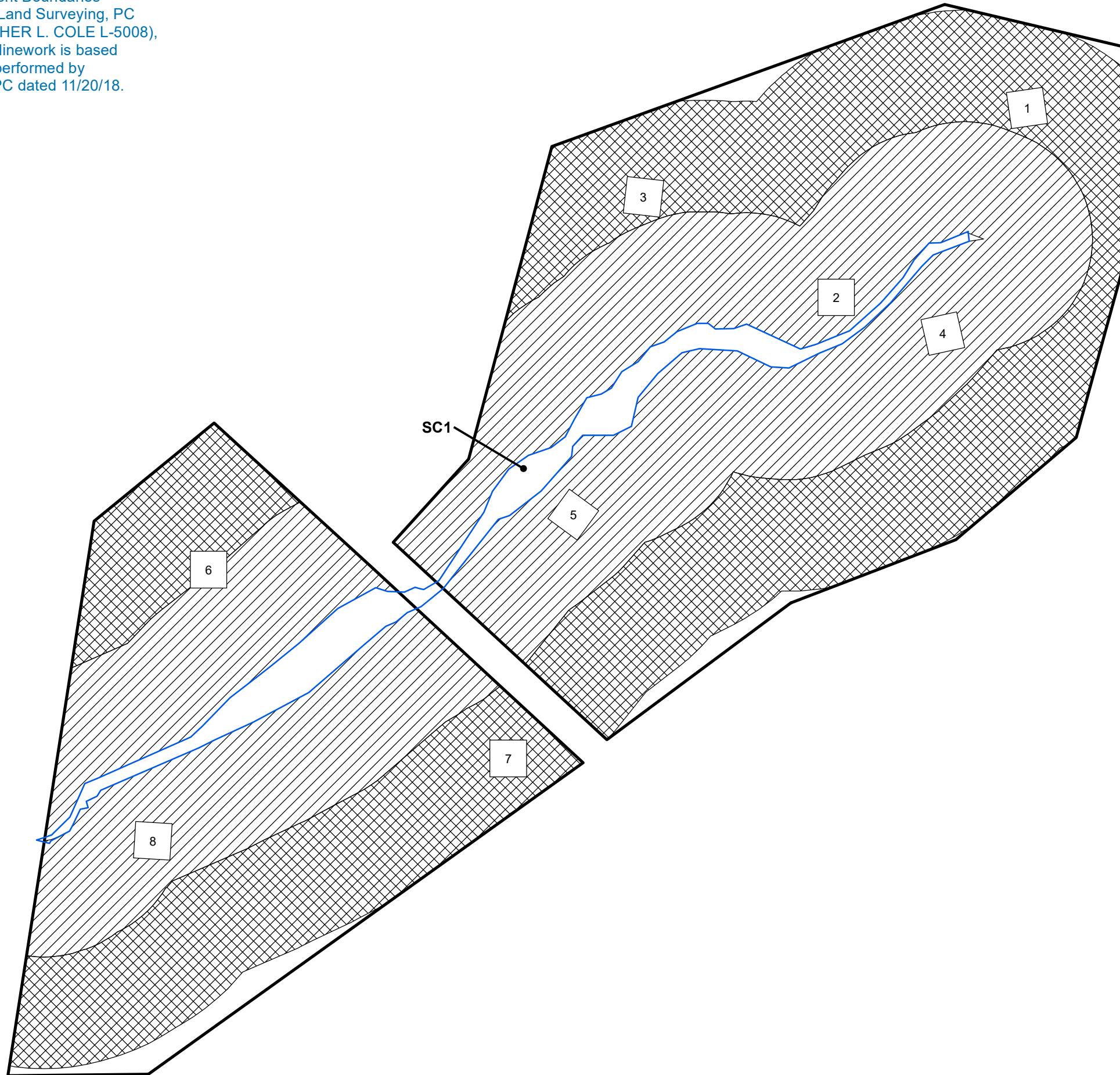
Checked by: BPB

1 inch = 200 feet





Sealed Conservation Easement Boundaries were provided by Ascension Land Surveying, PC (FIRM # C-4288, CHRISTOPHER L. COLE L-5008), dated 11/20/18. Top of bank linework is based on field measurements also performed by Ascension Land Surveying, PC dated 11/20/18.

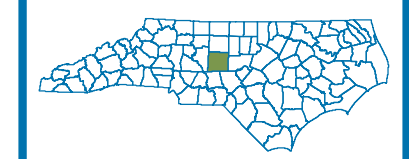


**Figure 3b**  
**As-Built Map**  
**RES Randleman Group A**  
**Schmid Creek Site**  
**Randolph County, NC**

Date: 5/9/2019      Drawn by: RTM  
1 in = 100 feet

**LEGEND**

- Conservation Easement
- Vegetation Plot
- Top of Bank
- Restoration, 0-100
- Restoration, 101-200



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Table 1c. Sunbeam Mitigation Site Buffer Project Areas and Assets

RIPARIAN BUFFER (15A NCAC 02B.0295)													If Converted to Nutrient Offset	
Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (acreage)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acreage)	Convertible to Nutrient Offset (Yes or No)	Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural	Subject	Restoration	ZF1	20-29	0.06	2,526.573	1	75%	1.33333	1,894.930	0.04	No	0.000	0.000
				30-100	4.16	181,155.058		100%	1.00000	181,155.058	4.16	No	0.000	0.000
				101-200	0.24	10,466.589		33%	3.00000	3,453.974	0.08	No	0.000	0.000
		Enhancement	ZF1	20-29	0.00	0.000	2	75%	2.66667	0.000	0.00	No	0.000	0.000
				30-100	0.15	6,623.942		100%	2.00000	3,311.971	0.08	No	0.000	0.000
				101-200	0.00	0.000		33%	6.00000	0.000	0.00	No	0.000	0.000
		Restoration	ZF2	20-29	0.00	0.000	1	75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	2.20	95,766.014		100%	1.00000	95,766.014	2.20	No	0.000	0.000
				101-200	0.00	0.000		33%	3.00000	0.000	0.00	No	0.000	0.000
			ZF3	20-29	0.00	0.000		75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	4.16	181,231.846		100%	1.00000	181,231.846	4.16	No	0.000	0.000
				101-200	0.20	8,616.555		33%	3.00000	2,843.463	0.07	No	0.000	0.000
			ZF4	20-29	0.00	0.000		75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	1.93	83,983.325		100%	1.00000	83,983.325	1.93	No	0.000	0.000
				101-200	1.86	81,120.676		33%	3.00000	26,769.823	0.61	No	0.000	0.000
		<b>SUBTOTALS</b>				<b>14.96</b>	<b>651,490.578</b>				<b>580,410.404</b>	<b>13.32</b>		<b>0.000</b>

**ELIGIBLE PRESERVATION AREA**      **4.99**      **217,163.526**

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (acreage)	Creditable Area (sf)*	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Riparian Buffer Credits (acreage)
Rural	Subject	Preservation	ZF4	20-29	0.00	0.000	10	75%	13.33333	0.000	0.00
				30-100	1.01	44,063.416		100%	10.00000	4406.342	0.10
				101-200	0.83	35,948.262		33%	30.00000	1186.293	0.03
				<b>SUBTOTALS</b>				<b>1.84</b>	<b>80,011.678</b>		
<b>TOTALS</b>				<b>16.79</b>	<b>731,502.256</b>				<b>586,003.039</b>	<b>13.45</b>	

\*Area eligible for preservation may be no more than 25% of total area, where total area is back-calculated with the equation R+E/0.75.

\*All buffers eligible for credit must be at minimum 20' wide

\*When preservation areas exceed the total eligible preservation area, select the areas with the best credit ratios as the creditable areas.

**FILLIBLE CELLS, leave blank if N/A**

Regulatory direction for Riparian Buffer in this table follows NCAC rule 15A NCAC 02B.0295, effective November 1, 2015.

Regulatory direction for Nutrient Offset in this table follows Nutrient Offsets Payments Rule 15A NCAC 02B.0240, amended effective September 1, 2010 and

DWR – 1998. Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment.

N.O. calculation based on effectiveness in 30 years, with 146.40 lb/ac P; and 2,273.02 lb/ac N. The N credit ratio used is 19.16325 sf per pound. The P credit ratio used is 297.54098 sf per pound.

**Table 2c. Project Activity and Reporting History  
Sunbeam Site**

**Elapsed Time Since grading complete:           NA**  
**Elapsed Time Since planting complete:       1 month**  
**Number of reporting Years<sup>1</sup>:               0**

<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Containerized, bare root and B&B plantings	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

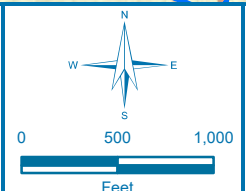
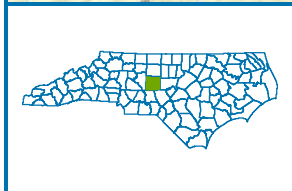
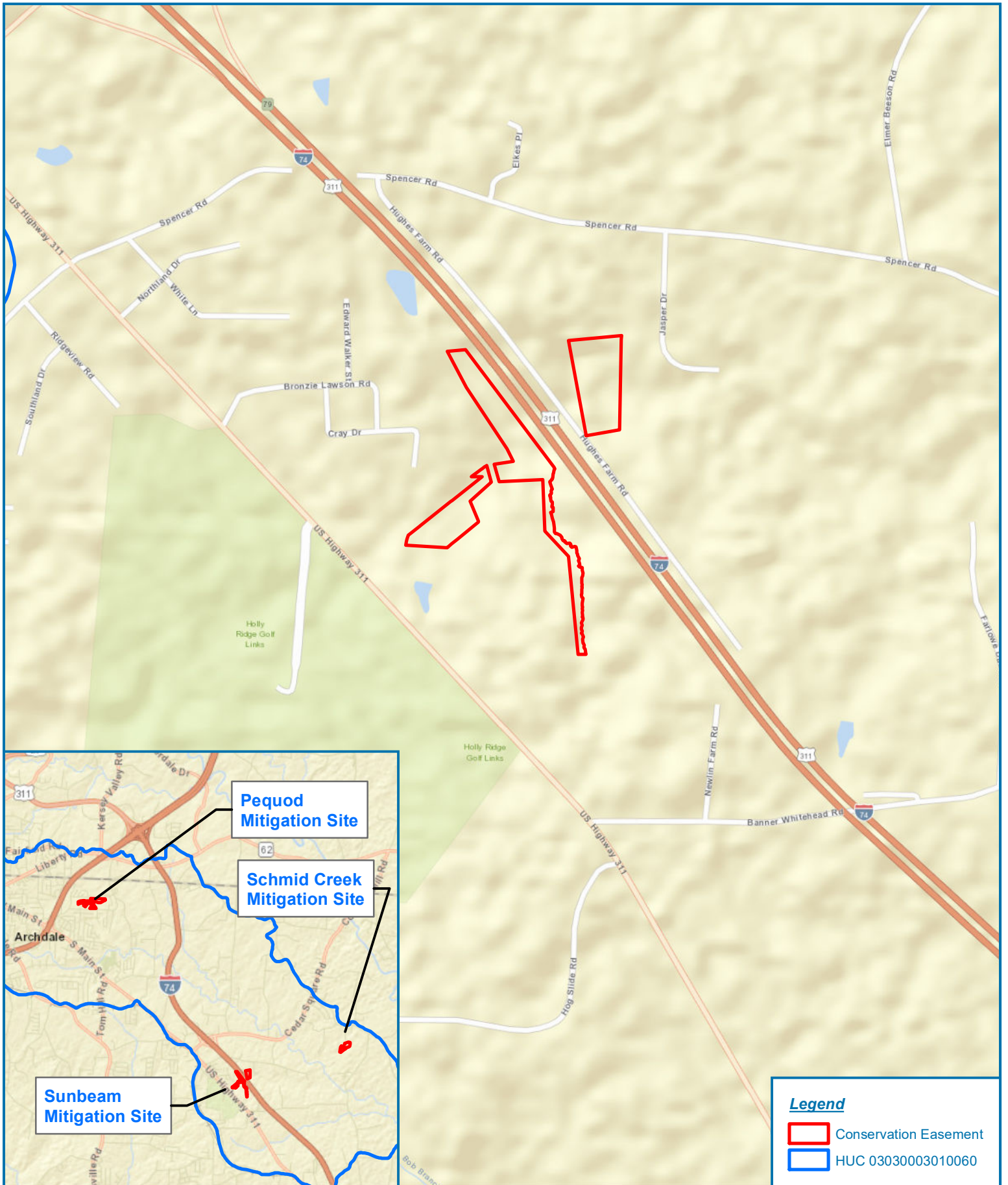
<sup>1</sup> = The number of reports or data points produced excluding the baseline

**Table 3c. Project Contacts Table  
Sunbeam Site**

<b>Planting Contractor</b>	H&J Forestry
Planting contractor POC	Matt Hitch
<b>Nursery Stock Suppliers</b>	Arborgen / 2011 Broadbank Court, Ridgeville, SC 29472
<b>Monitoring Performers</b>	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605
Vegetation Monitoring POC	Ryan Medric (919) 741-6268

**Table 4c. Project Background Information**

Project Name	Sunbeam		
County	Randolph		
Project Area (acres)	18.46		
Project Coordinates (latitude and longitude)	Latitude: 35.8726 N Longitude: -79.8726 W		
Planted Acreage (Acres of Woody Stems Planted)	14.8		
<b>Project Watershed Summary Information</b>			
Physiographic Province	Southern Outer Piedmont		
River Basin	Cape Fear		
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin	03-06-08		
Project Drainage Area (Acres)	540		
CGIA Land Use Classification	Forest; Agricultural; Residential		

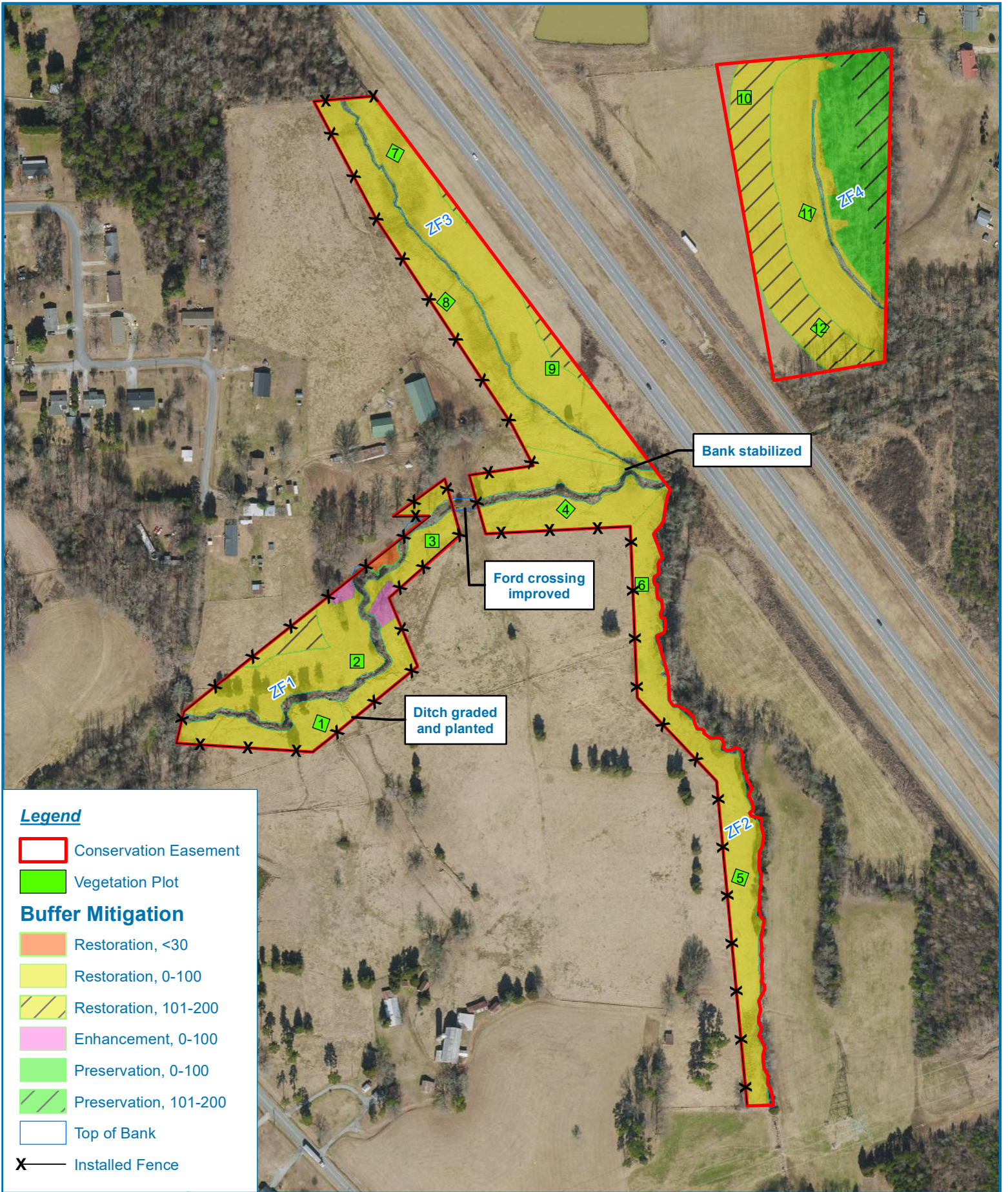


**Figure 1c - Site Location Map**  
**RES Randleman Group A - Sunbeam Mitigation Site**  
 Randolph County, North Carolina

Date: 5/3/2019  
 Drawn by: RTM  
 Checked by: BPB  
 1 inch = 1,000 feet







**Legend**

- Conservation Easement
- Vegetation Plot
- Buffer Mitigation**
- Restoration, <30
- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- Preservation, 0-100
- Preservation, 101-200
- Top of Bank
- ✕ — Installed Fence

Figure 2c - Current Conditions Plan View

**RES Randleman Group A:  
Sunbeam Mitigation Site**

Randolph County, North Carolina

Date: 5/29/2019

Drawn by: RTM

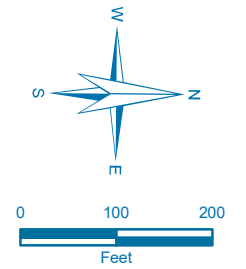
Checked by: BPB

1 inch = 300 feet





Sealed Conservation Easement Boundaries were provided by GC Mapping, PLLC (FIRM # P-1311, GUY V. COOKE, PLS, L-4596), dated 1/30/19. Top of bank linework is based on field measurements also performed by GC Mapping, PLLC dated 1/30/19.

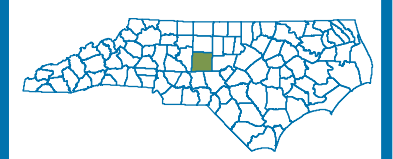
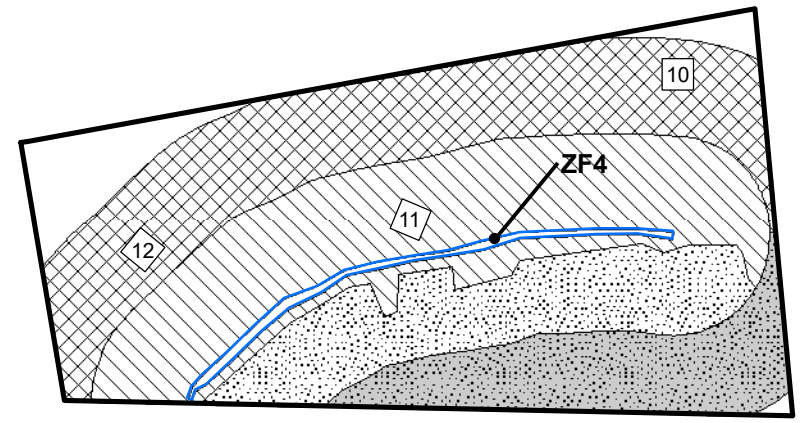
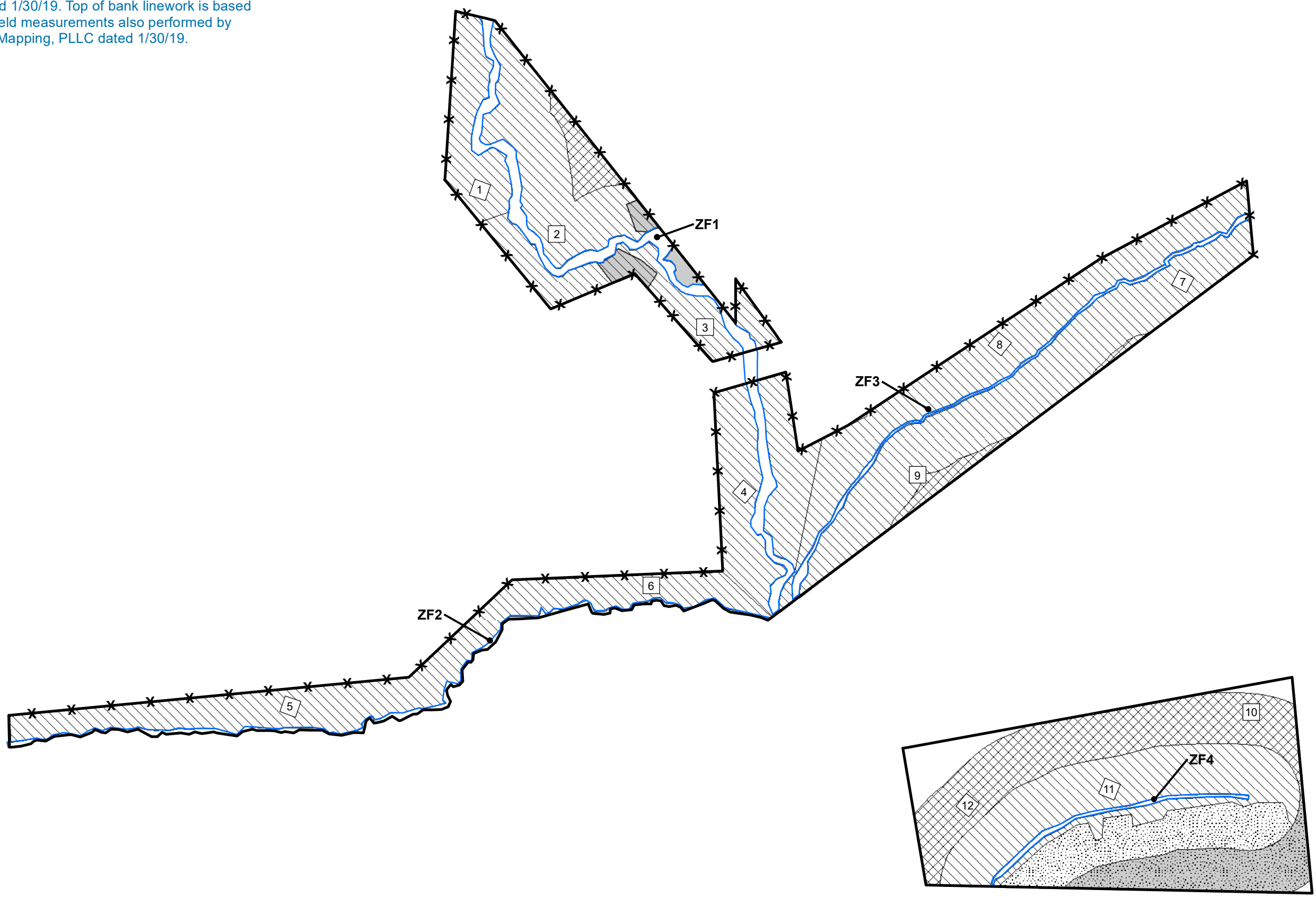


**Figure 3c**  
**As-Built Map**  
**RES Randleman Group A Sunbeam Site**  
**Randolph County, NC**

Date: 5/29/2019 Drawn by: RTM  
 1 in = 200 feet

**LEGEND**

- Conservation Easement
- Vegetation Plot
- Top of Bank
- Buffer Mitigation**
- Restoration, <30
- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- Preservation, 0-100
- Preservation, 101-200
- Installed Fence



# **Appendix B**

## **Vegetation Assessment Data**



**Table 5a. Pequod Planted Species Summary**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Total Stems Planted</b>
Sycamore	<i>Platanus occidentalis</i>	3,800
Water Oak	<i>Quercus nigra</i>	3,800
Tuliptree	<i>Liriodendron tulipifera</i>	2,400
Willow Oak	<i>Quercus phellos</i>	2,000
White Oak	<i>Quercus alba</i>	1,800
Northern Red Oak	<i>Quercus rubra</i>	1,800
River Birch	<i>Betula nigra</i>	1,400
Green Ash	<i>Fraxinus pennsylvanica</i>	1,200
<b>Total</b>		<b>18,200</b>

**Table 6a. Pequod Vegetation Plot Mitigation Success Summary**

<b>Plot #</b>	<b>Planted Stems/Acre</b>	<b>Volunteer Stems/Acre</b>	<b>Total Stems/Acre</b>	<b>Success Criteria Met?</b>	<b>Average Planted Stem Height (ft)</b>
1	1093	0	1093	Yes	1.9
2	971	0	971	Yes	1.5
3	809	0	809	Yes	2.1
4	971	0	971	Yes	1.8
5	1093	0	1093	Yes	1.6
6	1052	0	1052	Yes	1.6
7	890	0	890	Yes	1.6
8	809	0	809	Yes	1.5
9	1012	0	1012	Yes	1.8
10	1012	0	1012	Yes	1.7
11	931	0	931	Yes	1.6
12	1012	0	1012	Yes	1.5
13	1012	0	1012	Yes	1.7
14	1012	0	1012	Yes	2.0
15	809	6070	6880	Yes	1.9
16	809	0	809	Yes	1.4
17	931	0	931	Yes	1.6
<b>Project Avg</b>	<b>955</b>	<b>357</b>	<b>1312</b>	<b>Yes</b>	<b>1.7</b>



**Table 5b. Schmid Creek Planted Species Summary**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Total Stems Planted</b>
Water Oak	<i>Quercus nigra</i>	2,700
Sycamore	<i>Platanus occidentalis</i>	2,800
Tuliptree	<i>Liriodendron tulipifera</i>	1,600
Willow Oak	<i>Quercus phellos</i>	1,500
White Oak	<i>Quercus alba</i>	1,500
Northern Red Oak	<i>Quercus rubra</i>	1,200
River Birch	<i>Betula nigra</i>	1,000
Green Ash	<i>Fraxinus pennsylvanica</i>	800
<b>Total</b>		<b>13,100</b>

**Table 6b. Schmid Creek Vegetation Plot Mitigation Success Summary**

<b>Plot #</b>	<b>Planted Stems/Acre</b>	<b>Volunteer Stems/Acre</b>	<b>Total Stems/Acre</b>	<b>Success Criteria Met?</b>	<b>Average Planted Stem Height (ft)</b>
1	931	0	931	Yes	1.7
2	1012	0	1012	Yes	1.5
3	1255	0	1255	Yes	1.8
4	1093	0	1093	Yes	1.5
5	890	0	890	Yes	1.6
6	1255	0	1255	Yes	1.7
7	1174	0	1174	Yes	1.7
8	1012	0	1012	Yes	1.7
<b>Project Avg</b>	<b>1077</b>	<b>0</b>	<b>1077</b>	<b>Yes</b>	<b>1.7</b>

**Table 7b. Schmid Creek Stem Count Total and Planted by Plot Species**

Schmid Creek			Current Plot Data (MY0 2019)																								Annual Means		
Scientific Name	Common Name	Species Type	04122019-01-0001			04122019-01-0002			04122019-01-0003			04122019-01-0004			04122019-01-0005			04122019-01-0006			04122019-01-0007			04122019-01-0008			MY0 (2019)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	river birch	Tree	1	1	1	1	1	1	5	5	5	8	8	8	2	2	2	11	11	11				1	1	1	29	29	29
Fraxinus pennsylvanica	green ash	Tree	1	1	1	4	4	4				2	2	2	1	1	1	2	2	2	3	3	3	1	1	1	14	14	14
Liriodendron tulipifera	tuliptree	Tree	4	4	4	2	2	2	1	1	1	5	5	5	6	6	6	5	5	5	8	8	8	5	5	5	36	36	36
Platanus occidentalis	American sycamore	Tree	8	8	8	5	5	5	12	12	12	2	2	2	4	4	4	7	7	7	4	4	4	3	3	3	45	45	45
Quercus	oak	Tree	6	6	6	6	6	6				4	4	4				5	5	5	9	9	9	8	8	8	38	38	38
Quercus alba	white oak	Tree				2	2	2																			2	2	2
Quercus nigra	water oak	Tree	1	1	1	1	1	1	2	2	2				3	3	3							1	1	1	8	8	8
Quercus phellos	willow oak	Tree	1	1	1	2	2	2	10	10	10	4	4	4	5	5	5				1	1	1	6	6	6	29	29	29
Quercus rubra	northern red oak	Tree	1	1	1	2	2	2	1	1	1	2	2	2	1	1	1	1	1	1	4	4	4				12	12	12
<b>Stem count</b>			23	23	23	25	25	25	31	31	31	27	27	27	22	22	22	31	31	31	29	29	29	25	25	25	213	213	213
<b>size (ares)</b>			1			1			1			1			1			1			1			8					
<b>size (ACRES)</b>			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247			0.1977					
<b>Species count</b>			8	8	8	9	9	9	6	6	6	7	7	7	7	7	7	6	6	6	6	6	6	7	7	7	9	9	9
<b>Stems per ACRE</b>			931	931	931	1012	1012	1012	1255	1255	1255	1093	1093	1093	890	890	890	1255	1255	1255	1174	1174	1174	1012	1012	1012	1077	1077	1077

**Table 5c. Sunbeam Planted Species Summary**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Total Stems Planted</b>
Water Oak	<i>Quercus nigra</i>	2,100
Sycamore	<i>Platanus occidentalis</i>	1,900
Tuliptree	<i>Liriodendron tulipifera</i>	1,000
Willow Oak	<i>Quercus phellos</i>	1,000
White Oak	<i>Quercus alba</i>	800
Northern Red Oak	<i>Quercus rubra</i>	800
River Birch	<i>Betula nigra</i>	600
Green Ash	<i>Fraxinus pennsylvanica</i>	600
<b>Total</b>		<b>8,800</b>

**Table 6c. Sunbeam Vegetation Plot Mitigation Success Summary**

<b>Plot #</b>	<b>Planted Stems/Acre</b>	<b>Volunteer Stems/Acre</b>	<b>Total Stems/Acre</b>	<b>Success Criteria Met?</b>	<b>Average Planted Stem Height (ft)</b>
1	688	0	688	Yes	1.7
2	647	0	647	Yes	2.0
3	1012	0	1012	Yes	1.9
4	931	0	931	Yes	1.7
5	1133	0	1133	Yes	1.6
6	1133	0	1133	Yes	1.7
7	1133	0	1133	Yes	1.8
8	1416	0	1416	Yes	1.3
9	769	0	769	Yes	1.7
10	809	0	809	Yes	1.5
11	688	0	688	Yes	1.7
12	931	0	931	Yes	1.4
<b>Project Avg</b>	<b>941</b>	<b>0</b>	<b>941</b>	<b>Yes</b>	<b>1.6</b>

Table 7c. Sunbeam Stem Count Total and Planted by Plot Species

Sunbeam			Current Plot Data (MY0 2019)																				
Scientific Name	Common Name	Species Type	04182019-01-0001			04182019-01-0002			04182019-01-0003			04182019-01-0004			04182019-01-0005			04182019-01-0006			04182019-01-0007		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	river birch	Tree							3	3	3	7	7	7	1	1	1	5	5	5			
Fraxinus pennsylvanica	green ash	Tree	7	7	7	5	5	5	5	5	5	5	5	5	2	2	2	3	3	3			
Liriodendron tulipifera	tuliptree	Tree	1	1	1	2	2	2	2	2	2	1	1	1	6	6	6				5	5	5
Platanus occidentalis	American sycamore	Tree	3	3	3	4	4	4	5	5	5	3	3	3	6	6	6	9	9	9	6	6	6
Quercus	oak	Tree	5	5	5	4	4	4	2	2	2	3	3	3	5	5	5	2	2	2	5	5	5
Quercus alba	white oak	Tree												1	1	1							
Quercus nigra	water oak	Tree	1	1	1				4	4	4	3	3	3	3	3	3	3	3	3	5	5	5
Quercus phellos	willow oak	Tree							2	2	2	1	1	1	3	3	3	4	4	4	4	4	4
Quercus rubra	northern red oak	Tree				1	1	1	2	2	2				1	1	1	2	2	2	3	3	3
<b>Stem count</b>			17	17	17	16	16	16	25	25	25	23	23	23	28	28	28	28	28	28	28	28	28
<b>size (ares)</b>			1			1			1			1			1			1			1		
<b>size (ACRES)</b>			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
<b>Species count</b>			5	5	5	5	5	5	8	8	8	7	7	7	9	9	9	7	7	7	6	6	6
<b>Stems per ACRE</b>			688	688	688	647	647	647	1012	1012	1012	931	931	931	1133	1133	1133	1133	1133	1133	1133	1133	1133

Sunbeam			Current Plot Data (MY0 2019)												Annual Means					
Scientific Name	Common Name	Species Type	04182019-01-0008			04182019-01-0009			04182019-01-0010			04182019-01-0011			04182019-01-0012			MY0 (2019)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	river birch	Tree	2	2	2												18	18	18	
Fraxinus pennsylvanica	green ash	Tree	3	3	3				1	1	1	3	3	3	2	2	2	36	36	36
Liriodendron tulipifera	tuliptree	Tree				2	2	2	1	1	1	2	2	2			22	22	22	
Platanus occidentalis	American sycamore	Tree	1	1	1	6	6	6	4	4	4	3	3	3	1	1	1	51	51	51
Quercus	oak	Tree	7	7	7	3	3	3	6	6	6	5	5	5	5	5	5	52	52	52
Quercus alba	white oak	Tree	10	10	10									8	8	8	19	19	19	
Quercus nigra	water oak	Tree	3	3	3	2	2	2	3	3	3	3	3	3			30	30	30	
Quercus phellos	willow oak	Tree	4	4	4	2	2	2	2	2	2			4	4	4	26	26	26	
Quercus rubra	northern red oak	Tree	5	5	5	4	4	4	3	3	3	1	1	1	3	3	3	25	25	25
<b>Stem count</b>			35	35	35	19	19	19	20	20	20	17	17	17	23	23	23	279	279	279
<b>size (ares)</b>			1			1			1			1			1			12		
<b>size (ACRES)</b>			0.0247			0.0247			0.0247			0.0247			0.0247			0.2965		
<b>Species count</b>			8	8	8	6	6	6	7	7	7	6	6	6	6	6	6	9	9	9
<b>Stems per ACRE</b>			1416	1416	1416	769	769	769	809	809	809	688	688	688	931	931	931	941	941	941

# **Appendix C**

## **Vegetation Monitoring Plot Photos**



## Pequod Vegetation Monitoring Plot Photos



Vegetation Plot 1



Vegetation Plot 2



Vegetation Plot 3



Vegetation Plot 4



Vegetation Plot 5



Vegetation Plot 6



**Pequod Vegetation Monitoring Plot Photos**



Vegetation Plot 7



Vegetation Plot 8



Vegetation Plot 9



Vegetation Plot 10



Vegetation Plot 11



Vegetation Plot 12



**Pequod Vegetation Monitoring Plot Photos**



Vegetation Plot 13



Vegetation Plot 14 (no photo)



Vegetation Plot 15



Vegetation Plot 16



Vegetation Plot 17



## Schmid Creek Vegetation Monitoring Plot Photos



Vegetation Plot 1



Vegetation Plot 2



Vegetation Plot 3



Vegetation Plot 4



Vegetation Plot 5



Vegetation Plot 6

**Schmid Creek Vegetation Monitoring Plot Photos**



Vegetation Plot 7



Vegetation Plot 8



## Sunbeam Vegetation Monitoring Plot Photos



Vegetation Plot 1



Vegetation Plot 2



Vegetation Plot 3



Vegetation Plot 4



Vegetation Plot 5



Vegetation Plot 6



## Sunbeam Vegetation Monitoring Plot Photos



Vegetation Plot 7



Vegetation Plot 8



Vegetation Plot 9



Vegetation Plot 10



Vegetation Plot 11



Vegetation Plot 12

# **Appendix D**

## **Buffer Impacts Authorization**



NORTH CAROLINA  
*Environmental Quality*

ROY COOPER  
*Governor*

MICHAEL S. REGAN  
*Secretary*

LINDA CULPEPPER  
*Interim Director*

January 23, 2019

DWR # 20181330 v2  
Randolph County

RES  
Attn: Jamey McEachran  
302 Jefferson St  
Raleigh NC 27608

**Subject:** APPROVAL of RANDLEMAN RIPARIAN BUFFER IMPACTS WITH ADDITIONAL CONDITIONS  
Sunbeam Mitigation Site

Dear Ms. McEachran:

You have our approval for the impacts listed below for the purpose described in your application dated and received by the Division of Water Resources (Division) December 20, 2018, with subsequent information on January 16, 2019. These impacts are covered by the Randleman Lake Buffer Rules and the conditions listed below. Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

This approval requires you to follow the conditions listed in the enclosed certification(s) or general permit and the following additional conditions:

1. The following impacts are hereby approved provided that all of the other specific and general conditions of the Randleman Lake Buffer Rules are met. No other impacts are approved, including incidental impacts. [15A NCAC 02B .0250(8)]

Type of Impact	Amount Approved (units)	
	Permanent	Temporary
Buffers – Zone 1	0 square feet	5448 square feet





2. This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of the Authorization. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this approval letter and General Certification(s)/Permit/Authorization and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]
3. The permittee shall report to the Winston Salem Regional Office any noncompliance with this certification, any violation of stream or wetland standards [15A NCAC 02B .0200] including but not limited to sediment impacts, and any violation of state regulated riparian buffer rules [15A NCAC 02B .0200]. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the applicant became aware of the circumstances. A written submission shall also be provided within 5 business days of the time the applicant becomes aware of the circumstances. The written submission shall contain a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, if the noncompliance has not been corrected, the anticipated time compliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Division may waive the written submission requirement on a case-by-case basis.

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5]

This Authorization can be contested as provided in General Statute 150B by filing a written petition for an administrative hearing to the Office of Administrative Hearings (hereby known as OAH) **within sixty (60) calendar days**.

A petition form may be obtained from the OAH at <http://www.ncoah.com/> or by calling the OAH Clerk's Office at (919) 431-3000 for information. A petition is considered filed when the original and one (1) copy along with any applicable OAH filing fee is received in the OAH during normal office hours (Monday through Friday between 8:00am and 5:00pm, excluding official state holidays).

The petition may be faxed to the OAH at (919) 431-3100, provided the original and one copy of the petition along with any applicable OAH filing fee is received by the OAH within five (5) business days following the faxed transmission.

Mailing address for the OAH:

*If sending via US Postal Service:*

Office of Administrative Hearings  
6714 Mail Service Center  
Raleigh, NC 27699-6714

*If sending via delivery service (UPS, FedEx, etc):*

Office of Administrative Hearings  
1711 New Hope Church Road  
Raleigh, NC 27609-6285

One (1) copy of the petition must also be served to DEQ:

William F. Lane, General Counsel  
Department of Environmental Quality  
1601 Mail Service Center  
Raleigh, NC 27699-1601

This letter completes the review of the Division the Randleman Lake Riparian Buffer Rules as described in 15A NCAC 02B .0250. Please contact Sue Homewood at 336-776-9693 or [sue.homewood@ncdenr.gov](mailto:sue.homewood@ncdenr.gov) if you have any questions or concerns.

Sincerely,



Sherri V. Knight, P. E.  
Regional Supervisor  
Water Quality Regional Operations Section  
Division of Water Resources, NCDEQ – WSRO

cc: Milford C. Farlow, Hockett Family Trust, 6879 Dresden Rd, Archdale NC 27263  
DWR WSRO 401 file  
DWR 401 & Buffer Permitting Unit file