Year 2 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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December 2020

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RE: RES Randleman Group A: MY2 Monitoring Report (NCDMS ID 100046)

Listed below are comments provided by DMS on Novemebe 16, 2020 regarding the RES Randleman Group A: Draft MY2 Monitoring Report and RES' responses.

1. Please take all credits to 3 decimal places throughout the report (Section 1.1 Credit Table, Table 1a, Table 1b, etc.).
Done.

2. Section 2.2, 1st paragraph – Please verify the credits for restoration and enhancement in the first sentence. The values do not match DMS calculations or Table 1a in the report. As mentioned above, please take the credits to 3 decimal places.
Done.

3. Please change creditable areas in Tables 1a, 1b, and 1c to the nearest whole number. Also, please consistently format table numbers to use comma separators.
Done.

4. Electronic Files – Please include the veg plot features for Pequod.
Done.

Table of Contents

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 1,671,826.349 ft² (38.38acres) 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	812,085.766 ft² (18.64 ac)
Schmid Creek	273,737.545 ft² (6.28 ac)
Sunbeam	586,003.039 ft² (13.45 ac)
Total	**1,671,826.349 ft² (38.38 ac)**

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 were invasive species were treated,
- diffuse flow is being maintained in the conservation easement areas; and
- there has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

Component/ Feature	Monitoring	Maintenance through project close-out
Vegetation	Annual vegetation monitoring	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing.
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) 03030003, 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, approximately 22.14 acres in size, 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 767,201.823 ft^2 (17.61 acres) of riparian buffer restoration credits on existing non-forested pasture and 44,883.943 ft^2 (1.03 acres) of buffer enhancement credits. The riparian buffer restoration and enhancement adjacent to the ephemeral Reach B4 comprises 1.32 acres (57,464 ft^2) 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 03030003 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 and 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 and treated.

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 4th, 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.

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 4th, 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 ft² (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) 03030003, 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 acres. 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^2 (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) 03030003, 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, approximately 18.4 acres in size, 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^2 (13.25 acres) of riparian buffer restoration credits on existing non-forested pasture, 3,311.971 ft^2 (0.08 acres) of buffer enhancement credits via cattle exclusion, and 5,592.634 ft^2 (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 03030003 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 (**As-Built Report**). 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 YEAR 2 (MY2) MONITORING PERFORMANCE

The RES Randleman Group A Year 2 Monitoring activities were completed in October 2020. All Year 2 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 October 2020. Vegetation tables are in **Appendix B** and associated photos are in **Appendix C**. At Pequod, 17 of 17 plots are exceeding the interim success criteria of 320 planted stems per acre. Planted stem densities ranged from 364 to 971 planted stems per acre with a mean of 643 planted stems per acre across all plots. The average planted stem height was 2.9 feet. At Schmid Creek, 8 of 8 plots are exceeding the interim success criteria and the planted stem densities range from 486 to 1,093 with a mean of 799 stems per acre across all plots. The average planted stem height was 2.4 feet. And 12 of 12 plots at Sunbeam are exceeding the interim success criteria and the planted stem densities range from 445 to 1,255 with a mean of 762 stems per acre across all plots. The average planted stem height was 3.5 feet. A total of 13 tree species were documented within the plots. Volunteer species were more abundant across the sites in MY2.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout all three Sites. Small, localized areas of Chinese privet, tree of heaven, and princess tree were treated at Pequod and Sunbeam in August 2020. Invasive treatments will continue as needed throughout the remainder of the monitoring period.

6 REFERENCES

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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 – As-Built Baseline Monitoring Report.

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Appendix A

Project Background Tables and Site Maps

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

RIPARIAN BUFFER (15A NCAC 02B.0295)

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)	If Converted to Nutrient Offset: Nutrient Offset: N (lbs)	If Converted to Nutrient Offset: 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	145,905		100%	1.00000	145,904.931	3.35	No	0.000	0.000
				101-200	0.24	10,237		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	No	0.000	0.000
				30-100	0.05	2,032		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	239,201		100%	1.00000	239,200.774	5.49	No	0.000	0.000
				101-200	0.18	7,966		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	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	212,393		100%	1.00000	212,392.571	4.88	No	0.000	0.000
				101-200	0.99	43,258		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	No	0.000	0.000
				30-100	0.64	27,860		100%	2.00000	13,930.039	0.32	No	0.000	0.000
				101-200	0.00			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		100%	1.00000	48,185.441	1.11	No	0.000	0.000
				101-200	0.04	1,850		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	No	0.000	0.000
				30-100	0.08	3,362		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	80,603		100%	1.00000	80,602.565	1.85	No	0.000	0.000
				101-200	0.24	10,290		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	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
				SUBTOTALS	**19.13**	**833,142**				**767,201.823**	**17.61**		**0.000**	**0.000**

	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
				SUBTOTALS		**0**				**0.000**	**0.000**

**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*		6.38	277,714						
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		100%	1.00000	37,838.047	0.87
				101-200	0.37	16,278		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		100%	2.00000	1674.124	0.04
				101-200	0.00	0		33%	6.00000	0.000	0.00
				SUBTOTALS	**1.32**	**57,464**				**44,883.943**	**1.03**
				TOTALS	**20.45**	**890,606**				**812,085.766**	**18.64**

** 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 year 7 months**
Number of reporting Years[1]: **2**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Site Planting	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring	Oct-19	Nov-19
Invasive Species Treatment	NA	Aug-20
Year 2 Monitoring	Oct-20	Nov-20
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

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

Table 3a. Project Contacts Table Pequod Site	
Planting Contractor Planting contractor POC	H&J Forestry Matt Hitch
Nursery Stock Suppliers	Claridge Nursery 1-(888) 628-7337
Monitoring Performers	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
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	

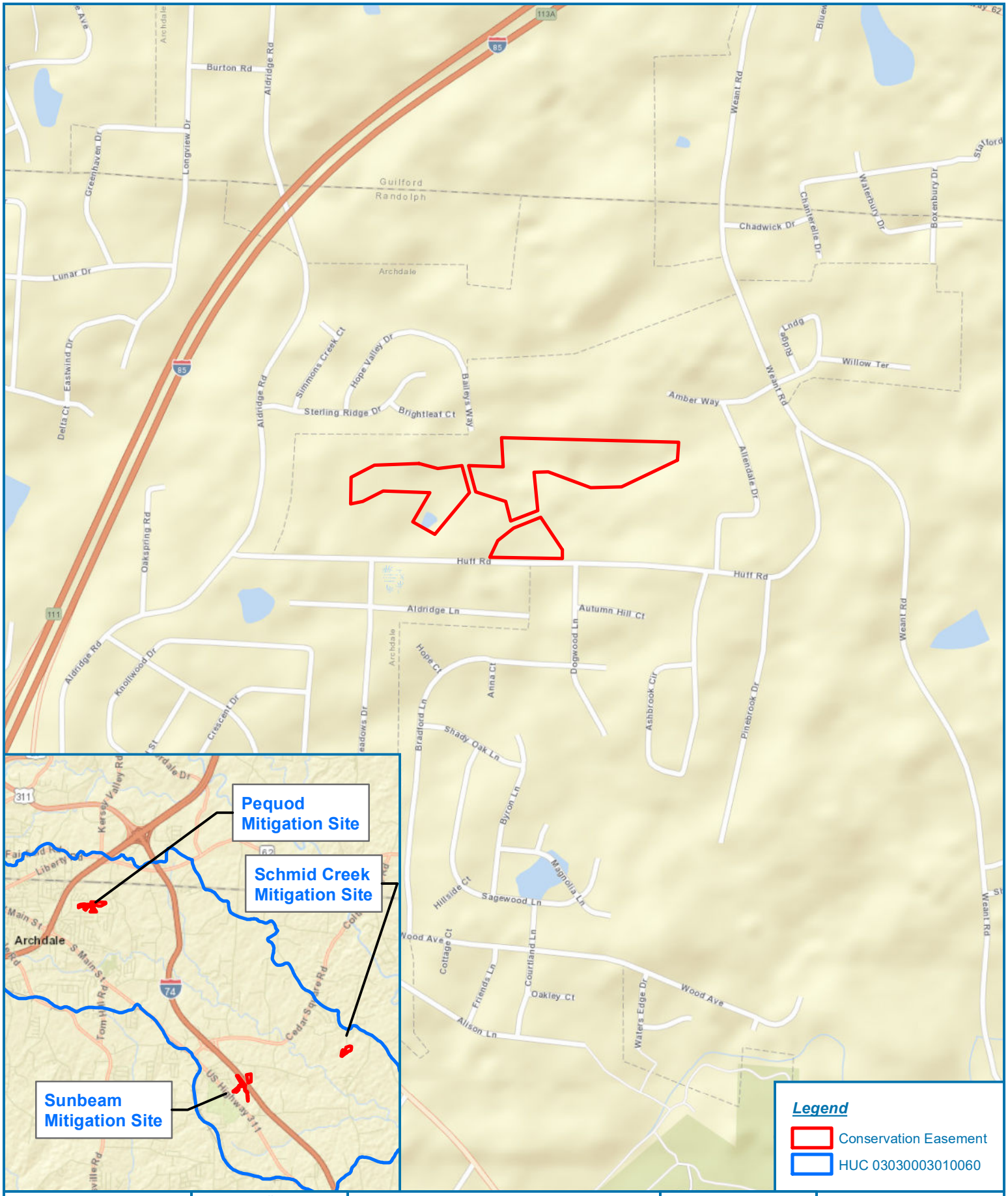


Figure 1a - Site Location Map

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

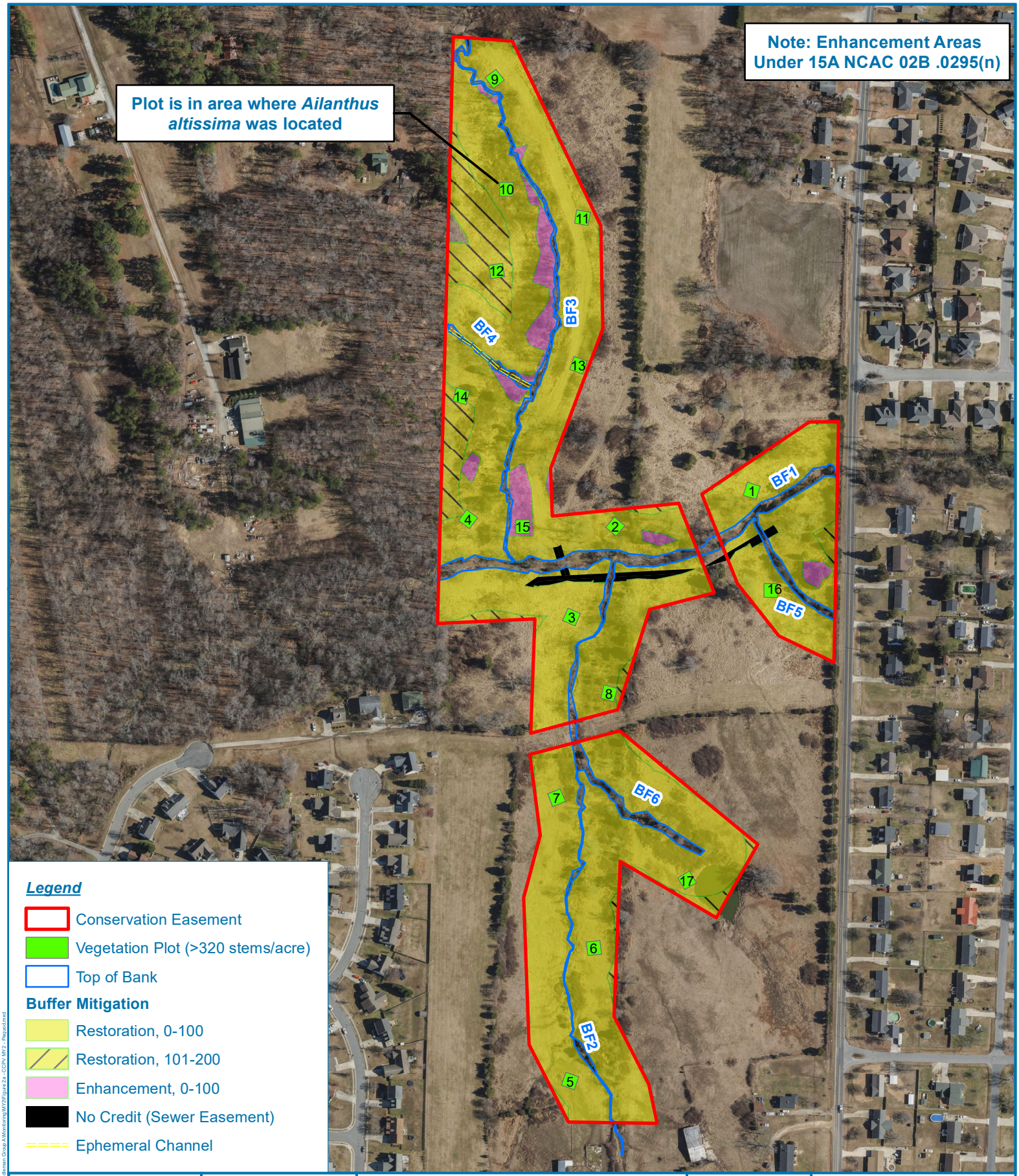


Figure 2a. Current Conditions Plan View

RES Randleman Group A - Pequod Mitigation Site (MY2 2020)

Randolph County, North Carolina

Date: 11/5/2020

Drawn by: RTM

Checked by: BPB

1 inch = 300 feet

Document Path: R:\esg\data\projects\active\NC\Randleman Group A\Monitoring\MY2\Figure 2a - CCPV MY2 - Pequod.mxd

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

RIPARIAN BUFFER (15A NCAC 02B.0295)

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)	If Converted to Nutrient Offset: Nutrient Offset: N (lbs)	If Converted to Nutrient Offset: 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		100%	1.00000	209,182.414	4.80	No	0.000	0.000
				101-200	4.49	195,622		33%	3.00000	64,555.131	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
				SUBTOTALS	**9.29**	**404,804**				**273,737.545**	**6.28**		**0.000**	**0.000**

			ELIGIBLE PRESERVATION AREA			**134,935**					
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
				SUBTOTALS		**0**				**0.000**	**0.00**
				TOTALS	**9.29**	**404,804**				**273,737.545**	**6.28**

**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 year 7 months**
Number of reporting Years[1]: **2**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Site Planting	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring	Oct-19	Jan-20
Year 2 Monitoring	Oct-20	Oct-20
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

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

Table 3b. Project Contacts Table Schmid Creek Mitigation Site	
Planting Contractor	H&J Forestry
Planting contractor POC	Matt Hitch
Nursery Stock Suppliers	Arborgen / 2011 Broadbank Court, Ridgeville, SC 29472
Monitoring Performers	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
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		
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)	57		
CGIA Land Use Classification	Forest; Agricultural; Residential		

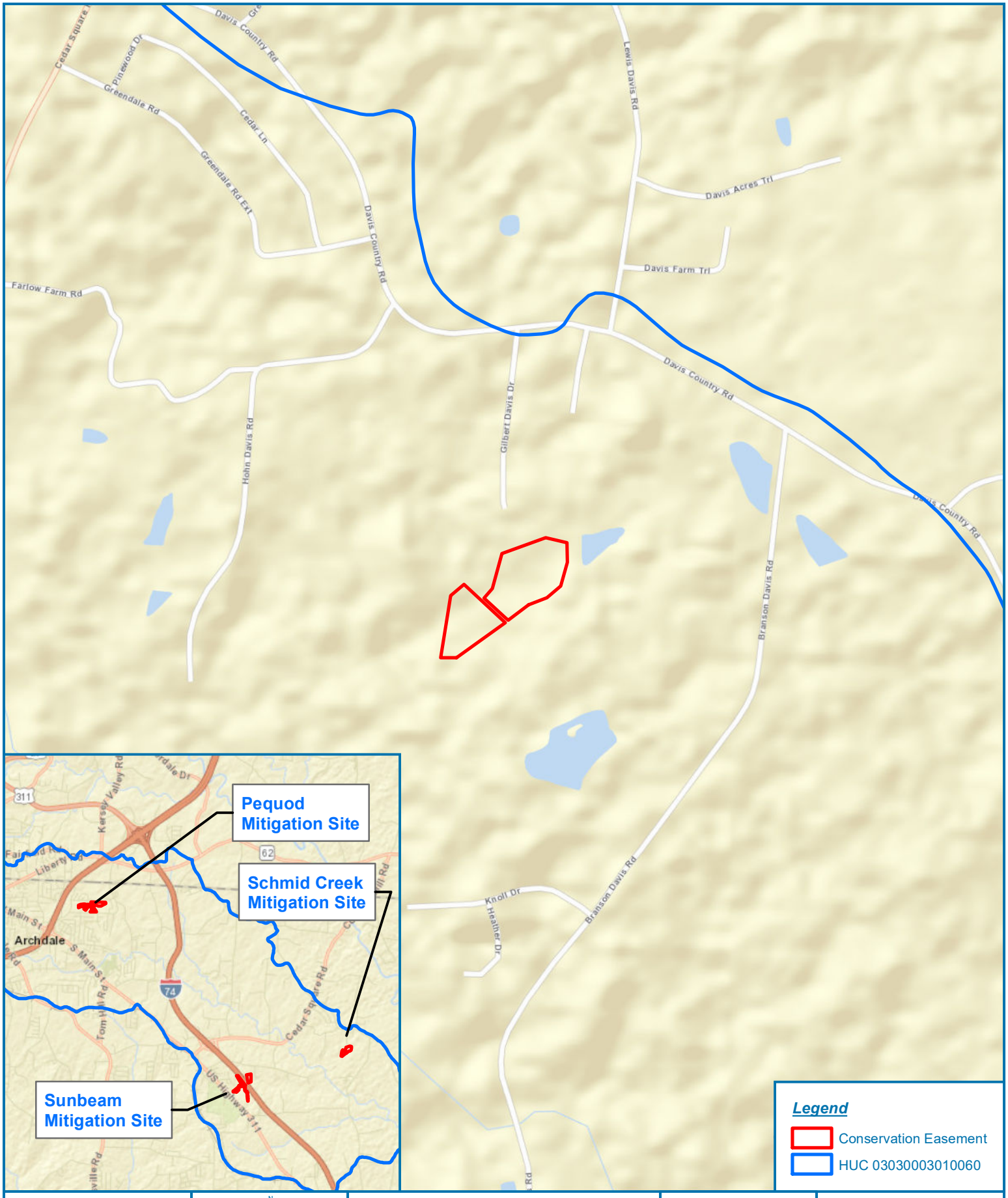


Figure 1b - Site Location Map

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

0 500 1,000 Feet

N
W E
S
0 100 200
Feet

Figure 2b - Current Conditions Plan View

RES Randleman Group A -
Schmid Creek Mitigation Site (MY2 2020)

Randolph County, North Carolina

Date: 11/5/2020
Drawn by: RTM
Checked by: BPB
1 inch = 200 feet

res

Document Path: R:\mapping\drawings\projects\NC\Randleman Group A\Monitoring\MY2\Figure 2b - CCPV MY2 - Schmid.mxd

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

RIPARIAN BUFFER (15A NCAC 02B.0295)

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)	If Converted to Nutrient Offset: Nutrient Offset: N (lbs)	If Converted to Nutrient Offset: Nutrient Offset: P (lbs)
Rural	Subject	Restoration	ZF1	20-29	0.06	2,527	1	75%	1.33333	1,894.930	0.04	No	0.000	0.000
				30-100	4.16	181,155		100%	1.00000	181,155.058	4.16	No	0.000	0.000
				101-200	0.24	10,467		33%	3.00000	3,453.974	0.08	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	0.15	6,624		100%	2.00000	3,311.971	0.08	No	0.000	0.000
				101-200	0.00	0		33%	6.00000	0.000	0.00	No	0.000	0.000
		Restoration	ZF2	20-29	0.00	0	1	75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	2.20	95,766		100%	1.00000	95,766.014	2.20	No	0.000	0.000
				101-200	0.00	0		33%	3.00000	0.000	0.00	No	0.000	0.000
			ZF3	20-29	0.00	0		75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	4.16	181,232		100%	1.00000	181,231.846	4.16	No	0.000	0.000
				101-200	0.20	8,617		33%	3.00000	2,843.463	0.07	No	0.000	0.000
			ZF4	20-29	0.00	0		75%	1.33333	0.000	0.00	No	0.000	0.000
				30-100	1.93	83,983		100%	1.00000	83,983.325	1.93	No	0.000	0.000
				101-200	1.86	81,121		33%	3.00000	26,769.823	0.61	No	0.000	0.000
				SUBTOTALS	**14.96**	**651,491**				**580,410.404**	**13.32**		**0.000**	**0.000**
				ELIGIBLE PRESERVATION AREA	**4.99**	**217,164**								

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	10	75%	13.33333	0.000	0.00
				30-100	1.01	44,063		100%	10.00000	4406.342	0.10
				101-200	0.83	35,948		33%	30.00000	1186.293	0.03
				SUBTOTALS	**1.84**	**80,012**				**5,592.634**	**0.13**
				TOTALS	**16.79**	**731,502**				**586,003.039**	**13.45**

**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 year 7 months**
Number of reporting Years[1]: **1**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	NA	Mar-19
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Site Planting	NA	Apr-19
As-built (Year 0 Monitoring – baseline)	Apr-19	May-19
Year 1 Monitoring	Oct-19	Jan-20
Invasive Species Treatment	NA	Aug-20
Year 2 Monitoring	Oct-20	Nov-20
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

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

Table 3c. Project Contacts Table Sunbeam Site	
Planting Contractor	H&J Forestry
Planting contractor POC	Matt Hitch
Nursery Stock Suppliers	Arborgen / 2011 Broadbank Court, Ridgeville, SC 29472
Monitoring Performers	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
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	
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)		540	
CGIA Land Use Classification		Forest; Agricultural; Residential	

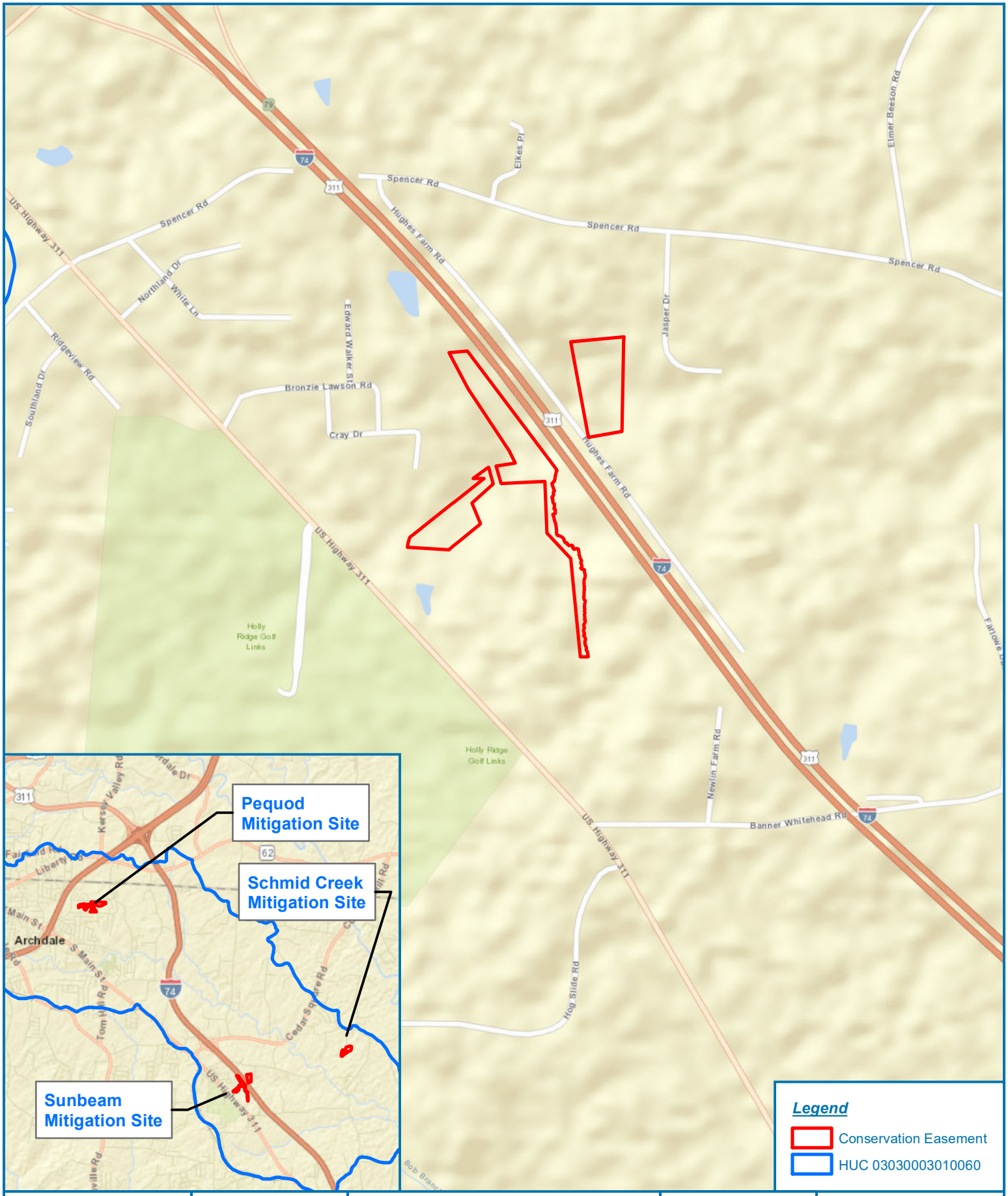
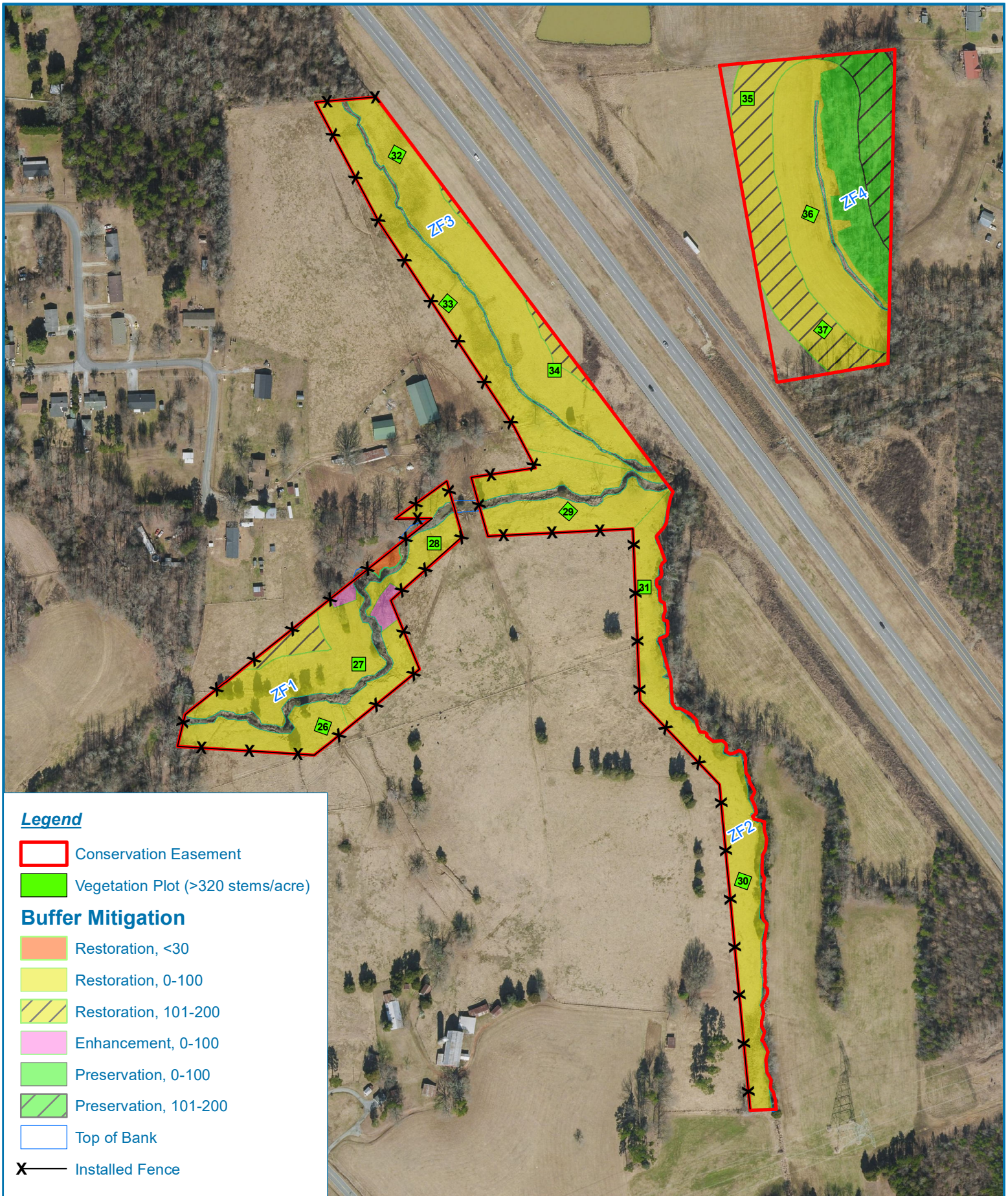


Figure 1c - Site Location Map

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 (>320 stems/acre)

Buffer Mitigation

- Restoration, <30
- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- Preservation, 0-100
- Preservation, 101-200
- Top of Bank
- Installed Fence

N W E S

0 150 300

Feet

Figure 2c - Current Conditions Plan View

RES Randleman Group A - Sunbeam Mitigation Site (MY2 2020)

Randolph County, North Carolina

Date: 11/5/2020

Drawn by: RTM

Checked by: BPB

1 inch = 300 feet

res

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Appendix B

Vegetation Assessment Data

Table 5a. Pequod Planted Species Summary

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

Table 6a. Pequod Vegetation Plot Mitigation Success Summary (MY2)

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
1	607	0	607	Yes	4.4
2	728	3035	3764	Yes	3.2
3	607	647	1255	Yes	3
4	769	2023	2792	Yes	3.8
5	486	0	486	Yes	2
6	971	0	971	Yes	2.8
7	607	0	607	Yes	2.4
8	607	647	1255	Yes	2.6
9	728	283	1012	Yes	2.7
10	567	121	688	Yes	2.3
11	364	445	809	Yes	3.7
12	607	283	890	Yes	2.5
13	607	2428	3035	Yes	2.8
14	809	40	850	Yes	3.4
15	607	5059	5666	Yes	3.6
16	688	1376	2064	Yes	2.2
17	567	0	567	Yes	1.9
Project Avg	**643**	**964**	**1607**	**Yes**	**2.9**

Table 7a. Pequod Stem Count Total and Planted by Plot Species (MY2)

Pequod			Current Plot Data (MY2 2020)																												
			100046-01-0001			100046-01-0002			100046-01-0003			100046-01-0004			100046-01-0005			100046-01-0006			100046-01-0007			100046-01-0008			100046-01-0009			100046-01-0010		
Scientific Name	Common Name	Species Type	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	PnoLS	P-all	T
Acer rubrum	red maple	Tree																								14					
Betula nigra	river birch	Tree							1	1	1	2	2	2													1	1	1			
Carya	hickory	Tree																								1					
Fraxinus pennsylvanica	green ash	Tree	1	1	1	1	1	26			1				1	1	1	3	3	3	1	1	1	1	1	1	1	1	3	1	1	1
Juglans nigra	black walnut	Tree																													
Liquidambar styraciflua	sweetgum	Tree						50			15			50												1			5			3
Liriodendron tulipifera	tuliptree	Tree				2	2	2				4	4	4										1	1	1	1	1	1	1	1	1
Platanus occidentalis	American sycamore	Tree	10	10	10	1	1	1	10	10	10	2	2	2	3	3	3	8	8	8	4	4	4				5	5	5	2	2	2
Prunus serotina	black cherry	Tree																													
Quercus	oak	Tree																1	1	1	1	1	1									
Quercus alba	white oak	Tree										1	1	1										3	3	3				1	1	1
Quercus nigra	water oak	Tree	1	1	1	1	1	1				2	2	2	1	1	1													2	2	2
Quercus phellos	willow oak	Tree	3	3	3	9	9	9	4	4	4	5	5	5	4	4	4	12	12	12	6	6	6	6	6	6	7	7	7	3	3	3
Quercus rubra	northern red oak	Tree				4	4	4				3	3	3	3	3	3				2	2	2	4	4	4	3	3	3	4	4	4
Ulmus americana	American elm	Tree																													
		Stem count	15	15	15	18	18	93	15	15	31	19	19	69	12	12	12	24	24	24	15	15	15	15	15	31	18	18	25	14	14	17
		size (ares)	1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	4	4	4	6	6	7	3	3	5	7	7	8	5	5	5	4	4	4	6	6	6	5	5	8	6	6	7	7	7	8
		Stems per ACRE	607	607	607	728	728	3764	607	607	1255	769	769	2792	486	486	486	971	971	971	607	607	607	607	607	1255	728	728	1012	567	567	688

Pequod			Current Plot Data (MY2 2020)																				Annual Means								
			100046-01-0011			100046-01-0012			100046-01-0013			100046-01-0014			100046-01-0015			100046-01-0016			100046-01-0017			MY2 (2020)			MY1 (2019)			MY0 (2019)		
Scientific Name	Common Name	Species Type	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	PnoLS	P-all	T
Acer rubrum	red maple	Tree																								14			7			
Betula nigra	river birch	Tree													1	1	1				1	1	1	6	6	6	3	3	3	3	3	3
Carya	hickory	Tree																								1			7			
Fraxinus pennsylvanica	green ash	Tree	2	2	3	4	4	5	2	2	2				1	1	36							19	19	84	22	22	86	24	24	100
Juglans nigra	black walnut	Tree												1			5									6						
Liquidambar styraciflua	sweetgum	Tree			10			6			60						85			34						319			558			76
Liriodendron tulipifera	tuliptree	Tree				5	5	5	1	1	1							1	1	1				16	16	16	25	25	30	34	34	34
Platanus occidentalis	American sycamore	Tree	2	2	2	3	3	3	4	4	4	3	3	3	7	7	7							64	64	64	69	69	69	79	79	79
Prunus serotina	black cherry	Tree																											3			
Quercus	oak	Tree										1	1	1										3	3	3	10	10	10	124	124	124
Quercus alba	white oak	Tree							2	2	2							5	5	5	6	6	6	18	18	18	23	23	23	1	1	1
Quercus nigra	water oak	Tree				1	1	1				2	2	2										11	11	11	17	17	17	28	28	28
Quercus phellos	willow oak	Tree	2	2	2	1	1	1	5	5	5	9	9	9	4	4	4	7	7	7	3	3	3	90	90	90	100	100	102	89	89	89
Quercus rubra	northern red oak	Tree	3	3	3	1	1	1	1	1	1	5	5	5	2	2	2	4	4	4	4	4	4	43	43	43	50	50	52	19	19	19
Ulmus americana	American elm	Tree																											2			
		Stem count	9	9	20	15	15	22	15	15	75	20	20	21	15	15	140	17	17	51	14	14	14	270	270	675	319	319	969	401	401	553
		size (ares)	1			1			1			1			1			1			1			17			17			17		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.42			0.42			0.42		
		Species count	4	4	5	6	6	7	6	6	7	5	5	6	5	5	7	4	4	5	4	4	4	9	9	13	9	9	14	9	9	10
		Stems per ACRE	364	364	809	607	607	890	607	607	3035	809	809	850	607	607	5666	688	688	2064	567	567	567	643	643	1607	759	759	2307	955	955	1316

Table 5b. Schmid Creek Planted Species Summary

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

Table 6b. Schmid Creek Vegetation Plot Mitigation Success Summary (MY2)

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
18	647	0	647	Yes	1.8
19	850	40	890	Yes	2.2
20	769	0	769	Yes	2.4
21	769	0	769	Yes	5.3
22	486	0	486	Yes	1.8
23	1093	0	1093	Yes	1.9
24	931	0	931	Yes	1.9
25	850	1214	2064	Yes	2.0
Project Avg	**799**	**157**	**956**	**Yes**	**2.4**

Table 7b. Schmid Creek Stem Count Total and Planted by Plot Species (MY2)

Schmid Creek			Current Plot Data (MY2 2020)																							Annual Means								
			100046-01-0018			100046-01-0019			100046-01-0020			100046-01-0021			100046-01-0022			100046-01-0023			100046-01-0024			100046-01-0025			MY2 (2020)			MY1 (2019)			MY0 (2019)		
Scientific Name	Common Name	Species Type	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	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	River Birch, Red Birch	Tree				1	1	1	4	4	4	6	6	6				4	4	4							15	15	15	16	16	16	29	29	29
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree				4	4	5				1	1	1	1	1	1	2	2	2	3	3	3	2	2	32	13	13	44	14	14	24	14	14	14
Liriodendron tulipifera	Tulip Poplar	Tree	2	2	2	2	2	2							1	1	1	1	1	1	2	2	2	1	1	1	9	9	9	24	24	24	36	36	36
Platanus occidentalis	Sycamore, Plane-tree	Tree	4	4	4	4	4	4	8	8	8	1	1	1	2	2	2	6	6	6	4	4	4	1	1	1	30	30	30	30	30	30	45	45	45
Quercus	Oak	Shrub Tree																															38	38	38
Quercus alba	White Oak	Tree	5	5	5	4	4	4				5	5	5				3	3	3				3	3	3	20	20	20	23	23	23	2	2	2
Quercus nigra	Water Oak	Tree				1	1	1	1	1	1				2	2	2										4	4	4	4	4	4	8	8	8
Quercus phellos	Willow Oak	Tree	2	2	2	1	1	1	4	4	4	4	4	4	6	6	6	10	10	10	10	10	10	4	4	4	41	41	41	44	44	44	29	29	29
Quercus rubra	Northern Red Oak	Tree	3	3	3	4	4	4	2	2	2	2	2	2				1	1	1	4	4	4	10	10	10	26	26	26	26	26	26	12	12	12
		Stem count	16	16	16	21	21	22	19	19	19	19	19	19	12	12	12	27	27	27	23	23	23	21	21	51	158	158	189	181	181	191	213	213	213
		size (ares)	1			1			1			1			1			1			1			1			8			8			8		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.20			0.20			0.20		
		Species count	5	5	5	8	8	8	5	5	5	6	6	6	5	5	5	7	7	7	5	5	5	6	6	6	8	8	8	8	8	8	9	9	9
		Stems per ACRE	647	647	647	850	850	890	769	769	769	769	769	769	486	486	486	1093	1093	1093	931	931	931	850	850	2064	799	799	956	916	916	966	1077	1077	1077

Table 5c. Sunbeam Planted Species Summary

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

Table 6c. Sunbeam Vegetation Plot Mitigation Success Summary (MY2)

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
26	647	0	647	Yes	3.1
27	445	0	445	Yes	5.7
28	728	121	850	Yes	4.8
29	647	202	850	Yes	3.2
30	890	0	890	Yes	3.6
31	1052	324	1376	Yes	6.6
32	647	81	728	Yes	3.3
33	1255	0	1255	Yes	2.5
34	728	0	728	Yes	2.6
35	647	0	647	Yes	1.8
36	567	0	567	Yes	2.5
37	890	0	890	Yes	1.7
Project Avg	**762**	**61**	**823**	**Yes**	**3.5**

Table 7c. Sunbeam Stem Count Total and Planted by Plot Species (MY2)

Sunbeam			Current Plot Data (MY2 2020)																						
			100046-01-0026			100046-01-0027			100046-01-0028			100046-01-0029			100046-01-0030			100046-01-0031			100046-01-0032			100046-01-0033		
Scientific Name	Common Name	Species Type	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							4	4	4	5	5	8	1	1	1	5	5	5				2	2	2
Fraxinus pennsylvanica	green ash	Tree	9	9	9	6	6	6	2	2	3	5	5	6	1	1	1	2	2	7				4	4	4
Hamamelis virginiana	American witchhazel	Tree																								
Juglans nigra	black walnut	Tree																		3						
Liquidambar styraciflua	sweetgum	Tree												1									2			
Liriodendron tulipifera	tuliptree	Tree	1	1	1										4	4	4				1	1	1			
Platanus occidentalis	American sycamore	Tree	2	2	2	3	3	3	5	5	5	1	1	1	6	6	6	7	7	7	6	6	6	1	1	1
Quercus	oak	Tree																								
Quercus alba	white oak	Tree																						11	11	11
Quercus nigra	water oak	Tree							3	3	3	3	3	3	6	6	6	4	4	4	5	5	5	5	5	5
Quercus phellos	willow oak	Tree	4	4	4	2	2	2	3	3	3	2	2	2	1	1	1	8	8	8	4	4	4	2	2	2
Quercus rubra	northern red oak	Tree							1	1	1				3	3	3							6	6	6
Ulmus americana	American elm	Tree									2															
Stem count			16	16	16	11	11	11	18	18	21	16	16	21	22	22	22	26	26	34	16	16	18	31	31	31
size (ares)			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	4	3	3	3	6	6	7	5	5	6	7	7	7	5	5	6	4	4	5	7	7	7
Stems per ACRE			648	648	648	445	445	445	728	728	850	648	648	850	890	890	890	1052	1052	1376	648	648	728	1255	1255	1255

Sunbeam										Annual Means								
			100046-01-0034			100046-01-0035			100046-01-0036			100046-01-0037			MY2 (2020)			MY1 (2019)			MY0 (2019)		
Scientific Name	Common Name	Species Type	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													17	17	20	18	18	18	18	18	18
Fraxinus pennsylvanica	green ash	Tree				1	1	1	1	1	1	2	2	2	33	33	40	32	32	34	36	36	36
Hamamelis virginiana	American witchhazel	Tree																		2			
Juglans nigra	black walnut	Tree															3						
Liquidambar styraciflua	sweetgum	Tree															3			7			
Liriodendron tulipifera	tuliptree	Tree	2	2	2										8	8	8	15	15	15	22	22	22
Platanus occidentalis	American sycamore	Tree	4	4	4	4	4	4	5	5	5	1	1	1	45	45	45	47	47	47	51	51	51
Quercus	oak	Tree																7	7	7	52	52	52
Quercus alba	white oak	Tree										7	7	7	18	18	18	19	19	19	19	19	19
Quercus nigra	water oak	Tree	2	2	2	3	3	3	5	5	5	1	1	1	37	37	37	42	42	42	30	30	30
Quercus phellos	willow oak	Tree	5	5	5	4	4	4	3	3	3	8	8	8	46	46	46	39	39	39	26	26	26
Quercus rubra	northern red oak	Tree	5	5	5	4	4	4				3	3	3	22	22	22	20	20	20	25	25	25
Ulmus americana	American elm	Tree															2						
Stem count			18	18	18	16	16	16	14	14	14	22	22	22	226	226	244	239	239	250	279	279	279
size (ares)			1			1			1			1			12			12			12		
size (ACRES)			0.02			0.02			0.02			0.02			0.30			0.30			0.30		
Species count			5	5	5	5	5	5	4	4	4	6	6	6	8	8	11	9	9	11	9	9	9
Stems per ACRE			728	728	728	648	648	648	567	567	567	890	890	890	762	762	823	806	806	843	941	941	941

Appendix C

Vegetation Monitoring Plot Photos

Pequod Vegetation Monitoring Plot Photos

Vegetation Plot 1 (10/30/20)

Vegetation Plot 2 (10/30/20)

Vegetation Plot 3 (10/27/20)

Vegetation Plot 4 (10/30/20)

Vegetation Plot 5 (10/27/20)

Vegetation Plot 6 (10/27/20)

Pequod Vegetation Monitoring Plot Photos

Vegetation Plot 7 (10/27/20)

Vegetation Plot 8 (10/27/20)

Vegetation Plot 9 (10/28/20)

Vegetation Plot 10 (10/28/20)

Vegetation Plot 11 (10/28/20)

Vegetation Plot 12 (10/28/20)

Pequod Vegetation Monitoring Plot Photos

Vegetation Plot 13 (10/30/20)

Vegetation Plot 14 (10/30/20)

Vegetation Plot 15 (10/30/20)

Vegetation Plot 16 (10/27/20)

Vegetation Plot 17 (10/27/20)

Schmid Creek Vegetation Monitoring Plot Photos

Vegetation Plot 18

Vegetation Plot 19

Vegetation Plot 20

Vegetation Plot 21

Vegetation Plot 22

Vegetation Plot 23

Schmid Creek Vegetation Monitoring Plot Photos

Vegetation Plot 24

Vegetation Plot 25

Sunbeam Vegetation Monitoring Plot Photos

Vegetation Plot 26 (10/21/2020)

Vegetation Plot 27 (10/21/2020)

Vegetation Plot 28 (10/21/2020)

Vegetation Plot 29 (10/21/2020)

Vegetation Plot 30 (10/21/2020)

Vegetation Plot 31 (10/21/2020)

Sunbeam Vegetation Monitoring Plot Photos

Vegetation Plot 32 (10/21/2020)

Vegetation Plot 33 (10/21/2020)

Vegetation Plot 34 (10/21/2020)

Vegetation Plot 35 (10/21/2020)

Vegetation Plot 36 (10/21/2020)

Vegetation Plot 37 (10/21/2020)