MONITORING YEAR 1
ANNUAL BUFFER REPORT
FINAL

PERRY HILL MITIGATION SITE

Orange County, NC
NCDEQ Contract No. 7744
DMS Project No. 100093
NCDWR Project No. 2019-0157v2
RFP No. 16-007576

Neuse River Basin
HUC 03020201

Data Collection Period: October 2021
Draft Submission Date: December 2021
Final Submission Date: January 2022

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
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PERRY HILL MITIGATION SITE

Monitoring Year 1 Buffer Report

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APPENDICES

Section 1: PROJECT OVERVIEW

1.1 Project Summary

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the Perry Hill Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS). The 26.88-acre Site encompasses portions of Perry Branch, three unnamed tributaries (UT1, UT2, and UT3) and two ephemeral channels (EC1 and EC3), all of which eventually drain to Falls Lake and the Neuse River. A total of 24.71 acres (1,076,267 ft^2) of riparian buffer have been restored or enhanced and are expected to generate 874,590.412 riparian buffer credits, with potential to convert some buffer credits to nutrient offset credits dependent on the need. The Site is located approximately three miles northwest of Hillsborough, NC (Figure 1). The project resides within Hydrologic Unit Code 03020201030020 and North Carolina Department of Water Resources (NCDWR) Sub-basin 03-04-01. Three unnamed tributaries (UT1, UT2, and UT3) drain to Perry Branch, which drains to Corporation Lake water supply reservoir on the Eno River, and then Falls Lake.

Work at the Site was planned, designed, and constructed per the Perry Hill Mitigation Site – Riparian Buffer Mitigation Plan (Wildlands Engineering, 2020) and the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (effective November 1, 2015). The purpose of the riparian buffer restoration is to provide riparian buffer credits to compensate for buffer impacts within the Hydrologic Unit Code 03020201 and the Falls Lake Watershed. The service area for the riparian buffer credits is depicted in Figure 2.

1.2 Project Goals and Objectives

Prior to stream construction, the Perry Hill Site was cattle pasture and livestock had access to all streams, causing streambank erosion. Onsite streams and riparian buffers at the Site were restored and/or enhanced.

The major goals of the riparian restoration project are to provide ecological and water quality enhancements to the Neuse River Watershed within the Falls Lake Water Supply Watershed by creating a functional riparian corridor and restoring the riparian area. The project supports specific goals identified in the 2010 Neuse River Basin Restoration Priorities Plan (RBRP) for the Neuse River Targeted Local Watershed (TLW). This document highlights the importance of riparian buffers for stream restoration projects. Forested riparian areas immobilize and retain nutrients and suspended sediment. The RBRP also supports the Falls Lake watershed plan. Falls Lake is a receiving water supply water body downstream of the Site and is classified as WS-IV and NSW. Specific enhancements to water quality and ecological processes are outlined below:

- Exclude cattle from project streams – Fencing has been installed around project areas adjacent to cattle pastures.
- Restore and enhance native floodplain vegetation – Planted native tree species in riparian zone where tree growth was insufficient.
- Permanently protect the project Site from harmful uses – Established a conservation easement on the site.

The 26.88-acre Site is protected with a permanent conservation easement. Of the 26.88-acres, Neuse riparian buffer credits were generated by restoring 16.77 acres and enhancing 7.94 acres. No buffer credit will be generated from the remaining 2.17 acres. In general, riparian buffer restoration area widths on streams extend out to 50 feet from top of bank on each side of the stream channel. Figure 3 and Table 1 in Appendix 1 detail the buffer credit generation.

1.3 Monitoring Year 1 Data Assessment

The Mitigation Plan (Wildlands Engineering, 2020) was submitted and accepted by DMS in July 2020. Construction activities by Main Stream Earthwork, Inc. and tree planting by Bruton Natural Systems, Inc. were both completed in April 2021. The baseline as-built survey was completed by IPW Construction Group in April 2020. Refer to Appendix 1 for detailed project activity, history, contact information, and watershed/site background information.

Vegetative performance for buffer restoration areas will be in accordance with 15A NCAC 02B .0295(n)(2)(B), and (n)(4) (effective November 1, 2015). To meet success criteria, areas generating buffer mitigation credits shall include a minimum of four native hardwood tree species, where no one species is greater than 50 percent of stems, and shall have a survival of at least 260 planted stems per acre at the end of the required five-year monitoring period. For monitoring to be completed and buffer credit to be awarded, NCDWR must provide written approval of successful revegetation of buffer restoration areas.

1.3.1 Vegetative Assessment

The quantity of monitoring vegetation plots was determined in accordance with the Carolina Vegetative Sampling Protocol (Lee et al., 2008) such that at least 2 percent of the Site is encompassed in monitoring plots. A total of fourteen fixed 100 square meter vegetation monitoring quadrants were established within the project easement boundaries. All planted stems were marked with flagging tape and a reference photograph was taken from the southwestern corner of each vegetation plot during vegetation assessments. Annually, trees will be re-marked and plot photos will be taken along with overview photographs of the Site. Species composition, vigor, height, density, and survival rates will be evaluated by plot on an annual basis. The extent of invasive species coverage will also be monitored and controlled as necessary.

The MY1 vegetative survey was completed in October 2021. Vegetation monitoring resulted in an average stem density of 558 planted stems per acre across all vegetation plots, which is well above the final success criteria of 260 stems per acre required at MY5. All fourteen vegetation plots individually met the interim success criteria and stem densities for each plot range from 405 to 728 planted stems per acre. The average number of stems per plot is 13 with an average of 7 different species in each plot. Refer to Appendix 2 for the vegetation condition assessment table, monitoring plan view maps, vegetation plot and overview photographs. Appendix 3 contains vegetation plot criteria attainment data, CVS vegetation plot metadata, and vegetation summary tables.

1.3.2 Vegetation Areas of Concern

Problem areas with vegetative health will be noted (e.g. low stem density, vegetation mortality, invasive species, or encroachment). Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment.

Invasive species at Perry Hill have been greatly reduced by pre-construction treatments throughout the existing forested areas. This included treatment of Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*) in November 2020. Additionally, scattered stems of tree of heaven (*Ailanthus altissima*) were treated in October 2021. However, Wildlands recognizes that multiple treatments are typically needed for effective invasive plant control. Sporadic areas of re-sprouting multiflora rose (*Rosa multiflora*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*) will be addressed in winter 2021/2022 using a combination of methods including

mechanical removal as well as foliar and cut stump applications. These areas will be monitored and retreated as necessary.

During construction, Wildlands ran conduit through the project crossings to allow the landowner to route waterlines at a later date without disturbing the stream. In October 2021, the landowner installed the water lines without contacting Wildlands staff which resulted in ground disturbance and tree mortality impacts to the easement outside of the internal crossings (see Figures 3-3b and Vegetation Areas of Concern Photographs – Conservation Easement Encroachment in Appendix 2). The encroachment area covers approximately 0.13 acres. Wildlands has discussed the impact with DMS staff including the need to allow for future maintenance of the water lines. Wildlands is currently investigating the proper methods to address the encroachment but most likely there will be some form of documentation widening the internal crossing to encompass the impacted areas and allow for future maintenance of the water lines while avoiding future easement encroachments.

1.4 Monitoring Year 1 Summary

Vegetation across the Site is exceeding performance standards and is on track to achieve the final requirement of 260 planted stems per acre. Monitoring Year 1 data shows an average density of 558 planted stems per acre across vegetation plots. Sporadic invasive vegetation was treated in MY1 and follow up treatments are scheduled for winter 2021/2022. To build on the success of previous herbicide ring sprays, additional ring sprays will be applied around the base of trees in areas of high competition with herbaceous vegetation in spring 2022. Wildlands is investigating the proper methods to address the easement encroachment.

Summary information/data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information, formerly found in these reports, can be found in the Mitigation Plan (Wildlands, 2020) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 2: METHODOLOGY

Planted woody vegetation was monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008). A total of fourteen fixed, 100 square meter vegetation plots were established within the Site conservation easement area.

Section 3: REFERENCES

Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Carolina Ecosystem Enhancement Program. Accessed at: https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Neuse_River_Basin/FINAL%20RBRP%20Neuse%202010_%2020111207%20CORRECTED.pdf

Lee, M.T., Peet, R.K., Roberts, S.D., & Wentworth, T.R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Accessed at: http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-2.pdf

Natural Resources Conservation Service (NRCS), 2011. Web Soil Survey. Accessed at: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0 Accessed at: https://files.nc.gov/ncdeq/Mitigation%20Services/Document%20Management%20Library/Guidance%20and%20Template%20Documents/RB_NO_Base_Mon_Template_2.0_2017_5.pdf

North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2015. 15A NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers. Accessed at: http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0295.pdf

North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2011. Surface Water Classifications. Accessed at: https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications#DWRPrimaryClassification

Wildlands Engineering, Inc. (2020). Perry Hill Mitigation Site – Riparian Buffer Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

APPENDIX 1. General Figures and Tables

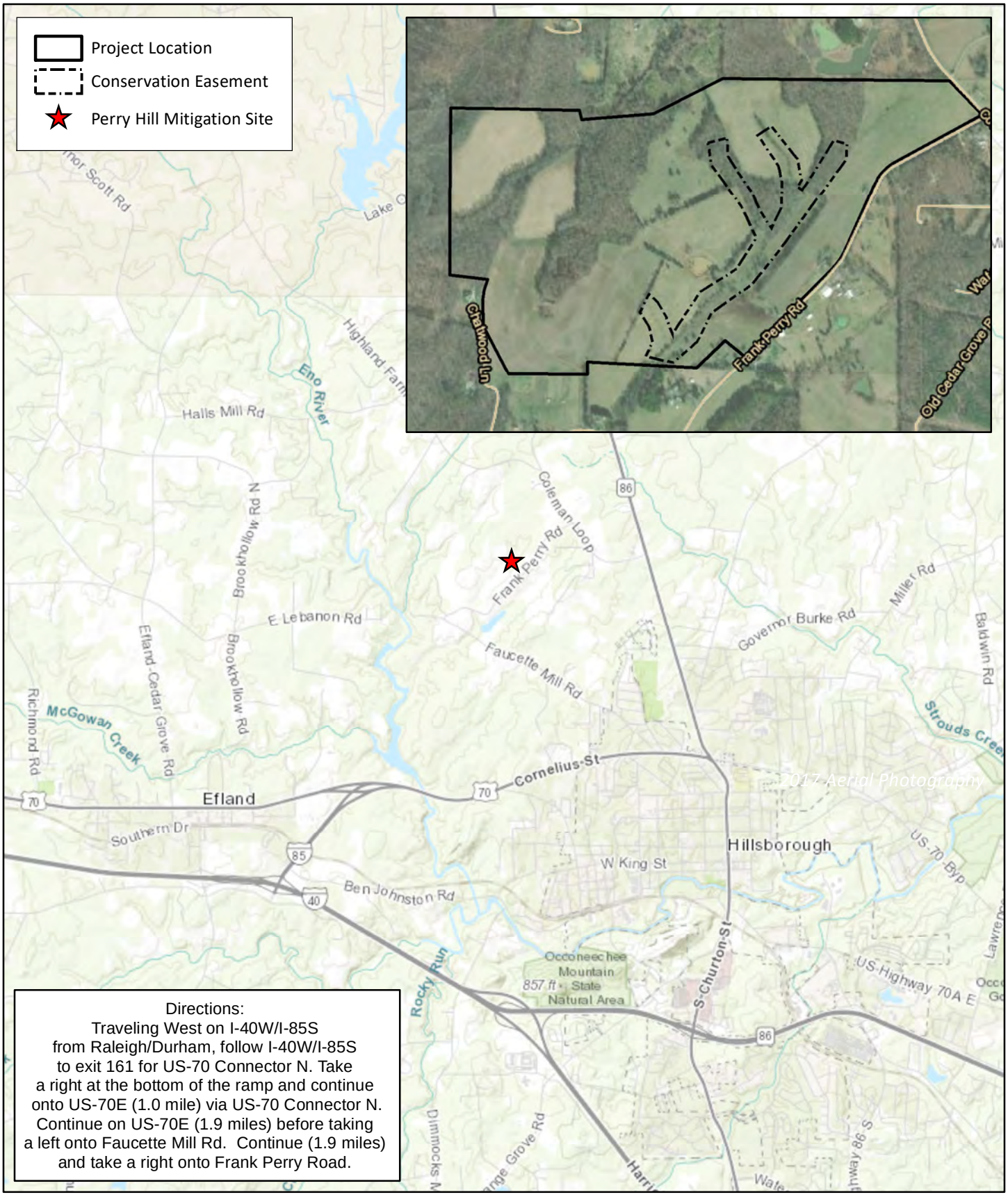

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Figure 1. Project Vicinity Map
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021
Orange County, NC

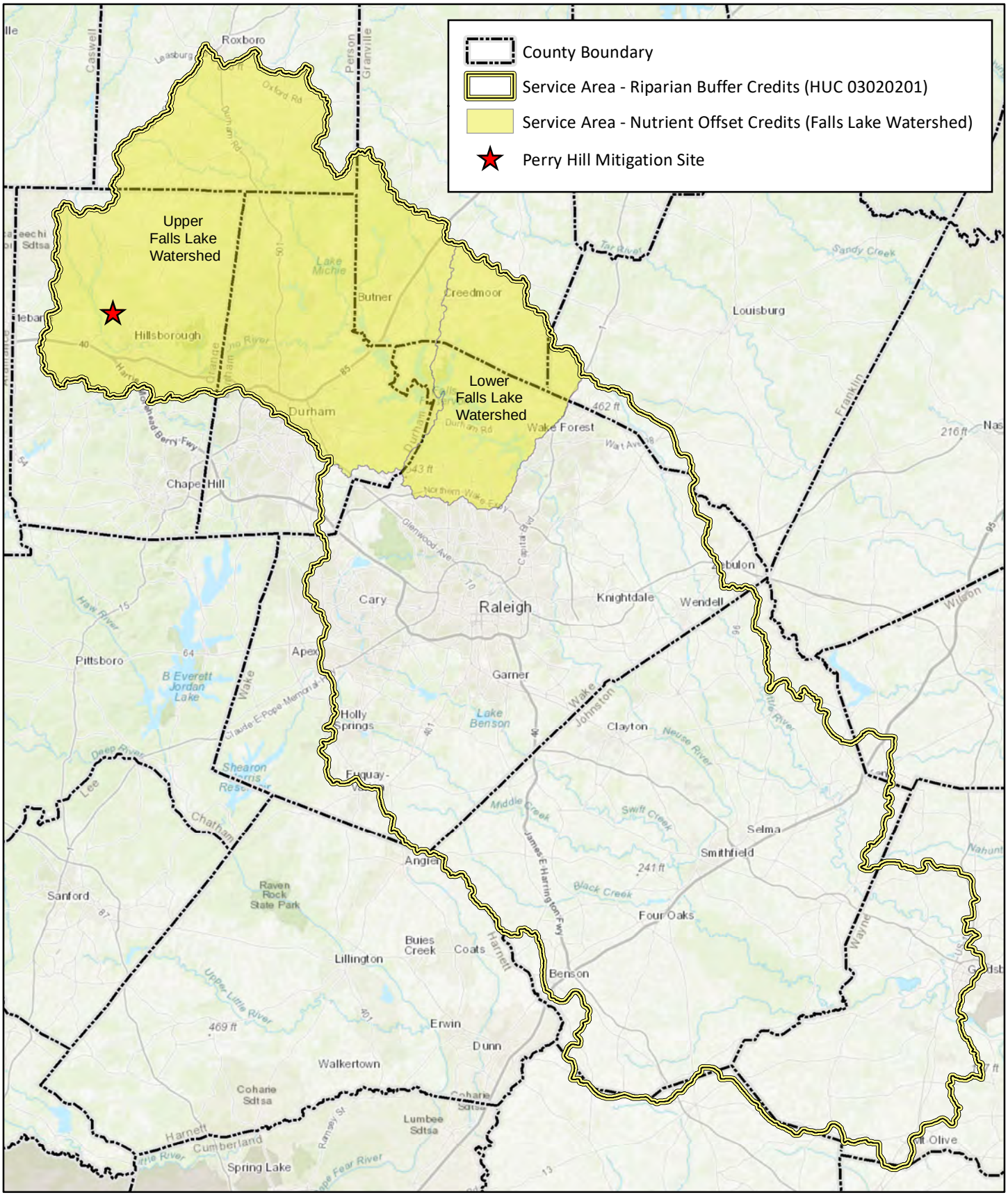

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Figure 2. Service Area Map
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Orange County, NC

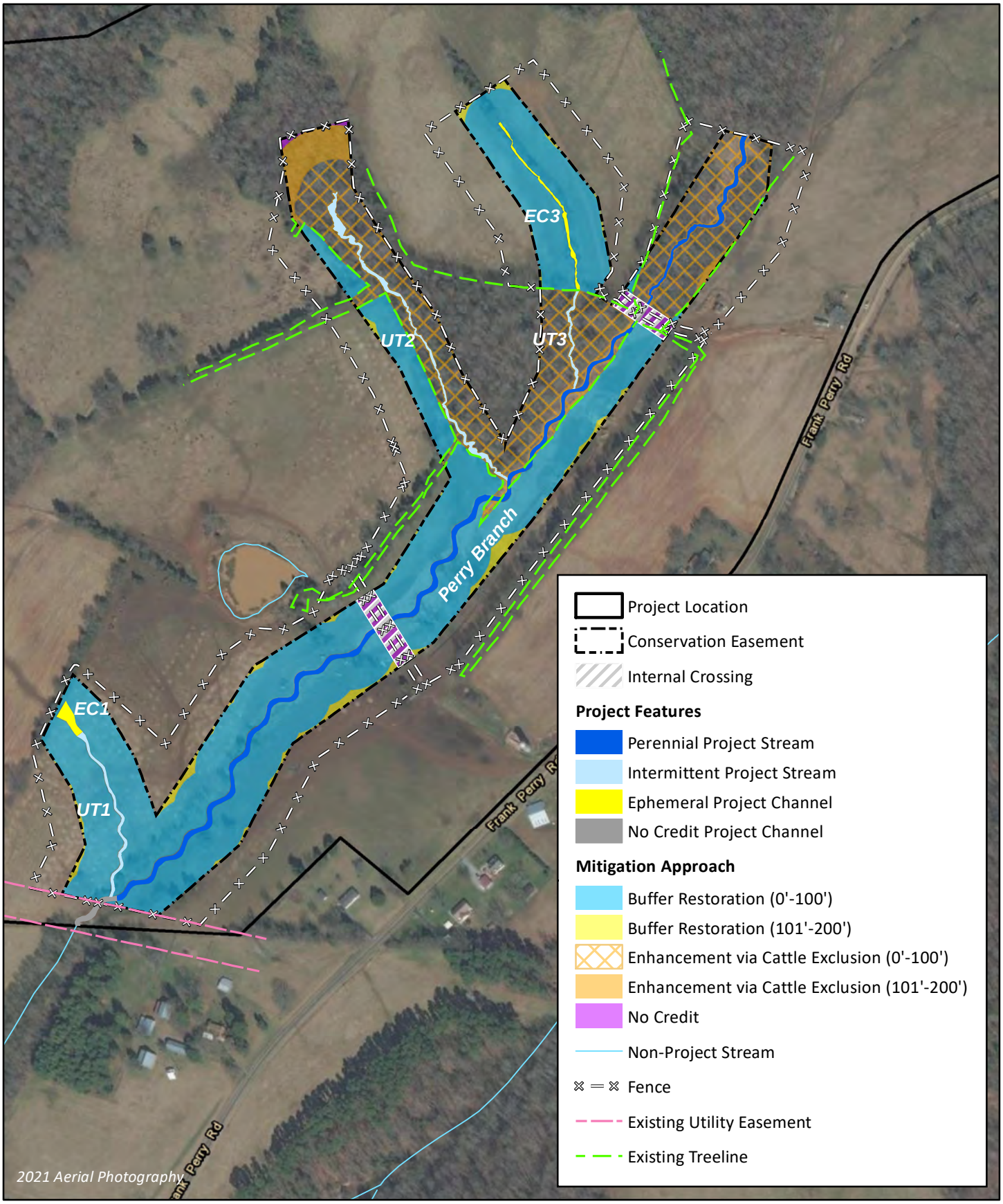

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Figure 3. Project Component/Asset Map
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Orange County, NC

Table 1. Buffer Project Areas and Assets
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Neuse 03020201 - Upper Falls Lake	**Project Area**
19.16394	**N Credit Conversion Ratio (ft^2/pound)**
297.54099	**P Credit Conversion Ratio (ft^2/pound)**

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft^2)	Total (Creditable) Area of Buffer Mitigation (ft^2)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?	Delivered Nutrient Offset: N (lbs)	Delivered Nutrient Offset: P (lbs)
Buffer	Rural	Yes	I / P	Restoration	0-100	Perry Branch	408,293	408,293	1	100%	1.00000	Yes	408,293.000	Yes	21,305.269	1,372.224
Buffer	Rural	Yes	I / P	Restoration	101-200	Perry Branch	22,411	22,411	1	33%	3.03030	Yes	7,395.637	Yes	1,169.420	75.320
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	Perry Branch	157,953	157,953	2	100%	2.00000	Yes	78,976.500	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	101-200	Perry Branch	1,903	1,903	2	33%	6.06061	Yes	313.995	No	—	—
Buffer	Rural	Yes	I / P	Restoration	0-100	UT1	92,839	92,839	1	100%	1.00000	Yes	92,839.000	Yes	4,844.447	312.020
Buffer	Rural	Yes	I / P	Restoration	101-200	UT1	2,558	2,558	1	33%	3.03030	Yes	844.141	Yes	133.487	8.598
Buffer	Rural	No	I / P	Restoration	0-100	UT2	58,526	58,526	1	100%	1.00000	Yes	58,526.000	Yes	3,053.947	196.698
Buffer	Rural	No	I / P	Restoration	101-200	UT2	1,007	1,007	1	33%	3.03030	Yes	332.310	Yes	52.529	3.383
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	0-100	UT2	124,130	124,130	2	100%	2.00000	Yes	62,065.000	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	101-200	UT2	24,834	24,834	2	33%	6.06061	Yes	4,097.607	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	0-100	UT3	37,195	37,195	2	100%	2.00000	Yes	18,597.500	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	101-200	UT3	24	24	2	33%	6.06061	Yes	3.960	No	—	—
Buffer	Rural	No	Ephemeral	Restoration	0-100	EC1	15,423	15,423	1	100%	1.00000	Yes	15,423.000	Yes	804.795	51.835
Buffer	Rural	No	Ephemeral	Restoration	101-200	EC1	0	0	1	33%		Yes	—	Yes	0.000	0.000
Buffer	Rural	No	Ephemeral	Restoration	0-100	EC3	125,605	125,605	1	100%	1.00000	Yes	125,605.000	Yes	6,554.216	422.142
Buffer	Rural	No	Ephemeral	Restoration	101-200	EC3	3,872	3,872	1	33%	3.03030	Yes	1,277.761	Yes	202.050	13.014
						Totals:	1,076,572	1,076,572								

Enter Preservation Credits Below

Eligible for Preservation (ft^2): 358,857

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (ft^2)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer				Preservation								—

Preservation Area Subtotal (ft^2):	0
Preservation as % Total Area of Buffer Mitigation:	0.0%
Ephemeral Reaches as % Total Area of Buffer Mitigation:	13.5%

TOTAL AREA OF BUFFER MITIGATION (TABM)		
Mitigation Totals	**Square Feet**	**Credits**
Restoration:	730,532	710,535.850
Enhancement:	346,039	164,054.562
Preservation:	0	0.000
Total Riparian Buffer:	1,076,572	874,590.412
TOTAL NUTRIENT OFFSET MITIGATION		
Mitigation Totals	**Square Feet**	**Credits**
Nutrient Offset: Nitrogen:	0	0.000
Nutrient Offset: Phosphorus:		0.000

last updated 01/17/2020

Table 2. Project Activity and Reporting History

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan	July 2020	July 2020
Final Design - Construction Plans	September 2020	September 2020
Invasive Vegetation Treatment		November 2020
Construction	January-March 2021	March 2021
Temporary S&E mix applied to entire project area[1]	March 2021	March 2021
Permanent seed mix applied to reach/segments[1]	March 2021	March 2021
Soils ripped to a depth of 15-18 inches	March-April 2021	April 2021
Bare root and live stake plantings for reach/segments	April 2021	April 2021
Competitive Vegetation Treatment[2]		April 2021
Baseline Monitoring Document (Year 0)	April 2021	May 2021
Invasive Vegetation Treatment		October 2021
Easement Encroachment		October 2021
Year 1 Monitoring	October 2021	December 2021
Year 2 Monitoring	2022	December 2022
Year 3 Monitoring	2023	December 2023
Year 4 Monitoring	2024	December 2024
Year 5 Monitoring	2025	December 2025

[1]Seed and mulch is added as each section of construction is completed.
[2]Herbicide ring sprays around the base of planted stems.

Table 3. Project Contact Table

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Designer Geoff Smith, PE	**Wildlands Engineering, Inc.** 497 Bramson Ct, Suite 104 Mt. Pleasant, SC 29464 843.277.6221
Construction Contractor	**Main Stream Earthwork, Inc.** 631 Camp Dan Valley Rd Reidsville, NC 27320
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Main Stream Earthwork, Inc.** 631 Camp Dan Valley Rd Reidsville, NC 27320
Seed Mix Sources	**Green Resources** 5204 Highgreen Court Colfax, NC 27235
Nursery Stock Suppliers **Bare Roots**	**Dykes and Sons Nursery and Greenhouse** 825 Maude Etter Rd McMinnville, TN 37110
Live Stakes	**Bruton Natural Systems, Inc**
	Foggy Mountain Nursery 797 Helton Creek Rd Lansing, NC 28643
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986

Table 4. Project Information and Attributes

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

PROJECT INFORMATION	
Project Name	Perry Hill Mitigation Site
County	Orange County
Project Coordinates (latitude and longitude)	36° 06’ 25.81” N, 79° 07’46.66” W
Project Area (acres)	26.88
Planted Acreage (acres of woody stems planted)	20.53
PROJECT WATERSHED SUMMARY INFORMATION	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Neuse River
USGS Hydrologic Unit 8-digit	03020201
USGS Hydrologic Unit 14-digit	03020201030020
DWR Sub-basin	03-04-01
Project Drainiage Area (acres)	174
Project Drainage Area Percentage of Impervious Area	<1%
CGIA Land Use Classification	68% managed herbaceous cover/pasture, 22% forested, 5% shrub, 3% grassland/herbaceous, 2% residential area, <1% impervious

Table 5. Adjacent Forested Areas Existing Tree and Shrub Species

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Common Name	Scientific Name	Wetland Indicator Status
American elm	*Ulmus americana*	FACW
American hornbeam	*Carpinus caroliniana*	FAC
Eastern Red Cedar	*Juniperus virginiana*	FACU
Green Ash	*Fraxinus pennsylvanica*	FACW
Red Maple	*Acer rubrum*	FAC
Shagbark Hickory	*Carya ovata*	FACU
Sugarberry	*Celtis laevigata*	FACW
Sweet Gum	*Liquidambar styraciflua*	FAC

Table 6. Planted Tree Species

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Common Name	Scientific Name	Number Planted	% of Total
Bare Roots			
American sycamore	*Platanus occidentalis*	2,209	18.7%
River birch	*Betula nigra*	1,869	15.8%
American persimmon	*Diospyros virginiana*	1,141	9.6%
Eastern cottonwood	*Populus deltoides*	1,048	8.9%
Cherrybark oak	*Quercus pagoda*	1,017	8.6%
Boxelder	*Acer negundo*	960	8.1%
American elm	*Ulmus americana*	559	4.7%
Northern red oak	*Quercus rubra*	545	4.6%
Willow oak	*Quercus phellos*	468	4.0%
Pawpaw	*Asimina triloba*	468	4.0%
Southern sugar maple	*Acer floridanum*	266	2.2%
Black gum	*Nyssa sylvatica*	203	1.7%
White oak	*Quercus alba*	203	1.7%
Winged elm	*Ulmus alata*	203	1.7%
Blackhaw viburnum	*Viburnum prunifolium*	179	1.5%
Southern red oak	*Quercus falcata*	102	0.9%
Sourwood	*Oxydendrym arboreum*	102	0.9%
Overcup oak	*Quercus lyrata*	96	0.8%
Silky dogwood	*Cornus amomum*	93	0.8%
Arrowwood viburnum	*Viburnum dentatum*	31	0.3%
American beech	*Fagus grandifolia*	25	0.2%
Flowering dogwood	*Cornus florida*	20	0.2%
Sugarberry	*Celtis laevigata*	12	0.1%
Ironwood	*Carpinus caroliniana*	10	0.1%
Live Stakes			
Buttonbush	*Cephalanthus occidentalis*	248	
Silky dogwood	*Cornus amomum*	650	
Silky willow	*Salix sericea*	788	
Black willow	*Salix nigra*	123	
Elderberry	*Sambucus canadensis*	263	

APPENDIX 2. Visual Assessment Data

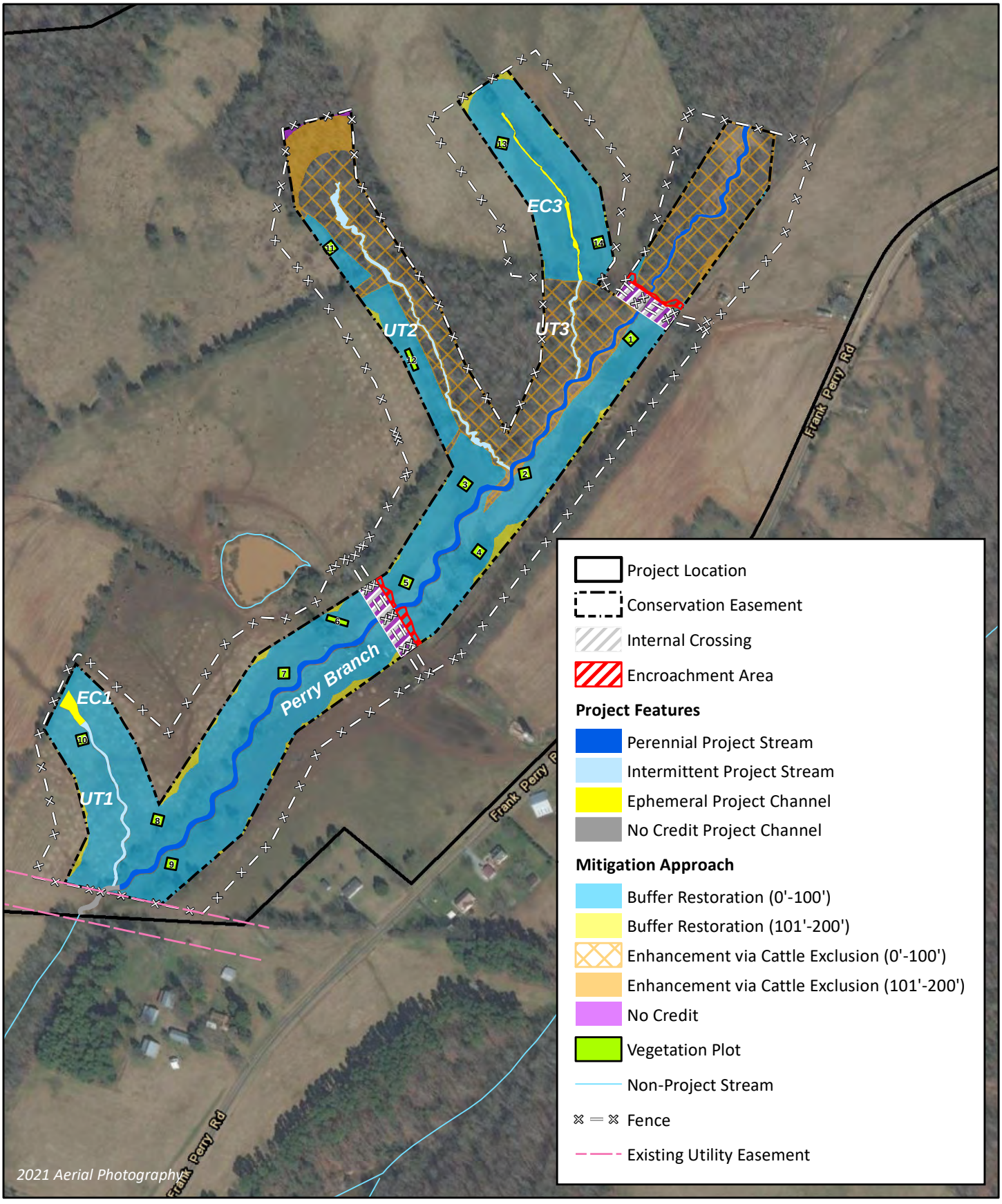

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Figure 4. Monitoring Plan View Map
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Orange County, NC

Table 7. Vegetation Condition Assessment Table
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Planted Acreage **20.53**

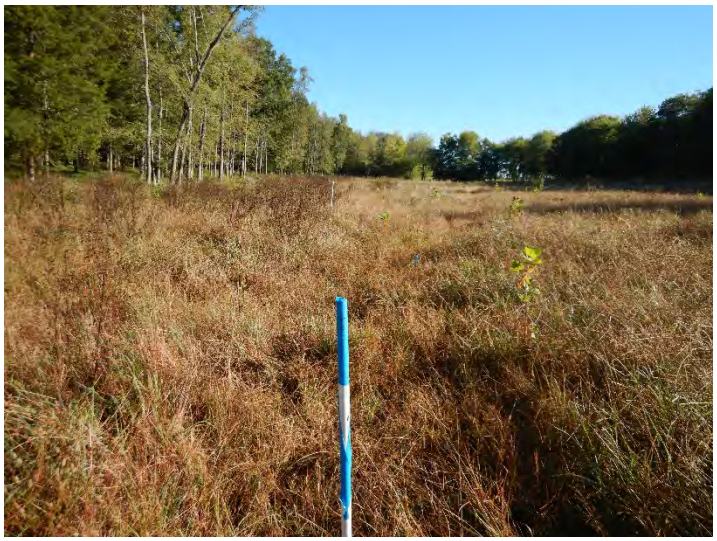
Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
		Total	**0**	**0%**
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
		Cumulative Total	**0.0**	**0%**

Easement Acreage **26.88**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Invasive species included in summation above should be identified in report summary.	0.10	0	0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	2 Encroachments Noted / 0.13 ac	

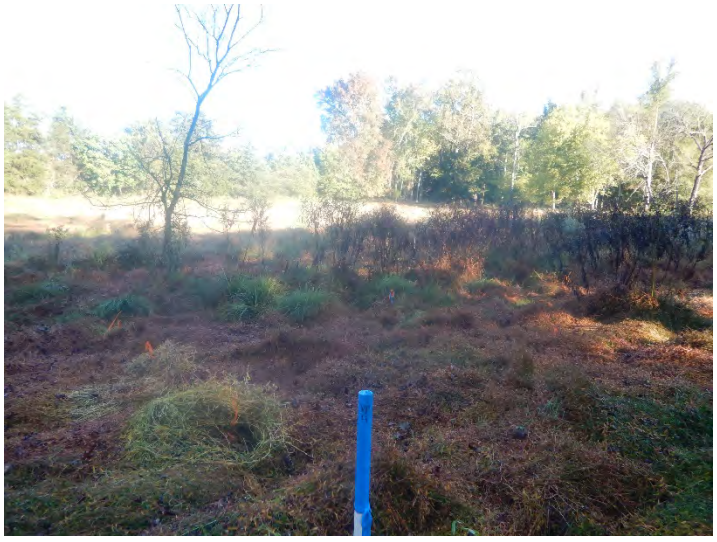
VEGETATION PLOT PHOTOGRAPHS

VEG PLOT 1 *(10/20/2021)*

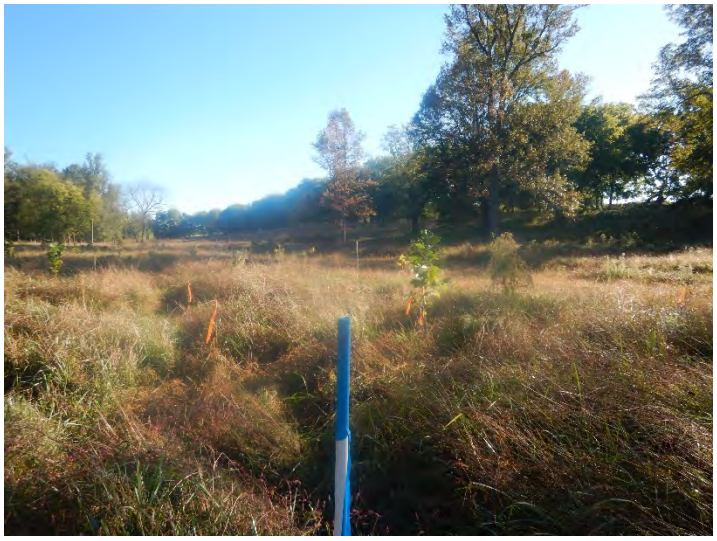


VEG PLOT 2 *(10/20/2021)*

VEG PLOT 3 *(10/20/2021)*

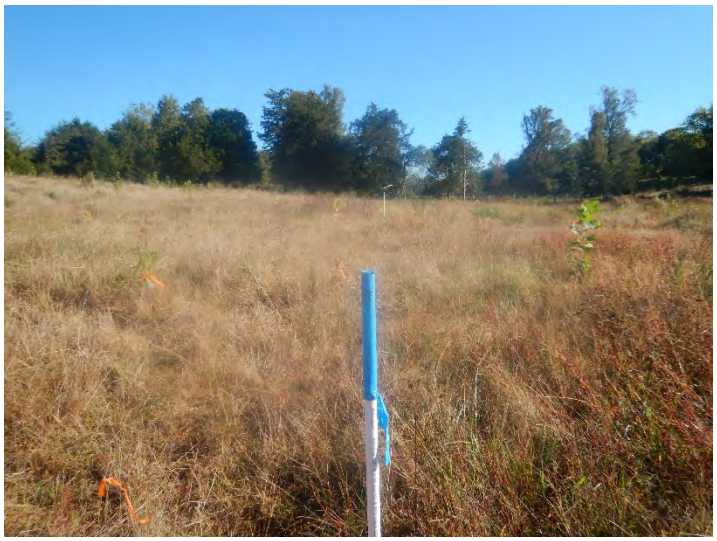


VEG PLOT 4 *(10/20/2021)*



VEG PLOT 5 *(10/20/2021)*

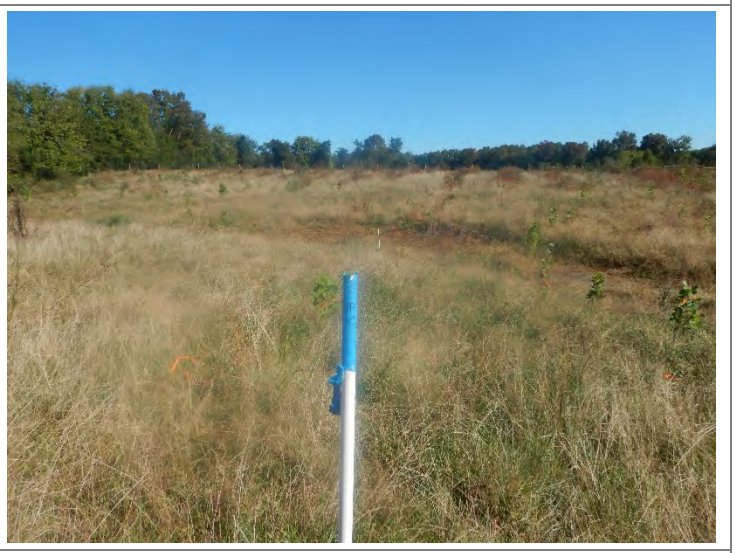
VEG PLOT 6 *(10/20/2021)*



VEG PLOT 7 *(10/20/2021)*

VEG PLOT 8 *(10/20/2021)*

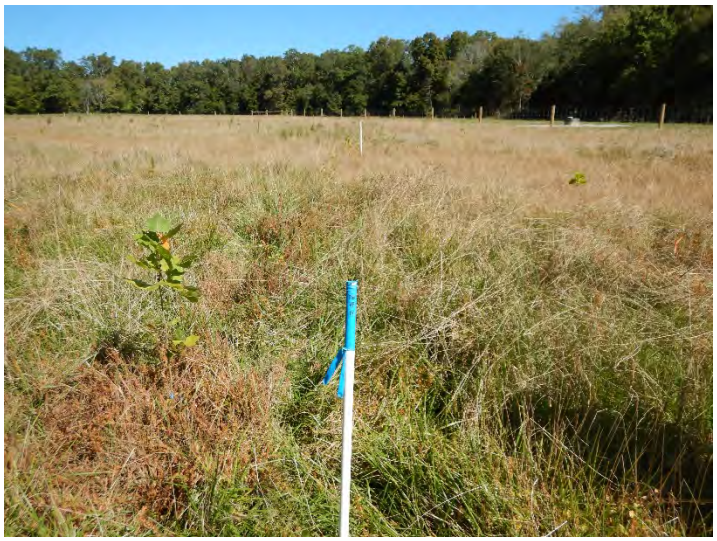
VEG PLOT 9 *(10/20/2021)*



VEG PLOT 10 *(10/20/2021)*

VEG PLOT 11 *(10/20/2021)*

VEG PLOT 12 *(10/20/2021)*

	
VEG PLOT 13 *(10/20/2021)*	**VEG PLOT 14** *(10/20/2021)*

OVERVIEW PHOTOGRAPHS

VEGETATION AREAS OF CONCERN PHOTOGRAPHS
Conservation Easement Encroachment

	
Perry Branch Reach 2 – CE Encroachment *(10/04/2021)*	**Perry Branch Reach 2 – CE Encroachment** *(10/04/2021)*
	
Perry Branch Reach 4 – CE Encroachment *(10/04/2021)*	**Perry Branch Reach 4 – CE Encroachment** *(10/04/2021)*

APPENDIX 3. Vegetation Plot Data

Table 8. Vegetation Plot Criteria Attainment Table

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 1 - 2021

Plot	Success Criteria Met*	Tract Mean
1	Yes	100%
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	Yes	
11	Yes	
12	Yes	
13	Yes	
14	Yes	

*Based on the target stem density for MY5 of 260 planted stems per acre.

Table 9. CVS Vegetation Tables - Metadata
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

Report Prepared By	Tasha King
Date Prepared	11/2/2021 8:31
Database Name	Perry Hill_Stream Fixed VPs_MY1_cvs-v2.5.0.mdb
Database Location	F:\Monitoring\Perry Hill\MY1 - 2021\DMS Buffer
Computer Name	CHARLOTTEINTERN
File Size	78249984
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Project Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Project Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and Spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	20190157
Project Name	Perry Hill Mitigation Site
Description	Riparian Buffer Mitigation for NCDMS
Sampled Plots	14

Table 10. Planted and Total Stem Counts
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

			Current Plot Data (MY1 2021)																								
			VP 1			VP 2			VP 3			VP 4			VP 5			VP 6			VP 7			VP 8		
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**
Acer floridanum	Southern Sugar Maple	Tree				1	1	1																		
Acer negundo	Boxelder	Tree	2	2	2	1	1	1	1	1	1	2	2	2				1	1	1	1	1	1	1	1	1
Asimina triloba	Common Pawpaw	Shrub Tree																						1	1	1
Betula nigra	River Birch	Tree	3	3	3	2	2	2	2	2	2	3	3	3	2	2	2	3	3	3	1	1	1	3	3	3
Cornus amomum	Silky Dogwood	Shrub Tree	2	2	2																					
Diospyros virginiana	American Persimmon	Tree							2	2	2				1	1	1				1	1	1	3	3	3
Nyssa sylvatica	Black Gum	Tree																								
Platanus occidentalis	Sycamore	Tree	2	2	2	4	4	4	1	1	1	3	3	3	2	2	2	6	6	6	3	3	3	2	2	2
Populus deltoides	Eastern Cottonwood	Tree				2	2	2	1	1	1				1	1	1				1	1	1	2	2	2
Quercus alba	White Oak	Tree																								
Quercus lyrata	Overcup Oak	Tree	2	2	2							2	2	2				3	3	3						
Quercus pagoda	Cherrybark Oak	Tree	4	4	4				1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	3	3	3
Quercus phellos	Willow Oak	Tree													1	1	1				1	1	1			
Quercus rubra	Northern Red Oak	Tree				2	2	2													2	2	2			
Ulmus alata	Winged Elm	Tree																								
Ulmus americana	American Elm	Tree							2	2	2	2	2	2	1	1	1	2	2	2				3	3	3
Viburnum prunifolium	Black Haw	Shrub Tree													1	1	1				1	1	1			
		Stem count	15	15	15	12	12	12	10	10	10	14	14	14	11	11	11	16	16	16	12	12	12	18	18	18
		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	6	6	6	6	6	6	7	7	7	6	6	6	8	8	8	6	6	6	9	9	9	8	8	8
		Stems per ACRE	607	607	607	486	486	486	405	405	405	567	567	567	445	445	445	647	647	647	486	486	486	728	728	728

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS - Planted Stems Excluding Live Stakes
P-all - All Planted Stems
T - All Woody Stems

Table 10. Planted and Total Stem Counts
Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 1 - 2021

			Current Plot Data (MY1 2021)																		Annual Means					
			VP 9			VP 10			VP 11			VP 12			VP 13			VP 14			MY1 (2021)			MY0 (2021)		
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**
Acer floridanum	Southern Sugar Maple	Tree													1	1	1	1	1	1	3	3	3	2	2	2
Acer negundo	Boxelder	Tree	3	3	3	1	1	1				1	1	1	3	3	3	1	1	1	18	18	18	20	20	20
Asimina triloba	Common Pawpaw	Shrub Tree				1	1	1				2	2	2				1	1	1	5	5	5	9	9	9
Betula nigra	River Birch	Tree	2	2	2	3	3	3	2	2	2	3	3	3	3	3	3	2	2	2	34	34	34	35	35	35
Cornus amomum	Silky Dogwood	Shrub Tree																			2	2	2	2	2	2
Diospyros virginiana	American Persimmon	Tree	1	1	1	2	2	2	3	3	3	2	2	2							15	15	15	16	16	16
Nyssa sylvatica	Black Gum	Tree							1	1	1										1	1	1	1	1	1
Platanus occidentalis	Sycamore	Tree	3	3	3	2	2	2	4	4	4	4	4	4	3	3	3	3	3	3	42	42	42	42	42	42
Populus deltoides	Eastern Cottonwood	Tree	1	1	1	1	1	1				1	1	1				2	2	2	12	12	12	12	12	12
Quercus alba	White Oak	Tree							2	2	2										2	2	2	2	2	2
Quercus lyrata	Overcup Oak	Tree																			7	7	7	7	7	7
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	2	2	2				1	1	1	2	2	2	1	1	1	21	21	21	21	21	21
Quercus phellos	Willow Oak	Tree				2	2	2							2	2	2				6	6	6	6	6	6
Quercus rubra	Northern Red Oak	Tree							1	1	1	1	1	1				1	1	1	7	7	7	7	7	7
Ulmus alata	Winged Elm	Tree							1	1	1										1	1	1	1	1	1
Ulmus americana	American Elm	Tree	1	1	1													2	2	2	13	13	13	14	14	14
Viburnum prunifolium	Black Haw	Shrub Tree	1	1	1													1	1	1	4	4	4	4	4	4
		Stem count	13	13	13	14	14	14	14	14	14	15	15	15	14	14	14	15	15	15	193	193	193	201	201	201
		size (ares)	1			1			1			1			1			1			14			14		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.35			0.35		
		Species count	8	8	8	8	8	8	7	7	7	8	8	8	6	6	6	10	10	10	17	17	17	17	17	17
		Stems per ACRE	526	526	526	567	567	567	567	567	567	607	607	607	567	567	567	607	607	607	558	558	558	581	581	581

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS - Planted Stems Excluding Live Stakes
P-all - All Planted Stems
T - All Woody Stems