STALLINGS BUFFER RESTORATION SITE -- DMS #357
Jones County NC -- Neuse River HUC# 03020204-010050

MY-4 (2017) ANNUAL MONITORING REPORT

North Carolina Department of Environmental Quality
Division of Mitigation Services (DEQ-DMS) -- Contract # 5765

Data Collected: October 2017 **Draft Report Submitted: Nov 2017**

Environmental Quality	**N.C. Department of Environmental Quality** **Division of Mitigation Services** **1652 Mail Service Center** **Raleigh, NC 27699-1652** --- **DMS Project Manager: Jeff Schaffer**

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ENVIRONMENTAL CONSULTING

MMI
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14 December 2017

Jeff Schaffer
Eastern Supervisor/Project Manager
NC Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: Stallings Buffer Restoration Site #357, MMI responses to MY4 draft review comments.

Dear Mr. Schaffer,

Thank you for your review comments on our MY4 Draft Monitoring Report for the Stallings site which you received on 27 November 2017. Below are responses to your review comments:

1a. Please ensure that MMI uses the correct coordinate system, State Plane Feet NAD 83 for all GIS shapefiles/layers. Specifically, a warning came up regarding this for the "Flat_Swamp" and "Planted BufferLine" data sources.

Response: "Planted Bufferline" was an old duplicate feature which we have now deleted. "Flat Swamp" coordinates have been corrected to State Plane Feet NAD-83.

1b. Please note that while MMI did provide area breakdowns and mitigation approaches for each riparian buffer area, in future submittals, please provide the acreage and square footage in the attribute table(s) as required by contract and stated in the most recent DMS monitoring report template and digital drawing requirements.

Response: Areas for the planted buffer shape files are included in the attribute tables for each polygon. The "Planted Bufferline" feature (now deleted) was a polyline rather than polygon feature, and thus did not include an area.

2. Section 1.3 page 4 – Multiple references to Figures 1B-C in the second paragraph but the monitoring report does not have a Figure C. Please remove references to Figure C.

Response: The MY0 as-built report had a pre-restoration features map that was not included in subsequent monitoring reports. References to Figure 1C have been removed.

Along with this response letter we are mailing you three paper copies and one CD containing a pdf of the revised report plus all support files and updated GIS files.

Sincerely,

Gerald B Pottern

Gerald Pottern
MMI Raleigh office

Table of Contents

1.0. Project Summary

1.1. Project Goals & Objectives

The Stallings Buffer Restoration Project is located on a 146-acre parcel of former cropland in northern Jones County NC, in the Trent River sub-basin of the Neuse River Basin, USGS Cataloging Unit (CU) #03020204-010050 (Figure 1A). The NC Department of Transportation (NCDOT) purchased this property east of Wyse Fork Rd (SR-1002) in 2003 for conservation use, and also acquired a conservation easement on 3 additional acres of farmed riparian land immediately upstream on the west side of Wyse Fork Rd. Access points into the site are located on Wyse Fork Rd (Lat: 35.1682, Lon: -77.4845) and Webb Farm Rd (Lat: 35.1722, Lon: -77.4823).

The 2010 Neuse River Basin Restoration Priority Plan (RBRP) identifies agricultural impacts including stream channelization, wetland ditching, loss of forested riparian buffers, and nonpoint source runoff as causes of water quality degradation in the Trent River watershed. The Plan identifies "reestablishment of riparian buffers and corridors of substantial width to improve connectivity of protected areas" and "projects that address agricultural runoff" as priority goals for this watershed. Restoration Goals for CU #03020204 as identified in the 2010 plan include:

- Promote nutrient and sediment reduction in agricultural areas by restoring and preserving wetlands, streams and riparian buffers.
- Continue targeted implementation of Nutrient Offset and Riparian Buffer program projects, and focus NCDOT-sponsored restoration in areas where it will provide ecosystem functional improvement.
- Protect, augment and connect Natural Heritage Areas and other conservation lands.

The Stallings Buffer Restoration Project was identified as an opportunity to improve water quality and augment conservation lands within the Trent River watershed. The project goals include the following:

- Provide improved water quality by reducing nutrient and sediment loads to the receiving waters.
- Improve terrestrial and aquatic habitat and connectivity in the Flat Swamp Watershed.

These goals will be achieved through implementation of the following project objectives (Figure 1B):

- Restore 31.6 acres of riparian buffers by planting native tree species at a sufficient density to promote native forest succession, thus increasing riparian area root density and nutrient uptake.
- Preserve 19.1 acres of riparian riverine wetlands along Flat Swamp and its tributaries.

1.2. Project Success Criteria

Tree planting on 31.6 acres of riparian buffers along Streams A, B, and C was conducted in February to early March 2014. Post-construction annual monitoring will be conducted from 2014 through 2018 using 25 permanent CVS vegetation plots all five years, and 25 temporary warranty plots during the first three years. The CVS plots were established by RJG&A (now Mogensen Mitigation Inc) during March 2014. Vegetative success of the buffer restoration is evaluated based on a minimum of **320 planted**

native hardwood trees per acre at the end of 5 years, as specified in the project mitigation plan. (Note: The 2015 Monitoring Report stated that the density criterion had been revised to 260 planted stems per acre at the end of 5 years, based on the 2014 Consolidated Buffer Mitigation Rules. The original criterion of 320 trees per acre was reinstated after discussion between DMS and DWR in 2016).

1.3. Project Setting & Pre-Restoration Conditions

The Stallings Buffer Restoration Project is located on a 146-acre parcel of former cropland in the northern corner of Jones County NC, along the transition zone between the Inner Coastal Plain and Outer Coastal Plain, eight miles southeast of downtown Kinston NC. Traveling to the site from Kinston, drive east on US-70 into Jones County, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then travel south approximately 3.5 miles to Webb Farm Road (SR-1306). The Stallings site is located southeast of the intersection of Wyse Fork Road and Webb Farm Road (Figure 1A). The northern portion of the site is accessible from Webb Farm Road, and the southern portion is accessible from Wyse Fork Road near the intersection with Moore Rd (SR-1306). Elevations on the site range from 42 to 52 feet above mean seal level (NAVD-83).

The Stallings site is drained by channelized streams and ditches flowing southeastward into Flat Swamp along the eastern boundary of the site (Figure 1B). In May 2011 the NC Division of Water Resources (DWR) agent Chris Pullinger provided a letter and color-coded map indicating streams subject to Neuse River Buffer Rules (Appendix A). Intermittent or perennial channels subject to Buffer Rules are mapped in blue, and ephemeral channels or ditches **not** subject to Buffer Rules are mapped in red by DWR. The three streams where DMS seeks buffer credits (blue streams in DWR's map) are labeled A, B and C in Figure 1B. A fourth stream segment near the northeast corner of the site is also mapped in blue (Stream D in Figure 1B), but is not labeled on the DWR map or listed in the letter. Due to this discrepancy DMS is not seeking buffer credit along Stream D. Flat Swamp flows into Beaver Creek in the Trent River sub-basin of the Neuse River basin, USGS Cataloging Unit #03020204-010050 and DWR sub-basin 03-04-11. An adjacent protected conservation area (non-DMS) across Flat Swamp east of the Stallings site creates a combined conservation area of 307 acres. This site in turn connects with Great Dover Swamp, comprising several thousand acres of mostly undeveloped land in the Beaver Creek and Trent River watershed, between Wyse Fork Rd and US-70.

The USDA Soil Survey of Jones County (Barnhill, 1981) shows Goldsboro fine sandy loam (GoA) mapped on the higher, well-drained areas on the northern part of the site, Meggett loam (Me) on the majority of the site including the planted areas, and Stockade fine sandy loam (Sx) along the Flat Swamp floodplain. Meggett loam and Stockade fine sandy loam are designated hydric soils, although much of the area mapped as Meggett has been drained and altered by agricultural activity and is not jurisdictional wetland in its current condition. Vegetation on the former cropland areas includes a mix of grasses, herbs, shrubs, vines, and tree seedlings typical of abandoned fields. A 120-ft-wide mowed powerline right-of-way lies east-west across the middle of the site. The floodplain of Flat Swamp along the eastern edge of the site supports about 16 acres of mature bottomland hardwood and swamp forest wetlands, and the lower reaches of Streams A and C (north and south of the powerline) have about 3 acres of disturbed (previously farmed) scrub-dominated riparian wetlands. Wetland hydrology is maintained by a combination of upland runoff and occasional overbank flooding (Stantec, 2011).

1.4. Project Design Approach, Components and Mitigation Assets

The 146-acre Stallings Buffer Restoration Site is former cropland purchased by NC Department of Transportation (NCDOT) in 2003, and is protected for conservation use by a deed restriction. The 3-acre riparian buffer on the adjacent Lee property west of Wyse Fork Rd is protected by a conservation easement. In 2003 the Stallings site had sparse cover of predominantly herbaceous old-field weeds, but vegetation density and height increased over the subsequent decade (2003 to 2013) as shrubs and sapling trees became established, especially *Baccharis*, *Morella*, *Rubus*, and *Pinus*.

The Mitigation Plan (Stantec Consulting Services, 2011) included 40.0 acres of Riparian Buffer Restoration (40.0 Mitigation Units), 27.2 acres of Nitrogen Nutrient Offset (27.2 Mitigation Units), 3.0 acres of Wetland Enhancement (1.5 Mitigation Units), 16.1 acres of Wetland Preservation (3.2 Mitigation Units), and 5,403 feet of Stream Enhancement (2,161 Mitigation Units), all on the 146-acre eastern tract. The 3-acre western tract has no mitigation credits.

During the interval between development of the 2011 Mitigation Plan and project implementation in Feb-Mar 2014, natural colonization and growth of tree saplings and shrubs continued in the fallow fields and proposed wetland enhancement areas. The Riparian Buffer Restoration area was subsequently reduced from 40.0 acres to 31.6 acres, with buffers extending 200 feet laterally from the DWR-verified stream-banks, except where limited by the powerline right-of-way, roads, and areas with adequate natural woody stem density (other than pines and exotics). DMS and DWR determined that the proposed Wetland Enhancement areas along the lower reaches of Streams A and C would instead be categorized as Wetland Preservation, since supplemental tree planting was no longer needed. Stream channel reconstruction was determined to be unnecessary and was deleted from the plan based on the engineer's calculations of shear stress and stream power, and confirmation by DWR in May 2011 that the existing channels appear relatively stable. Nutrient offset buffers along the non-stream ditches were deleted, as were the proposed stream enhancement mitigation credits along Streams A, B and C.

The original plan to clear and grub the riparian buffer planting areas was changed to mowing only to preserve the many native volunteer saplings. Planting areas were mowed in 2014 with a bush-hog to facilitate planting and reduce competition for the planted trees. *Pinus, Liquidambar,* and shrubs were mostly mowed or cut, but other native hardwood trees (*Ulmus, Acer, Platanus, Fraxinus, Carpinus, Quercus* and others) were left standing to the extent practicable. Some areas were too wet and soft to effectively bush-hog, and were left as is prior to planting. The contractor planted 14,200 bare-root tree seedlings of *Platanus, Liriodendron, Nyssa,* and *Quercus* within the 31.6 acre buffer restoration areas using Dibble bars during late February to early March 2014. Planted areas that were not mowed are dominated by *Baccharis, Morella, Rubus,* and herbaceous plants, plus scattered *Pinus* and *Liquidambar* saplings. Planted seedlings were mostly 10 to 18 inches tall, with a few seedlings 24 inches or taller, and average planting density was 449 stems/acre.

The final built project as surveyed in March 2014 includes 31.6 acres of Riparian Buffer Restoration, which may be applied as either 31.6 Riparian Buffer Mitigation Credits, 31.6 Nitrogen Nutrient Offset Credits, or a combination of Riparian Buffer and Nitrogen Nutrient Offset Mitigation Credits up to a total of 31.6 (not on the same footprint) depending on mitigation need as per agreement with DWR (Table 1). The other 19.1 acres of wetland preservation, 86 acres of non-buffer upland preservation, and

3-acre conservation easement west of Wyse Fork Rd do not provide any mitigation credits, but will help improve water quality and habitat along waterways that are not subject to Neuse River Buffer Rules but may be Section 404 jurisdictional waters (Tables 1 to 4 and Figures 1A to 1C).

The monitoring contractor (MMI-RJGA) installed 25 permanent CVS vegetation monitoring plots (10 x 10 meter) marked with steel conduit at the corners (including a tall pipe at the (0,0) corner) during March 11-12, 2014. The side closest to the stream was designated as the x-axis, and a photo of each plot was taken from the 0,0 corner. For each plot the latitude and longitude coordinates of the 0,0 corner were recorded with a Trimble sub-meter GPS unit, and the x-axis angle (from 0,0 corner to 10,0 corner) was recorded with a magnetic compass. The x,y coordinates of each planted tree within the plots was recorded using meter tapes laid along the plot edges, and survey flagging was tied loosely around each tree to facilitate subsequent measurements and to distinguish them from volunteer trees.

1.5. Current Conditions (2017) and Performance Summary

The Stallings site was evaluated during October 16-18, 2017, about 44 months after the original planting in Feb 2014. Native volunteer shrubs and vines, especially *Morella, Baccharis, Rubus, Rhus, Vitis, Smilax, Ampelopsis,* and *Campsis* are continuing to grow vigorously over most of the site, along with a dense herb layer dominated by *Solidago, Eupatorium, Juncus, Scirpus,* and grasses overtopping the planted trees. Larger volunteer *Pinus, Platanus, Liquidambar, Acer, Fraxinus, Celtis,* and *Ulmus* ranging from 4 to 8 inches dbh are common in some areas, especially along ditch banks.

Areas where low planted tree density was reported in 2014 received supplemental planting in February 2015 by Carolina Silvics, the original planting contractor. Approximately 3,800 bare-root seedlings of *Liriodendron, Platanus, Nyssa, Quercus,* and *Fraxinus* were planted on 20 acres, at densities of 109 to 242 trees per acre based on the 2014 CVS plot and warranty plot data (Appendix C, Figure 5). A few of these 2015 planted trees were found in CVS plots in 2016 and 2017.

A second supplemental planting (6,000 new stems, species TBD) is scheduled for the winter of 2017-2018; Carolina Silvics staff were cutting transects for replanting with brush-cutters during the period while MMI staff were collecting this year's CVS plot data. Plots 1 through 14, 16, and 17 had transects cut through them just prior to MMI sampling in Oct 2017, while plot 15 and plots 18 through 25 had not yet been cut. Some of the monitored trees in CVS plots had been either cut or crushed under the cut shrub debris, but these losses will be offset by replanting in a few months. The new cut lines also exposed some very small planted stems that had been missed during previous sampling years.

Nine of the 25 permanent CVS plots in 2017 had eight or more living planted trees, and met the 320 stems/acre success criterion (Tables 6 -7). Another 10 CVS plots had seven or fewer living planted stems and failed to meet the criterion, but exceeded 320 stems/acre based on total planted plus volunteer native hardwood trees, including *Platanus, Liquidambar, Diospyros, Pinus, Prunus, Acer, Salix, Ulmus,* and *Fraxinus.* While *Pinus* are typically not counted toward success, we include them here since Pine Flatwoods was presumably the native forest community on much of this site based on soils (Schafale & Weakley, 1990). The eight plots containing volunteer *Pinus* had 1 to 3 *Pinus* stems, comprising 7% to 22% of the trees counted in those plots. The remaining 6 plots failed to meet 320 stems/acre based on the total planted plus volunteer native trees; 4 of these 6 failing plots were in the recently-cut areas. The

average density of surviving planted stems for all 25 plots in 2017 was 6.5 trees per plot (264 trees per acre), slightly less than the 2016 average (269 trees per acre). With native volunteer trees added, the average density for all plots is 408 trees per acre. Native volunteer shrubs *Morella, Baccharis, Rhus* and *Rubus*.are also abundant in all plots, but were not counted.

Much of the planted area beyond the CVS plots also exhibited low density and vigor of planted trees in 2017, due to competition from dense shrubs and/or recent cutting or crushing of small trees during the contractor's site preparation for supplemental planting this winter. Since many planted stems were recently cut (and may resprout next year), and the site will be replanted soon, it was not feasible or necessary to map low stem density areas beyond the CVS plots this year (Figure 2 and Table 5). Areas of low stem density and low vigor will be mapped and quantified in the MY5 (2018) monitoring report.

Invasive exotic plants (*Ligustrum, Lonicera, Rosa, Lespedeza, Pyrus, Triadica*) occur as individuals or small patches at many scattered locations throughout the project site. However, invasives no longer appear to be threatening planted stem survival, since native shrubs, trees and vines have now overtopped most of the invasives. A few mature trees of *Pyrus* and *Triadica* were noted on the southeastern portion of the project, but few seedlings from these trees were observed, suggesting that they are not currently spreading. Patches of invasive *Lespedeza cuneata* mapped in 2015 on the eastern portion of the site are continuing to decline due to overtopping by dense native shrubs and vines. No invasive vegetation problem areas were mapped in 2017 (Figure 2.1-2.2).

In 2016 we reported mowing of ditch-bank vegetation (presumably by NCDOT) extending into the conservation easement along Webb Farm Rd and Wyse Fork Rd. Subsequent mowing in 2017 appears to be confined to the road side of the ditches, as appropriate. No new encroachment or damage from vehicles or livestock was observed, other than the paths cut by Carolina Silvics for supplemental planting this coming winter. "Conservation Area" signs posted along roadsides are intact, although some are now obscured from view by shrubs and vine growth. There is no fencing around the project site.

2.0. Monitoring Methods

Baseline Monitoring and Annual Monitoring and reporting methods follow the current DMS -provided templates and guidelines (Lee *et al* 2008; NC-EEP 2012). The 25 permanent CVS vegetation plots (10 x 10 meters) are evaluated and photographed during late Summer or Fall each year from 2014 through 2018. For planted trees, the species, height, dbh, and qualitative vigor rating of each tree is recorded (CVS Level 1 data). For volunteer trees and shrubs, the numbers of stems of each species within each height category is recorded (CVS Level 2 data). Planted and volunteer woody species are identified using Radford et al. (1968) and Weakley (2012).

For the first three years (2014 through 2016) an additional 25 temporary vegetation warranty plots (100 m^2 each) scattered throughout the replanted buffer areas were evaluated. Square warranty plots (10 x 10 m) were used in 2014, and strip plots (33.3 x 3 m) used in 2015 and 2016, with locations varying from year to year to maximize the cumulative sampling area covered. These plots record the total number of surviving planted tree species only; species and size data are not be recorded.

The Stallings site does not have a perimiter fence, but the contractor checks the condition of conservation signage along the adjacent public roads, and looks for evidence of encroachment by off-road vehicles, livestock, or other potential sources of damage. Areas of invasive exotic vegetation in the planted areas are mapped in accordance with current DMS guidance. No hydrologic or geomorphic monitoring is included in the Stallings project monitoring scope.

3.0. References

Barnhill, W.L. (1981). *Soil Survey of Jones County, North Carolina*. USDA Soil Conservation Service (Natural Resources Conservation Service), Raleigh, NC.

Lee, Michael T., Peet, Robert K., Roberts, Steven D., Wentworth, Thomas R. (2008). *CVS-EEP Protocol for Recording Vegetation version 4.2, October 2008*. Retrieved September 2011, from: http://cvs.bio.unc.edu/methods.htm

NC Ecosystem Enhancement Program. (2014). *NC-EEP Monitoring Report Template and Guidance version 1.0, February 2014.* http://portal.ncdenr.org/web/eep/dbb-resources

NC Ecosystem Enhancement Program. (2010). *Neuse River Basin Restoration Priority Plan, Draft 2010*. http://www.nceep.net/services/restplans/DRAFT_RBRP_Neuse_201007.pdf

Radford, A.E., H.E. Ahles, and C.R. Bell (1968). *Manual of the Vascular Flora of the Carolinas*. University of North Carolina Press. Chapel Hill, NC.

Robert J. Goldstein & Associates, Inc. (2014). *Stallings Buffer Restoration Site #357 MY-0 Baseline Monitoring Report, Final, July 2014*. Prepared for NC Ecosystem Enhancement Program, Raleigh, NC.

Stantec Consulting Services, Inc. (2011). *Mitigation Plan: Stallings Buffer Restoration, EEP Project # 357, December 2011*. Prepared for NC Ecosystem Enhancement Program, Raleigh, NC.

US Army Corps of Engineers (2003) *Stream Mitigation Guidelines*. US Army Corps of Engineers, US Environmental Protection Agenmcy Region 4, USDA Natural Resources Conservation Service, NC Wildlife Resources Commission, and NC Dept. Environment & Natural Resources.

Weakley, Alan (2012). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. http://www.herbarium.unc.edu/flora.htm.

Figure 1A. Project Vicinity Map, Stallings Buffer Restoration Site, DMS #357 -- Neuse River Basin HUC #03020204-010050, Jones County, NC. Directions to Site: From Kinston, drive east on US-70, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then drive south 3.5 miles to Webb Farm Road (SR-1306). The northern portion of the site can be accessed from Webb Farm Road, and the southern portion can be accessed from Wyse Fork Road near the Moore Rd intersection.

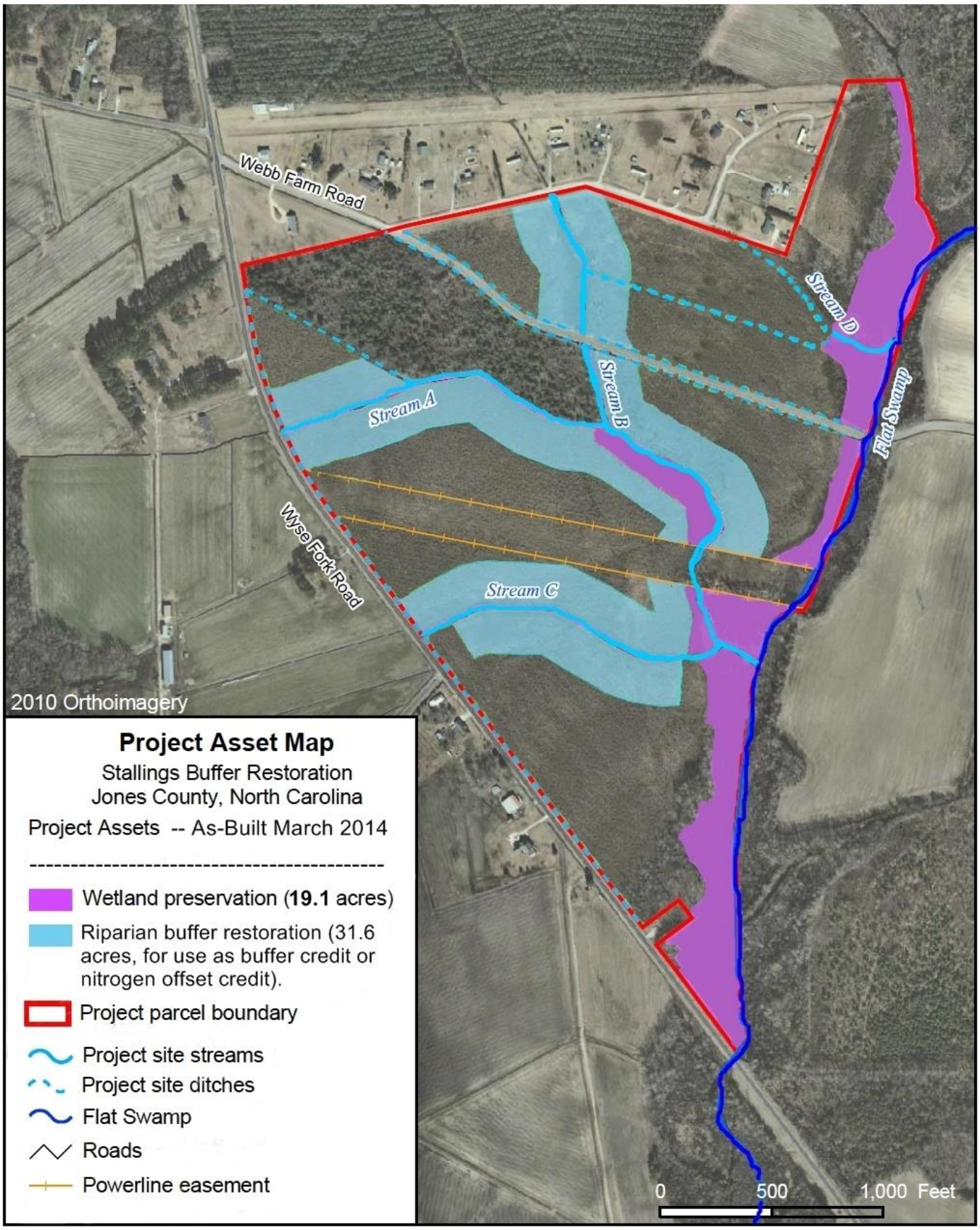


Figure 1B. Stallings Buffer Restoration #357, As-Built Project Components and Mitigation Assets Map.

Appendix A. Project Background Tables

Table 1. Project Components & Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Attributes Table

Table 1. Project Components and Mitigation Credits
Stallings Buffer Restoration, Flat Swamp, Jones County, DMS Project # 357

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals							**31.6**	**(31.6) a**	

(a): Buffer restoration is applicable for Buffer Credit and/or Nutrient Offset Credit, but not both within the same footprint, up to a combined total of 31.6 units.

Project Components

Project Component or Reach ID	Stationing or Location	Existing Footage or Acreage	Approach (PI, PII etc.)	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	Mitigation Units
Stream Enhancement							
Riparian Buffer	**Streams A,B,C**	**31.6 ac**	**Rest**	**R**	**31.6 ac**	**1:1**	**31.6**
Wetland Enhancement							
Wetland Preservation	**Flat Swamp, streams A.C**	**19.1 ac**	**Pres**				**0**
Nitrogen Nutrient Offset							**(31.6) a**

(a): Combined total of 31.6 units of Buffer Credit and/or Nutrient Offset Credit, not applied within the same footprint.

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration					**1,377,325**	
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation		**19.1 ac**				
High Quality Preservation						

BMP Elements

Element	Location	Purpose/Function	Notes

BMP Elements: BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

Table 2. Project Activity and Reporting History Stallings Buffer Restoration -- DMS #357 -- Jones County NC		
Elapsed Time Since Grading Complete: NA		
Elapsed Time Since Planting Complete: 45 Months		
Number of Reporting Years: 4		
Activity or Deliverable	**Data Collection Complete**	**Completion or Delivery**
Restoration Plan	---	Dec 2011
Construction (Mowing)	---	Jan-Feb 2014
Bare Root Tree Planting	---	Feb 2014
MY-0: As-built Baseline Survey	Mar 2014	Jul 2014
MY-1: Plant Warranty Plot Data	Sep 2014	Dec 2014
MY-1: 2014 Monitoring Report	Sep 2014	Apr 2015
Supplemental Tree Planting	---	Feb 2015
MY-2: Plant Warranty Plot Data	Sep 2015	Oct 2015
MY-2: 2015 Monitoring Report	Sep 2015	Nov 2015
MY-3 Plant Warranty Plot Data	Nov 2016	Nov 2016
MY-3 2016 Monitoring Report	Nov 2016	Dec 2016
MY-4 2017 Monitoring Report	Oct 2017	Nov 2017
MY-5 2018 Monitoring Report		
Final Close-Our Report		

Table 3. Project Contacts Table Stallings Buffer Restoration -- DMS #357 -- Jones County NC	
Designer	Stantec Consulting Services, Inc. P.C. 801 Jones Franklin Rd, Suite 300 Raleigh, NC 27606 (919) 851-6866
Construction Contractor	None
Survey Contractor	McKim & Creed 200 MacKenan Court Cary, NC 27511 (919) 233-8091
Planting Contractor	Carolina Silvics 908 Indian Trail Rd Edenton, NC 27932 Mary-Margaret McKinney (252) 482-8491
Nursery Stock Suppliers	ArborGen South Carolina Supertree Nursery 5594 Highway 38 South Blenheim, SC 29516 (843) 528-3203
Monitoring Performers	Mogensen Mitigation Inc. - Raleigh Office 104 East Chestnut Avenue Wake Forest, NC 27587 Gerald Pottern, (919) 556-8845 --- Mogensen Mitigation Inc - Main Office P.O. 690429 Charlotte, NC 28227 Rich Mogensen, (704) 576-1111

Table 4.0. Project Baseline Information and Attributes			
Stallings Buffer Restoration (EEP#357)			
Project Information			
Project County	Jones		
Project Area (acres)	146 ac NCDOT + 3 ac Private = 149 ac		
Project Coordinates (latitude and longitude)	35.1718 -77.4841		
Project Watershed Summary Information			
Physiographic Region	Coastal Plain		
River Basin	Neuse		
USGS HUC for Project (14 digit)	03020204-010050		
NCDWQ Sub-basin for Project	03-04-11		
Project Drainage Area (sq mi)	0.72		
Project Drainage Area % Impervious	3.80%		
CGIA Landuse Classification	Forest Land, Cultivated Land, Herbaceous Cover and Shrubland,		
Reach Summary Information			
n/a			
Wetland Summary Information			
	Wetland 1	Wetland 2	
Size of wetland (acres)	3.0 ac	16.1	
Wetland Type (non-riparian, riparian riverine or riparian non-riverine	Riparian riverine	Riparian riverine	
Mapped Soil Series	Megget loam	Megget loam & Stockade fine sandy loam	
Drainage class	Poorly drained	Poorly drained & very poorly drained	
Soil hydric status	Yes	Yes	
Source of Hydrology	Overbank flooding	Overbank flooding	
Hydrologic Impairment	None	None	
Native vegetation community	Disturbed/cutover	Riverine bottomland hardwood	
Percent composition of exotic invasive vegetation	0%	0%	
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States - Section 404	No	n/a	n/a
Waters of the United States - Section 401	No	n/a	n/a
Endangered Species Act	No	n/a	n/a
Historic Preservation Act	Yes	Yes	Correspondence with NC Dept. Cultural Resources
Coastal Zone Management Act (CZMA)/Coastal Aream Management Act (CAMA)	No	n/a	n/a
FEMA Floodplain Compliance	No	n/a	n/a
Essential Fisheries Habitat	No	n/a	n/a

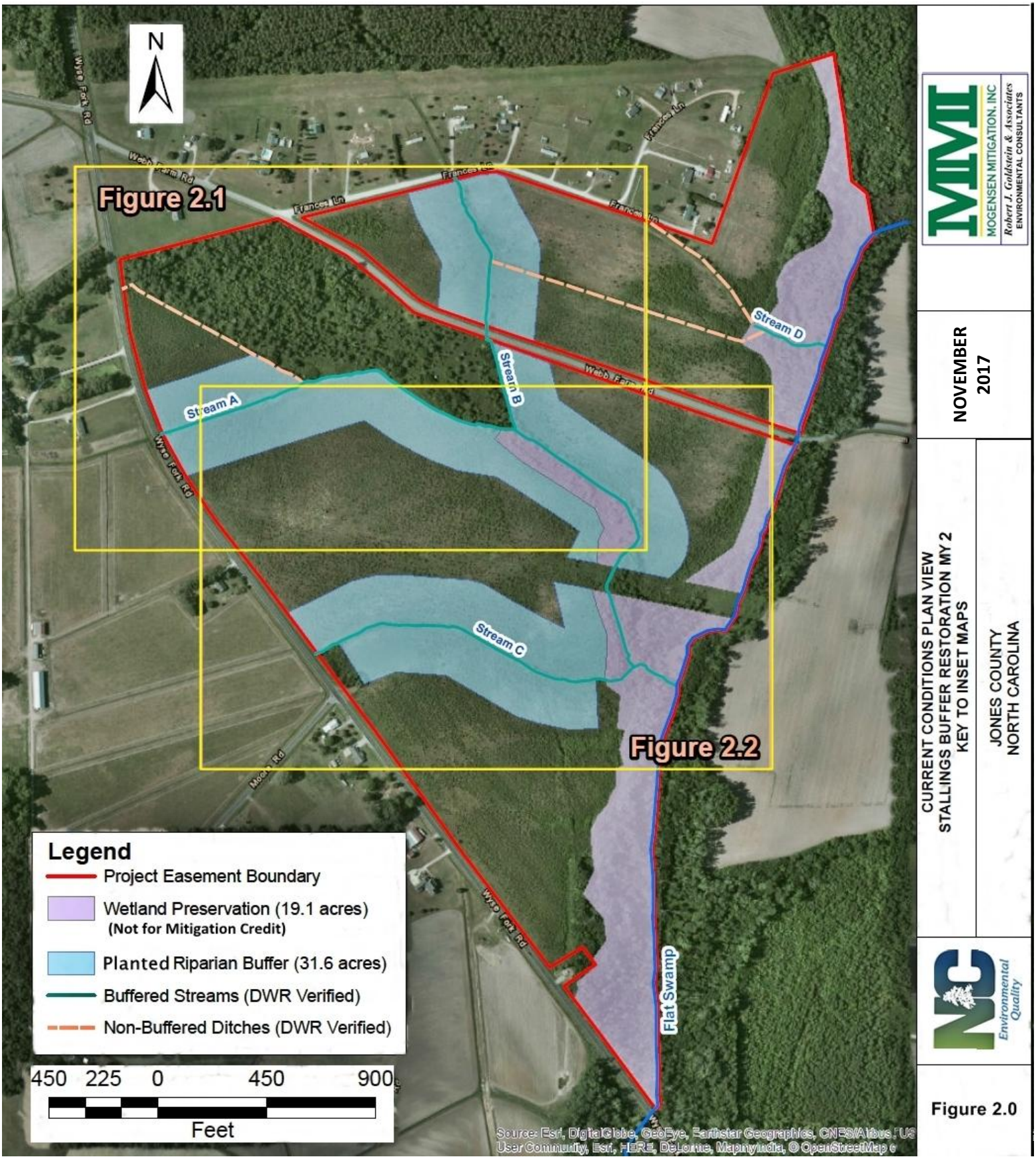
Appendix B. Visual Assessment Data

Figure 2. Current Conditions Plan View: October 2017.

2.0. Stallings Site Key Map to CCPV Inset Maps
2.1. Stallings Buffer Restoration Site, Northern Area
2.2. Stallings Buffer Restoration Site, Southern Area

Table 5. Vegetation Condition Visual Assessment

Figure 3. Vegetation Monitoring Plots & Other Photos



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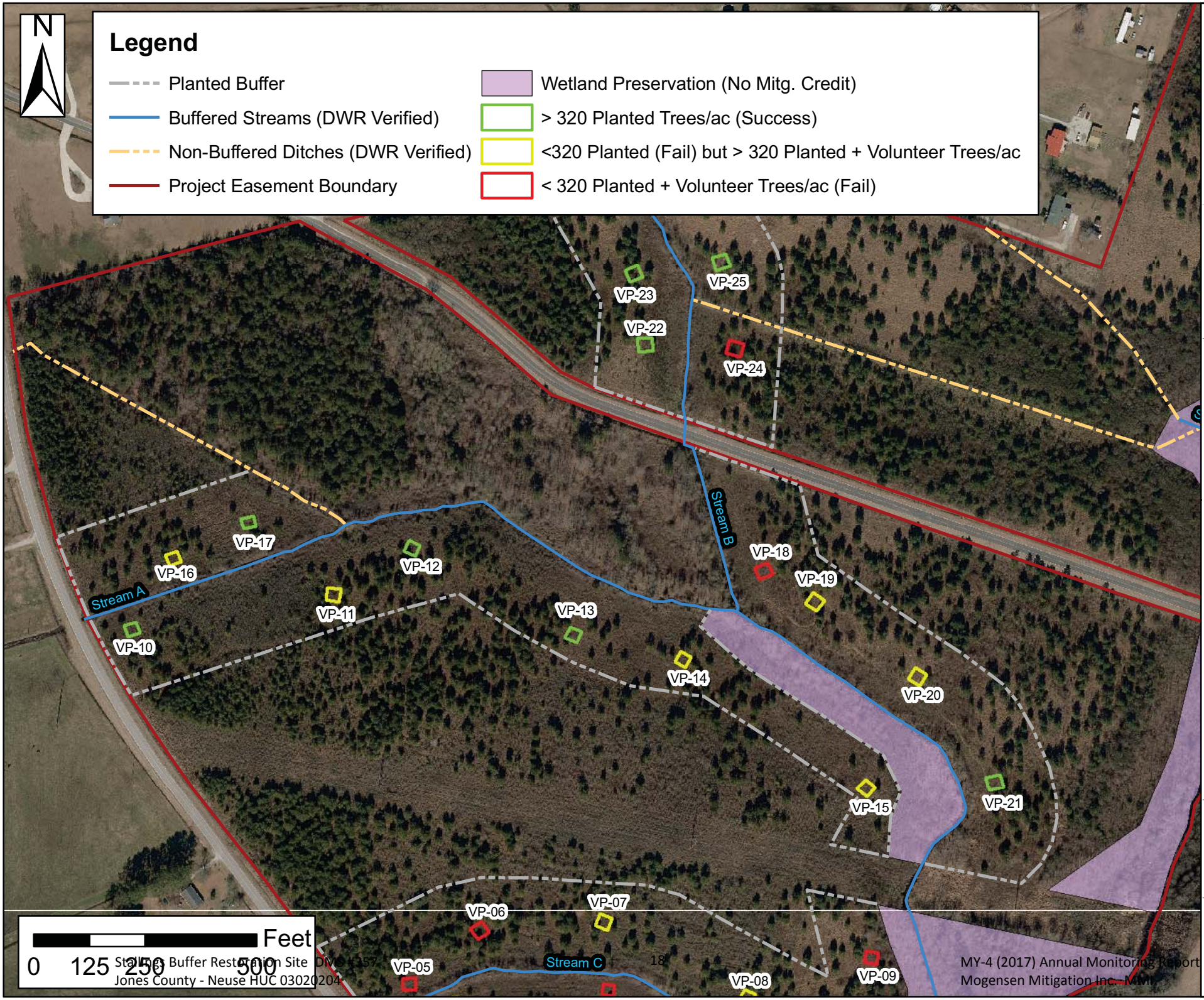
NOVEMBER 2017

CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION MY 2
KEY TO INSET MAPS

JONES COUNTY
NORTH CAROLINA

NC Environmental Quality

Figure 2.0



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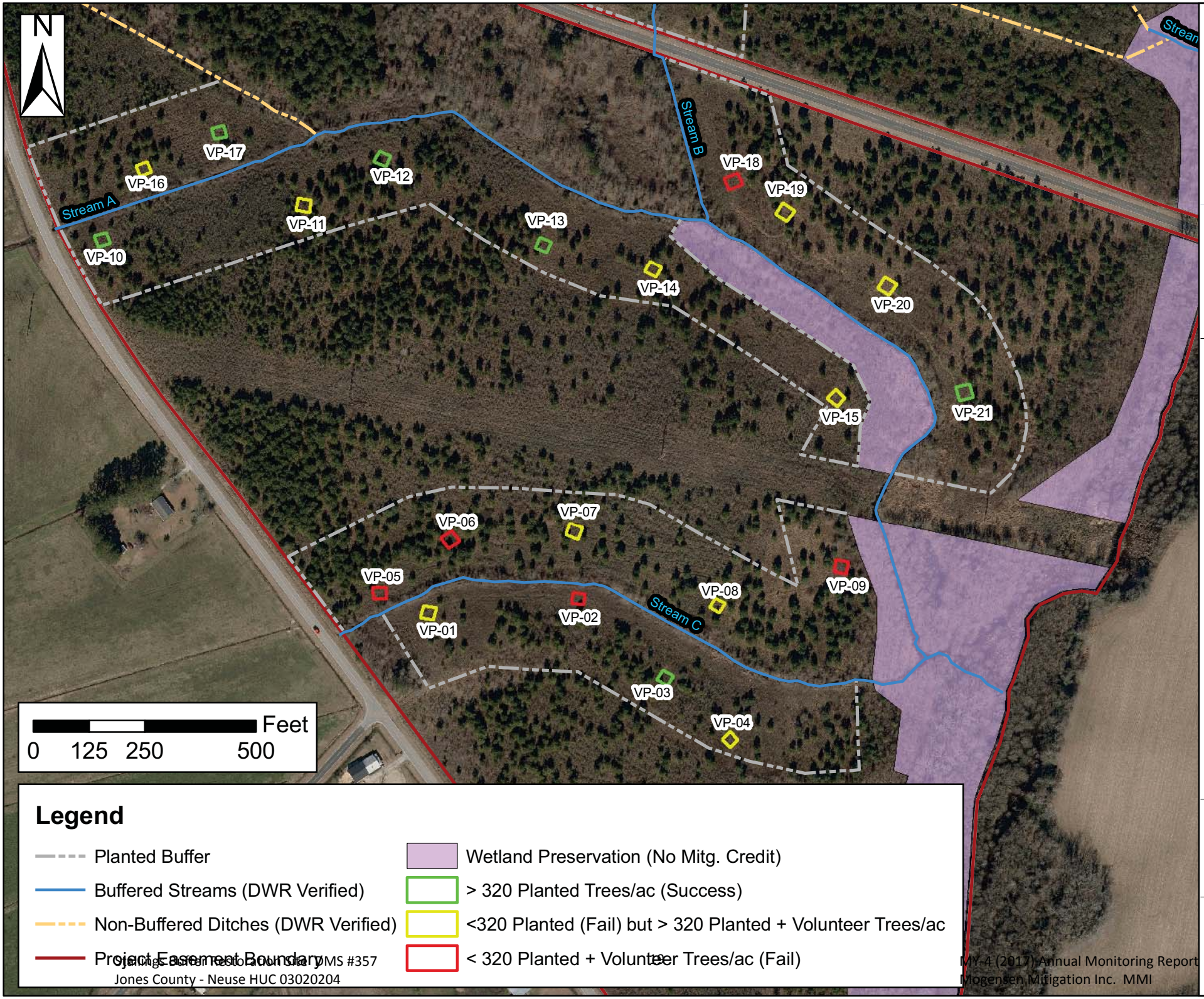
CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357

JONES COUNTY
NORTH CAROLINA

FIGURE 2.1
NOV 2017
MY4 of 5



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CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357

JONES COUNTY
NORTH CAROLINA

FIGURE 2.2
NOV 2017
MY4 of 5

Table 5: Vegetation Condition Assessment Table
Stallings Site Buffer Restoration #357 (Flat Swamp, Jones County)
Monitoring Year 4 of 5 (2017)

Planted Acreage = **31.6**

Vegetation Problem Category	Definitions	Mapping Threshold (acres)	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	N/A	0	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	*** Not Mapped; See Note Below			0%
			Total	**0**		**0%**
Areas of Poor Growth Rates or Vigor *	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25	*** Not Mapped; See Note Below			0%
			Cumulative Total	0	0	**60%**

Easement Acreage = **50.7**

Vegetation Problem Category	Definitions	Mapping Threshold (SF)	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1000	N/A	0	0	0%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	N/A	0	0	0%

Problem areas are based on field observations in October 2017, 44 months after initial tree planting.

Competition from tall Grasses, Solidago, Eupatorium, Rubus, Baccharis, Morella, and other dense native plants may be limiting planted tree survival and growth.

Easement (Mitigation Assets) acreage = 31.6 acres planted + 19.1 acres preserved riparian buffers = 50.7 acres. Total conservation parcel acreage = 146 acres.

***** Many small planted trees were recently cut or crushed in Oct 2017 during cutting of transects for replanting this winter. Consequently, the majority of the planted area currently has low planted stem density and/or low vigor. Since the site will be replanted soon, it was not feasible or necessary to map and measure low density areas beyond the CVS plots this year. Areas of low stem density and low vigor will be mapped and quantified in the MY5 (2018) monitoring report.**

Figure 3.1 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-1: MY-1 Sep 23-25, 2014

CVS VegPlot-1: MY-4 Oct 16-18, 2017

CVS VegPlot-2: MY-0 Mar 11-12, 2014

CVS VegPlot-2: MY-4 Oct 16-18, 2017

Figure 3.2 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-3: MY-1 Sep 23-25, 2014

CVS VegPlot-3: MY-4 Oct 16-18, 2017

CVS VegPlot-4: MY-1 Sep 23-25, 2014

CVS VegPlot-4: MY-4 Oct 16-18, 2017

Figure 3.3 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-5: MY-1 Sep 23-25, 2014

CVS VegPlot-5: MY-4 Oct 16-18, 2017

CVS VegPlot-6: MY-1 Sep 23-25, 2014

CVS VegPlot-6: MY-4 Oct 16-18, 2017

Figure 3.4 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-7: MY-0 Mar 11-12, 2014

CVS VegPlot-7: MY-4 Oct 16-18, 2017

CVS VegPlot-8: MY-0 Mar 11-12, 2014

CVS VegPlot-8: MY-4 Oct 16-18, 2017

Figure 3.5 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-9: MY-0 Mar 11-12, 2014

CVS VegPlot-9: MY-4 Oct 16-18, 2017

CVS VegPlot-10: MY-0 Mar 11-12, 2014

CVS VegPlot-10: MY-4 Oct 16-18, 2017

Figure 3.6 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-11: MY-0 Mar 11-12, 2014

CVS VegPlot-11: MY-4 Oct 16-18, 2017

CVS VegPlot-12: MY-0 Mar 11-12, 2014

CVS VegPlot-12: MY-4 Oct 16-18, 2017

Figure 3.7 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-13: MY-0 Mar 11-12, 2014

CVS VegPlot-13: MY-4 Oct 16-18, 2017

CVS VegPlot-14: MY-0 Mar 11-12, 2014

CVS VegPlot-14: MY-4 Oct 16-18, 2017

Figure 3.8 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-15: MY-0 Mar 11-12, 2014

CVS VegPlot-15: MY-4 Oct 16-18, 2017

CVS VegPlot-16: MY-0 Mar 11-12, 2014

CVS VegPlot-16: MY-4 Oct 16-18, 2017

Figure 3.9 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-17: MY-0 Mar 11-12, 2014

CVS VegPlot-17: MY-4 Oct 16-18, 2017

CVS VegPlot-18: MY-0 Mar 11-12, 2014

CVS VegPlot-18: MY-4 Oct 16-18, 2017

Figure 3.10 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-19: MY-0 Mar 11-12, 2014

CVS VegPlot-19: MY-4 Oct 16-18, 2017

CVS VegPlot-20: MY-0 Mar 11-12, 2014

CVS VegPlot-20: MY-4 Oct 16-18, 2017

Figure 3.11 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-21: MY-0 Mar 11-12, 2014

CVS VegPlot-21: MY-4 Oct 16-18, 2017

CVS VegPlot-22: MY-0 Mar 11-12, 2014

CVS VegPlot-22: MY-4 Oct 16-18, 2017

Figure 3.12 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-23: MY-0 Mar 11-12, 2014

CVS VegPlot-23: MY-4 Oct 16-18, 2017

CVS VegPlot-24: MY-0 Mar 11-12, 2014

CVS VegPlot-24: MY-4 Oct 16-18, 2017

Figure 3.13 Vegetation Monitoring Plots & Other Photos - Stallings Buffer Restoration #357 - MY4 (2017)

CVS VegPlot-25: MY-0 Mar 11-12, 2014

CVS VegPlot-25: MY-4 Oct 16-18, 2017

Baccharis wetland thicket west of VP-11. Oct 16-18, 2017

Typical mixed shrub thicket south of VP-24. Oct 16-18, 2017

Appendix C. Vegetation Plot Monitoring Data

Table 6. CVS Plot Stem Density & Success Summary

Table 7. CVS Plot Stem Counts & Density by Species and Year

(Scanned 2017 raw data sheets are in support files on CD)

Table 6. CVS Vegetation Plot Stem Densities & Success Stallings Buffer Site #357 Flat Swamp, Jones Co. Stream/Wetland, Riparian Buffer, & Total Stem Densities (stems per acre, MY4: Oct 2017)				
Plot ID	**Stream/ Wetland Stems[1]**	**Volunteer Stems[2]**	**Total Stems[3]**	**Success Criteria Met?**
0001	243	283	526	**NO**
0002	121	81	202	**NO**
0003	324	121	445	**YES**
0004	283	81	364	**NO**
0005	121	81	202	**NO**
0006	81	81	162	**NO**
0007	122	202	324	**NO**
0008	202	162	364	**NO**
0009	162	121	283	**NO**
0010	445	0	445	**YES**
0011	122	202	324	**NO**
0012	445	243	688	**YES**
0013	324	40	364	**YES**
0014	284	40	324	**NO**
0015	243	162	405	**NO**
0016	283	81	364	**NO**
0017	365	40	405	**YES**
0018	162	40	202	**NO**
0019	243	202	445	**NO**
0020	162	283	445	**NO**
0021	404	324	728	**YES**
0022	405	283	688	**YES**
0023	566	162	728	**YES**
0024	122	40	162	**NO**
0025	364	243	607	**YES**
Project Avg	**264**	**144**	**408**	**NO**

Woody Stem Classification

[1]Stream/Wetland Stems = Native planted trees and shrubs. Does NOT include live stakes or vines.

[2]Volunteers = Native volunteer trees and shrubs. Does NOT include vines or planted stems.

[3]Total = Planted + volunteer native woody stems, including live stakes. Excludes exotics & vines.

Table 7A. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	357-01-0001			357-01-0002			357-01-0003			357-01-0004			357-01-0005		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree															
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree			1												1
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			5			1			1			1			1
Liriodendron tulipifera	Tuliptree	Tree													1	1	1
Nyssa sylvatica	Blackgum	Tree	1	1	1												
Pinus taeda	Loblolly pine	Tree															
Platanus occidentalis	American sycamore	Tree	5	5	6	3	3	4			2	3	3	3	2	2	2
Prunus angustifolia	Chickasaw plum	Shrub												1			
Prunus serotina	Black cherry	Tree															
Quercus nigra	Water oak	Tree							1	1	1	2	2	2			
Quercus phellos	Willow oak	Tree							5	5	5						
Quercus rubra	Northern red oak	Tree							2	2	2	2	2	2			
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
		Stem count	6	6	13	3	3	5	8	8	11	7	7	9	3	3	5
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	2	2	4	1	1	2	3	3	5	3	3	5	2	2	4
		Stems per ACRE	243	243	526	121	121	202	324	324	445	283	283	364	121	121	202

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7B. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	357-01-0006			357-01-0007			357-01-0008			357-01-0009			357-01-0010		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree															
Acer rubrum	Red maple	Tree												1			
Alnus serrulata	Hazel alder	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree							1	1	1				2	2	2
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			1			3			3			1			
Liriodendron tulipifera	Tuliptree	Tree	1	1	1	1	1	1	1	1	1						
Nyssa sylvatica	Blackgum	Tree	1	1	1												
Pinus taeda	Loblolly pine	Tree			1			2			1			1			
Platanus occidentalis	American sycamore	Tree				2	2	2	1	1	1	1	1	1	2	2	2
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree															
Quercus nigra	Water oak	Tree													1	1	1
Quercus phellos	Willow oak	Tree							1	1	1				4	4	4
Quercus rubra	Northern red oak	Tree							1	1	1	3	3	3	2	2	2
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
		Stem count	2	2	4	3	3	8	5	5	9	4	4	7	11	11	11
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	2	2	4	2	2	4	5	5	7	2	2	5	5	5	5
		Stems per ACRE	81	81	162	121	121	324	202	202	364	162	162	283	445	445	445

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7C. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	357-01-0011			357-01-0012			357-01-0013			357-01-0014			357-01-0015		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree															1
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree	1	1	1				1	1	1	1	1	1			2
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			4			3			1			1			1
Liriodendron tulipifera	Tuliptree	Tree				2	2	2	1	1	1	1	1	1	1	1	1
Nyssa sylvatica	Blackgum	Tree															
Pinus taeda	Loblolly pine	Tree						3									
Platanus occidentalis	American sycamore	Tree	2	2	2	5	5	5	3	3	3	1	1	1			
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree															
Quercus nigra	Water oak	Tree			1							1	1	1			
Quercus phellos	Willow oak	Tree				2	2	2				2	2	2	4	4	4
Quercus rubra	Northern red oak	Tree				2	2	2	3	3	3	1	1	1	1	1	1
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
		Stem count	3	3	8	11	11	17	8	8	9	7	7	8	6	6	10
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	2	2	4	4	4	6	4	4	5	6	6	7	3	3	6
		Stems per ACRE	121	121	324	445	445	688	324	324	364	283	283	324	243	243	405

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7D. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	357-01-0016			357-01-0017			357-01-0018			357-01-0019			357-01-0020		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree															
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															5
Fraxinus pennsylvanica	Green ash	Tree										1	1	1			
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			1			1									
Liriodendron tulipifera	Tuliptree	Tree													1	1	1
Nyssa sylvatica	Blackgum	Tree	1	1	1	1	1	1				1	1	1			
Pinus taeda	Loblolly pine	Tree			1												
Platanus occidentalis	American sycamore	Tree	4	4	4	2	2	2	1	1	1			5			2
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree									1						
Quercus nigra	Water oak	Tree	1	1	1				1	1	1	1	1	1			
Quercus phellos	Willow oak	Tree	1	1	1	4	4	4	1	1	1	1	1	1			
Quercus rubra	Northern red oak	Tree				2	2	2	1	1	1	2	2	2	3	3	3
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
		Stem count	7	7	9	9	9	10	4	4	5	6	6	11	4	4	11
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	4	4	6	4	4	5	4	4	5	5	5	6	2	2	4
		Stems per ACRE	283	283	364	364	364	405	162	162	202	243	243	445	162	162	445

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7E. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	357-01-0021			357-01-0022			357-01-0023			357-01-0024			357-01-0025		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree															
Acer rubrum	Red maple	Tree			2			1									
Alnus serrulata	Hazel alder	Shrub															
Crataegus spp.	Hawthorn	Shrub									1						
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree			2			2			1				1	1	1
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			2												
Liriodendron tulipifera	Tuliptree	Tree															
Nyssa sylvatica	Blackgum	Tree				2	2	2	2	2	2				4	4	4
Pinus taeda	Loblolly pine	Tree						3									1
Platanus occidentalis	American sycamore	Tree	2	2	3	7	7	7				1	1	2	3	3	4
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree			1			1			2						4
Quercus nigra	Water oak	Tree	2	2	2							1	1	1			
Quercus phellos	Willow oak	Tree	2	2	2	1	1	1	2	2	2				1	1	1
Quercus rubra	Northern red oak	Tree	4	4	4				10	10	10	1	1	1			
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
		Stem count	10	10	18	10	10	17	14	14	18	3	3	4	9	9	15
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	4	4	8	3	3	7	3	3	6	3	3	3	4	4	6
		Stems per ACRE	405	405	728	405	405	688	567	567	728	121	121	162	364	364	607

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7F. CVS Vegetation Plot Stem Densities: MY-4: Oct 2017 - Annual Mean Densities. Stallings Buffer Site #357.

Scientific Name	Common Name	Species Type	MY5 (2018)			MY4 (2017)			MY3 (2016)			MY2 (2015)			MY1 (2014)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree	-	-	-			1									2
Acer rubrum	Red maple	Tree	-	-	-			4			6			1			
Alnus serrulata	Hazel alder	Shrub	-	-	-						1						
Crataegus spp.	Hawthorn	Shrub	-	-	-			1									
Diospyros virginiana	Persimmon	Tree	-	-	-			5			4						
Fraxinus pennsylvanica	Green ash	Tree	-	-	-	8	8	17	10	10	14			8			
Ilex opaca	American holly	Tree	-	-	-						2						1
Ilex vomitoria	Yaupon holly	Shrub	-	-	-						1						
Juniperus virginiana	Eastern redcedar	Tree	-	-	-						1						
Liquidambar styraciflua	Sweetgum	Tree	-	-	-			31			39			23			24
Liriodendron tulipifera	Tuliptree	Tree	-	-	-	10	10	10	11	11	12	19	19	19	25	25	25
Nyssa sylvatica	Blackgum	Tree	-	-	-	13	13	13	16	16	16	17	17	17	25	25	25
Pinus taeda	Loblolly pine	Tree	-	-	-			13			9			5			6
Platanus occidentalis	American sycamore	Tree	-	-	-	50	50	64	49	49	62	59	59	65	73	73	89
Prunus angustifolia	Chickasaw plum	Shrub	-	-	-			1			1						
Prunus serotina	Black cherry	Tree	-	-	-			9			11						14
Quercus nigra	Water oak	Tree	-	-	-	11	11	12	7	7	8	4	4	4	4	4	4
Quercus phellos	Willow oak	Tree	-	-	-	31	31	31	27	27	27	26	26	27	23	23	23
Quercus rubra	Northern red oak	Tree	-	-	-	40	40	40	46	46	46	41	41	41	51	51	52
Rhus copallinum	Winged sumac	Shrub	-	-	-						10						
Ulmus americana	American elm	Tree	-	-	-						1						
Unknown		Shrub/Tree	-	-	-							4	4	4	1	1	1
		Stem count	-	-	-	163	163	252	166	166	271	170	170	214	202	202	266
		size (ares)	-			25			25			25			25		
		size (ACRES)	-			0.618			0.618			0.618			0.618		
		Species count	-	-	-	7	7	15	7	7	19	7	7	11	7	7	12
		Stems per ACRE	-	-	-	264	264	408	269	269	439	275	275	346	327	327	431

Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%