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

MY-5 (2018) ANNUAL MONITORING REPORT

North Carolina Department of Environmental Quality
Division of Mitigation Services (DEQ-DMS) -- Contract # 5765
NC Division of Water Resources Project # 2006-0413

Data Collected: October 2018 **Final Report Submitted: Jan 2019**

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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MOGENSEN MITIGATION, INC

January 17, 2019

Mr. Gerald Pottern
Mogensen Mitigation, Inc.
104 East Chestnut Avenue
Wake Forest, NC 27587

Re: Draft Year 5 Monitoring Report Comments for Stallings Buffer Restoration Project
Jones County, Neuse 03020204 -- DMS #357, Contract #5765

Dear Mr. Pottern,
On January 2, 2019, DMS received one (1) pdf copy of the Draft Year 5 Monitoring Report and digital files for Stallings Buffer Restoration Project from Mogensen Mitigation, Inc. (MMI). DMS has completed our review of the Draft Year 5 Monitoring Report and digital submittals and have the following comments:

MMI Responses in RED

1. The digital data and drawings have been reviewed and DMS has the following comments:

a. Please note that while MMI did provide area breakdowns and mitigation approaches for each riparian buffer area, 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. These should more closely match the assets and areas stated in the asset table and report.

MMI Response: We revised Table 1 to itemize the acreage of the four planted areas separately, including adjustments for the non-planted wetland east of VP-10 and non-buffered ditch north of VP-17).

b. No shapefiles were provided depicting the Non-credit planted areas (non-diffuse ditch inflow).

MMI Response: Rather than adding new shapefiles for the credit-excluded areas, we revised the planted area shapefiles to reflect the exclusion. This achieves the same result. The northeastern ditch flows eastward, away from the restored buffer, and does not need any credit reduction.

2. Cover Sheet: Please add the DWR Project # 2006-0413. MMI response: Done

3. Appendix A, Table 1:
a. Since DMS is not receiving any credit for the Wetland Preservation, please delete all references from the table. It can only add confusion to others. MMI response: Done

b. In Component Summation section, please explain how you determined the square footage of buffer.

MMI Response: The square footage has been revised to match the 31.64 acre creditable area.

c. Footnote (b): Per the guidance referenced by DWR in their comments on the MY4 report (attached), the total square footage to be deducted is 6,525 sf (4,350 sf from ditch north of Webb Farm Rd and 2,175 sf from western ditch that flows into Stream A).

MMI Response: The 2008 DWR buffer guidance document only shows examples of perpendicular non-buffered ditches. If the ditch enters at an angle, then the excluded wedge is smaller, in this case 800 sq.

ft. The northern ditch does not require any credit deduction because it flows out of the restored buffer, rather than into the buffer.

Please incorporate the revisions and provide a response to comments letter, two (2) hardcopies and one (1) pdf copy along with any updated digital files that may be needed based on the comments above. If you have any questions, or wish to discuss these comments further, please contact me at any time. I can be reached at (919) 707-8308, or via email at jeff.schaffer@ncdenr.gov.

Sincerely,
Jeff Schaffer
Eastern Supervisor/Project Manager

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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 northern corner Jones County NC, along the transition zone between the Inner Coastal Plain and Outer Coastal Plain, eight miles southeast of downtown Kinston NC. Heading east on US-70 from Kinston, turn right on Wyse Fork Rd (SR-1002) about 0.5 mile past the Lenoir/Jones County line, then travel south 3.5 miles to Webb Farm Rd (SR-1306). The Stallings site is located southeast of the Wyse Fork Rd and Webb Farm Road intersection (Figure 1A). The northern part of the site is accessible from Webb Farm Road, and the southern part 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 prior to restoration (2003 to 2013) as shrubs and sapling trees became established, especially *Baccharis*, *Morella*, *Rubus*, and *Pinus*.

The 2011 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 was not restored and 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. One area (1.07 ac) was too wet and soft to effectively bush-hog, and was left as is. The contractor planted 14,200 bare-root tree seedlings of *Platanus*, *Liriodendron*, *Nyssa*, and *Quercus* within the buffer restoration areas using Dibble bars during late February to early March 2014. The non-mowed area is 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 and 93.3 acres of non-buffer upland preservation 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-1B).

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.

During review of the 2017 annual report, DWR commented that non-diffused flow enters the restored buffer via two side ditches, and the buffer credit area should be reduced in accordance with DWR's 2008 guidance regarding adjustments for non-diffused inflow from ditches (Katie Merritt comments by email to Greg Melia, 15 March 2018). However, the northeastern ditch (east of VP-24) flows eastward away from the buffer, and does not require any credit deduction. Using the 2008 guidance (120-degree wide triangle extending into the buffer 50 feet along the ditch), the credit reduction for the western ditch (north of VP-17) is 800 sq.ft. Tables and figures have been revised accordingly.

1.5. Current Conditions and Performance Summary

The Stallings site was evaluated during October 23-25, 2018, 56 months after the initial planting in February 2014. Native volunteer shrubs and vines, especially *Morella*, *Baccharis*, *Rubus*, *Rhus*, *Vitis*, *Smilax*, *Ampelopsis*, and *Campsis* continue 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 with low planted tree density 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 second supplemental planting (6,000 new stems) was done in February 2018, also by Carolina Silvics. Planting transects were cut with gas-powered brush-cutters in October 2017 (during MY4 data collection) and some of the monitored trees in CVS plots were cut or crushed under the debris. These losses were offset in 2018 by the new planted trees and by increased light exposure for some of the previously planted seedlings that had remained small, shaded under the dense shrub cover.

Fifteen of the 25 permanent CVS plots (60%) in October 2018 had eight or more living planted trees, meeting the 320 stems/acre success criterion (Tables 6 -7). The remaining 10 CVS plots (40%) had 5 to 7 living planted stems (202 to 283 stems/acre) and failed to meet the criterion, but all plots exceeded 320 stems/acre with planted and volunteer native hardwoods combined (364 to 1012 total native hardwood stems per acre). Volunteers include *Acer*, *Platanus*, *Fraxinus*, *Diospyros*, *Prunus*, *Liquidambar*, *Ulmus*, *Rhus*, *Quercus*, and others. Volunteer *Pinus* are present in many plots, but are not counted toward

success criteria. Given that the natural forest on this site was presumably Pine Flatwoods, based on soils, adding *Pinus* to the volunteer stem count would increase the overall average density from 601 to 633 total native stems per acre. Certain over-abundant native volunteer shrubs were not counted: *Morella*, *Baccharis*, and *Rubus*. These taxa, although good for soil stabilization and nutrient uptake, grow so dense that they impede survival and growth of the planted trees.

Planted areas outside of the CVS plots are generally similar to the areas within nearby plots. Assuming the plots are representative of the overall site, roughly 40 percent of the total planted area has less than 320 planted stems per acre. However, with volunteer stems added (other than *Pinus, Rubus, Morella*, and *Baccharis*) most areas appear to have more than 320 total native hardwood trees per acre. Areas with less than 320 hardwood trees per acre have high densities of *Morella*, *Baccharis*, and *Rubus*; these areas are numerous but small and widely scattered throughout the project; none larger than the 0.1 acre mapping threshold was found, and thus no "low density" area is included in the CCPV (Figure 2, Table 5). The entire site has dense shrub and herbaceous growth; there are no areas with sparse vegetation.

Many planted trees throughout the site are small and received low vigor ratings, with the exception of *Platanus*, most of which have grown well. Competition from dense herbs, shrubs and vines resulted in low initial survival and need for supplemental plantings; many planted stems are thus 1 to 4 years old, rather than 5 years. In 2018 most of the plots had average vigor ratings between 2.1 and 2.9. Three CVS plots (plots # 01, 22, and 24) had average vigor ratings of 3.0 or higher, and two plots (plots # 13 and 19) had average vigor ratings of 2.0 or lower. Small, low vigor trees are interspersed throughout the project site and not concentrated in any particular areas; thus no low vigor areas are mapped on the CCPV figures. Vigorous native volunteer trees that have outgrown the planted stems are abundant over most of the site, especially *Fraxinus, Acer, Liquidambar, Diospyros, Platanus*, and *Prunus*.

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. As invasives are widely scattered throughout the site with no discernable "problem areas" and appear to be having little effect on planted tree growth, no invasive areas were mapped in the 2018 CCPV (Figure 2).

No recent encroachment or damage from vehicles, livestock, or people was observed, other than the paths cut by Carolina Silvics for supplemental planting in fall 2017. "Conservation Area" signs posted along roadsides are intact, although some are obscured from view by shrubs and vine growth. There is no fencing around the Stallings project site.

2.0. Monitoring Methods

Baseline Monitoring and Annual Monitoring and reporting methods follow the current DMS-provided templates and guidelines (NC-DMS 2017). The 25 permanent CVS vegetation plots (10 x 10 meters)

are evaluated and photographed during 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). Plant 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 perimeter 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.

NC Division of Mitigation Services. (2017). *NC-DMS Annual Monitoring Report Format, Data Requirements and Content Guidance, June 2017.* 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.

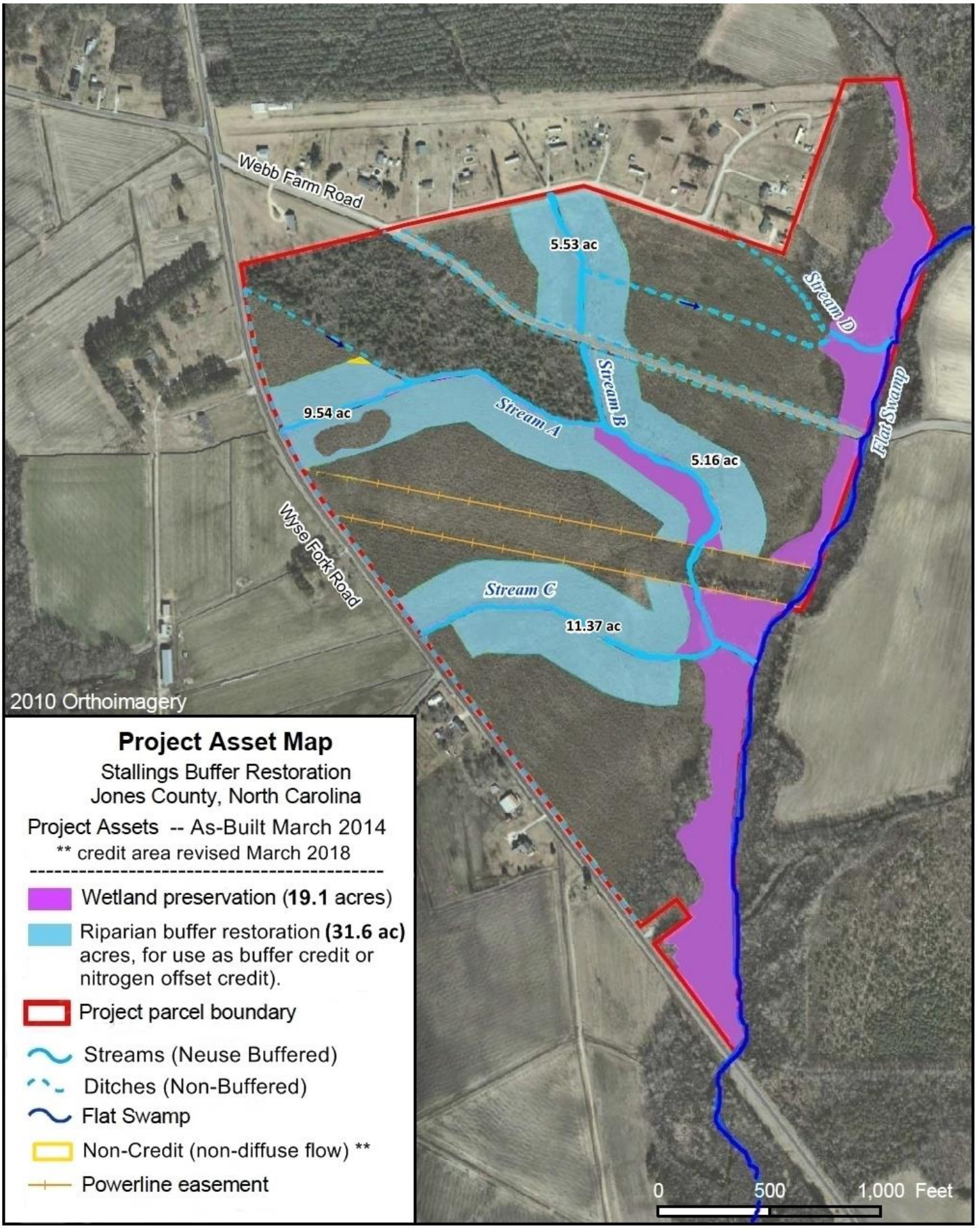


Figure 1B. Stallings Buffer Restoration #357, As-Built Project Components and Mitigation Assets Map.

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							**31.599**	**(31.599) *b**	

(a): Buffer restoration is applicable for Buffer Credit and/or Nitrogen Offset Credit, but not both within the same footprint.

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, sq.ft
Stream Enhancement							
Riparian Buffer	**Stream A (VP-10-17)**	**10.64 ac**	**Rest**	**R**	**9.539 ac *a**	**1:1**	**415,519**
Riparian Buffer	**Stream B (VP-22-25)**	**5.54 ac**	**Rest**	**R**	**5.530 ac**	**1:1**	**240,887**
Riparian Buffer	**Stream B, A (VP-18-21)**	**5.17 ac**	**Rest**	**R**	**5.160 ac**	**1:1**	**224,770**
Riparian Buffer	**Stream C, A (VP-01-09)**	**11.38 ac**	**Rest**	**R**	**11.370 ac**	**1:1**	**495,278**
Wetland Enhancement							
Wetland Preservation							
Nitrogen Nutrient Offset					**(31.599) *b**		**(1,376,454)**

***a: Deduct 1.071 acre wetland (not mowed & planted) +.020 ac for non-diffused flow from side ditch, per DWR guidance.**
***b: Combined total of 31.599 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					**1,376,454**	
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation						
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: 56 Months		
Number of Reporting Years: 5		
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
Supplemental Tree Planting	---	Feb 2018
MY-5 2018 Monitoring Report	Oct 2018	Jan 2019
Final Close-Out 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 Ave 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. Project Background Information				
Project Name	Stallings Buffer Restoration			
County	Jones County			
Project Area (acres)	146 acres			
Project Coordinates (latitude and longitude)	35.1721, -77.4824			
Planted Acreage (Acres of Woody Stems Planted)				
Project Watershed Summary Information				
Physiographic Province	Coastal Plain			
River Basin	Neuse (Trent River)			
USGS Hydrologic Unit 8-digit	3020204	USGS Hydrologic Unit 14-digit	03020204-010050	
DWR Sub-basin	03-04-11			
Project Drainage Area (Acres and Square Miles)	460 acres (0.72 sq.mi)			
Project Drainage Area Percentage of Impervious Area	3.80%			
CGIA Land Use Classification	Forest, Cultivated, Herbaceous, Shrub			
Reach Summary Information				
Parameters	**Reach 1**	**Reach 2**	**Reach 3**	
Not Applicable				
Wetland Summary Information				
Parameters	**Wetland 1**	**Wetland 2**	**Wetland 3**	
Size of Wetland (acres)	3.0 acres	16.1 acres		
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	riverine	riverine		
Mapped Soil Series	Meggett loam	Meggett, Stockade		
Drainage class	Poorly	Poorly, Very poor		
Soil Hydric Status	Yes	Yes		
Source of Hydrology	overbank	overbank		
Restoration or enhancement method (hydrologic, vegetative etc.)	none (pres)	none (pres)		
Regulatory Considerations				
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**	
Water of the United States - Section 404	No	not applicable	not applicable	
Water of the United States - Section 401	No	not applicable	not applicable	
Endangered Species Act	No	not applicable	not applicable	
Historic Preservation Act	Yes	Yes	NC-DCR letter	
Coastal Zone Management Act (CZMA or CAMA)	No	not applicable	not applicable	
FEMA Floodplain Compliance	No	not applicable	not applicable	
Essential Fisheries Habitat	No	not applicable	not applicable	

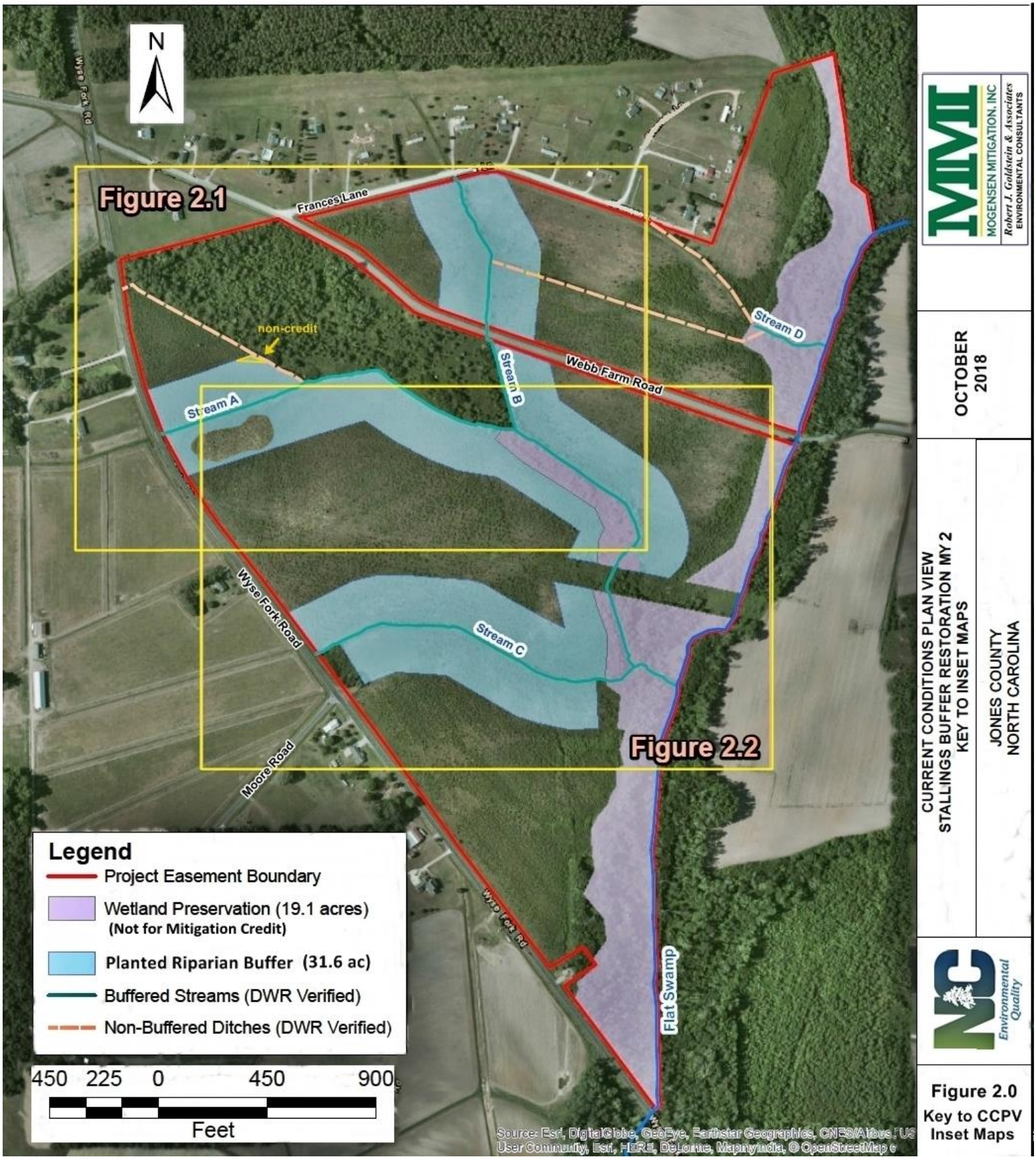
Appendix B. Visual Assessment Data

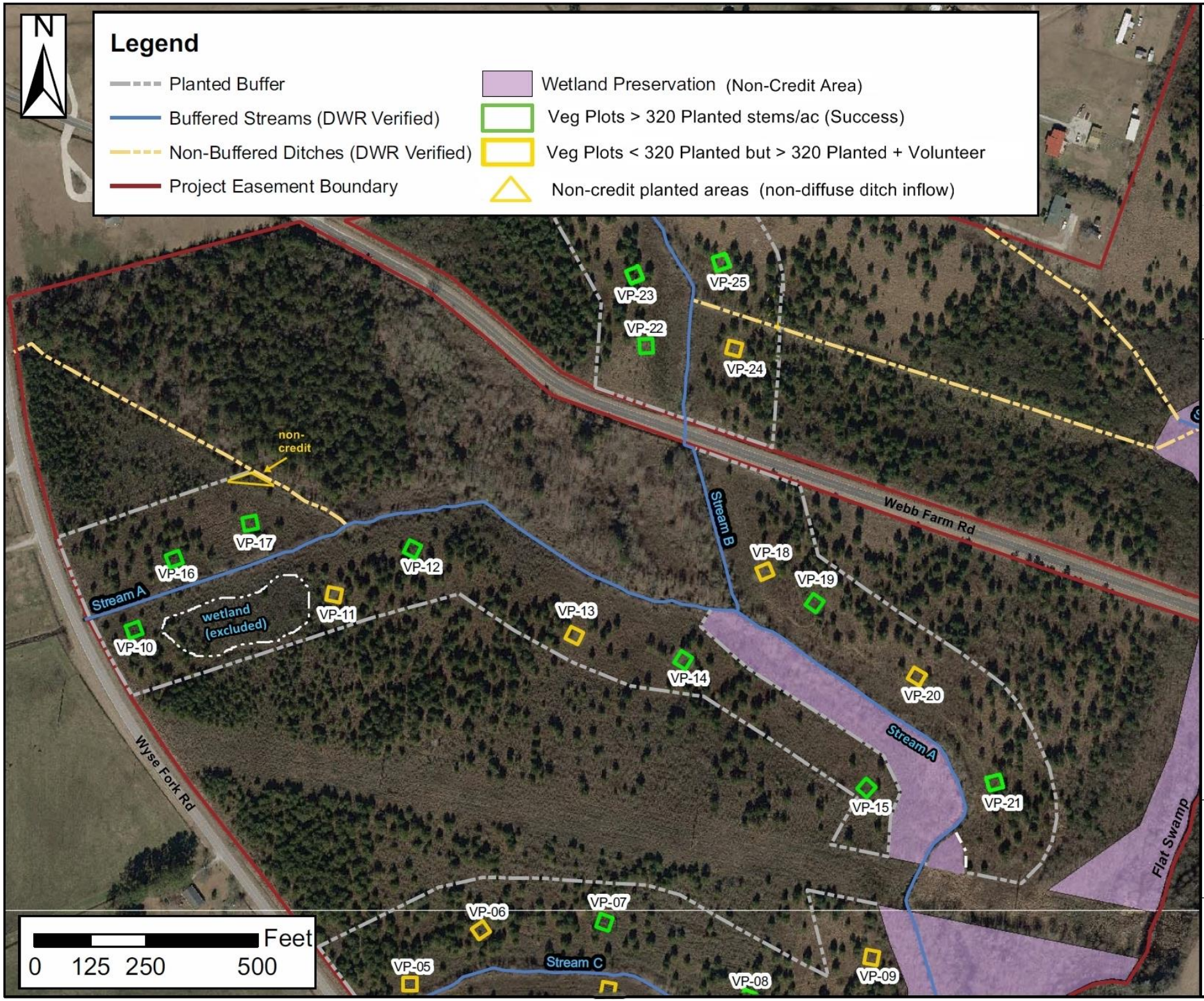
Figure 2. Current Conditions Plan View: October 2018.

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


N
Figure 2.1
Figure 2.2
Frances Lane
Webb Farm Road
Wyse Fork Rd
Wyse Fork Road
Moore Road
non-credit
Stream A
Stream B
Stream C
Stream D
Flat Swamp
Legend
Project Easement Boundary
Wetland Preservation (19.1 acres)
(Not for Mitigation Credit)
Planted Riparian Buffer (31.6 ac)
Buffered Streams (DWR Verified)
Non-Buffered Ditches (DWR Verified)
450 225 0 450 900
Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap c
MMI
MOGENSEN MITIGATION, INC
Robert J. Goldstein & Associates
ENVIRONMENTAL CONSULTANTS
OCTOBER 2018
CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION MY 2
KEY TO INSET MAPS
JONES COUNTY
NORTH CAROLINA
NC Environmental Quality
Figure 2.0
Key to CCPV Inset Maps



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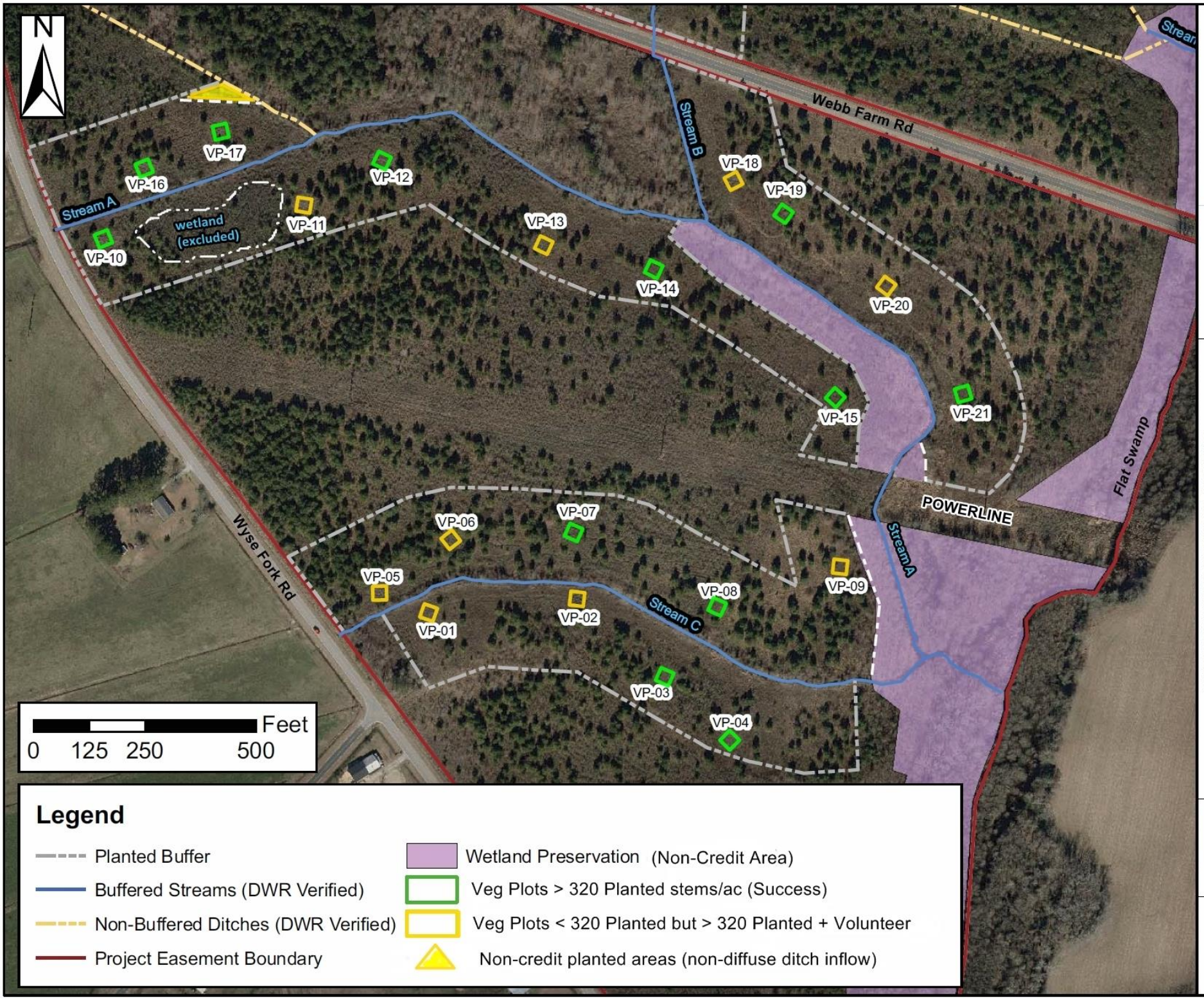
Charlotte, NC 28227
(704) 576-1111

CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357
JONES COUNTY
NORTH CAROLINA

FIGURE 2.1
OCT 2018
MY-5 of 5



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CURRENT CONDITIONS PLAN VIEW
STALLINGS BUFFER RESTORATION #357

JONES COUNTY
NORTH CAROLINA

Environmental Quality

FIGURE 2.2
OCT 2018
MY-5 of 5

Table 5: Vegetation Condition Assessment Table
Stallings Site Buffer Restoration #357 (Flat Swamp, Jones County)
Monitoring Year 5 of 5 (2018)

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	N/A	*** See Note A below		
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	N/A	*** See Note A below		
			Cumulative Total	0	0	**40%**

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 or points (if too small to render as polygons).	1000	N/A	*** See Note B below		
Easement Encroachment Areas	Areas or points (if too small to render as polygons).	none	N/A	0	0	0%

Problem areas are based on field observations in October 2018, 56 months after initial tree planting.
Competition from dense native shrubs and herbs is 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.

A) Many planted trees throughout the site are small and received low vigor ratings due to shading by native shrubs, vines, and herbs. Low-vigor planted trees and numerous small patches of low planted stem density are interspersed widely throughout the project site and not concentrated in distinct areas suitable for mapping in the CCPV figures. Based on planted stem densities in the CVS plots, we estimate that 40 percent of the planted area has fewer than 320 planted stems per acre and/or low average vigor ratings. However, vigorous native volunteer hardwood trees are common throughout, and most of the site has > 320 native hardwood trees/acre with volunteers included. See discussion in MY5 report section 1.5.

B) Invasive exotic plants occur at low density scattered widely throughout the planted areas, and are not concentrated in distinct areas suitable for mapping in the CCPV figures or for targeted treatment. Widespread invasives include Lonicera japonica, Ligustrum sinense, Rosa multiflora, Lespedeza cuneata, and Pyrus calleryana. These invasives do not appear to be a significant threat in limiting the growth of planted and volunteer native trees. Competition from fast-spreading native shrubs is a far more significant factor, especially Morella cerifera, Baccharis halimifolia, and Rubus species. See discussion in MY5 report section 1.5.

Figure 3.1 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-1: MY-5 Oct 23-25, 2018

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

CVS VegPlot-2: MY-5 Oct 23-25, 2018

Figure 3.2 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-3: MY-5 Oct 23-25, 2018

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

CVS VegPlot-4: MY-5 Oct 23-25, 2018

Figure 3.3 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-5: MY-5 Oct 23-25, 2018

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

CVS VegPlot-6: MY-5 Oct 23-25, 2018

Figure 3.4 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-7: MY-5 Oct 23-25, 2018

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

CVS VegPlot-8: MY-5 Oct 23-25, 2018

Figure 3.5 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-9: MY-5 Oct 23-25, 2018

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

CVS VegPlot-10: MY-5 Oct 23-25, 2018

Figure 3.6 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-11: MY-5 Oct 23-25, 2018

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

CVS VegPlot-12: MY-5 Oct 23-25, 2018

Figure 3.7 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-13: MY-5 Oct 23-25, 2018

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

CVS VegPlot-14: MY-5 Oct 23-25, 2018

Figure 3.8 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-15: MY-5 Oct 23-25, 2018

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

CVS VegPlot-16: MY-5 Oct 23-25, 2018

Figure 3.9 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-17: MY-5 Oct 23-25, 2018

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

CVS VegPlot-18: MY-5 Oct 23-25, 2018

Figure 3.10 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-19: MY-5 Oct 23-25, 2018

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

CVS VegPlot-20: MY-5 Oct 23-25, 2018

Figure 3.11 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-21: MY-5 Oct 23-25, 2018

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

CVS VegPlot-22: MY-5 Oct 23-25, 2018

Figure 3.12 Vegetation Monitoring Plot Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-23: MY-5 Oct 23-25, 2018

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

CVS VegPlot-24: MY-5 Oct 23-25, 2018

Figure 3.13 Vegetation Monitoring Plots & Other Photos - Stallings Buffer Restoration #357 - MY5 (2018)

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

CVS VegPlot-25: MY-5 Oct 23-25, 2018

Baccharis thicket W of VP-11 after hurricane. MY-5 Oct 25, 2018

Conservation signpost along Webb Farm Rd. MY-5 Oct 25, 2018

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

Supplemental Planting Maps - February 2018

Table 6. CVS Vegetation Plot Stem Densities & Success Stallings Buffer Site #357 Flat Swamp, Jones Co. Planted Stem, Volunteer & Total Stem Densities STEMS PER ACRE -- MY5: Oct 2018				
Plot ID	**Planted Stems[1]**	**Volunteer Stems[2]**	**Total Stems[3]**	**Success Criteria Met?**
0001	283	486	769	**NO**
0002	283	122	405	**NO**
0003	445	203	648	**YES**
0004	324	405	729	**YES**
0005	243	162	405	**NO**
0006	283	122	405	**NO**
0007	364	405	769	**YES**
0008	364	324	688	**YES**
0009	243	162	405	**NO**
0010	445	122	567	**YES**
0011	202	203	405	**NO**
0012	364	162	526	**YES**
0013	283	81	364	**NO**
0014	364	122	486	**YES**
0015	445	284	729	**YES**
0016	324	162	486	**YES**
0017	405	162	567	**YES**
0018	243	405	648	**NO**
0019	324	445	769	**YES**
0020	283	324	607	**NO**
0021	445	567	1012	**YES**
0022	405	324	729	**YES**
0023	526	284	810	**YES**
0024	243	243	486	**NO**
0025	364	243	607	**YES**
Project Avg	**340**	261	**601**	**YES**

Woody Stem Classification

[1] Planted Stems = Native planted trees and shrubs, excluding live stakes.

[2] Volunteers = Native volunteer trees and shrubs excluding Pinus, Morella, and Baccharis.

[3] Total = Planted + volunteer native trees & shrubs excluding those specified above.

Table 7A. CVS Vegetation Plot Stem Densities: MY-5: Oct 2018. 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			3									2			1
Acer rubrum	Red maple	Tree			2												
Alnus serrulata	Hazel alder	Shrub															
Callicarpa americana	American beautyberry	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree			1	1	1	1			1	1	1	2	2	2	2
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			6			3			4			4			3
Liriodendron tulipifera	Tuliptree	Tree													1	1	1
Nyssa sylvatica	Blackgum	Tree	1	1	1												
Pinus taeda	Loblolly pine	Tree			1												
Platanus occidentalis	American sycamore	Tree	5	5	5	4	4	4	2	2	2	3	3	3	2	2	2
Prunus angustifolia	Chickasaw plum	Shrub												3			
Prunus serotina	Black cherry	Tree															
Quetcus falcata	Southern red oak	Tree															
Quercus michauxii	Swamp chestnut oak	Tree	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
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							1	1	1	1	1	1			
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
(green fill = planted species)		**Stem count**	7	7	19	7	7	10	11	11	16	8	8	18	6	6	10
(violet fill = volunteer species)		**size (ares)**	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	3	3	8	3	3	4	5	5	7	5	5	8	4	4	6
		Stems per ACRE	283	283	769	283	283	405	445	445	647	324	324	728	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 7B. CVS Vegetation Plot Stem Densities: MY-5: Oct 2018. 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												1			
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Callicarpa americana	American beautyberry	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree	2	2	2	2	2	2	2	2	4	1	1	2	3	3	6
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			3			10			6			2			
Liriodendron tulipifera	Tuliptree	Tree															
Nyssa sylvatica	Blackgum	Tree	2	2	2												
Pinus taeda	Loblolly pine	Tree			3			2			1						
Platanus occidentalis	American sycamore	Tree				3	3	3	2	2	2	1	1	1	2	2	2
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree															
Quetcus falcata	Southern red oak	Tree	3	3	3												
Quercus michauxii	Swamp chestnut oak	Tree				4	4	4	3	3	3						
Quercus nigra	Water oak	Tree													1	1	1
Quercus phellos	Willow oak	Tree							2	2	2	1	1	1	4	4	4
Quercus rubra	Northern red oak	Tree										3	3	3	1	1	1
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
(green fill = planted species)		**Stem count**	7	7	10	9	9	19	9	9	17	6	6	10	11	11	14
(violet fill = volunteer species)		**size (ares)**	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	3	3	5	3	3	5	4	4	6	4	4	6	5	5	5
		Stems per ACRE	283	283	405	364	364	769	364	364	688	243	243	405	445	445	567

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-5: Oct 2018. 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															2
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Callicarpa americana	American beautyberry	Shrub															
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree	1	1	1	1	1	2	3	3	3	1	1	2	4	4	4
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			2			3			2			2			4
Liriodendron tulipifera	Tuliptree	Tree													1	1	1
Nyssa sylvatica	Blackgum	Tree															
Pinus taeda	Loblolly pine	Tree			5			2									
Platanus occidentalis	American sycamore	Tree	2	2	3	5	5	5	2	2	2	1	1	1			
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree															
Quetcus falcata	Southern red oak	Tree															
Quercus michauxii	Swamp chestnut oak	Tree	1	1	1							3	3	3	1	1	1
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	1	1	3	1	1	1	2	2	2	1	1	1	1	1	1
Rhus copallinum	Winged sumac	Shrub															
Ulmus americana	American elm	Tree															
(green fill = planted species)		**Stem count**	5	5	10	9	9	13	7	7	9	9	9	12	11	11	18
(violet fill = volunteer species)		**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	6	3	3	4	6	6	7	5	5	8
		Stems per ACRE	202	202	405	364	364	526	283	283	364	364	364	486	445	445	728

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-5: Oct 2018. 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									4						2
Acer rubrum	Red maple	Tree															
Alnus serrulata	Hazel alder	Shrub															
Callicarpa americana	American beautyberry	Shrub															1
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															2
Fraxinus pennsylvanica	Green ash	Tree				2	2	2			2	1	1	4	1	1	2
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree															
Liquidambar styraciflua	Sweetgum	Tree			4			2						1			
Liriodendron tulipifera	Tuliptree	Tree							1	1	1				1	1	1
Nyssa sylvatica	Blackgum	Tree	1	1	1	1	1	1				1	1	1			
Pinus taeda	Loblolly pine	Tree			1			1									
Platanus occidentalis	American sycamore	Tree	5	5	5	2	2	4	1	1	1			6			2
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree									2			1			
Quetcus falcata	Southern red oak	Tree															
Quercus michauxii	Swamp chestnut oak	Tree										1	1	1	2	2	2
Quercus nigra	Water oak	Tree	1	1	1				1	1	1	1	1	1			
Quercus phellos	Willow oak	Tree	1	1	1	3	3	3	1	1	1	1	1	1			
Quercus rubra	Northern red oak	Tree				2	2	2	2	2	2	3	3	3	3	3	3
Rhus copallinum	Winged sumac	Shrub									2						
Ulmus americana	American elm	Tree															
(green fill = planted species)		**Stem count**	8	8	12	10	10	14	6	6	16	8	8	19	7	7	15
(violet fill = volunteer species)		**size (ares)**	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	4	4	6	5	5	7	5	5	9	6	6	9	4	4	8
		Stems per ACRE	324	324	486	405	405	567	243	243	647	324	324	769	283	283	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 7E. CVS Vegetation Plot Stem Densities: MY-5: Oct 2018. 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			3												
Acer rubrum	Red maple	Tree			2												
Alnus serrulata	Hazel alder	Shrub															
Callicarpa americana	American beautyberry	Shrub															1
Crataegus spp.	Hawthorn	Shrub															
Diospyros virginiana	Persimmon	Tree															
Fraxinus pennsylvanica	Green ash	Tree	1	1	4	2	2	3				4	4	7	2	2	2
Ilex opaca	American holly	Tree															
Ilex vomitoria	Yaupon holly	Shrub															
Juniperus virginiana	Eastern redcedar	Tree						2									
Liquidambar styraciflua	Sweetgum	Tree			4			1			4			2			
Liriodendron tulipifera	Tuliptree	Tree															
Nyssa sylvatica	Blackgum	Tree							1	1	1				2	2	2
Pinus taeda	Loblolly pine	Tree									3						1
Platanus occidentalis	American sycamore	Tree	2	2	3	7	7	7				1	1	1	4	4	4
Prunus angustifolia	Chickasaw plum	Shrub															
Prunus serotina	Black cherry	Tree			1			2			3			1			5
Quetcus falcata	Southern red oak	Tree															
Quercus michauxii	Swamp chestnut oak	Tree							1	1	1						
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				9	9	9						
Rhus copallinum	Winged sumac	Shrub						2									
Ulmus americana	American elm	Tree															
(green fill = planted species)		**Stem count**	11	11	25	10	10	18	13	13	20	6	6	12	9	9	15
(violet fill = volunteer species)		**size (ares)**	1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	5	5	9	3	3	7	4	4	7	3	3	5	4	4	7
		Stems per ACRE	445	445	1012	405	405	728	526	526	809	243	243	486	364	364	607

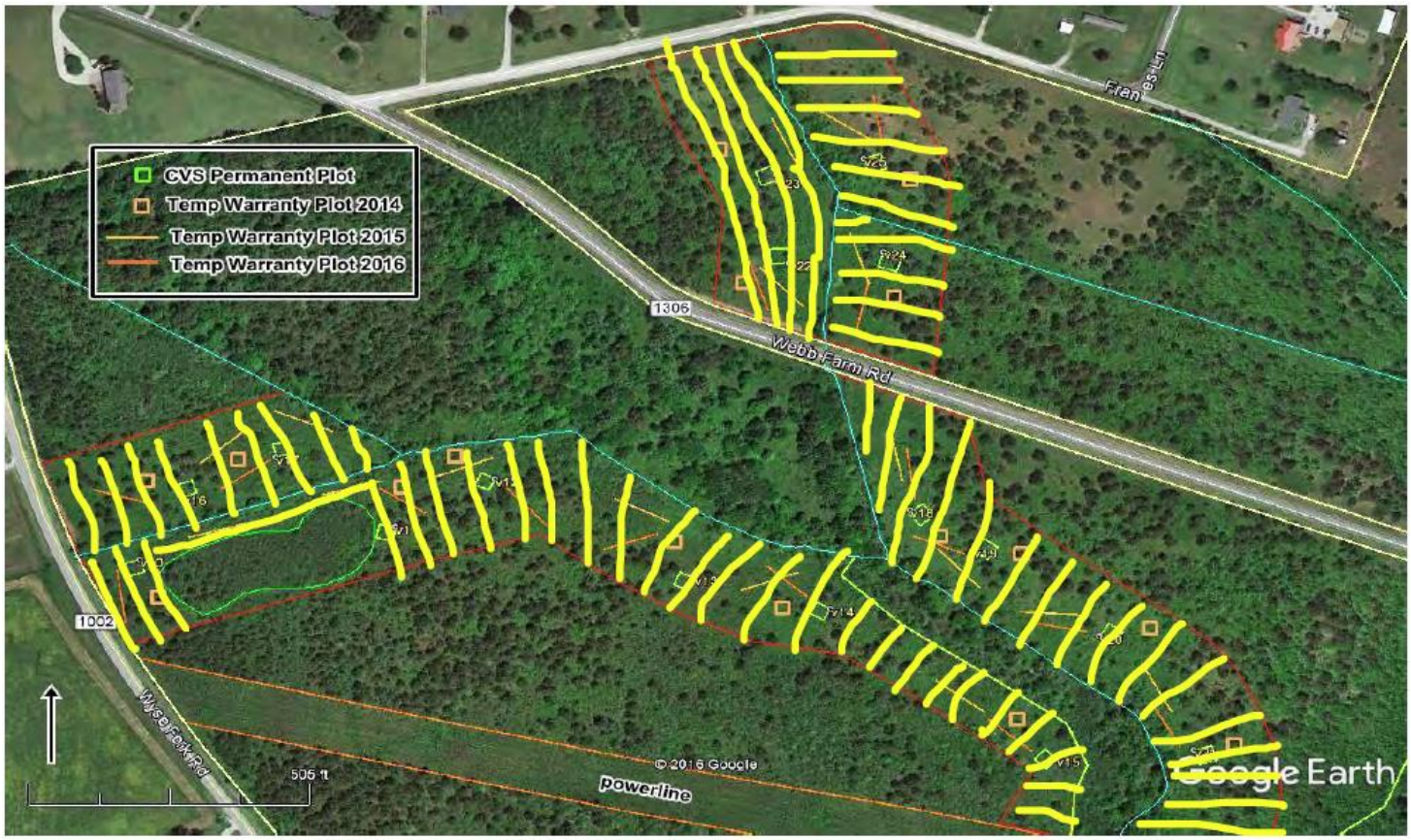
Color Codes for Planted Tree Density
Exceeds 320 trees/acre requirements by 10%
Exceeds 320 trees/acre requirements, but by less than 10%
Fails to meet 320 trees/acre requirements, by less than 10%
Fails to meet 320 trees/acre requirements by more than 10%

Table 7F. CVS Vegetation Plot Stem Densities: MY-5: Oct 2018 - Annual Mean Densities. Stallings Buffer Site #357.

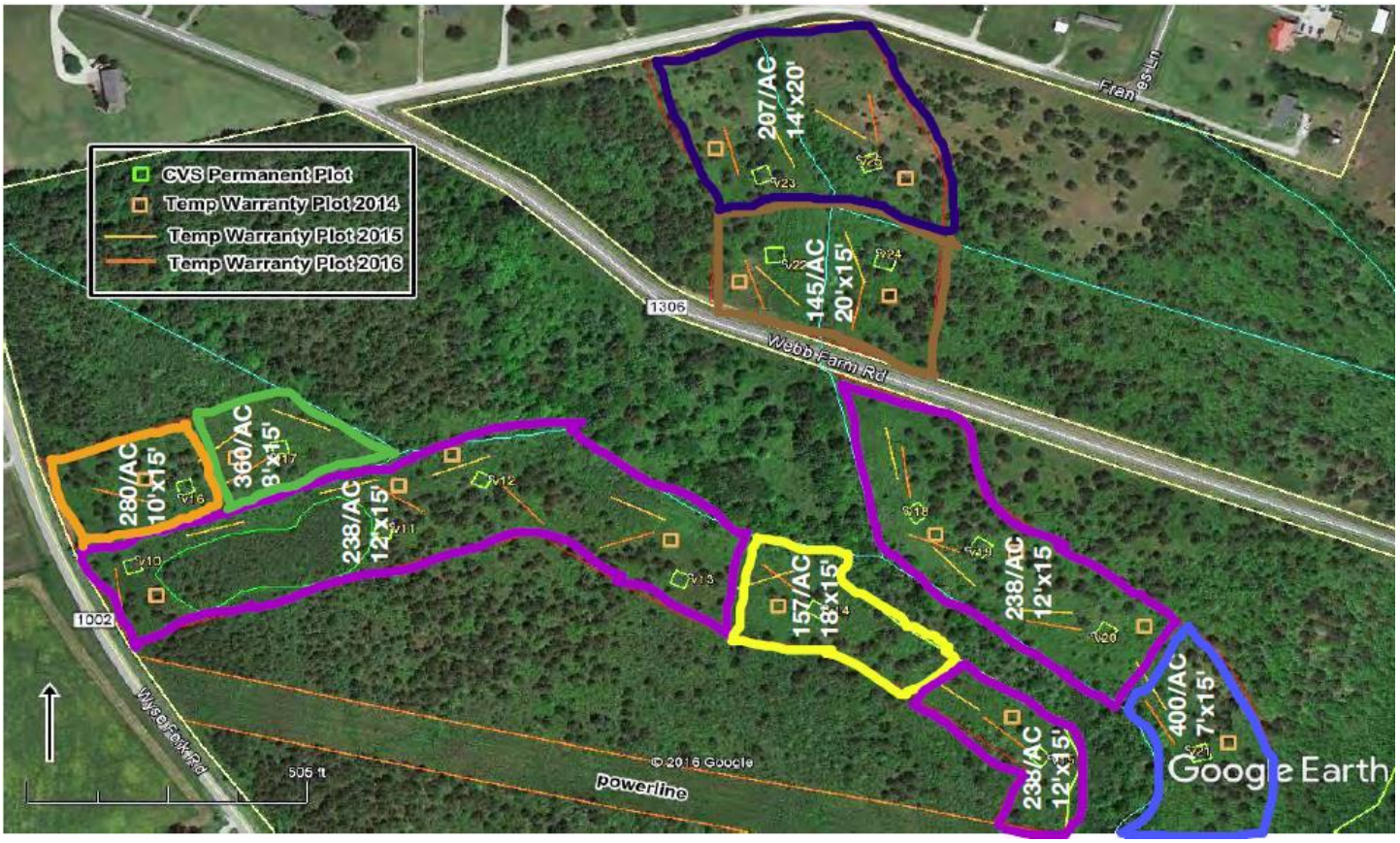
Scientific Name	Common Name	Species Type	MY5 (2018)			MY4 (2017)			MY3 (2016)			MY2 (2015)			MY1 (2014)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder maple	Tree			18			1									2
Acer rubrum	Red maple	Tree			4			4			6			1			
Alnus serrulata	Hazel alder	Shrub									1						
Callicarpa americana	American beautyberry	Shrub			2												
Crataegus spp.	Hawthorn	Shrub						1									
Diospyros virginiana	Persimmon	Tree			2			5			4						
Fraxinus pennsylvanica	Green ash	Tree	37	37	61	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			2						1						
Liquidambar styraciflua	Sweetgum	Tree			72			31			39			23			24
Liriodendron tulipifera	Tuliptree	Tree	4	4	4	10	10	10	11	11	12	19	19	19	25	25	25
Nyssa sylvatica	Blackgum	Tree	9	9	9	13	13	13	16	16	16	17	17	17	25	25	25
Pinus taeda	Loblolly pine	Tree			20			13			9			5			6
Platanus occidentalis	American sycamore	Tree	56	56	68	50	50	64	49	49	62	59	59	65	73	73	89
Prunus angustifolia	Chickasaw plum	Shrub			3			1			1						
Prunus serotina	Black cherry	Tree			15			9			11						14
Quetcus falcata	Southern red oak	Tree	3	3	3												
Quercus michauxii	Swamp chestnut oak	Tree	23	23	23												
Quercus nigra	Water oak	Tree	11	11	12	11	11	12	7	7	8	4	4	4	4	4	4
Quercus phellos	Willow oak	Tree	32	32	32	31	31	31	27	27	27	26	26	27	23	23	23
Quercus rubra	Northern red oak	Tree	35	35	37	40	40	40	46	46	46	41	41	41	51	51	52
Rhus copallinum	Winged sumac	Shrub			4						10						
Ulmus americana	American elm	Tree									1						
Unknown	(identified in 2016)	Shrub/Tree										4	4	4	1	1	1
(green fill = planted species)		**Stem count**	210	210	371	163	163	239	166	166	262	170	170	209	202	202	260
(violet fill = volunteer species)		**size (ares)**	25			25			25			25			25		
		size (ACRES)	0.618			0.618			0.618			0.618			0.618		
		Species count	9	9	19	7	7	15	7	7	19	7	7	11	7	7	12
		Stems per ACRE	340	340	601	264	264	387	269	269	424	275	275	338	327	327	421

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%

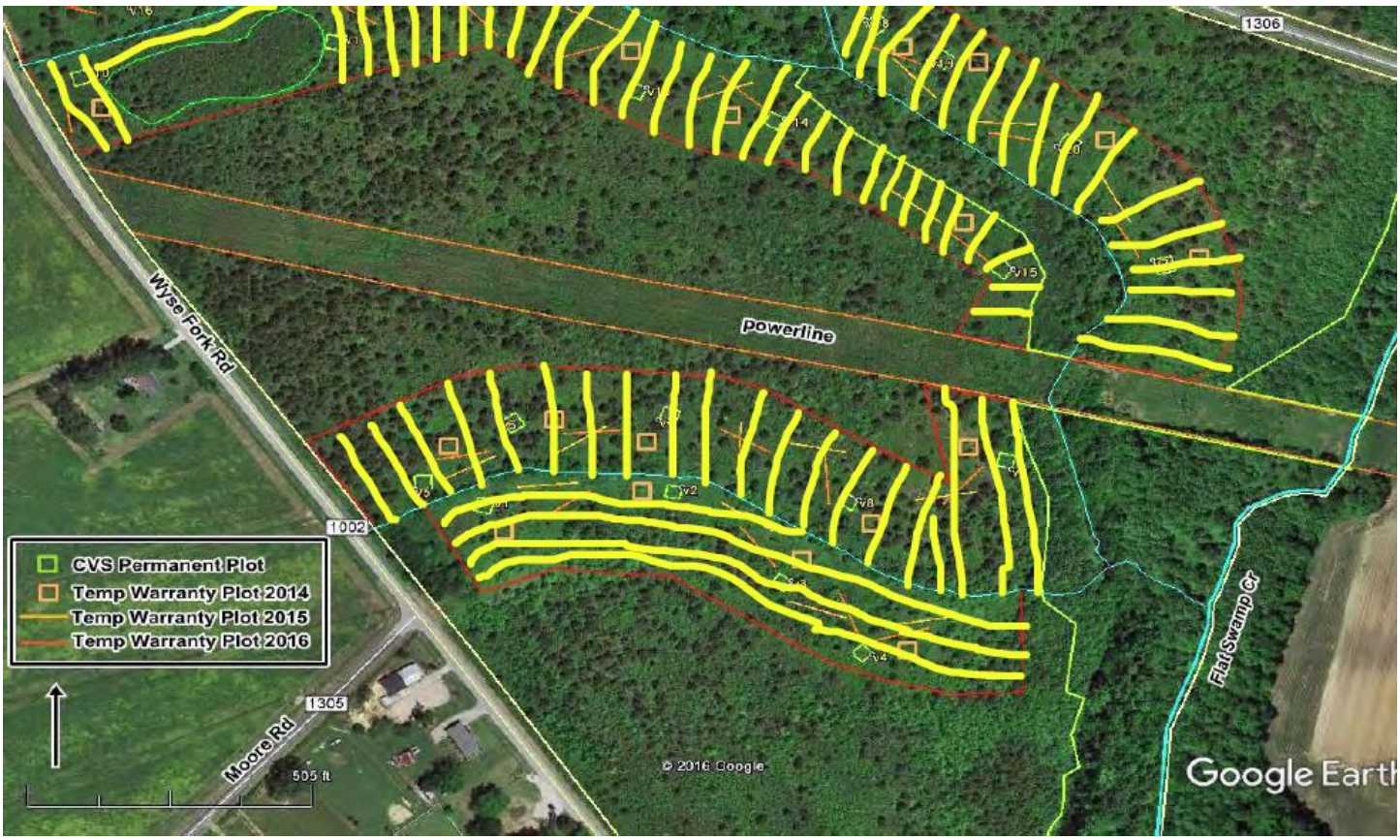
Supplemental Planting Maps from Carolina Silvics -- February 2018 -- Stallings Site #357 -- Northern Half



The yellow lines depict the orientation of the transects to the stream. These are not accurately spaced apart on the map; they just show the general direction.



Supplemental Planting Maps from Carolina Silvics -- February 2018 -- Stallings Site #357 -- Southern Half



The yellow lines depict the orientation of the transects to the stream. These are not accurately spaced apart on the map; they just show the general direction.