MONITORING YEAR 5 ANNUAL REPORT
Final

LOFLIN DAIRY BUFFER MITIGATION SITE
Randolph County, NC
NCDEQ Contract No. 003995
DMS ID No. 95008

Data Collection Period: July 2016
Final Submission Date: September 30, 2016

PREPARED FOR:

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Division of Mitigation Services
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EXECUTIVE SUMMARY

The Loflin Dairy Buffer Mitigation Site, hereafter referred to as the Site, is located within the Randleman Reservoir watershed of the Cape Fear River Basin (United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 03030003010060). On-site stream channels are unnamed tributaries to Bob Branch, which drains to the Randleman Regional Reservoir. The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998) approximately six miles southeast of the intersection of Interstate 85 and Highway 311 in Randolph County, NC. Directions and a map of the Site are provided in Figure 1 (Appendix 1). The Site has historically been used for agricultural purposes, and is surrounded by fields that are alternately used for cattle and crop production. A conservation easement has been recorded to protect 9.8 acres in perpetuity. The project is being completed to provide buffer mitigation units (BMUs) in the Cape Fear River Basin, and will include 9.1 BMUs in buffer restoration. Credits generated from buffer restoration on the Site are in accordance with the Randleman Lake Water Supply Watershed Rules, 15A NCAC 02B .0250 and .0252. The remaining protected acreage is buffer preservation not sought for credit. See Table 1 (Appendix 1) for a summary of project components and mitigation credits. A map of the conservation easement and project reaches is provided in Figure 2 (Appendix 1).

The goals of the Site address water quality improvements identified in the Cape Fear River Basin Restoration Priorities Report (RBRP) (NCEEP, 2009) and include the following:

- Remove harmful nutrients from creek flow;
- Reduce pollution of creek by excess sediment;
- Restore terrestrial habitat; and
- Improve aesthetics.

The following project objectives were established in the Loflin Dairy Buffer Mitigation Site Mitigation Plan (2012) to meet the RBRP goals:

- Runoff will be filtered through buffer zones. Flood flows will be filtered through restored riparian areas, where flood flow will spread through native vegetation. Vegetation will be planted to uptake excess nutrients;
- Stream bank erosion which contributes sediment load to the creek will be greatly reduced, if not eliminated, in the project area. Eroding streambanks will be stabilized by increased woody root mass in banks and reducing channel incision. Storm flow containing grit and fine sediment will be filtered through restored riparian buffer areas, where flow will spread through native vegetation;
- The establishment and maintenance of riparian buffers will create long-term shading of the channel bed, reducing thermal heating and improving aquatic habitat; and
- Adjacent buffer and riparian habitats will be restored with native vegetation and invasive species will be treated as part of the project. Native vegetation will provide cover and food for terrestrial creatures.

Overall, the Site has met the required buffer mitigation success criteria for the fifth year of annual monitoring (MY5). Although one vegetation plot (plot 15) did not meet the MY5 success criteria, the average stem density of the Site is greater than the required MY5 success criteria. Areas with invasive species observed in MY5 will be treated and observed throughout the current year to ensure minimal advancement occurs within the Site.

APPENDICES

1.0 PROJECT OVERVIEW

The Loflin Dairy Buffer Mitigation Site, hereafter referred to as the Site, is located within the Randleman Regional Reservoir watershed (North Carolina Division of Water Resources (NCDWR) Subbasin 03-06-08) of the Cape Fear River Basin (United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 03030003010060). On-site stream channels are unnamed tributaries to Bob Branch (NCDWR Index No. 17-9.6-(1)) which drain to the Randleman Regional Reservoir. The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998) approximately six miles southeast of the intersection of Interstate 85 and Highway 311 in Randolph County, NC. Directions and a map of the Site are provided in Figure 1 (Appendix 1).

The Site is surrounded by fields that are alternately used for cattle and crop production. The Site is comprised of two areas (Area A and B) on one parcel of land along several unnamed tributaries and ephemeral ditches to Bob Branch. A map of the conservation easement and project reaches is provided in Figure 2 (Appendix 1). The Site has historically been used for agricultural purposes. The current property owner has confirmed that Area A was used as an active dairy farm since 1947 and Area B has been surrounded by agricultural fields since the late 1920s. Bob Branch is a direct tributary to the Randleman Regional Reservoir. The reservoir is a regional water supply and stream buffer protection rules are in place throughout the watershed. At the downstream limits of the project, Area A has a drainage area of 18 acres (0.03 square miles) and Area B has a drainage area of 59 acres (0.09 square miles).

The NCDWR assigns best usage classifications to State Waters that reflect water quality conditions and potential resource usage. Bob Branch is classified as Class WS-IV waters. Class WS-IV waters are used as sources of water supply for drinking or food processing purposes where a more restrictive WS-I, WS-II, or WS-III classification is not feasible. These waters are also protected for Class C uses such as secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, and agriculture. WS-IV waters are generally in moderately to highly-developed watersheds or Protected Areas. This portion flowing into the Randleman Regional Reservoir is located within the Critical Area or area within one-half mile of a water supply

A conservation easement has been recorded to protect 9.8 acres of riparian corridor resources in perpetuity. The project is being completed to provide buffer mitigation units (BMUs) in the Cape Fear River Basin and will include 9.1 BMUs of buffer restoration. The remaining protected acreage is buffer preservation not sought for credit. See Table 1 (Appendix 1) for a summary of project components and mitigation credits.

1.1 Project Goals and Objectives

Prior to construction activities, the primary watershed stressor was the lack of a vegetated buffer and nutrient runoff from adjacent agricultural maintenance activities. The riparian zones within these areas were maintained and mowed on an annual basis resulting in varying buffer widths and densities. The riparian zones were also actively sprayed due to their locations in an active row crop field and cattle pasture. A concentrated flow of cattle waste drained directly to several of the tributaries located adjacent to the dairy farm. Although there is no immediate evidence of increased development within the project site's watersheds; the new NC Highway 311 corridor has been constructed immediately downstream of the project area. This new highway corridor may increase development pressure on the project's watersheds and this area of Randolph County in the future. The restored riparian buffer areas within the Site will aid in protecting water quality and endangered species habitat within the Deep River

watershed by filtering runoff from adjacent agricultural practices and restoring terrestrial habitat. The Deep River watershed is an important component of the Randleman Regional Reservoir in this part of the state. Riparian stream buffers were planted and restored to the dominant natural plant community that exists within the project watershed. This natural community within and adjacent to the project easement is classified as Piedmont Bottomland Forest and was determined based on existing canopy and herbaceous species (Schafale and Weakley, 1990). Tables 1-4 in Appendix 1 present detailed information for pre and post restoration conditions.

The goals of the Site address water quality improvements identified in the Cape Fear River Basin Restoration Priorities Report (RBRP) (NCEEP, 2009) and include the following:

- Remove harmful nutrients from creek flow;
- Reduce pollution of creek by excess sediment;
- Restore terrestrial habitat; and
- Improve aesthetics.

The following project objectives were established in the Loflin Dairy Buffer Mitigation Site Mitigation Plan (2012) to meet the RBRP goals:

- 9.1 acres of riparian area will be fenced off from adjacent agricultural activities and runoff will be filtered through buffer zones. Flood flows will be filtered through restored riparian areas, where flood flow will spread through native vegetation. Vegetation will be planted to uptake excess nutrients;
- Stream bank erosion which contributes sediment load to the creek will be greatly reduced, if not eliminated, in the project area. Eroding streambanks will be stabilized by increased woody root mass in banks and reducing channel incision. Storm flow containing grit and fine sediment will be filtered through restored riparian buffer areas, where flow will spread through native vegetation;
- The establishment and maintenance of riparian buffers will create long-term shading of the channel bed, reducing thermal heating and improving aquatic habitat; and
- Adjacent buffer and riparian habitats will be restored with native vegetation and invasive species will be treated as part of the project. Native vegetation will provide cover and food for terrestrial creatures.

1.2 Monitoring Year 5 Data Assessment

The final mitigation plan was submitted and accepted by the North Carolina Department of Mitigation Services (NCDMS) in February 2012. Grading activities were completed by the landowner in March 2012. Planting activities were completed by Bruton Natural Systems, Inc. in March 2012. The baseline monitoring and as-built survey were completed in April 2012. There were no significant deviations reported in the project elements in comparison to the design plans. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

The buffer restoration success criteria for the Site follows the criteria in 15A NCAC 02B .0250, .0252, and .0295. Annual monitoring was conducted to assess the Site conditions in July 2016.

1.2.1 Vegetative Assessment

A total of 16 vegetation plots were established within the project easement area using 10 meter by 10 meter vegetation monitoring plots. Plots were randomly established within planted portions of the stream buffer areas to capture the heterogeneity of the designed vegetative communities. The plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs at the origin looking diagonally across the plot to the opposite corner were taken with the as-built and during annual monitoring. The final vegetative success criteria will be the survival of 320 planted stems per acre in the buffer corridor at the end of year five (MY5) of the monitoring period. Along with the stem density requirement, the final planted vegetation community must also include at least two different planted species to be considered successful. The extent of invasive species coverage will also need to be monitored and controlled as necessary.

The MY5 average planted stem density for the Site is 415 stems per acre, which is 54% of the baseline (MY0) density recorded (764 stems per acre) in April 2012. There is an average of 10 planted stems per plot in MY5. In MY4, vegetation plots 4 and 6 had low stem density. In MY5, two additional stems were found in vegetation plot 4, and four additional stems were found in vegetation plot 6. These increases were the result of supplemental planting performed in May 2016 in those areas. In MY5, 15 of the 16 plots met the success criteria required for MY5. Vegetation plot 15 did not meet the MY5 success criteria due to insufficient stem density. While, vegetation Plots 4, 6 and 15 had high mortality rate in MY1 and MY2, the majority of remaining living stems in those plots currently have excellent growth and vigor scores. The low stem density in plot 15 is not representative of the rest of the restored buffer in that area. Natural recruitment of volunteer woody stems improves the density and diversity of the Site. The MY5 overall stem density is 546 stems per acre with volunteers included.

The current year vegetative assessment observed invasive plants in Area B consistent with what was observed in previous MY4, with Japanese honeysuckle (*Lonicera japonica*) concentrated primarily along the forested margins. An increase in Morning glory (*Ipomea sp.*) was found in Area A. Johnson grass (*Sorghum halepense)* is currently actively cultivated in adjacent farm fields, which has contributed to its presence within both areas of the easement. Spot treatment of the identified invasive plants occurred in 2015. Additional herbicide treatment of the morning glory found in Area A is planned for the current year to control that species and prevent further spreading. Please refer to Appendix 2 for vegetation plot photographs and visual assessment data and Appendix 3 for vegetation plot data.

1.3 Monitoring Year 5 Summary

Overall, the Site has met the required buffer mitigation success criteria for MY5. Although one vegetation plot (plot 15) did not meet the MY5 success criteria, the average stem density of the Site is greater than the required MY5 success criteria. Patches of invasive species observed in MY5 in Area A will be treated and observed throughout the remainder of the current year to ensure minimal advancement occurs within the Site.

2.0 METHODOLOGY

Vegetation monitoring protocols followed the Carolina Vegetation Survey-NCEEP Level Two Protocol (Lee et al., 2008).

3.0 REFERENCES

Lee, Michael T., Peet, Robert K., Steven D., Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Retrieved from http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-5.pdf

North Carolina Ecosystem Enhancement Program. 2009. Cape Fear River Basin Restoration Priorities 2009. http://www.nceep.net/services/lwps/cape_fear/RBRP%20Cape%20Fear%202008.pdf

North Carolina Ecosystem Enhancement Program. 2010. NCEEP Mitigation Plan Guidance (Version 2.0, 10/01/2010). http://portal.ncdenr.org/c/document_library/get_file?p_l_id=1169848&folderId=7135626&name=DLFE-53356.pdf

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd approx. North Carolina Natural Heritage Program, Raleigh, North Carolina.

United States Department of Agriculture (USDA), 2009. Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Randolph County, North Carolina. http://SoilDataMart.nrcs.usda.gov

United States Geological Survey (USGS), 1998. North Carolina Geology. http://www.geology.enr.state.nc.us/usgs/carolina.htm

Weakley, A.S. 2010. *Flora of the Carolinas, Virginia, Georgia, Northern Florida, and Surrounding Areas* University of North Carolina at Chapel Hill: Chapel Hill, NC.

Wildlands Engineering, Inc. 2012. Loflin Dairy Buffer Mitigation Site Mitigation Plan. NCDMS, Raleigh, NC.

Wildlands Engineering, Inc. 2012. Loflin Dairy Buffer Mitigation Site Baseline Monitoring Document and As-Built Baseline Report. NCDMS, Raleigh, NC.

APPENDIX 1. General Tables and Figures

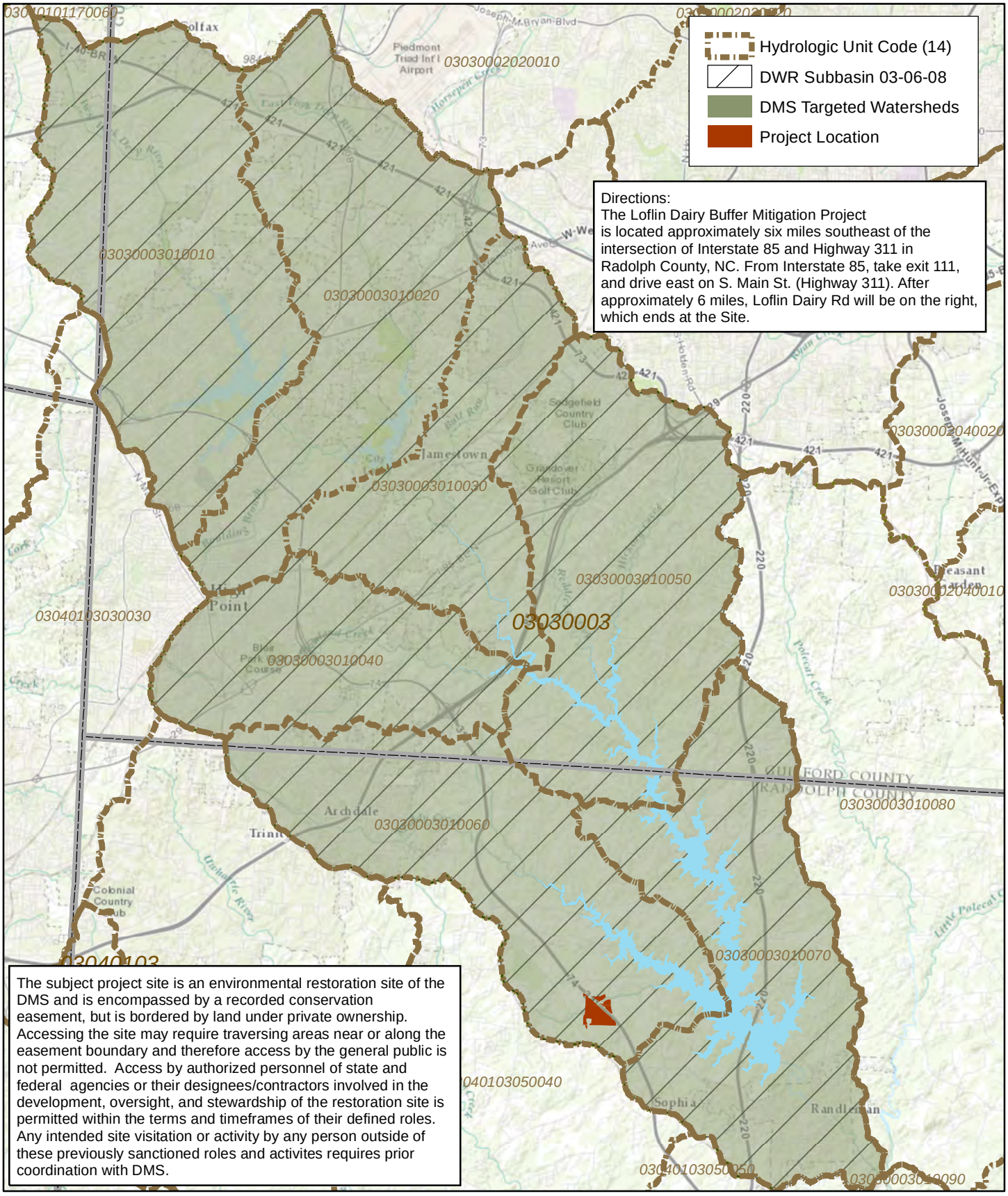

Figure 1 Project Vicinity Map
Loflin Dairy Buffer Mitigation Site
DMS Project No. 95008
Monitoring Year 5
Randolph County, NC

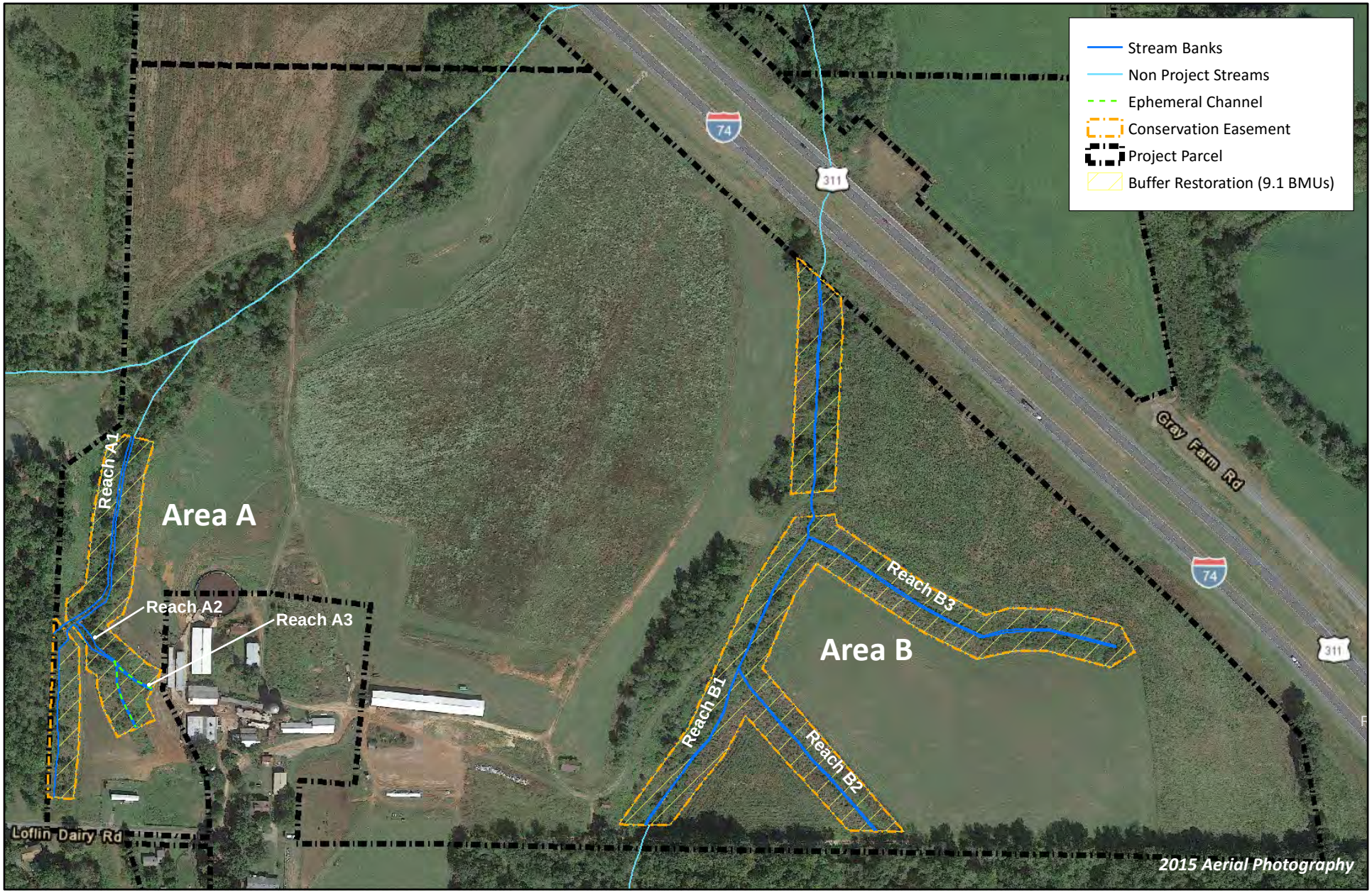

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Figure 2 Project Component/Asset Map
Loflin Dairy Buffer Mitigation Site
DMS Project No. 95008
Monitoring Year 5
Randolph County, NC

Table 1. Project Components and Mitigation Credits

Loflin Dairy Mitigation Site

DMS Project No. 95008

Monitoring Year 5 - 2016

MITIGATION CREDITS								
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE		
Totals	N/A	N/A	N/A	N/A	N/A	N/A	398,398	N/A

PROJECT COMPONENTS						
Reach ID	Stationing/ Location	Exisitng Footage (LF)	Approach	Restoration (R) or Restoration Equivalent (RE)	Area (acres)	Mitigation Ratio
Reach A1	Area A		N/A	Restoration (R)	1.7	1:1
Reach A2	Area A		N/A	Restoration (R)	0.7	1:1
Reach B1	Area B		N/A	Restoration (R)	3.6	1:1
Reach B2	Area B		N/A	Restoration (R)	1.1	1:1
Reach B3	Area B		N/A	Restoration (R)	2.0	1:1

COMPONENT SUMMATION						
Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration					398,398	
Enhancement						
Enhancement I						
Enhancement II						

Table 2. Project Activity and Reporting History

Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan	December 2011	February 2012
Final Design - Construction Plans	December 2011	February 2012
Construction	January 2012	January 2012
Temporary S&E mix applied to entire project area*	January 2012	January 2012
Permanent seed mix applied to reach/segments	January 2012	January 2012
Containerized and B&B plantings for reach/segments	March 2012	March 2012
Baseline Monitoring Document (Year 0 Monitoring - baseline)	April 2012	June 2012
Year 1 Monitoring	Sept 2012	December 2012
Year 2 Monitoring	July 2013	August 2013
Year 3 Monitoring	July 2014	August 2014
Year 4 Monitoring	July 2015	October 2015
Year 5 Monitoring	July 2016	August 2016

*Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table

Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

Designer **Daniel Taylor**	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	**Clifford W. Loflin** 2409 Loflin Dairy Road Sophia, NC 27350
Planting Contractor	**Bruton Natural Systems, Inc.** PO Box 1197 Freemont, NC 27830 919.242.6555
Seeding Contractor	**Bruton Natural Systems, Inc.** PO Box 1197 Freemont, NC 27830 919.242.6555
Seed Mix Sources	**Mellow Marsh Farm**
Nursery Stock Suppliers **Bare Roots** **Live Stakes** **Plugs**	 **Arborgen** **Dykes and Son Nursery** **NCForestry Service, Claridge Nursery**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Kirsten Y. Gimbert 704.332.7754, ext. 110

Table 4. Project Baseline Information and Attributes

Loflin Dairy Mitigation Site

DMS Project No. 95008

Monitoring Year 5 - 2016

PROJECT INFORMATION		
Project Name	Loflin Dairy Buffer Mitigation Site	
County	Randolph	
Project Area (acres)	9.8	
Project Coordinates (latitude and longitude)	35° 50' 44.082"N, 79° 52' 22.487"W	
PROJECT WATERSHED SUMMARY INFORMATION		
Physiographic Province	Carolina Slate Belt of the Piedmont	
River Basin	Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	
USGS Hydrologic Unit 14-digit	03030003010060	
DWQ Sub-basin	03-06-08	
	Area A	**Area B**
Project Drainiage Area (acres)	18	59
Project Drainage Area Percentage of Impervious Area	<1%	
CGIA Land Use Classification	82% Cultivated Land and 18% Forested Land	45% Cultivated Land, 40% Forested Land, 10% Residential, and 5 % Commercial
REACH SUMMARY INFORMATION		
Parameters	**Area A**	**Area B**
Length of reach (linear feet) - Post-Restoration	Reach A1 : 917 Reach A2 : 155 Reach A2(ephem):180 Reach A3 : 120	Reach B1 : 1489 Reach B2 : 866 Reach B3 : 486
Valley classification	N/A	N/A
Drainage area (acres)	Reach A1 : 61 Reach A2 : 6.5 Reach A3 : 1.0	Reach B1 : 230 Reach B2 : 26 Reach B3 : 22
NCDWQ stream identification score	Reach A1 : 24/ 34.5 Reach A2 : 23.25 Reach A3 : N/A	Reach B1 : 27.25/ 35.5 Reach B2 : 20.75 Reach B3 : 22.75
NCDWQ Water Quality Classification	WS-IV, C	
Morphological Desription (stream type)	Reach A1 – Per. / Int. Reach A2 – Int. / Ephemeral Ditch Reach A3- Ephemeral Ditch	Reach B1 – Per. / Int. Reach B2 – Int. Reach B3 – Int.
Evolutionary trend (Simon's Model) - Pre- Restoration	N/A	N/A
Underlying mapped soils	Wynott-Enon complex	Mecklenburg loam, 8-15% slopes; Mecklenburg clay loam, 2-8% slopes
Drainage class	well drained	well drained
Soil Hydric status	No	No
Slope	8-15%	2-8%
FEMA classification	no regulated floodplain	
Native vegetation community	Bottom-land Forest	
Percent composition of exotic invasive vegetation - Post-Restoration	0%	

REGULATORY CONSIDERATIONS			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States - Section 404	N/A	N/A	N/A
Waters of the United States - Section 401	N/A	N/A	N/A
Endangered Species Act	X	X	Loflin Dairy Buffer Mitigation Plan; studies found "no effect" (letter from USFWS)
Historic Preservation Act	X	X	Loflin Diary Buffer Mitigation Plan; No historic resources were found to be impacted (letter from SHPO)
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A
FEMA Floodplain Compliance	N/A	N/A	N/A
Essential Fisheries Habitat	N/A	N/A	N/A

APPENDIX 2. Visual Assessment Data

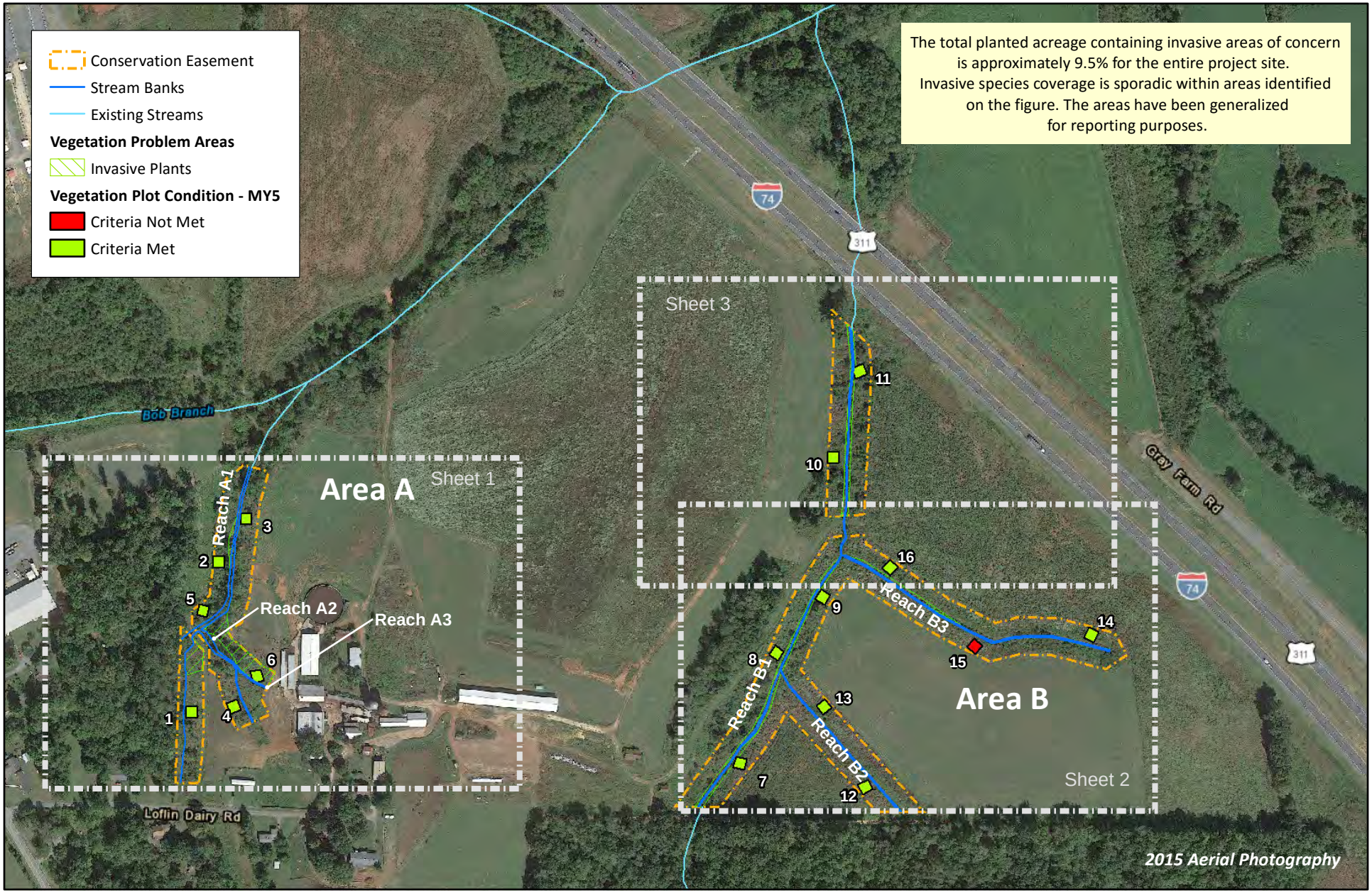

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Figure 3.0 Integrated Current Condition Plan View
(Key)
Loflin Dairy Buffer Mitigation Site
DMS Project No. 95008
Monitoring Year 5

Randolph County, NC

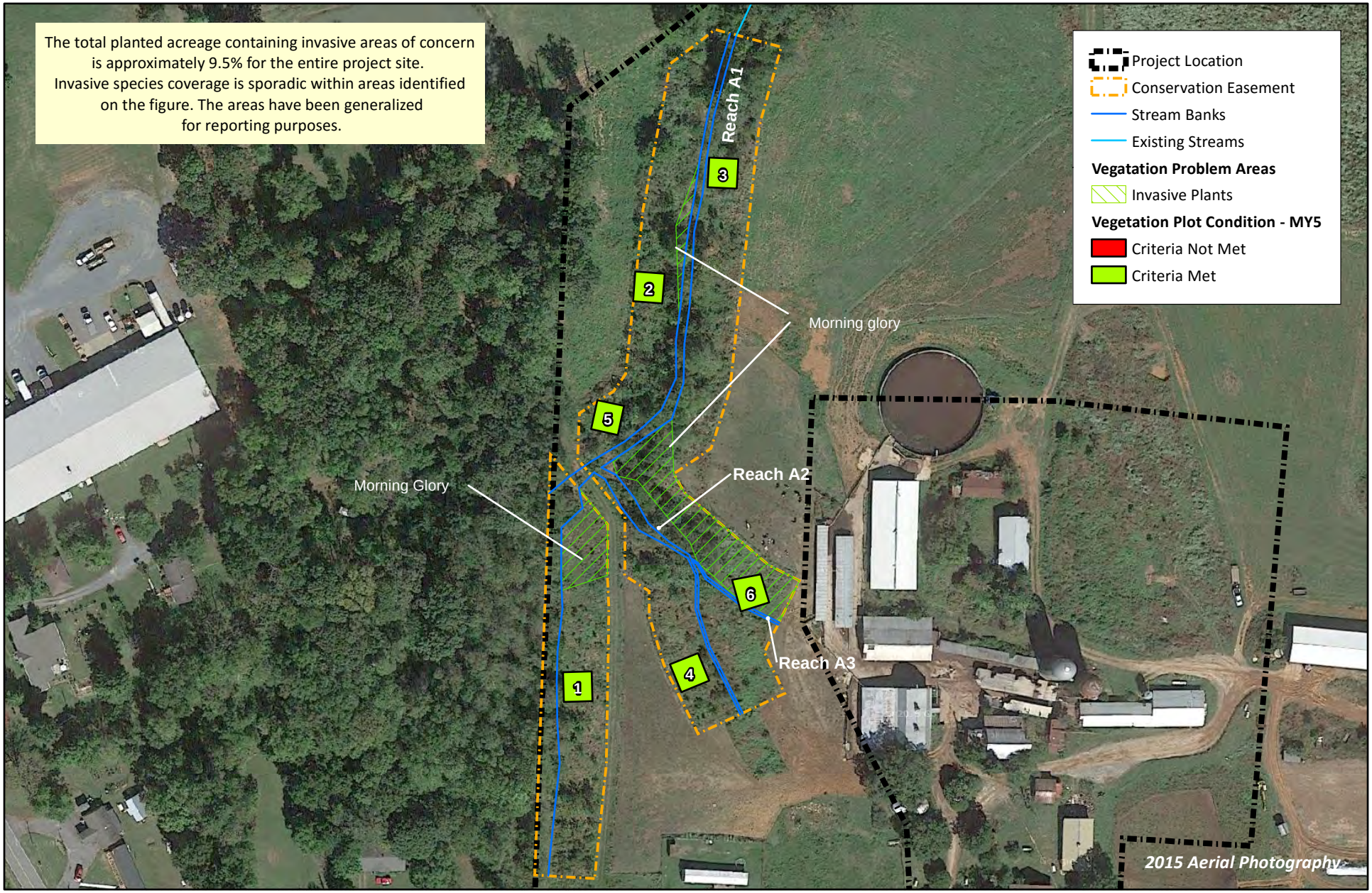

Figure 3.1 Integrated Current Condition Plan View
(Sheet 1 of 3)
Loflin Dairy Buffer Mitigation Site
DMS Project No. 95008
Monitoring Year 5

Randolph County, NC

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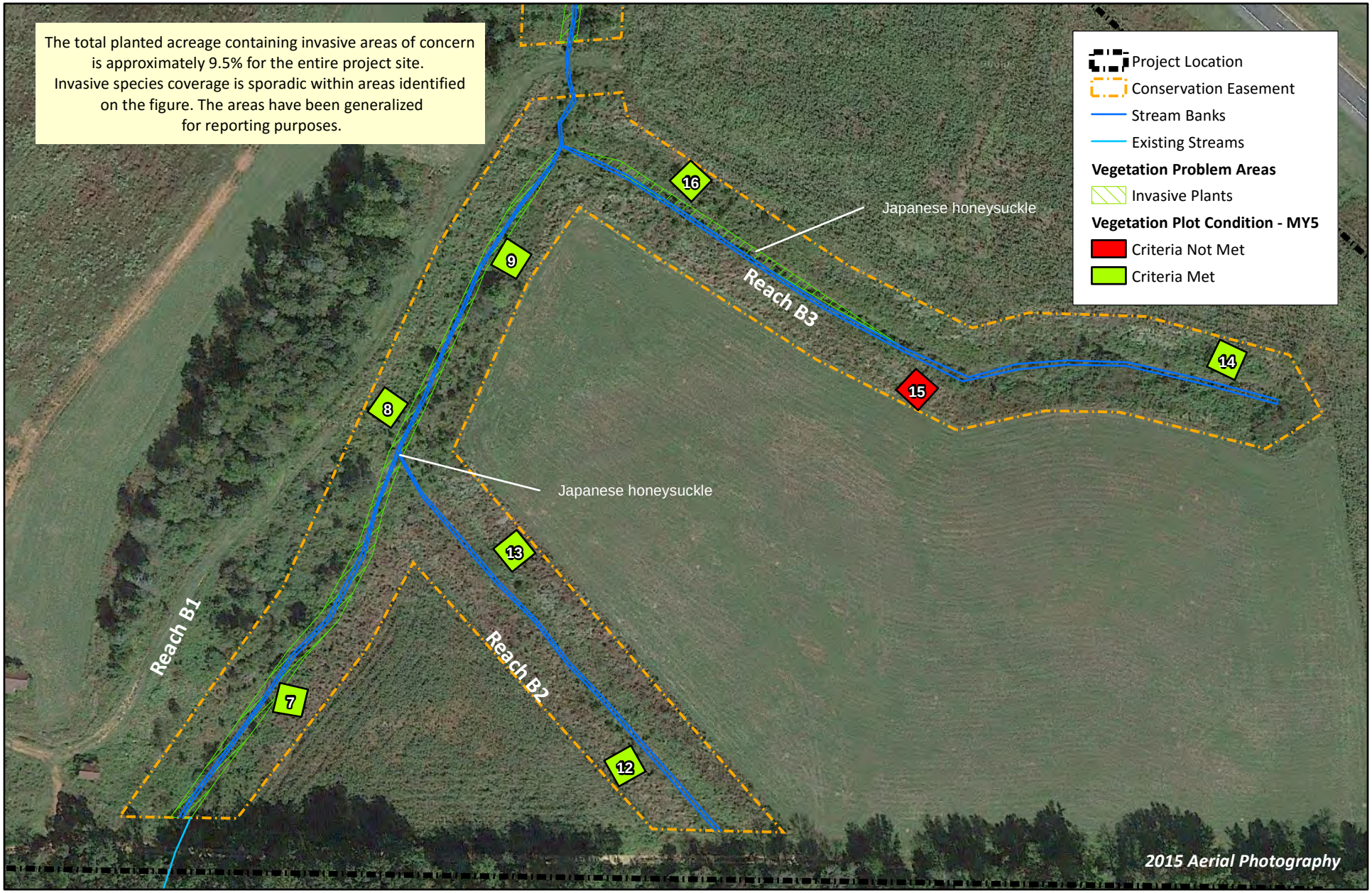

WILDLANDS ENGINEERING

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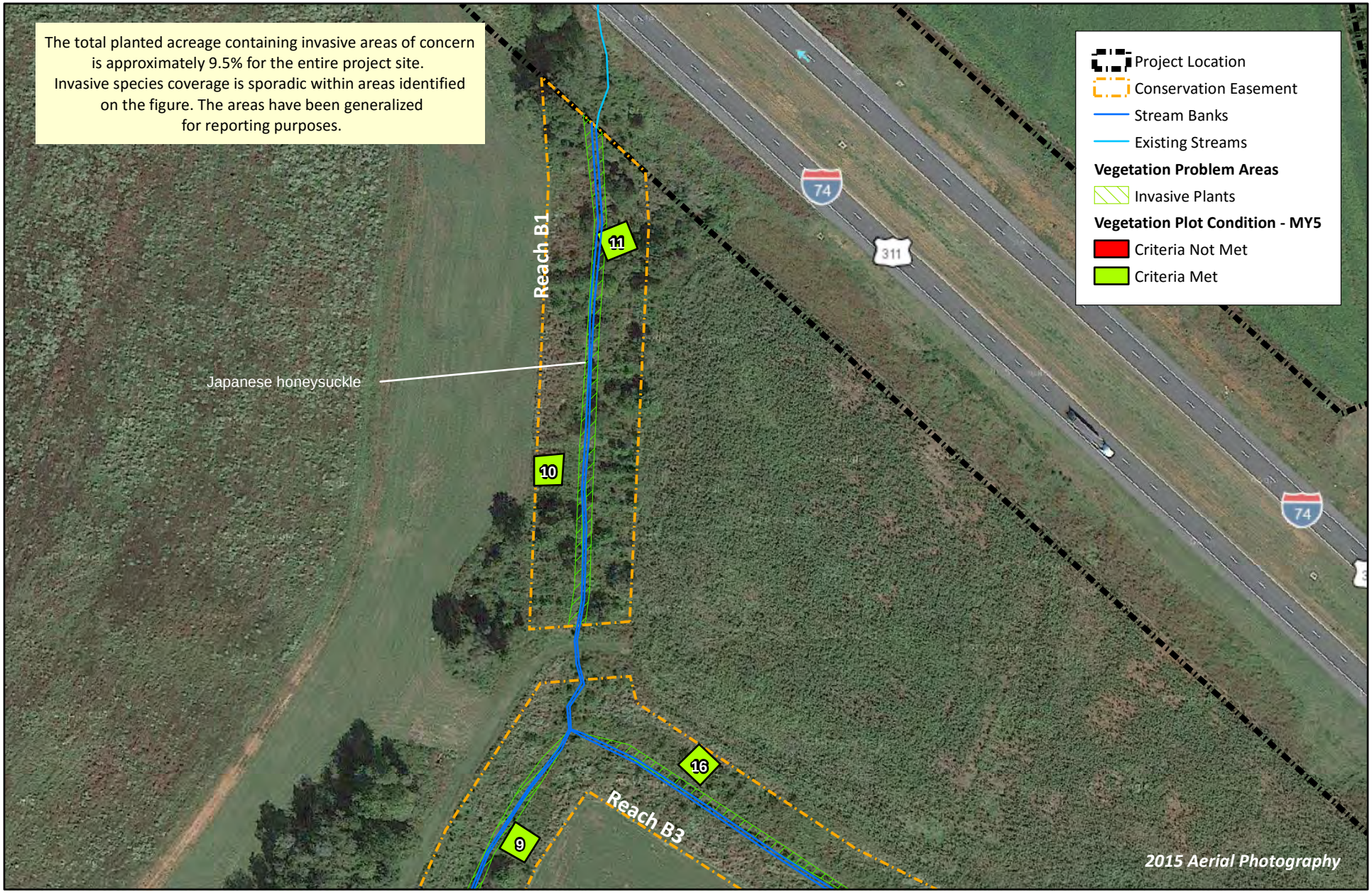
Figure 3.2 Integrated Current Condition Plan View
(Sheet 2 of 3)
Loflin Dairy Buffer Mitigation Site
DMS Project No. 95008
Monitoring Year 5
Randolph County, NC



WILDLANDS ENGINEERING

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Figure 3.3 Integrated Current Condition Plan View
(Sheet 3 of 3)
Loflin Dairy Buffer Mitigation Site
DMS Project No 95008
Monitoring Year 5
Randolph County, NC

Table 5. Vegetation Condition Assessment Table

Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

Planted Acreage **9.1**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage*
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	0	0	0.00%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	1	0.1	1%
		Total	**1**	**0.6**	**1%**
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 acres	1	0.025	0%
		Cumulative Total	**1**	**0.6**	**1%**

Easement Acreage **9.8**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1000	7	0.86	9.5%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

Vegetation Photographs

Vegetation Plot 1 – *(07/05/2016)*

Vegetation Plot 2 – *(07/05/2016)*

Vegetation Plot 3 – *(07/05/2016)*

Vegetation Plot 4 – *(07/05/2016)*

Vegetation Plot 5 – *(07/05/2016)*

Vegetation Plot 6 – *(07/05/2016)*

Vegetation Plot 7 – *(07/05/2016)*

Vegetation Plot 8 – *(07/05/2016)*

Vegetation Plot 9 – *(07/05/2016)*

Vegetation Plot 10 – *(07/05/2016)*

Vegetation Plot 11 – *(07/05/2016)*

Vegetation Plot 12 – *(07/05/2016)*

Vegetation Plot 13 – *(07/05/2016)*

Vegetation Plot 14 – *(07/05/2016)*

Vegetation Plot 15 – *(07/05/2016)*

Vegetation Plot 16 – *(07/05/2016)*

APPENDIX 3. Vegetation Plot Data

Table 6. Vegetation Plot Criteria Attainment

Loflin Dairy Mitigation Site

DMS Project No. 95008

Monitoring Year 5 - 2016

Plot	MY5 Success Criteria Met (Y/N)	Tract Mean
1	Y	94%
2	Y	
3	Y	
4	Y	
5	Y	
6	Y	
7	Y	
8	Y	
9	Y	
10	Y	
11	Y	
12	Y	
13	Y	
14	Y	
15	N	
16	Y	

Table 7. CVS Vegetation Plot Metadata

Loflin Dairy Mitigation Site

DMS Project No. 95008

Monitoring Year 5 - 2016

Report Prepared By	Alea Tuttle
Date Prepared	7/19/2016 13:19
database name	*Loflin Dairy MY5_cvs-eep-entrytool-v2.3.1.mdb*
database location	*Q:\ActiveProjects\005-02131 Loflin Dairy Buffer Mitigation Site\Monitoring\Monitoring Year 5\Vegetation Assessment*
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	*Description of database file, the report worksheets, and a summary of project(s) and project data.*
Plots	*Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.*
Stem Count by Plot and Spp	*A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.*
PROJECT SUMMARY----------	
Project Code	95008
project Name	Loflin Dairy Mitigation Site
Description	Buffer Mitigation
length (ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	16
Sampled Plots	16

Table 8. Planted and Total Stem Counts
Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

			Current Plot Data (MY5 2016)																				
			Vegetation Plot 1			Vegetation Plot 2			Vegetation Plot 3			Vegetation Plot 4			Vegetation Plot 5			Vegetation Plot 6			Vegetation Plot 7		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer rubrum	red maple	Tree						1															
Betula nigra	river birch	Tree				2	2	2				1	1	1	2	2	2				1	1	1
Carpinus caroliniana	American hornbeam	Tree													2	2	2						
Celtis laevigata	sugarberry	Tree						2			1												
Cephalanthus occidentalis	common buttonbush	Shrub																					
Diospyros virginiana	common persimmon	Tree									5												
Fraxinus pennsylvanica	green ash	Tree	8	8	8	5	5	7	5	5	6				2	2	2	1	1	1	4	4	4
Ilex	holly	Shrub or Tree																2	2	2			
Juglans nigra	black walnut	Tree			6						2												
Liquidambar styraciflua	sweetgum	Tree						3															
Liriodendron tulipifera	tuliptree	Tree	2	2	2			5	1	1	1							3	3	3	2	2	2
Nyssa sylvatica	blackgum	Tree																					
Platanus occidentalis	American sycamore	Tree				2	2	3	2	2	2	5	5	5	3	3	3	2	2	2	6	6	6
Quercus michauxii	swamp chestnut oak	Tree										1	1	1									
Quercus phellos	willow oak	Tree				4	4	4	1	1	1							1	1	1	1	1	1
Quercus rubra	northern red oak	Tree										1	1	1	1	1	1						
Salix nigra	black willow	Tree																					
Salix sericea	silky willow	Shrub																					
Sambucus canadensis	Common Elderberry	Shrub																					
Ulmus alata	winged elm	Tree						2			3												
Ulmus americana	American elm	Tree																					
Stem count			10	10	16	13	13	29	9	9	21	8	8	8	10	10	10	9	9	9	14	14	14
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stems per ACRE			405	405	647	526	526	1174	364	364	850	324	324	324	405	405	405	364	364	364	567	567	567

Color For Density

Exceeds requirements by 10% or greater
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 8. Planted and Total Stem Counts
Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

			Current Plot Data (MY5 2016)																				
			Vegetation Plot 8			Vegetation Plot 9			Vegetation Plot 10			Vegetation Plot 11			Vegetation Plot 12			Vegetation Plot 13			Vegetation Plot 14		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer rubrum	red maple	Tree															1						
Betula nigra	river birch	Tree										1	1	1	2	2	2	2	2	2			
Carpinus caroliniana	American hornbeam	Tree							3	3	3				1	1	1				4	4	4
Celtis laevigata	sugarberry	Tree																					
Cephalanthus occidentalis	common buttonbush	Shrub			2																		
Diospyros virginiana	common persimmon	Tree																					
Fraxinus pennsylvanica	green ash	Tree	7	7	7	4	4	4	1	1	1				2	2	2	6	6	6	8	8	8
Ilex	holly	Shrub or Tree																					
Juglans nigra	black walnut	Tree						1			1												
Liquidambar styraciflua	sweetgum	Tree						1									1						
Liriodendron tulipifera	tuliptree	Tree	1	1	1	1	1	1	1	1	1						1						
Nyssa sylvatica	blackgum	Tree																					
Platanus occidentalis	American sycamore	Tree				5	5	5				8	8	8	2	2	2				1	1	1
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	2	2	2				1	1	1									
Quercus phellos	willow oak	Tree	1	1	1	1	1	1	4	4	4	5	5	5	2	2	2						
Quercus rubra	northern red oak	Tree										1	1	1				1	1	1			
Salix nigra	black willow	Tree			4																		
Salix sericea	silky willow	Shrub																					
Sambucus canadensis	Common Elderberry	Shrub																					1
Ulmus alata	winged elm	Tree																					
Ulmus americana	American elm	Tree															3						
Stem count			10	10	16	13	13	15	9	9	10	16	16	16	9	9	15	9	9	9	13	13	14
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stems per ACRE			405	405	647	526	526	607	364	364	405	647	647	647	364	364	607	364	364	364	526	526	567

Color For Density

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Table 8. Planted and Total Stem Counts
Loflin Dairy Mitigation Site
DMS Project No. 95008
Monitoring Year 5 - 2016

			Current Plot Data (MY5 2016)						Annual Summary																	
			Vegetation Plot 15			Vegetation Plot 16			MY5 (2016)			MY4 (2015)			MY3 (2014)			MY2 (2013)			MY1 (2012)			MY0 (2012)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree									2			1												
Betula nigra	river birch	Tree	4	4	4				15	15	15	15	15	15	14	14	14	16	16	16	27	27	27	95	95	95
Carpinus caroliniana	American hornbeam	Tree							10	10	10	10	10	10	9	9	9	12	12	12	23	23	23	18	18	18
Celtis laevigata	sugarberry	Tree									3			2			1									
Cephalanthus occidentalis	common buttonbush	Shrub									2															
Diospyros virginiana	common persimmon	Tree									5			11			4									
Fraxinus pennsylvanica	green ash	Tree			1	3	3	3	56	56	60	57	57	61	57	57	60	57	57	58	61	61	61	62	62	62
Ilex	holly	Shrub or Tree							2	2	2															
Juglans nigra	black walnut	Tree									10			8			3			1						
Liquidambar styraciflua	sweetgum	Tree			1						6			10			6									
Liriodendron tulipifera	tuliptree	Tree							11	11	17	12	12	14	11	11	12	12	12	12	17	17	17	30	30	30
Nyssa sylvatica	blackgum	Tree															1									
Platanus occidentalis	American sycamore	Tree			1	5	5	5	41	41	43	38	38	40	38	38	38	39	39	39	42	42	42	50	50	50
Quercus michauxii	swamp chestnut oak	Tree							5	5	5	5	5	5	6	6	6	7	7	7	11	11	11	7	7	7
Quercus phellos	willow oak	Tree							20	20	20	19	19	19	21	21	21	24	24	24	24	24	24	19	19	19
Quercus rubra	northern red oak	Tree							4	4	4	4	4	4	5	5	5	6	6	6	12	12	12	21	21	21
Salix nigra	black willow	Tree									4						12									
Salix sericea	silky willow	Shrub												3												
Sambucus canadensis	Common Elderberry	Shrub									1			4												
Ulmus alata	winged elm	Tree									5			5			3									
Ulmus americana	American elm	Tree									3															
Stem count			4	4	7	8	8	8	164	164	217	160	160	212	161	161	195	173	173	175	217	217	217	302	302	302
size (ares)			1			1			16			16			16			16			16			16		
size (ACRES)			0.02			0.02			0.40			0.40			0.40			0.40			0.40			0.40		
Species count			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stems per ACRE			162	162	283	324	324	324	415	415	549	405	405	536	407	407	493	438	438	443	549	549	549	764	764	764

Color For Density

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