

Annual Monitoring Report (MY1)

MAPLE SWAMP BUFFER MITIGATION SITE

Edgecombe County, NC

NCDEQ Contract No. 200208-01

DMS ID No. 100189

DWR Project No. 2021-0614v2

RFP No. 16-20200208

Prepared for:



NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center, Raleigh, NC 27699-1652

November 2022





MEMO
Lindsay Crocker, DMS

January 12, 2023

Re: Maple Swamp Buffer MY1 report (email dated 12/21/22)
DMS Site #100189, Contract #200208-01

After receiving the draft review on November 28, DMS has the following comments:

- Add visual assessment table for planted area.
[Visual assessment table has been added to the Appendix as requested.](#)
- The narrative briefly mentions a small area of low stem density (check typo). However, looking at the CCPV it appears that 1 row of trees along the entirety of the easement may have been mowed. Assuming trees planted on 6' centers, and the length of the ditch being around 1,500 feet, this area should be about 0.2 acres and be noted as an encroachment, which is not typically considered a small area. Please measure this area and update with the area of encroachment described in the narrative, on the CCPV, and in the visual assessment table as an encroachment. Provide photo of the area for documentation purposes. Provide description of what was communicated to the landowner to ensure it does not happen again (additional marking, phone call, etc).
[The encroachment has been noted in the narrative, CCPV, and visual assessment table as requested. Most of the trees are alive with good root structure and will resprout. Out of an abundance of caution, the area will be supplementally planted with trees approved in the Final Mitigation Plan to ensure adequate stocking of the impacted area in MY2. The landowner has been informed of his responsibility for this loss of trees, and Eco Terra is working with both the landowner and tree supplier to replant as soon as possible. A photo documenting the area has been provided. Additional temporary easement marking has occurred, and more permanent easement marking will be established following supplemental planting.](#)
- Please note that if any encroachment occurs again on this site, Eco Terra should notify and work with DMS to communicate easement restrictions to the landowner. [We thank DMS for this note and will again advise the landowner and farm tenants of their responsibilities. Should this happen again, Eco Terra will advise DMS as soon as possible and coordinate with DMS on an acceptable course of action.](#)



Please let us know if you have any further comments or questions related to the MY1 Annual Report. We look forward to working with you and ensuring a successful project moving forward.

Regards,

D. Norton Webster, Eco Terra

ANNUAL MONITORING REPORT (MY1)
MAPLE SWAMP BUFFER MITIGATION SITE

Edgecombe County, NC
NCDEQ Contract No. 200208-01
DMS ID No. 100189

Tar-Pamlico River Basin
HUC 03020102

Prepared For:



NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center, Raleigh, NC 27699-1652

Prepared By:



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This Baseline Monitoring Plan has been written in conformance with the requirements of the following:

- 15A NCAC 02B.0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers.
- 15A NCAC 02B.0703 Nutrient Offset Credit Trading

These documents govern DMS operations and procedures for the delivery of compensatory mitigation.

Contributing Staff

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1.0 Mitigation Project Summary

The Maple Swamp Buffer Mitigation Site (Site, Project, or Project Site) is a buffer restoration project located approximately 2.0 miles northeast of Leggett off NC Hwy 97 E in Edgecombe County, NC. The Project Site comprises approximately 8.13 acres of a 356-acre tract situated along an unnamed tributary (UT) to Maple Swamp that drains into Fishing Creek. The project is located within North Carolina Division of Mitigation Services (NCDMS) identified Habitat, Hydrology, and Water Quality Targeted Resource Areas (TRA). Maple Swamp is defined as Water Supply (WS-IV) and Nutrient Sensitive Waters (NSW) according to the NC Department of Environmental Quality (NCDEQ) within the Tar-Pamlico River basin hydrologic unit code (HUC) 03020102060010 and Subbasin 03-03-02. According to the as-built survey and DWR Buffer Mitigation Calculation Tool v3 (updated August 2020), the Site is expected to generate 294,366.000 buffer mitigation units (BMU), offset 989.329 pounds of nitrogen, and offset 63.316 pounds of phosphorus (Appendix 1: Table 2).

1.1 Project Goals

The major goals of the proposed buffer restoration project are to address agricultural runoff, including nutrients and sediment, protect the project site in perpetuity, and restore terrestrial habitat. The Maple Swamp Mitigation Site will reduce future sediment and nutrient loading into Fishing Creek watershed and the Tar-Pamlico River downstream. It will also improve terrestrial habitats along this stream by establishing a riparian corridor and allowing the land to convert to forested communities.

The project goals and objectives are consistent with those of the NCDMS, and the specific goals outlined in the 2018 Tar-Pamlico RBRP. As proposed, the Maple Swamp Buffer Mitigation Project will further help NCDMS to meet these goals.

1.2 Existing Site Conditions

The Project Site is located within one parcel (~356 acres) currently used for row crop agriculture rotations. Adjacent land use is in row crop agriculture and little vegetated buffer exists along the length of the UT to Maple Swamp stream within the Project Site.

The project was successfully planted with appropriate trees and herbaceous vegetation and is now at the end of the first (1st) full growing season and early stages of successful buffer restoration. The project restored forested riparian buffers and adjacent riparian areas to a maximum of approximately 100 feet from the top of bank of the streams and removed rotating crops and fertilizer inputs.



The restored Tar-Pamlico riparian buffer and adjacent riparian areas will filter runoff from the surrounding farm fields and provide shading to improve stream temperatures and aquatic habitat. Invasive vegetation will be treated as needed within the project area to promote native vegetation.

During biannual site inspection and first year monitoring, one area of encroachment was observed where a farmer accidentally mowed the historic farm path adjacent to the stream feature (see Figure 1). The landowner has been informed of his responsibility for this loss of trees, and Eco Terra is working with both the landowner and tree supplier to replant as soon as possible. The trees will sprout back, but additional trees will be supplementally planted in this area to ensure vegetation plots met success criteria across the site and no further supplemental planting is anticipated in MY2.

2.0 Regulatory Considerations

Riparian buffer and adjacent riparian area restoration was accomplished in accordance with the Consolidated Buffer Mitigation Rule (15A NCAC 02B .0295) and the Nutrient Offset Credit Trading Rule (15A NCAC 02B .0703). All areas within 100+ linear feet of the top of bank of subject streams as measure from the top of bank landward were be planted and devoted to generating riparian buffer mitigation credits. Areas designated for nutrient offset within 50 linear feet of the top of bank were planted similarly. Mitigation credits generated are found in Table 2 of Appendix 1 and are based upon DWR Buffer Mitigation Calculation Tool v3 (updated August 2020) (Appendix 1).

3.0 Project Construction Summary

The Project construction was completed in early February 2022, following mitigation plan approval. Eco Terra and supporting team members successfully planted and restored the proposed areas dedicated for riparian buffer and adjacent riparian area restoration with high quality native trees, shrubs, and herbaceous vegetation.

3.1 Riparian Area Restoration Activities

Restoration of the riparian areas involved planting bare root one to two-year-old trees in designated planting zones, specific to soil and Site conditions, and in accordance with the Mitigation Plan. A combination of machine and manual planting techniques were used depending on site conditions. Approximately 6,600 stems (812 stems/ac) were planted within the riparian areas designated for restoration.



4.0 Annual Monitoring and Performance Criteria

The Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers (15A NCAC 02B .0295) and RFP 16-20200208 set forth specific performance criteria for the successful development and close-out of the Maple Swamp Buffer Mitigation Site. Performance criteria monitoring includes standardized vegetation plot establishment and annual monitoring for planted stems including individual plot photo documentation, overall site photo documentation, biannual visual assessments for project status and easement integrity including herbaceous and/or invasive species competition, stem mortality, stand health, incidental damage from agricultural equipment, and stem loss or damage from natural causes such as fire, disease, or animal predation. Figure 1 (Appendix 1) illustrates the location of project easement, permanent vegetation plots/photo points, as well as overall site photo points.

4.1 Vegetation

Six permanent vegetation plots were established according to the most recent Carolina Vegetation Survey (CVS) protocol within the restored buffer area. Representative vegetation plots were established at a minimum density of 2% of the planted area. Specifically, vegetation monitoring was obtained for all plots according to Level 1 protocols from the CVS-EEP Protocol for Recording Vegetation V4.2 (2008) manual. Monitoring year one (MY1) vegetation stem data is included in Appendix 3, Table 4. All vegetation plots meet criteria for stem densities and overall site density is 688 stems/ac. Overall tree vigor across the site is adequate for first (1st) year survival and project success averaging 3.5 and overall tree height averaged 57.6 cm.

4.2 Photo Reference Stations

Site reference photos were taken at designated points along the conservation easement boundary providing an overall view of the project success (Appendix 2). Individual plot photos taken at the approximate southwest corner (origin) of each plot are included in this baseline monitoring report (Appendix 3). All photo points were located by survey and georeferenced for map production to provide a consistent means for photo replication annually and in the event a plot or photo location must be reestablished during the monitoring period. Photo orientation (direction and bearing) were recorded as well as approximate vertical position for consistency in photo logging.

4.3 Visual Assessments

Additional observations were made of site conditions and vegetation conditions outside of monitoring plots. Overall, the implementation and planting of the project resulted in a full stocking of native tree species. One exception was observed – an incidental mowed area along the north side of the stream feature. The encroachment is illustrated and

quantified in the CCPV and Table 3 (Appendix 1). Biannual visual assessments will continue in order to appropriately monitor changing site conditions and address any issues to ensure Site success and performance criteria are met in subsequent monitoring years. Any additional Site problems will be noted and discussed in the annual reports, addressed in a remedial action plan if necessary, and monitored biannually to ensure performance criteria are met following any remedial action.

4.4 Annual Reporting Performance Criteria

All monitoring reports, including this annual report, will be compiled and submitted to DMS annually in accordance with the Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template Ver. 2.0 (May 2017). Annual monitoring will occur for a minimum of five years or until performance criteria are met.

4.5 Maintenance and Contingency Plans

Any Site observations identified through vegetation plots or visual assessments, whereby the performance criteria is not met, will be noted and discussed in the annual reports and addressed with a contingency plan as necessary. DMS/NCDWR will be notified, and if necessary, collaborate with Eco Terra to develop a contingency plan with remedial action steps to correct the performance criteria deficiency. Any contingency plan and remedial actions will occur within an agreed timeframe and monitoring adjusted accordingly, if necessary. Site problem areas will be monitored biannually to ensure performance criteria are met following any remedial action.

5.0 References

- 15 NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers. 2015.
- 15A NCAC 02B .0703 Nutrient Offset Trading. 2020.
- N.C. Department of Water Quality Methodology for Determining Nutrient Reductions Associated with Riparian Buffer Establishment. 1998.
- N.C. Department of Water Quality Buffer Interpretation/Clarification #2008-019 Memorandum August 19, 2008.
- N.C. Department of Environmental Quality. Division of Water Resources. Clarified Procedures for Calculating Buffer Mitigation Credits & Nutrient Offset Credits for Riparian Projects Regulated under 15A NCAC 02B .0295 and 15A NCAC 02B .0240. November 21, 2019.
- Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. <http://cvs.bio.unc.edu/protocol/cvs-EEP-protocol-v4.2-lev1-2.pdf>
- North Carolina Department of Environmental Quality. Division of Mitigation Services (NCDMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template Version 2.0.
- North Carolina Department of Environmental Quality. Division of Mitigation Services (NCDMS). 2018. Tar-Pamlico River Basin Restoration Priorities.
- U.S. Department of Agriculture. Natural Resources Conservation Service. 2021. Web Soil Survey. (<https://websoilsurvey.nrcs.usda.gov/app/>). (Accessed April 2021).
- U.S. Geological Survey. 2013. Draughn and Tarboro. 1:24,000. North Carolina Topographic Quadrangle (7.5-minute series). Reston, VA: U.S. Department of the Interior, USGS, 2013.

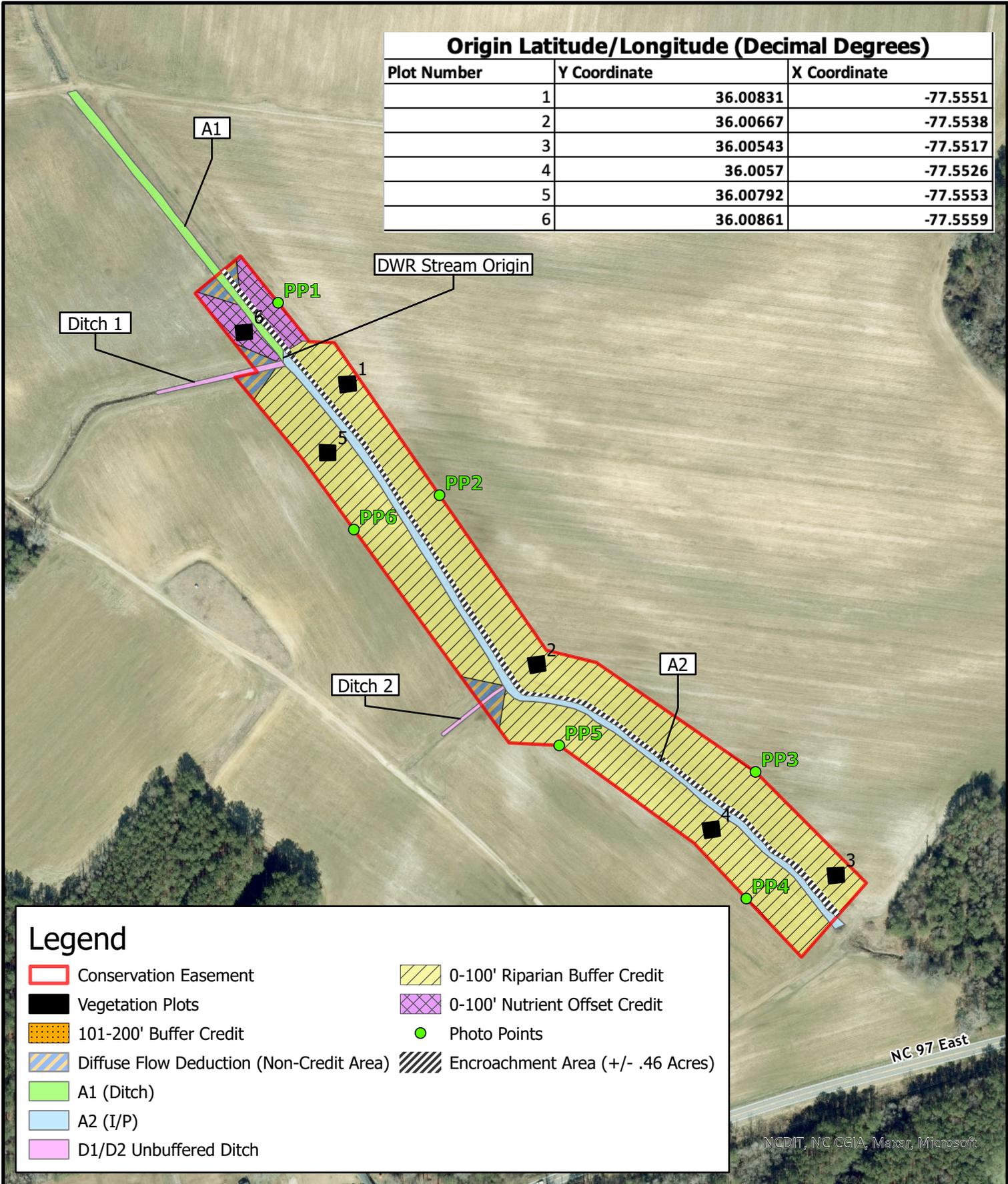


APPENDIX 1

PROJECT DATA

Origin Latitude/Longitude (Decimal Degrees)

Plot Number	Y Coordinate	X Coordinate
1	36.00831	-77.5551
2	36.00667	-77.5538
3	36.00543	-77.5517
4	36.0057	-77.5526
5	36.00792	-77.5553
6	36.00861	-77.5559



Legend

- Conservation Easement
- Vegetation Plots
- 101-200' Buffer Credit
- Diffuse Flow Deduction (Non-Credit Area)
- A1 (Ditch)
- A2 (I/P)
- D1/D2 Unbuffered Ditch
- 0-100' Riparian Buffer Credit
- 0-100' Nutrient Offset Credit
- Photo Points
- Encroachment Area (+/- .46 Acres)

NCDIT, NC CGIA, Maxar, Microsoft



Current Condition Plan View
Maple Swamp Buffer Mitigation Site
Tar-Pamlico 03020102
Edgecombe County, North Carolina
January 2023

NC Onemap Latest Orthoimagery

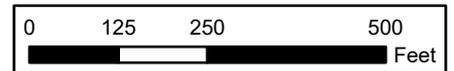


Table 1: Buffer Project Attributes

Maple Swamp Buffer Mitigation Site

DMS ID No. 100189

DWR Project No. 2021-0614v2

Monitoring Year 1 – 2022

Project Name	Maple Swamp Buffer Mitigation Site
Hydrologic Unit Code	03020102
River Basin	Tar-Pamlico
Geographic Location (decimal degrees)	36.008912, -77.556057
Site Protection Instrument (BK, PG)	1750/176-186
Types of Credits	Riparian Buffer (294,193.140) Nutrient Offset (983.044 lbs N) Nutrient Offset (63.316 lbs P)
Mitigation Plan Date	September 2021
Initial Planting Date	February 2022
Baseline Report Date	April 2022
MY1 Report Date	November 2022
MY2 Report Date	November 2023
MY3 Report Date	November 2024
MY4 Report Date	November 2025
MY5 Report Date	November 2026
Close out Report Date/Visit	May 2027

Table 3: Visual Vegetation Assessment

Maple Swamp Buffer Mitigation Site

DMS ID No. 100189

DWR Project No. 2021-0614v2

Monitoring Year 1 – 2022

Planted Acreage = 8.07 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10 acres	0.00	0.0%
Total			0.00	0.0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
Cumulative Total			0.00	0.0%

Easement Acreage = 8.13 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	0.00	0.0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	0.10 acres	0.46	3.0%

APPENDIX 2

SITE PHOTO-POINTS

Photo-points

<i>Photo-Points</i>		
Maple Swamp Buffer Mitigation Site		
DMS ID No. 100189		
DWR Project No. 2021-0614v2		
Photo Location	Baseline (MY0) 2022	MY1 2022
Pp1		
Pp2		
Pp3		
Pp4		

Photo Location	Baseline 2022	MY1 2022
Pp5		
Pp6		

APPENDIX 3

MONITORING PLOT DATA
MONITORING PLOT PHOTOGRAPHS

Monitoring Plot Photos

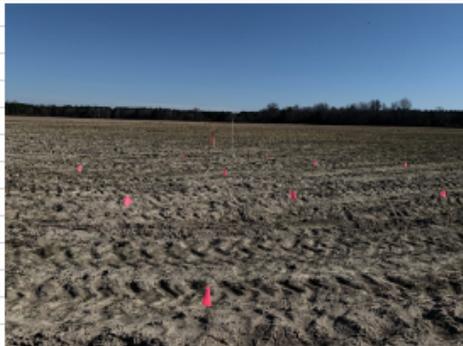
<i>Monitoring Plots</i>		
Maple Swamp Buffer Mitigation Site		
DMS ID No. 100189		
DWR Project No. 2021-0614v2		
Photo Location	Baseline (MY0) 2022	MY1 2022
MP1		
MP2		
MP3		
MP4		

Photo Location	Baseline 2022	MY1 2022
MP5		
MP6		

Site post construction (October 2022)

