WILDLANDS
ENGINEERING

May 17, 2021

Ms. Kim Browning
U.S. Army Corps of Engineers
Regulatory Division
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587

RE: McClenny Acres Mitigation Site – Baseline Monitoring Document and As-Built Baseline Report
DEQ Contract Number 007423, RFP# 16-007279, DMS# 100038
Neuse River Basin 03020201; Wayne County, NC

Dear Ms. Browning:

This letter accompanies the Baseline Monitoring Document for the above referenced project. The as-built survey and baseline monitoring have been completed for the project as described in the enclosed report. As we have discussed, an adjustment is needed for both stream and wetland credits for the site. The mitigation plan states that the site will provide 9,284.100 stream credits and 37.089 wetland credits. However, we are requesting a modification to the site instrument resulting in a change to 9,209.500 stream credits and 36.608 wetland credits.

The reduction in credits is necessary due to a misunderstanding related to the width of the powerline corridor on the site that is maintained by Duke Energy. As described in the enclosed report, the plat of the conservation easement and the previous plat of the property on which the new plat was based both indicate that the width of the Duke powerline easement is 80 feet. This width was used to determine stream and wetland credits proposed in the mitigation plan. However, we have recently discovered that the original easement recorded in 1949 indicates that width of the powerline easement is 150 feet. Wildlands confirmed that Duke Energy currently maintains a corridor for the powerline that is 150 feet wide. Wildlands met Duke Energy personnel on site to define and survey the extents of the maintenance corridor which is shown on Figure 2 of the enclosed report. This results in an overlap of the Duke Energy powerline easement and the conservation easement on both sides of the powerline. Based on our previous discussion, no credit will be allowed for the areas where the two easements overlap as indicated on Figure 2.

Wildlands owns the property where this mitigation site is located. Based on our conversation, the USACE agrees that, in this situation, the conservation easement for the site can stay as is including the overlap with the powerline easement and no modification to the conservation easement is required. The areas where the easements overlap were not planted with trees but have been seeded with native herbaceous seed.

Please contact me at 919-302-6919 if you have any questions.

Sincerely,

Jeff Keaton, *Project Manager*

enclosed: Baseline Monitoring Document and As-Built Baseline Report

BASELINE MONITORING DOCUMENT AND AS-BUILT BASELINE REPORT

FINAL

McClenny Acres Mitigation Site

Wayne County, NC
NCDEQ Contract No. 7423
DMS Project Number 100038
USACE Action ID Number 2018-02042
NCDWR Project Number 2018-0197

Data Collection Period: September 2020 – March 2021
Draft Submission Date: April 19, 2021
Final Submission Date: May 17, 2021

PREPARED FOR:

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

May 17, 2021

Jeremiah Dow
N.C. Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

RE: As-Built Baseline Report McClenny Acres Mitigation Site, DMS ID# 100038
Neuse River Basin – CU# 03020201
Wayne County, North Carolina
Contract No. 7423

Dear Mr. Dow,

We have reviewed the comments on the As-Built Baseline Report for the above referenced project dated May 4, 2021 and have revised the report based on these comments. The revised documents are submitted with this letter. Below are responses to each of your comments. For your convenience, the comments are reprinted with our response in italics.

As-built Baseline Report

1. Appendix 5: Record Drawings
   a. Please clarify the red callout "Log Sill Buried" that is on several stream plan and profile sheets.

   These log sills were slightly covered with sediment during September 2020 survey field work and were not located at that time. Location and elevation of these log sills was confirmed in December 2020.

2. Baseline Buffer Monitoring Report
   a. Buffer is misspelled on the title page.

   Spelling has been corrected.

   b. Figure 4: Recommend removing "Buffer Restoration 0-49' (Min 30')" item from the map and lumping in with the 50'-100' (change name to 0'-100') category so it matches the buffer width categories on Table 2.

   Zones with a riparian buffer from 0'-100' and a minimum width of 50' have been combined into a single category on Figure 4 (Appendix 1), Table 2 (Appendix 1), and the As-Built Survey (Appendix 3). We feel it is necessary to include the 0'-49' (Min. 30') category to account for the area along UT3 that is viable for 100% buffer restoration credit but not viable for conversion to nitrogen nutrient offset credit while attempting to preserve format of NCDWR template version Buffer_Mitigation_Tables_1.0_2018_12_20. This template was the tool in use during the buffer

mitigation plan phase of this project.

c. Table 2: Please verify the second row of the table (57,622 ft^2 on UT1 and UT3) is not viable for conversion to nutrient offset.

Much of this area is viable for conversion to nitrogen nutrient offset credit. Figure 4 and Table 2 have been corrected to include appropriate buffer and nutrient offset zones.

d. Buffer restoration in the service area "Neuse 03020201 – Outside Falls Lake" is viable for conversion to nitrogen nutrient offset only, not phosphorus.

Potential phosphorus nutrient offset credit was removed from Table 2 and report text was edited to clarify only nitrogen nutrient offset credit is viable in the service area.

3. Digital Files
   a. Please submit the as-built DWG file(s)

The as-built DWG file is included in this digital submittal.

b. The feature that represents UT2 Reach 1 (Preservation) overlaps with a wetland enhancement polygon. Please review and address this spatial overlap.

The segment of UT2 Reach 1 overlapping wetland enhancement has been removed. Table 1, Table 4, and values throughout the report text have been updated to reflect this change.

c. The Table 7 export from the CVS mdb produces divide by zero errors for plot 12 and 13. Please update and ensure there are no errors.

The CVS database has been updated to include plot sizes for plots 12 and 13. We confirmed no errors occur when exporting Table 7 (Table 6a. Fixed Plot Planted and Total Stem Counts in report).

We have also included a folder with georeferenced figures in this digital submittal. Georeference data is sometimes compromised when combining maps into large PDF files. Please use figures in this folder for applications requiring georeferenced data.

If you have any questions, please contact me by phone (919) 851-9986, or by email (jlorch@wildlandseng.com).

Sincerely,

Jason Lorch, *Monitoring Coordinator*

PREPARED BY:

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

Jason Lorch
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Phone: (919) 851-9986

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the McClenny Acres Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS). A total of 9,493 linear feet (LF) of streams and 36.89 acres of wetland were restored, enhanced, and preserved in Wayne County, NC. The Site is expected to generate 9,209.500 stream credits and 36.608 wetland credits. The Site is located approximately 4 miles west of Goldsboro, NC (Figure 1). It is in the Neuse River Basin 8-Digit Hydrologic Unit Code (HUC) 03020201 and within a DMS targeted watershed for the Neuse River Basin HUC 03020201200030 and NC Division of Water Resources (DWR) Subbasin 03-04-12. The Site contains four tributaries and riparian wetlands that drain directly into the Neuse River. The Neuse River is classified as Water Supply Waters (WS-IV) and Nutrient Sensitive Waters (NSW). The 54.24 acre Site is protected with a permanent conservation easement.

The Site is in a new targeted local watershed (TLW) which is not described in the 2010 Neuse River Basin Restoration Priorities (RBRP) plan. However, the proposed project does address key CU-wide restoration goals including reduction of sediment and nutrient loads from agricultural lands by restoring and preserving wetlands, streams, and riparian buffers. Ecological stressors addressed at the Site included row crop production, stream channelization, ditching, and wetland drainage.

The project goals established in the Mitigation Plan were completed with careful consideration of goals and objectives described in the Neuse River RBRP plan. The project goals established include:

- Improve stability of stream channels;
- Improve instream habitat;
- Reconnect channels with floodplains and riparian wetlands;
- Restore wetland hydrology, soils, and plant communities;
- Restore and enhance native floodplain and streambank vegetation; and
- Permanently protect the Site from harmful uses.

The project contributes to achieving goals for the watershed discussed in the Neuse River RBRP and provide ecological benefits within the Neuse River Basin.

Site construction was completed in September 2020 and planting was completed in March 2021. As-built surveys were conducted in September 2020. The Site has been built as designed, with a few adjustments due to field conditions. These adjustments are detailed in Section 5.1. Baseline (MY0) profiles and cross-section dimensions closely match the design parameters. Cross-section widths and pool depths occasionally deviate from the design parameters but fall within a normal range of variability for natural streams.

McCLENNY ACRES MITIGATION SITE

Baseline Monitoring Document and As-Built Baseline Report

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TABLES

APPENDICES

Section 1: PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

1.1 Project Location and Setting

The McClenny Acres Mitigation Site (Site) is located in Wayne County approximately four miles west of Goldsboro (Figure 1). From Raleigh, NC, take I-40 E for nine miles then take exit 309 onto US-70 E. Stay on US-70 E for 33 miles then take exit 350 onto US-70 E Business towards Goldsboro. Travel six tenths of a mile then turn right onto NC-581 S. In two and six tenths of a mile, NC-581 turns left at an intersection (Old Smithfield Road). Travel two tenths of a mile and the access road will be on the right. A conservation easement was recorded on 54.24 acres.

The Site contains four unnamed tributaries to the Neuse River which is classified as WS-IV and Nutrient sensitive waters (NSW). The Site is within Hydrologic Unit Code (HUC) 03020201200030 and NC Division of Water Resources subbasin 03-04-12. The Site is located in a new targeted local watershed (TLW) which was not described in the 2010 Neuse River Basin Restoration Priorities (RBRP) plan (Breeding, 2010). The project does address basin-wide restoration goals outlined in the Neuse River RBRP.

The Site is located in the western portion of the Atlantic Coastal Plain physiographic province which is often referred to as the inner coastal plain. The inner coastal plain is characterized by flat lands to gently-rolling hills and valleys with elevations from 25 to 600 feet above sea level. Project watershed elevations range from 64 to 134 feet. The Site is on a low terrace of the Neuse River with ridge and swale relief.

Prior to construction, all streams were channelized, wetlands were drained by channelized streams and ditches, and much of the Site was in row crop production. Table 4 in Appendix 1 and Tables 7a-d in Appendix 4 present additional information on pre-restoration conditions.

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits within the Neuse River Basin. While benefits such as habitat improvement and geomorphic stability are limited to the Site, others, such as reduced pollutant and sediment loading, have farther reaching effects. Expected improvements to water quality and ecological processes are outlined below as mitigation goals and objectives in Table 1. These goals were established and completed with careful consideration of goals and objectives described in the RBRP and to meet the DMS mitigation needs while maximizing the ecological and water quality uplift within the watershed.

Table 1: Mitigation Goals and Objectives – *McClenny Acres Mitigation Site*

Goal	Objective	Expected Outcomes
Improve the stability of stream channels.	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.	Reduce and control sediment inputs; Contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.
Improve instream habitat.	Install habitat features such as cover logs, log sills, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Improve aquatic communities in project streams.

Goal	Objective	Expected Outcomes
Reconnect channels with floodplains and riparian wetlands.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Reduce shear stress on channel; hydrate adjacent wetland areas; filter pollutants out of overbank flows.
Restore wetland hydrology, soils, and plant communities.	Restore and enhance riparian wetlands by raising stream beds, plugging existing ditches, removing berm material over relic hydric soils, and planting native wetland species.	Improve terrestrial habitat; Contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.
Restore and enhance native floodplain vegetation.	Plant native tree species in riparian zone where currently insufficient.	Reduce and control sediment inputs; Reduce and manage nutrient inputs; Provide a canopy to shade streams and reduce thermal loadings; Contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.
Permanently protect the project Site from harmful uses.	Establish conservation easements on the Site.	Ensure that development and agricultural uses that would damage the Site or reduce the benefits of the project are prevented.

1.3 Project Structure, Restoration Type, and Approach

The Mitigation Plan was approved in February 2020. Construction activities were completed by Land Mechanic Designs, Inc. in September 2020. Turner Land Surveying, PLLC conducted the baseline as-built survey during September 2020, and Bruton Natural Systems, Inc. completed planting in March 2021. Refer to Appendix 1 for detailed project activity, history, contact information, and watershed/Site background information.

1.3.1 Project Structure

The project will provide 9,209.500 stream credits and 36.608 wetland credits. Project credits have been adjusted since the mitigation plan was approved to account for a wider Duke Energy powerline maintenance corridor. Mitigation plan credits were based on the recent plat that shows an 80-foot-wide powerline easement. However, the original 1949 easement document indicates the easement is 150 feet wide and Duke Energy currently maintains this 150-foot width. Wildlands coordinated with Duke Energy to define the extents of the 150-foot-wide maintenance corridor (Figure 2) and removed all credits within this corridor. Refer to Figure 2 for the stream and wetland asset exhibits and Table 1 for the project component and mitigation credit information.

1.3.2 Restoration Type and Approach

The design streams were restored to the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions. The project consists of the stream restoration and enhancement activities as described below (Table 2) and illustrated in Figure 2.

Table 2: Restoration Type and Approach Per Reach – *McClenny Acres Mitigation Site*

Stream	Reach	Primary Stressors/Impairments	Treatment Approach	Restoration Activity
UT1	R1	Channelized, limited riparian vegetation	Restoration - Priority 1	Plan, Pattern, Profile, Planting
UT2	R1	N/A	Preservation	Conservation Easement
	R2	Channelized, lack of riparian vegetation	Restoration - Priority 1	Plan, Pattern, Profile, Planting
UT3	R1	Channelized, lack of riparian vegetation	Restoration - Priority 1	Plan, Pattern, Profile, Planting
	R2	Channelized, lack of riparian vegetation	Restoration - Priority 1	Plan, Pattern, Profile, Planting
UT4	R1	Channelized	Restoration - Priority 2	Plan, Pattern, Profile, Planting
	R2	Channelized	Enhancement Level II	Floodplain Berm Removal, Floodplain Bench on Left Side

The design approach for this Site employed a combination of analog and analytical approaches for stream restoration. Reference reaches were identified to serve as an acceptable range for design parameters. Channels were sized based on design discharge hydrologic analysis. Designs were then verified and/or modified based on a sediment transport analysis. This approach has been used on many successful coastal plain restoration projects and is appropriate for the goals and objectives for this Site.

The morphologic design parameters are shown in Appendix 4, Tables 7a-7d for the restoration reaches, and fall within the ranges specified for C5 streams (Rosgen, 1996). The specific values for the design parameters were selected based on designer experience and judgment and were verified with morphologic data form reference reach data sets.

1.4 Project History, Contacts, and Attribute Data

The Site was restored by Wildlands through a full delivery contract with DMS. Tables 2, 3, and 4 in Appendix 1 provide detailed information regarding the project activity and reporting history, project contacts, and project information and attributes.

Section 2: PERFORMANCE STANDARDS

The stream performance standards for the project will follow approved standards presented in the Wilmington District Stream and Wetland Compensatory Mitigation Updated in October 2016 by the North Carolina Interagency Review Team (NCIRT). Annual monitoring and semi-annual site visits by qualified personnel will be conducted to assess the condition of the project. Specific performance standard components are proposed for stream morphology, hydrology, and vegetation. Performance standards will be evaluated throughout the seven-year post-construction monitoring.

2.1 Stream

2.1.1 Dimension

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Per DMS guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 for restored C and E channels to be considered stable. All riffle cross-sections should fall within the parameters defined for channels of the designed stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg or eroding channel banks. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. It is important to note that in sand bed channels pools and bed forms (ripples, dunes, etc.) may migrate over time as a natural function of the channel hydraulics. These sorts of bed changes do not constitute a problem or indicate a need for remedial actions. Remedial action would not be taken if channel changes indicate a movement toward stability.

2.1.2 Pattern and Profile

Longitudinal profile surveys will not be conducted during the seven-year monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability. If a longitudinal profile is deemed necessary, monitoring will follow standards as described in the NCIRT Wilmington District Stream and Wetland Compensatory Mitigation Update (2016) and the 2003 USACE and NCDWR Stream Mitigation Guidance for the necessary reaches. Visual assessments and photo documentation should indicate that streams are remaining stable and do not indicate a trend toward vertical or lateral instability. A longitudinal profile was conducted as part of the as-built survey to provide a baseline for comparison should it become necessary to perform longitudinal profile surveys later during monitoring and to insure accordance with design plans.

2.1.3 Substrate

This is a sand bed system and the nature of the bed material is not expected to change over time. No pebble counts will be conducted for the project and no performance standard is being set for substrate.

2.1.4 Photo Documentation

Photographs should illustrate the Site's vegetation and morphological stability on an annual basis. Cross-section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent mid-channel bars or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected.

2.1.5 Hydrology Documentation

The occurrence of bankfull events will be documented throughout the monitoring period. Four bankfull flow events must be documented on restoration streams during the seven-year monitoring period. The four bankfull events must occur in separate years. Stream monitoring will continue until performance standards in the form of four bankfull events in separate years have been documented. UT3 above the confluence of UT2 is an intermittent channel that was restored. This reach will be monitored for hydrology with a stream gage and must demonstrate at least 30 consecutive days of stream flow.

2.2 Wetlands

Groundwater monitoring will be conducted for seven years after construction to evaluate the hydrologic state of the re-established wetland zones. A total of 19 groundwater monitoring gages were established at the Site.

Based on the soil type on the Site and associated USACE guidance, the proposed performance standard for wetland hydrology shall be free groundwater surface within 12 inches of the ground surface for 10-14% of the growing season for Wayne County under normal precipitation conditions. A majority of the Site contains Lumbee soils, which has a hydrology performance standard of 10% of the growing season according to the Wilmington District Stream and Wetland Compensatory Mitigation Update issued in October 2016 by the USACE and NCIRT. A small portion of the Site along UT2 contains Torhunta soils, which has a performance standard of 14%. Groundwater gages one and five are within the 14% monitoring area (Figure 3-3b).

2.3 Vegetation

Vegetative performance for riparian buffers associated with the stream restoration component of the project (buffer widths 0 – 50ft) will be in accordance with the Stream Mitigation Guidelines issued October 2016 by the USACE and NCIRT. The success criteria is an interim survival rate of 320 planted stems per acre at the end of monitoring year three (MY3), 260 stems per acre at the end of monitoring year 5 (MY5) and a final vegetation survival rate of 210 stems per acre at the end of monitoring year 7 (MY7). Planted vegetation must average 7 feet in height at the end of monitoring year 5 and 10 feet in height in each plot at the end of monitoring year 7.

The extent of invasive species coverage will be monitored and treated as necessary throughout the required monitoring period.

2.4 Visual Assessment

Visual assessments should support the specific performance standards for each metric as described above.

2.5 Schedule and Reporting

Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. Based on the DMS Annual Monitoring Report Template (June 2017), the monitoring reports will include the following:

- Project background which includes project objectives, project structure, restoration type and approach, location and setting, history and background;
- Monitoring Current Condition Plan View (CCPV) maps with major project elements noted such as grade control structures, vegetation plots, permanent cross-sections, and crest gauges;
- Photographs showing views of the restored Site taken from fixed point stations;
- Assessment of the stability of the Site based on the cross-sections;

- Vegetative data as described above including the establishment of any undesirable plant species;
- A description of damage by animals or vandalism; and
- Maintenance issues and recommended remediation measures will be detailed and documented.

Section 3: MONITORING PLAN

Monitoring will consist of collecting morphological, hydrologic, and vegetative data to assess the project performance based on the restoration goals and objectives on an annual basis until performance criteria have been met. The performance of the project will be assessed using measurements of the stream channel's dimension, pattern, substrate composition, permanent photographs, surface water hydrology, and vegetation. Any areas identified as high priority problems, such as streambank instability, aggradation/degradation, or lack of vegetation establishment will be evaluated on a case-by-case basis. The problem areas will be visually noted, and remedial actions will be discussed with DMS staff to determine a plan of action. A remedial action plan will be submitted if substantial maintenance is required. The monitoring period will extend seven years beyond completion of construction or until performance criteria have been met.

3.1 Stream

Geomorphic assessments will follow guidelines outlined in the Stream Channel Reference Sites: An Illustrated Guide to Field Techniques (Harrelson et al., 1994), methodologies utilized in the Rosgen stream assessment and classification document (Rosgen, 1994 and 1996), and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al, 2003). Refer to Figure 3 in Appendix 2 and Record Drawings in Appendix 5 for monitoring locations discussed below.

3.1.1 Dimension

A total of 20 cross-sections were installed along the stream restoration reaches. Two cross-sections were installed per 1,000 linear feet of stream restoration work. Each cross-section was permanently marked with pins to establish its location. Cross-section surveys include points measured at all breaks in slope; including top of bank, bankfull, edge of water, and thalweg to monitor any deviations in dimension. Annual cross-section surveys will be conducted in MY1, MY2, MY3, MY5, and MY7. Photographs will be taken annually of the cross-sections looking upstream and downstream.

3.1.2 Pattern and Profile

Longitudinal profile surveys will not be conducted during the seven-year monitoring period unless other indicators during the annual monitoring show a trend toward vertical and lateral instability. If a longitudinal profile is deemed necessary, monitoring will follow standards as described in the NCIRT Wilmington District Stream and Wetland Compensatory Mitigation Update (2016) and the 2003 USACE and NCDWR Stream Mitigation Guidance for the necessary reaches. Stream pattern and profile will be assessed visually as described below in section 3.4.

3.1.3 Substrate

Project streams have sand bed substrate and no substrate monitoring will be performed.

3.1.4 Photo Documentation

A total of 30 permanent photograph reference points were established along the stream reaches after construction. Permanent markers were established so that the same locations and view directions on the Site are photographed each year. Longitudinal stream photographs will be taken looking upstream and downstream once a year to visually document stability. Cross-sectional photos will be taken at each permanent cross-section looking upstream and downstream. The photographer will attempt to consistently maintain the same area in each photo over time.

3.1.5 Hydrology Documentation

Four automated crest gauges were installed on Site. The crest gauges were installed in surveyed riffle cross-sections on UT1, UT2 Reach 2, UT3 Reach 1, and UT4 Reach 1. Crest gauge data will be downloaded quarterly to determine if a bankfull event has occurred. One flow gage was installed in a riffle cross-section on UT3 Reach 1 to monitor consecutive days of stream flow.

3.2 Wetlands

Nineteen groundwater monitoring wells equipped with pressure transducers were installed to assess hydrology in re-establishment areas. Pressure transducers will record groundwater pressure at least twice daily. Data from the wells will be downloaded at regular intervals and included in annual monitoring reports to evaluate successful attainment of hydroperiod criterion. Groundwater well locations are shown in Appendix 2 Figures 3-3b.

The estimated growing season for Wayne County is approximately 262 days (March 4 through November 21). A soil temperature probe was be installed at a depth of 12 inches to determine growing season dates for each individual monitoring year. The growing season will be defined as that portion of the year where soil temperature remains above 40 degrees Fahrenheit. The growing season may not begin before March 1 of each year when calculating hydroperiods. Bud burst will be observed to corroborate the start of the growing season. If a wetland zone does not meet the performance standard for a given monitoring year, rainfall patterns will be analyzed to assess whether atypical weather conditions occurred during the monitoring period.

3.3 Vegetation

Planted woody vegetation will be monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008). A total of 20 fixed 10-meter by 10-meter vegetation plots were established within the project easement area. Five randomly located 100 square meter plots will also be inventoried each vegetation monitoring year.

Vegetation plots were randomly established throughout the planted area within the conservation easement boundaries and five feet from the top of stream banks. Fixed vegetation plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit (Figure 3a, 3b). Reference photographs were taken at the origin looking diagonally across the plot to the opposite corner during the baseline monitoring in February and March 2021. Subsequent annual assessments following the baseline survey will capture the same reference photograph locations. Planted woody stems will be marked annually or as needed. Trees have been located relative to a known origin so they can be found in subsequent monitoring years.

Random vegetation plots will be randomly located within planted areas during each vegetation monitoring year. Sample area of random vegetation plots will be 100 square meters.

Vegetation inventory will be conducted during monitoring years 1, 2, 3, 5, and 7. Data collected for each individual stem within a vegetation plot will include species, survival, height, diameter at breast height (DBH), vigor, and damage.

3.4 Visual Assessment

Visual assessments will be performed within the entire project area on a semi-annual basis during the seven-year monitoring period. Problem areas will be noted such as channel instability (i.e. lateral and/or vertical instability, in-stream structure failure/instability and/or piping, or headcuts), vegetation health (i.e. low density, slow growth rate), vegetation composition, beaver activity, or encroachment. Areas of concern will be mapped and accompanied by a written description in the annual report. Problem areas

will be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

Section 4: MAINTENANCE AND CONTINGENCY PLAN

Wildlands will perform maintenance as needed at the Site. A physical inspection of the Site shall be conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following construction and may include one or more of the following components.

4.1 Stream

Stream problem areas will be mapped and included in the CCPV as part of the annual stream assessment. Stream problems areas may include bank erosion, structure failure, beaver dams, aggradation/degradation, etc. Routine channel maintenance and repair activities may include repair of in-stream structures to prevent piping, securing loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water runoff flows into the channel may also require maintenance to prevent bank failures and head-cutting.

4.2 Vegetation

Vegetation shall be maintained to ensure the health and vigor of the targeted community. Vegetative problem areas will be mapped and included in the CCPV as part of the annual vegetation assessment. Vegetation problem areas may include planted vegetation not meeting performance criteria, persistent invasive species, barren areas with little to no herbaceous cover, or competition suppression of planted stems. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.

4.3 Site Boundary

Site boundary issues will be mapped and included in the CCPV as part of the annual visual assessment. Site boundaries shall be identified in the field to ensure clear distinction between the Site and adjacent properties. Boundaries are marked with conservation easement signs attached to metal posts. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.

Section 5: AS-BUILT CONDITION (BASELINE)

Site construction and as-built survey were completed in September 2020. The survey included developing an as-built topographic surface as well as surveying the as-built channel thalweg, top of banks, structures, and cross-sections.

5.1 As-Built/Record Drawings

A sealed half-size set of record drawings are in Appendix 5 which includes the post-construction survey, alignments, structures, and monitoring features. These include redlines for any significant field adjustments made during construction that differ from the design plans. Adjustments made during construction are listed below.

5.1.1 UT1

- No changes made during construction.

5.1.2 UT2 Reach 2

- No changes made during construction.

5.1.3 UT3 Reach 1

- No changes made during construction.

5.1.4 UT3 Reach 2

- Station 320+07 to 320+66 Vegetated soil lift was replaced with brush toe and a rock outlet to provide greater stability for the outlet of an existing linear wetland;
- Station 321+13 to 321+57 sod mat was not installed because no sod mat was available.

5.1.5 UT4 Reach 1

- Station 425+76 to 426+03 sod mat was not installed because no sod mat was available.

5.2 Baseline Data Assessment

Baseline monitoring (MY0) was conducted between September 2020 and March 2021. The first annual monitoring assessment (MY1) will be completed in late 2021. The streams will be monitored for a total of seven years, with the final monitoring activities concluding in 2027. The close-out for the Site will be conducted in 2028 given the performance criteria have been met.

5.2.1 Morphological State of the Channel

Morphological data for the as-built profile was collected in September 2020. Refer to Appendix 2 for stream photographs and Appendix 4 for summary data tables and morphological plots.

Profile

The MY0 longitudinal profiles closely match design profiles. On design profiles, pools and riffles were depicted as straight lines with consistent slopes. The as-built surveyed profiles are not as consistent in slope due to inherent variability during construction, incorporation of wood in the stream, and mobility of substrate in sand bed streams. Pool and riffle slopes are expected to be maintained near design parameter values. The variations in slope and depth do not constitute a problem or indicate a need for remedial actions. Some log sills had been slightly covered by sediment at the time of as-built survey (Appendix 4, Appendix 5). These sills are still functioning as intended, and sediment should flush through the system during future storm events.

Dimension

The MY0 channel dimensions are within an acceptable range of the design parameters. Each stream was designed and built as a C5 channel with the expectation they may develop E5 channel characteristics over time. Summary data and cross-section plots of each project reach are included in Appendix 4.

Pattern

The MY0 pattern metrics fall within an acceptable range of the design parameters. No major changes to design alignments were made during construction. Pattern data will be evaluated if significant changes in channel dimension or profile are observed.

5.2.2 Hydrology

Stream flow monitoring began during late February 2021. Flow and crest gage data will be discussed in the MY1 report.

5.2.3 Wetlands

Wetland data recording began for the 2021 growing season and data will be reported in the MY1 report.

5.2.4 Vegetation

The MY0 vegetation survey was completed in March 2021. The MY0 planted density ranged from 526 to 728 stems per acre in fixed plots and 526 to 688 stems per acre within random plots. Fixed Vegetation plot 12 was planted with 971 stems per acre but appears to be in a small area that was over planted, so this value was considered an outlier. All sampled plots and visually assessed areas appear to contain stem densities over the MY3 interim success criterion of 320 stems per acre. The average stem density for fixed vegetation plots, excluding data from vegetation plot 12, is 622 stems per acre. Vegetation plot photographs are included in Appendix 2 and summary data for each plot are included in Tables 6a and 6b in Appendix 3.

Section 6: REFERENCES

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

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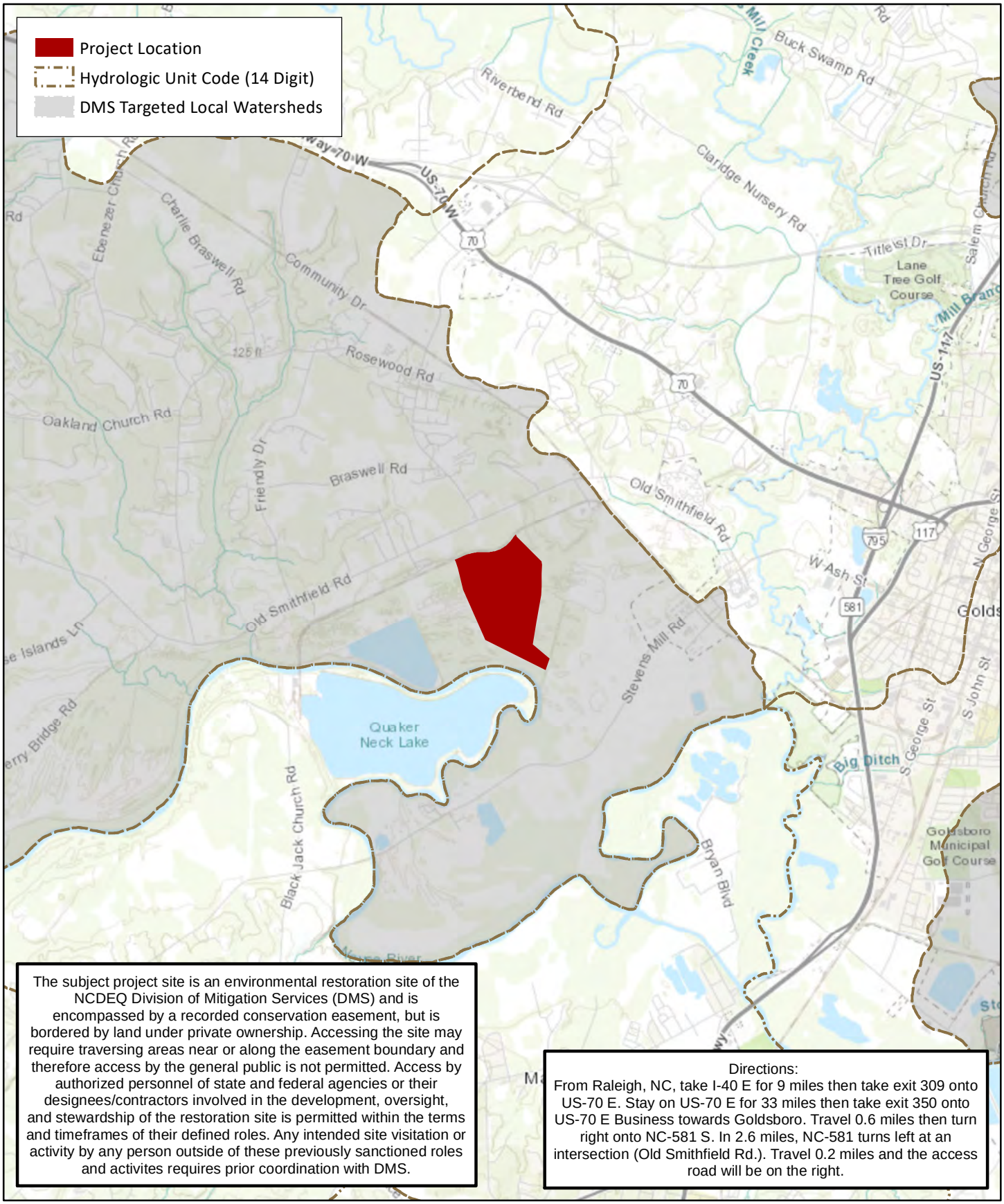
APPENDIX 1. General Figures and Tables



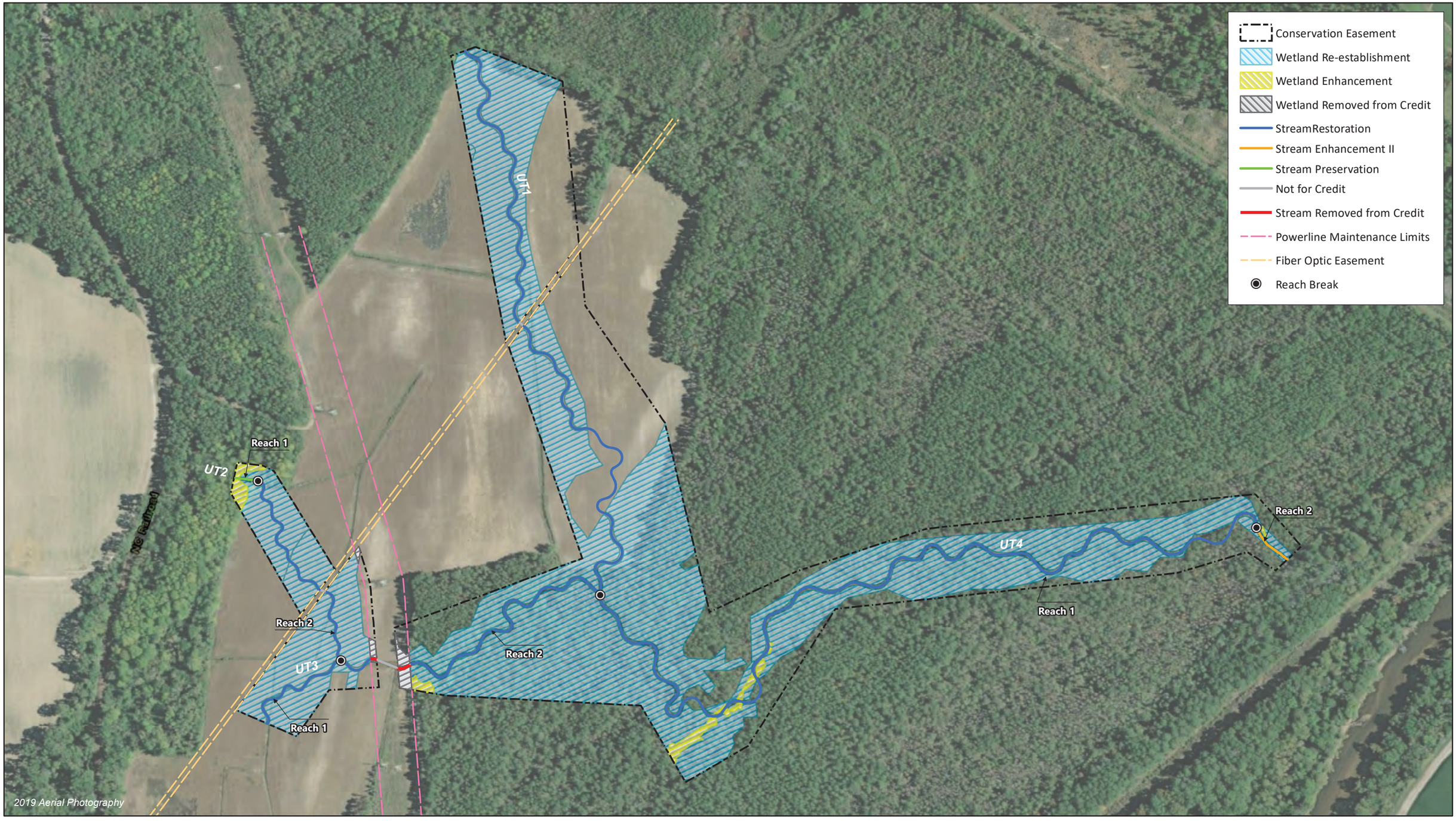
WILDLANDS ENGINEERING

0 0.5 1 Miles

N

Figure 1. Project Vicinity Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Wayne County, NC



WILDLANDS ENGINEERING

0 350 Feet

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Figure 2 - Project Component/Asset Map
McClenny Acres Mitigation Site
DMS Project No. 100038
MY0 - 2021

Wayne County, NC

Table 1. Project Components and Mitigation Credits
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

PROJECT COMPONENTS									
Reach/Wetland ID	**Existing Footage/ Acreage**	**Mitigation Plan Footage/ Acreage**	**Mitigation Category**	**Restoration Level**	**Priority Level**	**Mitigation Ratio (X:1)**	**Project Credits**	**As-Built Footage/ Acreage**	**Comments**
STREAMS									
UT1 Reach 1	814	1,263	Warm	R	P1	1	1,263.000	1,286	Full Channel Restoration, Planted Buffer
	23	20	N/A	N/A	N/A	N/A	N/A	20	Utility R.O.W., Not for Credit
	2,095	1,471	Warm	R	P1	1	1,471.000	1,497	Full Channel Restoration, Planted Buffer
UT2 Reach 1	95	95	Warm	P	N/A	10	8.900	89	Conservation Easement
UT2 Reach 2	730	574	Warm	R	P1	1	574.000	574	Full Channel Restoration, Planted Buffer
	57	21	N/A	N/A	N/A	N/A	N/A	21	Utility R.O.W., Not for Credit
	372	314	Warm	R	P1	1	314.000	311	Full Channel Restoration, Planted Buffer
UT3 Reach 1	147	472	Warm	R	P1	1	472.000	472	Full Channel Restoration, Buffer Planting
UT3 Reach 2	239	170	Warm	R	P1	1	145.000 [1]	153	Full Channel Restoration, Buffer Planting
	92	89	N/A	N/A	N/A	N/A	N/A	163	Utility R.O.W., Not for Credit
	782	1,117	Warm	R	P1	1	1068.000 [1]	1,082	Full Channel Restoration
UT4 Reach 1	2,945	3,824	Warm	R	P1	1	3,824.000	3,862	Full Channel Restoration
UT4 Reach 2	174	174	Warm	EII	N/A	2.5	69.600	167	Floodplain Berm Removed
Wetlands									
Wetland Re-establishment	36.795	36.795	Riparian	Re-establishment	N/A	1	36.328 [1]	36.328	Restored Hydrology, Planted
Wetland Enhancement	0.588	0.588	Riparian	Enhancement	N/A	2	0.280 [1]	0.560	Enhanced Hydrology

[1] Mitigation plan footage/acreage was based on an 80' wide powerline easement. Credit length/acreage was reduced because the actual maintained width is 150'.

PROJECT CREDITS							
Restoration Level	**Stream**			**Riparian Wetland**		**Non-Riparian Wetland**	**Coastal Marsh**
	Warm	**Cool**	**Cold**	**Riverine**	**on-Riverir**		
Restoration	9,131.000						
Enhancement I							
Enhancement II	69.600						
Preservation	8.900						
Re-Establishment				36.328			
Rehabilitation							
Enhancement				0.280			
Creation							
Totals	**9,209.500**			**36.608**			

Table 2. Project Activity and Reporting History
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		February 2020	February 2020
Final Design - Construction Plans		March 2020	March 2020
Construction		June 2020 - September 2020	September 2020
Temporary S&E mix applied to entire project area [1]		June 2020 - September 2020	September 2020
Permanent seed mix applied to reach/segments [1]		October 2020	October 2020
Bare root and live stake plantings for reach/segments		March 2021	March 2021
Baseline Monitoring Document (Year 0)	Stream Survey	September 2020	March 2021
	Vegetation Survey	March 2021	
Year 1 Monitoring	Stream Survey	2021	December 2021
	Vegetation Survey	2021	
Year 2 Monitoring	Stream Survey	2022	December 2022
	Vegetation Survey	2022	
Year 3 Monitoring	Stream Survey	2023	December 2023
	Vegetation Survey	2023	
Year 4 Monitoring			December 2024
Year 5 Monitoring	Stream Survey	2025	December 2025
	Vegetation Survey	2025	
Year 6 Monitoring			December 2026
Year 7 Monitoring	Stream Survey	2027	December 2027
	Vegetation Survey	2027	

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2020

Designer Nicole Macaluso Millns, PE	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Seed Mix Sources	**Garrett Wildflower Seed Company**
Nursery Stock Suppliers Bare Roots	**Dykes and Sons Nursery and Greenhouse**
Live Stakes	**Bruton Natural Systems, Inc**
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986

Table 4. Project Information and Attributes
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

PROJECT INFORMATION				
Project Name	McClenny Acres Mitigation Site			
County	Wayne County			
Project Area (acres)	54.240			
Planted (acres)	34.560			
Project Coordinates (latitude and longitude)	35.389121, -78.060636			
PROJECT WATERSHED SUMMARY INFORMATION				
Physiographic Province	Coastal Plain			
River Basin	Neuse River			
USGS Hydrologic Unit 8-digit	03020201			
USGS Hydrologic Unit 14-digit	03020201200030			
DWR Sub-basin	03-04-12			
Project Drainiage Area (acres)	784			
Project Drainage Area Percentage of Impervious Area	2.1%			
CGIA Land Use Classification	36% Cultivated Crops; 21% Forest; 17% Shrub/Herbaceous; 15% wetland; 9% Residential; 2% Pasture/Hay			
REACH SUMMARY INFORMATION				
Parameters	**UT1**	**UT2**	**UT3**	**UT4**
Length of Reach (linear feet) - Post-Restoration	2,803	995	1,870	4,029
Drainage Area (acres)	423	40	222	784
NCDWR Stream Identification Score	30.25	30.75	32.5	37.75
NCDWR Water Quality Classification	WS-IV (NSW)			
Morphological Desription (stream type)	Perennial	Perennial	Perennial	Perennial
Evolutionary Trend (Simon's Model) - Pre-Restoration	III Degradation; IV Degradation and Widening	III Degradation	III Degradation	IV Degradation and Widening
Underlying Mapped Soils	Lumbee sandy loam, Pantego loam, Johns sandy loam, Kalmia loam, Wickham loamy sanc			
Drainage Class	-			
Soil Hydric Status	-			
Slope	0.1 - 0.16%	0.14 - 0.36%	0.1 - 0.63%	0.11 - 0.13%
FEMA Classification	Zone AE			
Native Vegetation Community	Coastal Plain Small Stream Swamp			
Percent Composition Exotic Invasive Vegetation - Post-Restoration	0%			

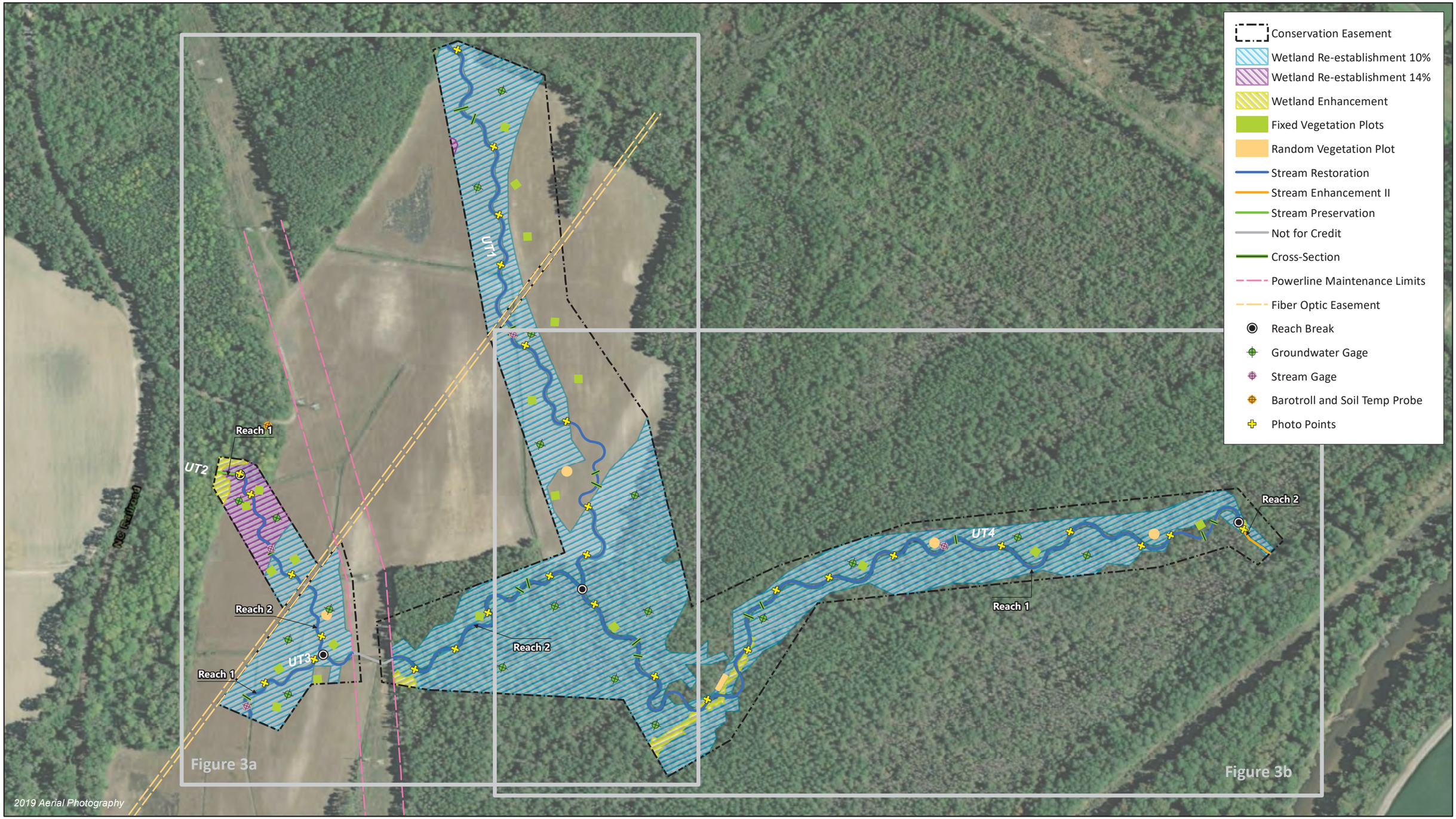
REGULATORY CONSIDERATIONS			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No. 27 and DWQ 401 Water Quality Certification No. 4134.
Waters of the United States - Section 401	Yes	Yes	
Division of Land Quality (Dam Safety)	N/A	N/A	N/A
Endangered Species Act	Yes	Yes	Categorical Exclusion; Wildlands determined "no effect" on Wayne County threatened and endangered species. The USFWS was contacted and replied "the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act."
Historic Preservation Act	Yes	Yes	Categorical Exclusion; NCSHPO was contacted and replied they were not aware of any historic resources that would be affected by the project.
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	Wayne County Floodplain Development Permit No. 20020101090.
Essential Fisheries Habitat	N/A	N/A	N/A

Table 5. Monitoring Component Summary

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Parameter	Monitoring Feature	Quantity / Length by Reach				Frequency
		UT1	UT2	UT3	UT4	
Dimension	Riffle Cross-Sections	3	1	2	4	Year 1, 2, 3, 5, and 7
	Pool Cross-Sections	3	1	2	4	Year 1, 2, 3, 5, and 7
Pattern	Pattern	N/A				N/A
Profile	Longitudinal Profile	N/A				Year 0 (Unless Required)
Hydrology	Transducer: Crest Gauge (CG) or Flow Gauge (FG)	1 CG	1 CG	1 CG, 1 FG	1 CG	Quarterly
Vegetation	CVS Level 2 Vegetation Plots	20 Fixed, 5 Random				Year 1, 2, 3, 5, and 7
Wetlands	Groundwater Well	19				Quarterly
Visual Assessment		Yes				Semi-Annual
Exotic and Nuisance Vegetation						Semi-Annual
Project Boundary						Semi- Annual
Reference Photos	Photographs	30				Annual

APPENDIX 2. Visual Assessment Data

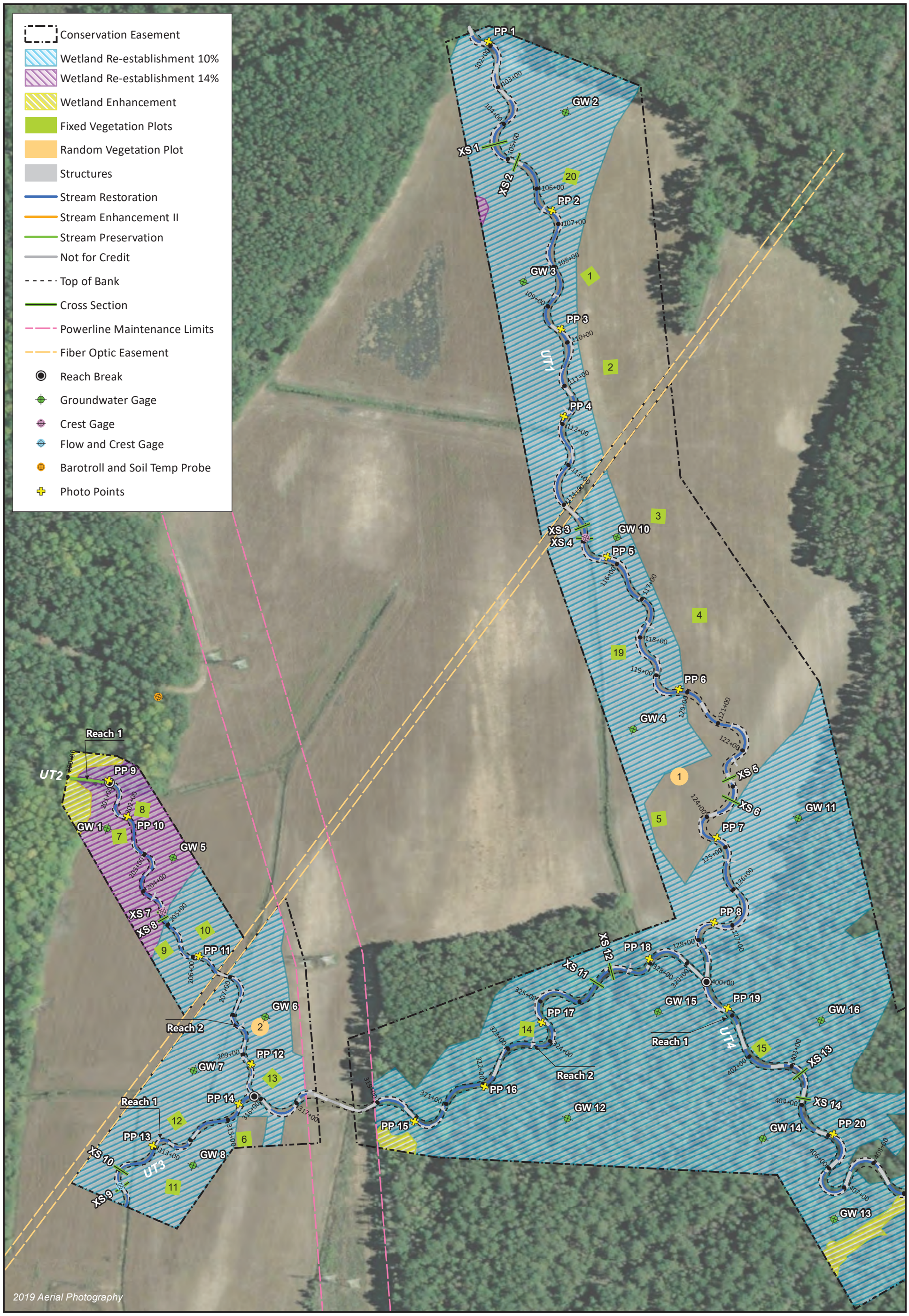


WILDLANDS ENGINEERING

0 350 Feet

Figure 3 - Monitoring Map Key
McClenny Acres Mitigation Site
DMS Project No. 100038
MY0 - 2021

Wayne County, NC



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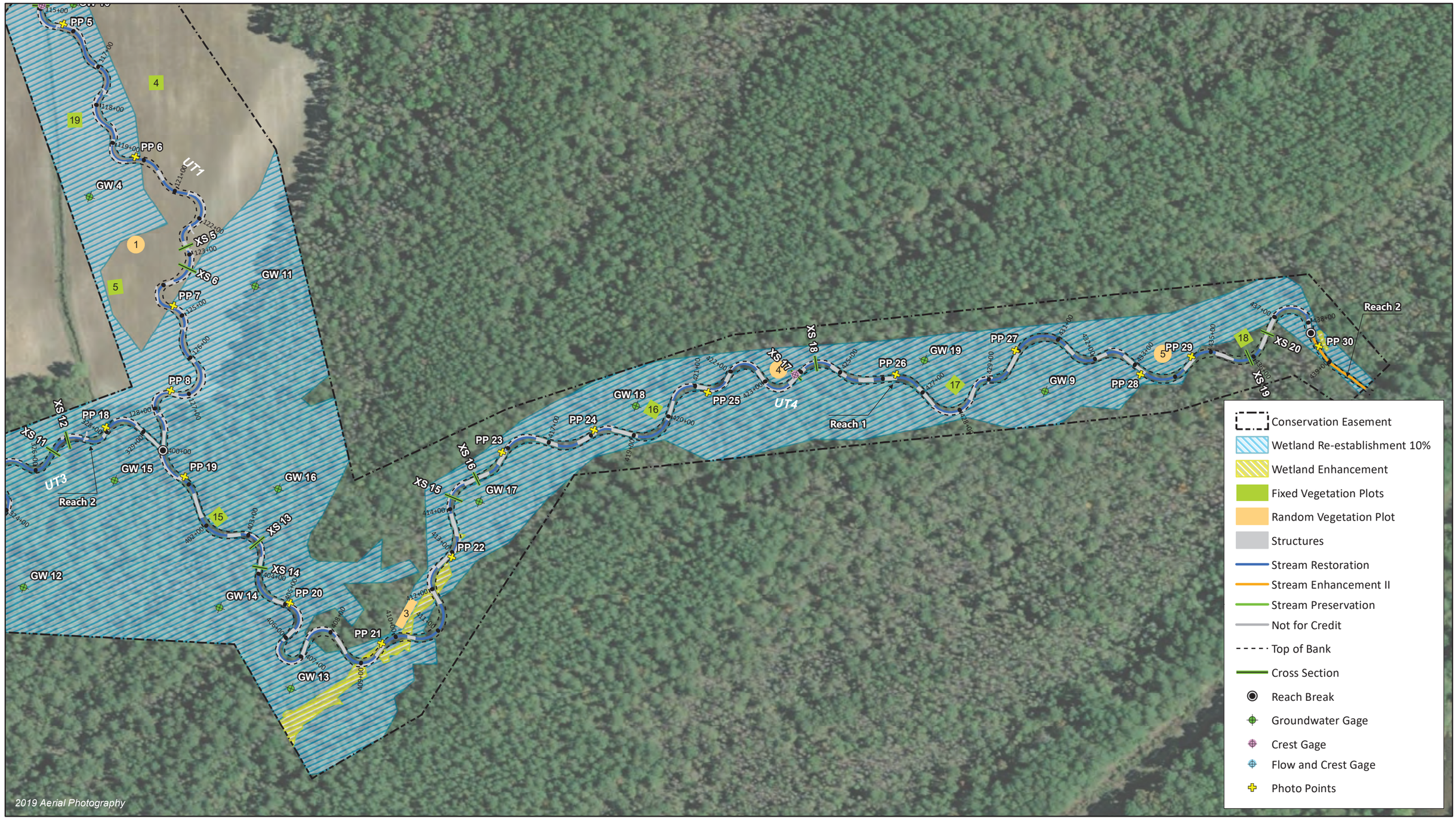
WILDLANDS ENGINEERING

Figure 3a - Monitoring Map
McClenny Acres Mitigation Site
DMS Project No. 100038
MY0 - 2021

Wayne County, NC



WILDLANDS ENGINEERING

0 200 Feet

N

Figure 3b - Monitoring Map
McClenny Acres Mitigation Site
DMS Project No. 100038
MY0 - 2021

Wayne County, NC

STREAM PHOTOGRAPHS

	
PHOTO POINT 1 UT1 – upstream *(8/10/2020)*	**PHOTO POINT 1 UT1 –** downstream *(8/10/2020)*
	
PHOTO POINT 2 UT1 – upstream (8/10/2020*)*	**PHOTO POINT 2 UT1 –** downstream *(8/10/2020)*
	
PHOTO POINT 3 UT1 – upstream *(8/10/2020)*	**PHOTO POINT 3 UT1 –** downstream (8/10/2020*)*

	
PHOTO POINT 4 UT1 – upstream *(8/10/2020)*	**PHOTO POINT 4 UT1 –** downstream *(8/10/2020)*
	
PHOTO POINT 5 UT1 – upstream *(8/10/2020)*	**PHOTO POINT 5 UT1 –** downstream *(8/10/2020)*
	
PHOTO POINT 6 UT1 – upstream *(8/10/2020)*	**PHOTO POINT 6 UT1 –** downstream *(8/10/2020)*

PHOTO POINT 7 UT1 – upstream *(8/28/2020)*

PHOTO POINT 7 UT1 – downstream *(8/28/2020)*

PHOTO POINT 8 UT1 – upstream *(8/28/2020)*

PHOTO POINT 8 UT1 – downstream *(8/28/2020)*

PHOTO POINT 9 UT2 Reach 2 – upstream (8/25/2020*)*

PHOTO POINT 9 UT2 Reach 2 – downstream *(8/25/2020)*

PHOTO POINT 10 UT2 Reach 2 – upstream *(8/25/2020)*

PHOTO POINT 10 UT2 Reach 2 – downstream *(8/25/2020)*

PHOTO POINT 11 UT2 Reach 2 – upstream *(8/25/2020)*

PHOTO POINT 11 UT2 Reach 2 – downstream *(8/25/2020)*

PHOTO POINT 12 UT2 Reach 2 – upstream (8/25/2020*)*

PHOTO POINT 12 UT 2 Reach 2 – downstream *(8/25/2020)*

PHOTO POINT 13 UT3 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 13 UT3 Reach 1 – downstream (9/25/2020*)*

PHOTO POINT 14 UT3 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 14 UT3 Reach 1 – downstream *(9/25/2020)*

PHOTO POINT 15 UT3 Reach 2 – upstream *(9/25/2020)*

PHOTO POINT 15 UT3 Reach 2 – downstream *(9/25/2020)*

	
PHOTO POINT 16 UT3 Reach 2 – upstream *(9/25/2020)*	**PHOTO POINT 16 UT3 Reach 2 –** downstream *(9/25/2020)*
	
PHOTO POINT 17 UT3 Reach 2 – upstream *(9/25/2020)*	**PHOTO POINT 17 UT3 Reach 2 –** downstream *(9/25/2020)*
	
PHOTO POINT 18 UT3 Reach 2 – upstream *(9/25/2020)*	**PHOTO POINT 18 UT3 Reach 2 –** downstream *(9/25/2020)*

	
PHOTO POINT 19 UT4 Reach 1 – upstream *(9/25/2020)*	**PHOTO POINT 19 UT4 Reach 1 –** downstream *(9/25/2020)*
	
PHOTO POINT 20 UT4 Reach 1 – upstream *(9/25/2020)*	**PHOTO POINT 20 UT4 Reach 1 –** downstream *(9/25/2020)*
	
PHOTO POINT 21 UT4 Reach 1 – upstream *(9/25/2020)*	**PHOTO POINT 21 UT4 Reach 1 –** downstream *(9/25/2020)*

	
PHOTO POINT 22 UT4 Reach 1 – upstream *(9/25/2020)*	**PHOTO POINT 22 UT4 Reach 1 –** downstream *(9/25/2020)*
	
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PHOTO POINT 25 UT4 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 25 UT4 Reach 1 – downstream *(9/25/2020)*

PHOTO POINT 26 UT4 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 26 UT4 Reach 1 – downstream *(9/25/2020)*

PHOTO POINT 27 UT4 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 27 UT4 Reach 1 – downstream *(9/25/2020)*

PHOTO POINT 28 UT4 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 28 UT4 Reach 1 – downstream *(9/25/2020)*

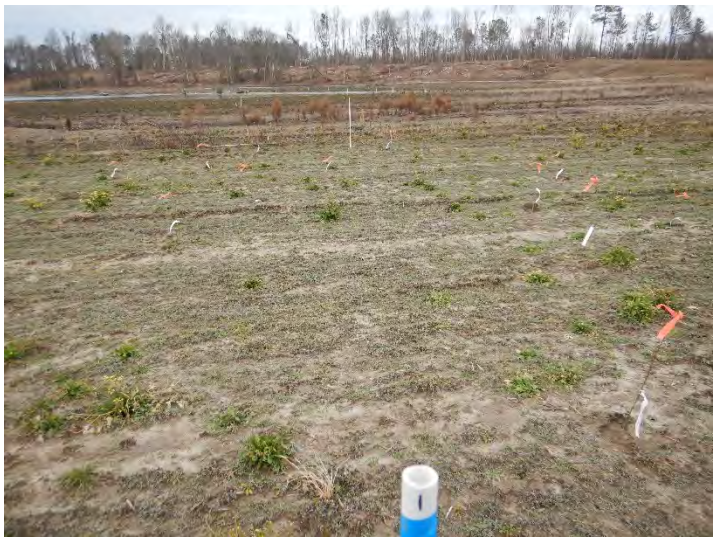
PHOTO POINT 29 UT4 Reach 1 – upstream *(9/25/2020)*

PHOTO POINT 29 UT4 Reach 1 – downstream *(9/25/2020)*

PHOTO POINT 30 UT4 Reach 2 – upstream *(9/25/2020)*

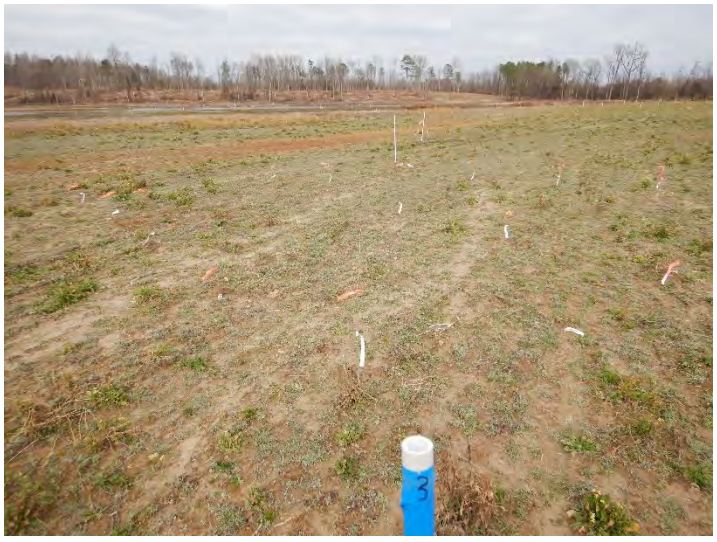
PHOTO POINT 30 UT4 Reach 2 – downstream *(9/25/2020)*

VEGETATION PLOT PHOTOGRAPHS



VEGETATION PLOT 1 *(2/10/2021)*

VEGETATION PLOT 2 *(2/10/2021)*



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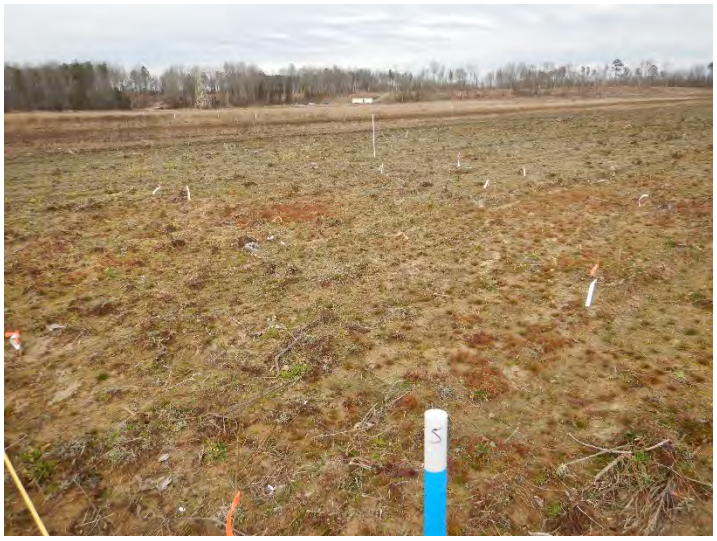
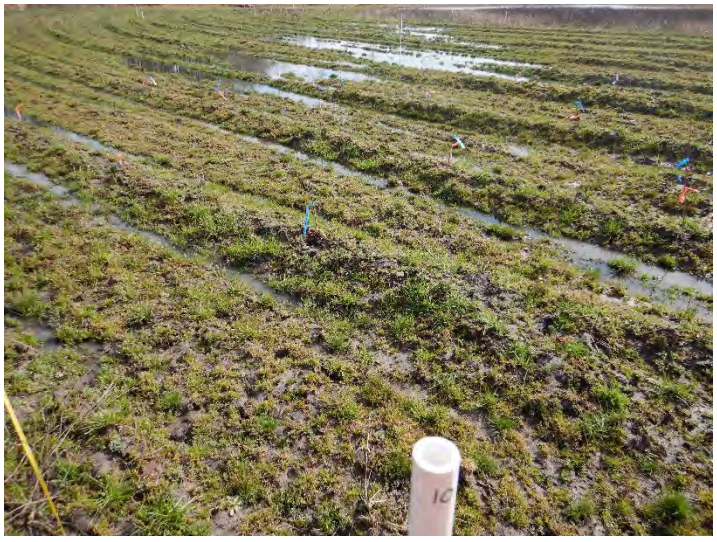
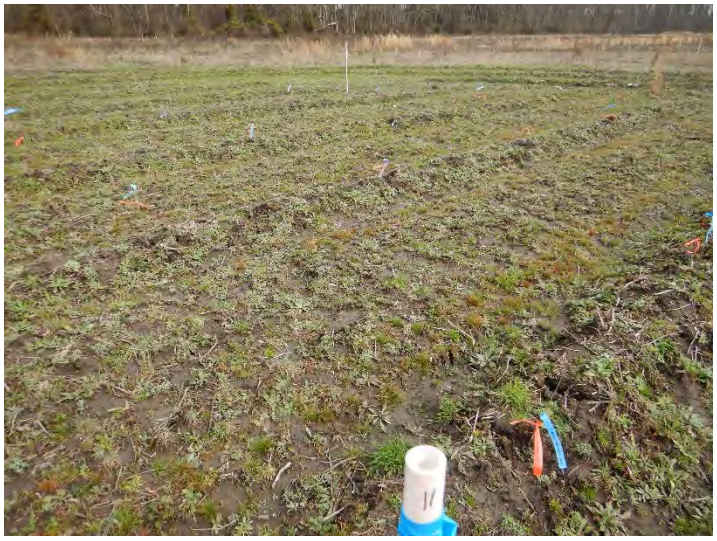
VEGETATION PLOT 4 *(2/10/2021)*



VEGETATION PLOT 5 *(2/10/2021)*

VEGETATION PLOT 6 *(3/2/2021)*

	
VEGETATION PLOT 7 ***(3/2/2021)***	**VEGETATION PLOT 8** ***(3/2/2021)***
	
VEGETATION PLOT 9 ***(3/2/2021)***	**VEGETATION PLOT 10** ***(3/2/2021)***
	
VEGETATION PLOT 11 ***(3/2/2021)***	**VEGETATION PLOT 12** ***(3/4/2021)***

VEGETATION PLOT 13 ***(3/4/2021)***

VEGETATION PLOT 14 ***(2/10/2021)***

VEGETATION PLOT 15 ***(3/2/2021)***

VEGETATION PLOT 16 ***(3/2/2021)***

VEGETATION PLOT 17 ***(3/2/2021)***

VEGETATION PLOT 18 ***(3/2/2021)***

	
VEGETATION PLOT 19 *(3/2/2021)*	**VEGETATION PLOT 20 *(3/2/2021)***
	
RANDOM VP 1 *(3/2/2021)*	**RANDOM VP 2 *(3/2/2021)***
	
RANDOM VP 3 *(3/2/2021)*	**RANDOM VP 4 *(3/2/2021))***

RANDOM VP 5 ***(3/2/2021)***

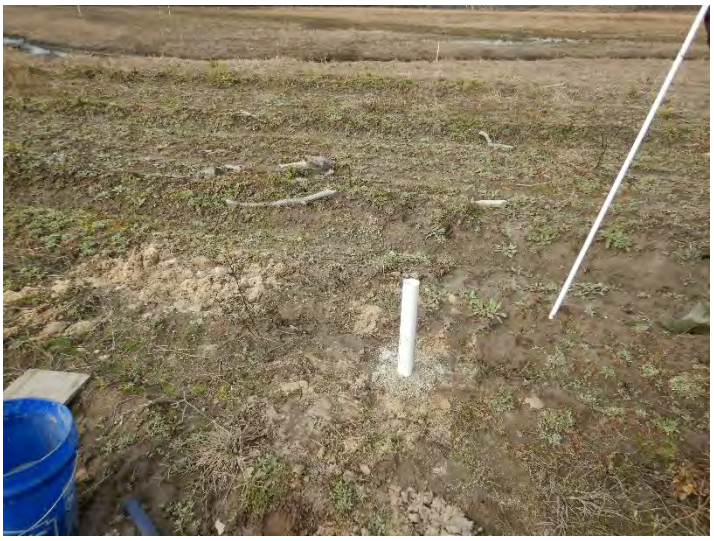
GROUNDWATER WELL PHOTOGRAPHS

	
GROUNDWATER WELL 1 - *(7/21/2020)*	**GROUNDWATER WELL 2 -** *(7/22/2020)*
	
GROUNDWATER WELL 3 – *(7/22/2020)*	**GROUNDWATER WELL 4 –** *(9/15/2020)*
	
GROUNDWATER WELL 5 – *(9/15/2020)*	**GROUNDWATER WELL 6 –** *(9/15/2020)*

GROUNDWATER WELL 7 – *(9/15/2020)*

GROUNDWATER WELL 8 – *(9/15/2020)*

GROUNDWATER WELL 9 – *(12/29/2020)*



GROUNDWATER WELL 10 – *(2/10/2021)*

GROUNDWATER WELL 11 – *(2/10/2021)*

GROUNDWATER WELL 12 – *(2/10/2021)*

GROUNDWATER WELL 13 – *(12/30/2020)*

GROUNDWATER WELL 14 – *(12/30/2020)*

GROUNDWATER WELL 15 – *(12/30/2020)*

GROUNDWATER WELL 16 – *(2/26/2021)*

GROUNDWATER WELL 17 – upstream *(12/29/2020)*

GROUNDWATER WELL 18 – *(1/18/2021)*

GROUNDWATER WELL 19 – *(12/29/2020)*

APPENDIX 3. Vegetation Plot Data

Table 6a. Fixed Plot Planted and Total Stem Counts

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

			Current Plot Data (MY0 2021)																	
			VP 1			VP 2			VP 3			VP 4			VP 5			VP 6		
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**
Betula nigra	River Birch	Tree	4	4	4	3	3	3	3	3	3	4	4	4	1	1	1	1	1	1
Diospyros virginiana	Persimmon	Tree				1	1	1	1	1	1	1	1	1				1	1	1
Fraxinus pennsylvanica	Green Ash	Tree	2	2	2							1	1	1	1	1	1			
Magnolia virginiana	Sweetbay	Shrub Tree	1	1	1							1	1	1	1	1	1	1	1	1
Nyssa biflora	Swamp Tupelo	Tree																		
Platanus occidentalis	Sycamore	Tree	2	2	2	3	3	3	3	3	3	4	4	4	5	5	5	3	3	3
Populus deltoides	Eastern Cottonwood	Tree	1	1	1	2	2	2				1	1	1						
Quercus lyrata	Overcup Oak	Tree																		
Quercus michauxii	Swamp Chestnut Oak	Tree				2	2	2	1	1	1				3	3	3	6	6	6
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	2	2	2	1	1	1				1	1	1	2	2	2
Quercus phellos	Willow Oak	Tree	3	3	3	1	1	1	6	6	6	2	2	2	2	2	2	1	1	1
Salix nigra	Black Willow	Tree																		
Taxodium distichum	Bald-cypress	Tree										1	1	1	2	2	2			
Ulmus alata	Winged Elm	Tree																		
		Stem count	14	14	14	14	14	14	15	15	15	15	15	15	16	16	16	15	15	15
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	7	7	7	7	7	7	6	6	6	8	8	8	8	8	8	7	7	7
		Stems per ACRE	567	567	567	567	567	567	607	607	607	607	607	607	647	647	647	607	607	607

1. Outlier VP 12 is excluded from summary values related to an average.

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes,

T: Total Stems

Table 6a. Fixed Plot Planted and Total Stem Counts

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 0 - 2021

			Current Plot Data (MY0 2021)																	
			VP 7			VP 8			VP 9			VP 10			VP 11			VP 12		
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**
Betula nigra	River Birch	Tree	2	2	2	3	3	3	2	2	2	4	4	4	3	3	3	4	4	4
Diospyros virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green Ash	Tree	1	1	1				1	1	1	1	1	1	1	1	1			
Magnolia virginiana	Sweetbay	Shrub Tree	1	1	1	1	1	1				1	1	1				1	1	1
Nyssa biflora	Swamp Tupelo	Tree	2	2	2	1	1	1	2	2	2	3	3	3	2	2	2	2	2	2
Platanus occidentalis	Sycamore	Tree	2	2	2	3	3	3	3	3	3	1	1	1	1	1	1	5	5	5
Populus deltoides	Eastern Cottonwood	Tree																		
Quercus lyrata	Overcup Oak	Tree	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Quercus michauxii	Swamp Chestnut Oak	Tree				2	2	2	1	1	1	1	1	1	2	2	2	4	4	4
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Quercus phellos	Willow Oak	Tree																		
Salix nigra	Black Willow	Tree	2	2	2				1	1	1	1	1	1	1	1	1			
Taxodium distichum	Bald-cypress	Tree	5	5	5	3	3	3	5	5	5	3	3	3	3	3	3	7	7	7
Ulmus alata	Winged Elm	Tree	1	1	1				1	1	1	1	1	1	1	1	1			
		Stem count	18	18	18	15	15	15	18	18	18	18	18	18	16	16	16	24	24	24
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	10	10	10	8	8	8	10	10	10	11	11	11	10	10	10	7	7	7
		Stems per ACRE	728	728	728	607	607	607	728	728	728	728	728	728	647	647	647	971	971	971

1. Outlier VP 12 is excluded from summary values related to an average.

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes,

T: Total Stems

Table 6a. Fixed Plot Planted and Total Stem Counts

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

			Current Plot Data (MY0 2021)																	
			VP 13			VP 14			VP 15			VP 16			VP 17			VP 18		
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**
Betula nigra	River Birch	Tree	5	5	5	2	2	2	1	1	1	2	2	2	3	3	3	2	2	2
Diospyros virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green Ash	Tree	1	1	1	1	1	1				1	1	1				1	1	1
Magnolia virginiana	Sweetbay	Shrub Tree	1	1	1	2	2	2				1	1	1	1	1	1			
Nyssa biflora	Swamp Tupelo	Tree	2	2	2	1	1	1	3	3	3	1	1	1						
Platanus occidentalis	Sycamore	Tree	2	2	2	2	2	2	1	1	1	3	3	3	2	2	2	3	3	3
Populus deltoides	Eastern Cottonwood	Tree																		
Quercus lyrata	Overcup Oak	Tree							2	2	2							1	1	1
Quercus michauxii	Swamp Chestnut Oak	Tree				3	3	3	1	1	1	2	2	2	1	1	1	2	2	2
Quercus pagoda	Cherrybark Oak	Tree	5	5	5				1	1	1	2	2	2	2	2	2	2	2	2
Quercus phellos	Willow Oak	Tree																		
Salix nigra	Black Willow	Tree				1	1	1							2	2	2	1	1	1
Taxodium distichum	Bald-cypress	Tree				2	2	2	3	3	3	2	2	2	2	2	2	4	4	4
Ulmus alata	Winged Elm	Tree	1	1	1				1	1	1				1	1	1			
		Stem count	17	17	17	14	14	14	13	13	13	14	14	14	14	14	14	16	16	16
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
		Stems per ACRE	688	688	688	567	567	567	526	526	526	567	567	567	567	567	567	647	647	647

1. Outlier VP 12 is excluded from summary values related to an average.

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes,

T: Total Stems

Table 6a. Fixed Plot Planted and Total Stem Counts

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

			Current Plot Data (MY0 2021)						Annual Summary		
			VP 19			VP 20			MY0 (2021)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	River Birch	Tree	3	3	3	1	1	1	53	53	53
Diospyros virginiana	Persimmon	Tree							4	4	4
Fraxinus pennsylvanica	Green Ash	Tree							12	12	12
Magnolia virginiana	Sweetbay	Shrub Tree							13	13	13
Nyssa biflora	Swamp Tupelo	Tree	2	2	2	1	1	1	22	22	22
Platanus occidentalis	Sycamore	Tree	2	2	2	4	4	4	54	54	54
Populus deltoides	Eastern Cottonwood	Tree							4	4	4
Quercus lyrata	Overcup Oak	Tree				1	1	1	9	9	9
Quercus michauxii	Swamp Chestnut Oak	Tree	2	2	2	2	2	2	35	35	35
Quercus pagoda	Cherrybark Oak	Tree	3	3	3				28	28	28
Quercus phellos	Willow Oak	Tree							15	15	15
Salix nigra	Black Willow	Tree	1	1	1				10	10	10
Taxodium distichum	Bald-cypress	Tree	3	3	3	5	5	5	50	50	50
Ulmus alata	Winged Elm	Tree							7	7	7
		Stem count	16	16	16	14	14	14	316	316	316
		size (ares)		1			1			19 [1]	
		size (ACRES)		0.02			0.02			0.47 [1]	
		Species count	7	7	7	6	6	6	14	14	14
		Stems per ACRE	647	647	647	567	567	567	622 [1]	622 [1]	622 [1]

1. Outlier VP 12 is excluded from summary values related to an average.

Color Coding for Table

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

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

Table 6b. Random Plot Stem Counts

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

			Current Plot Data (MY0 2021)										Annual Summary	
			RVP 1		RVP 2		RVP 3		RVP 4		RVP 5		MY0 (2021)	
Scientific Name	Common Name	Species Type	Te	Total	Te	Total	Te	Total	Te	Total	Te	Total	Te	Total
Betula nigra	River Birch	Tree	4	4	2	2	3	3	4	4			13	13
Diospyros virginiana	Persimmon	Tree									1	1	1	1
Fraxinus pennsylvanica	Green Ash	Tree			1	1	1	1					2	2
Magnolia virginiana	Sweetbay	Shrub Tree			1	1					1	1	2	2
Nyssa biflora	Swamp Tupelo	Tree					2	2	2	2	3	3	7	7
Platanus occidentalis	Sycamore	Tree	4	4			2	2	3	3	3	3	12	12
Populus deltoides	Eastern Cottonwood	Tree	1	1									1	1
Quercus lyrata	Overcup Oak	Tree			4	4	1	1			2	2	7	7
Quercus michauxii	Swamp Chestnut Oak	Tree	1	1	3	3	2	2	4	4	3	3	13	13
Quercus pagoda	Cherrybark Oak	Tree					1	1					1	1
Quercus phellos	Willow Oak	Tree	2	2									2	2
Taxodium distichum	Bald-cypress	Tree	1	1	5	5	5	5	3	3	3	3	17	17
		Stem count	13	13	16	16	17	17	16	16	16	16	78	78
		size (ares)	1		1		1		1		1		5	
		size (ACRES)	0.02		0.02		0.02		0.02		0.02		0.12	
		Species count	6	6	6	6	8	8	5	5	7	7	12	12
		Stems per ACRE	526	526	647	647	688	688	647	647	647	647	631	631

Color Coding for Table

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

Te - Number of Stems including exotic species
Total - Number of stems excluding exotic species

APPENDIX 4. Morphological Summary Data and Plots

Table 7a. Baseline Stream Data Summary
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

UT1

		PRE-RESTORATION CONDITION		REFERENCE REACH DATA						DESIGN		AS-BUILT/BASELINE	
Parameter	**Gage**	**UT1**		**Johanna Creek**		**UT to Tyson Creek**		**Shepherd Run**		**UT1**		**UT1**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle													
Bankfull Width (ft)	N/A	5.7	7.1	9.7		14.6		7.8		11.6		12.5	14.9
Floodprone Width (ft)		10	100	---		---		---		26	58	>200	
Bankfull Mean Depth		0.8	0.9	---		---		---		0.9		0.7	0.9
Bankfull Max Depth		1.2		1.1		1.6		2.1		1.3		1.3	1.6
Bankfull Cross Sectional Area (ft^2)		4.9	6.5	7.2	7.8	9.5		12.6		10.9		9.5	11.9
Width/Depth Ratio		6.6	8.1	10.1	19.7	22.4		4.8		12.4		14.4	20.3
Entrenchment Ratio		1.4	17.6	8.0	9.6	8.2		17.1		2.2	5.0	13.5	16.0
Bank Height Ratio		1.6	2.8	1.0		---		---		1.0		1.0	
D50 (mm)		---		---		---		---		---		---	
Profile													
Riffle Length (ft)	N/A												
Riffle Slope (ft/ft)		---		---		---		---		0.0012	0.0054	0.0003	0.0218
Pool Length (ft)													
Pool Max Depth (ft)		---		---		---		---		2.8	3.7	2.2	4.9
Pool Spacing (ft)		84	848	---		---		---		23	71	42	115
Pool Volume (ft^3)													
Pattern													
Channel Beltwidth (ft)	N/A	16	113	---		---		---		23	93	23	93
Radius of Curvature (ft)		5	276	---		---		---		23	58	23	58
Rc:Bankfull Width (ft/ft)		0.7	48.4	---		---		---		2.0	5.0	2.0	5.0
Meander Length (ft)		248	1,093	---		---		---		73	218	73	218
Meander Width Ratio		2.3	19.8	---		---		---		2.0	8.0	2.0	8.0
Substrate, Bed and Transport Parameters													
Ri%/Ru%/P%/G%/S%	N/A												
SC%/Sa%/G%/C%/B%/Be%													
d16/d35/d50/d84/d95/d100		---		---		---		---		---		---	
Reach Shear Stress (Competency) lb/ft^2		0.06		---		---		---		---		---	
Max part size (mm) mobilized at bankfull													
Stream Power (Capacity) W/m^2													
Additional Reach Parameters													
Drainage Area (SM)	N/A	0.66		0.90		0.66		1.38		0.66		0.66	
Watershed Impervious Cover Estimate (%)		2.1%		---		---		---		2.1%		2.1%	
Rosgen Classification		E5/G5		E5/C5		C5		E5		C5		C5	
Bankfull Velocity (fps)		2.0	2.5	1.8	1.9	0.9		1.9		1.1		1.1	1.3
Bankfull Discharge (cfs)		11.9		14		9		21		12		10.7	15.2
Q-NFF regression													
Q-USGS extrapolation													
Q-Mannings													
Valley Length (ft)		---		---		---		---		---		---	
Channel Thalweg Length (ft)		2986		---		---		---		2,811		2,812	
Sinuosity		1.05		1.20		1.18		1.18		1.25		1.28	
Water Surface Slope $(ft/ft)^2$		0.0022		0.0022		0.002		0.002		0.0011		0.0014	
Bankfull Slope (ft/ft)		---		---		---		---		0.0010	0.0016	0.0017	

(---): Metric was not calculated

Table 7b. Baseline Stream Data Summary
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

UT2 Reach 2

		PRE-RESTORATION CONDITION		REFERENCE REACH DATA						DESIGN		AS-BUILT/BASELINE	
Parameter	**Gage**	**UT2 Reach 2**		**Still Creek**		**Grady Branch**		**Scout West 2**		**UT2 Reach 2**		**UT2 Reach 2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle													
Bankfull Width (ft)		5.9		6.8	8	3.4	5.3	5.6	7.6	7.0		8.3	
Floodprone Width (ft)		7		---		---		---		15	35	>200	
Bankfull Mean Depth		0.3		---		---		---		0.6		0.5	
Bankfull Max Depth		0.5		1.1	1.4	0.8		1.2	1.3	0.9		1.0	
Bankfull Cross Sectional Area (ft^2)	N/A	1.8		5.7	6.7	---		5.3	5.4	4.3		4.4	
Width/Depth Ratio		18.8		7.4	11.3	4.9	7.6	5.7	11.0	11.5		15.5	
Entrenchment Ratio		1.2		4.9	13.0	---		>2.2		2.2	5.0	>24	
Bank Height Ratio		5.6		1.0		---		1.1	1.2	1.0		1.0	
D50 (mm)		---		---		---		---		---		---	
Profile													
Riffle Length (ft)													
Riffle Slope (ft/ft)		---		---		---		---		0.0017	0.0122	0.0002	0.0100
Pool Length (ft)													
Pool Max Depth (ft)	N/A	---		---		---		---		1.8	2.4	1.5	2.5
Pool Spacing (ft)		188	509	---		---		---		26	43	33	80
Pool Volume (ft^3)													
Pattern													
Channel Beltwidth (ft)		24		---		---		---		14	56	14	56
Radius of Curvature (ft)		52	105	---		---		---		14	35	14	35
Rc:Bankfull Width (ft/ft)	N/A	8.8	17.8	---		---		---		2.0	5.0	2.0	5.0
Meander Length (ft)		343		---		---		---		44	132	44	132
Meander Width Ratio		4.1		---		---		---		2.0	8.0	6.3	18.8
Substrate, Bed and Transport Parameters													
Ri%/Ru%/P%/G%/S%													
SC%/Sa%/G%/C%/B%/Be%													
d16/d35/d50/d84/d95/d100	N/A	---		---		---		---		---		---	
Reach Shear Stress (Competency) lb/ft^2		0.05		---		---		---		---		---	
Max part size (mm) mobilized at bankfull													
Stream Power (Capacity) W/m^2													
Additional Reach Parameters													
Drainage Area (SM)		0.06		0.35		0.25		0.34		0.06		0.06	
Watershed Impervious Cover Estimate (%)		2.1%		---		---		---		2.1%		2.1%	
Rosgen Classification		F5		E5		E5		E5		C5		C5	
Bankfull Velocity (fps)		2.1		1.2		---		1.2		1.0		1.0	
Bankfull Discharge (cfs)		4.2		7.3		---		6.4		4.0		4.2	
Q-NFF regression													
Q-USGS extrapolation	N/A												
Q-Mannings													
Valley Length (ft)		---		---		---		---		---		---	
Channel Thalweg Length (ft)		1,254		---		---		---		909		906	
Sinuosity		1.03		1.33		---		1.20		1.25		1.19	
Water Surface Slope $(ft/ft)^2$		0.0024		0.0066		0.0054		0.004		0.0014		0.0016	
Bankfull Slope (ft/ft)		---		---		---		---		0.0014	0.0036	0.0019	

(---): Metric was not calculated

Table 7c. Baseline Stream Data Summary
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

UT3 Reach 1 & 2

		PRE-RESTORATION CONDITION				REFERENCE REACH DATA						DESIGN				AS-BUILT/BASELINE			
Parameter	**Gage**	**UT3 Reach 1**		**UT3 Reach 2**		**Still Creek**		**Grady Branch**		**Scout West 2**		**UT3 Reach 1**		**UT3 Reach 2**		**UT3 Reach 1**		**UT3 Reach 2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																			
Bankfull Width (ft)		10.2		12.0		6.8	8	3.4	5.3	5.6	7.6	8.8		11		9.6		12.5	
Floodprone Width (ft)		11.9		12.6		---		---		---		19	44	24	55	>200		>200	
Bankfull Mean Depth		0.3		0.8		---		---		---		0.7		0.9		0.6		1.0	
Bankfull Max Depth		0.5		1.3		1.1	1.4	0.8		1.2	1.3	1.2		1.0		1.0		1.7	
Bankfull Cross Sectional Area (ft^2)	N/A	3.5		9.1		5.7	6.7	---		5.3	5.4	6.3		9.6		5.8		13.1	
Width/Depth Ratio		29.9		16.0		7.4	11.3	4.9	7.6	5.7	11.0	12.3		12.6		15.8		11.9	
Entrenchment Ratio		1.2		1.0		4.9	13.0	---		>2.2		2.2	5.0	2.2	5.0	>20		>16	
Bank Height Ratio		7.1		3.4		1.0		---		1.1	1.2	1.0		1.0		1.0		1.0	
D50 (mm)		---		---		---		---		---		---		---		---		---	
Profile																			
Riffle Length (ft)																			
Riffle Slope (ft/ft)		---		---		---		---		---		0.0018	0.0213	0.0012	0.0037	0.0027	0.0029	0.0029	0.0094
Pool Length (ft)	N/A																		
Pool Max Depth (ft)		---		---		---		---		---		2.1	2.9	2.6	3.5	1.9	2.5	2.3	4.0
Pool Spacing (ft)		---		---		---		---		---		33	55	41	68	52	70	50	128
Pool Volume (ft^3)																			
Pattern																			
Channel Beltwidth (ft)		41		---		---		---		---		18	70	22	88	18	70	22	88
Radius of Curvature (ft)		17	373	29	38	---		---		---		18	44	22	55	18	44	22	55
Rc:Bankfull Width (ft/ft)	N/A	1.7	36.6	2.4	3.2	---		---		---		2.0	5.0	2.0	5.0	2.0	5.0	2.0	5.0
Meander Length (ft)		413	415	---		---		---		---		55	165	69	207	55	165	69	207
Meander Width Ratio		4.0		---		---		---		---		2.0	8.0	2.0	8.0	2.0	8.0	2.0	8.0
Substrate, Bed and Transport Parameters																			
Ri%/Ru%/P%/G%/S%																			
SC%/Sa%/G%/C%/B%/Be%																			
d16/d35/d50/d84/d95/d100	N/A	---		---		---		---		---		---		---		---		---	
Reach Shear Stress (Competency) lb/ft^2		0.06		0.05		---		---		---		---		---		---		---	
Max part size (mm) mobilized at bankfull																			
Stream Power (Capacity) W/m^2																			
Additional Reach Parameters																			
Drainage Area (SM)		0.14		0.35		0.35		0.25		0.34		0.14		0.35		0.14		0.35	
Watershed Impervious Cover Estimate (%)		2.1%		2.1%		---		---		---		2.1%		2.1%		2.1%		2.1%	
Rosgen Classification		F5		F5		E5		E5		E5		C5		C5		C5		C5	
Bankfull Velocity (fps)		2.3		1.1		1.2		---		1.2		1.1		1.0		0.9		1.3	
Bankfull Discharge (cfs)		7.1		10.0		7.3		---		6.4		7.0		9.9		5.2		16.8	
Q-NFF regression																			
Q-USGS extrapolation	N/A																		
Q-Mannings																			
Valley Length (ft)		---		---		---		---		---		---		---		---		---	
Channel Thalweg Length (ft)		1,200		1,410		---		---		---		472		1,376		475		1,394	
Sinuosity		1.01		1.05		1.33		---		1.20		1.25		1.20		1.26		1.26	
Water Surface Slope $(ft/ft)^2$		0.0065		0.0014		0.0066		0.0054		0.004		0.0015		0.0010		0.0012		0.0012	
Bankfull Slope (ft/ft)		---		---		---		---		---		0.0015	0.0063	0.0010	0.0011	0.0007		0.0006	

(---): Metric was not calculated

Table 7d. Baseline Stream Data Summary
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

UT4 Reach 1

		PRE-RESTORATION CONDITION		REFERENCE REACH DATA						DESIGN		AS-BUILT/BASELINE	
Parameter	**Gage**	**UT4 Reach 1**		**Johanna Creek**		**UT to Tyson Creek**		**Shepherd Run**		**UT4 Reach 1**		**UT4 Reach 1**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle													
Bankfull Width (ft)	N/A	5.1	12.4	9.7		14.6		7.8		12.8		13.1	13.5
Floodprone Width (ft)		13.0	14.4	---		---		---		28	64	178	>200
Bankfull Mean Depth		0.9	1.8	---		---		---		1.1		0.9	1.1
Bankfull Max Depth		1.3	2.2	1.1		1.6		2.1		1.5		1.6	1.9
Bankfull Cross Sectional Area (ft^2)		9.0	11.1	7.2	7.8	9.5		12.6		13.6		12.3	14.5
Width/Depth Ratio		2.9	13.9	10.1	19.7	22.4		4.8		12.1		12.3	13.9
Entrenchment Ratio		1.2	2.5	8.0	9.6	8.2		17.1		2.2	5.0	13.2	>15
Bank Height Ratio		2.3	5.3	1.0		---		---		1.0		1.0	
D50 (mm)		---		---		---		---		---		---	
Profile													
Riffle Length (ft)	N/A												
Riffle Slope (ft/ft)		---		---		---		---		0.0013	0.0044	0.0001	0.0087
Pool Length (ft)													
Pool Max Depth (ft)		---		---		---		---		3.2	4.2	2.6	4.4
Pool Spacing (ft)		---		---		---		---		26	78	47	156
Pool Volume (ft^3)													
Pattern													
Channel Beltwidth (ft)	N/A	34	40	---		---		---		26	102	26	102
Radius of Curvature (ft)		26	114	---		---		---		26	64	26	64
Rc:Bankfull Width (ft/ft)		2.1	22.4	---		---		---		2.0	5.0	2.0	5.0
Meander Length (ft)		367	517	---		---		---		81	241	81	241
Meander Width Ratio		2.7	7.8	---		---		---		2.0	8.0	2.0	8.0
Substrate, Bed and Transport Parameters													
Ri%/Ru%/P%/G%/S%	N/A												
SC%/Sa%/G%/C%/B%/Be%													
d16/d35/d50/d84/d95/d100		---		---		---		---		---		---	
Reach Shear Stress (Competency) lb/ft^2		0.08		---		---		---		---		---	
Max part size (mm) mobilized at bankfull													
Stream Power (Capacity) W/m^2													
Additional Reach Parameters													
Drainage Area (SM)	N/A	1.23		0.90		0.66		1.38		1.23		1.23	
Watershed Impervious Cover Estimate (%)		2.1%		---		---		---		2.1%		2.1%	
Rosgen Classification		E5/F5		E5/C5		C5		E5		C5		C5	
Bankfull Velocity (fps)		1.8	2.1	1.8	1.9	0.9		1.9		1.4		1.2	1.3
Bankfull Discharge (cfs)		18.4		14		9		21		18.7		15.0	18.9
Q-NFF regression													
Q-USGS extrapolation													
Q-Mannings													
Valley Length (ft)		---		---		---		---		---		---	
Channel Thalweg Length (ft)		2,826		---		---		---		3,824		3,854	
Sinuosity		1.04		1.20		1.18		1.18		1.25		1.29	
Water Surface Slope $(ft/ft)^2$		0.0010		0.0022		0.002		0.002		0.0013		0.0012	
Bankfull Slope (ft/ft)		---		---		---		---		0.0011	0.0013	0.0011	0.0012

(---): Metric was not calculated

Table 8a. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 0 - 2021

	UT1																							
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Pool)						Cross-Section 4 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	76.17						76.24						75.41						75.46					
Low Bank Elevation (ft)	76.17						76.24						75.41						75.46					
Bankfull Width (ft)	18.7						12.5						15.6						13.1					
Floodprone Width (ft)	N/A						>200						N/A						>200					
Bankfull Mean Depth (ft)	1.4						0.8						1.5						0.9					
Bankfull Max Depth (ft)	3.2						1.4						2.8						1.6					
Bankfull Cross-Sectional Area (ft^2)	26.3						9.5						23.7						11.9					
Bankfull Width/Depth Ratio	13.3						16.6						10.2						14.4					
Entrenchment Ratio[1]	N/A						>16						N/A						>15					
Bankfull Bank Height Ratio[2]	N/A						1.0						N/A						1.0					
	UT1												UT2 Reach 2											
	Cross-Section 5 (Riffle)						Cross-Section 6 (Pool)						Cross-Section 7 (Riffle)						Cross-Section 8 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	74.79						74.50						76.22						76.10					
Low Bank Elevation (ft)	74.79						74.50						76.22						76.10					
Bankfull Width (ft)	14.9						19.5						8.3						9.7					
Floodprone Width (ft)	>200						N/A						>200						N/A					
Bankfull Mean Depth (ft)	0.7						1.6						0.5						0.7					
Bankfull Max Depth (ft)	1.3						3.4						1.0						1.4					
Bankfull Cross-Sectional Area (ft^2)	10.9						31.5						4.4						7.0					
Bankfull Width/Depth Ratio	20.3						12.1						15.5						13.3					
Entrenchment Ratio[1]	>13						N/A						>24						N/A					
Bankfull Bank Height Ratio[2]	1.0						N/A						1.0						N/A					
	UT3 Reach 1												UT3 Reach 2											
	Cross-Section 9 (Riffle)						Cross-Section 10 (Pool)						Cross-Section 11 (Riffle)						Cross-Section 12 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	75.72						75.49						74.16						73.72					
Low Bank Elevation (ft)	75.72						75.49						74.16						73.72					
Bankfull Width (ft)	9.6						13.0						12.5						14.6					
Floodprone Width (ft)	>200						N/A						>200						N/A					
Bankfull Mean Depth (ft)	0.6						1.3						1.0						1.2					
Bankfull Max Depth (ft)	1.0						2.5						1.7						2.1					
Bankfull Cross-Sectional Area (ft^2)	5.8						17.6						13.1						17.0					
Bankfull Width/Depth Ratio	15.8						9.7						11.9						12.5					
Entrenchment Ratio[1]	>20						N/A						>16						N/A					
Bankfull Bank Height Ratio[2]	1.0						N/A						1.0						N/A					

[1]Entrenchment Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum.

[2]Bank Height Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum.

Table 8b. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 0 - 2021

	UT4 Reach 1																							
	Cross-Section 13 (Pool)						Cross-Section 14 (Riffle)						Cross-Section 15 (Pool)						Cross-Section 16 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	73.64						73.72						73.08						73.04					
Low Bank Elevation (ft)	73.64						73.72						73.08						73.04					
Bankfull Width (ft)	15.5						14.2						15.4						13.2					
Floodprone Width (ft)	N/A						>200						N/A						>200					
Bankfull Mean Depth (ft)	1.7						1.0						1.9						1.1					
Bankfull Max Depth (ft)	3.3						1.6						3.8						1.8					
Bankfull Cross-Sectional Area (ft^2)	26.1						13.7						28.7						14.2					
Bankfull Width/Depth Ratio	9.2						14.8						8.3						12.3					
Entrenchment Ratio[1]	N/A						>14						N/A						>15					
Bankfull Bank Height Ratio[2]	N/A						1.0						N/A						1.0					
	UT4 Reach 1																							
	Cross-Section 17 (Riffle)						Cross-Section 18 (Pool)						Cross-Section 19 (Pool)						Cross-Section 20 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	72.40						72.22						70.50						70.03					
Low Bank Elevation (ft)	72.40						72.22						70.50						70.03					
Bankfull Width (ft)	13.1						17.1						17.3						13.5					
Floodprone Width (ft)	186						N/A						N/A						178					
Bankfull Mean Depth (ft)	0.9						1.9						1.4						1.1					
Bankfull Max Depth (ft)	1.6						3.3						2.2						1.9					
Bankfull Cross-Sectional Area (ft^2)	12.3						32.4						24.0						14.5					
Bankfull Width/Depth Ratio	13.9						9.0						12.4						12.5					
Entrenchment Ratio[1]	14.2						N/A						N/A						13.2					
Bankfull Bank Height Ratio[2]	1.0						N/A						N/A						1.0					

[1]Entrenchment Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum

[2]Bank Height Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum

Longitudinal Profile Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

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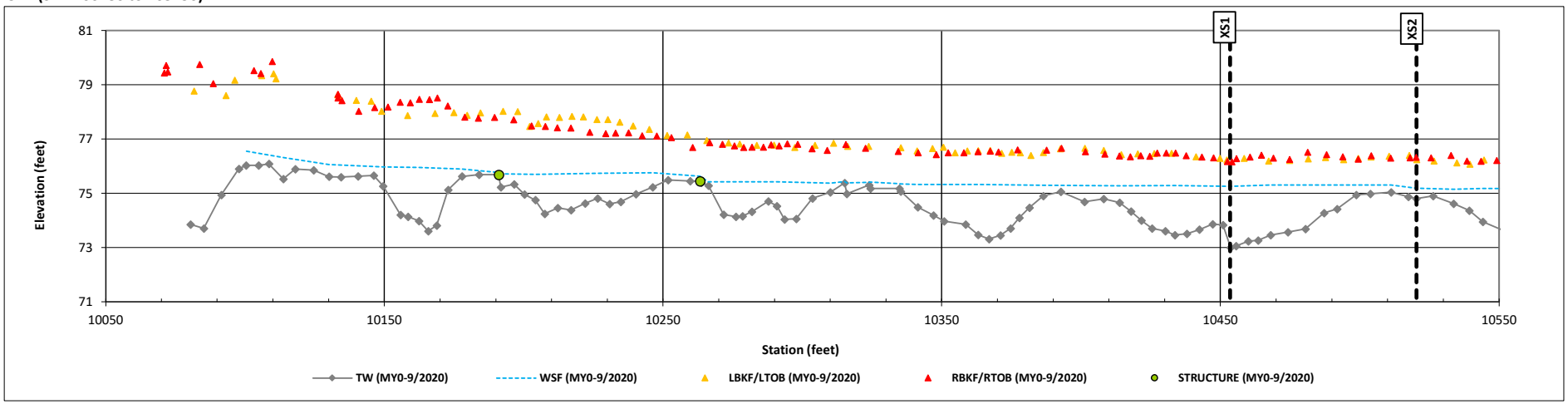
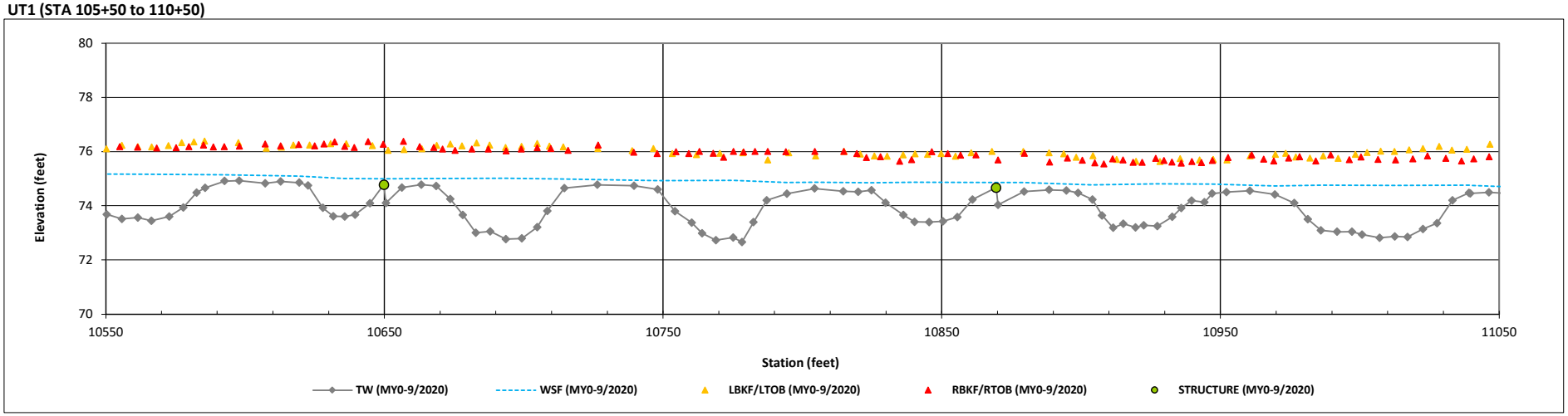
UT1 (STA 100+80 to 105+50)



UT1 (STA 105+50 to 110+50)



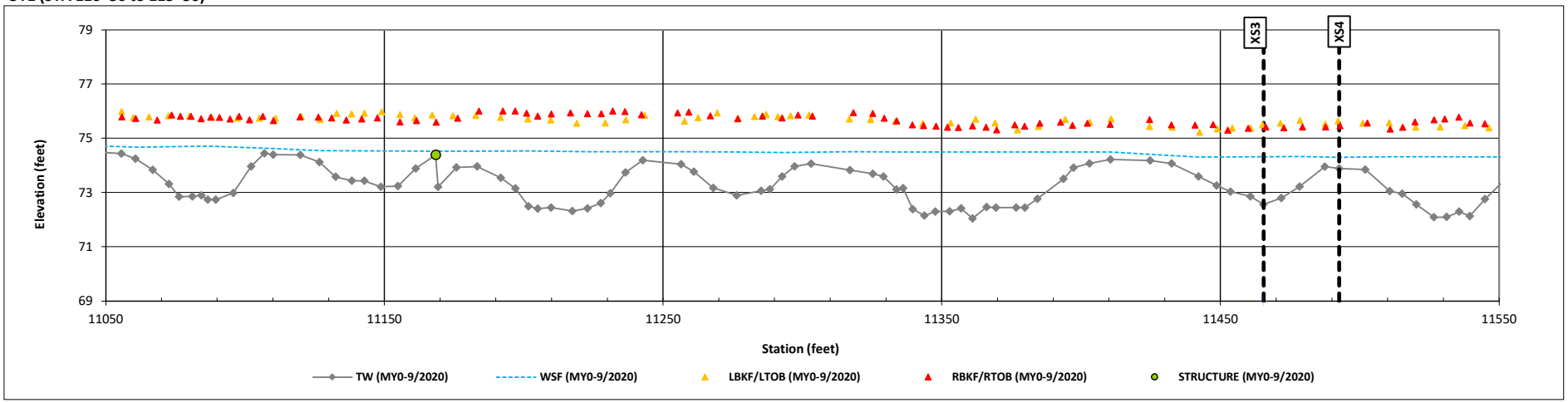
Longitudinal Profile Plots

McClenny Acres Mitigation Site

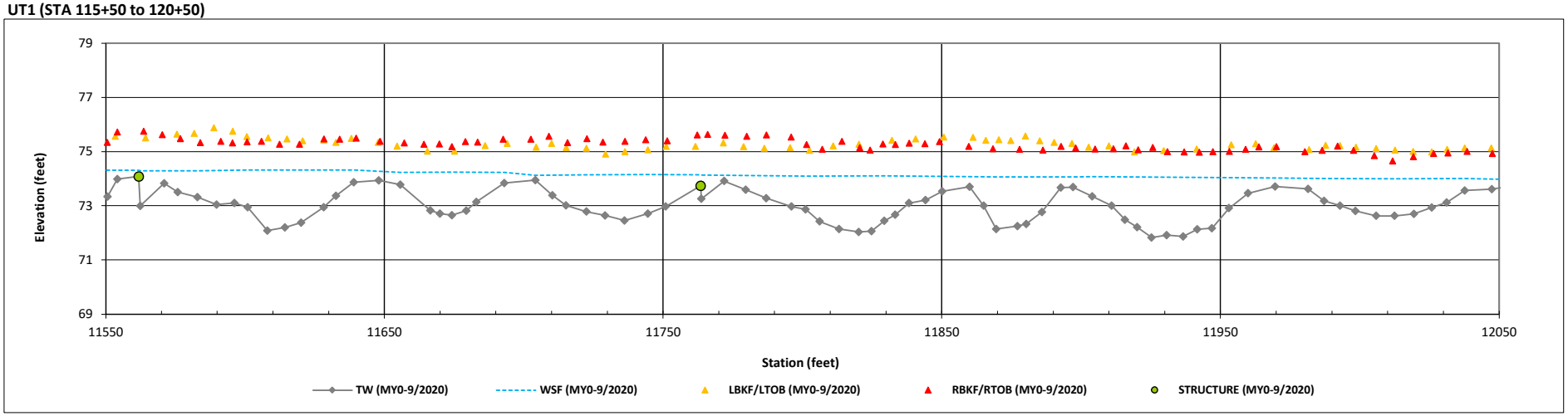
DMS Project No. 100038

Monitoring Year 0 - 2021

UT1 (STA 110+50 to 115+50)



UT1 (STA 115+50 to 120+50)



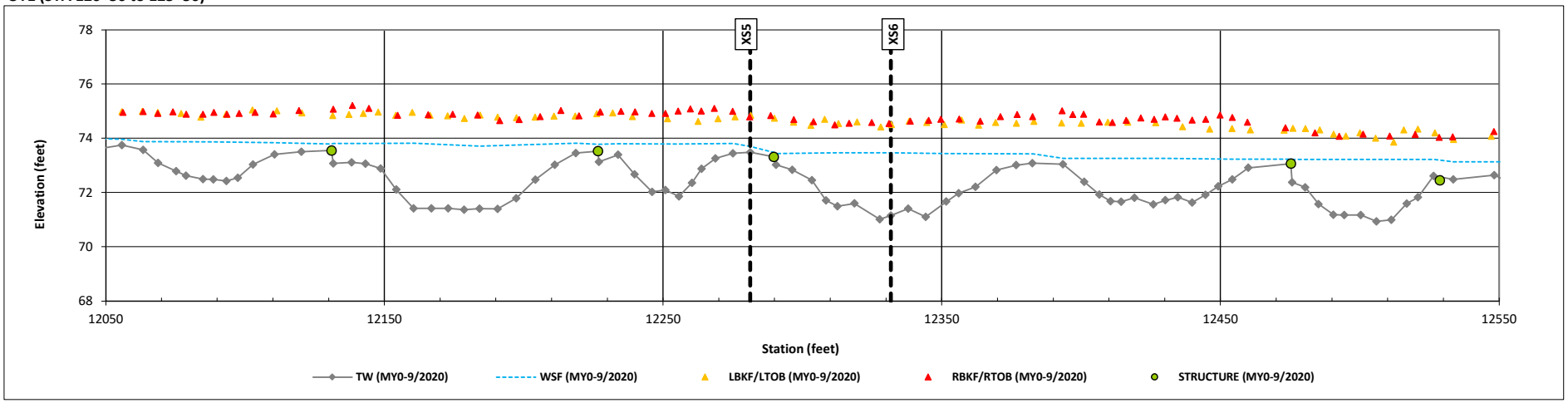
Longitudinal Profile Plots

McClenny Acres Mitigation Site

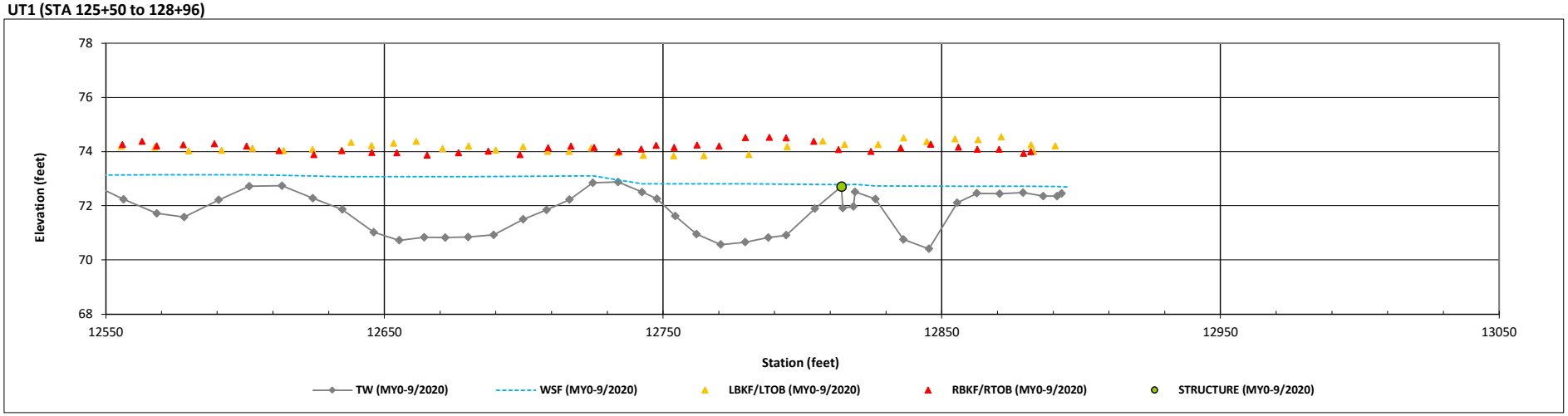
DMS Project No. 100038

Monitoring Year 0 - 2021

UT1 (STA 120+50 to 125+50)



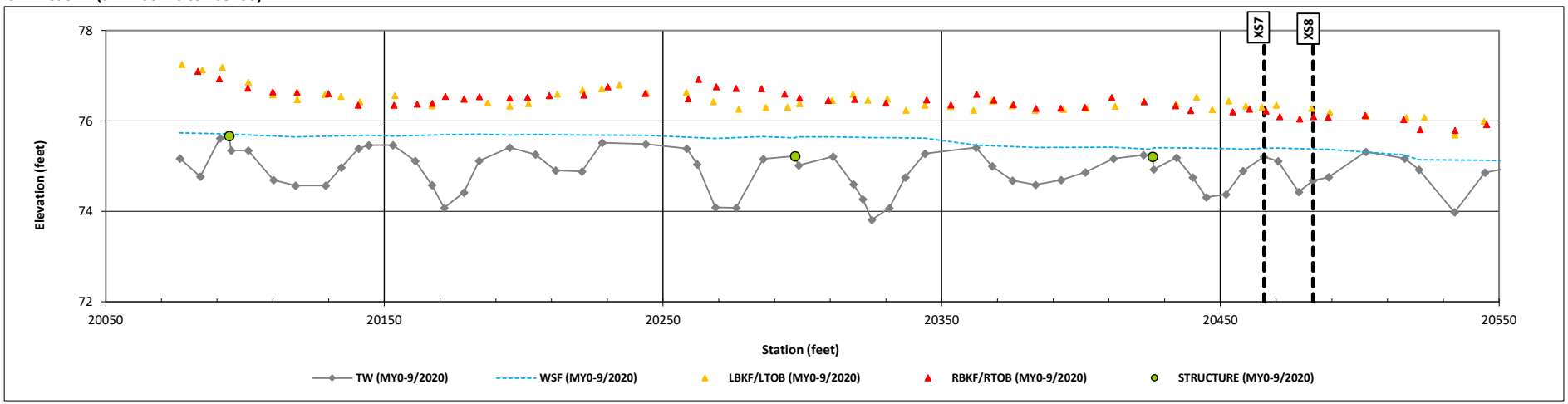
UT1 (STA 125+50 to 128+96)



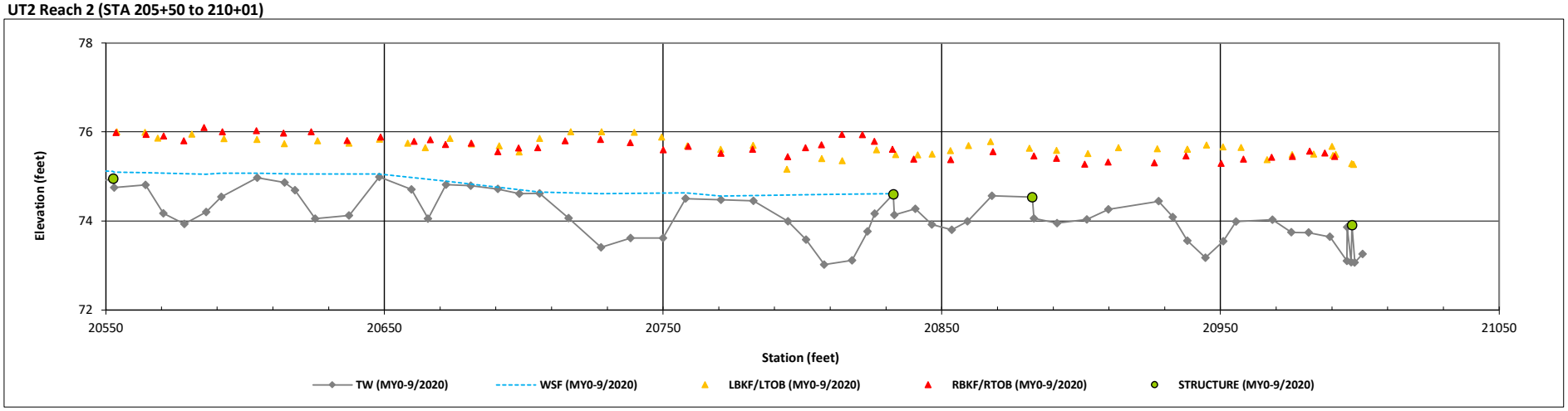
Longitudinal Profile Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

UT2 Reach 2 (STA 200+76 to 205+50)



UT2 Reach 2 (STA 205+50 to 210+01)



At the time of the as-built survey, water within portions of the surveyed reach was limited to the pools.

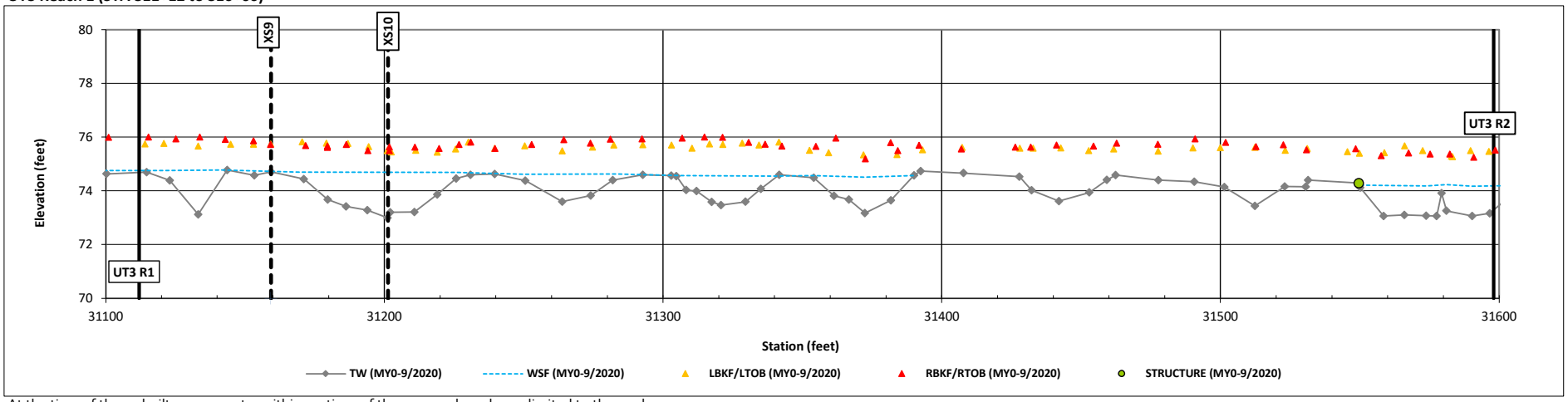
Longitudinal Profile Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

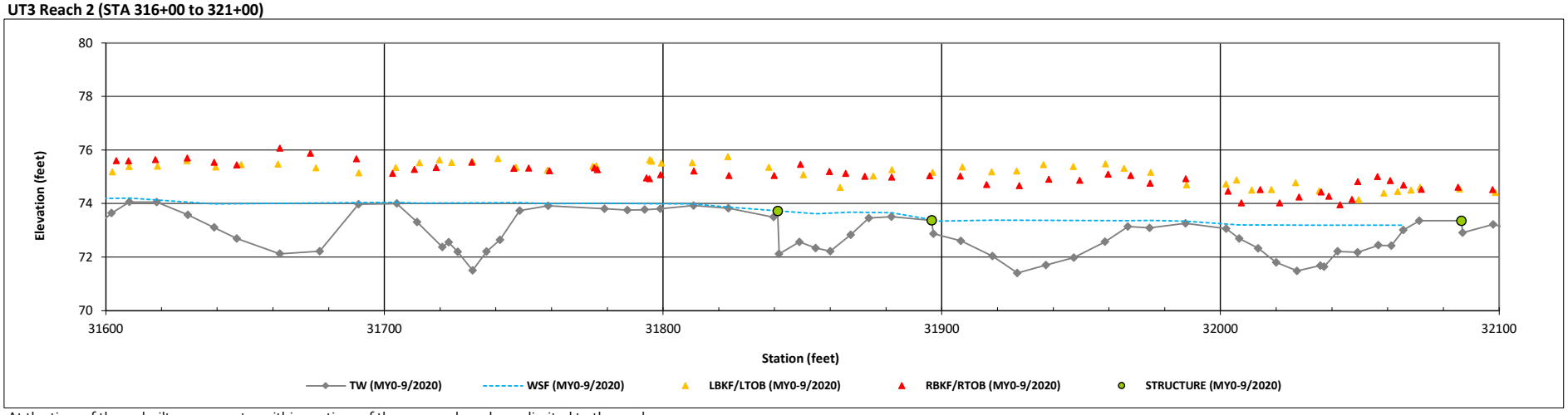
Monitoring Year 0 - 2021

UT3 Reach 1 (STA 311+12 to 316+00)



At the time of the as-built survey, water within portions of the surveyed reach was limited to the pools.

UT3 Reach 2 (STA 316+00 to 321+00)



At the time of the as-built survey, water within portions of the surveyed reach was limited to the pools.

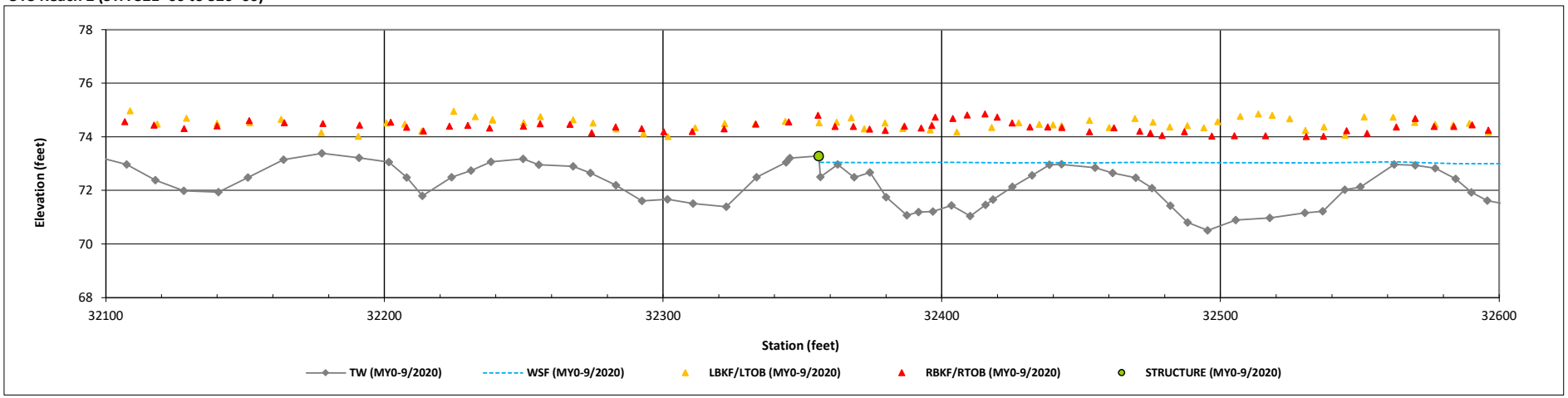
Longitudinal Profile Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

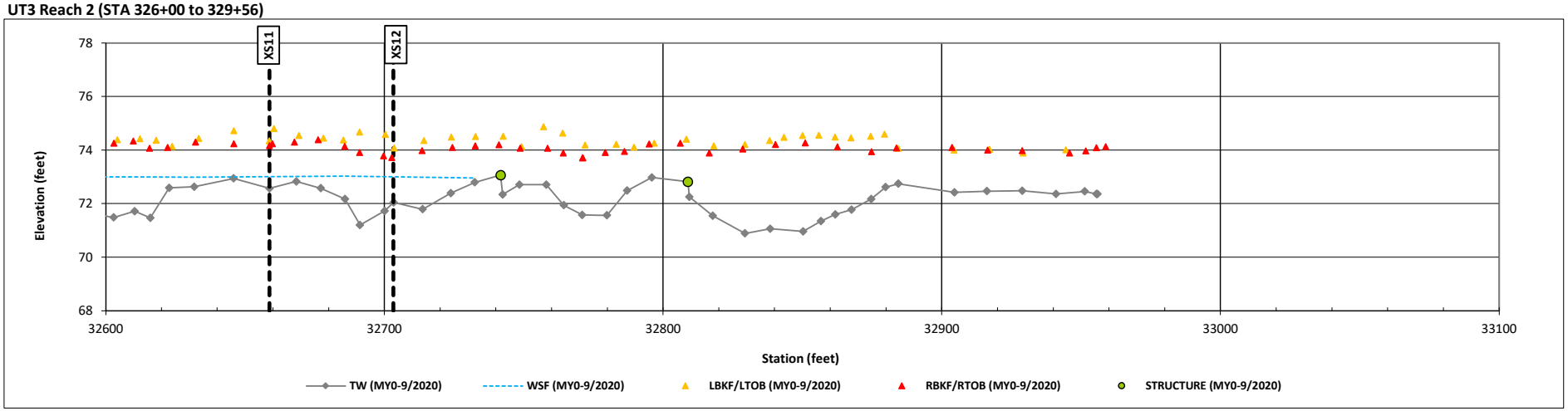
Monitoring Year 0 - 2021

UT3 Reach 2 (STA 321+00 to 326+00)



At the time of the as-built survey, water within portions of the surveyed reach was limited to the pools.

UT3 Reach 2 (STA 326+00 to 329+56)



At the time of the as-built survey, water within portions of the surveyed reach was limited to the pools.

Longitudinal Profile Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
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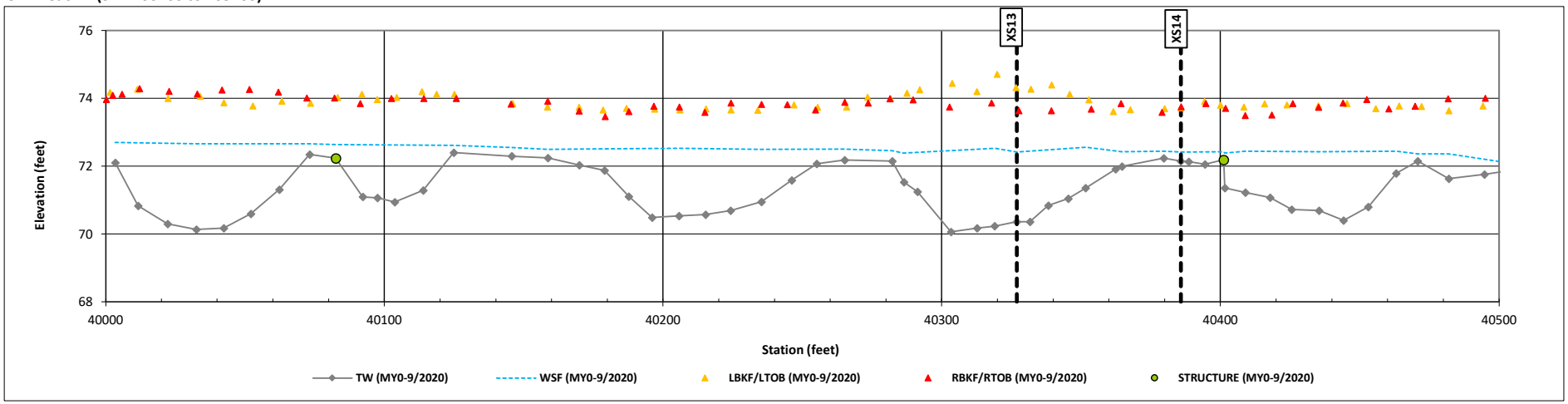
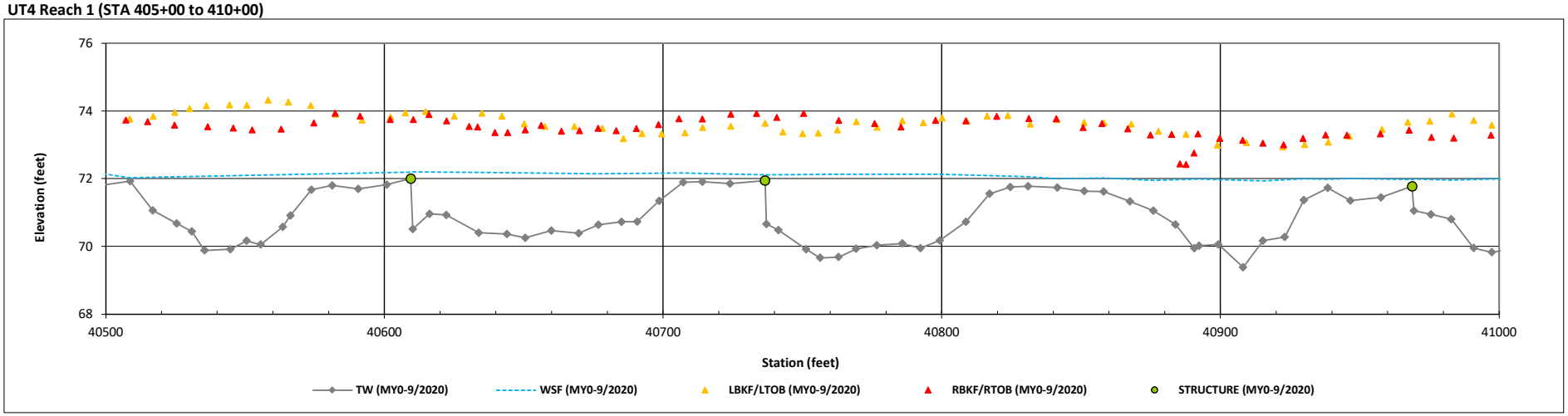
UT4 Reach 1 (STA 400+00 to 405+00)



UT4 Reach 1 (STA 405+00 to 410+00)



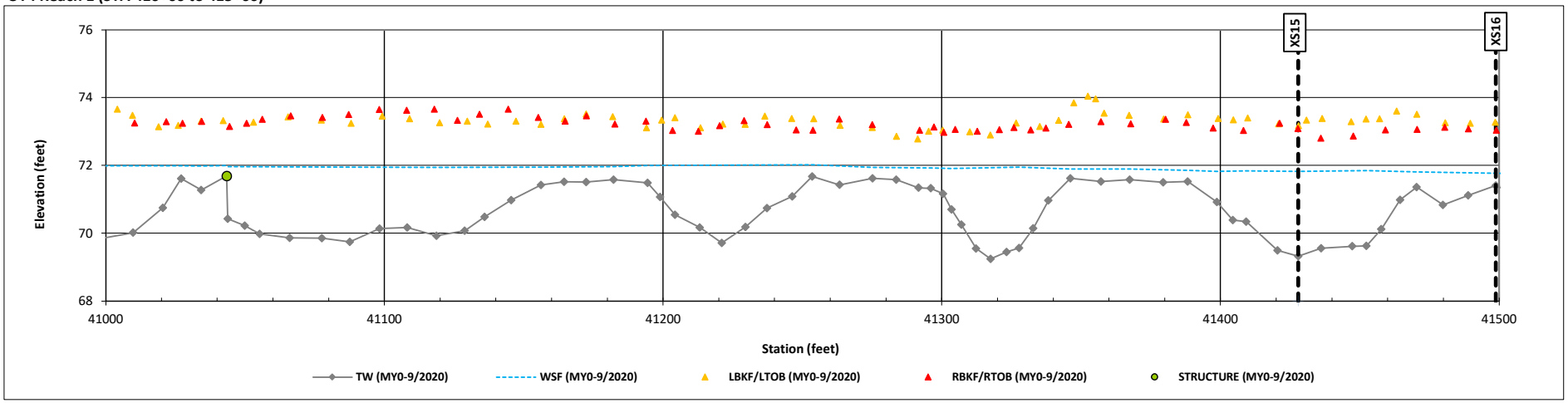
Longitudinal Profile Plots

McClenny Acres Mitigation Site

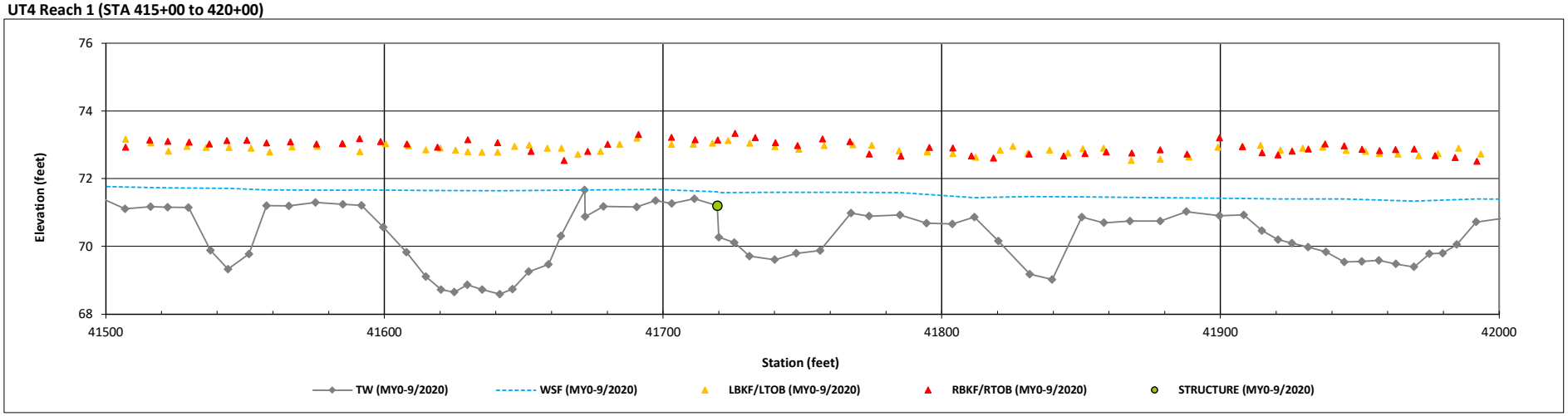
DMS Project No. 100038

Monitoring Year 0 - 2021

UT4 Reach 1 (STA 410+00 to 415+00)



UT4 Reach 1 (STA 415+00 to 420+00)



Longitudinal Profile Plots

McClenny Acres Mitigation Site
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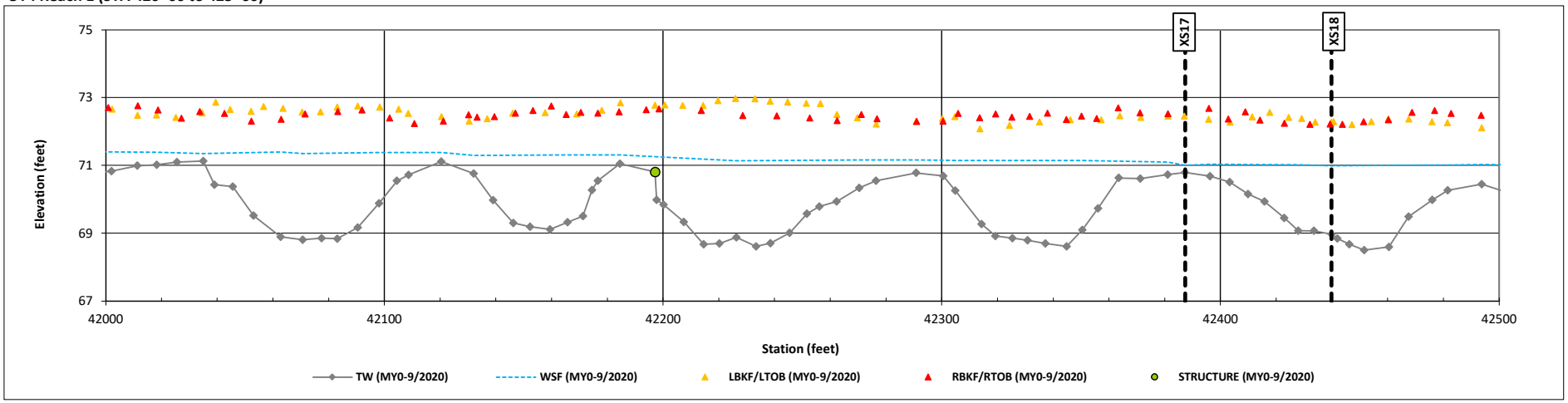
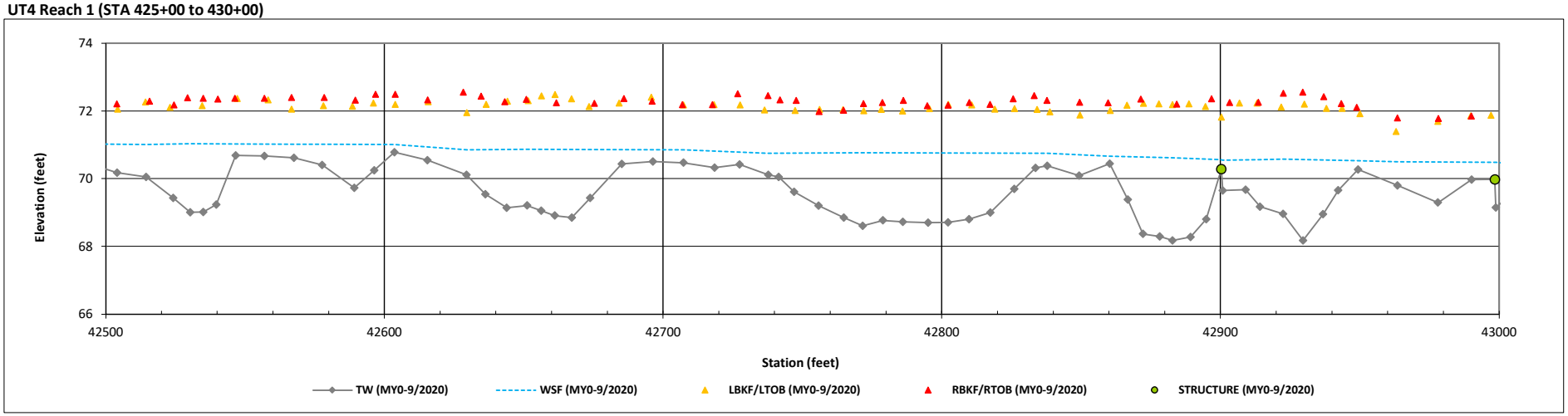
UT4 Reach 1 (STA 420+00 to 425+00)



UT4 Reach 1 (STA 425+00 to 430+00)



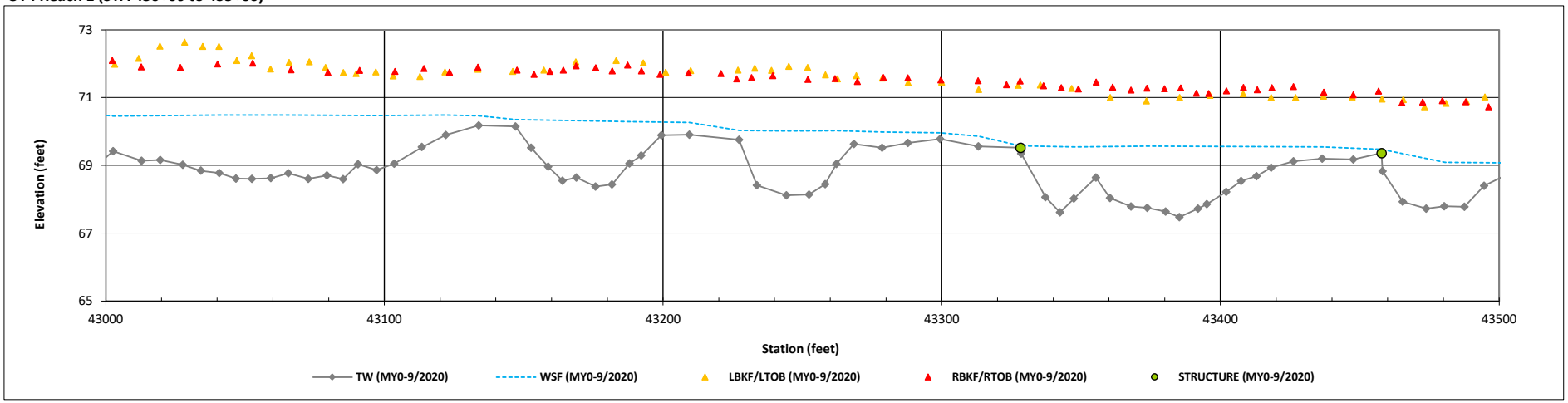
Longitudinal Profile Plots

McClenny Acres Mitigation Site

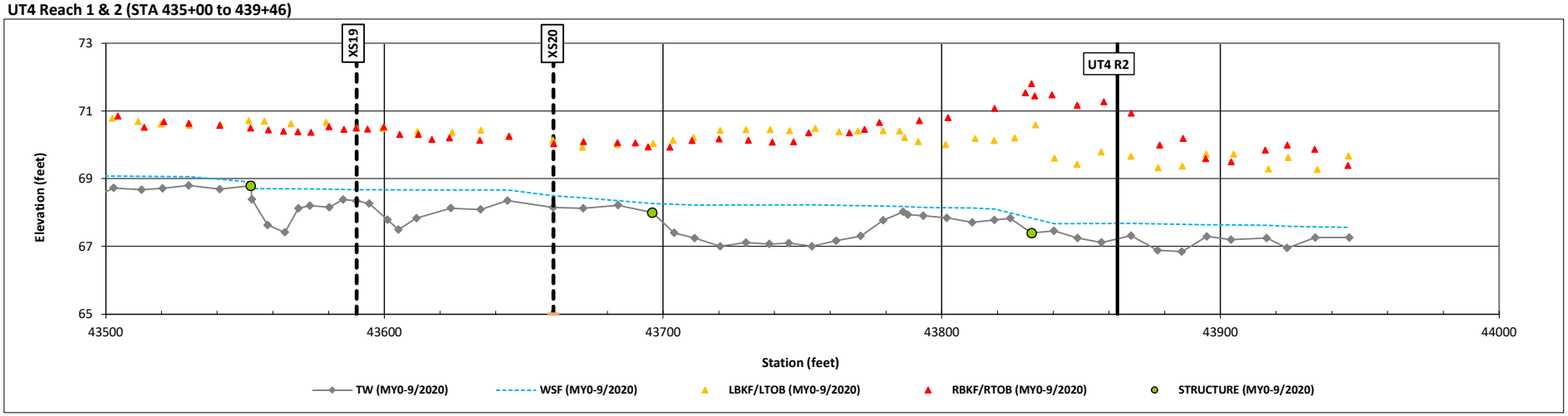
DMS Project No. 100038

Monitoring Year 0 - 2021

UT4 Reach 1 (STA 430+00 to 435+00)



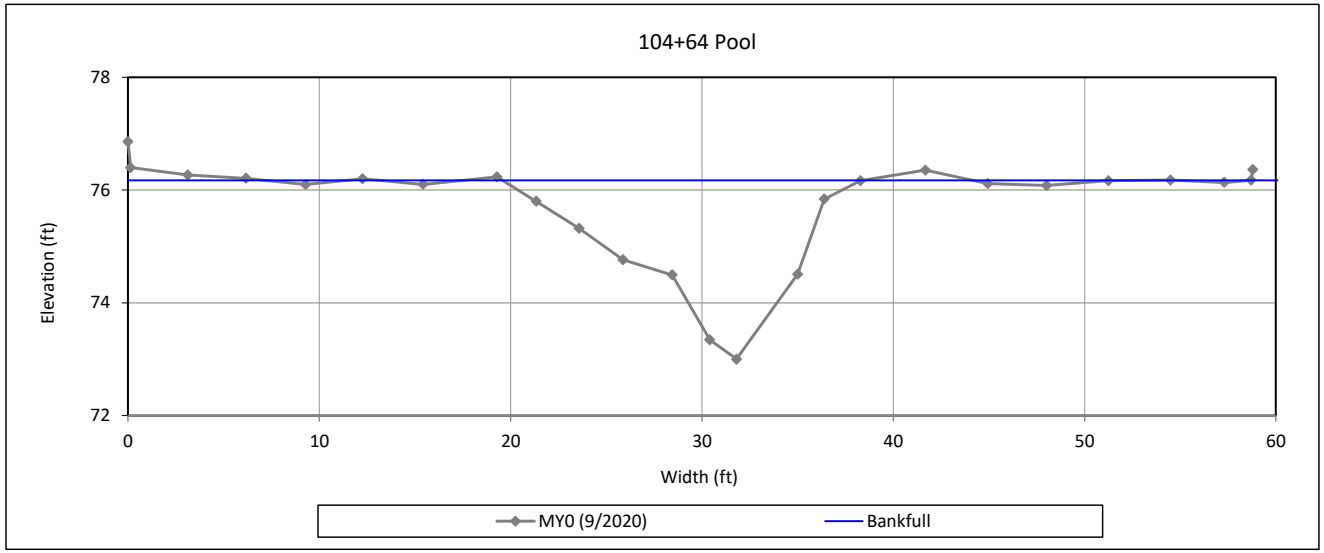
UT4 Reach 1 & 2 (STA 435+00 to 439+46)



Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 1-UT1



Bankfull Dimensions	
26.3	x-section area (ft.sq.)
18.7	width (ft)
1.4	mean depth (ft)
3.2	max depth (ft)
20.1	wetted perimeter (ft)
1.3	hydraulic radius (ft)
13.3	width-depth ratio

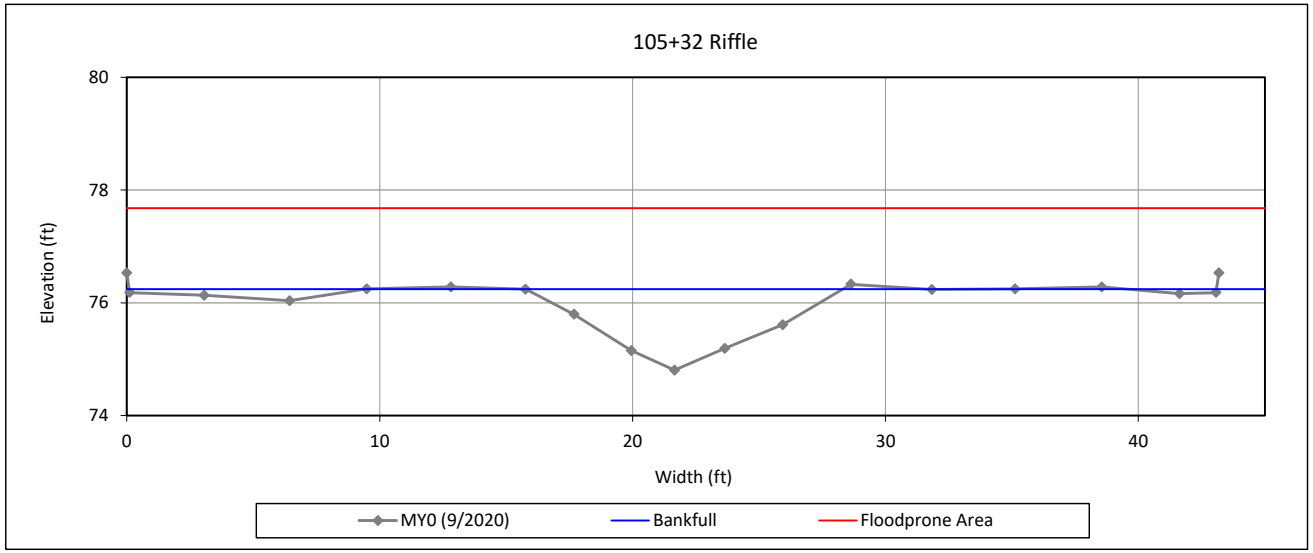
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 2-UT1



Bankfull Dimensions

9.5	x-section area (ft.sq.)
12.5	width (ft)
0.8	mean depth (ft)
1.4	max depth (ft)
12.9	wetted perimeter (ft)
0.7	hydraulic radius (ft)
16.6	width-depth ratio
200.0	W flood prone area (ft)
16.0	entrenchment ratio
1.0	low bank height ratio

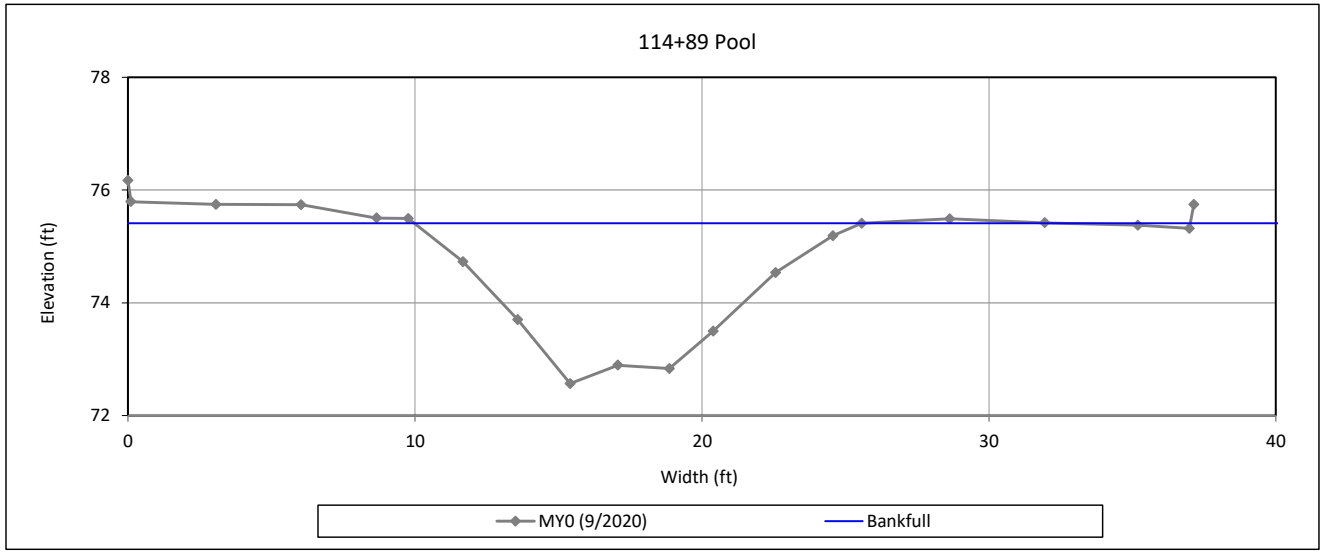
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 3-UT1



Bankfull Dimensions	
23.7	x-section area (ft.sq.)
15.6	width (ft)
1.5	mean depth (ft)
2.8	max depth (ft)
16.8	wetted perimeter (ft)
1.4	hydraulic radius (ft)
10.2	width-depth ratio

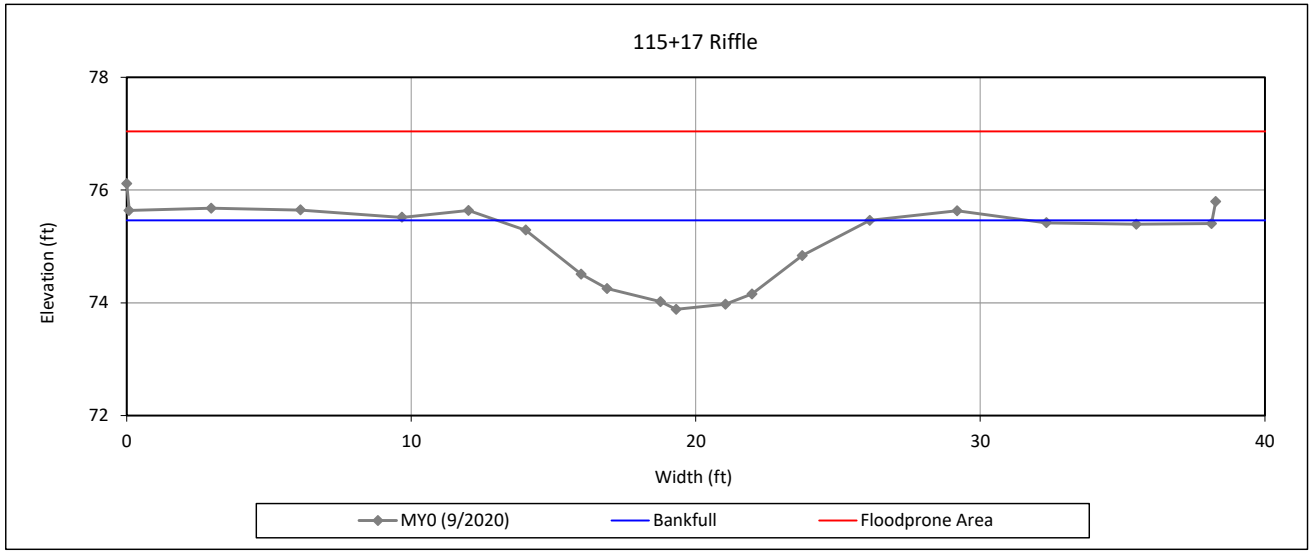
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 4-UT1



Bankfull Dimensions

11.9	x-section area (ft.sq.)
13.1	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
13.5	wetted perimeter (ft)
0.9	hydraulic radius (ft)
14.4	width-depth ratio
200.0	W flood prone area (ft)
15.3	entrenchment ratio
1.0	low bank height ratio

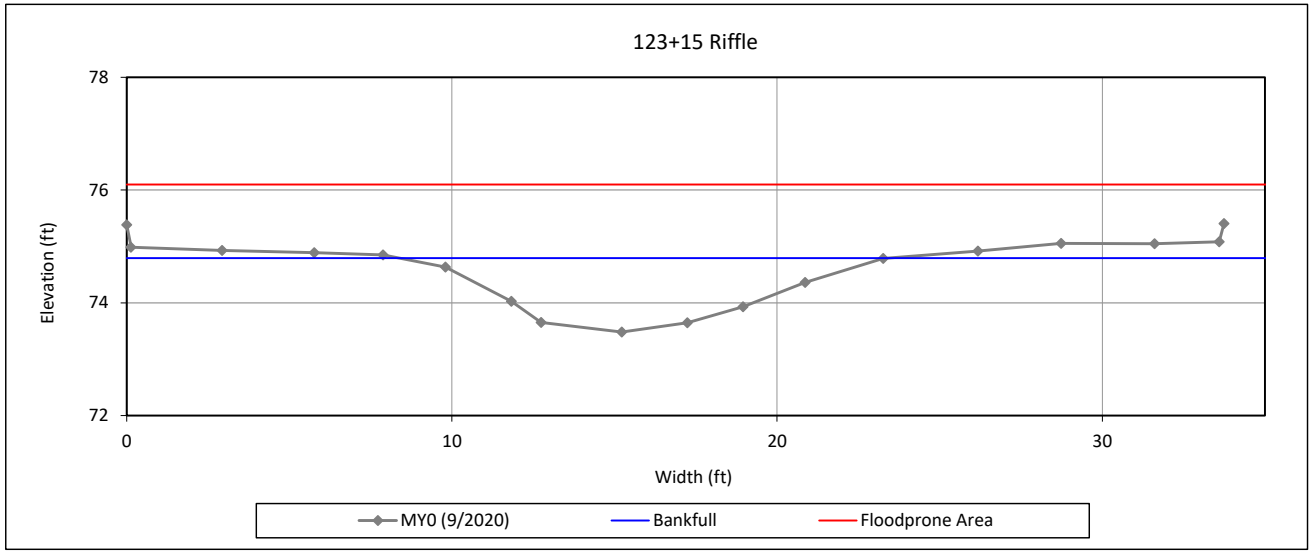
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 5-UT1



Bankfull Dimensions

10.9	x-section area (ft.sq.)
14.9	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
15.2	wetted perimeter (ft)
0.7	hydraulic radius (ft)
20.3	width-depth ratio
200.0	W flood prone area (ft)
13.5	entrenchment ratio
1.0	low bank height ratio

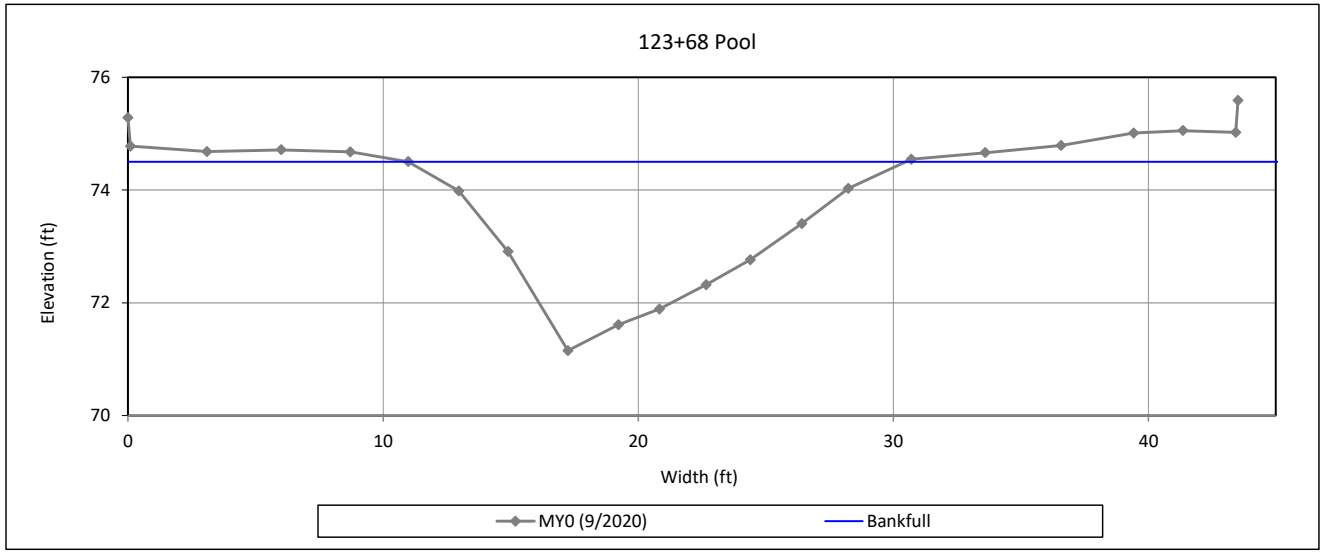
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 6-UT1



Bankfull Dimensions	
31.5	x-section area (ft.sq.)
19.5	width (ft)
1.6	mean depth (ft)
3.4	max depth (ft)
20.9	wetted perimeter (ft)
1.5	hydraulic radius (ft)
12.1	width-depth ratio

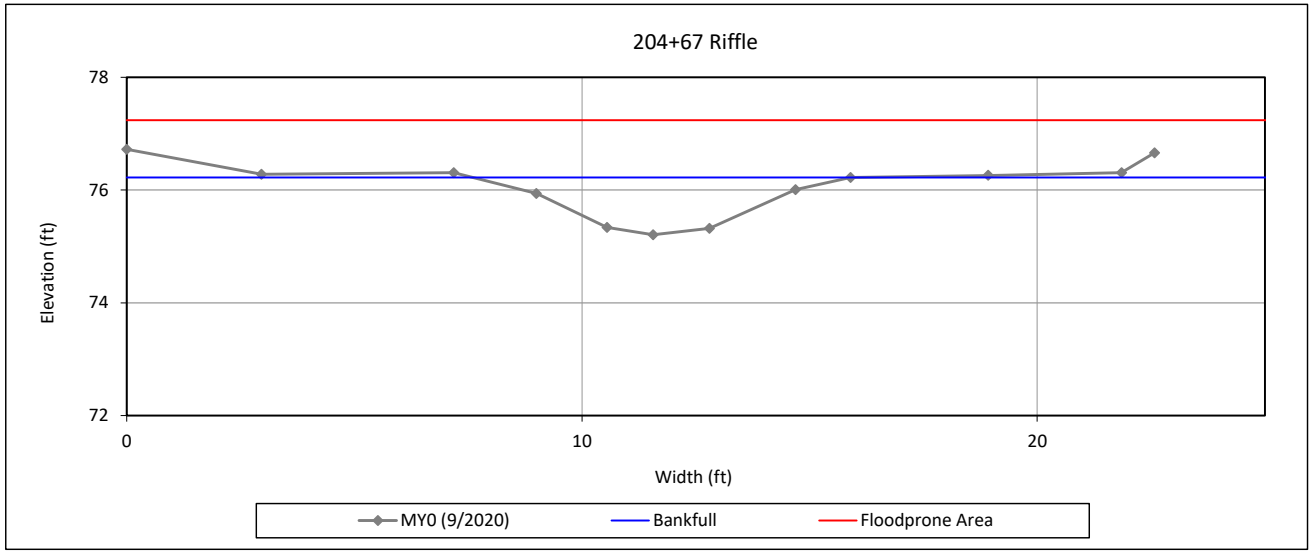
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 7-UT2 Reach 2



Bankfull Dimensions

4.4	x-section area (ft.sq.)
8.3	width (ft)
0.5	mean depth (ft)
1.0	max depth (ft)
8.6	wetted perimeter (ft)
0.5	hydraulic radius (ft)
15.5	width-depth ratio
200.0	W flood prone area (ft)
24.1	entrenchment ratio
1.0	low bank height ratio

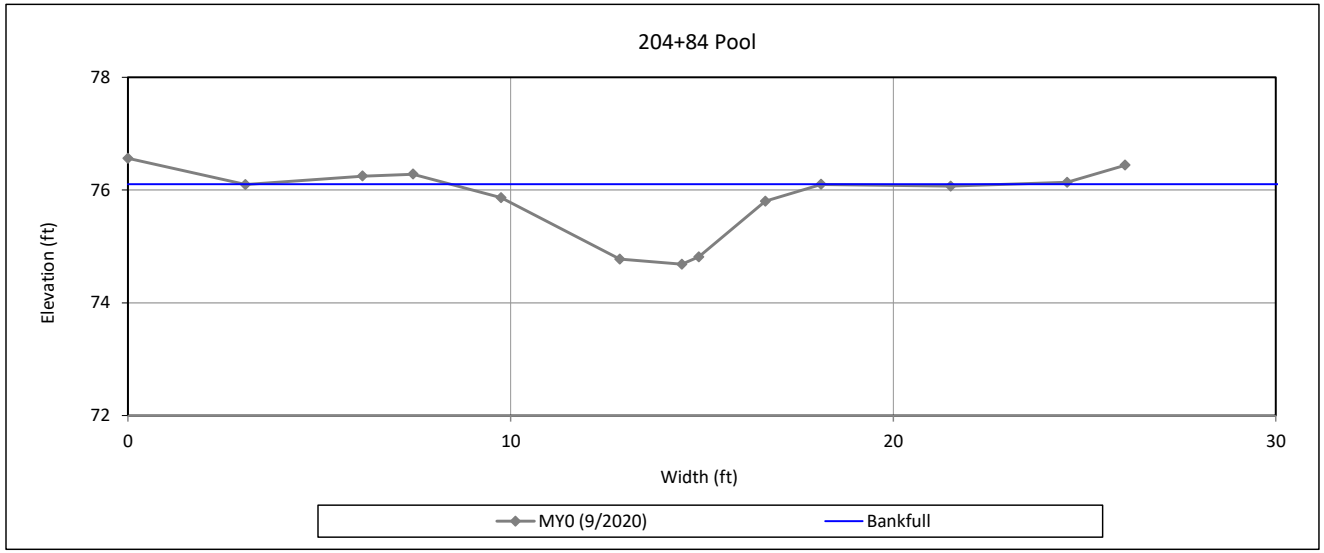
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 8-UT2 Reach 2



Bankfull Dimensions	
7.0	x-section area (ft.sq.)
9.7	width (ft)
0.7	mean depth (ft)
1.4	max depth (ft)
10.2	wetted perimeter (ft)
0.7	hydraulic radius (ft)
13.3	width-depth ratio

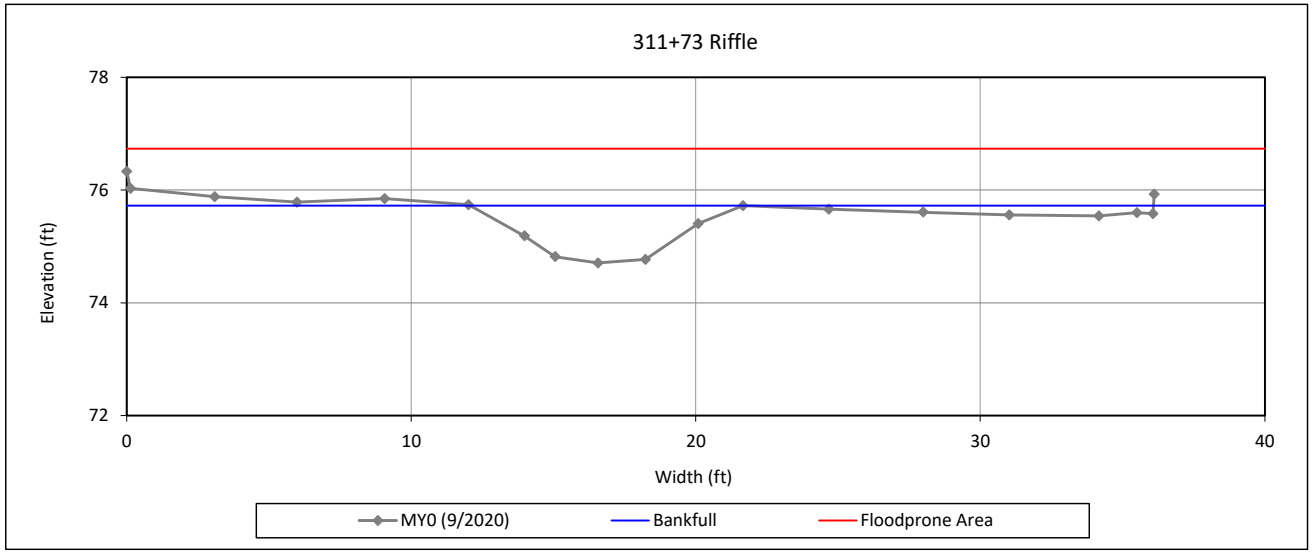
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 9-UT3 Reach 1



Bankfull Dimensions

5.8	x-section area (ft.sq.)
9.6	width (ft)
0.6	mean depth (ft)
1.0	max depth (ft)
9.8	wetted perimeter (ft)
0.6	hydraulic radius (ft)
15.8	width-depth ratio
200.0	W flood prone area (ft)
20.9	entrenchment ratio
1.0	low bank height ratio

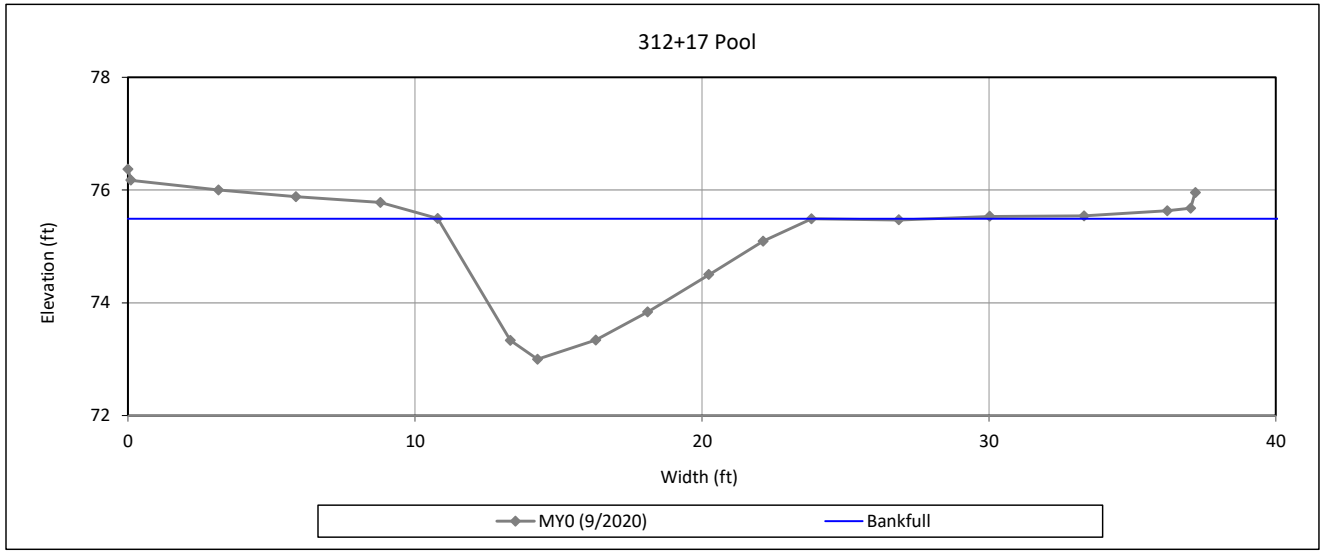
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 10-UT3 Reach 1



Bankfull Dimensions	
17.6	x-section area (ft.sq.)
13.0	width (ft)
1.3	mean depth (ft)
2.5	max depth (ft)
14.2	wetted perimeter (ft)
1.2	hydraulic radius (ft)
9.7	width-depth ratio

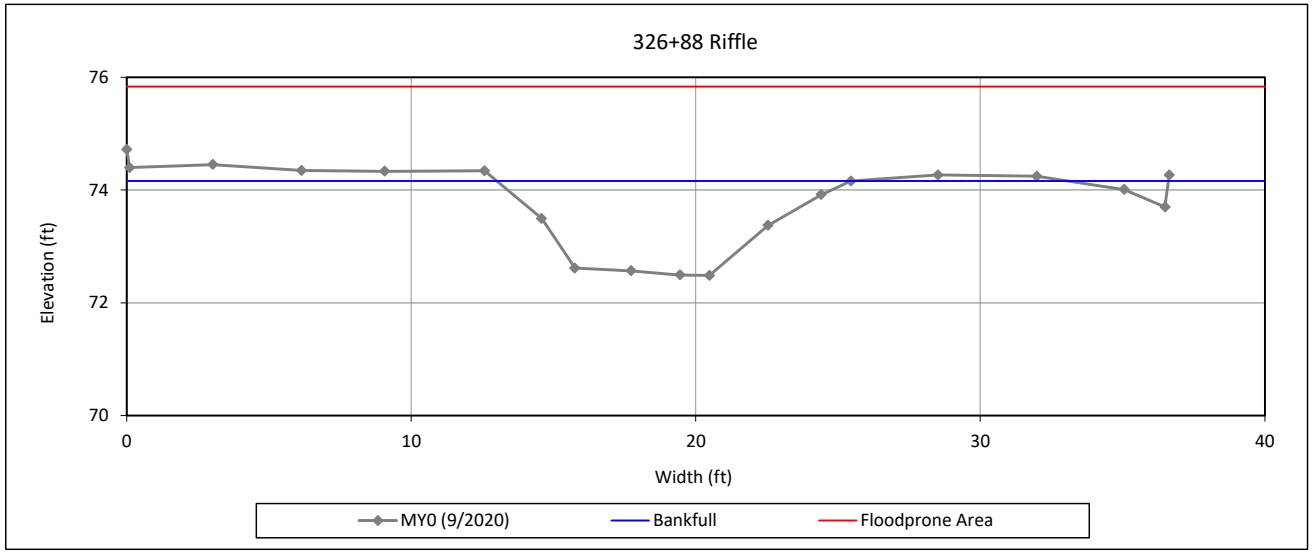
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 11-UT3 Reach 2



Bankfull Dimensions

13.1	x-section area (ft.sq.)
12.5	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
13.2	wetted perimeter (ft)
1.0	hydraulic radius (ft)
11.9	width-depth ratio
200.0	W flood prone area (ft)
16.1	entrenchment ratio
1.0	low bank height ratio

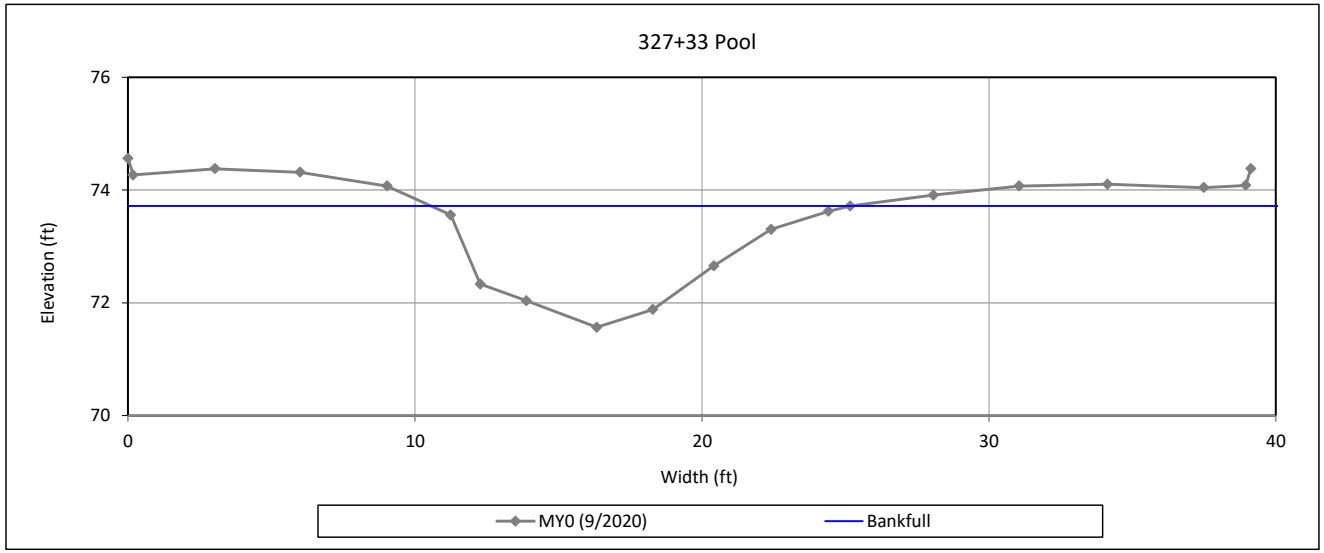
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 12-UT3 Reach 2



Bankfull Dimensions	
17.0	x-section area (ft.sq.)
14.6	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
15.6	wetted perimeter (ft)
1.1	hydraulic radius (ft)
12.5	width-depth ratio

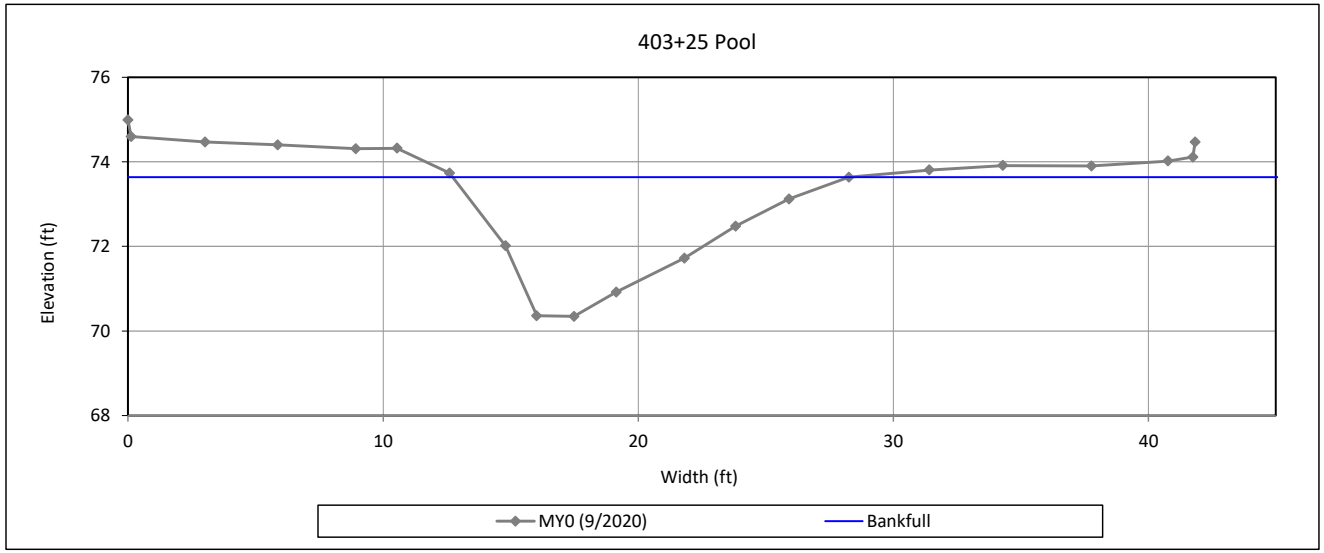
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 13-UT4 Reach 1



Bankfull Dimensions	
26.1	x-section area (ft.sq.)
15.5	width (ft)
1.7	mean depth (ft)
3.3	max depth (ft)
17.4	wetted perimeter (ft)
1.5	hydraulic radius (ft)
9.2	width-depth ratio

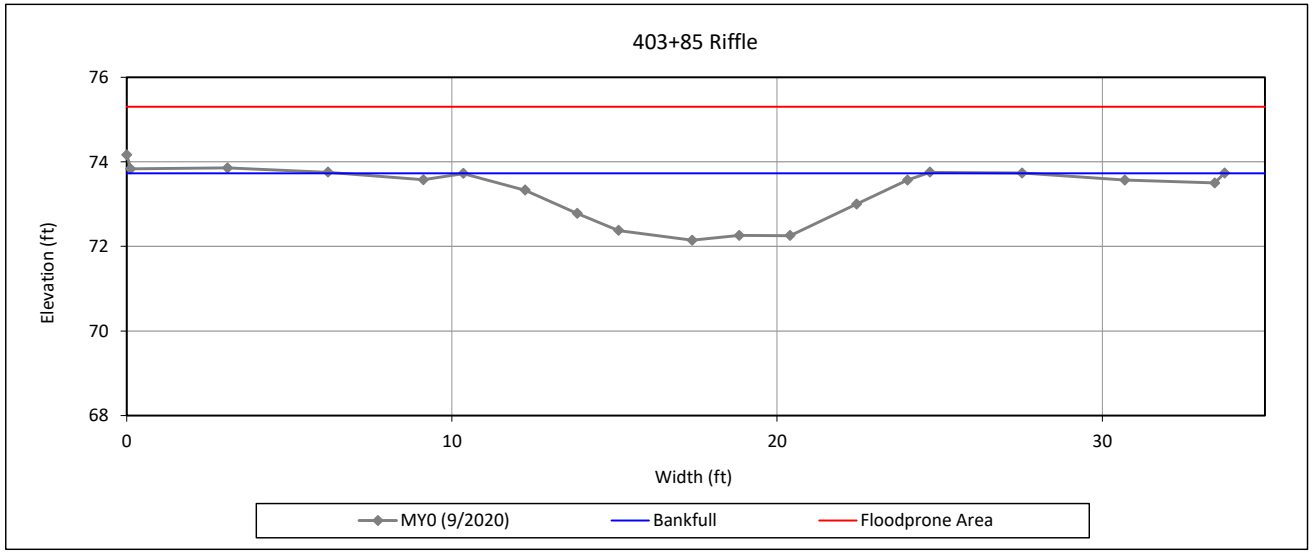
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 14-UT4 Reach 1



Bankfull Dimensions

13.7	x-section area (ft.sq.)
14.2	width (ft)
1.0	mean depth (ft)
1.6	max depth (ft)
14.7	wetted perimeter (ft)
0.9	hydraulic radius (ft)
14.8	width-depth ratio
200.0	W flood prone area (ft)
14.1	entrenchment ratio
1.0	low bank height ratio

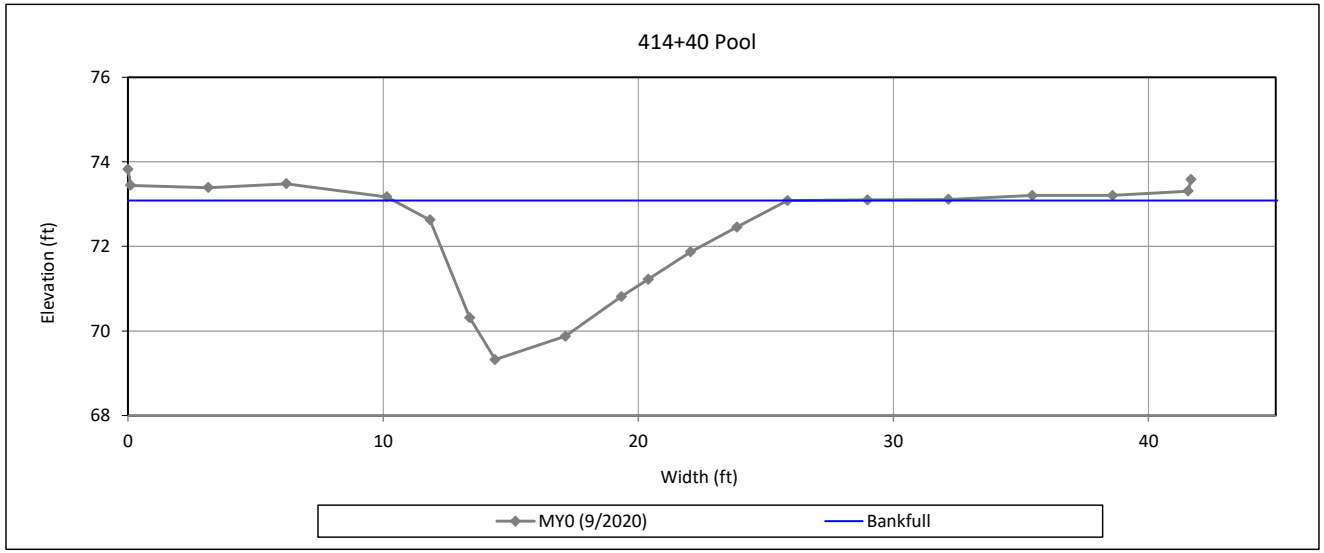
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 15-UT4 Reach 1



Bankfull Dimensions	
28.7	x-section area (ft.sq.)
15.4	width (ft)
1.9	mean depth (ft)
3.8	max depth (ft)
17.8	wetted perimeter (ft)
1.6	hydraulic radius (ft)
8.3	width-depth ratio

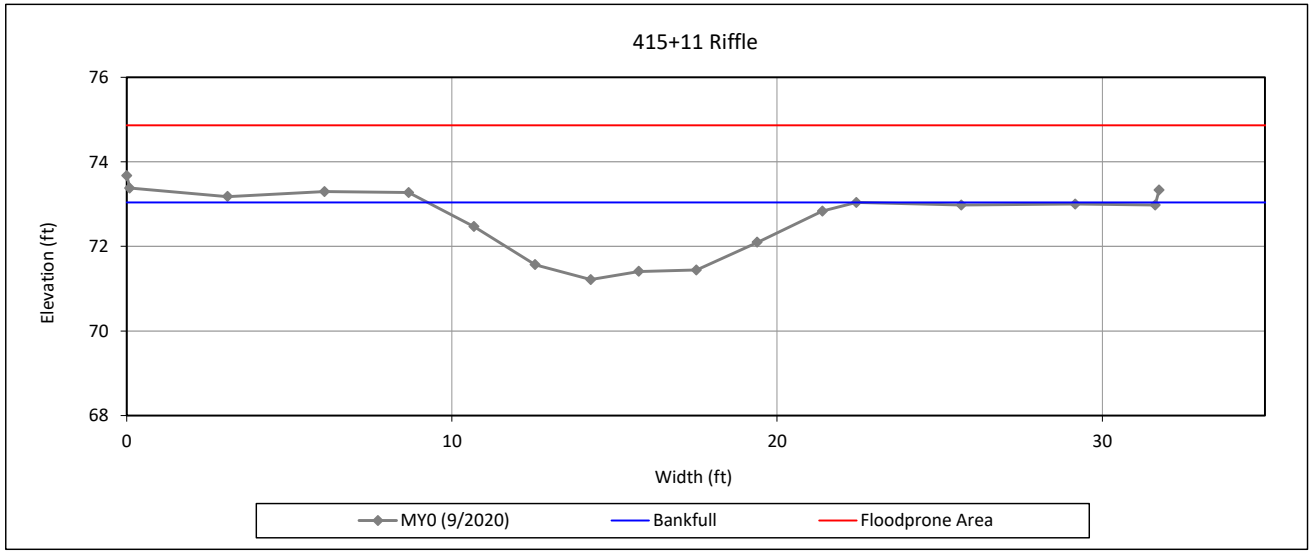
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 16-UT4 Reach 1



Bankfull Dimensions

14.2	x-section area (ft.sq.)
13.2	width (ft)
1.1	mean depth (ft)
1.8	max depth (ft)
13.8	wetted perimeter (ft)
1.0	hydraulic radius (ft)
12.3	width-depth ratio
200.0	W flood prone area (ft)
15.2	entrenchment ratio
1.0	low bank height ratio

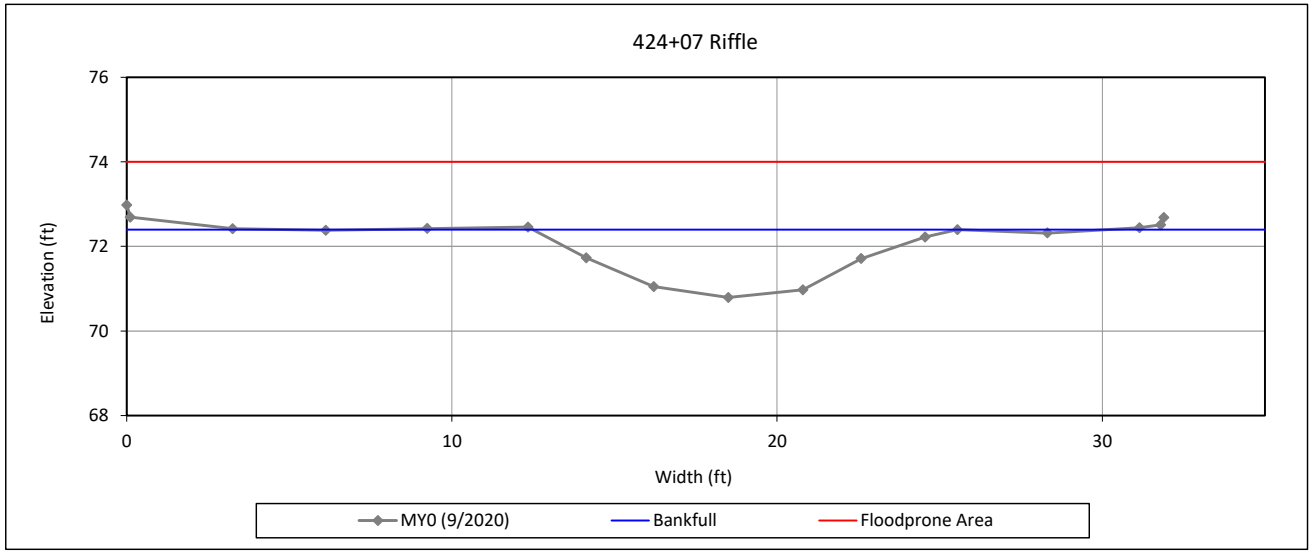
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 17-UT4 Reach 1



Bankfull Dimensions

12.3	x-section area (ft.sq.)
13.1	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
13.5	wetted perimeter (ft)
0.9	hydraulic radius (ft)
13.9	width-depth ratio
186.0	W flood prone area (ft)
14.2	entrenchment ratio
1.0	low bank height ratio

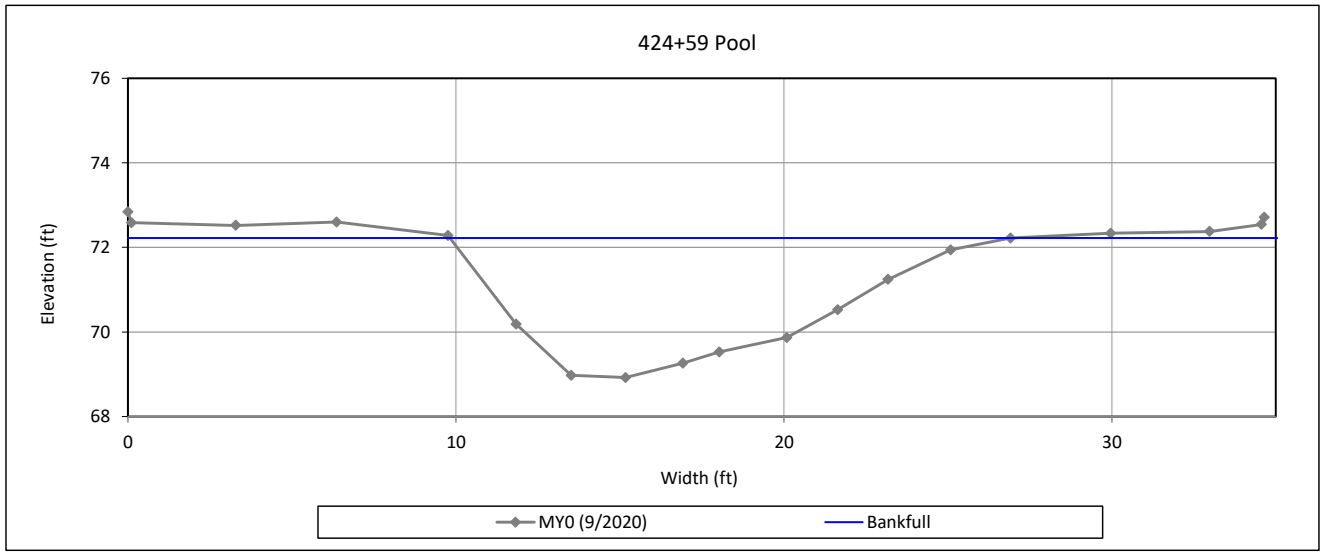
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 18-UT4 Reach 1



Bankfull Dimensions	
32.4	x-section area (ft.sq.)
17.1	width (ft)
1.9	mean depth (ft)
3.3	max depth (ft)
18.9	wetted perimeter (ft)
1.7	hydraulic radius (ft)
9.0	width-depth ratio

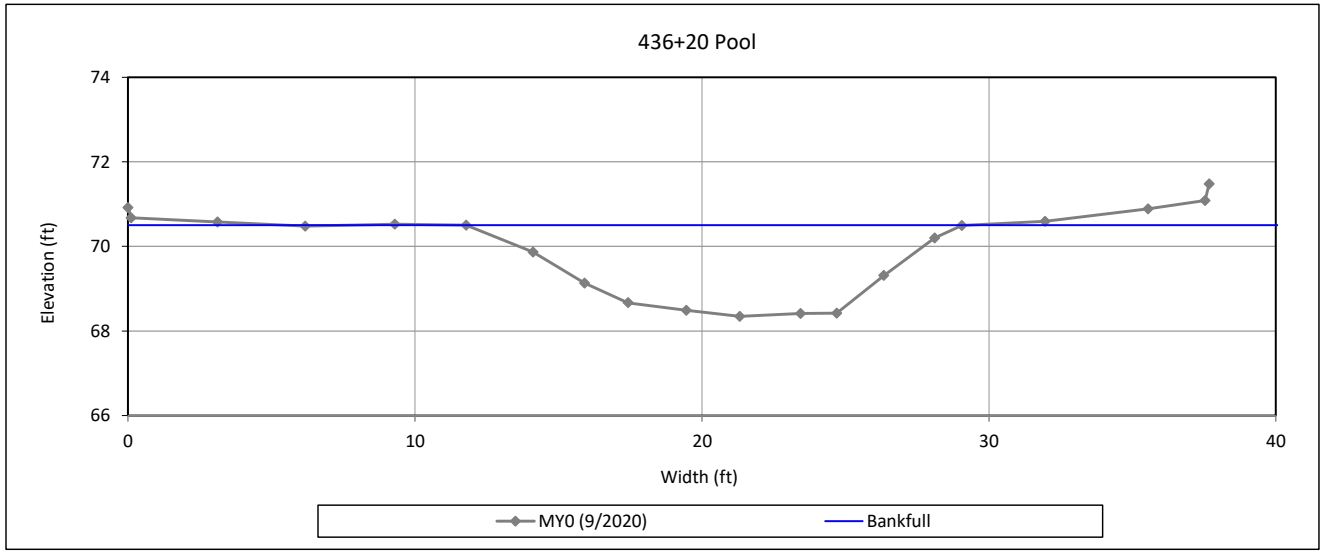
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 19-UT4 Reach 1



Bankfull Dimensions	
24.0	x-section area (ft.sq.)
17.3	width (ft)
1.4	mean depth (ft)
2.2	max depth (ft)
18.1	wetted perimeter (ft)
1.3	hydraulic radius (ft)
12.4	width-depth ratio

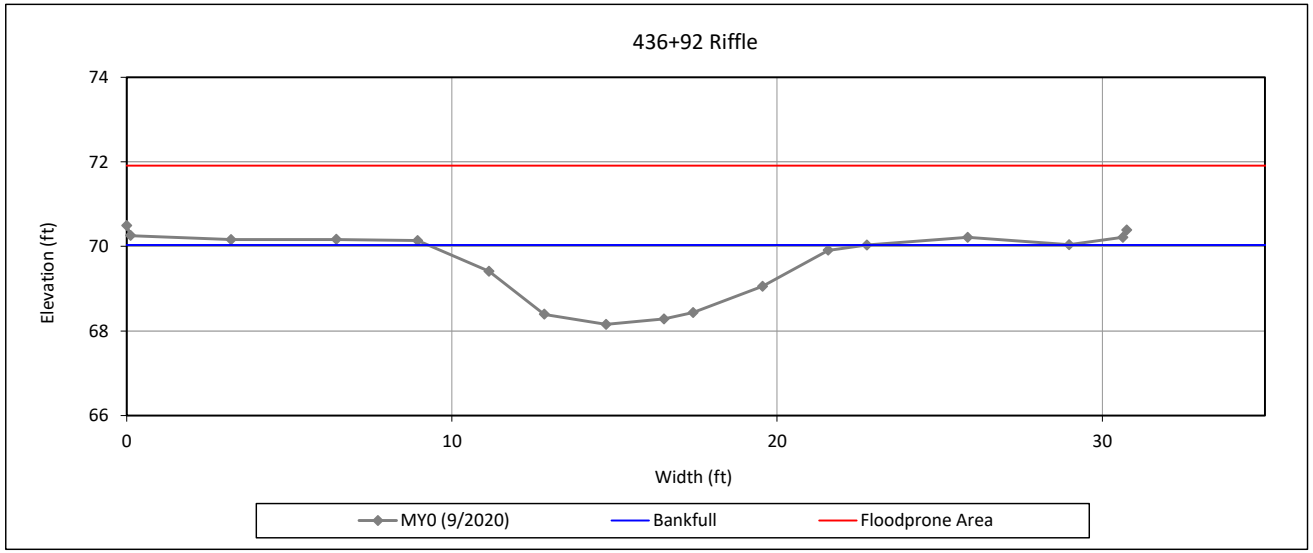
Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Cross-Section 20-UT4 Reach 1



Bankfull Dimensions

14.5	x-section area (ft.sq.)
13.5	width (ft)
1.1	mean depth (ft)
1.9	max depth (ft)
14.2	wetted perimeter (ft)
1.0	hydraulic radius (ft)
12.5	width-depth ratio
178.0	W flood prone area (ft)
13.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 9/2020
Field Crew: Turner Land Surveying

View Downstream

APPENDIX 5. Record Drawings

McClenny Acres Mitigation Site

Neuse River Basin 03020201

for

NCDEQ

Division of Mitigation Services

Vicinity Map
Not to Scale

AS-BUILT AND RECORD DRAWINGS ISSUED APRIL 2021

Sheet Index

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 W. Millbrook Rd, Suite 225
Raleigh, NC 27609
Jeff Keaton, PE, Project Manager
Nicole Macaluso Millns, PE, Project Engineer
919-851-9986

Surveying:
Turner Land Surveying
P.O. Box 148
Swannanoa, NC 28778
David S. Turner, PLS
919-827-0745

NCDEQ Contract No. 7423
DMS Project No. 100038
USACE Action ID No. 2018-02042
NCDWR Project No. 2018-0197

I, DAVID S. TURNER, CERTIFY THAT THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS TOPOGRAPHIC SURVEY WAS PERFORMED AT THE 95 PERCENT CONFIDENCE LEVEL TO MEET FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS FOR A TOPOGRAPHIC SURVEY TO THE HORIZONTAL ACCURACY OF CLASS A AND THE VERTICAL ACCURACY WHEN APPLICABLE TO CLASS C STANDARD, AND THAT THE ORIGINAL DATA WAS OBTAINED IN SEP-OCT 2020; THAT THE SURVEY WAS COMPLETED ON 15 NOV 2020; AND ALL COORDINATES ARE BASED ON NAD83 (2011) AND ALL ELEVATIONS ARE BASED ON NAVD88. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL THIS 17th DAY OF APRIL , 2021.

DAVID S. TURNER, P.L.S. #L-4551

NORTH CAROLINA PROFESSIONAL SEAL L-4551 LAND SURVEYOR DAVID S. TURNER 04-17-21

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. KEATON 04-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Title Sheet

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 0.1

April 13, 2021

X:\Shared Projects\005-02167 McClenny Acres\Monitoring\4 As-Built Drawings\Plans\005-02167-As Built Sheet.dwg

April 13, 2021

N/F
MAUD WHITLEY
HEIRS
DB 540 PG 49
PIN 2589282556

N/F
FANNIE B. LANE HEIRS
DB 486 PG 289
PIN 2680013146

FEMA 100-YEAR
FLOODPLAIN BOUNDARY
FOR NEUSE RIVER

BEGIN UT1
REACH 1 (RESTORATION)
STA. 100+86

EXISTING 80'
POWERLINE EASEMENT
(PC I SLIDE 240)

EXISTING 30'
ACCESS EASEMENT
PC O SLIDE 58-G

20' UTILITY R.O.W. UT1
REACH 1 (RESTORATION)
STA. 114+07

20' UTILITY R.O.W. UT1
REACH 1 (RESTORATION)
STA. 114+27

N/F
MAUD WHITLEY HEIRS
DB 540 PG 49
PIN 2589282556

N/F
SOUTHERN RAILWAY CO.
& ATLANTIC COAST LINE CO.

EXISTING 20'
SOUTHERN BELL EASEMENT
(PC I SLIDE 240)

N/F
WILDLANDS ENGINEERING, INC.
D.B. 3493, PG. 886
P.C. "P", SLIDE 15-C & D
P.C. "I", SLIDE 240
P.C. "O", SLIDE 58-G (TRACT 2)
PIN: 2589073837

END UT2
REACH 1 (PRESERVATION)
BEGIN UT2
REACH 2 (RESTORATION)
STA. 200+95

BEGIN UT2
REACH 1 (PRESERVATION)
STA. 200+00

END UT4
REACH 1 (RESTORATION)
BEGIN UT4
REACH 2 (ENHANCEMENT II)
STA. 438+24

NC HWY 581
(60' PUBLIC R/W)

OLD SMITHFIELD ROAD
(SR 1007) (60' PUBLIC R/W)

80' UTILITY R.O.W. UT3
REACH 1 (RESTORATION)
STA. 317+54

N/F
STATE OF NORTH CAROLINA
N/R
PIN 2589655622

20' UTILITY R.O.W. UT2
REACH 1 (RESTORATION)
STA. 206+69

20' UTILITY R.O.W. UT2
REACH 1 (RESTORATION)
STA. 206+90

END UT4
REACH 2 (ENHANCEMENT II)
STA. 439+98

START OF FULL-DELIVERY
STREAM CREDITS
STA. 311+12

80' UTILITY R.O.W. UT3
REACH 1 (RESTORATION)
STA. 318+43

END UT2
REACH 2 (RESTORATION)
STA. 210+04
END UT3
REACH 1 (RESTORATION)
BEGIN UT3
REACH 2 (RESTORATION)
STA. 315+84

END UT1
REACH 1 (RESTORATION)
STA. 128+98
END UT3
REACH 2 (RESTORATION)
STA. 329+60
BEGIN UT4
REACH 1 (RESTORATION)
STA. 400+00

N/F
JACQUELYN DELORIS BEDFORD HAWLEY
& JEFFREY ALLEN JONES
DB 3089 PG 250
PIN 2670709172
LOT 1
PC N SLIDE 88-B

20' UTILITY R.O.W. UT3
REACH 1 (RESTORATION)
STA. 302+00

20' UTILITY R.O.W. UT3
REACH 1 (RESTORATION)
STA. 302+21

N/F
JOE WALTER BEDFORD
& CAROLYN L. BEDFORD
DB 3148 PG 525
PIN 2670709071
LOT 3
PC N SLIDE 88-B

N/F
RALPH A. MILLS
& SHIRLEY ANN MILLS
DB 1437 PG 827
PIN 2579777828

N/F
RALPH A. MILLS
& SHIRLEY ANN MILLS
DB 1437 PG 827
PIN 2579777828

N/F
DUKE ENERGY PROGRESS, LLC
DB 3260 PG 196
PIN 2579853880
PC O SLIDE 52-I

UT1 UT2 UT3 UT4

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 1.10 1.11 1.12 1.13 1.14 1.15 1.16 1.17 1.18 1.19 1.20 1.21 1.22 1.23 1.24

0' 250' 500' 750'
1" = 250'

X:\Shared Projects\WI016 McClenny Acres\Monitoring\As-Built Drawings\Plans\005-02167-AR Project Overview.dwg

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
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Tel: 919.851.9986
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. WILLIS 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Project Overview

Revisions:

Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Sheet 0.2

April 13, 2021

Pre-Construction Features Features

- Existing Property Boundary
- Existing NCDOT Right-of-way (R/W)
- Existing Utility Right-of-way (U R/W)
- Existing Utility Maintenance Limits
- Storm Pipe
- Existing Edge of Pavement
- Existing Fence (X)
- FEMA 100 Year Flood Plain
- Existing Treeline
- Existing Tree
- Existing Wetlands
- Existing Farm Path
- Existing Bedrock

Design Features

- Conservation Easement (CE)
- Not For Credit
- Designed Preservation Reach
- Designed Enhancement II Reach
- Designed Restoration Reach
- Designed Bankfull
- Designed 5' Major Contour (540)
- Designed 1' Minor Contour
- Designed Access Road
- Designed Riffle
- Designed Log Sill with Root Wad Protection
- Designed Lunker Log
- Designed Angled Log Sill
- Designed Log Vane
- Designed Brush Toe
- Designed Vegetated Soil Lift
- Designed Transplanted Sod Mat
- Designed Rock Floodplain Outlet
- Designed Ford Crossing

As-Built Features

- Thalweg
- Bankfull
- 5' Major Contour (540)
- 1' Minor Contour (541)
- Limits of Disturbance (LOD)
- Cross Section (XS#)
- Photo Point (PP ##)
- Monitoring Well (GSG ##)
- Stream Gauge Crest/Flow (CG/FG)
- Vegetation Plot (VP ##, VEG)
- Riffle
- Log Sill with Root Wad Protection
- Lunker Log
- Angled Log Sill
- Log Vane
- Brush Toe
- Vegetated Soil Lift
- Transplanted Sod Mat
- Rock Floodplain Outlet
- Permanent Ford Crossing

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON C. NOLEN 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

General Notes & Symbols

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 0.3

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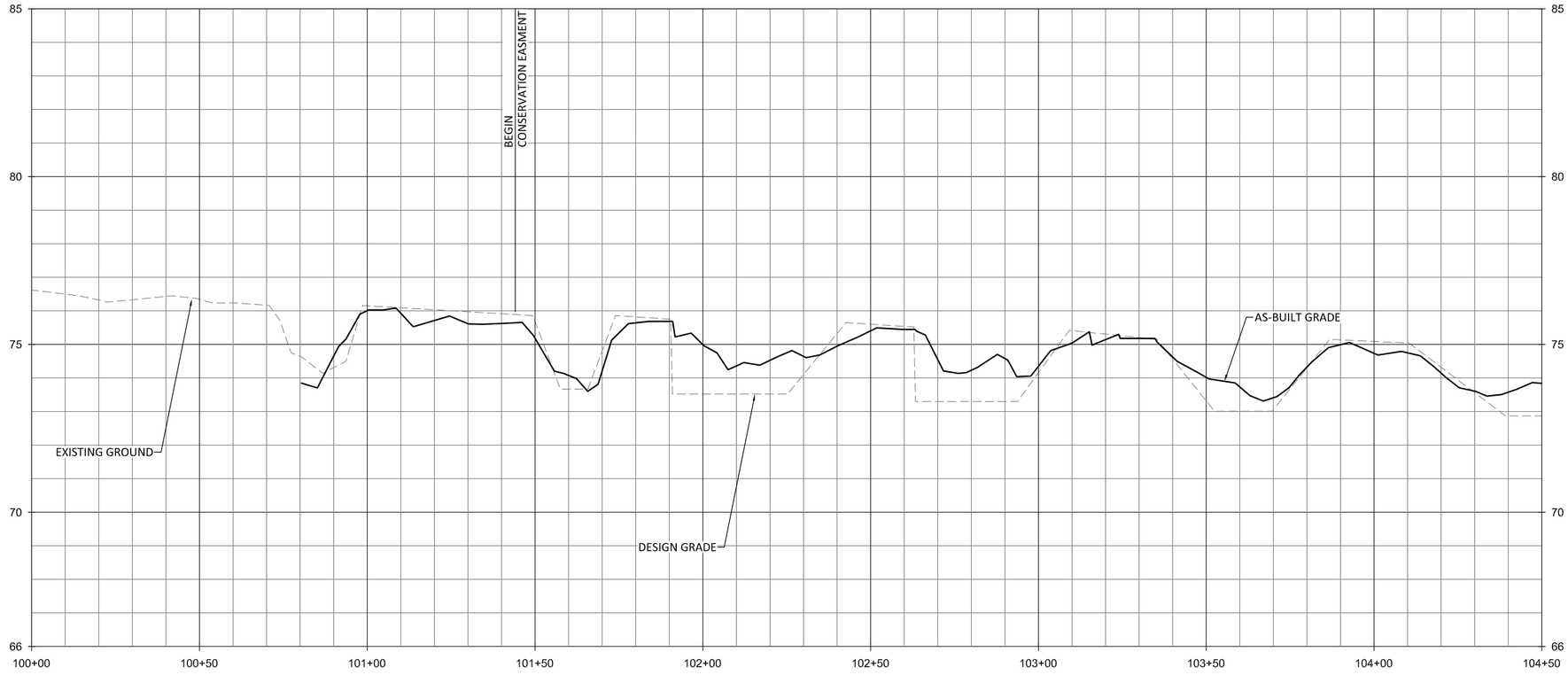
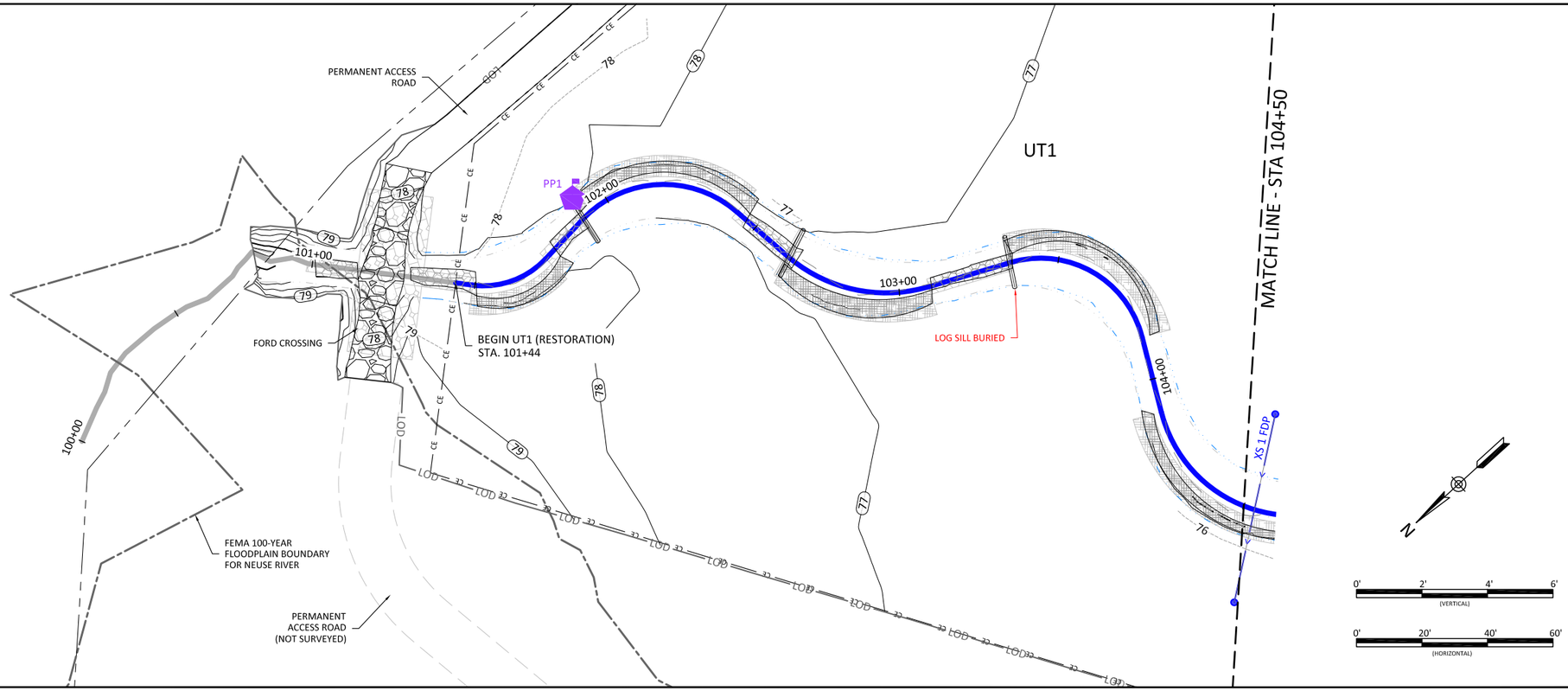
April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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PROFESSIONAL ENGINEER
NORTH CAROLINA
SEAL
031027
JEFFERSON A. WILLIAMS
4.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

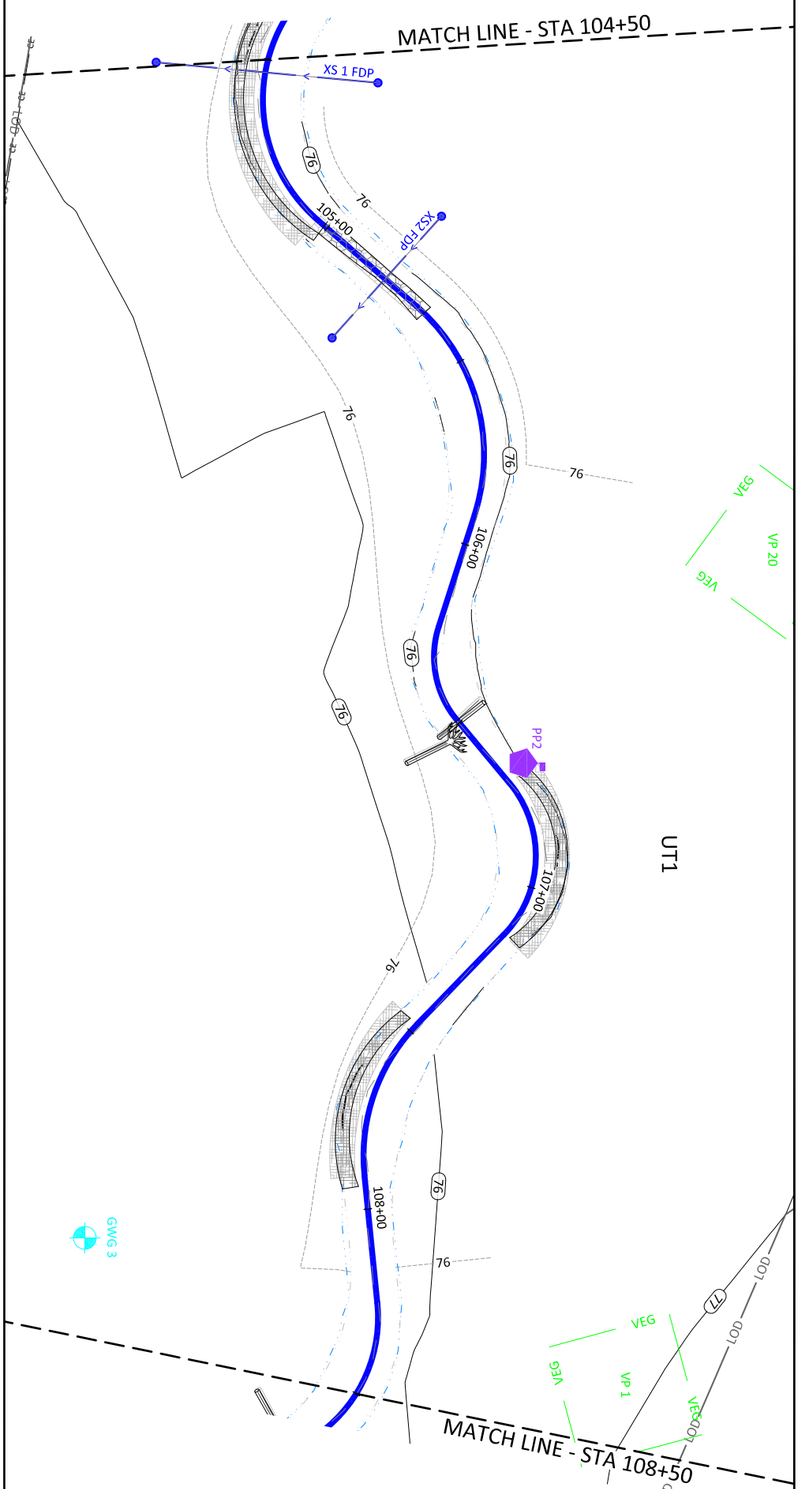
UT1
Stream Plan and Profile

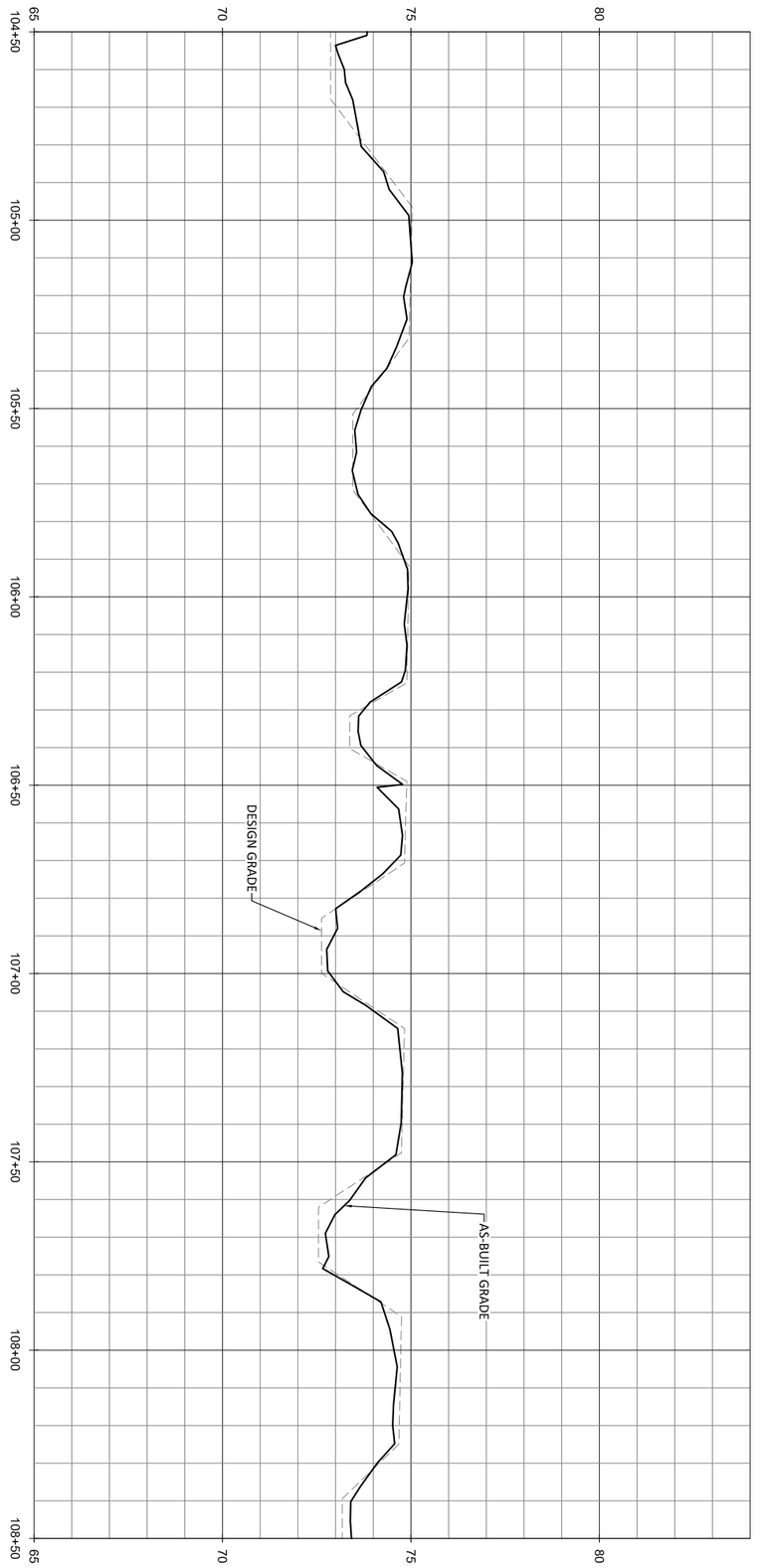
Revisions:

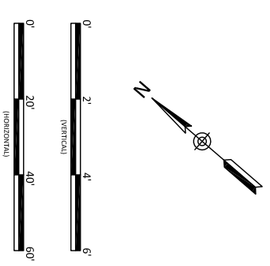
Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Sheet 1.1

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.







Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Revisions:

1.2
Sheet

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT1
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON K. KEATON
4.13.21

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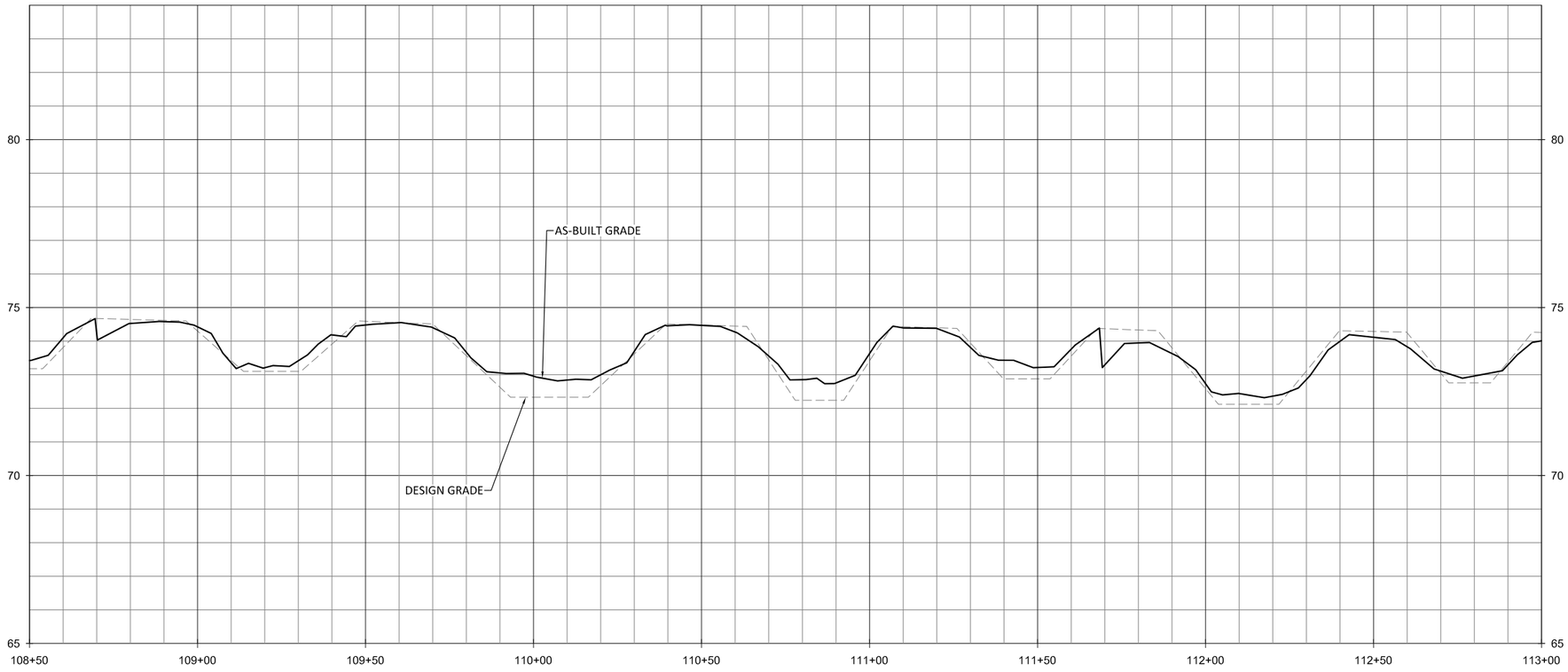
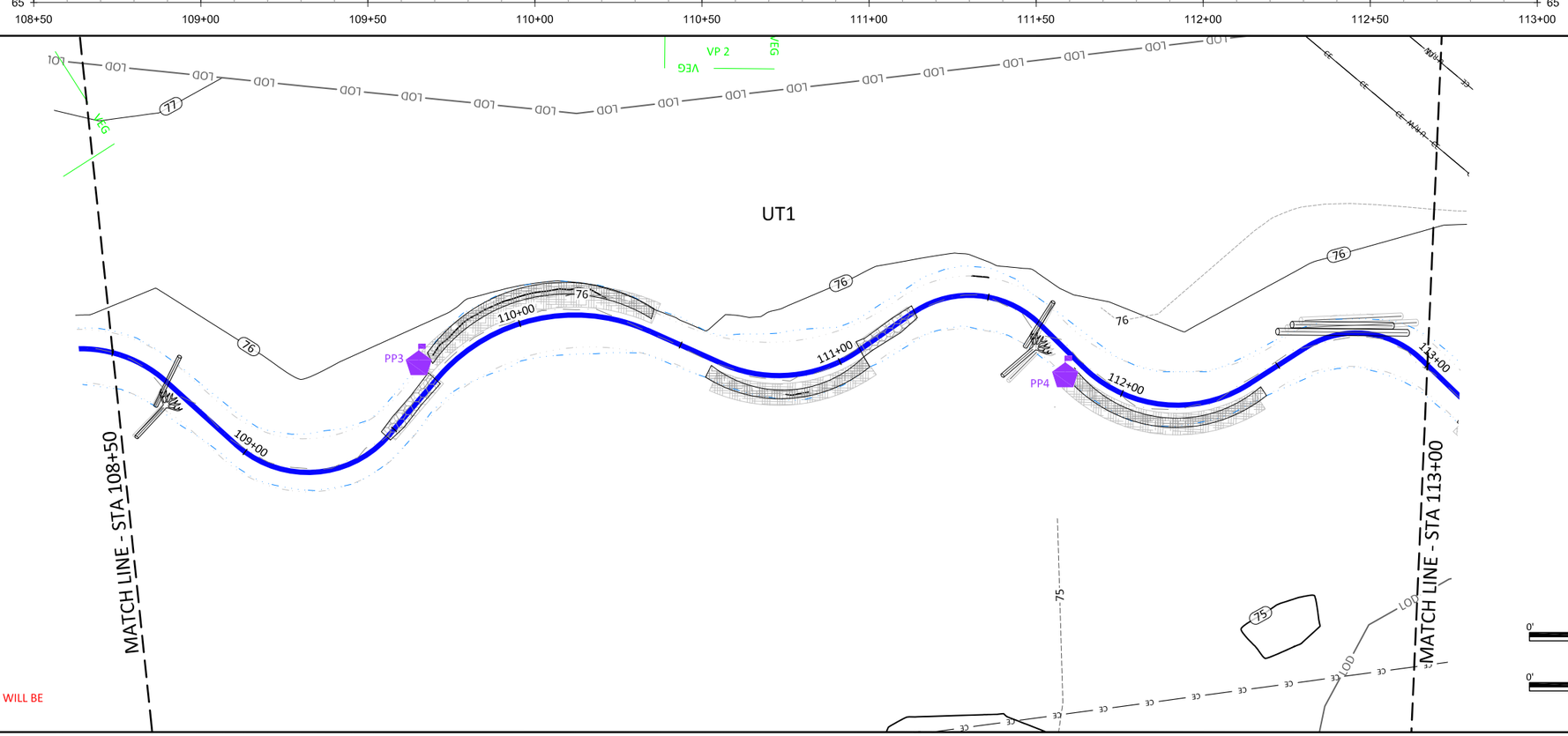
April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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McClenny Acres Mitigation Site
Wayne County, North Carolina

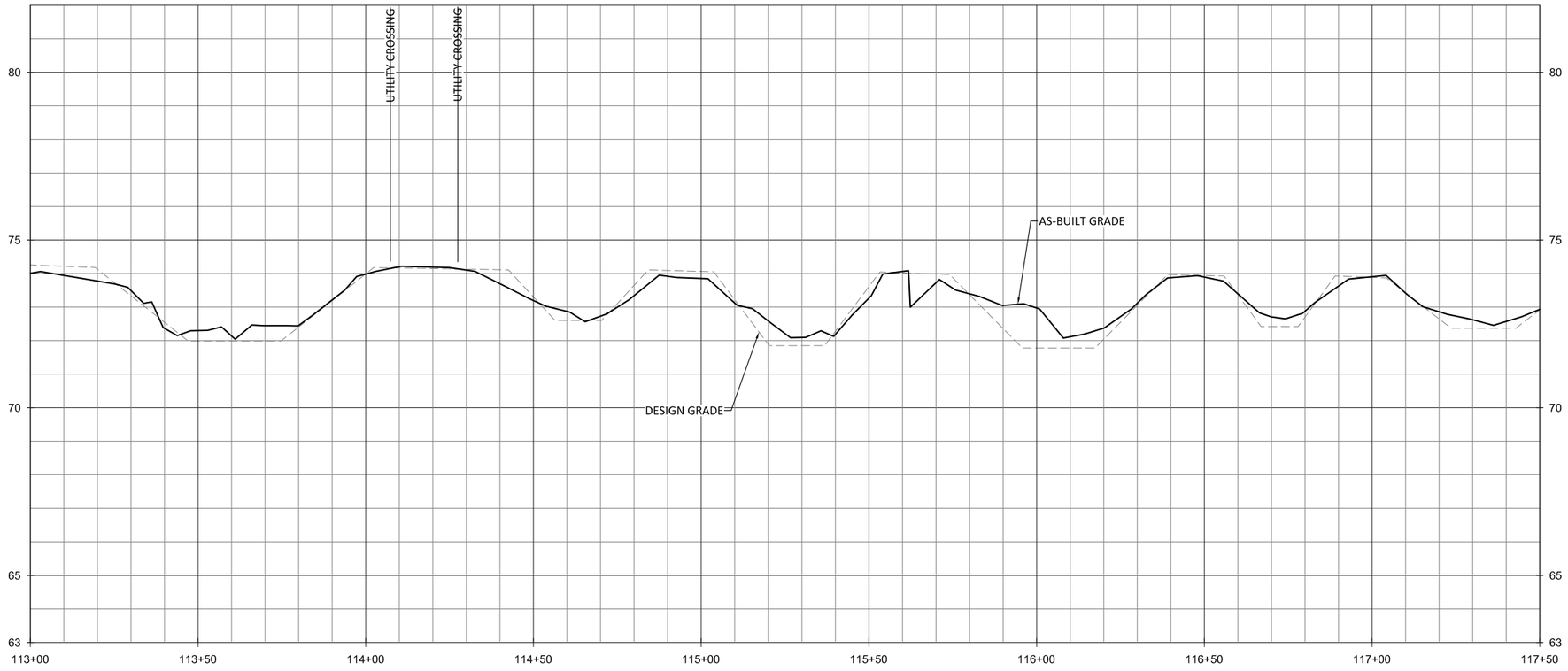
UT1
Stream Plan and Profile

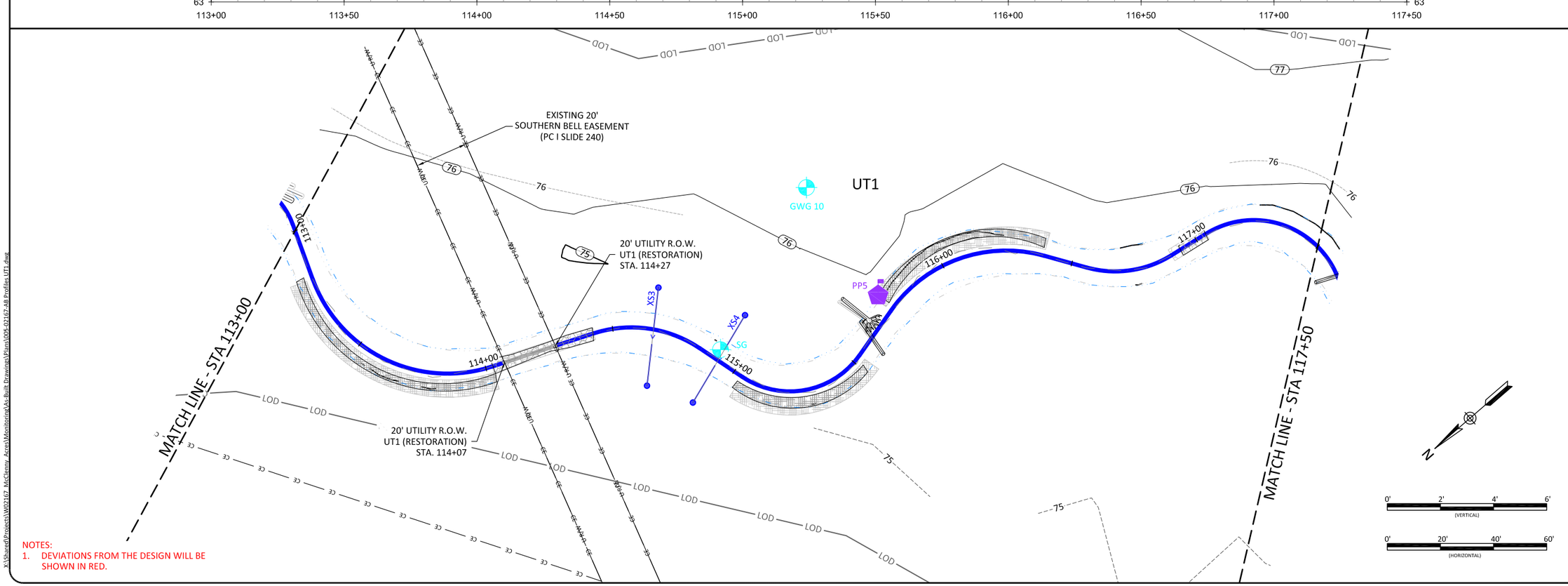
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.3

April 13, 2021





NOTES:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN 4.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

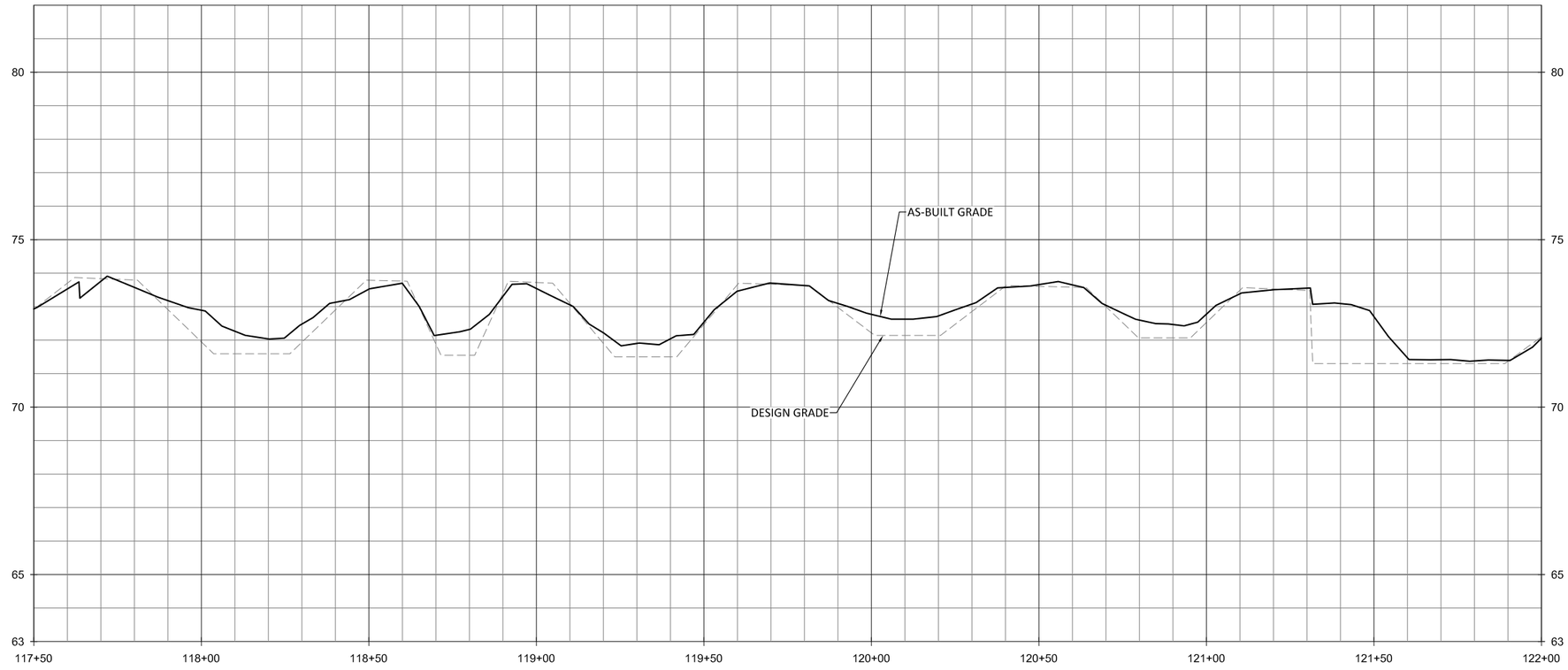
UT1
Stream Plan and Profile

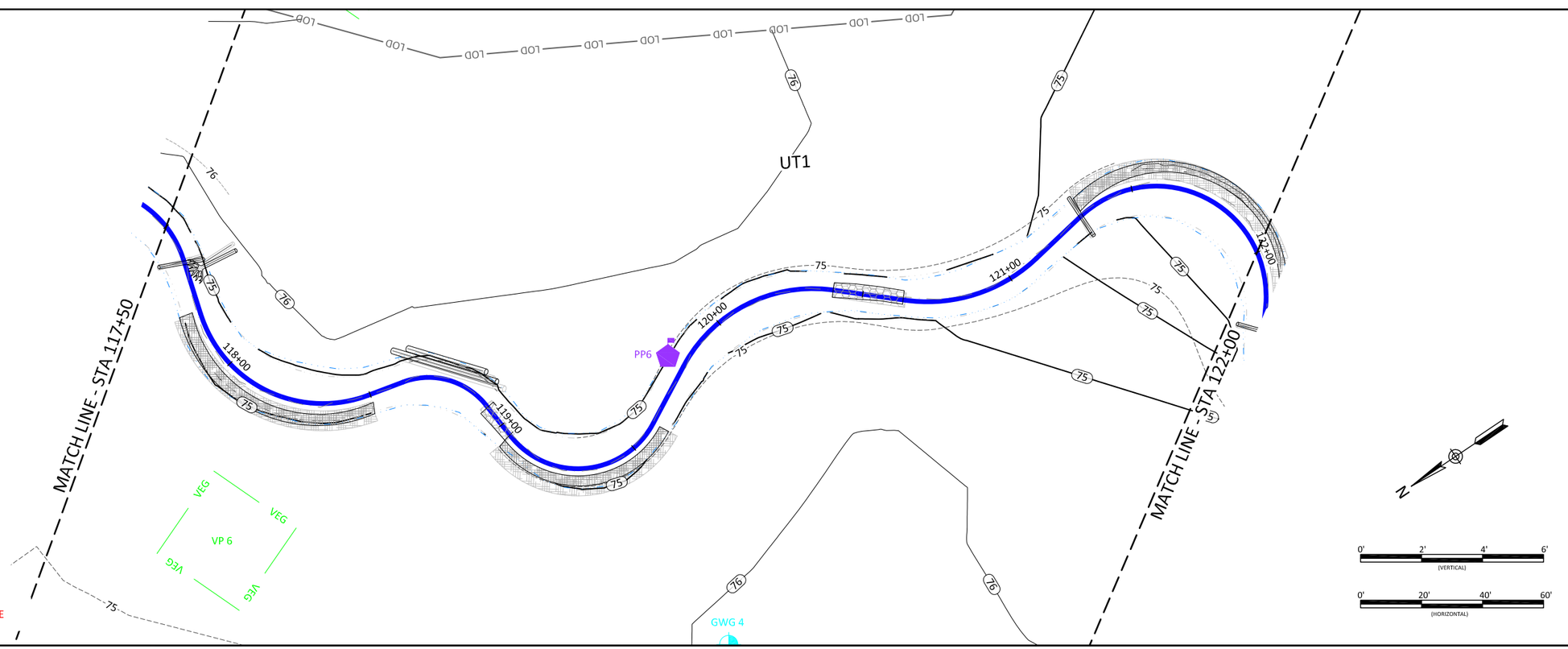
Revisions:

Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

1.4
Sheet

April 13, 2021





NOTES:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

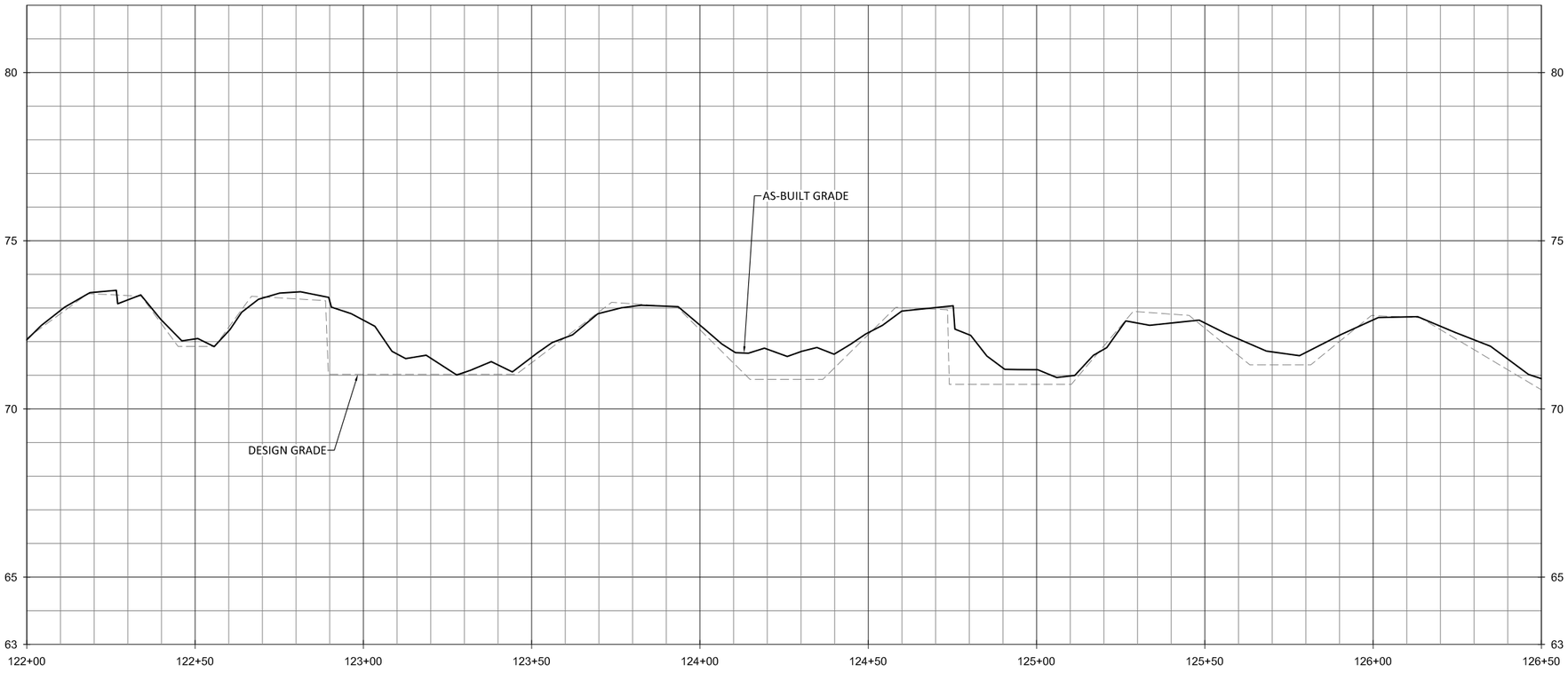
UT1
Stream Plan and Profile

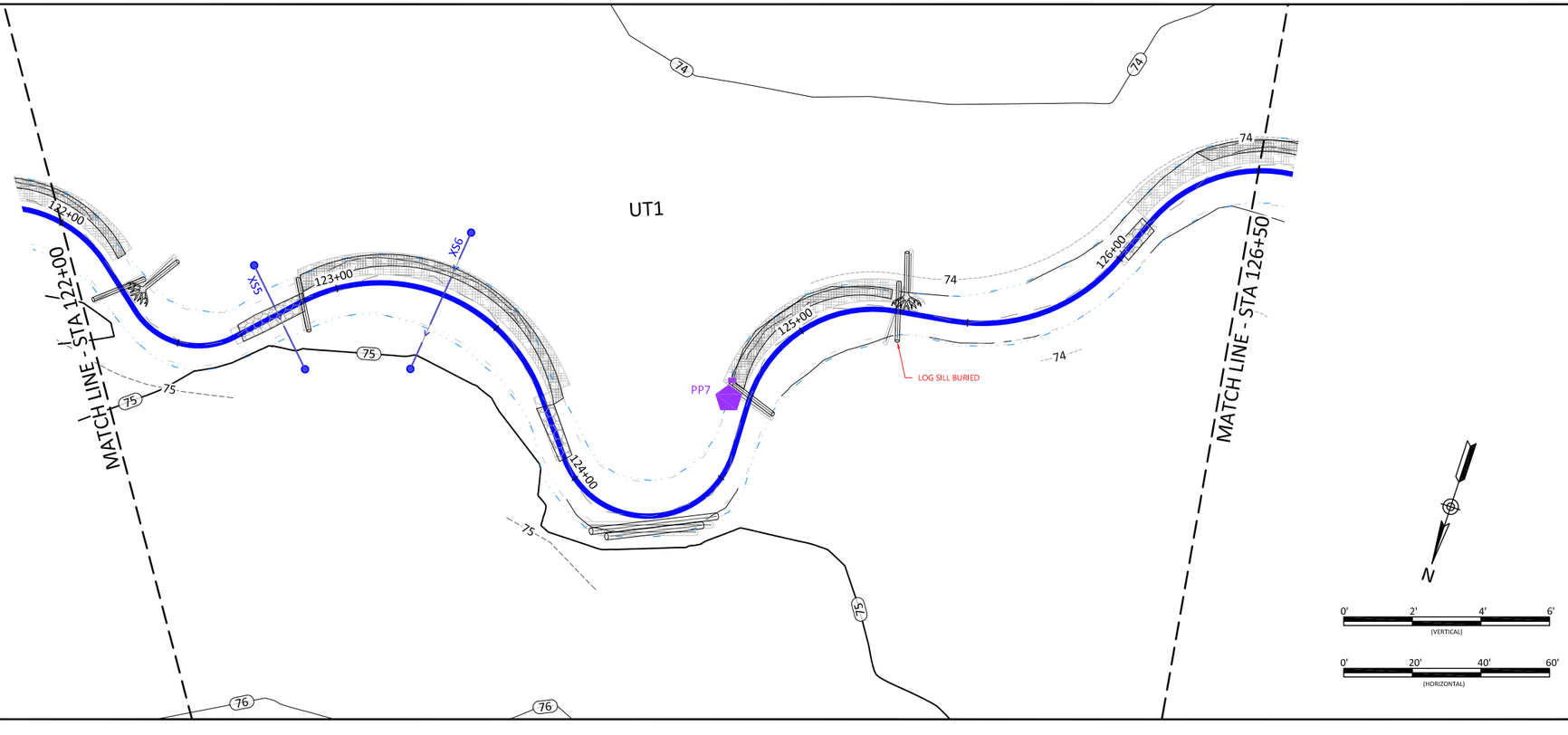
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.5

April 13, 2021





NOTES:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. FISHER 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT1
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.6

April 13, 2021

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
2. AS-BUILT INFORMATION FOR UT3 IS ADDRESSED ON SHEETS 1.10 THROUGH 1.14.
3. AS-BUILT INFORMATION FOR UT4 IS ADDRESSED ON SHEETS 1.15 THROUGH 1.24.

X:\Shared\Projects\WI02167 McClenny Acres\Monitoring\As-Built Drawings\Plans\005-02167-AB Profiles UT1.dwg

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON W. NOLEN
4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

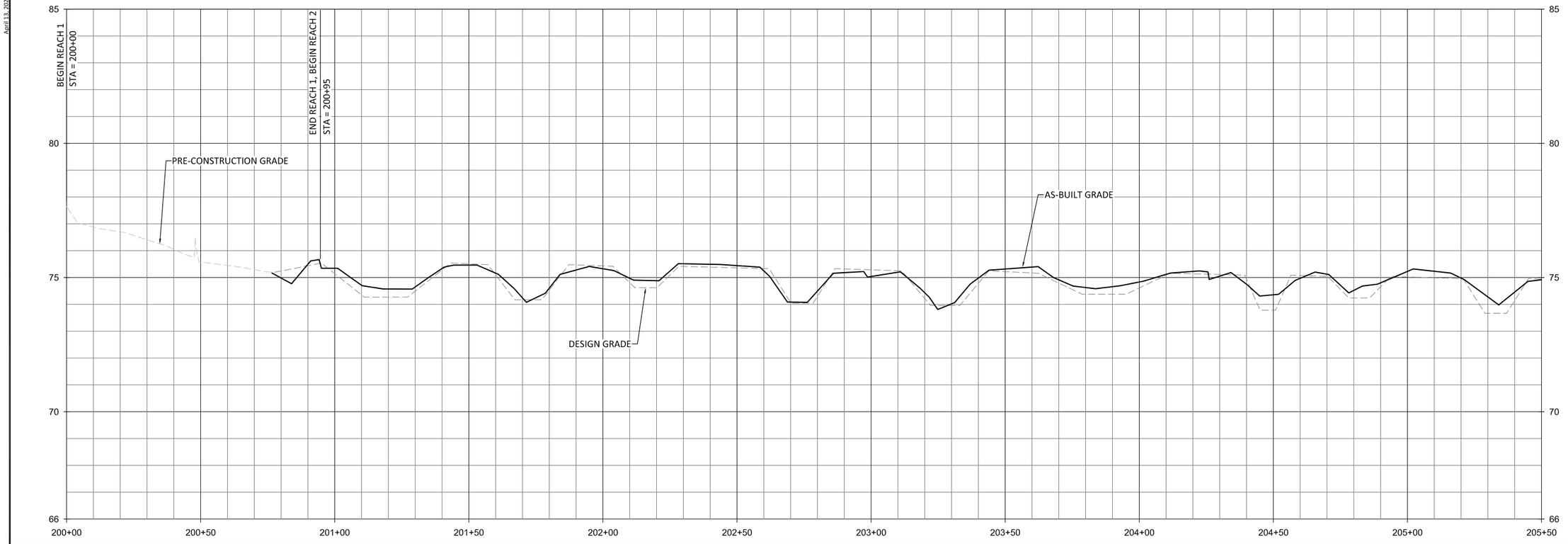
UT1
Stream Plan and Profile

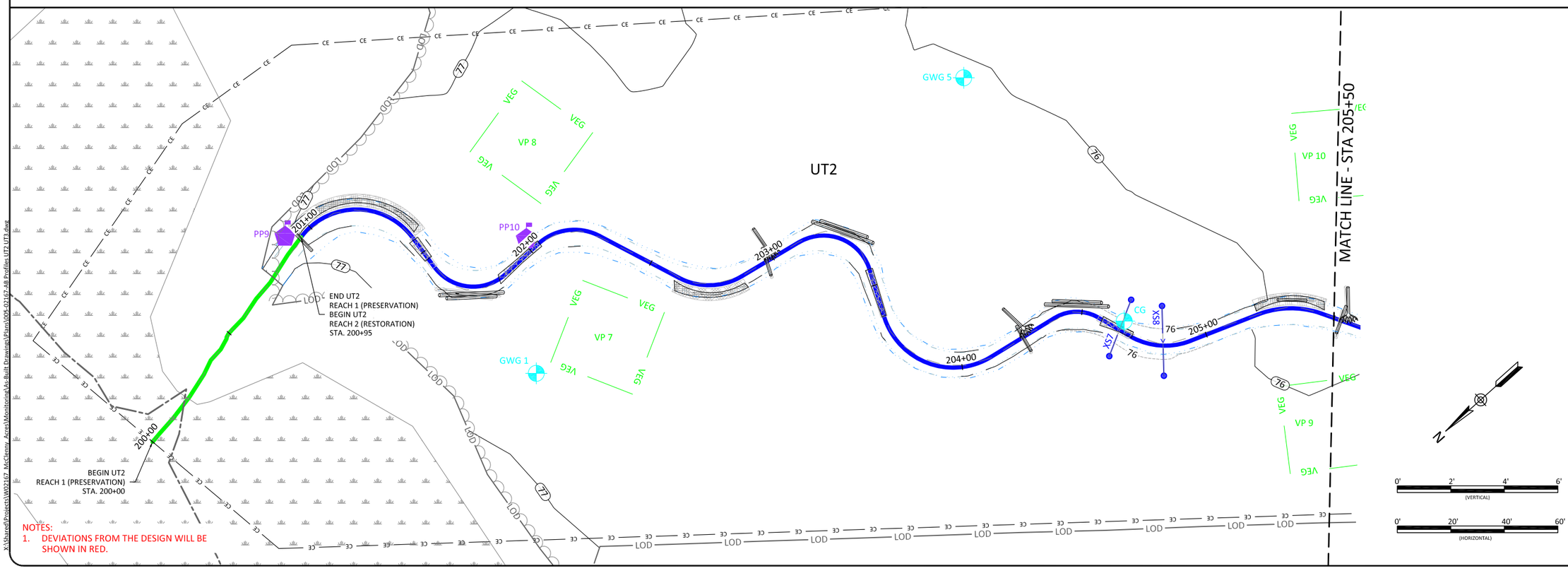
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.7

April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

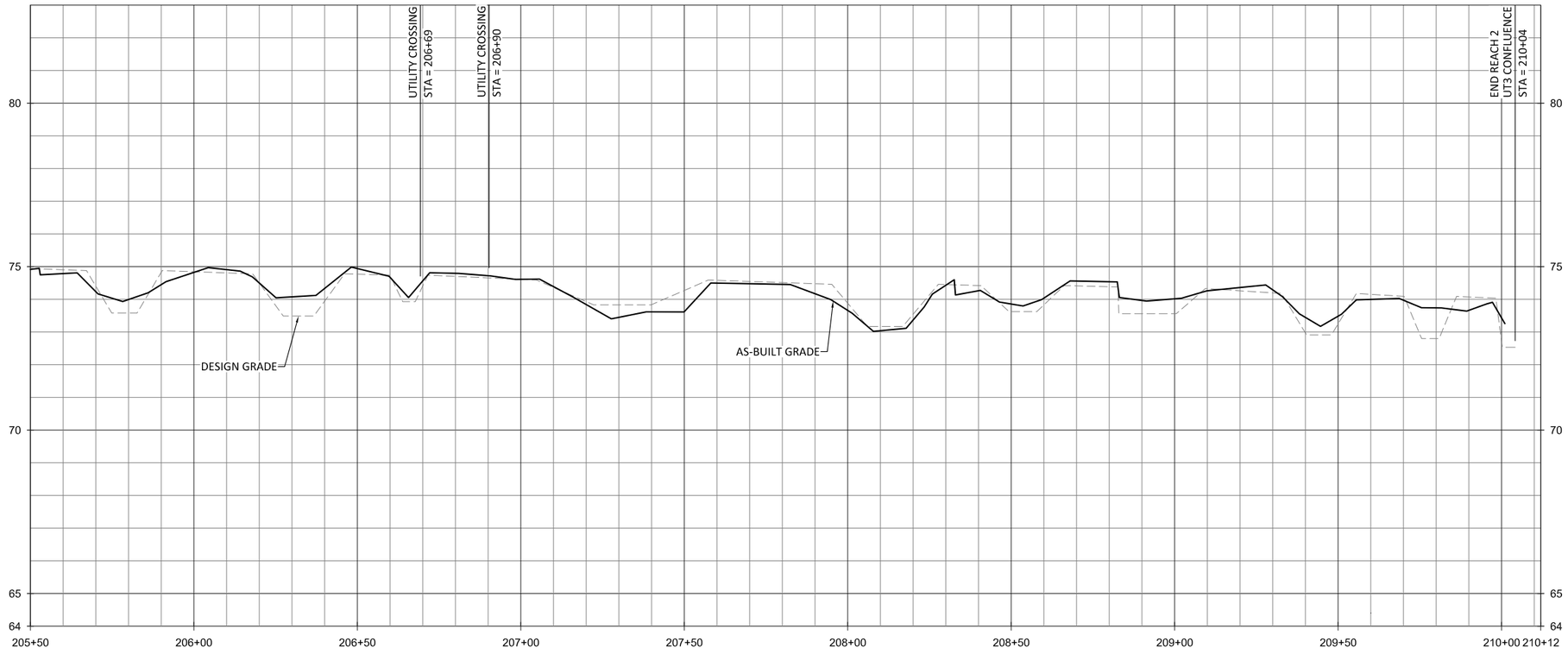
UT2
Stream Plan and Profile

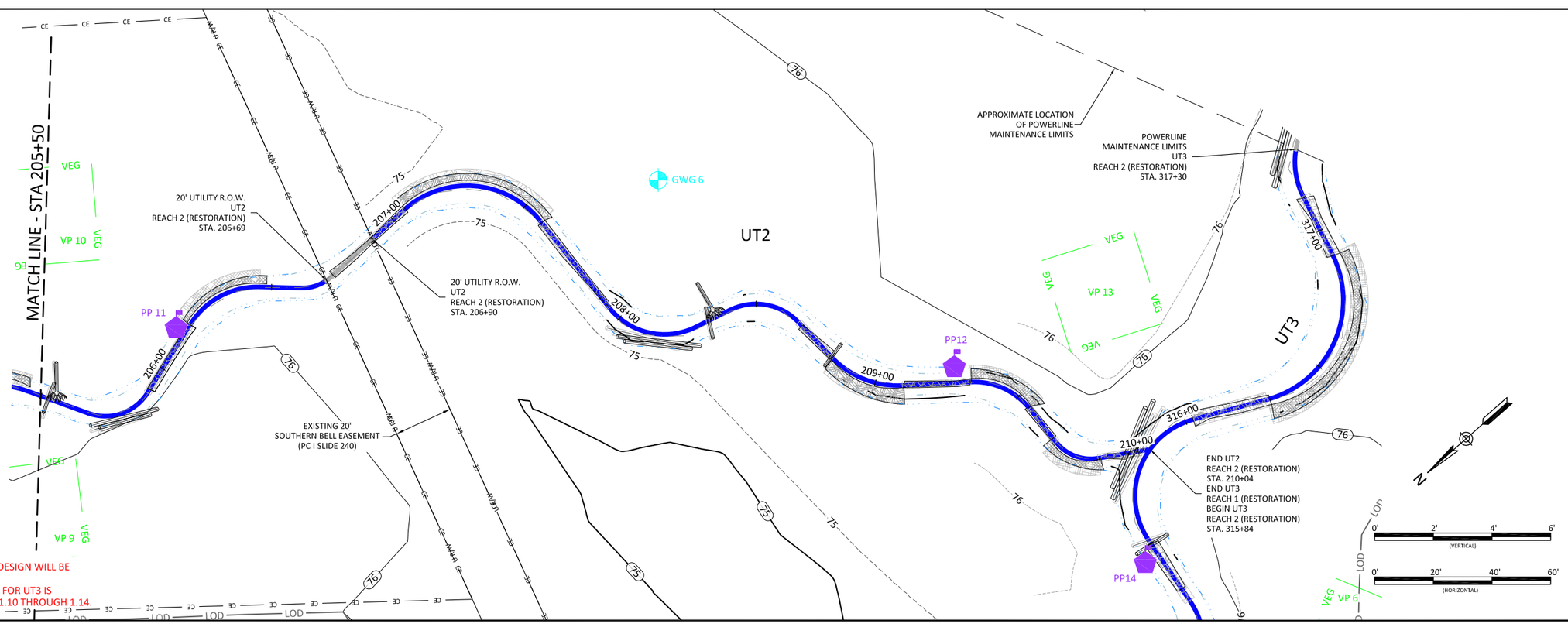
Revisions:

Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Sheet 1.8

April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
2. AS-BUILT INFORMATION FOR UT3 IS ADDRESSED ON SHEETS 1.10 THROUGH 1.14.

X:\Shared\Projects\WI02167 McClenny Acres\Monitoring\As-Built Drawings\Plans\005-02167-AB Profiles UT2 UT3.dwg

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SEAL
031027
JEFFERSON N. KLEIN
04.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

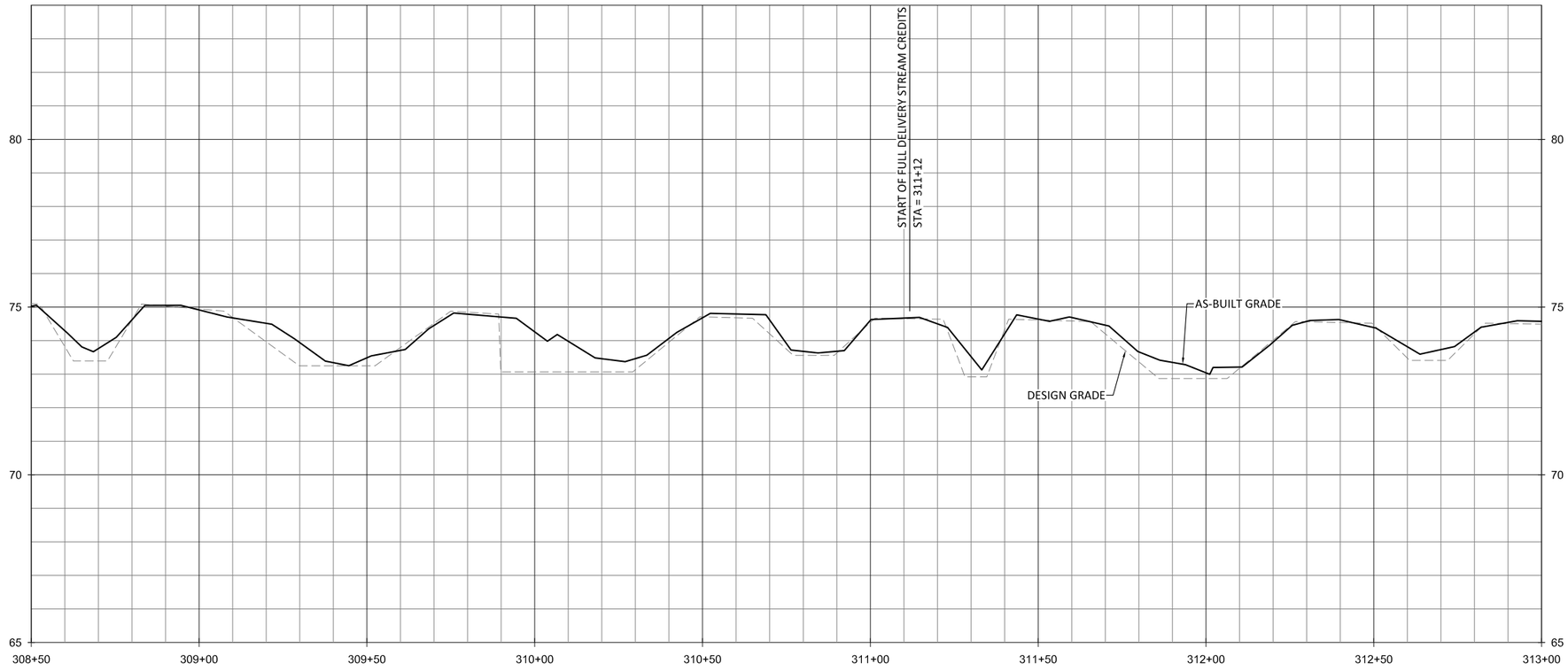
UT2
Stream Plan and Profile

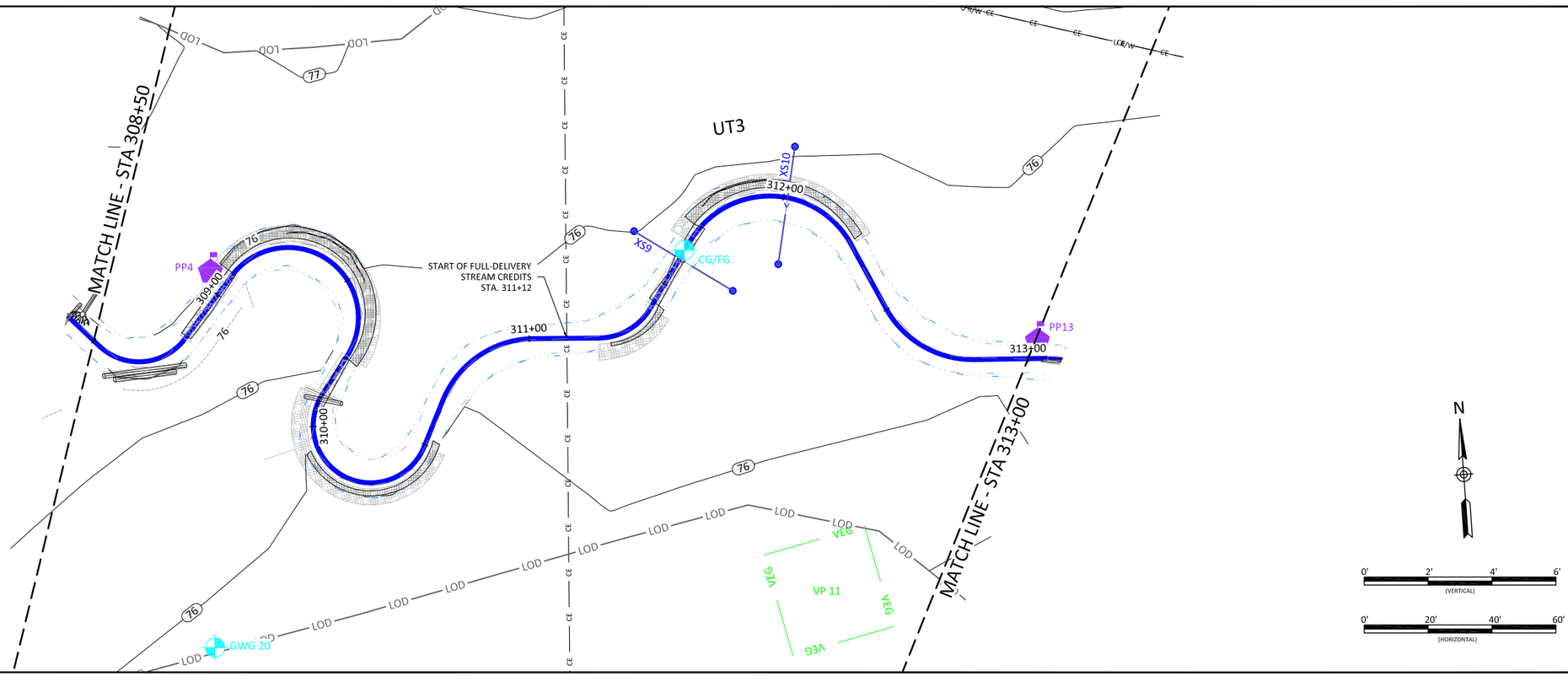
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.9

April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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PROFESSIONAL ENGINEER
NORTH CAROLINA
SEAL
031027
JEFFERSON N. ALLEN
4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

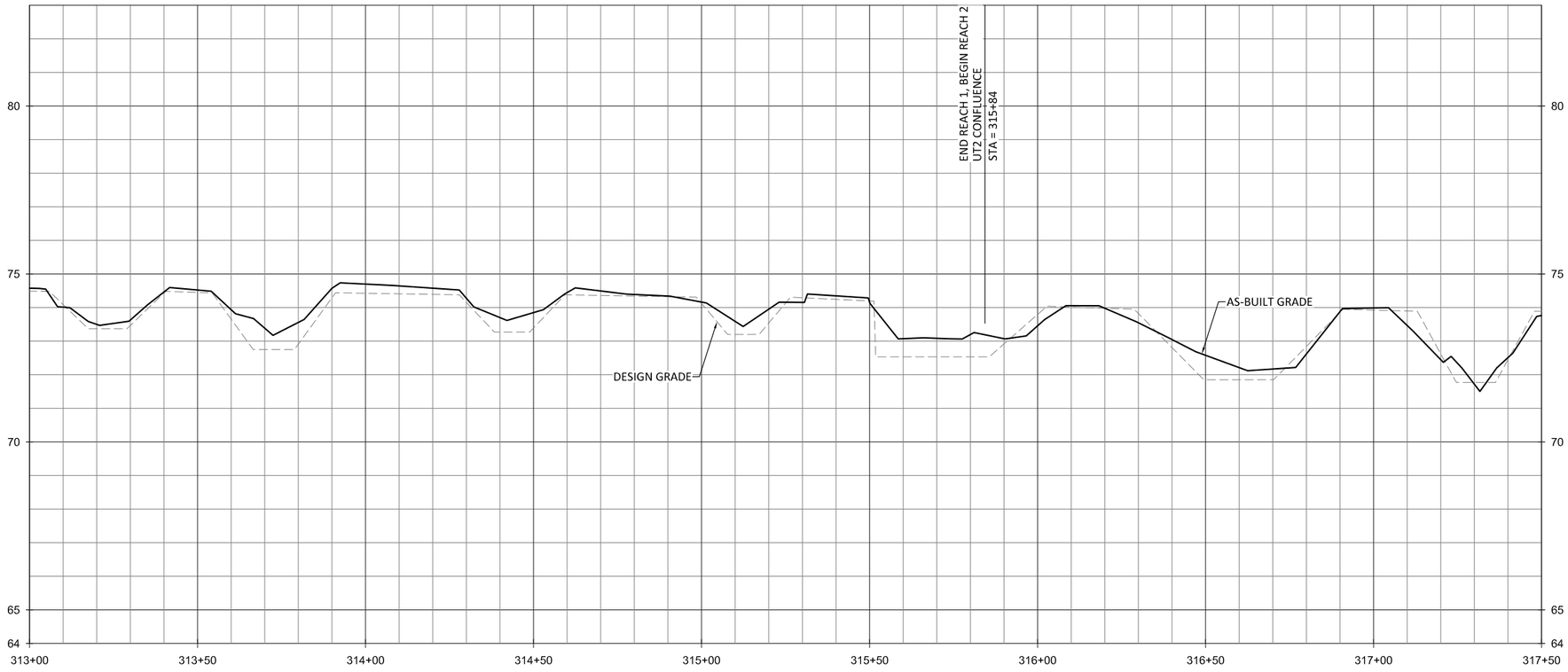
UT3
Stream Plan and Profile

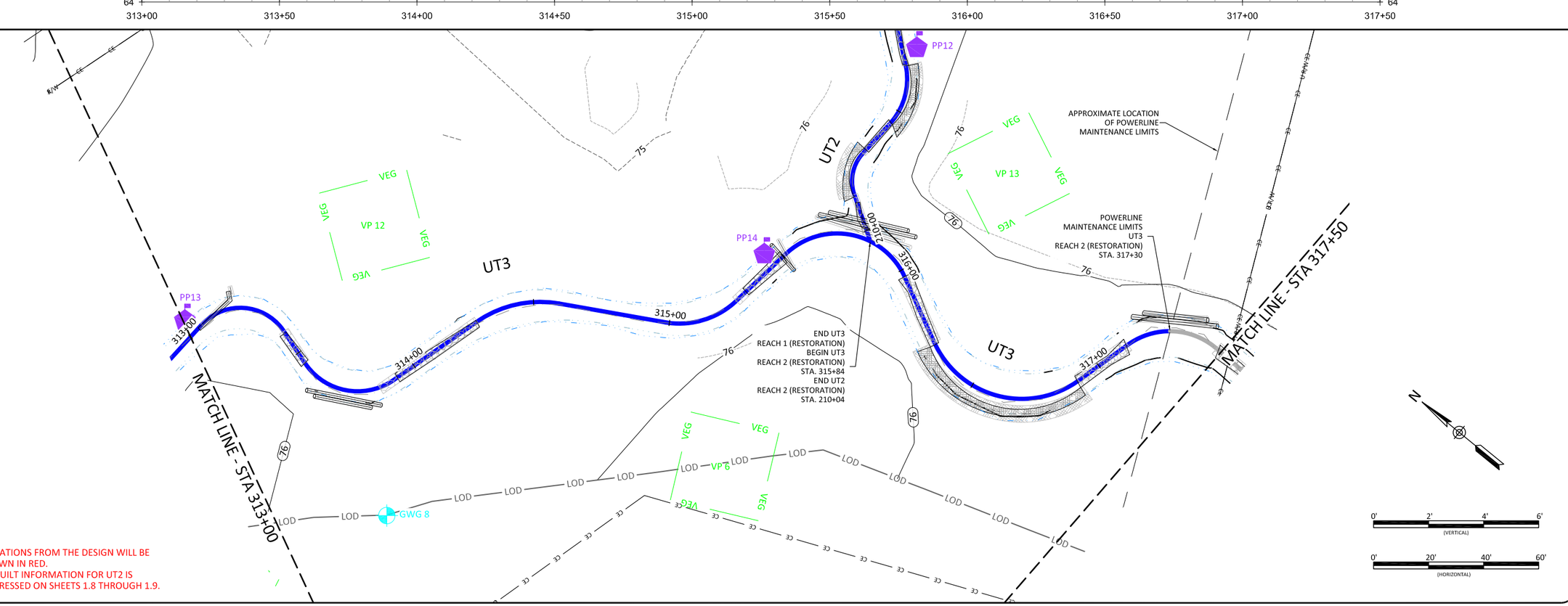
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.10

April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
2. AS-BUILT INFORMATION FOR UT2 IS ADDRESSED ON SHEETS 1.8 THROUGH 1.9.

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McClenny Acres Mitigation Site
Wayne County, North Carolina

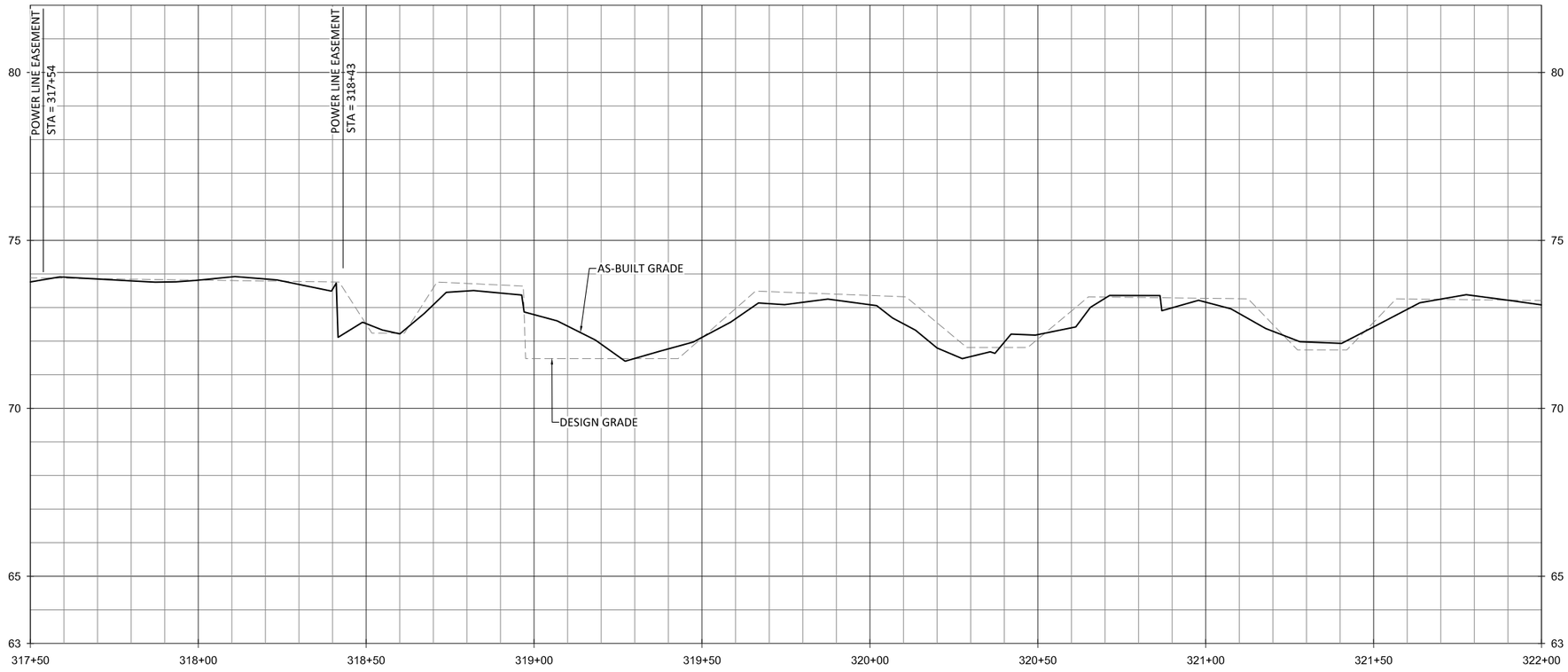
UT3
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

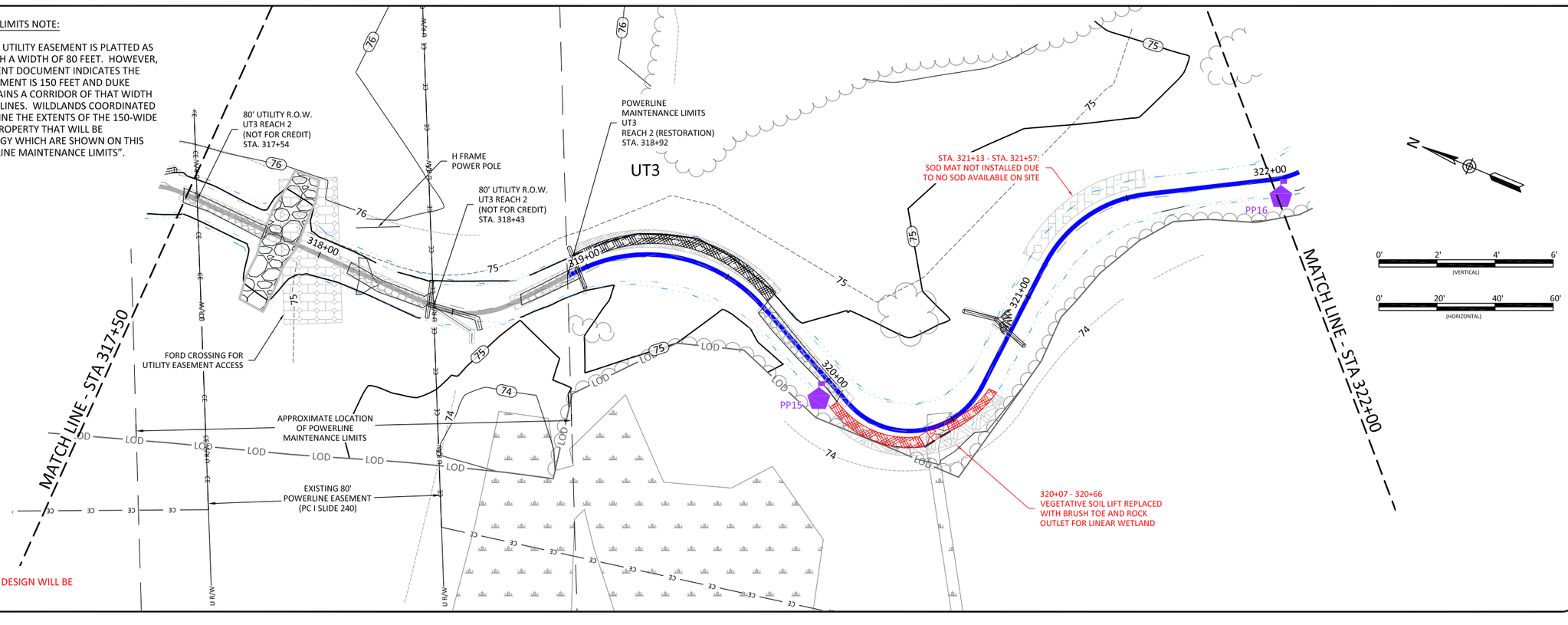
Sheet 1.11

April 13, 2021



POWERLINE MAINTENANCE LIMITS NOTE:

THE OVERHEAD POWERLINE UTILITY EASEMENT IS PLATTED AS SHOWN ON THIS SHEET WITH A WIDTH OF 80 FEET. HOWEVER, THE ORIGINAL 1949 EASEMENT DOCUMENT INDICATES THE WIDTH OF THE UTILITY EASEMENT IS 150 FEET AND DUKE ENERGY CURRENTLY MAINTAINS A CORRIDOR OF THAT WIDTH FOR THE OVERHEAD POWERLINES. WILDLANDS COORDINATED WITH DUKE ENERGY TO DEFINE THE EXTENTS OF THE 150-WIDE CORRIDOR THROUGH THE PROPERTY THAT WILL BE MAINTAINED BY DUKE ENERGY WHICH ARE SHOWN ON THIS AS-BUILT PLAN AS "POWERLINE MAINTENANCE LIMITS".



NOTES:
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PROFESSIONAL ENGINEER NORTH CAROLINA SEAL 031027 JEFFERSON N. ANDERSON 4.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT3
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.12

April 13, 2021

NOTES:
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0' 2' 4' 6' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)

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PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN NORTH CAROLINA

4.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT3
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

1.13
Sheet

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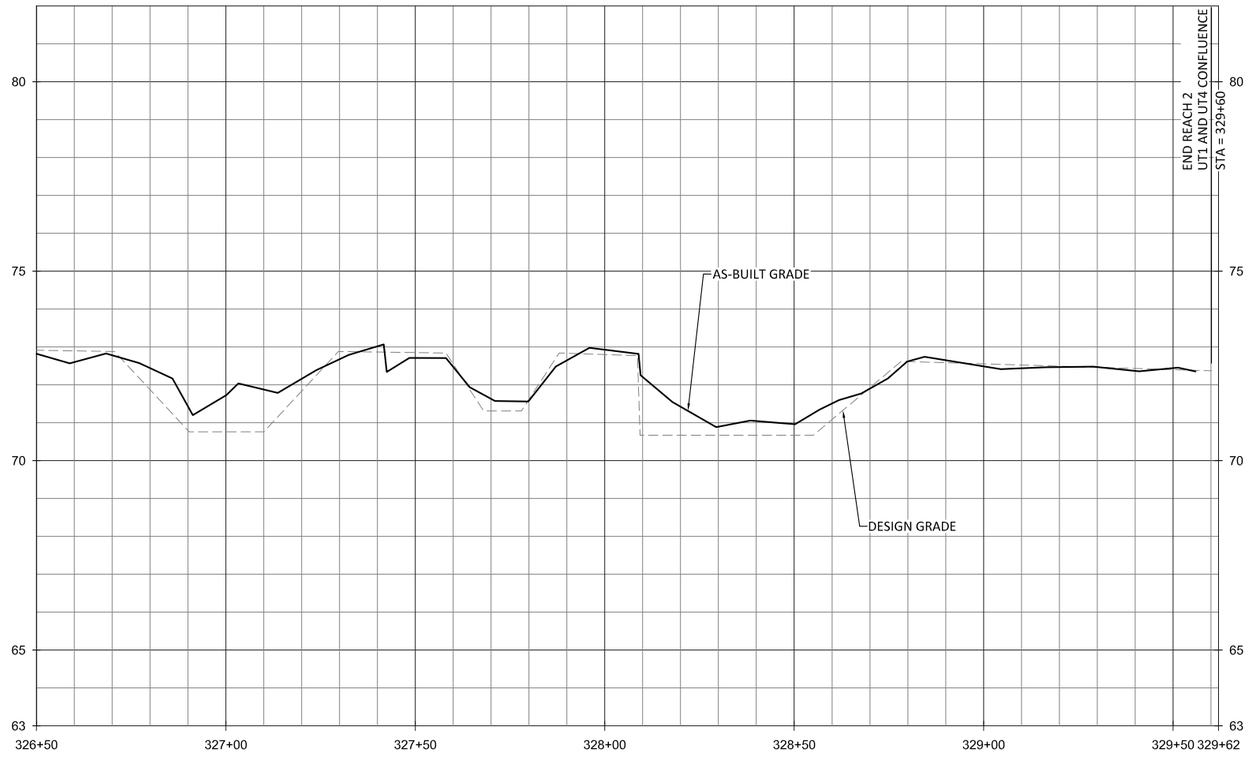
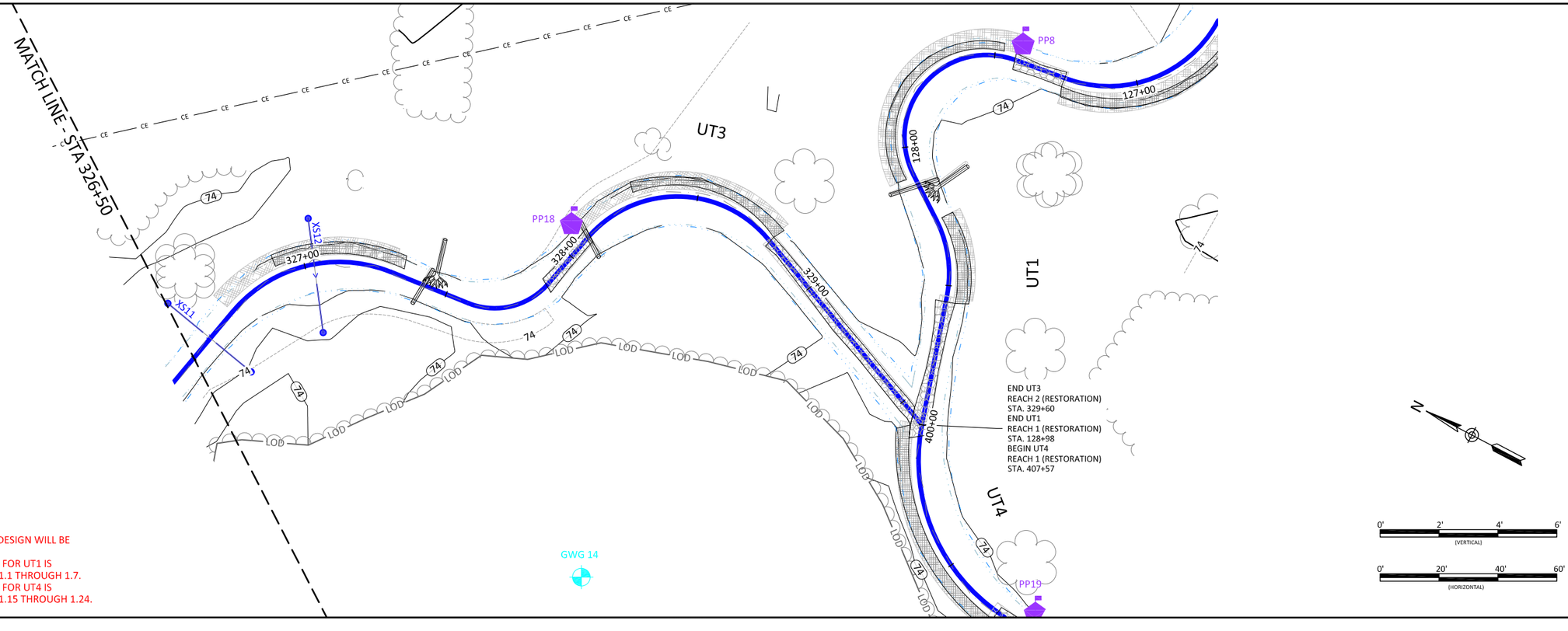
April 13, 2021





NOTES:
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2. AS-BUILT INFORMATION FOR UT1 IS ADDRESSED ON SHEETS 1.1 THROUGH 1.7.
3. AS-BUILT INFORMATION FOR UT4 IS ADDRESSED ON SHEETS 1.15 THROUGH 1.24.

X:\Shared\Projects\WI02167 McClenny Acres\Monitoring\As-Built Drawings\Plans\005-02167-AB Profiles UT2 UT3.dwg

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

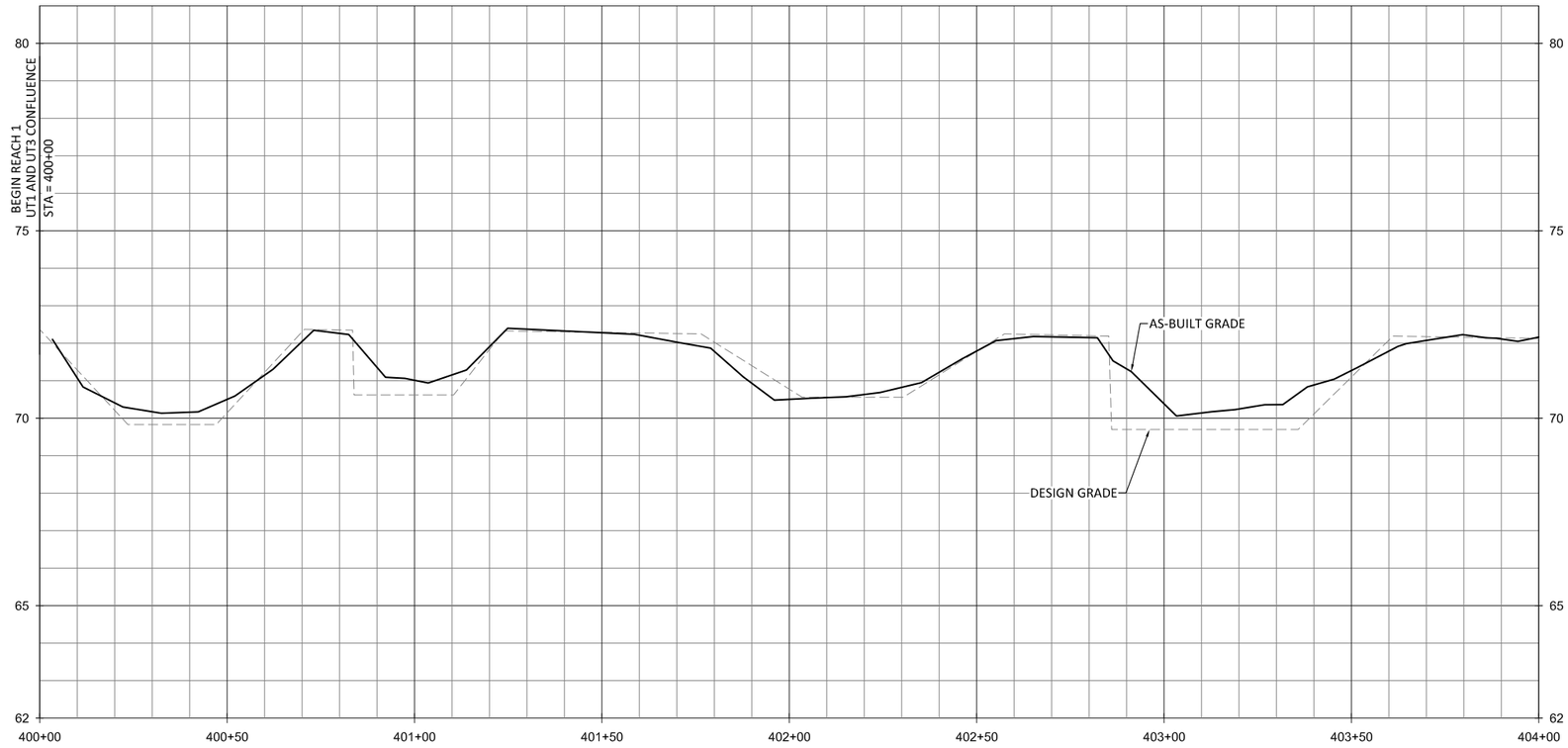
UT3
Stream Plan and Profile

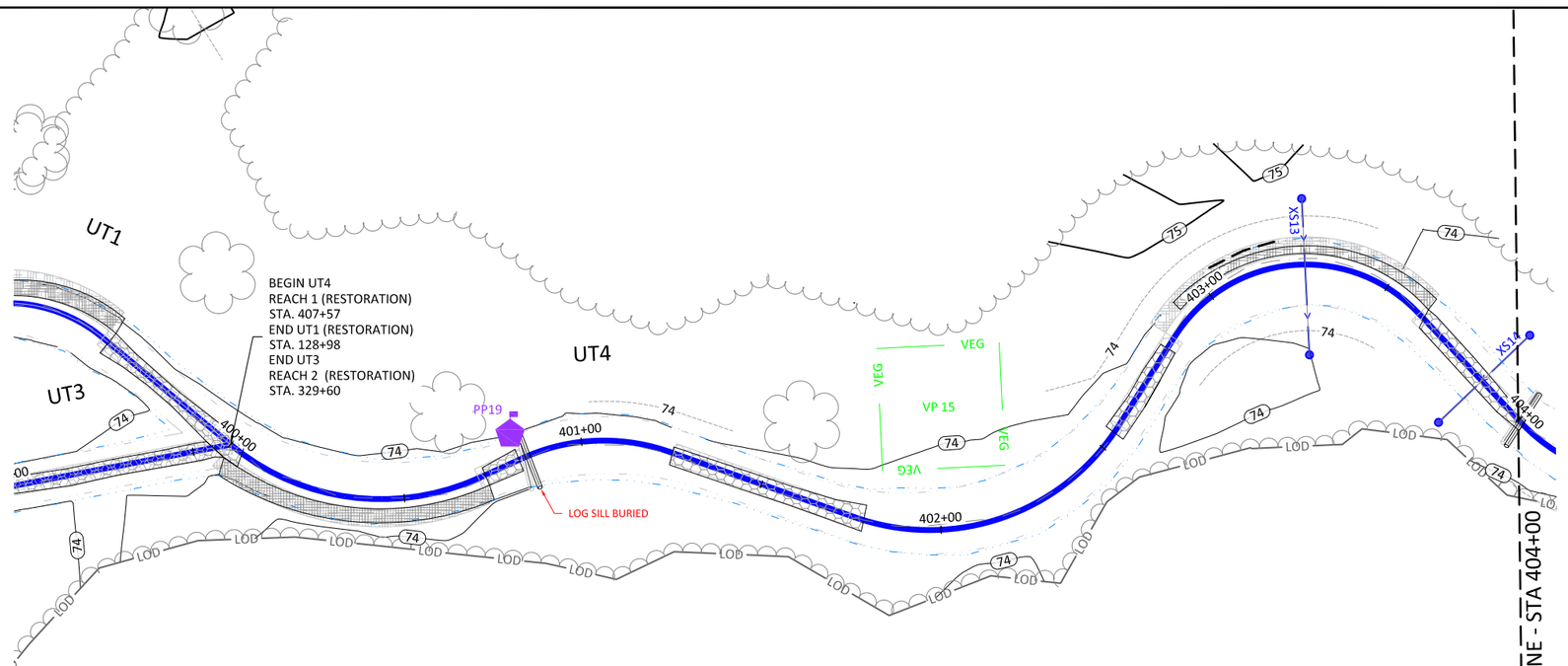
Revisions:

Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Sheet 1.14

April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
2. AS-BUILT INFORMATION FOR UT1 IS ADDRESSED ON SHEETS 1.1 THROUGH 1.7.
3. AS-BUILT INFORMATION FOR UT3 IS ADDRESSED ON SHEETS 1.10 THROUGH 1.14.

0' 2' 4' 6' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)

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Firm License No. F-0831

PROFESSIONAL ENGINEER SEAL 031027 NORTH CAROLINA JEFFERSON N. ADAMS 4.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.15

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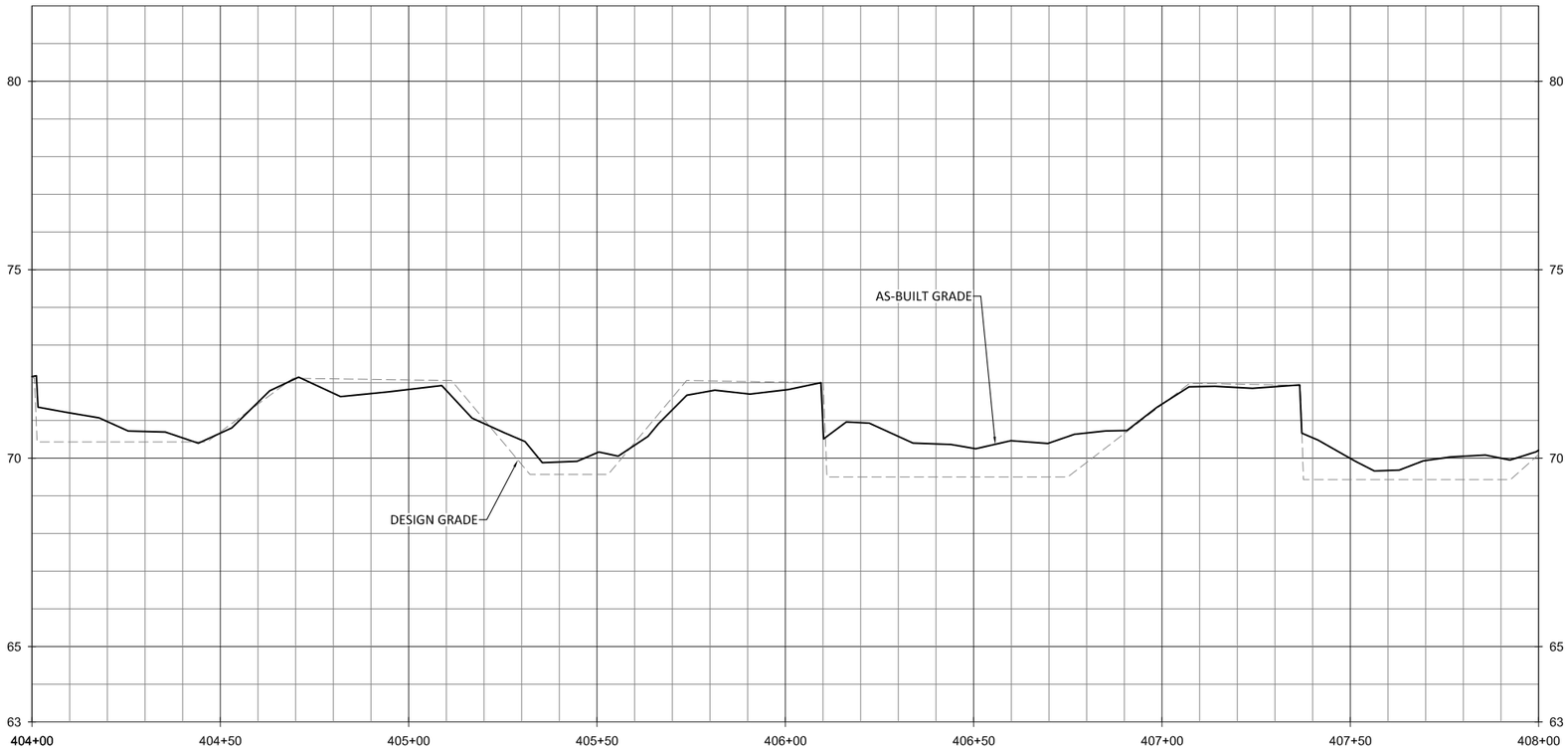
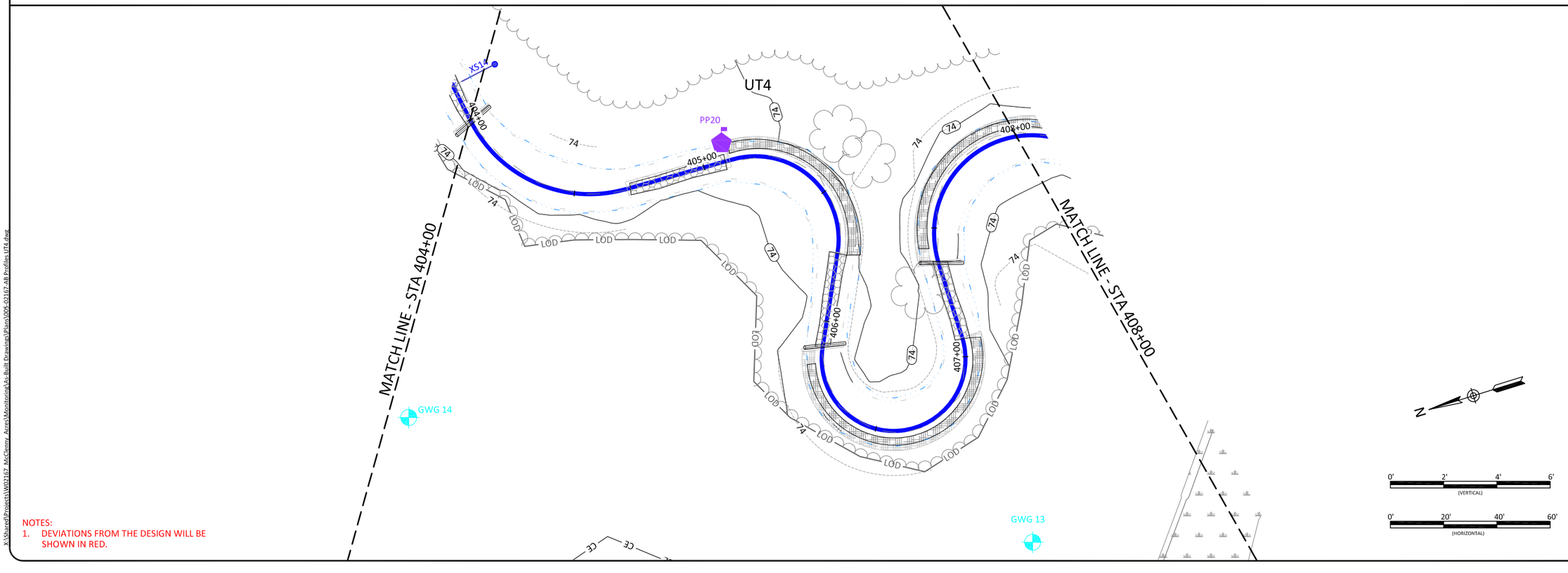
April 13, 2021





NOTES:
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON A. NEWTON 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

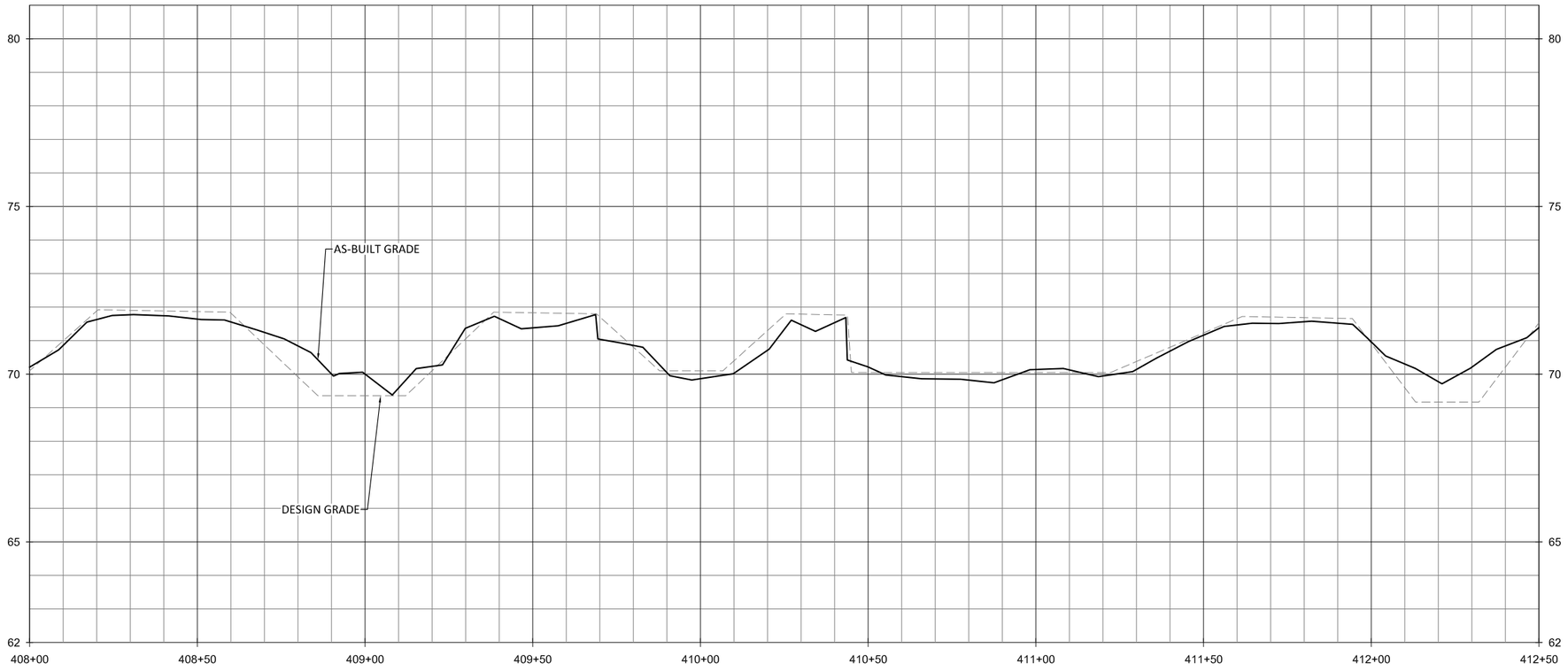
UT4
Stream Plan and Profile

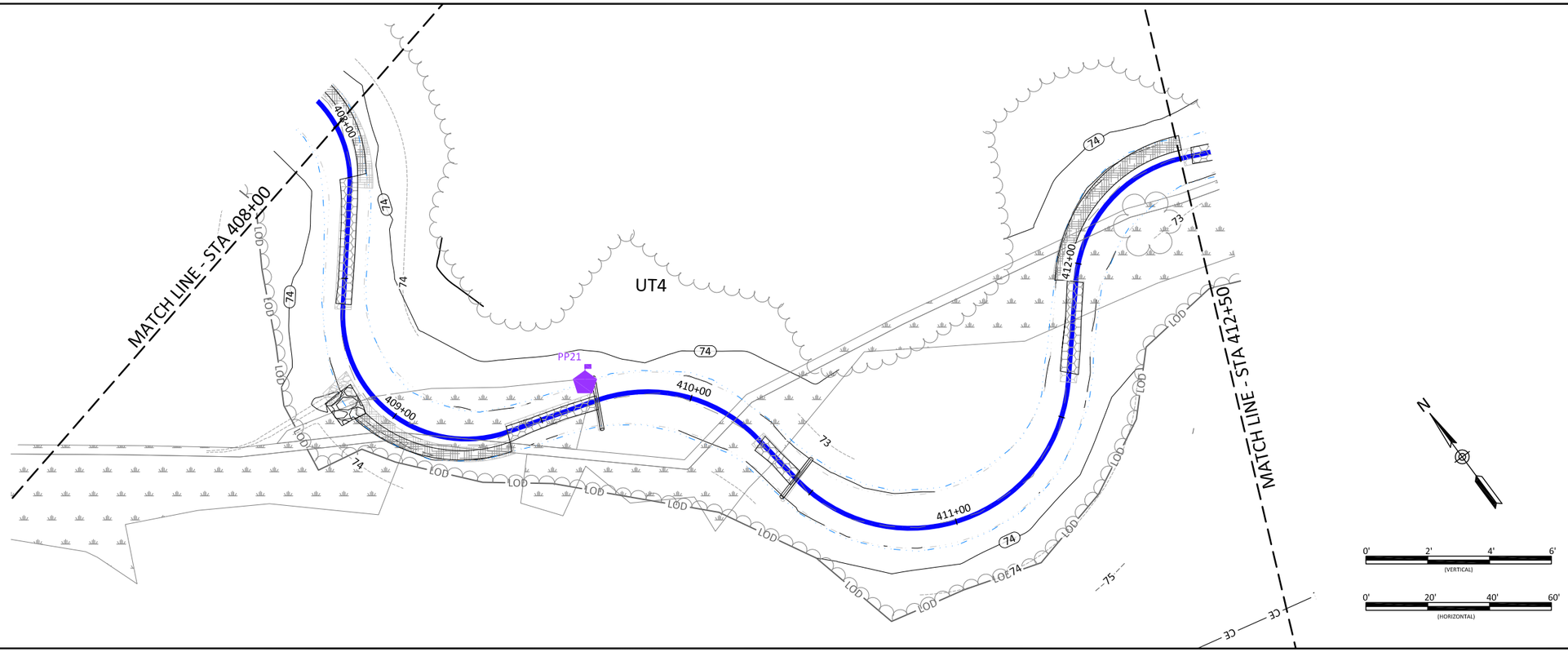
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.16

April 13, 2021





NOTES:
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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. WEAVER
04.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
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Sheet 1.17

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NOTES:
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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. HAM

04.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

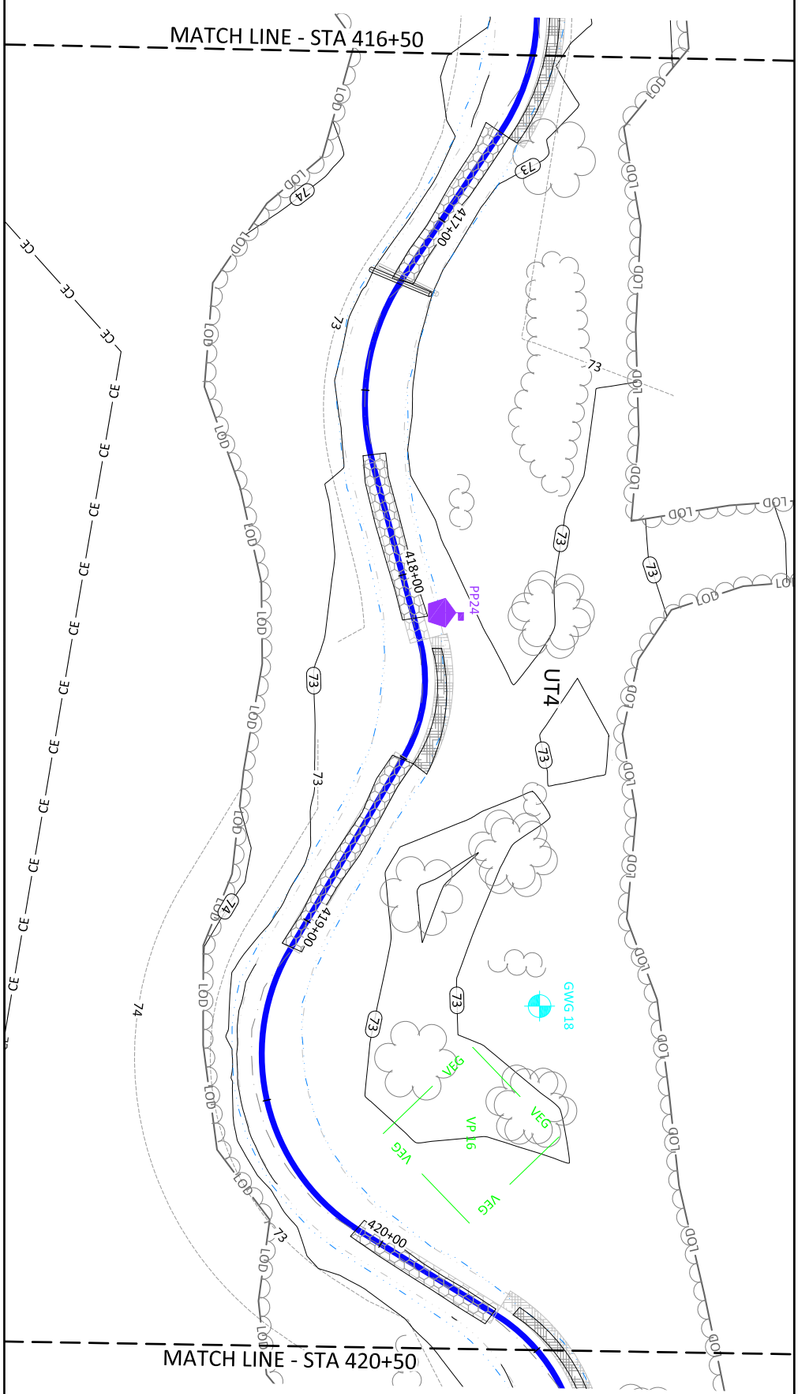
UT4
Stream Plan and Profile

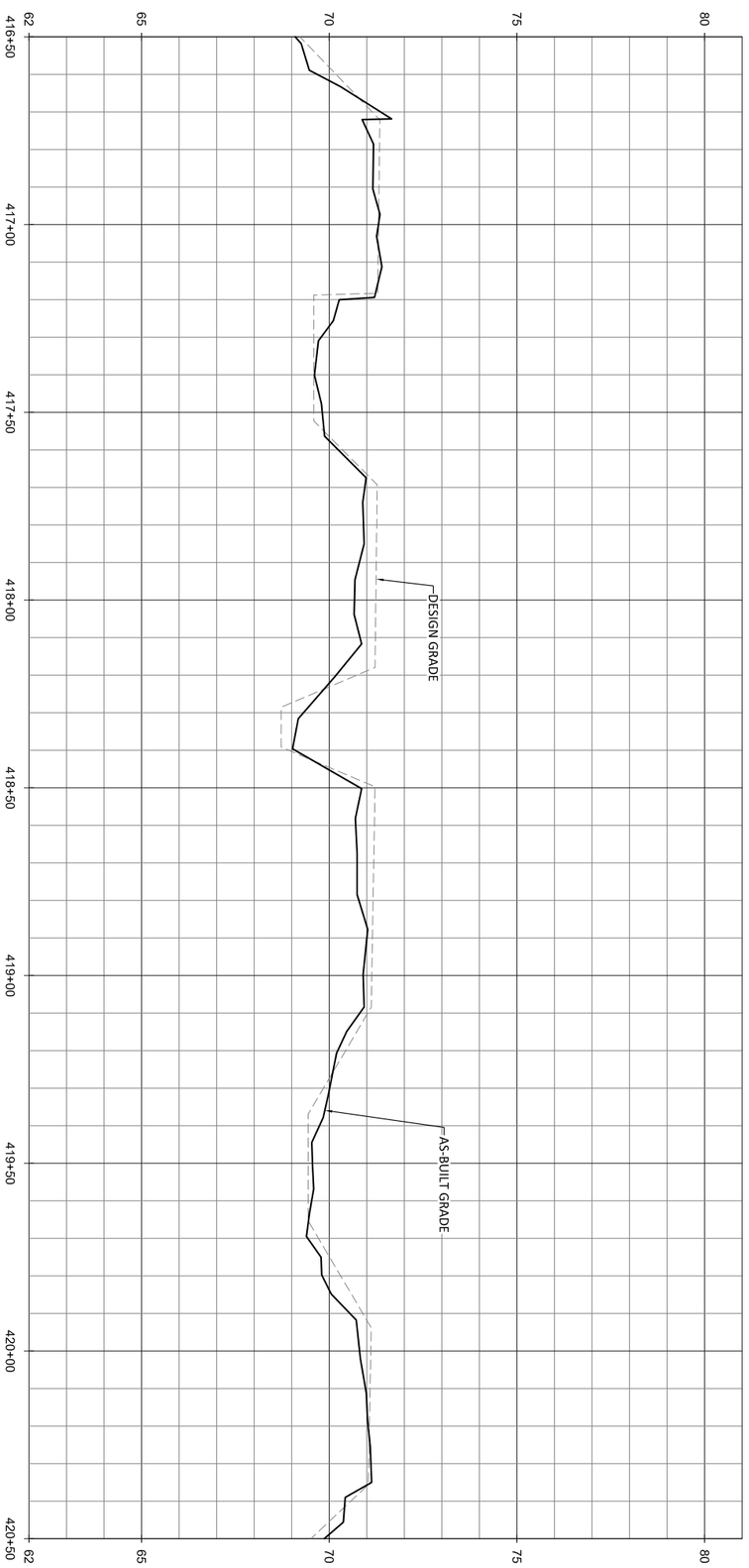
Revisions:

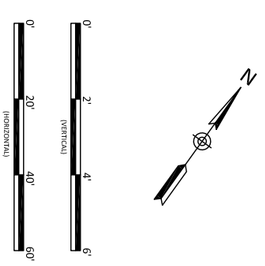
Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.18

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.







Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

Revisions:

1.19
Sheet

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEREMIAH N. KELTON
4.13.21

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. IVEY 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.20

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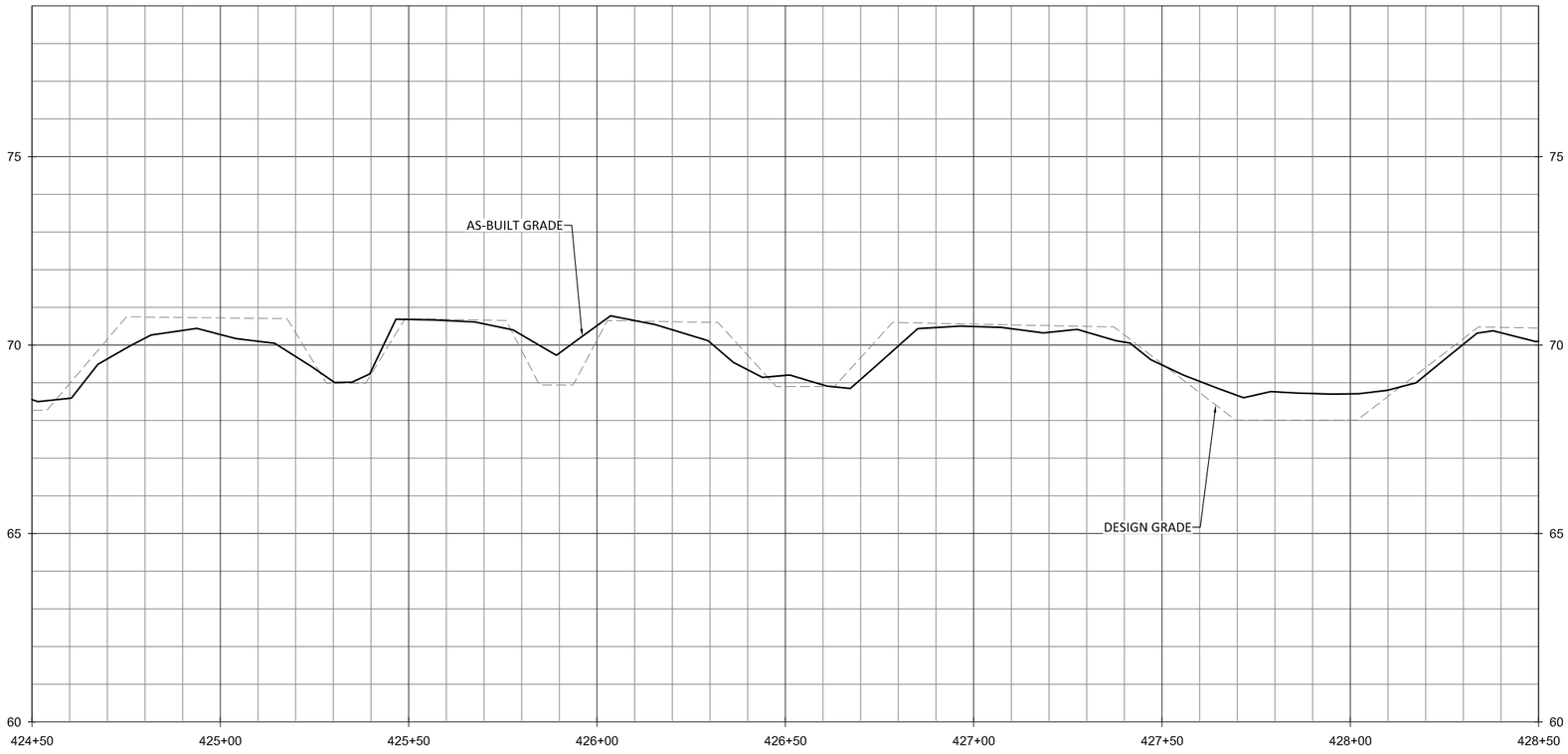
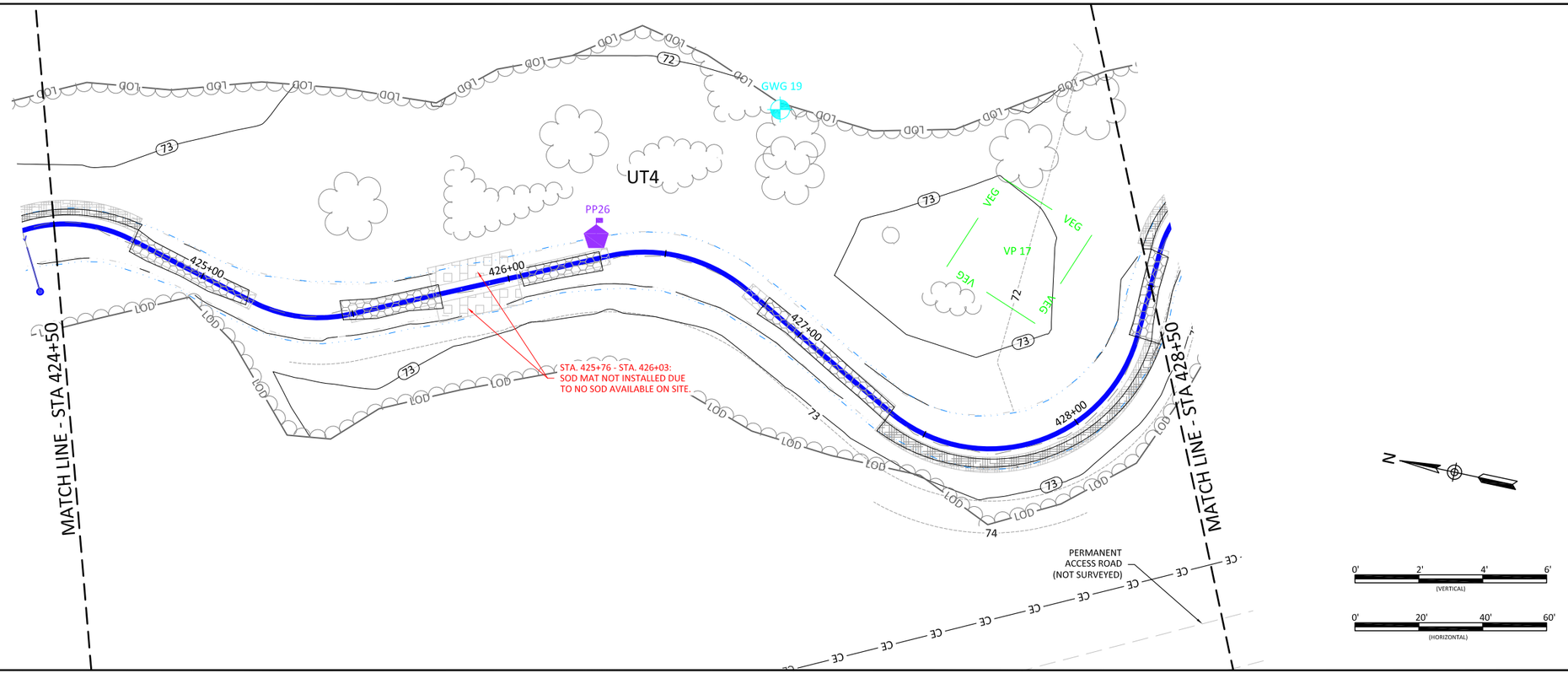
April 13, 2021





NOTES:
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McClenny Acres Mitigation Site
Wayne County, North Carolina

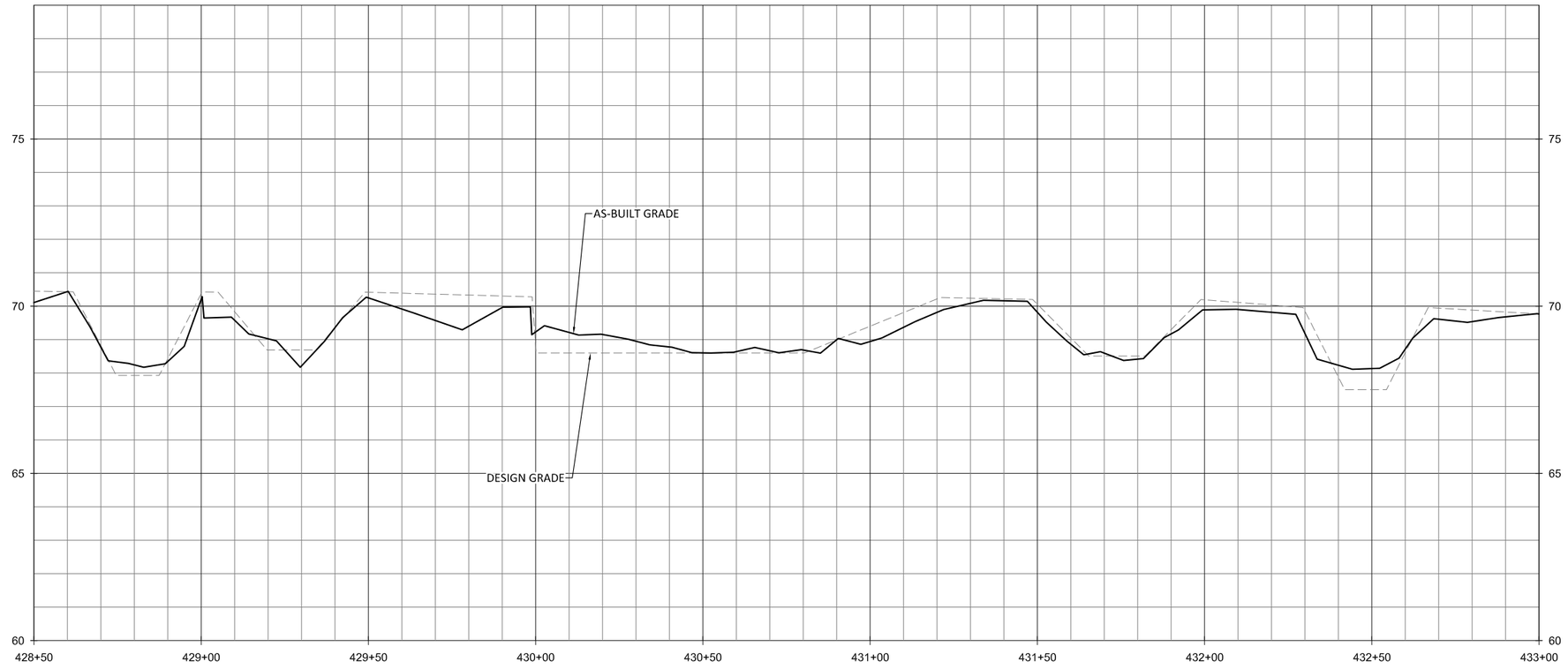
UT4
Stream Plan and Profile

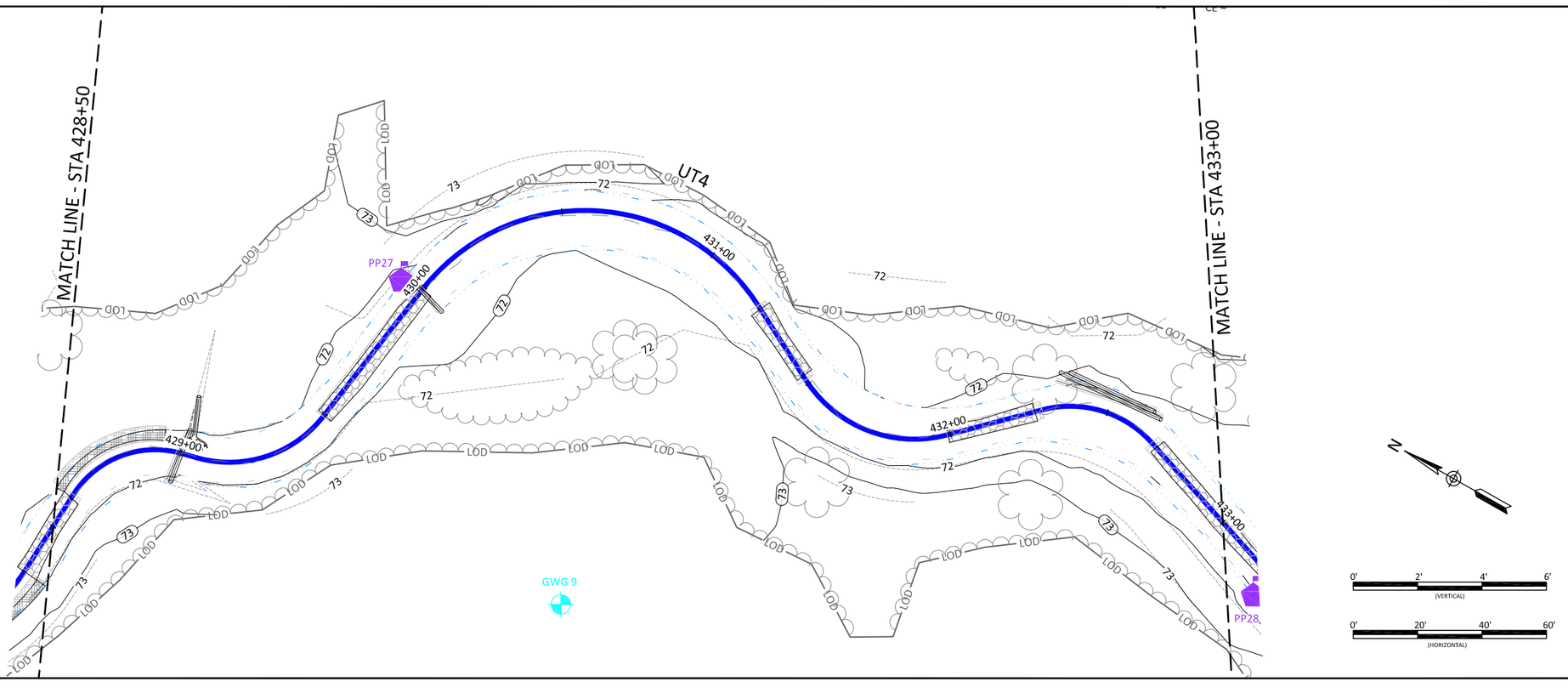
Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.21

April 13, 2021





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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031027 JEFFERSON N. KLEIN 04-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.22

April 13, 2021

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

0' 2' 4' 6' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)

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PROFESSIONAL ENGINEER NORTH CAROLINA SEAL 031027 JEFFERSON A. WILLIAMS 04-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.23

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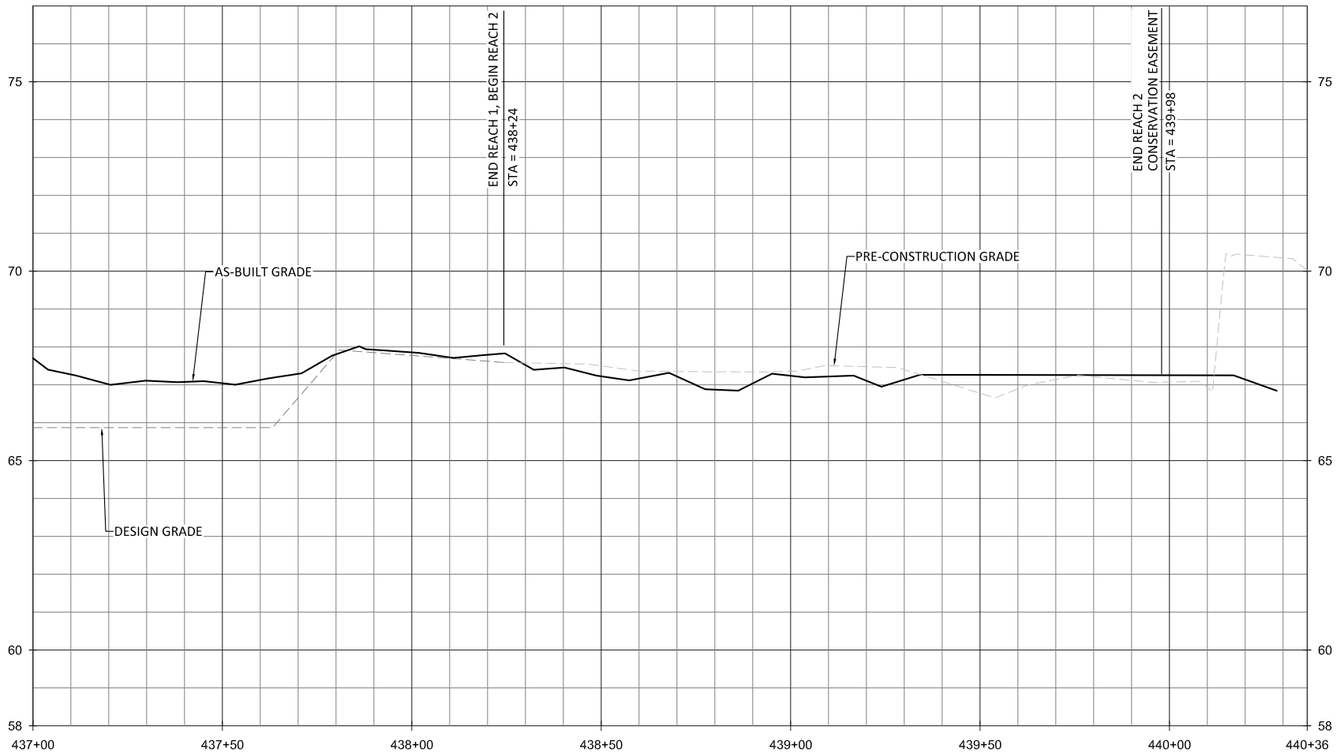
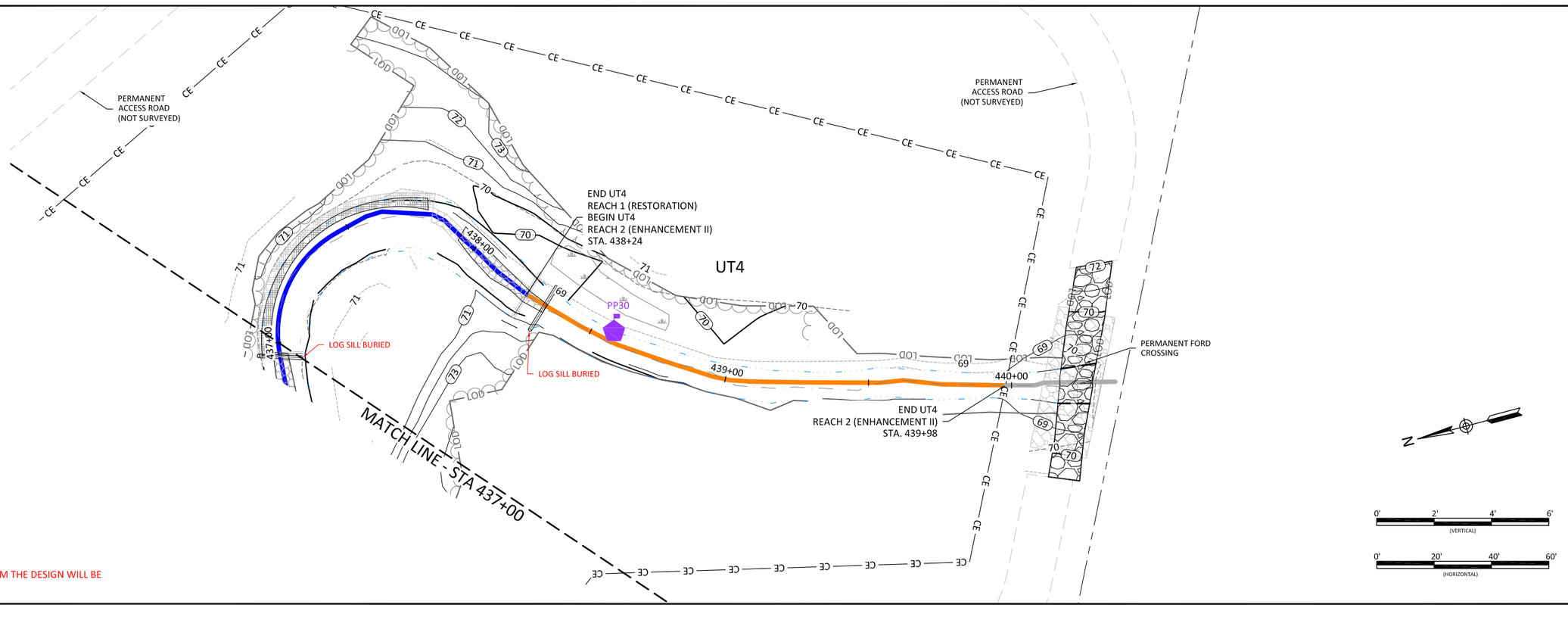
April 13, 2021





NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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PROFESSIONAL ENGINEER
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SEAL
031027
JEFFERSON A. NOLEN
4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

UT4
Stream Plan and Profile

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 1.24

April 13, 2021

PERMANENT FORD CROSSING

EXISTING 80'
POWERLINE EASEMENT
(PC I SLIDE 240)

APPROXIMATE LOCATION
OF POWERLINE
MAINTENANCE LIMITS

EXISTING 20'
SOUTHERN BELL EASEMENT
(PC I SLIDE 240)

WETLAND CROSSING
WITH CROSS DRAINS.

PERMANENT FORD
CROSSING

POWERLINE MAINTENANCE LIMITS NOTE:

THE OVERHEAD POWERLINE UTILITY EASEMENT IS PLATTED AS SHOWN ON THIS SHEET WITH A WIDTH OF 80 FEET. HOWEVER, THE ORIGINAL 1949 EASEMENT DOCUMENT INDICATES THE WIDTH OF THE UTILITY EASEMENT IS 150 FEET AND DUKE ENERGY CURRENTLY MAINTAINS A CORRIDOR OF THAT WIDTH FOR THE OVERHEAD POWERLINES. WILDLANDS COORDINATED WITH DUKE ENERGY TO DEFINE THE EXTENTS OF THE 150-WIDE CORRIDOR THROUGH THE PROPERTY THAT WILL BE MAINTAINED BY DUKE ENERGY WHICH ARE SHOWN ON THIS AS-BUILT PLAN AS "POWERLINE MAINTENANCE LIMITS".

Wetland Enhancement

Wetland Re-establishment

Wetland Preservation
Outside of DMS Project
Area

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

0' 175' 350' 525'
1" = 175'

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PROFESSIONAL ENGINEER
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031027
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11-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Wetlands

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 2.0

X:\Shared\Projects\WI02167_McClenny_Acres\Monitoring\As-Built Drawings\Plans\005-02167-AB Wetlands Overview.dwg

April 13, 2021

POWERLINE MAINTENANCE LIMITS NOTE:

THE OVERHEAD POWERLINE UTILITY EASEMENT IS PLATTED AS SHOWN ON THIS SHEET WITH A WIDTH OF 80 FEET. HOWEVER, THE ORIGINAL 1949 EASEMENT DOCUMENT INDICATES THE WIDTH OF THE UTILITY EASEMENT IS 150 FEET AND DUKE ENERGY CURRENTLY MAINTAINS A CORRIDOR OF THAT WIDTH FOR THE OVERHEAD POWERLINES. WILDLANDS COORDINATED WITH DUKE ENERGY TO DEFINE THE EXTENTS OF THE 150-WIDE CORRIDOR THROUGH THE PROPERTY THAT WILL BE MAINTAINED BY DUKE ENERGY WHICH ARE SHOWN ON THIS AS-BUILT PLAN AS "POWERLINE MAINTENANCE LIMITS".

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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON A. NOLEN 4-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Access Road Construction Overview

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 3.0

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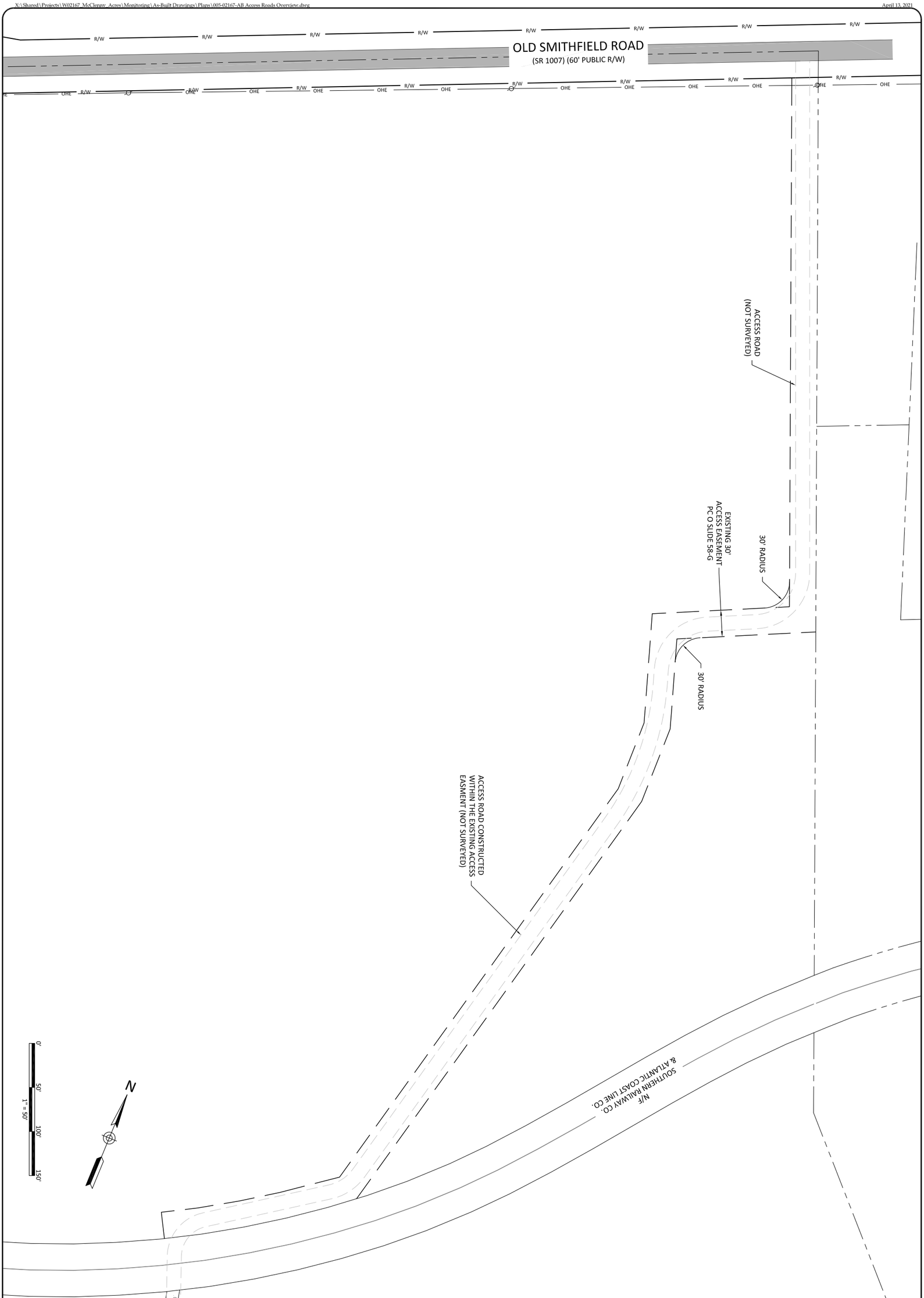

Date:	03.20.2020
Job Number:	005-02167
Project Engineer:	NMM
Drawn By:	CAW
Checked By:	ANA

3.1
Sheet

Revisions:

McClenny Acres Mitigation Site
Wayne County, North Carolina

Access Road Construction

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON K. KEATON
4.13.21

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April 13, 2021

Zone 1 (UT2, UT3 Reach 1) - Streambank Planting Zone 1

Zone 2 (UT1, UT3 Reach 2, UT4) - Streambank Planting Zone 2

Zone 3 - Upland Buffer Planting Zone

Zone 4 - Wetland Planting Zone

Zone 5 - Atlantic White Cedar Planting Zone

Zone 6 - Permanent Seeding Outside Easement

Note: Non-hatched areas within easement are currently vegetated, and will be planted as needed to achieve target density.

Streambank Planting Zone
Live Stakes and Herbaceous Plugs

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	% of Total
Salix nigra	Black Willow	12 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	20%
Cornus amomum	Silky Dogwood	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	25%
Sambucus canadensis	Elderberry	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	25%
Salix sericea	Silky Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	30%
Carex alata	Broadwing Sedge	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	N/A
Carex lurida	Lurid Sedge	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	N/A
Juncus effusus	Common Rush	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	N/A
						100%

Zone 1 (UT2, UT3 Reach 1): Live stakes were planted above top of bank in 2 staggered rows 2-3 ft apart with a linear spacing of 3-4 ft on the outside of meander bends and 6 ft on both sides of tangent sections. Herbaceous plugs were planted between normal water elevation and the top of bank at a spacing of 3-4 ft.

Zone 2 (UT1, UT3 Reach 2, UT4): Live stakes were planted above top of bank in 2 staggered rows with a linear spacing of 3-4 ft on the outside of meander bends and 6 ft on both sides of tangent sections. Herbaceous plugs were planted at or near the normal water elevation at a spacing of 3-4 feet.

Planting Acreage

Planting Zone	DMS Easement	Bank Easement	Total
Zone 1 - Streambank Planting Zone 1 (UT2, UT3 Reach 1)	0.28 ac	0.21 ac	0.49 ac
Zone 2 - Streambank Planting Zone 2 (UT1, UT3 Reach 2, UT4)	~~2.57 ac~~ 2.55 ac	N/A	~~2.57 ac~~ 2.55 ac
Zone 3 - Upland Buffer Planting Zone	~~8.34 ac~~ 8.29 ac	~~9.42 ac~~ 9.15 ac	~~17.76 ac~~ 17.44 ac
Zone 4 - Wetland Planting Zone	~~25.61 ac~~ 24.96 ac	~~34.68 ac~~ 33.12 ac	~~60.30 ac~~ 58.08 ac
Zone 5 - Atlantic White Cedar Planting Zone	0.62 ac	0.16 ac	0.78 ac
Zone 6 - Permanent Seeding Outside Easement	N/A	N/A	2.25 ac

PLANTING ACREAGES WERE ADJUSTED BASED ON POWERLINE MAINTENANCE LIMITS.

Buffer Planting Zone
Bare Root

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	% of Total
Quercus pagoda	Cherrybark Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Quercus phellos	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	15%
Platanus occidentalis	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Betula nigra	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Diospyros virginiana	Common Persimmon	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
Quercus michauxii	Swamp Chestnut Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Populus deltoides	Eastern Cottonwood	13 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
Magnolia Virginiana	Sweetbay Magnolia	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
Fraxinus pennsylvanica	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
Taxodium distichum	Bald Cypress	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
						100%

Wetland Planting Zone
Bare Root

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	% of Total
Taxodium distichum	Bald Cypress	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	22%
Quercus pagoda	Cherrybark Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Platanus occidentalis	American Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	12%
Betula nigra	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	12%
Salix nigra	Black Willow	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
Nyssa biflora	Swamp Tupelo	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Quercus michauxii	Swamp Chestnut Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Quercus lyrata	Overcup Oak	13 ft.	6-12 ft.	0.25"-1.0"	Canopy	7%
Magnolia virginiana	Sweetbay Magnolia	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	4%
Fraxinus pennsylvanica	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	4%
Ulmus alata	Winged Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	4%
						100%

Atlantic White Cedar Planting Zone
Bare Root

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	% of Total
Chamaecyparis thyoides	Atlantic White Cedar	6 ft.	6-6 ft.	0.25"-1.0	Canopy	100%

Zones 6 - seeding only

Zones 1-5

Permanent Riparian Seed Planting Zone
Pure Live Seed (20 lbs/ acre)

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
All Year	*Panicum rigidulum*	Redtop Panicgrass	Herb	3
All Year	*Agrostis hyenalis*	Winter Bentgrass	Herb	2
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	1
All Year	*Coreopsis lanceolata*	Lanceleaf Tickseed	Herb	1
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	3
All Year	*Elymus virginicus*	Virginia Wildrye	Herb	3
All Year	*Biden aristosa*	Bearded Beggarticks	Herb	1
All Year	*Helianthus angustifolius*	Swamp Sunflower	Herb	1
All Year	*Panicum virgatum*	Switchgrass	Herb	1
All Year	*Poa palustris*	Fowl Bluegrass	Herb	1
All Year	*Dichanthelium clandestinum*	Deertongue	Herb	3

Zones 1-6

Temporary Seeding
Pure Live Seed

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
Aug 15 - May 1	*Secale cereale*	Rye Grain	Herb	50
May 1 - Aug 15	*Setaria italica*	German Millet	Herb	50

NOTES:
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NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. NOLEN 11-13-21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Planting Tables

Revisions:

Date: 03/20/2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 4.0

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April 13, 2021

NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

EXISTING 80' POWERLINE EASEMENT (PC I SLIDE 240)

APPROXIMATE LOCATION OF POWERLINE MAINTENANCE LIMITS

EXISTING 20' SOUTHERN BELL EASEMENT (PC I SLIDE 240)

UT1

UT2

UT3

UT4

Zone 1 (UT2, UT3 Reach 1) - Streambank Planting Zone 1

Zone 2 (UT1, UT3 Reach 2, UT4) - Streambank Planting Zone 2

Zone 3 - Upland Buffer Planting Zone

Zone 4 - Wetland Planting Zone

Zone 5 - Atlantic White Cedar Planting Zone

Zone 6 - Permanent Seeding Outside Easement

Note: Non-hatched areas within easement are currently vegetated, and will be planted as needed to achieve target density.

POWERLINE MAINTENANCE LIMITS NOTE:

THE OVERHEAD POWERLINE UTILITY EASEMENT IS PLATTED AS SHOWN ON THIS SHEET WITH A WIDTH OF 80 FEET. HOWEVER, THE ORIGINAL 1949 EASEMENT DOCUMENT INDICATES THE WIDTH OF THE UTILITY EASEMENT IS 150 FEET AND DUKE ENERGY CURRENTLY MAINTAINS A CORRIDOR OF THAT WIDTH FOR THE OVERHEAD POWERLINES. WILDLANDS COORDINATED WITH DUKE ENERGY TO DEFINE THE EXTENTS OF THE 150-WIDE CORRIDOR THROUGH THE PROPERTY THAT WILL BE MAINTAINED BY DUKE ENERGY WHICH ARE SHOWN ON THIS AS-BUILT PLAN AS "POWERLINE MAINTENANCE LIMITS".

N

0' 175' 350' 525'
1" = 175'

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 031027 ENGINEER JEFFERSON N. MOSS
04.13.21

McClenny Acres Mitigation Site
Wayne County, North Carolina

Planting Plan Overview

Revisions:

Date: 03.20.2020
Job Number: 005-02167
Project Engineer: NMM
Drawn By: CAW
Checked By: ANA

Sheet 4.1

X:\Shared Projects\005-02167 - McClenny Acres\Monitoring\As-Built Drawings\Plans\005-02167-AB Planting Plan Overview.dwg

APPENDIX 6. Buffer Baseline Monitoring Report

BUFFER BASELINE MONITORING REPORT

FINAL

May 2021

McClenny Acres Mitigation Site

Wayne County, NC
NCDEQ Contract No. 7423
DMS ID No. 100038
NCDWR Project Number 2016-0197

Neuse River Basin
HUC 03020201

RFP #: 16-007279

PREPARED FOR:

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

BUFFER BASELINE MONITORING REPORT

MCCLENNY ACRES MITIGATION SITE

Wayne County, NC
NCDEQ Contract No. 7423
DMS ID No. 100038

Neuse River Basin
HUC 03020201

PREPARED FOR:

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

PREPARED BY:

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609
Phone: (919) 851-9986

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.

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

Contributing Staff:

Jeff Keaton, *Project Manager*
John Hutton, *Principal in Charge*
Jason Lorch, *Baseline Monitoring Plan*
Daniel Taylor, *Construction Administrator*
Charlie Neaves, *Monitoring Lead*
Andrea Eckardt, *Lead Quality Assurance*

TABLE OF CONTENTS

APPENDICES

1.0 Mitigation Project Summary

The McClenny Acres Mitigation Site (Site) is a buffer mitigation project in conjunction with a stream and wetland mitigation project. The Site is located in Wayne County, NC approximately four miles west of Goldsboro (Figure 1). Figure 2 depicts the service area of the Site. A 54.24-acre conservation easement along four unnamed tributaries to the Neuse River was recorded on the Site (Figure 3). Before construction, the Site was characterized by a large area in row crop agriculture and a wooded portion with distinct areas of pines and hardwoods. The Site is expected to generate 196,531.361 buffer credits.

The Site is within Hydrologic Unit Code (HUC) 03020201200030 and North Carolina Department of Water Resources (NCDWR) Sub-basin 03-04-12. The four unnamed tributaries (UT1-UT4) drain to the Neuse River. The Neuse River is classified as water supply waters (WS-IV) and nutrient sensitive waters (NSW).

1.1 Project Goals

The major goals of the riparian restoration project are to provide ecological and water quality enhancements to the Neuse River Watershed by restoring a preserving a functional riparian corridor. The Site is in a new Targeted local watershed which was not described in the 2010 Neuse River Basin Restoration Priorities (RBRP) plan (Breeding, 2010). The site will support the CU-wide restoration goals describe in the RBRP including reduction of sediment and nutrient loads from agricultural lands by restoring and preserving wetlands, streams, riparian buffers, and implementation of a nutrient offset project. Specific enhancements to water quality and ecological processes are outlined below:

- Decrease nutrient levels - Nutrient input will be decreased by filtering runoff from the agricultural fields through restored native buffer zones. The off-site nutrient input will also be absorbed on-site by dispersing flood flows through native vegetation, thereby reducing nutrient inputs to waters of the Neuse River Basin.
- Decrease water temperature and increase dissolved oxygen concentrations - Establishment and maintenance of riparian buffers will create additional long-term shading of the channel flow to reduce thermal pollution.
- Restore and enhance native floodplain vegetation - Plant native tree species in riparian zone where currently insufficient.
- Permanently protect the Site from harmful uses - Establish a conservation easement on the Site. Protect aquatic habitat; protecting water supply waters.

1.2 Pre-construction Site Conditions

The buffer mitigation area included a row crop field and forest with ditches and channelized streams. The Site includes four unnamed tributaries to the Neuse River (UT1-UT4). UT3 is intermittent upstream of the confluence with UT2, but all other project streams are perennial. The buffer project attributes are listed in Table 1, located in Appendix 1.

UT1 flows out of a wooded area to the northeast of the Site. On the Site, UT1 had been ditched parallel to the property line but was completely within the project parcel. The channelized stream followed the eastern property line for approximately 1,400 feet before turning sharply to the west and flowing through a wetland area. There were spoil piles that created a berm along portions of the stream and a remnant channel feature that evident near the existing channel in certain locations. Land use along the western side of the upstream portion of UT1 was row crop production while the eastern side was wooded. Beginning at the point where UT1 turns to the west, it flowed through woods along both banks for approximately 700 feet. Beyond that point it flowed along the southern edge of the row crop fields

for approximately 800 feet to the south to the confluence with UT3 to form UT4 (Figure 2). UT1 had been ditched at least since the late 1950s for agricultural purposes as evidenced by the straight alignment and overly deep cross section.

UT2 flowed onto the Site from a seep in a wooded area on the north side of the project parcel. It had been channelized at least since the late 1950s and was very straight. The ditched stream flowed southeast for approximately 400 feet before meeting an agricultural ditch and turning west. South of the wooded area, UT2 was entirely surrounded by agricultural fields.

UT3 originates north of the Site and flows onto the property through a culvert underneath the railroad. The channelized stream flowed along the toe of the railroad fill slope for approximately 350 feet before entering a forested area and making a gradual turn to the south. The stream exited the forested area and flowed 800 feet through the agricultural field before entering another forested reach and turning southeast. After exiting this wooded reach, UT3 turned south with forest on one side and the agriculture field on one side before reaching the confluence with UT1.

UT4 began at the confluence of UT1 and UT3 and flowed through a wooded area for approximately 2,700 feet to the Neuse River. This stream had also been ditched and is extremely straight for its entire length. Land use surrounding this stream was forest, but a path had been maintained on the right floodplain.

On February 9, 2018 NCDWR conducted on-site determinations to review features and land use within the project boundary. The resulting NCDWR site viability letter and map confirming the Site as suitable for riparian buffer and nutrient offset mitigation is located in Appendix 2. The four unnamed tributaries are appropriate for buffer and nutrient offset mitigation as related to the rules set forth in the Neuse Buffer Mitigation Rules: Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers (15A NCAC 02B .0295) and Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers (15A NCAC 02B .0233).

2.0 Determination of Credits

The project is expected to generate 196,531.361 riparian buffer credits, through buffer restoration and preservation along restored intermittent and perennial channels. Some buffer restoration credits may also be converted to nitrogen nutrient offset credits. Conversion to phosphorus nutrient offset is not viable in the service area. Mitigation credits are presented in Table 2 and illustrated in Figure 3 (Appendix 1). Calculations are based upon the as-built survey included in Appendix 3.

Project credits have been adjusted since the mitigation plan was approved to account for a wider Duke Energy powerline maintenance corridor. Mitigation plan credits were based on the recent plat that shows an 80-foot-wide powerline easement. However, the original 1949 easement document indicates the easement is 150 feet wide and Duke Energy currently maintains this 150-foot width. Wildlands coordinated with Duke Energy to define the extents of the 150-foot-wide maintenance corridor (Figure 3) and removed all credits within this corridor. This adjustment in utility corridor width and improved accuracy of survey resulted in a reduction of 6,139.446.

3.0 Baseline Summary

Riparian buffers were restored and preserved along four unnamed tributaries to the Neuse River in conjunction with McClenny Acres stream and wetland mitigation. Impacts to existing forested riparian buffers were minimized. Figure 3 illustrates the as-built conditions for the Site. Detailed descriptions of

the restoration activity follow in sections 3.1 through 3.4. Aerial photographs of the Site are included in Appendix 4.

3.1 Parcel Preparation

The four channelized streams were completely realigned and drainage ditches were filled as part of the stream and wetland mitigation project. Permits for impacts to aquatic resources are included in Appendix 5. Restored riparian corridors were prepared for planting by chisel plowing and disking. No tillage was implemented within buffer preservation areas impacted by stream restoration to further limit impact to existing tree roots. Minimal invasive species were present within the project area at the time of construction and planting.

3.2 Riparian Area Restoration Activities

The revegetation plan for the riparian restoration areas included permanent seeding and planting bare root trees. The species composition planted was selected based on the desired community type, occurrence of species in riparian areas adjacent to the Site, and best professional judgement. The total number of tree species planted across the buffer areas are as follows: cherrybark oak (*Quercus pagoda*) 463 stems, willow oak (*Quercus phellos*) 695 stems, American sycamore (*Platanus occidentalis*) 927 stems, river birch (*Betula nigra*) 927 stems, common persimmon (*Diospyros virginiana*) 232 stems, swamp chestnut oak (*Quercus michauxii*) 463 stems, eastern cottonwood (*Populus deltoides*) 232 stems, sweetbay magnolia (*Magnolia virginiana*) 232 stems, green ash (*Fraxinus pennsylvanica*) 231 stems, and bald cypress (*Taxodium distichum*) 232 stems.

Trees were planted at a density sufficient to meet the performance standards outlined in the Rule 15A NCAC 02B .0295 of 260 trees per acre at the end of five years. An appropriate seed mix was applied as necessary to provide temporary ground cover for soil stabilization and reduction of sediment loss during rain events in disturbed areas. This was followed by an appropriate permanent seed mixture. Tree planting was completed in March 2021.

3.3 Riparian Area Preservation Activities

Impacts to existing hardwood tree species within buffer preservation areas were minimized, though some were necessary for the stream restoration project. Buffer preservation areas impacted by stream restoration were planted where appropriate. No tillage was conducted in these areas to avoid impacts to remaining tree roots. Preservation areas are protected in perpetuity by a conservation easement.

4.0 Annual Monitoring and Performance Criteria

The performance criteria for the Site follow approved performance criteria presented in the guidance documents outlined in Request for Proposal (RFP) 16-007279 and the Consolidated Buffer Rule (15A NCAC 02B .0295). Annual monitoring and semi-annual site visits will be conducted to assess the condition of the project. The riparian restoration component of the project has been assigned specific performance criteria components for vegetation that will be evaluated throughout the five-year post-construction monitoring. An outline of the performance criteria and monitoring components follows. Monitoring components are included in Table 3 and vegetation plots are depicted in Figure 4 (Appendix 1).

4.1 Vegetation

Performance Standards for the Site will be based on the health and survival of a minimum density of 260 trees per acre after five years of monitoring, with a minimum of four native hardwood tree or shrub species and no one species comprising more than 50 percent of stems. Height, visual assessment of damage, and vigor will be used as indicators of overall health. Desirable volunteer species may be

included to meet the success criteria upon DWR approval. The extent of invasive species coverage will also be monitored and treated as necessary throughout the required five-year monitoring period.

Six fixed 100 square meter vegetation monitoring plots were installed across the buffer restoration components of the Site to measure the density of the planted stems (Figure 4). Stem density ranges from 567 to 647 stems per acre (Table 4). Vegetation monitoring followed the CVS-EEP Level 2 Protocol for Recording Vegetation (2008). All planted stems were marked with flagging tape and a reference photograph was taken from the southwestern corner of each vegetation plot during vegetation assessments. Each year, trees will be re-marked and plot photos will be taken along with overview photographs of the Site. Appendix 6 includes the baseline (MY0) vegetation plot planted and total stem counts, as well as plot photographs.

4.2 Overview Photographs

Photographs will be taken within the project area once a year to visually document vegetation growth for five years following construction. Baseline overview photographs are included in Appendix 4.

4.3 Visual Assessments

Visual assessments should support the performance standards for each metric as described above. Visual assessments will be performed within the Site on a semi-annual basis during the five-year monitoring period. Problem areas with vegetative health will be noted (e.g. low stem density, vegetation mortality, invasive species, or encroachment). Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment.

4.4 Annual Reporting Performance Criteria

Using the Division of Mitigation Services (DMS) Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0 (2017), monitoring reports will be prepared in the fall of each monitoring year and submitted to DMS. The monitoring period will extend five years beyond completion of construction or until performance criteria have been met.

4.5 Maintenance and Contingency Plans

The conservation easement has been properly and accurately marked by adding witness posts with easement placards along the easement boundary and at every corner. Adaptive management will be performed during the monitoring years to address minor issues as necessary. If during annual monitoring it is determined the project's ability to achieve performance standards are jeopardized, Wildlands will notify and work with the DMS/NCDWR to develop contingency plans and remedial actions. Any actions implemented will be designed to achieve the success criteria specified previously and will include a work schedule and updated monitoring criteria (if applicable).

5.0 References

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

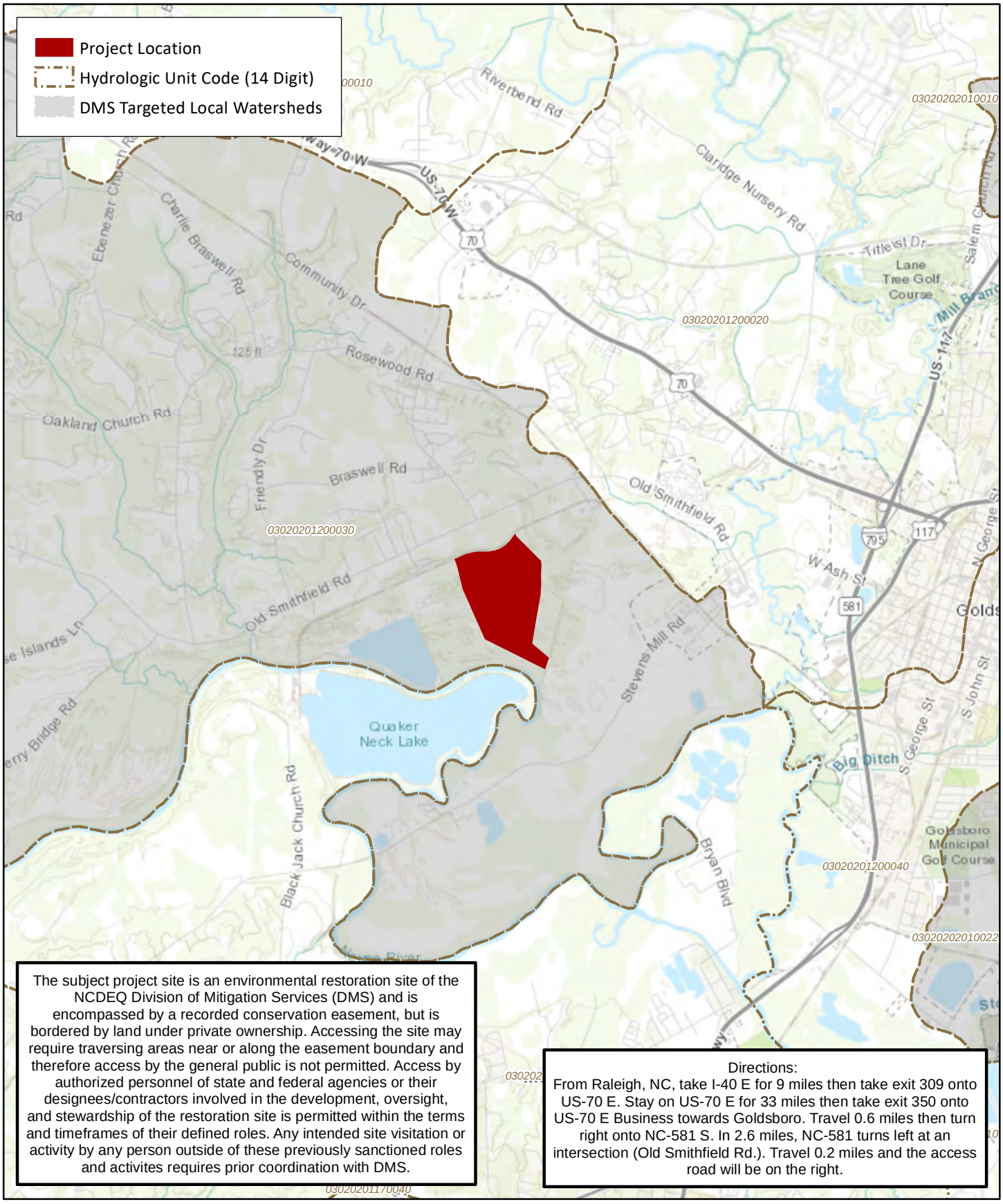
Lee, M.T., Peet, R.K., Roberts, S.D., & Wentworth, T.R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Accessed at: http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-2.pdf

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

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

Wildlands Engineering, Inc. (2019). McClenny Acres Mitigation Site – Riparian Buffer Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

APPENDIX 1. General Figures and Tables



The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activites requires prior coordination with DMS.

Directions:
From Raleigh, NC, take I-40 E for 9 miles then take exit 309 onto US-70 E. Stay on US-70 E for 33 miles then take exit 350 onto US-70 E Business towards Goldsboro. Travel 0.6 miles then turn right onto NC-581 S. In 2.6 miles, NC-581 turns left at an intersection (Old Smithfield Rd.). Travel 0.2 miles and the access road will be on the right.

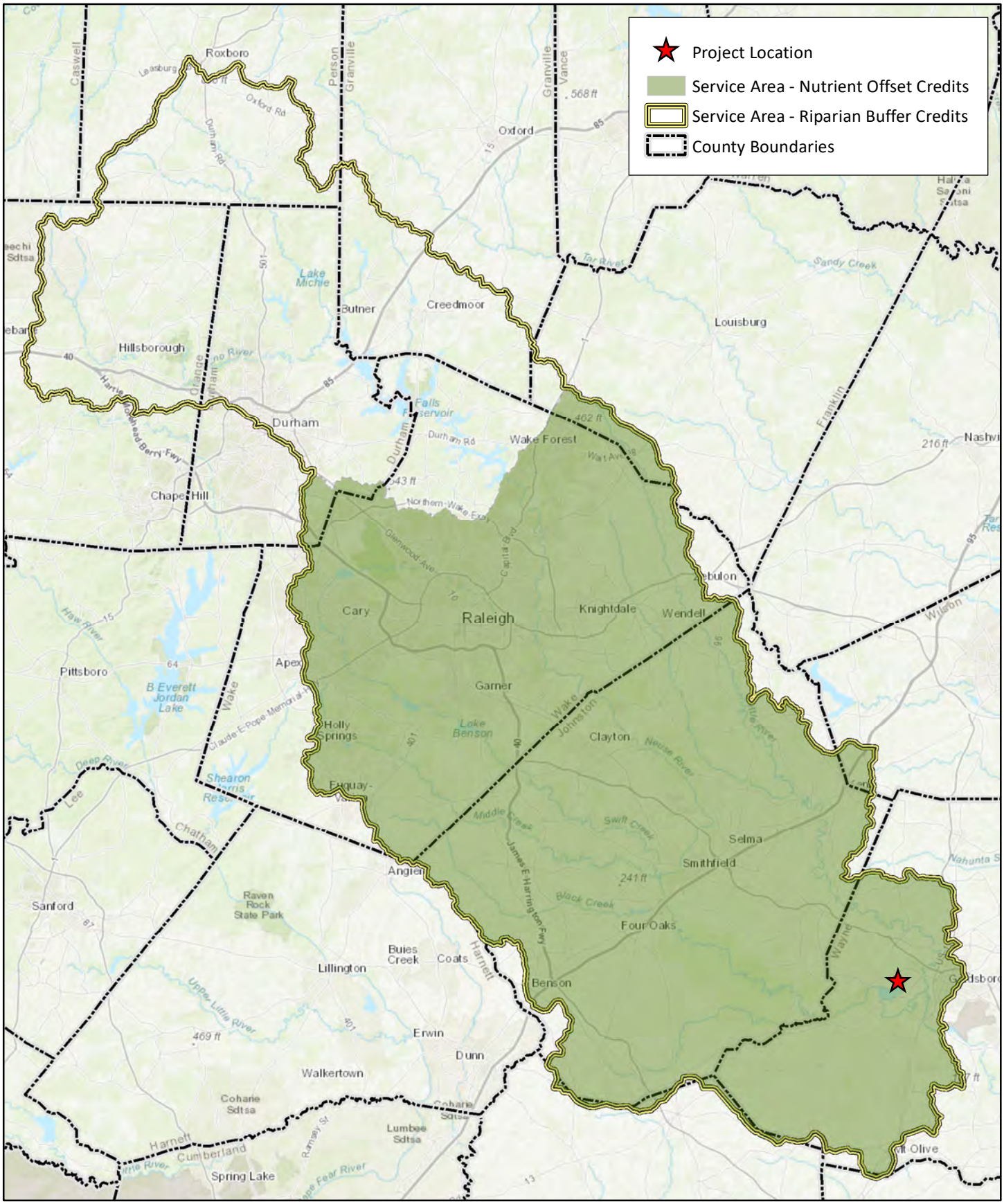
WILDLANDS ENGINEERING

0 0.5 1 Miles

N

Figure 1. Project Vicinity Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

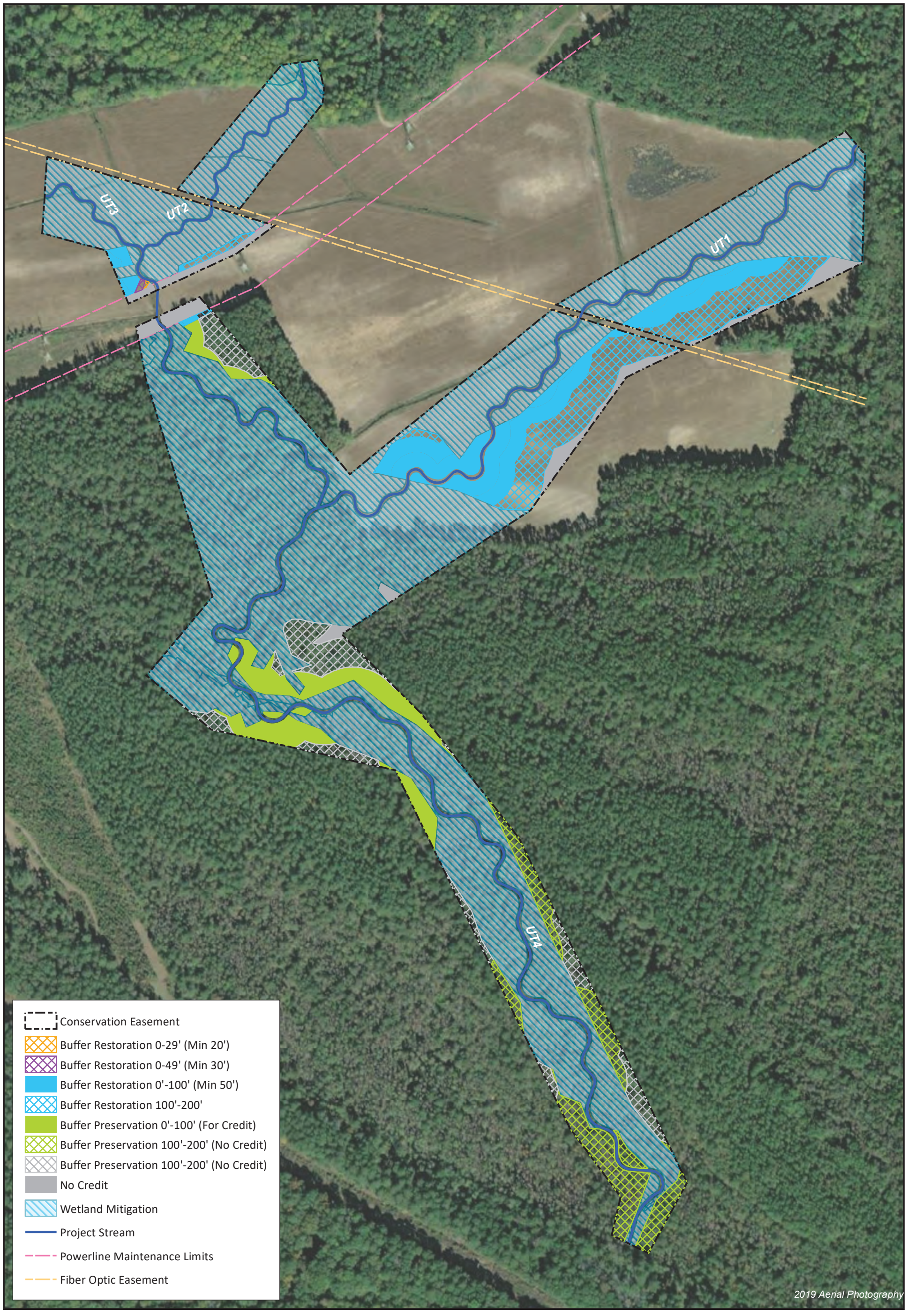
Wayne County, NC



WILDLANDS ENGINEERING

Figure 2. Service Area Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Wayne County, NC



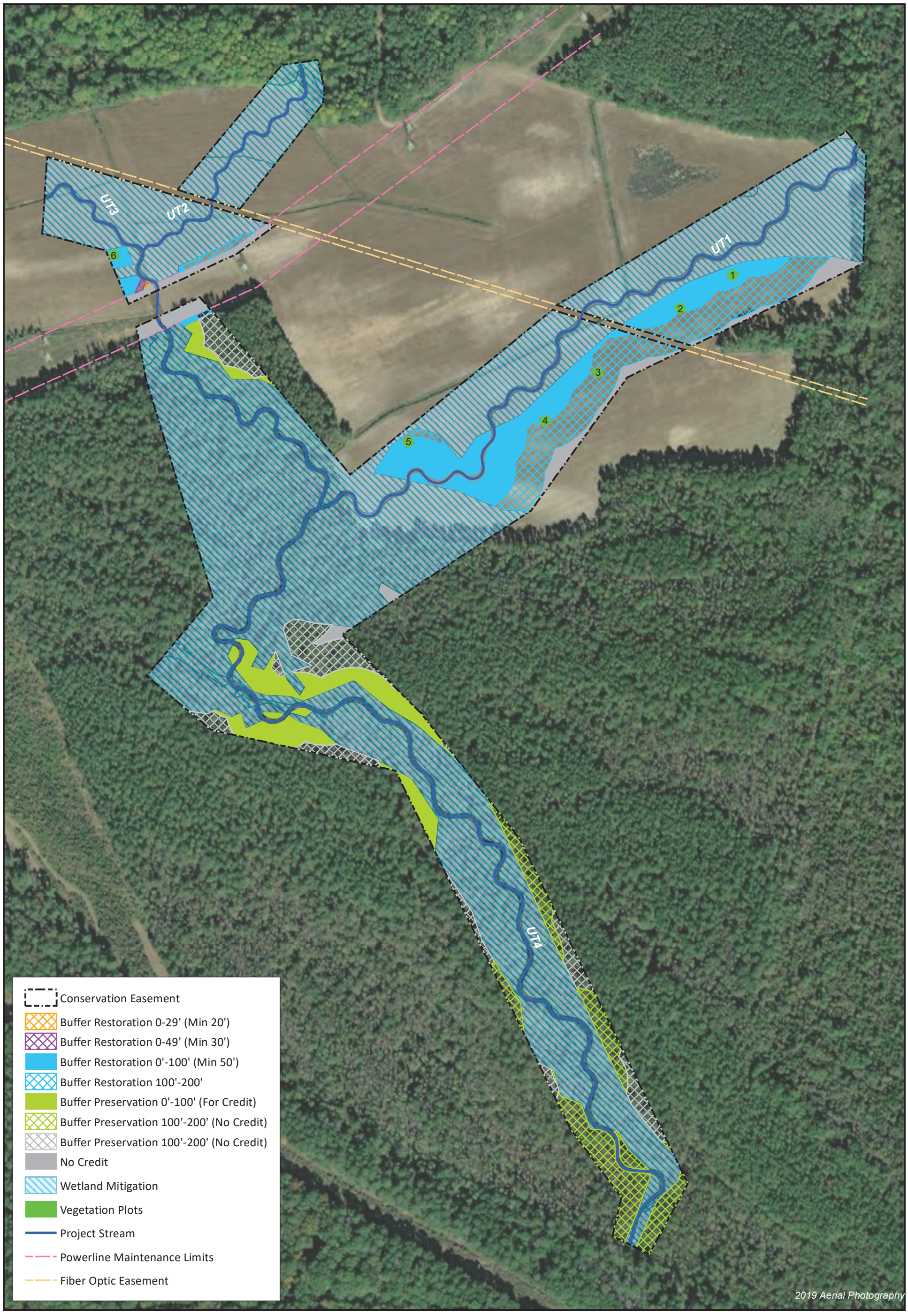
WILDLANDS ENGINEERING

0 150 300 Feet

N

Figure 3. Project Component/Asset Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Wayne County, NC



WILDLANDS ENGINEERING

0 150 300 Feet

N

Figure 4. Monitoring Map
McClenny Acres Mitigation Site
DMS Project No. 100038
Monitoring Year 0 - 2021

Wayne County, NC

Table 1. Buffer Project Attributes

McClenny Acres Mitigation Site

Monitoring Year 0 - 2021

Project Name	McClenny Acres Mitigation Site
Hydrologic Unit Code	03020201200030
River Basin	Neuse
Geographic Location (Lat, Long)	35° 23’ 25” N, 78° 03’ 15” W
Site Protection Instrument (DB/PG)	DB 3494 PG 871 - 884
Total Credits (BMU)	196,531.361
Types of Credits	Riparian Buffer
Mitigation Plan Date	July 2019
Initial Planting Date	March 2021
Baseline Report Date	April 2021
MY1 Report Date	December 2021
MY2 Report Date	December 2022
MY3 Report Date	December 2023
MY4 Report Date	December 2024
MY5 Report Date	December 2025

Table 2. Buffer Project Area and Assets

McClenny Acres Mitigation Site

Monitoring Year 0 - 2021

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (sf) [1]	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)	Convertible to Nutrient Offset (Yes or No)	If Converted to Nutrient Offset	
											Nutrient Offset: N (lbs)	Nutrient Offset: P (lbs)
Rural	Subject	Restoration	UT3	0-29 (Min. 20)	335	1	75%	1.33333	251.251	No	0.000	N/A
Rural	Subject	Restoration	UT1, UT3	0-49 (Min. 30)	688	1	100%	1.00000	688.000	No	0.000	N/A
Rural	Subject	Restoration	UT1, UT2, UT3	0-100 (Min. 50)	137,859	1	100%	1.00000	137,859.000	Yes	7,193.678	N/A
Rural	Subject	Restoration	UT1, UT2, UT3	101-200	146,157	1	33%	3.03030	48,231.810	Yes	7,626.680	N/A
			SUBTOTALS		**285,039**				**187,030.061**		**14,820.358**	**N/A**

ELIGIBLE PRESERVATION AREA:	**95,013**

Location	Jurisdictional Streams	Restoration Type	Reach ID / Component	Buffer Width (ft)	Creditable Area (sf) [1]	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits (BMU)
Rural	Subject	Preservation	UT4	0-100	95,013	10	100%	10.00000	9,501.300
			SUBTOTALS		**95,013**				**9,501.300**
			TOTALS		**380,052**				**196,531.361**

[1] The total buffer preservation area is 287,242 square feet.

[2] Credits in the Buffer Mitigation Plan and As-built Report were calculated using NCDWR template version *Buffer_Mitigation_Tables_1.0_2018_12_20.*

Table 3. Monitoring Components

McClenny Acres Mitigation Site

Monitoring Year 0 - 2021

Parameter	Monitoring Feature	Quantity	Frequency
Vegetation	CVS Level 2	6 Plots	Year 1-5
Visual Assessment	Photographs and Mapping		Semi-Annual
Exotic and Nuisance Vegetation	Photographs and Mapping		Semi-Annual
Project Boundary	Photographs and Mapping		Semi-Annual
Overview Photos	Photographs		Year 1-5

APPENDIX 2. DWR Correspondence

Water Resources
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

April 10, 2018

John Hutton
Wildlands Engineering, Inc.
312 West Millbrook Rd, Suite 225
Raleigh, NC 27609
(via electronic mail: jhutton@wildlandseng.com)

DWR ID# 2018-0197
Wayne County

Re: Site Viability for Buffer Mitigation and Nutrient Offset & Buffer- McClenny Acres Site
Near 1100 Old Smithfield Rd, Goldsboro, NC
Neuse 03020201 (not in Falls WS)

Dear Mr. Hutton,

On February 9, 2018, Katie Merritt, with the Division of Water Resources (DWR), received a request from Wildlands Engineering, Inc. (WEI) for an onsite mitigation determination near the above-referenced site (Site). The Site is located in the Neuse River Basin within the 8-digit Hydrologic Unit Code 03020201. The Site is being proposed as part of a full-delivery stream, riparian buffer and wetland mitigation project for the Division of Mitigation Services (RFP #16-007279). Members of the Interagency Review Team (IRT) and Division of Mitigation Services were also present onsite. At your request, on February 22, 2018, Ms. Merritt performed an onsite assessment of riparian land uses adjacent to streams onsite, which are shown on the attached map labeled "Figure A".

At the request of WEI, this mitigation determination is assessed using the proposed stream restoration plan/alignment shown on the attached map labeled "Revised Concept Map" that will be submitted to the Interagency Review Team (IRT) for review. If the proposed stream channel alignments change in any way from what is shown on the attached Revised Concept Map, or the stream channels do not develop into intermittent or perennial streams as determined by DWR, this viability letter may be subject to change.

Ms. Merritt's evaluation of the features and their associated mitigation determination for the riparian areas are provided in the table below. The evaluation was made from Top of Bank (TOB) out to 200' from each existing or *proposed* feature for buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015) and for nutrient offset credits pursuant to 15A NCAC 02B .0240.

Feature	Classification on Restoration Plan	[1]Subject to Buffer Rule	Riparian Land uses adjacent to proposed Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Credit Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
UT-1	Restored stream channel	Yes	Agricultural Fields	Yes	Yes	Fields - **Restoration site** per 15A NCAC 02B .0295 (n)

Feature	Classification on Restoration Plan	[1]Subject to Buffer Rule	Riparian Land uses adjacent to proposed Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Credit Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
UT-2	Restored stream channel	Yes	Agricultural Fields with some forested areas up stream	Yes[3]	Yes (fields only)	Fields (excluding the power line) – **Restoration site** per 15A NCAC 02B .0295 (n) Forested Areas – **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
UT3	Restored stream channel	Yes	Agricultural Fields with some forested areas up stream	Yes[3]	Yes (fields only)	Fields (excluding the power line) – **Restoration site** per 15A NCAC 02B .0295 (n) Forested Areas – **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
UT-3	Restored stream channel	Yes	Agricultural Fields with some forested areas	Yes[3]	Yes (fields only)	Fields – **Restoration site** per 15A NCAC 02B .0295 (n) Forested Areas – **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
UT-4	Restored stream channel	Yes	Mature forest w/ a maintained hunting lane within Zone 1	Yes[3]	No	Forested Areas – **Preservation Site** per 15A NCAC 02B .0295 (o)(5)
A	Ditch	No	Agricultural Fields	N/A	N/A	*N/A* *Proposed to be filled and graded for wetland mitigation*
B	Ditch	No	Agricultural Fields	N/A	N/A	*N/A* *Proposed to be filled and graded for wetland mitigation*
C & D	Not Assessed		Agricultural Fields			

[1]Subjectivity calls for the features were determined by DWR in correspondence dated April 5, 2018 and April 6, 2018 using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS.

[2] *NC Division of Water Resources - Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment*

[3]The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 0295 (o)(5) and 15A NCAC 0295 (o)(4). Site cannot be a Preservation only site to comply with this rule.

Maps that are attached to this letter were provided by DWR and WEI and were initialed by Ms. Merritt on April 10, 2018. This letter should be provided in all stream, wetland, buffer and/or nutrient offset mitigation plans for this Site.

This letter does not constitute an approval of this site to generate mitigation credits. Pursuant to 15A NCAC 02B .0295, a mitigation proposal and a mitigation plan shall be submitted to DWR for written approval **prior** to conducting any mitigation activities in riparian areas and/or surface waters for buffer mitigation credit. Pursuant to 15A NCAC 02B .0240, a proposal regarding a proposed nutrient load-reducing measure for nutrient offset credit shall be submitted to DWR for approval prior to any mitigation activities in riparian areas and/or surface waters.

All vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and/or nutrient offset mitigation credits. For any areas depicted as not being viable for nutrient offset credit above, one could propose a different measure, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset in accordance with 15A NCAC 02B .0240.

This viability assessment will expire on April 10, 2020 or upon the submittal of an As-Built Report to the DWR, whichever comes first. Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

Sincerely,

Katie Merritt

Karen Higgins, Supervisor
401 and Buffer Permitting Branch

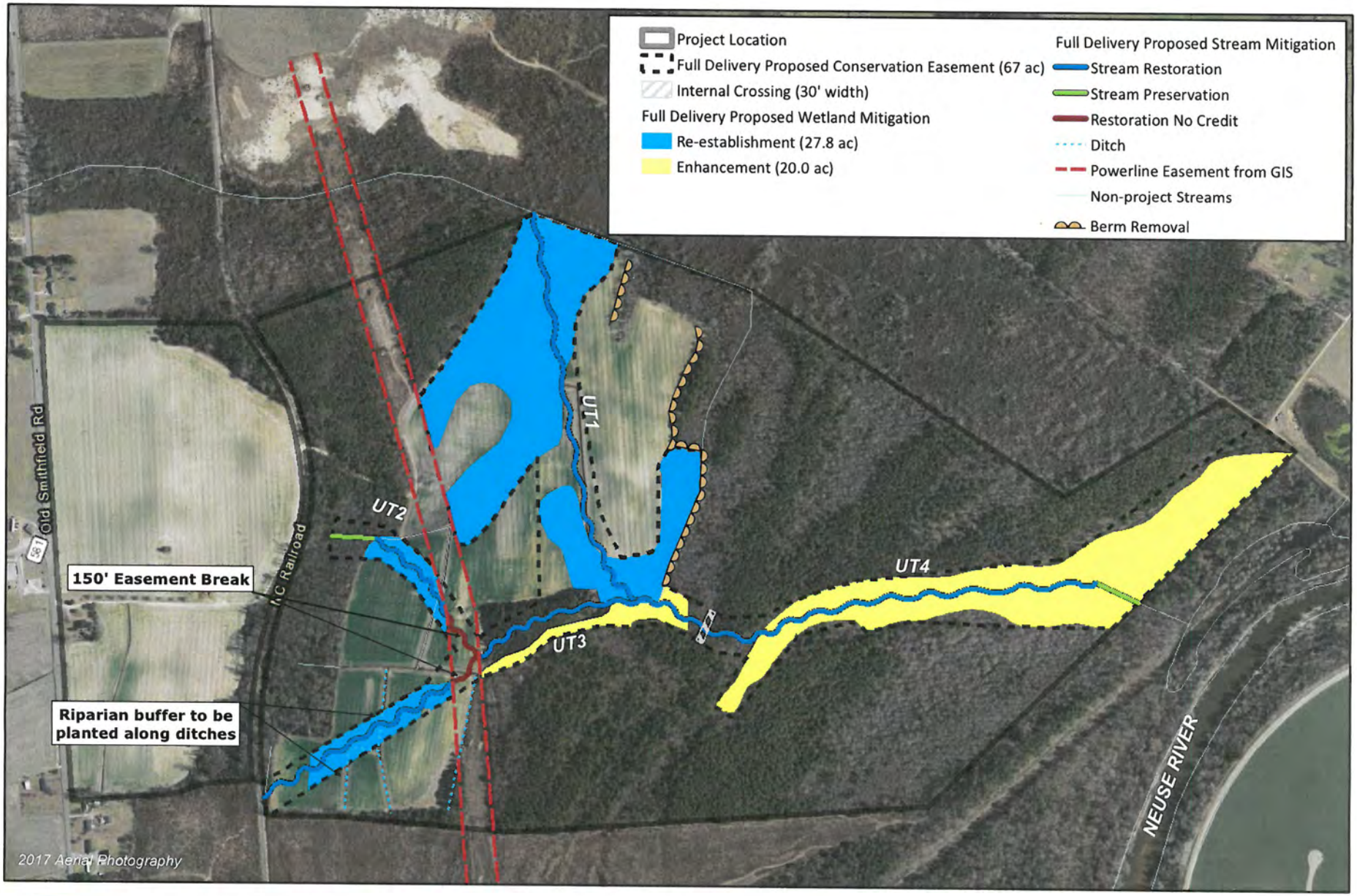
KAH/*km*
Attachments: Figure A, Revised Concept Map

cc: File Copy (Katie Merritt)
DMS – Jeff Schaffer (via electronic mail)

Figure A: McClenny Acres Full Delivery Site – DWR Stream Determination & Site Viability

Kym 4/6/18
DWR # 2018-0197v3

Kym 4/10/18
(viability)



WILDLANDS ENGINEERING

0 700 Feet

Revised Concept Map
McClenny Acres Mitigation Site
Neuse River Basin 03020201

Wayne County, NC

4/10/18

DWR # 2018-0197

Water Resources
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

April 6, 2018

Wildlands Engineering, Inc
Attention: John Hutton
312 West Millbrook Rd, Suite 225
Raleigh, NC 27609

DWR Project #18-0197v3
Wayne County

Subject: On-Site Determination for Applicability to the Neuse River Riparian Buffer Rules and Water Quality Standards (15A NCAC 02B .0233)

Subject Property/ Project Name: McClenny Acres Full Delivery Site

Address/Location: 1100 Old Smithfield Rd, Goldsboro, NC

Stream(s) Evaluated: UTs to the Neuse River

Determination Date: February 22, 2018

DWR Staff: Katie Merritt

Determination Type:	
Buffer:	Stream:
☒ Neuse (15A NCAC 02B .0233) ☐ Tar-Pamlico (15A NCAC 02B .0259) ☐ Catawba (15A NCAC 02B .0243) ☐ Jordan (15A NCAC 02B .0267) (governmental and/or interjurisdictional projects) ☐ Randleman (15A NCAC 02B .0250) ☐ Goose Creek (15A NCAC 02B .0605-.0608)	☒ Intermittent/Perennial Determination (where local buffer ordinances apply)

At the request of Wildlands Engineering, Inc, staff from the Division of Water Resources (DWR) conducted two (2) site visits on a parcel located near the location indicated above, for purposes of determining applicability of the Neuse River Riparian Buffer Rules & Water Quality Standards. The second site visit was performed on April 5, 2018 and referenced in correspondence dated April 5, 2018 (DWR# 2018-0197v2). See the following table and written explanation regarding the stream determinations performed on February 22, 2018.

Feature ID[1]	Feature Type[2]	Not Subject	Subject	Start@	Stop@	Soil Survey	USGS Topo
UT1	Stream (I)		X	Property Boundary	Confluence with UT-3	X	X
UT2[3]							
UT3	Stream (I)	X		See Map	Confluence with UT-4		
UT4	Stream (P)		X	Confluence with UT-3	Property Boundary	X	
A	Ditch	X		See map	Confluence with UT-3		X
B	Ditch			See map	Confluence with UT-2		
C	Not assessed			See map			
D	Not Assessed			See map			

[1] See maps provided with letter showing labeled features
[2] Ephemeral (E), Intermittent (I), Perennial (P)
[3] Stream Determination performed on April 5, 2018 by DWR Washington Regional Office

The DWR has determined that some of the streams listed above have been located on the most recently published NRCS Soil Survey of Wayne County, North Carolina and/or the most recent copy of the USGS Topographic map at a 1:24,000 scale and were evaluated for applicability to the Neuse Riparian Buffer Rule.

Maps are provided with this letter from Wildlands Engineering, Inc and were initialed by Katie Merritt on April 6, 2018. Each feature that is checked "Not Subject" has been determined to not be at least intermittent or not present on the property or not depicted on the required maps. Streams that are checked "Subject" have been located on the property and possess characteristics that qualify them to be at least intermittent streams. There may be other streams or features located on the property that do not appear on the maps referenced above but may be considered jurisdictional according to the US Army Corps of Engineers and subject to the Clean Water Act.

This on-site determination shall expire five (5) years from the date of this letter. Landowners or affected parties that dispute a determination made by the DWR may request a determination by the Director. An appeal request must be made within sixty (60) calendar days of the date of this letter to the Director in writing.

If sending via US Postal Service:

c/o Karen Higgins
DWR – 401 & Buffer Permitting Branch
1617 Mail Service Center
Raleigh, NC 27699-1617

If sending via delivery service (UPS, FedEx, etc.):

c/o Karen Higgins
DWR – 401 & Buffer Permitting Branch
512 N. Salisbury Street
Raleigh, NC 27604

This determination is final and binding as detailed above, unless an appeal is requested within sixty (60) days.

This determination only addresses the applicability to the buffer rules and does not approve any activity within the buffers. The project may require a Section 404/401 Permit for the proposed activity. Any inquiries regarding applicability to the Clean Water Act should be directed to the US Army Corps of Engineers Raleigh Regulatory Field Office at (919)-554-4884.

If you have questions regarding this determination, please feel free to contact Katie Merritt at (919) 807-6371.

Sincerely,

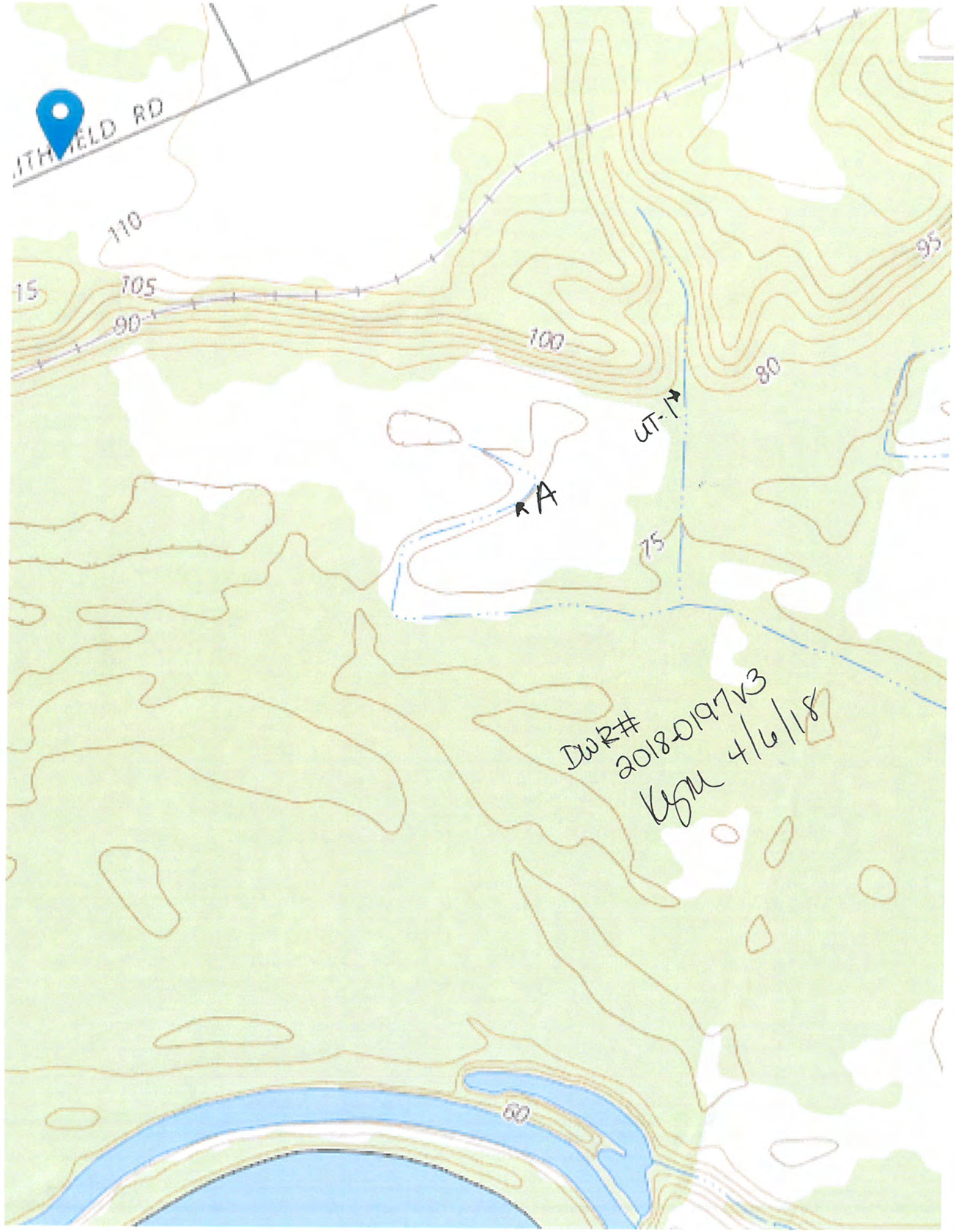
Karen Higgins

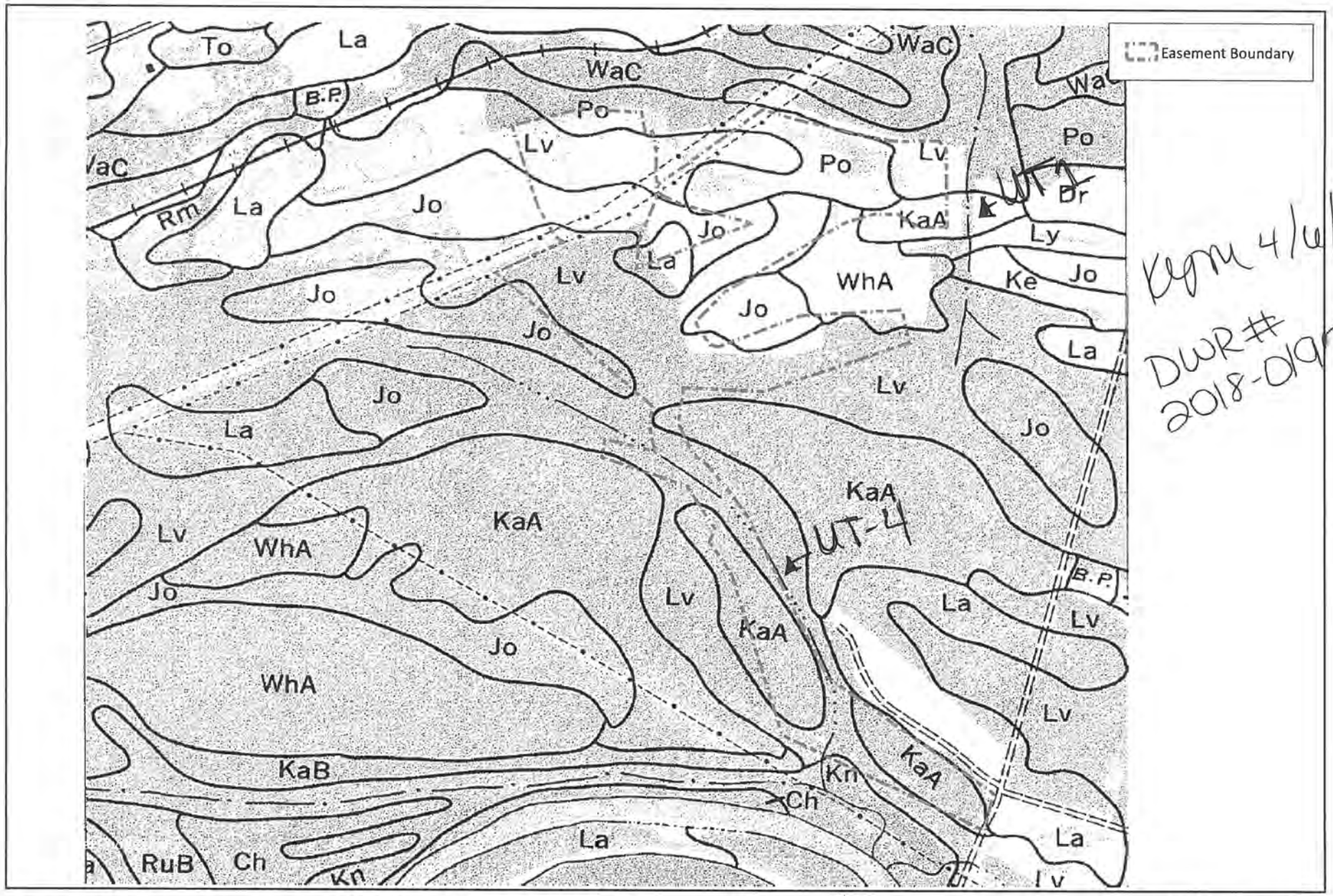
Karen Higgins, Supervisor
401 & Buffer Permitting Branch

Attachments: USGS Topographic Map, Wayne County Soil Survey Map, and Figure A

cc: William McClenny, 4700 Glenn Forest Dr., Raleigh, NC 27612
401 & Buffer Permitting Branch file
RRO DWR file

Filename: 180197v3McClennyMitSite(Wayne)_Neuse_StreamDet.docx


ATHFIELD RD
110
105
90
15
100
95
80
75
60
UT-1
A
DWR#
2018-0197v3
KGM 4/6/18



WILDLANDS ENGINEERING

1974 NRCS Soils Map
McClenny Acres Mitigation Site
Neuse River Basin 03020201

Wayne County, NC

Figure A: McClenny Acres Full Delivery Site – DWR Stream Determination & Site Viability

Kym 4/6/18
DWR # 2018-0197v3

Water Resources
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

April 5, 2018

William A McClenny
4700 Glenn Forest Drive
Raleigh, NC 27612

DWR #18-0197 V2
WAYNE County

Subject: On-Site Determination for Applicability to Neuse Riparian Buffer Rules (15A NCAC 02B .0233)

Subject Property/ Project Name: McClenny Acres Mitigation Site

Address/Location: Immediately South of Intersection of NC Highway 581 and Old Smithfield Road, Goldsboro

Stream(s) Evaluated: Ut to Neuse River

Determination Date: 4/3/18 Staff: Anthony Scarbraugh

Determination Type:	
Buffer:	Stream:
☒ Neuse (15A NCAC 02B .0233) ☐ Tar-Pamlico (15A NCAC 02B .0259) ☐ Catawba (15A NCAC 02B .0243) ☐ Jordan (15A NCAC 02B .0267) (governmental and/or interjurisdictional projects) ☐ Randleman (15A NCAC 02B .0250) ☐ Goose Creek (15A NCAC 02B .0605-.0608)	☐ Intermittent/Perennial Determination

Stream	E/I/P*	Not Subject	Subject	Start@	Stop@	Soil Survey	USGS Topo
18-0197 V2	I	X		Flag: 18-0197 V2 Begin	Flag: 18-0197 V2 End		X

**E/I/P/NSP = Ephemeral/Intermittent/Perennial/No Stream Present*

The Division of Water Resources (DWR) has determined that the stream listed above and included on the attached map have been located on the most recent published NRCS Soil Survey of WAYNE County, North Carolina and/or the most recent copy of the USGS Topographic map at a 1:24,000 scale and evaluated for applicability to the NEUSE River Riparian Buffer Rules. Each stream that is checked "Not Subject" has been determined to not be at least intermittent or not present on the property. Streams that are checked "Subject" have been located on the property and possess characteristics that qualify them to be at least intermittent streams. There may be other streams or features located on the property that do not appear on the maps referenced above but may be considered jurisdictional according to the US Army Corps of Engineers and subject to the Clean Water Act. **Please note, previous stream determinations were performed by Mrs. Katie Merritt of DWR Central Office on February 22, 2018.**

This on-site determination shall expire five (5) years from the date of this letter. Landowners or affected parties that dispute a determination made by the DWR may request a determination by the Director. An appeal request must be made within sixty (60) calendar days of date of this letter to the Director in writing.

If sending via US Postal Service:
c/o Karen Higgins
DWR – 401 & Buffer Permitting Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

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512 N. Salisbury Street
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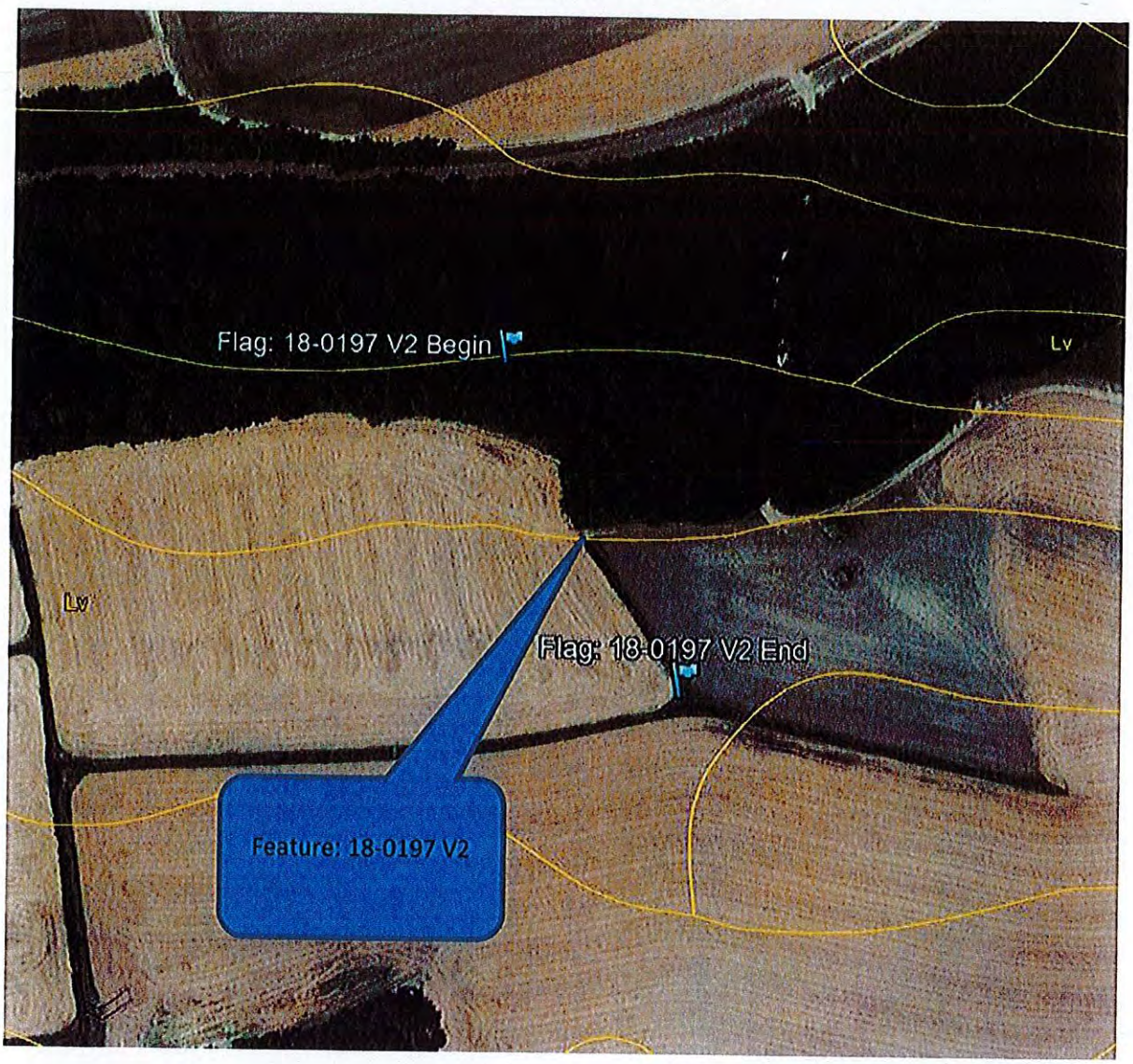
If you have questions regarding this determination, please feel free to contact Anthony Scarbraugh at (252) 948-3924.

Sincerely,

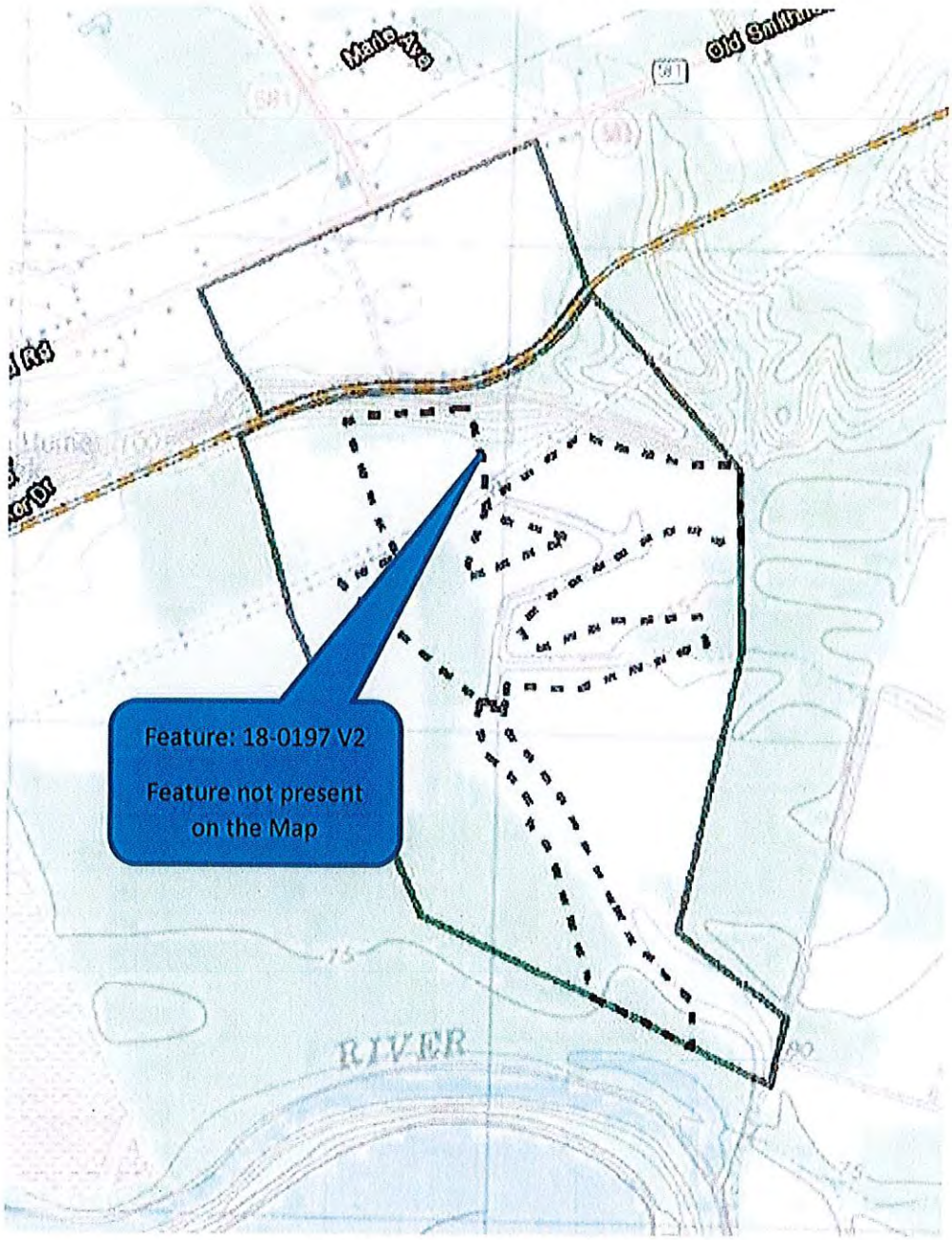
Robert Tankard, Assistant Regional Supervisor
Water Quality Regional Operations Section
Division of Water Resources, NCDEQ

cc: WaRO DWR File Copy
LASERFICHE
Daniel Taylor, Wildland Engineering, Inc., (via email: dtaylor@wildlandseng.com)

Google Earth Imagery Date: 5/14/2016

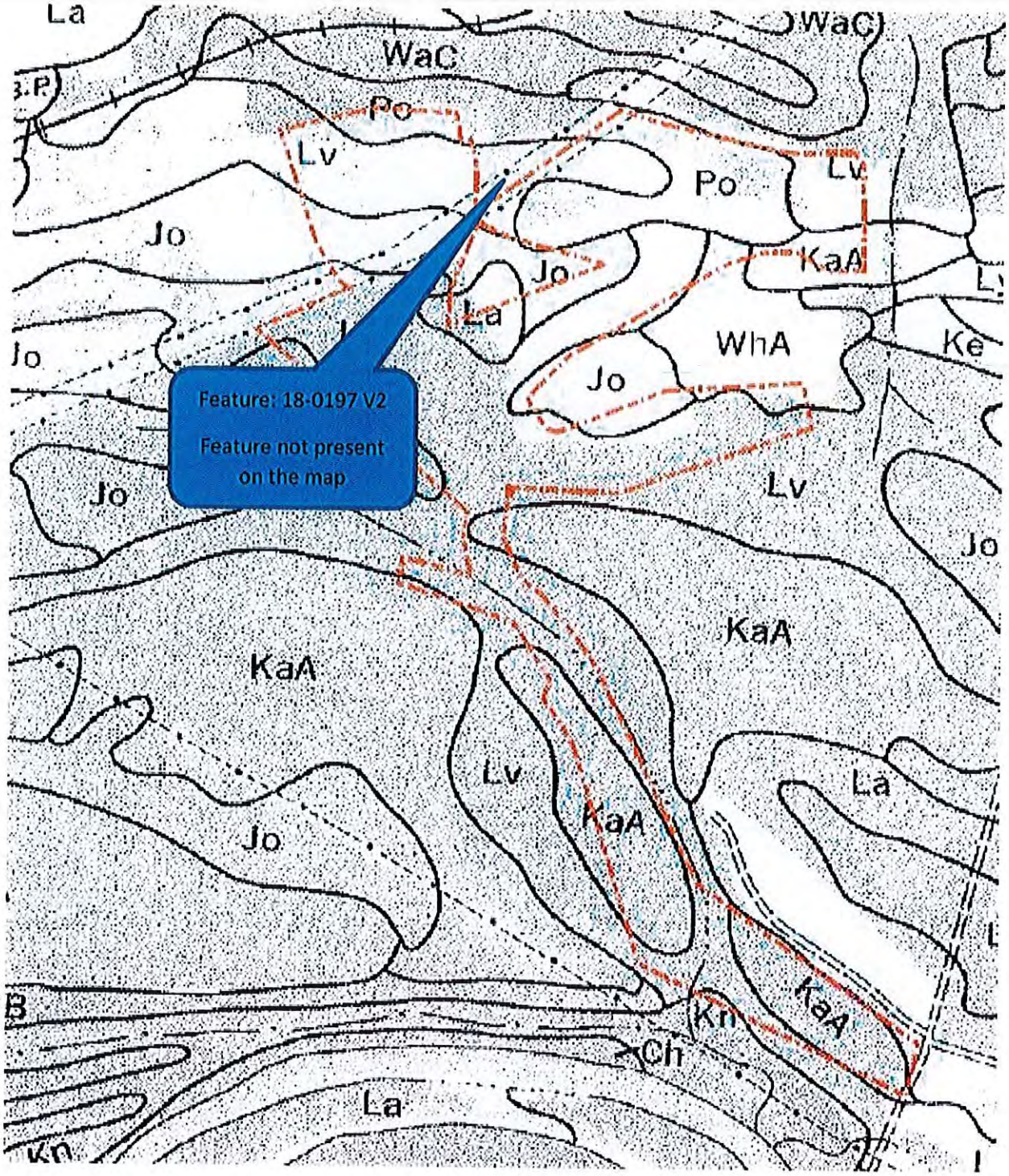


USGS Topo Map 1:24,000



North Carolina Environmental Management Commission
Division of Water Resources
For: NEUE Basin Buffer
Date 4/5, 2018
Reviewed by AI

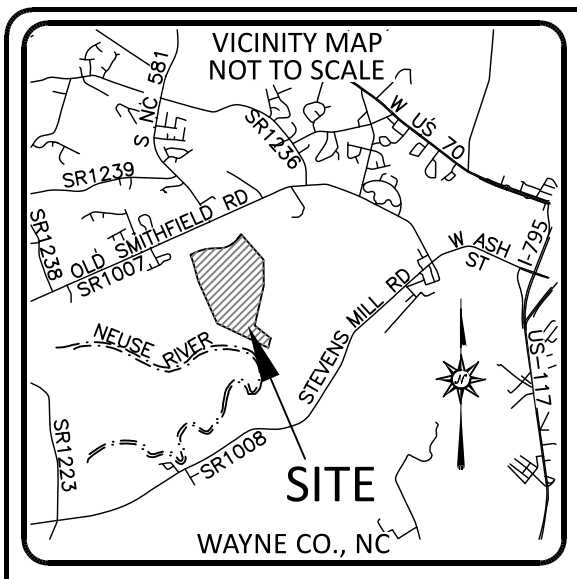
Wayne County NRCS Soils Map



North Carolina Environmental Management Commission
Division of Water Resources
For: Neuse Basin Buffer
Date 4/5, 2018
Reviewed by AS

APPENDIX 3. As-Built Survey

McCLENNY ACRES MITIGATION SITE



I, ELISABETH G. TURNER, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, CERTIFY THAT THIS BUFFER MAP WAS DRAWN UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, THAT THE EASEMENT BOUNDARY IS BASED ON PLAT BOOK SEE , PG NOTES RECORDED IN WAYNE COUNTY REGISTER OF DEEDS OFFICE, AND THAT THE BUFFER AREAS SHOWN ARE CALCULATED FROM AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 11th DAY OF MAY, 2021.

ELISABETH G. TURNER, P.L.S. #L-4440

NORTH CAROLINA PROFESSIONAL SEAL L-4440 LAND SURVEYOR ELISABETH G. TURNER

Riparian Buffer Credit:	SQ. FT.	Acres
Buffer Restoration 0'-29' (Min. 20')	335	0.01
Buffer Restoration 30' to <50' (Min. 30')	688	0.02
Buffer Restoration 0'-100' (Min. 50')	137,859	3.16
Buffer Restoration 100'-200'	146,157	3.35
Buffer Preservation 0'-100' (Min. 30')	191,401	4.39
Buffer Preservation 100'-200'	95,841	2.2
Wetlands	1,593,302	36.58
Streams	137,947	3.17
No Credit	59,287	1.36
Total CE Area	**2,362,817**	**54.24**

LINE LEGEND:
- CE — CONSERVATION EASEMENT (BY OTHERS)
- RIGHT–OF–WAY (RAILROAD)
- PROPERTY LINE (from Wayne Co GIS)
- EASEMENT/MAINTENANCE LIMITS
- TREELINE

NAD83 (2011)

GENERAL NOTES:
1. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
2. THE BASIS OF BEARINGS IS NCGS STATE PLANE NAD83(2011) DATUM.
3. THE AREA SHOWN HEREON WAS COMPUTED USING THE COORDINATE COMPUTATION METHOD.
4. THE PURPOSE OF THIS PLAT IS TO SHOW THE AS-BUILT AREAS FOR RIPARIAN BUFFER CREDITS WITHIN THE CONSERVATION EASEMENT. THIS PLAT IS NOT A BOUNDARY SURVEY. THE LAND PARCELS AND THEIR BOUNDARIES AFFECTED BY THIS CONSERVATION EASEMENT ARE NOT CHANGED BY THIS PLAT.
5. LINES NOT SURVEYED ARE SHOWN AS A DASHED LINETYPE AND WERE TAKEN FROM INFORMATION REFERENCED ON THE FACE OF THIS PLAT.
6. SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS, AND/OR ENCUMBRANCES THAT MAY AFFECT THE PROPERTY(S).
7. CONSERVATION EASEMENT MAP RECORDED IN PLAT CABINET C, PG. 15-C & 15-D IN THE WAYNE COUNTY REGISTER OF DEEDS OFFICE. EASEMENT LINES PROVIDED BY WILDLANDS ENGINEERING.
8. PROPERTY BOUNDARY LINES TAKEN FROM WAYNE COUNTY GIS PARCEL DATA FILES.
9. STREAM TOP OF BANK LINES TAKEN FROM AS-BUILT TOPOGRAPHIC SURVEY BY TURNER LAND SURVEYING.

EX RAILROAD R/W

WILDLANDS ENGINEERING, INC
DB 3493, PG 886
PIN 2589–07–3837

TREELINE

150' MAINTENANCE LIMITS FOR POWER LINE

20' SOUTHERN BELL EASEMENT EXISTING

WILDLANDS ENGINEERING, INC
DB 3493, PG 886
PIN 2589–07–3837

MATCHLINE

300' 0' 300' 600'

SCALE: 1 inch = 300 feet (11x17)

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47–30 MAPPING REQUIREMENTS.

SHEET 1 of 2

SCALE: 1" = 300'
FILE: McCLENNY BUFFER AB_F
PROJECT: 18-018
REVIEWED BY: EGT
DRAWN BY: EGT
SURVEYED BY: N/A
DATE: 4/2/2021

AS-BUILT SURVEY OF BUFFER AREAS FOR
WILDLANDS ENGINEERING, INC.
McCLENNY ACRES MITIGATION BANK PARCEL

NEUSE RIVER BASIN
FORK TOWNSHIP WAYNE COUNTY NORTH CAROLINA

REVISIONS, DATE AND INITIAL:

T:\CADD STANDARDS\TLS SHEET BORDERS\LOGO\turner-logo2015.jpg

P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
TurnerLandSurveying.com
Certified DBE/WBE

McCLENNY ACRES MITIGATION SITE

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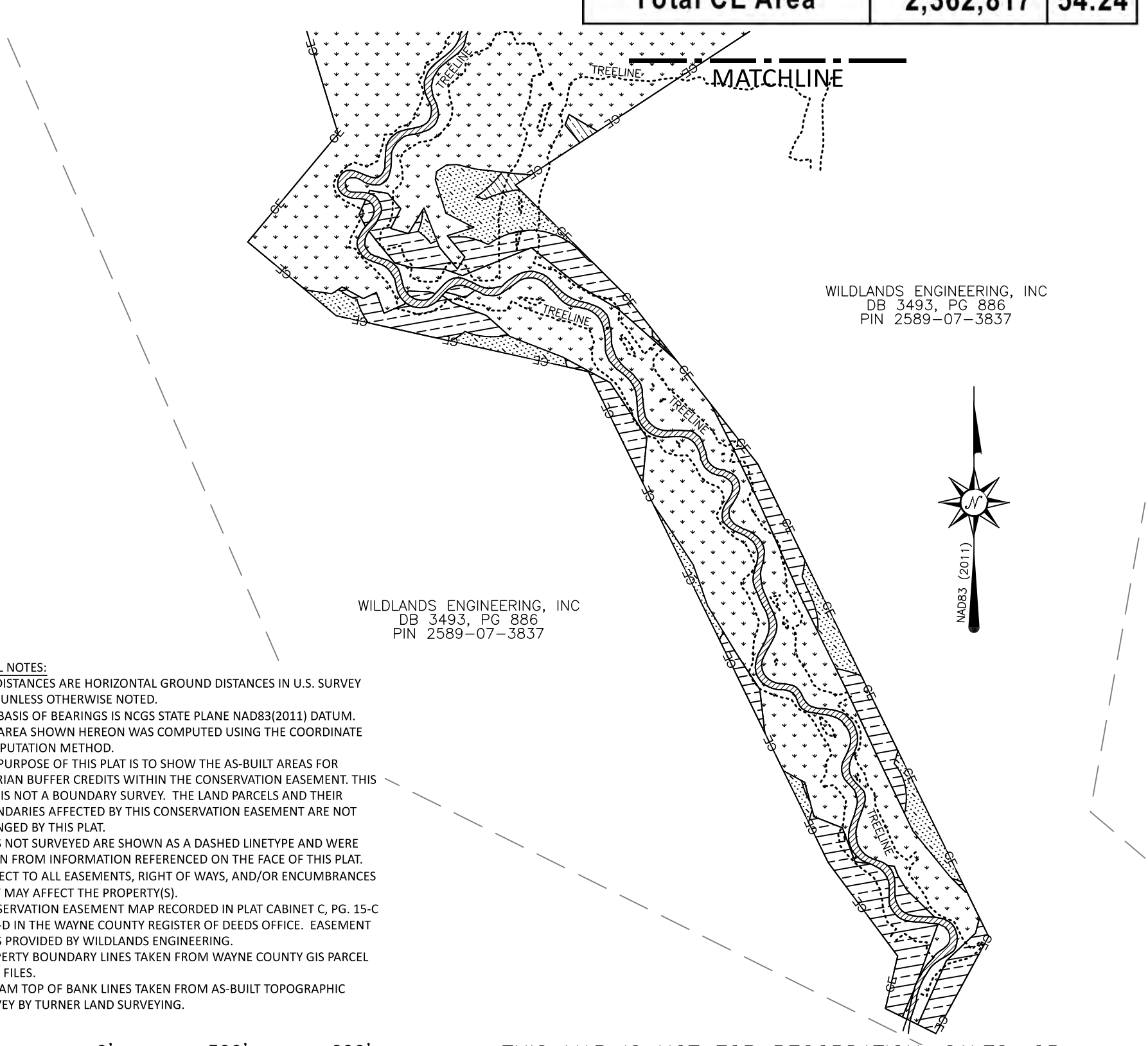

GENERAL NOTES:
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300' 0' 300' 600'

SCALE: 1 inch = 300 feet (11x17)

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

SHEET 2 of 2

SCALE: 1" = 300'
FILE: McCLENNY BUFFER AB_F
PROJECT: 18-018
REVIEWED BY: EGT
DRAWN BY: EGT
SURVEYED BY: N/A
DATE: 4/2/2021

AS-BUILT SURVEY OF BUFFER AREAS FOR
WILDLANDS ENGINEERING, INC.
McCLENNY ACRES MITIGATION BANK PARCEL

NEUSE RIVER BASIN

FORK TOWNSHIP WAYNE COUNTY NORTH CAROLINA

REVISIONS, DATE AND INITIAL:

T:\CADD STANDARDS\TLS SHEET BORDERS\LOGO\turner-logo2015.jpg

P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
TurnerLandSurveying.com
Certified DBE/WBE

APPENDIX 4. Overview Photographs

APPENDIX 5. Permit Approvals

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

March 25, 2020

DWR # 18-0197
Wayne County

NC Division of Mitigation Services
Attn: Lin Xu
217 West Jones Street
Raleigh, North Carolina 27699

Wildlands Engineering, Inc
Attn: Jeff Keaton
1430 S. Mint Street, Suite 104
Charlotte, NC

Subject: APPROVAL OF 401 WATER QUALITY CERTIFICATION WITH ADDITIONAL CONDITIONS

McClenny Acres (I)

Dear Mr. Xu and Mr. Keaton:

You have our approval for the impacts listed below for the purpose described in your application dated February 19, 2020, received by the Division of Water Resources. These impacts are covered by the attached Water Quality General Certification Number 4134 and the conditions listed below. This certification is associated with the use of Nationwide Permit Number 27 once it is issued to you by the U.S. Army Corps of Engineers. Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

This approval requires you to follow the conditions listed in the enclosed certification(s) or general permit and the following additional conditions:

1. The following impacts are hereby approved provided that all of the other specific and general conditions of the Certification are met. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b) and/or (c)]

Type of Impact	Amount Approved (units) Permanent	Amount Approved (units) Temporary
404/401 Wetlands		
W1	0.114(acres)	0 (acres)
W2	0.038	0
W3	0.006	0
W4	0	0.027
W5	0.007	0
W6	0	0.037
W7	0.065	0
W8	0.04	0
W9	0.008	0
total	0.278	0.064
Stream		
S1	1,055.63 (linear feet)	0 (linear feet)
S2	591.81	0
S3	1591.12	0
S4	2812.96	0
total	6,051.52	0

2. This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of the Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this approval letter and General Certification(s)/Permit/Authorization and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]

3. The issuance of the 401 Water Quality Certification for the restoration/enhancement project does not represent an approval of credit yield for the project. [15A NCAC 02H .0500(h)]

4. You have our approval for your proposed final stream/wetland Mitigation Plan. The stream and wetland restoration/enhancement must be constructed, maintained, and monitored according to the plans approved by this Office and this Certificate of Coverage. Any repairs or adjustments to the site must be made according to the approved plans or must receive written approval from this Office to make the repairs or adjustments. [15A NCAC 02H .0506(h)]

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5]

This Certification can be contested as provided in Articles 3 and 4 of General Statute 150B by filing a written petition for an administrative hearing to the Office of Administrative Hearings (hereby known as OAH) **within sixty (60) calendar days**.

A petition form may be obtained from the OAH at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000 for information. A petition is considered filed when the original and one (1) copy along with any applicable OAH filing fee is received in the OAH during normal office hours (Monday through Friday between 8:00am and 5:00pm, excluding official state holidays).

The petition may be faxed to the OAH at (919) 431-3100, provided the original and one copy of the petition along with any applicable OAH filing fee is received by the OAH within five (5) business days following the faxed transmission.

Mailing address for the OAH:

If sending via US Postal Service:	*If sending via delivery service (UPS, FedEx, etc):*
Office of Administrative Hearings 6714 Mail Service Center Raleigh, NC 27699-6714	Office of Administrative Hearings 1711 New Hope Church Road Raleigh, NC 27609-6285

One (1) copy of the petition must also be served to Department of Environmental Quality:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This letter completes the review of the Division under section 401 of the Clean Water Act. Please contact Mac Haupt at 919-707-3632 or mac.haupt@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Paul Wojoski
949D91BA53EF4E0...

Paul Wojoski, Supervisor
401 & Buffer Permitting Branch

Enclosures: GC 4134

cc: Todd Tugwell, Kim Browning, USACE Raleigh Regulatory Field Office
Anthony Scarbraugh, DWR WashingtonRO 401 file
DWR 401 & Buffer Permitting Branch file

Filename: 180197McClennyAcresI(Wayne)_approval ltr March 25, 2020.docx

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2018-02042** County: **Wayne** U.S.G.S. Quad: **NC-Northwest Goldsboro**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee:	**NC Division of Mitigation Services**	Permittee:	**Wildlands Engineering Inc**
	Attn: Mr. Tim Baumgartner		**Attn: Jeff Keaton**
Address:	**217 West Jones Street, Suite 3000A**	Address:	**312 W. Millbrook Road**
	Raleigh, North Carolina 27603		**Raleigh, NC 27609**
Telephone:	**919-707-8319**	Telephone:	**919-851-9986**

Size (acres)	**52.08 acres**	Nearest Town	**Goldsboro**
Nearest Waterway	**Neuse River**	River Basin	**Neuse River**
USGS HUC	**03020201**	Coordinates	Latitude: **35.390773 °N** Longitude: **-78.059800 °W**

Location description: **The NCDMS 52.08-acre McClenny Acres Mitigation Site includes tributaries and wetlands adjacent to the Neuse River. The site is located at 1050 Old Smithfield Road, Goldsboro, Wayne County, North Carolina. PIN: 2579985611.**

Description of projects area and activity: **The co-applicants, NCDMS and Wildlands Engineering, have requested a Department of the Army permit authorization to discharge dredged and/or fill material into waters of the United States associated with the NCDMS McClenny Acres Mitigation Site. Implementation of the proposed restoration and enhancement activities will result in the discharge of fill material into 6051.52 linear feet of stream channel, and 0.342 acres of wetlands associated with mechanized land clearing, excavation, placement of fill material, and stream relocation activities for the mitigation site. Compensatory mitigation is NOT required in conjunction with the aforementioned activities. Refer to the enclosed Table 1 for a detailed summary of impacts**

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number and/or Nationwide Permit Number: **NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities**

SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application and attached information dated February 19, 2020. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide and/or regional general permit authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide and/or regional general permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide and/or regional general permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide and/or regional general permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide and/or regional general permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Kimberly Browning, 919.554.4884 x60.**

Corps Regulatory Official: _____ Date: **April 9, 2020**
Expiration Date of Verification: **March 18, 2022**

Table 1. Authorized discharge of fill material into waters of the United States in association with the NCDMS McClenny Acres Mitigation Site (SAW-2018-02042).

Impact Number	Classification	Fill Length of Stream (lf)	Fill acreage wetland (ac)	Duration of Fill Material	Regulated Discharge of Fill Material Activity
W1 Ditch B	Open water/Ditch		0.114	Permanent	Ecological Restoration
W2 Ditch D	Open water/Ditch		0.038	Permanent	Ecological Restoration
W3 Ditch G	Open water/Ditch		0.006	Permanent	Ecological Restoration
W4 W-C	Headwater Forest		0.027	Temporary	Ecological Restoration
W5 Ditch E	Open water/Ditch		0.007	Permanent	Ecological Restoration
W6 W-G	Headwater Forest		0.037	Temporary	Ecological Restoration
W7 W-G	Headwater Forest		0.065	Permanent	Ecological Restoration
W8 Ditch F	Open water/Ditch		0.04	Permanent	Ecological Restoration
W9 W-F	Headwater Forest		0.008	Permanent	Ecological Restoration
	TOTAL WETLAND IMPACTS		0.342		
S1/UT1	River/Stream-INT	1055.63	0	Permanent	Ecological Restoration
S2/UT2	River/Stream-INT	591.81		Permanent	Ecological Restoration
S3/UT3	River/Stream-INT	1591.12		Permanent	Ecological Restoration
S4/UT4	River/Stream-PER	2812.96		Permanent	Ecological Restoration
	TOTAL STREAM IMPACTS	6051.52			

*****Impacts are associated with aquatic resource restoration and enhancement activities and are expected to result in a net gain in Waters of the US.

SPECIAL CONDITIONS

1. **The permittee understands and agrees that the document entitled "Mitigation Plan Final – McClenny Acres Mitigation Plan" dated February 2020 is incorporated and made part of this permit. Execution of the work and terms given in the approved mitigation plan are a condition of this permit.**

2. **This Nationwide Permit verification does not imply suitability of this property for compensatory mitigation for any particular project. The use of any portion of this site as compensatory mitigation for a particular project will be determined during the permit review process for that project.**

COMPLIANCE CERTIFICATION

Action ID Number: SAW-2018-02042 **County: Wayne**

Permittee: NC Division of Mitigation Services
Attn: Mr. Tim Baumgartner

Wildlands Engineering, Inc
Attn: Jeff Keaton

Project Name: NCDMS McClenny Acres Mitigation Site

Date Verification Issued: April 9, 2020

Project Manager: Kim Browning

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Regulatory Division Mitigation Office
Attn: Kim Browning
3331 Heritage Trade Drive, Suite 105
Raleigh, NC 27587

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
BRIAN WRENN
Acting Director

NORTH CAROLINA
Environmental Quality

May 27, 2020

LETTER OF APPROVAL WITH MODIFICATIONS

Wildlands Engineering, Inc.
Attn: Mr. John Hutton, Vice President
312 W. Millbrook Road, Suite 225
Raleigh, NC 27609

RE: Project Name: McClenny Acres
Project ID: Wayne-2020-014
County: Wayne
City/Township: Rosewood
Address: Old Smithfield Road
River Basin: Neuse
Date Received by LQS: May 15, 2020
Submitted By: Wildlands Engineering, Inc.
Plan Type: Revised

Acres Approved: 88.34 total
(12.58 additional)

Dear Sir,

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of April 1, 2019, all new construction activities are required to complete and submit an electronic Notice of Intent (eNOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction General Permit. After the form is reviewed and found to be complete, you will receive a link with payment instructions for the $100 annual permit fee. After the fee is received, you will receive the COC via email. You MUST obtain the COC prior to commencement of any land disturbing activity. The eNOI form may be accessed at deq.nc.gov/NCG01. Please direct questions about the eNOI form to Annette Lucas at Annette.lucas@ncdenr.gov or Paul Clark at Paul.clark@ncdenr.gov. If the owner/operator of this project changes in the future, the new responsible party is required to apply for his/her own COC.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

1. The approved E&SC plan as well as any approved deviation.
2. The NCG01 permit and the COC, once it is received.
3. Records of inspections made during the previous 30 days.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to insure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. In addition, it would be helpful if you notify this office of the proposed starting date for this project. Please notify us if you plan to have a preconstruction conference.

Please be advised that a rule to protect and maintain existing buffers along watercourses in the Neuse River Basin became effective on July 22, 1997. The Neuse River Riparian Area Protection and Maintenance Rule (15A NCAC 2B.0233) applies to the 50-foot wide zone directly adjacent to surface waters (intermittent streams, perennial streams, lakes, ponds, and estuaries) in the Neuse River Basin. For more information about this riparian area rule, please contact the Division of Water Resources Wetland/401 Unit at 919-807-6300, or DWR in our regional office at 252-946-6481.

Sincerely,

PE for

Samir Dumpor, PE
Regional Engineer

cc w/o enc: John Hutton, Wildlands Engineering, Inc. (email)
Jeff Keaton, PE, Wildlands Engineering, Inc. (email)
WaRO Division of Water Resources (email)

1. The developer is responsible for the control of sediment on-site. If the approved erosion and sedimentation control measures prove insufficient, the developer must take those additional steps necessary to stop sediment from leaving this site (NCGS 113A-57(3)). Each sediment storage device must be inspected after each storm event (NCGS 113A-54.1(e)). Maintenance and/or clean out is necessary anytime the device is at 50% capacity. All sediment storage measures will remain on site and functional until all grading and final landscaping of the project is complete (15A NCAC 04B .0113).

2. The developer is responsible for obtaining all permits and approvals necessary for the development of this project prior to the commencement of this land disturbing activity. This could include our agency's Stormwater regulations and the Division of Water Resources' enforcement requirements within Section 401 of the Clean Water Act, the U.S. Army Corps of Engineers' jurisdiction of Section 404 of the Clean Water Act, the Division of Coastal Management's CAMA requirements, the Division of Solid Waste Management's landfill regulations, the Environmental Protection Agency and/or The U.S. Army Corps of Engineers jurisdiction of the Clean Water Act, local County or Municipalities' ordinances, or others that may be required. This approval cannot supersede any other permit or approval.

3. Adequate and appropriate measures must be properly installed downstream, within the limits of disturbance, of any land disturbing activity to prevent sediment from leaving the limits of disturbance, entering existing drainage systems, impacting an on-site natural watercourse or adjoining property. (NCGS 113A-57)

PROJECT INFORMATION SHEET

APPROVAL DATE: May 27, 2020

RESPONSIBLE PARTY: Wildlands Engineering, Inc.

PROJECT NAME: McClenny Acres

COUNTY: Wayne NO.: Wayne-2020-014

OFF-SITE BORROW AND/OR DISPOSAL SITE: NO.:

START-UP DATE:

CONTRACTOR:

ON-SITE CONTACT:

ON-SITE PHONE NO.:

OFFICE PHONE NO.:

COMPLETE & RETURN THIS FORM
PRIOR TO THE START OF CONSTRUCTION TO:

N.C.D.E.Q.
LAND QUALITY SECTION
ATTN: *James Edwards*
943 WASHINGTON SQUARE MALL
WASHINGTON, NORTH CAROLINA 27889
james.edwards@ncdenr.gov

APPENDIX 6. Vegetation Plot Data

Table 4. Planted and Total Stem Counts

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 0 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY0 2021)											
			VP 1			VP 2			VP 3			VP 4		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	River Birch	Tree	4	4	4	3	3	3	3	3	3	4	4	4
Diospyros virginiana	American Persimmon	Tree				1	1	1	1	1	1	1	1	1
Fraxinus pennsylvanica	Green Ash	Tree	2	2	2							1	1	1
Magnolia virginiana	Sweetbay	Shrub Tree	1	1	1							1	1	1
Platanus occidentalis	Sycamore	Tree	2	2	2	3	3	3	3	3	3	4	4	4
Populus deltoides	Eastern Cottonwood	Tree	1	1	1	2	2	2				1	1	1
Quercus michauxii	Swamp Chestnut Oak	Tree				2	2	2	1	1	1			
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	2	2	2	1	1	1			
Quercus phellos	Willow Oak	Tree	3	3	3	1	1	1	6	6	6	2	2	2
Taxodium distichum	Bald-cypress	Tree										1	1	1
		Stem count	14	14	14	14	14	14	15	15	15	15	15	15
		size (ares)		1			1			1			1	
		size (ACRES)		0.02			0.02			0.02			0.02	
		Species count	7	7	7	7	7	7	6	6	6	8	8	8
		Stems per ACRE	567	567	567	567	567	567	607	607	607	607	607	607

Color for Density

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnLS: Number of planted stems excluding live stakes

P-all: Number of planted stems including live stakes

T: Total stems

Table 4. Planted and Total Stem Counts

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 0 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY0 2021)						Annual Means		
			VP 5			VP 6			MY0 (2021)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	River Birch	Tree	1	1	1	1	1	1	16	16	16
Diospyros virginiana	American Persimmon	Tree				1	1	1	4	4	4
Fraxinus pennsylvanica	Green Ash	Tree	1	1	1				4	4	4
Magnolia virginiana	Sweetbay	Shrub Tree	1	1	1	1	1	1	4	4	4
Platanus occidentalis	Sycamore	Tree	5	5	5	3	3	3	20	20	20
Populus deltoides	Eastern Cottonwood	Tree							4	4	4
Quercus michauxii	Swamp Chestnut Oak	Tree	3	3	3	6	6	6	12	12	12
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	2	2	2	7	7	7
Quercus phellos	Willow Oak	Tree	2	2	2	1	1	1	15	15	15
Taxodium distichum	Bald-cypress	Tree	2	2	2				3	3	3
		Stem count	16	16	16	15	15	15	89	89	89
		size (ares)	1			1			6		
		size (ACRES)	0.02			0.02			0.15		
		Species count	8	8	8	7	7	7	10	10	10
		Stems per ACRE	647	647	647	607	607	607	600	600	600

Color for Density

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

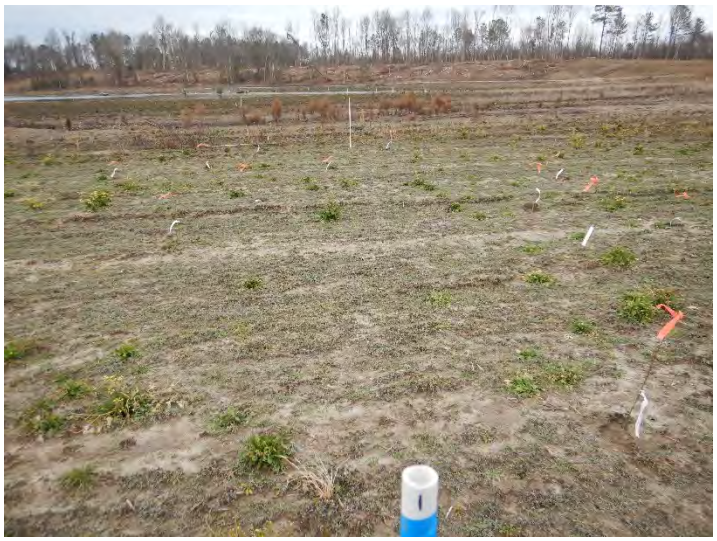
Volunteer species included in total

PnLS: Number of planted stems excluding live stakes

P-all: Number of planted stems including live stakes

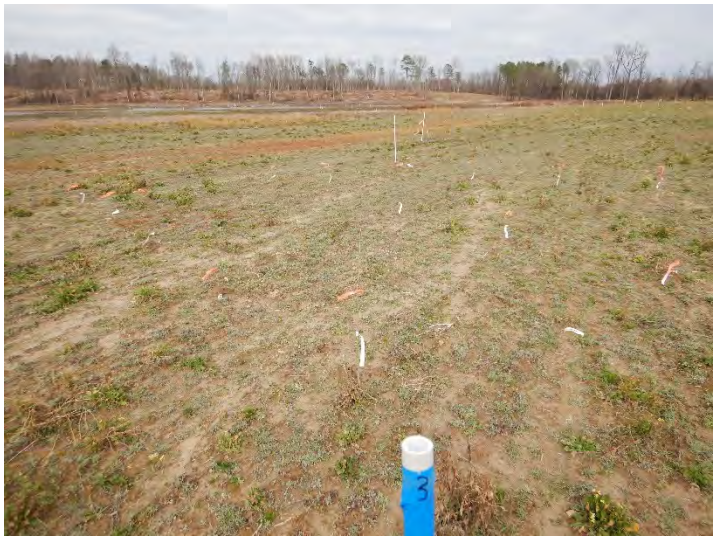
T: Total stems

VEGETATION PLOT PHOTOGRAPHS



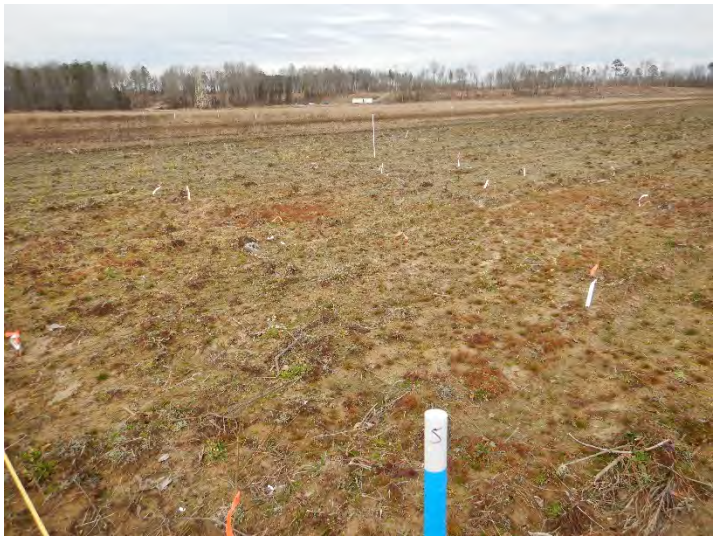
VEG PLOT 1 *(02/10/2021)*

VEG PLOT 2 *(02/10/2021)*



VEG PLOT 3 *(02/10/2021)*

VEG PLOT 4 *(02/10/2021)*



VEG PLOT 5 *(02/10/2021)*

VEG PLOT 6 *(03/02/2021)*