MONITORING YEAR 7 ANNUAL/CLOSEOUT REPORT

FINAL

VILE CREEK MITIGATION SITE

Alleghany County, NC
DEQ Contract No. 5999
DMS Project No. 96582

DWR No. 14-0869
USACE Action ID 2014-01585

Data Collection Period: April – October
2023 Submission Date: December 21, 2023

PREPARED FOR:

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December 21, 2023

Mr. Harry Tsomides
NC Department of Environmental Quality
Division of Mitigation Services
2090 US 70 Highway
Swannanoa, NC 28778

RE: Response to Monitoring Year 7 (MY7) Report – Draft Submittal Comments
Vile Creek Mitigation Site
DMS Project # 96582
Contract Number 5999
New River Basin - HUC# 05050001 - Alleghany County, North Carolina

Dear Mr. Tsomides:

Wildlands Engineering, Inc. (Wildlands) has reviewed the comments of the NCDEQ – Division of Mitigation Services (DMS) regarding the Vile Creek Mitigation Site Draft MY7 Monitoring Report. The following responses to the comments are noted below.

Please include a paragraph about the property and stewardship status. Wildlands have addressed multiple action items following the August 2023 DMS-DEQ stewardship site visit; please indicate that pending final landowner contact information, the project has had all boundary and property issues resolved, and has been accepted by DEQ stewardship.

The former landowner of parcel 308110118, Debbie Edwards, sold the property in 2020 without informing Wildlands. The new landowners, Ralph Stone and Candace Coffin-Stone were notified of the easement on the property in December 2023 with a hardcopy letter at the residence. They contacted Wildlands and the landowner information was updated with the DMS project manager in December 2023. All boundary and property issues have been addressed and the site has been accepted by DEQ stewardship. This information has been added to Section 1.2.5 of the MY7 Report.

Photos were provided for 4 piping structures (UT1 R1 (2), UT1 R2, and VC R1); can Wildlands discuss these in terms of their stability? One of them is scheduled for hand repairs in January 2024; what will this entail? Does Wildlands feel like these are all stable? How long have they been observed?

The piping structure at UT1 Reach 1 STA 212+60 received minor hand repairs in December 2023. A large coir log was installed below the sill to stabilize the bank and extend the existing footer log. The coir log was anchored with jute matting and live stakes. A smaller coir log was installed as a plug above the sill at the source of the piping and accumulated sediment was removed to redirect the thalweg back to the middle of the channel. The stream is currently flowing over the structure as designed. The three remaining piping structures on the Site are associated with stable banks and have not escalated since initial identification. The piping structure with minor bank erosion on Vile Creek Reach 1 STA 104+10 was first identified in MY4 and has remained in a similar condition with no active bank erosion through MY7. The piping structures on UT1 Reach 1 STA 207+50 and UT1 Reach 2 STA 219+00 were first identified in MY6.

There is no associated bank erosion, and the condition has not worsened since MY6. The structure at station 207+50 on UT1 was repaired in December 2023 using existing materials to plug the piping and redirect flow over the structure as intended. All noted areas of concern are isolated and have no negative impact on overall stream function or stability. This information has been added to section 1.2.5 of the MY7 report.

Section 1.3 – Proposed credit adjustments are mentioned in this section but not referenced; please indicate that the credit adjustment (downward) proposal can be found in Appendix 7. This will be discussed at the close out site meeting.

A reference to Appendix 7 containing the credit adjustment proposal was added to Section 1.3.

Table 9c (vegetation) – Pnols for MY6 have no values

MY6 Pnols values were added to Table 9c.

Digital Support File Comments

The submission is missing all stream morphology data and tables, please submit missing data.

Stream morphology data and tables were added to the "Stream Survey Data" folder in the digital support files.

The vegetation submission is incomplete, bog plots are missing, additional mobile veg plots added in 2023 are missing plot IDs, please submit missing elements.

Labeled bog plot and additional mobile vegetation plot features have been added to the geodatabase and are included in the final digital support file submission.

Wildlands submitted height data for veg plots to DMS but there was not any data in the report except for summary in text; the average height by plot should be included because this standard is specified as binding in the report.

In addition to summary in the text, average height by plot for MY0-MY7 was included in Table 9g in Appendix 3 of the Draft MY7 report and in the "Vegetation Data" folder in the digital support file submission. This information has been included again in the final support files.

Enclosed please find two (2) hard copies and one (1) electronic submittal of the Final Monitoring Report and the support files on USB. Please contact me at 828-774-6221 x 107 if you have any questions.

Sincerely,

Mimi Caddell
Environmental Scientist
mcaddell@wildlandseng.com

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) completed a full-delivery stream and wetland mitigation project at the Vile Creek Mitigation Site (Site) for the North Carolina Division of Mitigation Services (DMS) to restore and enhance a total of 8,056 linear feet (LF) of perennial and intermittent stream and to restore 6.40 acres of riparian wetlands in Alleghany County, NC. The Site is expected to generate 5,053.000 stream mitigation units (SMUs) and 5.703 riparian wetland mitigation units (WMUs) for the New River Basin (Table 1). The Site is located approximately one mile east of the Town of Sparta, NC in the New River Basin eight-digit Hydrologic Unit Code (HUC) 05050001 and the 14-digit HUC 05050001030020 (Figure 1). The Site streams consist of Vile Creek and five unnamed tributaries (UT) to Vile Creek including UT1, UT1b, UT1c, UT2, UT3, and a portion of Little River (Figure 2). Vile Creek flows into Little River near the downstream project boundary. The land adjacent to the streams and wetlands is primarily maintained cattle pasture and forest.

The Site is within a Targeted Local Watershed (TLW) identified in the New River Basin Restoration Priority (RBRP) plan (NCDENR, 2009). The Site is also located within the planning area for the Little River & Brush Creek Local Watershed Plan (LWP). The LWP identified the following stressors to watershed function: Heavily grazed deforested buffer, livestock access to the streams, heavily eroded stream banks, land-disturbing activities on steep slopes, non-point source pollution from the Town of Sparta and surrounding areas, and drained and deforested wetland areas (NCDENR, 2007).

The project goals defined in the Mitigation Plan (Wildlands, 2016) were established with careful consideration of goals and objectives that were described in the RBRP and to meet DMS mitigation needs while maximizing the ecological and water quality uplift with the watershed. The project goals established in the Mitigation Plan focused on permanent protection for the Site, re-establishing natural hydrology and vegetation, reducing water quality stressors, and enhancing terrestrial and aquatic habitat.

The Site construction and as-built survey were completed in February 2017. Monitoring Year (MY) 7 assessments and Site visits were completed between April and October 2023 to assess the conditions of the project.

This is the seventh and final monitoring year as established in the Mitigation Plan (Wildlands 2016). The Site will be presented to the NC IRT for regulatory closeout in 2024. Overall, the Site has met the required stream, vegetation, and hydrology success criteria for MY7 with some exceptions in stem height. All restored and enhancement I streams are geomorphically stable and functioning as designed with cross-section dimensions exhibiting minimal adjustments compared to as-built. Bankfull and geomorphically significant event criteria were met in MY2 with additional events recorded in MY7 including two bankfull events for UT1 Reach 2 and Vile Creek Reach 2 and one geomorphically significant event for UT1 Reach 2. The average planted stem density for Site is 359 stems per acre and, when factoring in new and supplementally planted stems from this year, is 383 stems per acre. Fourteen of seventeen permanent vegetation plots met criteria and, when factoring in new and supplementally planted stems from this year, sixteen of seventeen permanent vegetation plots met density requirements. Both transect plots and three of four additional mobile plots exceeded MY7 density standards. The average stem height for the Site is 6.6 feet and is on track to meet the final height requirement of 8 feet in the closeout year. All eight bog plots met appropriate percent cover. Nine of ten groundwater monitoring gauges in the wetland re-establishment, wetland rehabilitation, and bog areas met or exceeded hydrology success criteria. The gauge that did not meet in MY7 exceeded criteria in all previous monitoring years. Adaptive Management Plan (AMP) tasks completed in MY5 are functioning as intended and MY7 supplemental planting appears largely successful. The MY7 visual assessments revealed a previous easement violation was resolved and invasives were reduced. Aggradation areas along streams UT1B and UT1C were assessed and current stream LF and associated

wetland acreages have been presented for proposed credit adjustments. These areas will continue to be monitored and adaptive management will be performed as needed through closeout.

VILE CREEK MITIGATION SITE
Monitoring Year 7 Annual/Closeout Report

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APPENDICES

Section 1: PROJECT OVERVIEW

The Site is located approximately one mile east of the Town of Sparta in eastern Alleghany County, NC. The project is within the New River Basin eight-digit HUC 05050001 and the 14-digit HUC 05050001030020 (Figure 1). Located in the Blue Ridge Belt of the Blue Ridge Province (USGS, 1998), the project watershed primarily includes managed herbaceous, mixed upland hardwoods, and other forested land. The drainage area for the project streams ranges from 0.01 square miles to 2.69 square miles.

The project streams consist of Vile Creek and five unnamed tributaries (UT) to Vile Creek including UT1, UT1b, UT1c, UT2, UT3, and a portion of Little River. Stream restoration reaches include Vile Creek (Reaches 1 and 2) and UT1 Reach 2, which together comprise 3,047 linear feet (LF) of perennial stream channel. Stream enhancements reaches include UT1 Reach 1, UT1b, UT1c, UT2, UT3, and a portion of Little River, totaling 5,009 LF. Wetland components include 3.02 acres of wetland rehabilitation and 3.38 acres of wetland re-establishment.

Construction activities were completed by Land Mechanic Designs, Inc. in February 2017. Planting and seeding activities were completed by Bruton Natural Systems, Inc. in February 2017. The land required for construction, management, and stewardship of the mitigation project included portions of five parcels resulting in 25.04 acres of the conservation easement. The project is expected to generate 5,053.000 stream mitigation units (SMUs) and 5.703 riparian wetland mitigation units (WMUs). Annual monitoring has been conducted for seven years with close-out anticipated to commence in 2024 given the success criteria are met.

1.1 Project Goals and Objectives

The Site is intended to provide numerous ecological benefits within the New River Basin. While many of these gains are limited to the Vile Creek project area, other benefits are anticipated to create more widespread impacts including pollutant removal, reduced sediment loading, and improved aquatic and terrestrial habitat. Expected enhancements to water quality and ecological processes are outlined below as project goals and objectives. These intentions were established with careful consideration of targets described in the RBRP and to address stressors identified in the LWP.

The following project specific goals established in the Mitigation Plan (Wildlands, 2016) include:

Goals	Objectives
Reduce pollutant inputs to streams including fecal coliform, nitrogen, and phosphorous.	Exclude cattle from streams and buffers by installing fencing around conservation easements adjacent to cattle pastures. Install wells and drinkers to provide alternative water sources for cattle.
Reduce inputs of sediment into streams from eroding stream banks.	Reconstruct stream channels with stable dimensions. Add bank revetments and in-stream structures to protect restored/enhanced streams
Return a network of streams to a stable form that is capable of supporting hydrologic, biologic, and water quality functions	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.

Goals	Objectives
Improve aquatic communities in project streams and provide improved habitat for trout migrating from Little River into Vile Creek. Note: Presence of aquatic organisms and trout will not be tied to project success criteria.	Install habitat features such as constructed riffles, cover logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth
Raise local groundwater elevations and allow for more frequent overbank flows to provide a source of hydration for floodplain wetlands. Reduce shear stress on channels during larger flow events.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain
Restore wetland hydrology, soils, and plant communities.	Restore riparian wetlands by raising stream beds, plugging existing ditches, removing fill material over relict hydric soils, and planting native wetland species
Improve and expand Southern Appalachian bog habitat to support bog species such as bog turtles. Note: Presence of bog turtles will not be tied to project success criteria	Widen low lying ditched areas that represent bog conditions.
Create and improve riparian and wetland habitats by planting native vegetation. Provide a canopy to shade streams and reduce thermal loadings. Create a source of woody inputs for streams. Reduce flood flow velocities on floodplain and improve long-term lateral stability of streams. Improve bog habitat by planting herbaceous wetland plants.	Plant native tree and shrub species in riparian zone and wetland areas other than bog areas. Bog areas will be planted with herbaceous species.
Ensure that development and agricultural uses that would damage the site or reduce the benefits of project are prevented.	Establish conservation easements on the site.

1.2 Monitoring Year 7 Data Assessment

Annual monitoring and quarterly Site visits were conducted during MY7 to assess the condition of the project. The stream, vegetation, and hydrologic success criteria for the Site follows the approved success criteria presented in the Vile Creek Mitigation Plan (Wildlands, 2016).

1.2.1 Stream Assessment

Riffle cross-sections on the restoration and enhancement I reaches should be stable and show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Per NCDMS guidance, bank height ratios (BHR) shall not exceed 1.2 and entrenchment ratios (ER) shall be at least 2.2 (C stream type reaches only) for restored channels to be considered stable. All riffle cross-sections should fall within the parameters defined for channels of the appropriate stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators most often include trends in vertical incision or bank erosion. 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. Remedial action would not be taken if channel changes indicate a movement toward stability.

Morphological surveys for MY7 were conducted in April 2023. The cross-sections show little change in the bankfull area, maximum depth ratio, and width-to-depth ratio with minimal adjustment, indicating that channel dimensions are stable and project streams are functioning as designed. All cross-sections fell within the parameters defined for channels of the appropriate stream type (Rosgen, 1994 & 1996). In MY5, scouring on the left side of the stream bed at cross-section 7 resulted in an increase in bankfull area and a bank height ratio greater than 1.2. The bed has since stabilized, the scour remains isolated, and the bank height ratio decreased slightly in MY7, though remains above 1.2. The natural process of floodplain deposition may have also contributed to the increase in bank height ratio. The remaining cross-sections show little change in bankfull dimensions in comparison to the MY0 survey. See section 1.2.5 for further discussion about stream areas of concern.

1.2.2 Stream Hydrology Assessment

At the end of the seven-year monitoring period, two or more bankfull events and geomorphically significant (60% of bankfull flow) events must have occurred in separate years within the restoration and enhancement reaches.

The success criteria for bankfull and geomorphically significant events has been met on all monitored reaches with at least six bankfull events occurring in separate years documented on UT1 Reach 2 and at least five bankfull events occurring in separate years documented on Vile Creek Reach 2. At least 5 geomorphically significant events occurred on UT1 Reach 2 and at least 4 occurred on Vile Creek Reach 2 in separate years during the 7-year monitoring period. In MY7, one geomorphically significant event was recorded on UT1 Reach 2 on 7/15/2023, one bankfull event was recorded on 3/3/2023 on Vile Creek Reach 2, and one bankfull event was recorded on UT1 Reach 2 on 3/3/2023. Crest gauge (CG) 1 probe malfunctioned and failed to collect data after 7/20/2023. Refer to Appendix 5 for hydrology summary data and plots.

1.2.3 Vegetative Assessment

A total of 25 vegetation monitoring plots were installed during baseline monitoring throughout the project easement to measure the survival of the planted trees, shrubs, and herbaceous vegetation. Seventeen of the plots were established to evaluate woody species composition, density, and survival rates, while 8 of the plots were established to evaluate percent coverage of herbaceous species of bog areas. The size of individual quadrants is 100 square meters (10m x 10m or 5m x 20m) for woody tree and shrub species and 20 square meters (5m x 4m) for herbaceous vegetation bog plots. In MY5 two transect vegetation plots were added to evaluate a supplemental planting area from March 2021. Transect vegetation monitoring plot assessments will document number of planted stems and species using a circular or 100 square meters/rectangular plot.

Tree and shrub assessments are conducted following the 2006 Carolina Vegetation Survey (CVS) Level 2 Protocol for Recording Vegetation. The final planted stem vegetative success criterion for the Site is the survival of 210 planted stems per acre in the planted riparian and wetland corridor at the end of the required monitoring period (MY7). The interim measure of vegetative success for the Site is the survival of at least 320 planted stems per acre at the end of the third monitoring year (MY3) and at least 260 stems per acre at the end of the fifth monitoring year (MY5). In addition, planted trees must average 8 feet in height in each plot at the end of the seventh year of monitoring according to the 2021 Vile Creek Mitigation Site Adaptive Management Plan. Vegetation plots (VP) one and two contain only shrub species; therefore, shrub stem density success criteria of 160 surviving plants per acre at the end of year 3, 130 at the end of year 5, and 105 at the end of year 7 is used for these plots. There are no height

criteria for shrubs. The bog plots are assessed by visually estimating the percent herbaceous coverage within each plot and must have at least 80% coverage success criteria.

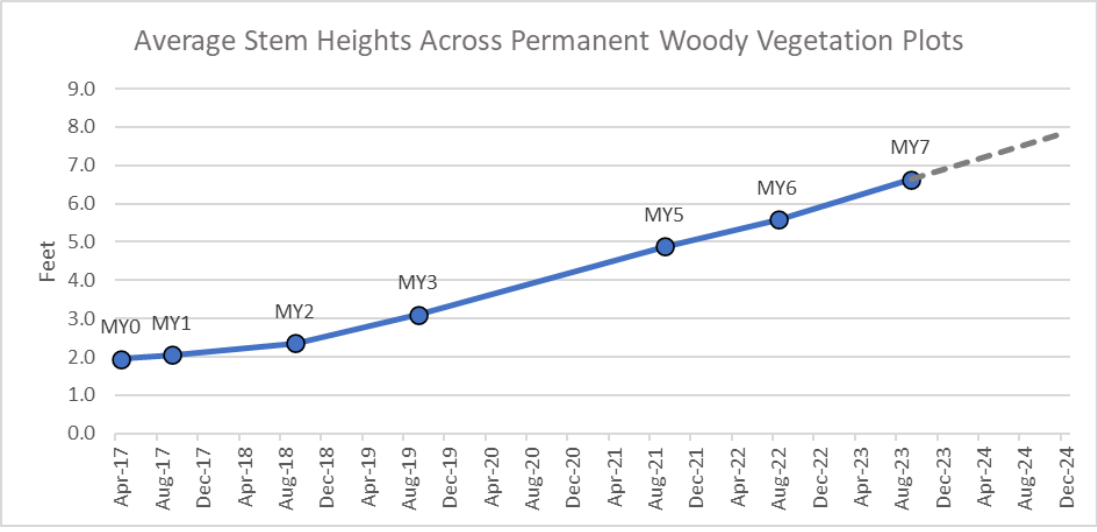
The MY7 vegetative survey was completed in September 2023. Supplemental planting occurred in low stem density areas along UT2 and UT1 Reach 1 in February 2023. Per IRT requirements, new stems are not to be counted toward formal stem densities until the second year present. In order to provide the most accurate reflection of Site conditions in the MY7 closeout year, density summaries with and without new and supplementally planted stems are presented where relevant.

When excluding new and supplemental stems, the MY7 planted stem density was 359 stems per acre for woody tree species plots (VP3 – VP17) and 263 stems per acre for shrub species plots (VP1 & VP2), both of which exceed the final requirement of 210 stems per acre for tree species and 105 stems per acre required for shrub species. In addition, 14 of the 17 plots (82%) individually met the success criteria with a stem density ranging from 283 to 567 stems per acre for tree species plots and 202 to 324 for shrub species plots. Vegetation plots five, nine, and fourteen did not meet stem density requirements at 202, 162, and 121 stems per acre, respectively.

When including new and supplemental stems added this year, the MY7 planted stem density was 383 stems per acre for woody tree species plots (VP3 – VP17) and 324 stems per acre for shrub species plots (VP1 & VP2), both of which exceed the final density requirements. In addition, 16 of the 17 plots (94%) individually met the success criteria with a stem density ranging from 243 to 567 stems per acre for tree species plots and 243 to 405 for shrub species plots. Vegetation plot fourteen did not meet stem density requirements at 121 stems per acre.

Four additional mobile plots (MP) were added to the 2023 supplementally planted areas to assess planting success. Both mobile plots along UT1 R1 exceeded stem density criteria. One MP in the supplementally planted area along the right bank of UT2 exceeded stem density criteria whereas densities in the MP along the left bank remained below the threshold. Stems in the successful areas appear healthy and well-established.

Average height across all woody plots (excluding shrub plots) was below the MY7 requirement at 6.6 feet. Three of fifteen tree plots (VP9, VP15, & VP17) met or exceeded MY7 average height requirements and three VPs (VP10, VP11, & VP16) nearly met the requirement with average heights ranging from 7.2 to 7.7 feet. At the current growth rate, the Site is expected to reach an average height of 8 feet in the closeout year. Refer to the plot below for woody tree height growth projections.



The permanent vegetation plots with the lowest average stem heights (2.5 - 4.5 feet) include VP3, VP5, and VP14. Refer to CCPV figures for areas of low stem height represented by these plots. Though stems have experienced stunted growth in these plots, over 75% of the monitored stems have health scores (vigor) of 3 or 4 indicating that those stems are healthy and likely to survive. Vegetation plots with moderate stem heights (5.7 - 6.5 feet) include VP4, VP6, VP7, VP8, VP12, and VP13. Approximately 83% of these stems have health scores of 3 or 4 and are likely to survive. Some areas of obvious low stem height were below the mapping threshold and only larger areas were reported in CCPV figures.

All herbaceous bog plots are exceeding success criteria with each reaching a minimum of 95% herbaceous cover. Both transect vegetation plots added to the supplemental planting area in March 2021 exceed the final density requirement with an average of 486 stems per acre.

The Gray's Lily (*Lilium grayi*) GPS locations are included in the CCPV. Photographs from the last known occurrence on the Site are included in Appendix 2. Refer to Appendix 2 for vegetation plot photographs and Appendix 3 for vegetation data tables.

1.2.4 Wetland Assessment

A total of ten groundwater hydrology gauges (GWG) and two soil temperature gauges were established during baseline monitoring within the wetland rehabilitation, wetland re-establishment, and bog areas. A barotroll logger, used to measure barometric pressure and aid in the calculation of groundwater levels, was also installed on-site. Groundwater monitoring gauges are downloaded on a quarterly basis and maintained as needed. Calibration is completed by manually measuring water levels on all gauges to confirm the downloaded data. Under typical precipitation conditions, the final performance success criteria for groundwater hydrology includes the documentation of free groundwater within 12 inches of the ground surface for 14 consecutive days (8.5%) of the defined 169-day growing season (April 26 – October 11) for wetland re-establishment and wetland rehabilitation areas and 20 consecutive days (12%) of the defined 169-day growing season (April 26 – October 11) for bog areas.

Nine of ten GWGs met MY7 success criteria with overall hydroperiods ranging from 9.5% to 100% of the growing season. With a measured hydroperiod of 4.1% of the growing season, GWG 2 was the only gauge that did not meet criteria in MY7 but met hydrology criteria in MY1-MY6 and water levels did not drop more than a few inches from the criteria level throughout the MY7 growing season. Manual measurements of GWG water levels were recorded quarterly during MY7. An instance of uncharacteristically low water level on the GWG 1 hydrograph in January 2023 signifies a reading directly after a well was pumped to remove unwanted bentonite from the bottom of the well and does not reflect true hydrologic conditions. Throughout the monitoring period (MY1 - MY7), all GWGs have met hydrology success criteria for a majority of the monitoring years.

The groundwater gauges representative of the created wetlands associated with UT1B and UT1C (formerly CG3 and CG4, respectively) both met success criteria in MY7. Because the GWGs are former flow gauges, the sensor depth below ground level is relatively shallow but still able to appropriately capture groundwater levels given the consistent proximity of groundwater to the ground surface. The "Gauge Sensor" lines on UT1B and UT1C hydrographs represent the limits of recorded water level data and data at or below this line was not used in determining wetland hydrology. UT1B and UT1C gauges meeting success criteria shows that wetland hydrology exists in the created wetlands.

Rainfall data was collected from the NC-AG-1-Sparta 3.5 SSW(NCCRONOS) rain gauge, approximately 4 miles from the Site. Average rainfall was recorded in January, March, May, and September. Higher than average rainfall occurred in April, June, July, and August while below average rainfall occurred in February and October. Refer to the CCPV Maps in Appendix 2 for groundwater gauge locations and Appendix 5 for groundwater hydrographs and rainfall summary plots.

1.2.5 Areas of Concern and Adaptive Management Activities

Stream repairs addressed in the IRT-approved MY5 Adaptive Management Plan (AMP) and completed in September 2021 are stable and functioning as designed as shown in the Repair Photo Log in Appendix 2. The UT1 Reach 1 (Station 205+10-205+60) natural stream realignment that occurred in MY4 (approximately 21-feet) appears to be stable. Isolated stream areas of concern are noted on the CCPV. The piping structure at UT1 Reach 1 STA 212+60 received minor hand repairs in December 2023. A large coir log was installed below the sill to stabilize the bank and extend the existing footer log. The coir log was anchored with jute matting and live stakes. A smaller coir log was installed as a plug above the sill at the source of the piping and accumulated sediment was removed to redirect the thalweg back to the middle of the channel. The stream is currently flowing over the structure as designed. The three remaining piping structures on the Site are associated with stable banks and have not escalated since initial identification. The piping structure with minor bank erosion on Vile Creek Reach 1 STA 104+10 was first identified in MY4 and has remained in a similar condition with no active bank erosion through MY7. The piping structures on UT1 Reach 1 STA 207+50 and UT1 Reach 2 STA 219+00 were first identified in MY6. There is no associated bank erosion, and the condition has not worsened since MY6. The structure at station 207+50 on UT1 was repaired in December 2023 using existing materials to plug the piping and redirect flow over the structure as intended. All noted areas of concern are isolated and have no negative impact on overall stream function or stability. Refer to Appendix 2 for vegetation and stream condition assessment tables and the CCPV maps.

Supplemental planting occurred along small sections of UT2 and UT1 Reach 1 in February 2023. Two hundred 3-gallon container plants were planted in three areas totaling approximately one acre. Some planted species were not in the approved Final Mitigation Plan but were subsequently approved in the MY5 AMP (Wildlands 2016, Wildlands 2021). These include boxelder (*Acer negundo*), white oak (*Quercus alba*), and black gum (*Nyssa sylvatica*). The 2023 Supplemental planting was predominantly successful with stem densities increasing in most areas. Stems failed to establish in a small, isolated area on the left bank of UT2 which continues to exhibit low stem densities but encompasses less than 2% of the entire planted acreage. Refer to Appendix 6 for the full 2023 supplemental planting list.

Average height across all woody plots (excluding shrub plots) is below the MY7 requirement though numerous efforts have been made over the project monitoring period to address low stem height. During supplemental planting along UT1 R2 in 2021 (MY5), protective tree tubes were added to all newly planted stems to deter problematic deer browsing. Most of these stems have established well and outgrown the tubes but deer browsing is still evident on smaller stems across the Site. In 2022 (MY6) and 2023 (MY7) soil amendments were applied to supplementally planted areas to boost macro and micronutrients, and improve cation exchange capacity, PH, and microbial communities in order to provide greater moisture-holding capacity, organic matter, and nutrient availability for plants.

Enhancement II streams UT1B and UT1C and associated wetlands were assessed in August 2023 to determine the MY7 extents. Aggradation along the streams has resulted in loss of 229.99 LF of stream and creation of 0.183 acres of wetlands. Wildlands proposes that these additional wetland areas be used to offset stream credit losses as discussed in the 2021 IRT Site Walk Meeting (Wildlands 2021). Please refer to Appendix 7 for a full summary of the August 2023 delineation and proposed credit adjustments.

Sitewide invasive treatment in July 2023 targeting Japanese barberry (*Berberis thunbergii*), primarily along easement fence lines, reduced species populations. Small pockets of Chinese bittersweet (*Celastrus orbiculatus*) were successfully treated on the downstream end of UT2. Multiflora rose (*Rosa multiflora*) populations remain reduced to levels below the mapping threshold after 2022 treatments

and are not depicted on CCPV Figures 3.0-3.4. Overall, no major invasive species are present in population sizes large enough to impact survival rates of planted stems or affect general Site integrity.

The former landowner of parcel 308110118, Debbie Edwards, sold the property in 2020 without informing Wildlands. The new landowners, Ralph Stone and Candace Coffin-Stone, were notified of the easement on the property in December 2023 with a hardcopy letter at the residence. They contacted Wildlands and the landowner information was updated with the DMS project manager in December 2023. All boundary issues have been addressed and the Site has been accepted by DEQ stewardship.

All action items noted after the 2022 DMS Easement Walk have been addressed (Wildlands 2022). The easement encroachment from mowing previously present on the left floodplain of UT1 Reach 1 was resolved in MY7. Wildlands added additional markings and horse tape along the easement line to eliminate future encroachment. No encroachment was observed along UT2 near STA 309+00, though the landowner was notified of correct boundaries. Additional signs will be added to this area in January 2024. In April 2023, Kee Mapping and Surveying located and stamped monument caps with missing numbering. Damaged fencing and easement signs were repaired in September 2023. There was no vegetation trimming observed around the mobile deer stand in the easement along Vile Creek Reach 2 and no damage due to easement access.

1.3 Monitoring Year 7 Summary

This is the seventh and final monitoring year as established in the Mitigation Plan (Wildlands 2016). The Site will be presented to the NC IRT for regulatory closeout in 2024. Overall, the Site has met the required stream, vegetation, and hydrology success criteria for MY7 with some exceptions in stem height. All restored and enhancement I streams are geomorphically stable and functioning as designed with cross-section dimensions exhibiting minimal adjustments compared to as-built. Bankfull and geomorphically significant event criteria were met in MY2 with additional events recorded in MY7 including two bankfull events for UT1 Reach 2 and Vile Creek Reach 2 and one geomorphically significant event for UT1 Reach 2. The average planted stem density for Site is 359 stems per acre and, when factoring in new and supplementally planted stems from this year, is 383 stems per acre. Fourteen of seventeen permanent vegetation plots met criteria and, when factoring in new and supplementally planted stems from this year, sixteen of seventeen permanent vegetation plots met density requirements. Both transect plots and three of four additional mobile plots exceeded MY7 density standards. The average stem height for the Site is 6.6 feet and is on track to meet the final height requirement of 8 feet in the closeout year. All eight bog plots met appropriate percent cover. Nine of ten groundwater monitoring gauges in the wetland re-establishment, wetland rehabilitation, and bog areas met or exceeded hydrology success criteria. The gauge that did not meet in MY7 exceeded criteria in all previous monitoring years. Adaptive Management Plan (AMP) tasks completed in MY5 are functioning as intended and MY7 supplemental planting appears largely successful. The MY7 visual assessments revealed a previous easement violation was resolved and invasives were reduced. Aggradation areas along streams UT1B and UT1C were assessed and current stream LF and associated wetland acreages have been presented for proposed credit adjustments. The credit adjustment proposal can be found in Appendix 7. These areas will continue to be monitored and adaptive management will be performed as needed through closeout.

Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Mitigation Plan documents available on the DMS website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 2: METHODOLOGY

Geomorphic data were collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was recorded using either a Trimble or Topcon handheld GPS with sub-meter accuracy and processed using Pathfinder and ArcGIS. Crest gauges were installed in surveyed riffle cross sections and monitored quarterly. Hydrologic monitoring instrument installation and monitoring methods are in accordance with the United States Army Corps of Engineers (USACE, 2016) standards. Planted woody vegetation is being monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2006).

Section 3: REFERENCES

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Harrelson, Cheryl C; Rawlins, C.L.; Potyondy, John P. 1994. *Stream Channel Reference Sites: An Illustrated Guide to Field Technique.* Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

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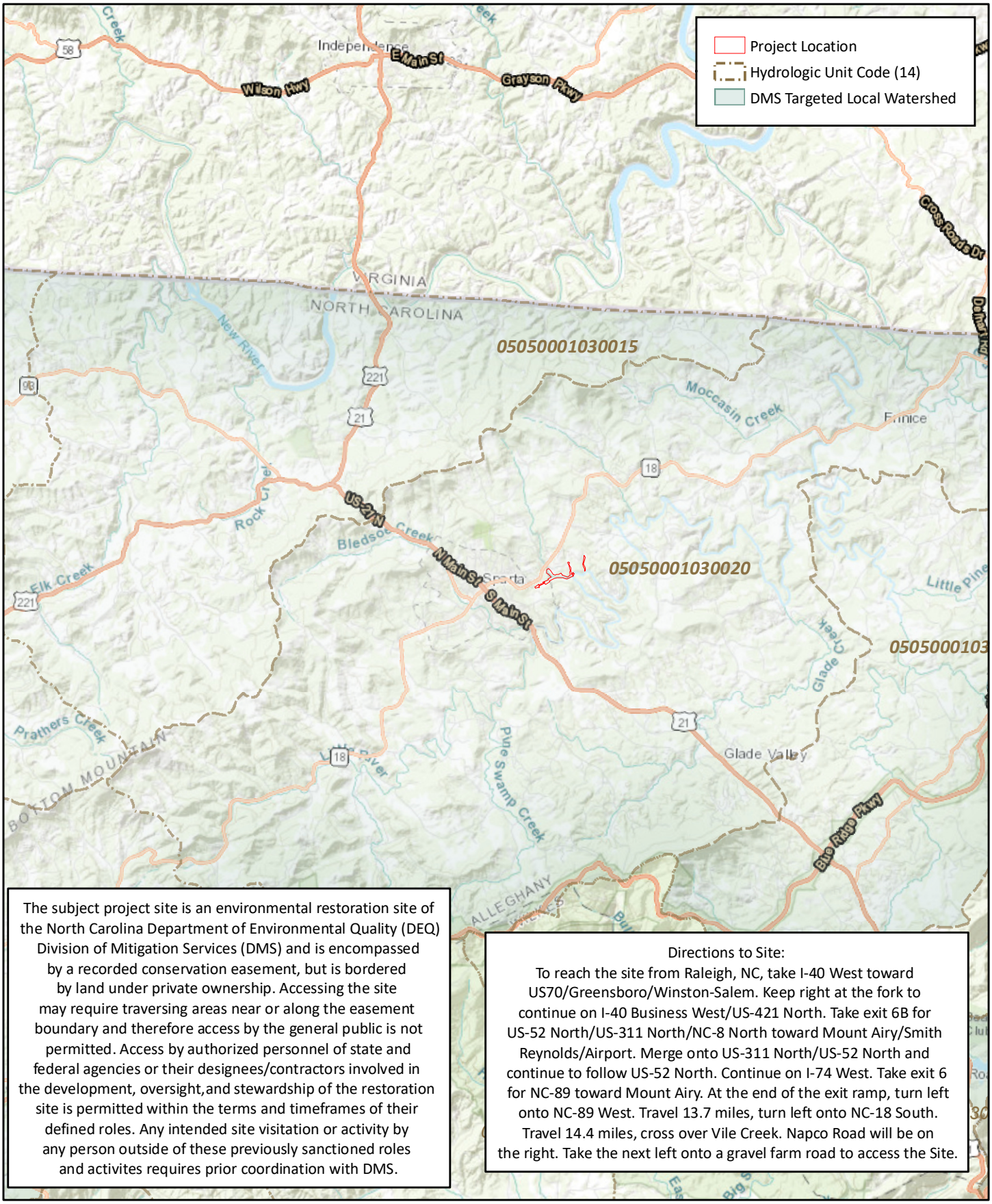
Wildlands Engineering, Inc. 2022. Vile Creek Monitoring Year 6. DMS, Raleigh, NC.

APPENDIX 1. General Figures and Tables



The subject project site is an environmental restoration site of the North Carolina Department of Environmental Quality (DEQ) 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 to Site:
To reach the site from Raleigh, NC, take I-40 West toward US70/Greensboro/Winston-Salem. Keep right at the fork to continue on I-40 Business West/US-421 North. Take exit 6B for US-52 North/US-311 North/NC-8 North toward Mount Airy/Smith Reynolds/Airport. Merge onto US-311 North/US-52 North and continue to follow US-52 North. Continue on I-74 West. Take exit 6 for NC-89 toward Mount Airy. At the end of the exit ramp, turn left onto NC-89 West. Travel 13.7 miles, turn left onto NC-18 South. Travel 14.4 miles, cross over Vile Creek. Napco Road will be on the right. Take the next left onto a gravel farm road to access the Site.

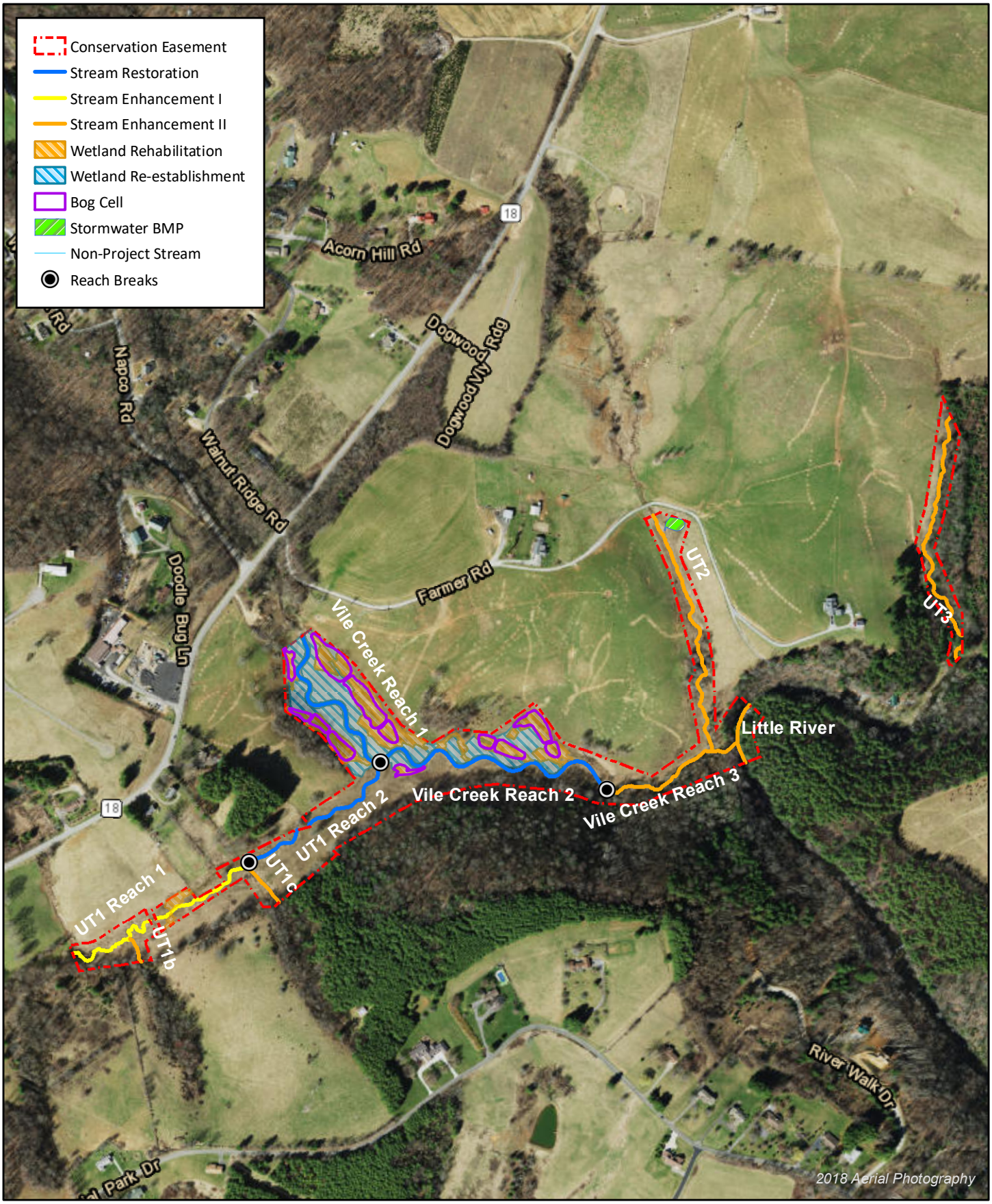
WILDLANDS ENGINEERING

0 1 2 Mile

N

Figure 1 Project Vicinity Map
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC



WILDLANDS ENGINEERING

0 300 600 Feet

N

Figure 2 Project Component Map
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC

Table 1. Project Components and Mitigation Credits
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

PROJECT COMPONENTS									
Project Area/Reach	**Existing Footage (LF) or Acreage**	**Mitigation Plan Footage (LF)/Acreage**	**Mitigation Category**	**Restoration Level**	**Priority Level**	**Mitigation Ratio (X:1)**	**As Built Footage/ Acreage[2]**	**Project Credit (SMU/WMU)[1,2]**	**Notes**
Vile Creek Reach 1	962	920	Warm	Restoration	P1	1:1	882	882.000	Alignment changed from mitigation plan/final design due to bedrock obstruction.
Vile Creek Reach 2	1,247	1,260	Warm	Restoration	P1	1:1	1,311	1,311.000	Alignment changed from mitigation plan/final design due to bedrock obstruction.
Vile Creek Reach 3	714	714	Warm	Enhancement II	N/A	2.5:1	713	279.000	As-Built credits were reduced for areas where easement is restricted and the full buffer width is not possible
UT1 Reach 1	1,143	1,107	Warm	Enhancement I	N/A	1.5:1	1,114	630.000	Excludes one 25 foot easement crossing break from 207+13 - 207+38. As-Built credits were reduced for areas where easement is restricted and the full buffer width is not possible.
UT1 Reach 2	989	825	Warm	Restoration	P1	1:1	777	750.000	Excludes 77 feet of stream outside of conservation easement from 215+68 - 216+45. Alignment changed from design due to bedrock obstruction. As-Built credits were reduced for areas where easement is restricted and the full buffer width is not possible.
UT1B	128	128	Warm	Enhancement II	N/A	2.5:1	128	48.000	As-Built credits were reduced for areas where easement is restricted and the full buffer width is not possible. 86.21 LF converted to wetland by the end of MY7 after 5 years (MY3-MY7) of continuos aggradation.
UT1C	234	228	Warm	Enhancement II	N/A	2.5:1	228	89.000	As-Built credits were reduced for areas where easement is restricted and the full buffer width is not possible. 143.78 LF converted to wetland by the end of MY7 after 5 years (MY3-MY7) of continuous aggradation.
UT2	1,226	1,226	Warm	Enhancement II	N/A	2.5:1	1,226	490.000	
UT3	1,316	1,236	Warm	Enhancement II	N/A	2.5:1	1,236	461.000	Creditable length reduced by 45 LF to account for 45 LF of alignment that does not have the full bankfull width within the CE.
Little River	284	284	Warm	Enhancement II	N/A	2.5:1	284	114.000	
Wetland Rehabilitation	3.02	3.02	Warm	Rehabilitation		1.3:1	3.02	2.323	
Wetland Re-establishment	0	3.50	Warm	Re-establishment		1:1	3.38	3.380	The reduction in wetland re-establishment acreage from design to as-built stages was mainly due to Vile Creek Reaches 1 and 2 having wider top widths in the as-built survey than in the design wetland area calculations. Thus, Vile Creek cut more into the wetland area in the as-built plans than it did in the design calculations, resulting in lower as-built wetland acreage.

[1] As-Built credits (SMUs) have been adjusted where the easement is restricted and the full buffer width and/or bankfull width is not fully contained within the conservation easement. The reductions are greater in the as-built compared to the mitigation plan. The as-built credit reductions follows the updated 2016 USACE Wilmington District Stream and Wetland Compensatory Mitigation update.

[2] Stream mitigation credits and stationg noted above are based on the as-built stream centerline.

Project Credits							
Restoration Level	**Stream**			**Riparian Wetland**		**Non-Riparian Wetland**	**Coastal Marsh**
	Warm	**Cool**	**Cold**	**Riverine**	**Non-Riv**		
Restoration	2,943.000	N/A	N/A	N/A	N/A	N/A	N/A
Re-establishment				3.380	N/A	N/A	N/A
Rehabilitation				2.323	N/A	N/A	N/A
Enhancement							
Enhancement I	630.000	N/A	N/A				
Enhancement II	1,481.000	N/A	N/A				
Creation							
Preservation							
Total	5,053.000	N/A	N/A	5.703	N/A	N/A	N/A

Table 2. Project Activity and Reporting History
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		N/A	June 2016
Final Design - Construction Plans		N/A	June 2016
Construction		N/A	February 2017
Temporary S&E mix applied to entire project area[1]		N/A	February 2017
Permanent seed mix applied to reach/segments[1]		N/A	February 2017
Bare root and live stake plantings for reach/segments		N/A	February 2017
Baseline Monitoring Document (Year 0)	Stream Survey	March 2017	April 2017
	Vegetation Survey	April 2017	
Year 1 Monitoring	Stream Survey	September 2017	December 2017
	Vegetation Survey	September 2017	
Year 2 Monitoring	Stream Survey	April 2018	November 2018
	Vegetation Survey	September 2018	
Year 3 Monitoring	Stream Survey	April 2019	December 2019
	Shrub Planting	June 2019	
	Invasive Treatment	June 2019	
	Vegetation Survey	September 2019	
Year 4 Monitoring	Supplemental Planting	March 2020	November 2020
	Stream Repairs	March 2020	
	Invasive Treatment	September 2020	
Year 5 Monitoring	Supplemental Planting	March 2021	November 2021
	Stream Survey	June 2021	
	Invasive Treatment	August 2021	
	Stream Repairs	September 2021	
	Vegetation Survey	September 2021	
Year 6 Monitoring	Vegetation Survey	August 2022	November 2022
	Supplemental Planting	April 2022	
	Invasive Treatment	August 2022	
	Soil Ammedments	June 2022	
Year 7 Monitoring	Supplemental Planting	February 2023	November 2023
	Boundary Marking Updated	March 2023	
	Corner Markers Stamped	April 2023	
	Stream Survey	April 2023	
	Soil Ammendments	June 2023	
	Invasive Treatment	July 2023	
	Vegetation Survey	September 2023	

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

Table 3. Project Contact Table
Vile Creek Mitigation Site
DMS Project No.96582
Monitoring Year 7 - 2023

Designer Jeff Keaton, PE	**Wildlands Engineering, Inc.** 1430 South Mint Street, Ste 104 Charlotte, NC 28205 704.332.7754
Construction Contractor	**Land Mechanics Design, 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 Mechanics Design, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Seed Mix Sources	**Green Resource, LLC**
Nursery Stock Suppliers	
Bare Roots	**Dykes and Son Nursery**
Live Stakes	**Bruton Natural Systems, Inc.; Foggy Mountain Nursery, LLC**
Plugs	**Wetland Plants Inc.**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Kristi Suggs 704.332.7754, ext. 110

Table 4. Project Information and Attributes
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

PROJECT INFORMATION	
Project Name	Vile Creek Mitigation Site
County	Alleghany County
Project Area (acres)	25.04
Project Coordinates (latitude and longitude)	36.510530° N, -80.104092° W

PROJECT WATERSHED SUMMARY INFORMATION	
Physiographic Province	Blue Ridge Belt of the Blue Ridge Province
River Basin	New
USGS Hydrologic Unit 8-digit	05050001
USGS Hydrologic Unit 14-digit	05050001030020
DWR Sub-basin	05-07-03
Project Drainiage Area (acres)	22,912
Project Drainage Area Percentage of Impervious Area	2%
CGIA Land Use Classification	Managed Herbaceous (50%), Forested (45%), Mountain Conifers (3%), Impervious (2%)

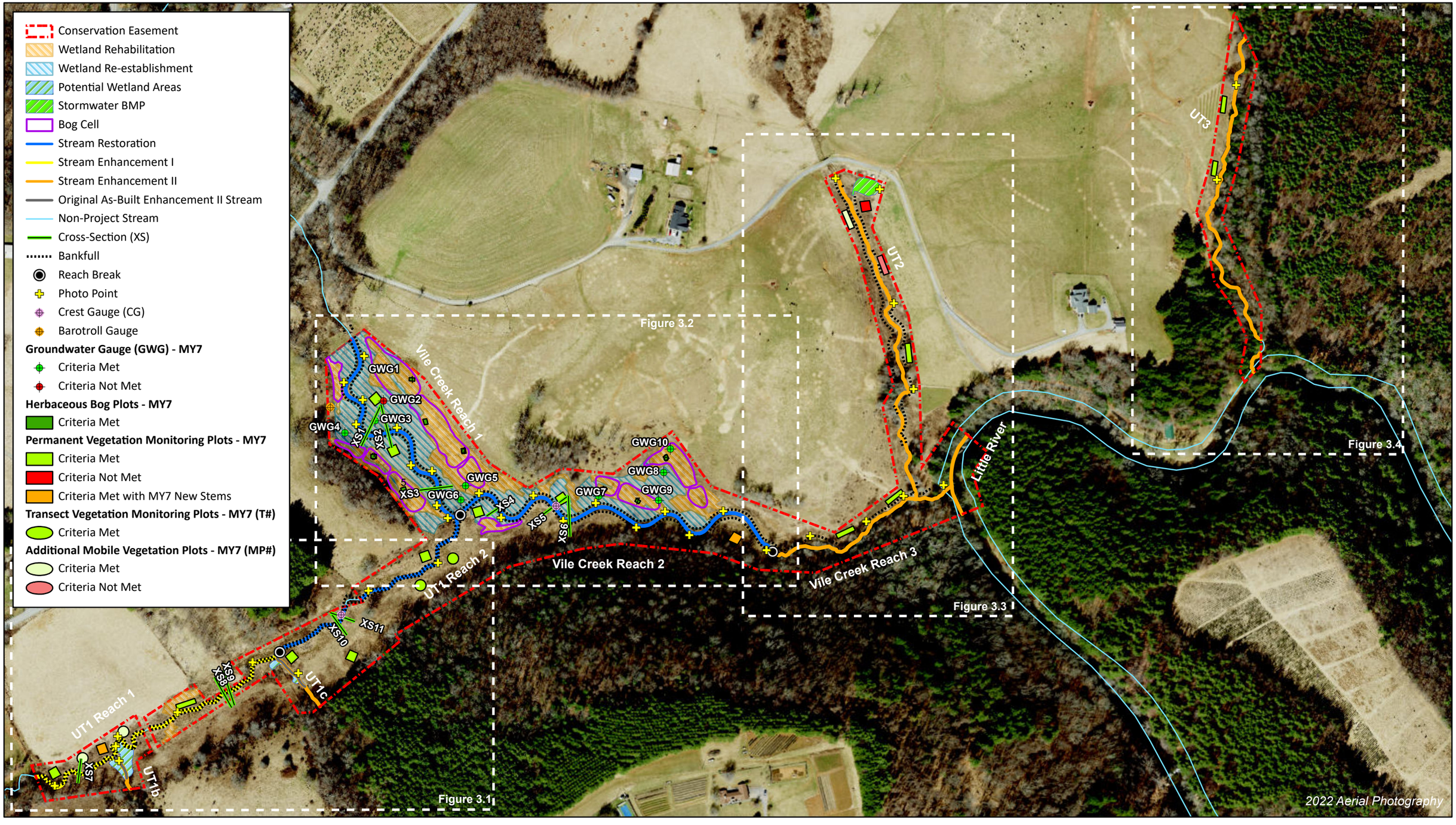
REACH SUMMARY INFORMATION

Parameters	Vile Creek Reach 1	Vile Creek Reach 2	Vile Creek Reach 3	UT1 Reach 1	UT1 Reach 2	UT1B	UT1C	UT2	Little River	UT3
Length of Reach (linear feet) - Post-Restoration	882	1,311	713	1,114	854	128	228	1,226	284	1,316
Drainage Area (acres)	1,375	1,639	1,720	190	218	8	8	80	22,912	38
NCDWR Stream Identification Score - Pre-Restoration	45.5	45.5	45.5	43	43	28.25	26	27, 42.5	49.5	33.5
NCDWR Water Quality Classification	C									
Morphological Desription (stream type) - Pre-Restoration	C3	C4	C4	E4b	F4b	E4b	E4b	B4	C4	B4a
Evolutionary Trend (Simon's Model) - Pre-Restoration	IV	IV	IV	III	IV	III	III	II	I	III
Underlying Mapped Soils	Alluvial land, wet (Nikwasi); Chandler silt loam; Chandler stony silt loam; Chester loam; Chester stony loam; Clifton loam; Fannin silt loam; Stony Steep Land; Tate loam; Tusquitee loam; Watauga loam									
Drainage Class	Very poorly drained (Alluvial land, wet (Nikwasi); Well Drained (Chester loam, Chester stony loam, Clifton loam, Fannin silt loam, Tate loam, Tusquitee loam, Watauga loam); Somewhat excessively drained (Chandler silt loam, Chandlery stony silt loam); Excessively drained (Stony steep land).									
Soil Hydric Status	A/D (Nikwasi); A (Chandler silt loam, Chandler stony silt loam, Tusquitee loam, Stony steep land); B (Chester silt loam, Chester stony loam, Clifton loam, Fannin silt loam, Tate loam, Watauga loam)									
Valley Slope - Pre-Restoration	0.017	0.016	0.015	0.032	0.033	0.071	0.067	0.048	N/A	0.070
FEMA Classification	AE									
Native Vegetation Community	Montane Alluvial Forest, Southern Appalachian Bog									
Percent Composition Exotic Invasive Vegetation -Post-Restoration	<1%									

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. 3885. Action ID# SAW-2014-01585
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	Vile Creek Mitigation Site Categorical Exclusion (CE) Approved 9/15/2014
Historic Preservation Act	Yes	Yes	No historic resources were found to be impacted (letter from SHPO dated 7/25/2014)
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	No impact application was prepared for local review. No post-project activities required.	Vile Creek Final Mitigation Plan (June 2016) and Vile Creek Categorical Exclusion (CE) Approved 9/15/2014
Essential Fisheries Habitat	No	No	Vile Creek Final Mitigation Plan (June 2016) and Vile Creek Categorical Exclusion (CE) Approved 9/15/2014

APPENDIX 2. Visual Assessment Data



WILDLANDS ENGINEERING

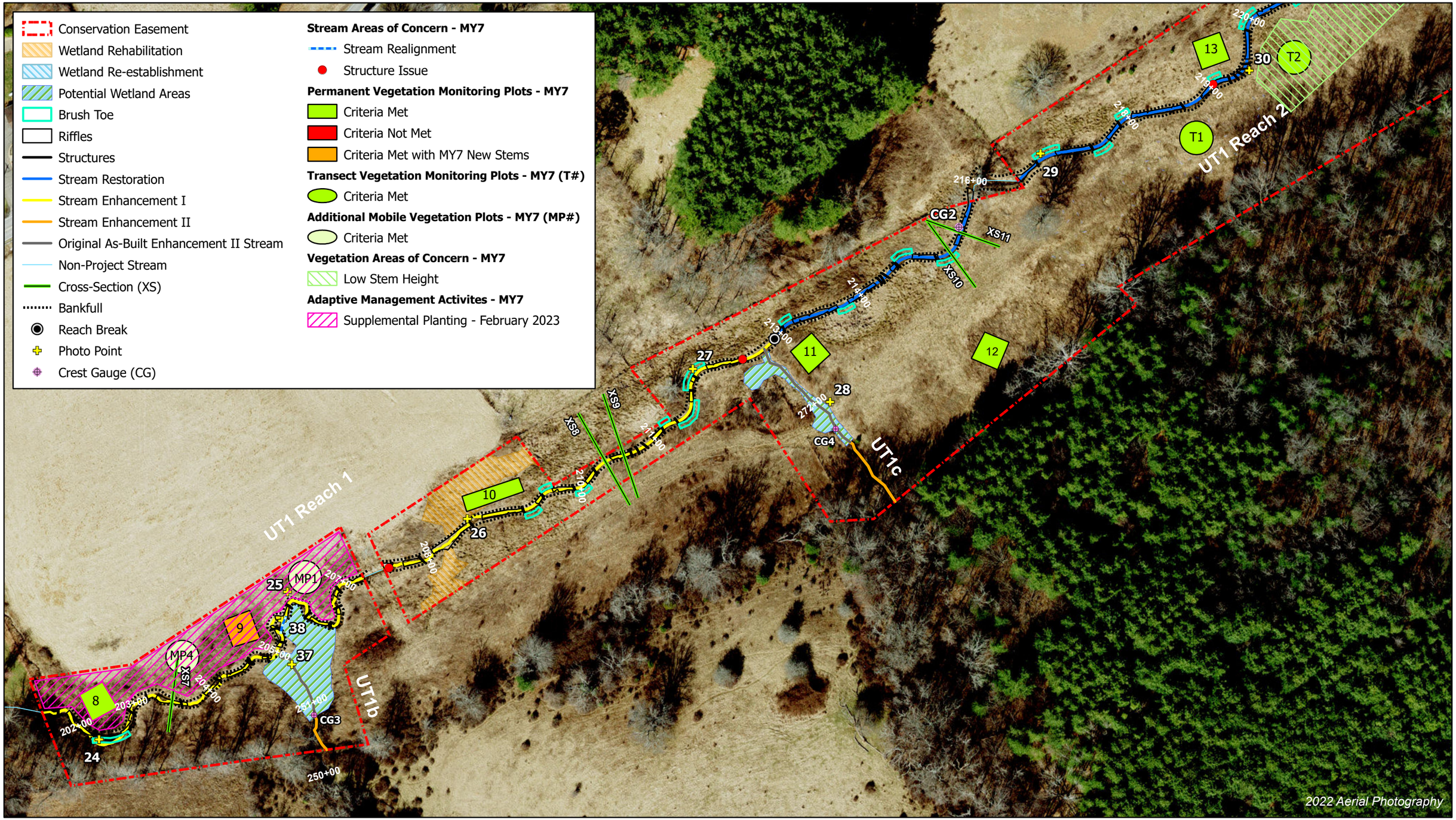
NC Mitigation Services ENVIRONMENTAL QUALITY

0 300 600 Feet

N

Figure 3.0 Integrated Current Condition Plan View
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC



WILDLANDS ENGINEERING

Mitigation Services ENVIRONMENTAL QUALITY

0 100 200 Feet

N

Figure 3.1 Integrated Current Condition Plan View
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC

Conservation Easement
Wetland Rehabilitation
Wetland Re-establishment
Bog Cell
Brush Toe
Riffles
Stream Restoration
Stream Enhancement I
Stream Enhancement II
Non-Project Stream
Structures
Bankfull
Cross-Section (XS)
Reach Break
Photo Point
Crest Gauge (CG)
Barotroll Gauge
Gray's Lily Locations (Lilium grayi)

Groundwater Gauge (GWG) - MY7
Criteria Met
Criteria Not Met

Stream Areas of Concern - MY7
Scour/Erosion
Structure Issue

Vegetation Areas of Concern - MY7
Low Stem Height

Herbaceous Bog Plots - MY7
Criteria Met

Permanent Vegetation Monitoring Plots - MY7
Criteria Met
Criteria Not Met
Criteria Met with MY7 New Stems

Transect Vegetation Monitoring Plots - MY7 (T#)
Criteria Met

Vile Creek Reach 1
Vile Creek Reach 2
UT1 Reach 2
GWG1
GWG2
GWG3
GWG4
GWG5
GWG6
GWG7
GWG8
GWG9
GWG10
CG1
XS1
XS2
XS3
XS4
XS5
XS6
T1
T2
2022 Aerial Photography

WILDLANDS ENGINEERING

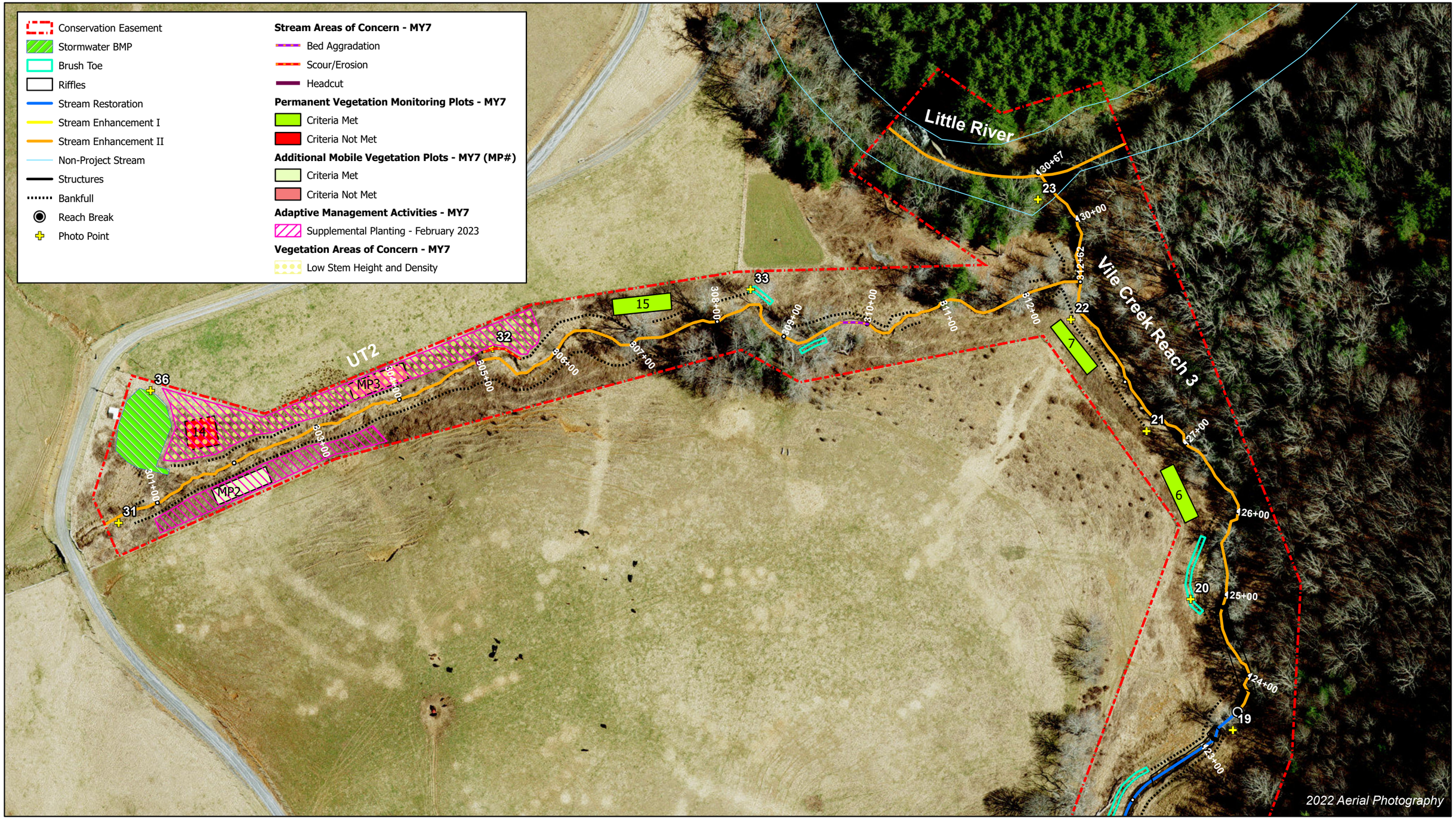
Mitigation Services ENVIRONMENTAL QUALITY

0 100 200 Feet

N

Figure 3.2 Integrated Current Condition Plan View
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC



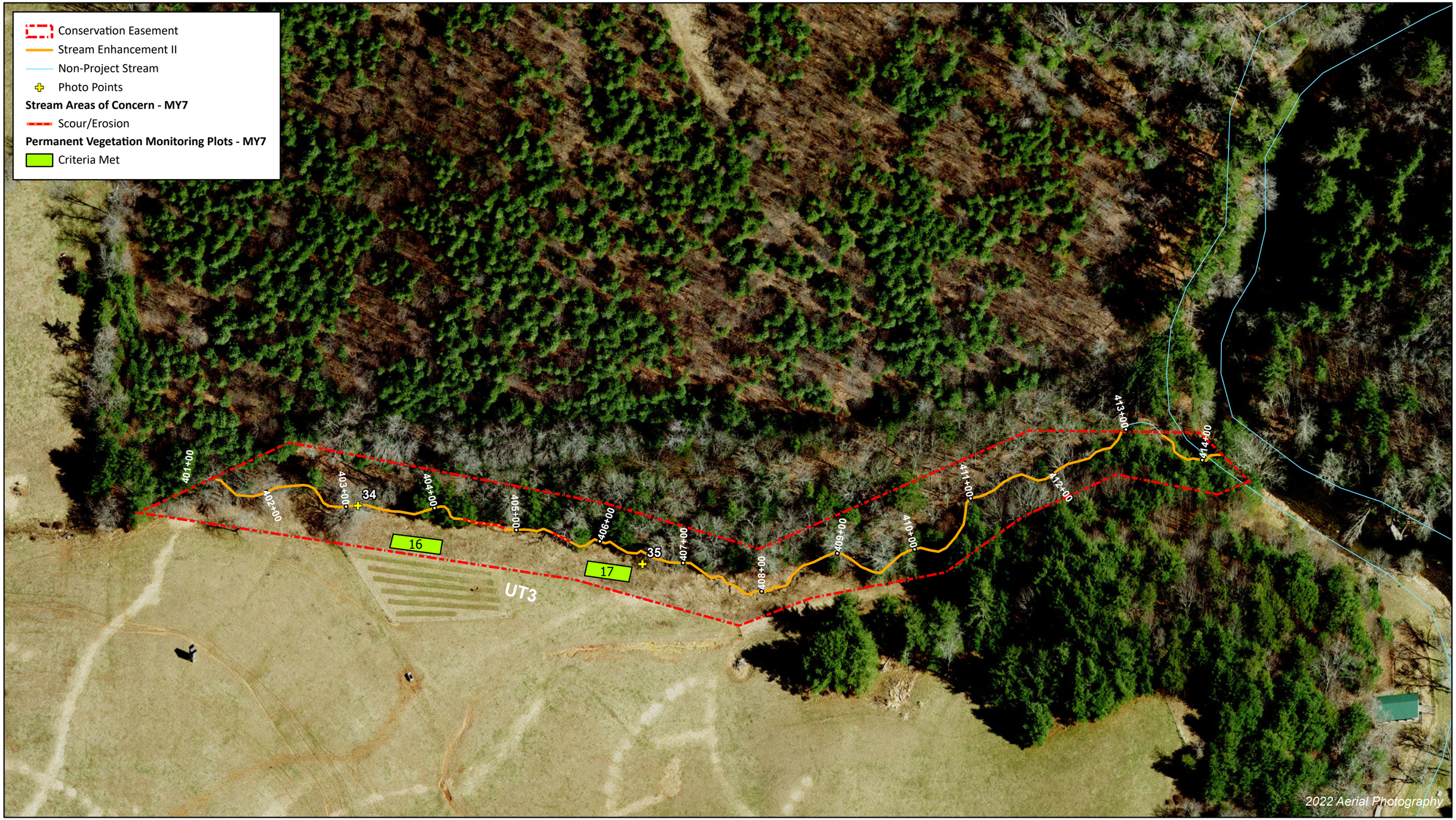
WILDLANDS ENGINEERING

Mitigation Services ENVIRONMENTAL QUALITY

0 100 200 Feet

Figure 3.3 Integrated Current Condition Plan View
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC



WILDLANDS ENGINEERING

NC Mitigation Services ENVIRONMENTAL QUALITY

0 100 200 Feet

Figure 3.4 Integrated Current Condition Plan View
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC

Table 5a. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
UT1 Reach 1 (1,114 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	22	22			100%			
	3. Meander Pool Condition	Depth Sufficient	14	14			100%			
		Length Appropriate	14	14			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	14	14			100%			
		Thalweg centering at downstream of meander bend (Glide)	14	14			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	37	37			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	28	30			93%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	28	30			93%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	37	37			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	37	37			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5b. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
UT1 Reach 2 (854 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	11	11			100%			
	3. Meander Pool Condition	Depth Sufficient	11	11			100%			
		Length Appropriate	11	11			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	11	11			100%			
		Thalweg centering at downstream of meander bend (Glide)	11	11			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	33	33			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	21	22			95%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	21	22			95%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	33	33			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	33	33			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5c. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
Vile Creek Reach 1 (882 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	8	8			100%			
	3. Meander Pool Condition	Depth Sufficient	8	8			100%			
		Length Appropriate	8	8			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		Thalweg centering at downstream of meander bend (Glide)	8	8			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	35	96%	0	0	96%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	35	96%	0	0	96%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	15	16			94%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	8			88%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	8			88%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	16	16			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	16	16			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5d. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
Vile Creek Reach 2 (1,311 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	10	10			100%			
	3. Meander Pool Condition	Depth Sufficient	9	9			100%			
		Length Appropriate	9	9			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	9	9			100%			
		Thalweg centering at downstream of meander bend (Glide)	9	9			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	16	16			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	16	16			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	16	16			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5e. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
Vile Creek Reach 3 (713 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	1	1			100%			
	3. Meander Pool Condition	Depth Sufficient	1	1			100%			
		Length Appropriate	1	1			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	1	1			100%			
		Thalweg centering at downstream of meander bend (Glide)	1	1			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	2	2			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5f. Visual Stream Morphology Stability Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
UT2: (763 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			1	32	96%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	N/A	N/A			n/a			
	3. Meander Pool Condition	Depth Sufficient	N/A	N/A			n/a			
		Length Appropriate	N/A	N/A			n/a			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	N/A	N/A			n/a			
		Thalweg centering at downstream of meander bend (Glide)	N/A	N/A			n/a			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	45	94%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	45	94%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	2	2			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.
N/A - Not applicable: No Engineered Structures applies to UT2

Table 6. Vegetation Condition Assessment Table
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Date of visual assessments: October 2023
Planted Acreage **17**

Vegetation Category	Definitions	Mapping Threshold (Ac)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	0	0.0	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY7 stem count criteria.	0.1	1	0.3	1.8%
		Total	**1**	**0.3**	**1.8%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25	2	0.7	4.1%
		Cumulative Total	**3**	**1.0**	**5.9%**

Easement Acreage **25**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1,000	0	0.0	0.0%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0.0%

Stream Photographs

MY0 - MY7

	
Photo Point 1 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 1** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 1 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 1** – view downstream Vile Creek R1 (04/03/2023)
	
Photo Point 2 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 2** – view upstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 2 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 2** – view downstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 3 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 3** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 3 – view downstream Vile Creek R1 (0*3/06/2017)*	**Photo Point 3** – view downstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 4 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 4** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 4 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 4** – view downstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 5 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 5** – view upstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 5 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 5** – view downstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 6 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 6** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 6 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 6** – view downstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 7 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 7** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 7 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 7** – view downstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 8 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 8** – view upstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 8 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 8** – view downstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 9 – view upstream Vile Creek R1 *(03/06/2017)*	**Photo Point 9** – view upstream Vile Creek R1 *(04/03/2023)*
	
Photo Point 9 – view downstream Vile Creek R1 *(03/06/2017)*	**Photo Point 9** – view downstream Vile Creek R1 *(04/03/2023)*

	
Photo Point 10 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 10** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 10 –view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 10** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 11 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 11** – view upstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 11 –view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 11** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 12 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 12** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 12 –view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 12** – view downstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 13 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 13** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 13 –view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 13** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 14 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 14** – view upstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 14 – view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 14** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 15 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 15** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 15 – view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 15** – view downstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 16 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 16** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 16 – view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 16** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 17 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 17** – view upstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 17 – view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 17** – view downstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 18 – view upstream Vile Creek R2 *(03/06/2017)*	**Photo Point 18** – view upstream Vile Creek R2 *(04/03/2023)*
	
Photo Point 18 – view downstream Vile Creek R2 *(03/06/2017)*	**Photo Point 18** – view downstream Vile Creek R2 *(04/03/2023)*

	
Photo Point 19 – view upstream Vile Creek R3 *(03/06/2017)*	**Photo Point 19** – view upstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 19 – view downstream Vile Creek R3 *(03/06/2017)*	**Photo Point 19** – view downstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 20 – view upstream Vile Creek R3 *(03/06/2017)*	**Photo Point 20** – view upstream Vile Creek R3 *(04/03/2023)*

	
Photo Point 20 – view downstream Vile Creek R3 *(03/06/2017)*	**Photo Point 20** – view downstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 21 – view upstream Vile Creek R3 *(03/06/2017)*	**Photo Point 21** – view upstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 21 – view downstream Vile Creek R3 *(03/06/2017)*	**Photo Point 21** – view downstream Vile Creek R3 *(04/03/2023)*

	
Photo Point 22 – view upstream Vile Creek R3 *(03/06/2017)*	**Photo Point 22** – view upstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 22 – view downstream Vile Creek R3 *(03/06/2017)*	**Photo Point 22** – view downstream Vile Creek R3 *(04/03/2023)*
	
Photo Point 23 – view upstream Little River *(03/06/2017)*	**Photo Point 23** – view upstream Little River *(04/03/2023)*

Photo Point 23 – view downstream Little River *(03/06/2017)*

Photo Point 23 – view downstream Little River *(04/03/2023)*

Photo Point 24 – view upstream UT1 R1 *(03/07/2017)*

Photo Point 24 – view upstream UT1 R1 *(04/03/2023)*

Photo Point 24 – view downstream UT1 R1 *(03/07/2017)*

Photo Point 24 – view downstream UT1 R1 *(04/03/2023)*

	
Photo Point 25 – view upstream UT1 R1 (*03/07/2017*)	**Photo Point 25** – view upstream UT1 R1 *(04/03/2023)*
	
Photo Point 25 – view downstream UT1 R1 (*03/07/2017*)	**Photo Point 25** – view downstream UT1 R1 *(04/03/2023)*
	
Photo Point 26 – view upstream UT1 R1 (*03/07/2017*)	**Photo Point 26** – view upstream UT1 R1 *(04/03/2023)*

	
Photo Point 26 – view downstream UT1 R1 (*03/07/2017*)	**Photo Point 26** – view downstream UT1 R1 *(04/03/2023)*
	
Photo Point 27 – view upstream UT1 R1 (0*3/07/2017*)	**Photo Point 27** – view upstream UT1 R1 *(04/03/2023)*
	
Photo Point 27 – view downstream UT1 R1 (*03/07/2017*)	**Photo Point 27** – view downstream UT1 R1 *(04/03/2023)*

	
Photo Point 28 – view upstream UT1C *(03/07/2017)*	**Photo Point 28** – view upstream UT1C *(04/03/2023)*
	
Photo Point 28 – view downstream UT1C *(03/07/2017)*	**Photo Point 28** – view downstream UT1C *(04/03/2023)*
	
Photo Point 29 – view upstream UT1 R2 *(03/07/2017)*	**Photo Point 29** – view upstream UT1 R2 *(04/03/2023)*

	
Photo Point 29 – view downstream UT1 R2 *(03/07/2017)*	**Photo Point 29** – view downstream UT1 R2 *(04/03/2023)*
	
Photo Point 30 – view upstream UT1 R2 *(03/07/2017)*	**Photo Point 30** – view upstream UT1 R2 *(04/03/2023)*
	
Photo Point 30 – view downstream UT1 R2 *(03/07/2017)*	**Photo Point 30** – view downstream UT1 R2 *(04/03/2023)*

	
Photo Point 31 – view upstream UT2 *(03/06/2017)*	**Photo Point 31** – view upstream UT2 *(04/03/2023)*
	
Photo Point 31 – view downstream UT2 *(03/06/2017)*	**Photo Point 31** – view downstream UT2 *(04/03/2023)*
	
Photo Point 31 – view of UT2 BMP *(03/06/2017)*	**Photo Point 31** – view of UT2 BMP *(04/03/2023)*

	
Photo Point 32 – view upstream UT2 *(03/06/2017)*	**Photo Point 32** – view upstream UT2 *(04/03/2023)*
	
Photo Point 32 – view downstream UT2 *(03/06/2017)*	**Photo Point 32** – view downstream UT2 *(04/03/2023)*
	
Photo Point 33 – view upstream UT2 *(03/06/2017)*	**Photo Point 33** – view upstream UT2 *(04/03/2023)*

	
Photo Point 33 – view downstream UT2 *(03/06/2017)*	**Photo Point 33** – view downstream UT2 *(04/03/2023)*
	
Photo Point 34 – view upstream UT3 *(03/06/2017)*	**Photo Point 34** – view upstream UT3 *(04/03/2023)*
	
Photo Point 34 – view downstream UT3 *(03/06/2017)*	**Photo Point 34** – view downstream UT3 *(04/03/2023)*

	
Photo Point 35 – view upstream UT3 *(03/06/2017)*	**Photo Point 35** – view upstream UT3 *(04/03/2023)*
	
Photo Point 35 – view downstream UT3 *(03/06/2017)*	**Photo Point 35** – view downstream UT3 *(04/03/2023)*
	
Photo Point 36 –stormwater wetland *(05/03/2017)*	**Photo Point 36** –stormwater wetland *(04/03/2023)*

	
Photo Point 37 – UT1B wetland view upstream *(04/03/2023)*	**Photo Point 38** – UT1 Reach 1 stream realignment *(04/03/2023)*

Vegetation Photographs

MY0 - MY7

	
Vegetation Plot 1 – MY0 *(03/06/2017)*	**Vegetation Plot 1** – MY7 *(09/05/2023)*
	
Vegetation Plot 2 – MY0 *(03/06/2017)*	**Vegetation Plot 2** – MY7 *(09/05/2023)*
	
Vegetation Plot 3 – MY0 *(03/06/2017)*	**Vegetation Plot 3** – MY7 *(09/05/2023)*

	
Vegetation Plot 4 – MY0 *(03/06/2017)*	**Vegetation Plot 4** – MY7 *(09/05/2023)*
	
Vegetation Plot 5 – MY0 *(03/06/2017)*	**Vegetation Plot 5** – MY7 *(09/05/2023)*
	
Vegetation Plot 6 – MY0 *(03/06/2017)*	**Vegetation Plot 6** – MY7 *(09/05/2023)*

	
Vegetation Plot 7 – MY0 *(03/06/2017)*	**Vegetation Plot 7** – MY7 *(09/05/2023)*
	
Vegetation Plot 8 – MY0 *(03/07/2017)*	**Vegetation Plot 8** – MY7 *(9/06/2023)*
	
Vegetation Plot 9 – MY0 *(03/07/2017)*	**Vegetation Plot 9** – MY7 *(09/06/2023)*

	
Vegetation Plot 10 – MY0 *(03/07/2017)*	**Vegetation Plot 10** – MY7 *(09/06/2023)*
	
Vegetation Plot 11 – MY0 *(03/07/2017)*	**Vegetation Plot 11** – MY7 *(09/06/2023)*
	
Vegetation Plot 12 – MY0 *(03/07/2017)*	**Vegetation Plot 12** – MY7 *(09/06/2023)*

	
Vegetation Plot 13 – MY0 *(03/07/2017)*	**Vegetation Plot 13** – MY7 *(09/06/2023)*
	
Vegetation Plot 14 – MY0 *(03/06/2017)*	**Vegetation Plot 14** – MY7 *(09/06/2023)*
	
Vegetation Plot 15 – MY0 *(03/06/2017)*	**Vegetation Plot 15** – MY7 *(09/06/2023)*

Vegetation Plot 16 – MY0 (0*3/06/2017*)

Vegetation Plot 16 – MY7 *(09/07/2023)*

Vegetation Plot 17 – MY0 *(03/06/2017)*

Vegetation Plot 17 – MY7 *(09/07/2023)*

Transect Vegetation Plot 1 – MY7 *(09/06/2023)*

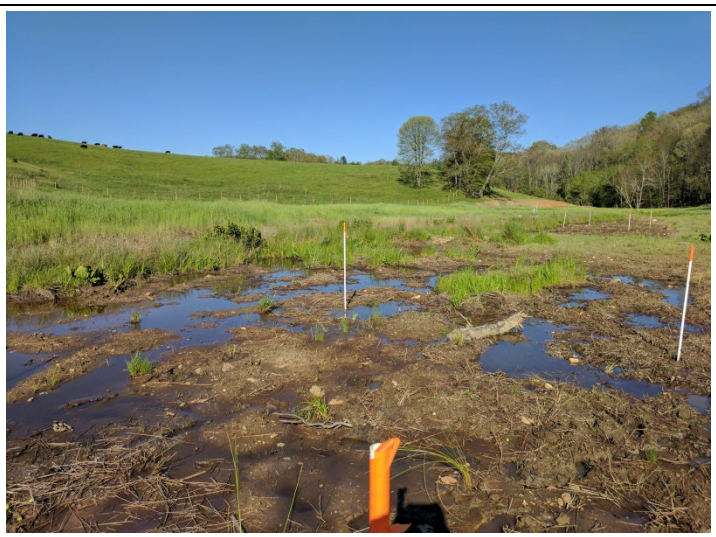
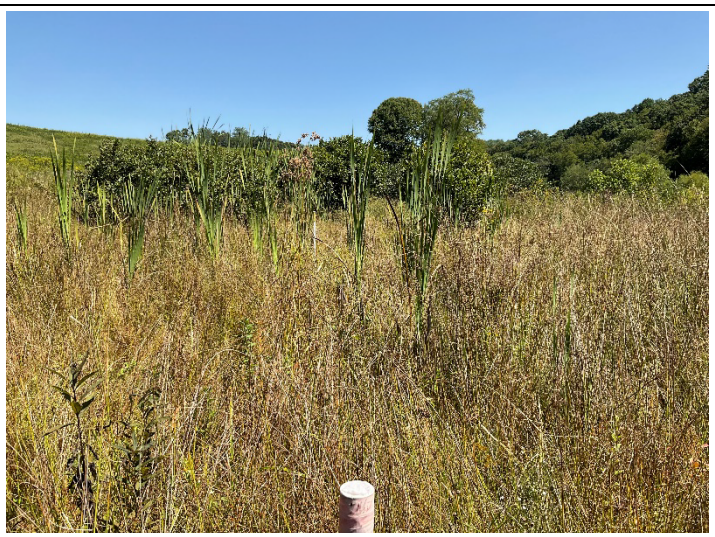
Transect Vegetation Plot 2 – MY7 *(09/06/2023)*

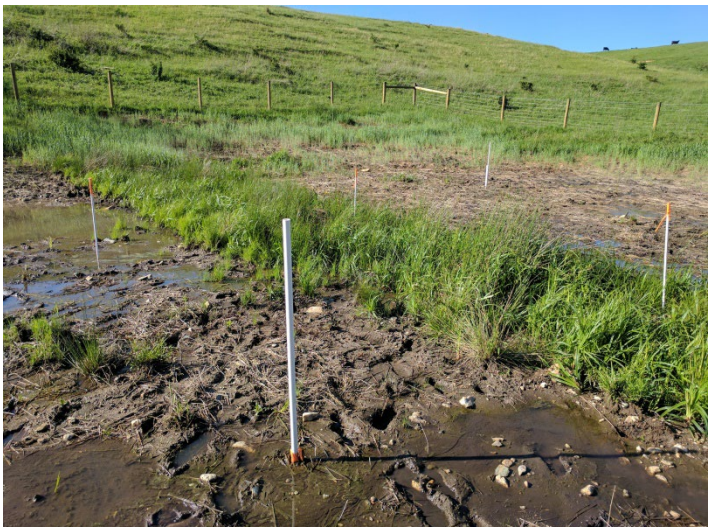
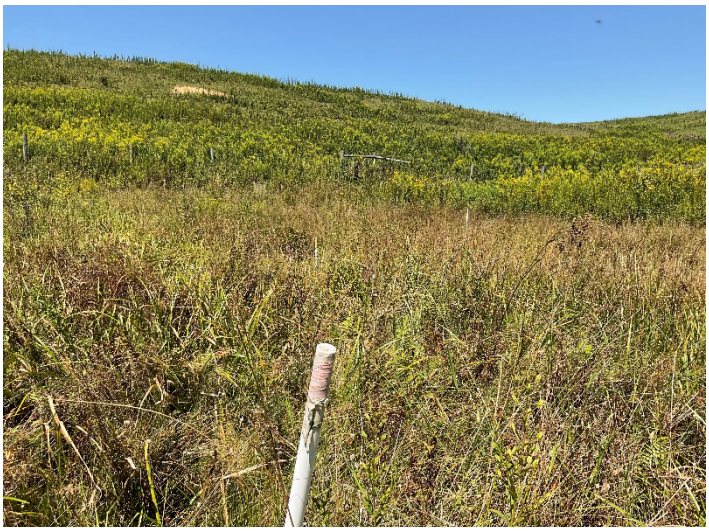
	
Mobile Vegetation Plot 1 – MY7 *(09/06/2023)*	**Mobile Vegetation Plot 2 –** MY7 *(09/06/2023)*
	
Mobile Vegetation Plot 3 – MY7 *(09/07/2023)*	**Mobile Vegetation Plot 4 –** MY7 *(09/07/2023)*

Bog Vegetation Photographs

MY0 – MY7

	
Bog Vegetation Plot 1 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 1** – MY7 *(09/05/2023)*
	
Bog Vegetation Plot 2 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 2** – MY7 *(09/05/2023)*
	
Bog Vegetation Plot 3 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 3** – MY7 *(09/05/2023)*

	
Bog Vegetation Plot 4 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 4** – MY7 *(09/05/2023)*
	
Bog Vegetation Plot 5 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 5** – MY7 *(09/05/2023)*
	
Bog Vegetation Plot 6 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 6** – MY7 *(09/05/2023)*

	
Bog Vegetation Plot 7 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 7** – MY7 *(09/05/2023)*
	
Bog Vegetation Plot 8 – MY0 *(05/04/2017)*	**Bog Vegetation Plot 8** – MY7 *(09/05/2023)*

Gray's Lily Photographs

	
Gray's Lily location 1 - *(5/11/2022)*	**Gray's Lily location 2** - *(6/04/2019)*

Vile Creek
Repairs Photo Log
MY7

Vile Creek R2: STA 118+50 - 118+80 - Right Bank Repair 04-03-2023

Vile Creek R2: STA 118+80 – J-Hook Repair 04-03-2023

Vile Creek R2: STA 119+50 - 119+70 - Bank Repair 04-03-2023

Vile Creek R2: STA 121+00 - 121+25 - Right Bank Repair 04-03-2023

Vile Creek R2: STA 122+20 - 123+00 – Stream Repair 04-03-2023

Vile Creek R2: STA 123+00 – Rock Sill Repair 04-03-2023

	
Vile Creek R3: STA 125+00 - 125+60 - Secondary Channel Repair 04-03-2023	UT2 BMP – Headcut Repair 04-20-2023

Vile Creek
Stream Areas of Concern Photo Log
MY7

Photo 1: UT1 R1 STA 207+50 – Piping Structure 10-23-2023

Photo 2: UT1 R1 STA 212+60 – Piping Structure 10-23-2023

Photo 3: UT1 R2 STA 219+00 – Piping Structure 10-23-2023

Photo 4: Vile Creek R1 STA 104+10 – Dislodged and piping structure with bank erosion 10-23-2023

Photo 5: UT1 R1 resolved encroachment

APPENDIX 3. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 7 - 2023

Plot	MY7 Success Criteria Met (Y/N)	MY7 Success Criteria Met with New or Supplementally Planted Stems (Y/N)	Tract Mean	
1	Y	Y		
2	Y	Y		
3	Y	Y		
4	Y	Y		
5	N	Y		
6	Y	Y		
7	Y	Y		
8	Y	Y		
9	N	Y	82%	94%
10	Y	Y		
11	Y	Y		
12	Y	Y		
13	Y	Y		
14	N	N		
15	Y	Y		
16	Y	Y		
17	Y	Y		

Table 8. CVS Vegetation Plot Metadata
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Report Prepared By	Jessica Waller
Date Prepared	9/25/2023 16:01
Database Name	Vile MY7 cvs-eep-entrytool-v2.5.0.mdb
Database Location	C:\Users\jwaller\OneDrive - Wildlands Engineering Inc\Desktop
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Project Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Project Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	96582
project Name	Vile Creek Restoration Project
Description	Stream and Wetland Mitigation
Required Plots (calculated)	17
Sampled Plots	17

Table 9a. Planted and Total Stem Counts
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

			Current Plot Data (MY7 2023)																	
			Vegetation Plot 1[1]				Vegetation Plot 2[1]				Vegetation Plot 3			Vegetation Plot 4			Vegetation Plot 5			
Scientific Name	Common Name	Species Type	MY7-NS[2]	PnoLS	P-all	T	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	MY7-NS[2]	PnoLS	P-all	T
Acer negundo	boxelder	Tree																		
Acer rubrum	red maple	Tree				5				12	1	1	3							2
Alnus serrulata	Tag Alder	Shrub Tree	1				1													
Aronia arbutifolia	Red Chokeberry	Shrub																		
Betula nigra	River Birch, Red Birch	Tree												3	3	3	1	1	1	1
Carpinus caroliniana	American hornbeam	Shrub Tree												1	1	1				
Cephalanthus occidentalis	Buttonbush	Shrub Tree	5	5	5	5	5	5	5	5										
Cornus amomum	Silky Dogwood	Shrub Tree					3	3	3	3	13	13	13							
Diospyros virginiana	American Persimmon	Tree																		
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree												3	3	3	2	2	2	2
Juglans nigra	Black Walnut	Tree																		
Lindera benzoin	Northern Spicebush	Shrub Tree																		
Liriodendron tulipifera	tulip poplar	Tree																		
Nyssa sylvatica	Black Gum	Tree																		
Platanus occidentalis	Sycamore, Plane-tree	Tree												4	4	4	2	2	2	2
Quercus pagoda	Cherrybark Oak	Tree												2	2	2				
Salix sericea	silky willow	Tree					1										1			
Stem count			6	5	5	10	10	8	8	20	14	14	16	13	13	13	6	5	5	7
size (ares)			1				1				1			1			1			
size (ACRES)			0.0247				0.0247				0.0247			0.0247			0.0247			
Species count			2	1	1	2	4	2	2	3	2	2	2	5	5	5	4	3	3	4
Stems per ACRE			243	202	202	405	405	324	324	809	567	567	647	526	526	526	243	202	202	283

			Current Plot Data (MY7 2023)																	
			Vegetation Plot 6			Vegetation Plot 7				Vegetation Plot 8			Vegetation Plot 9				Vegetation Plot 10		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree											1						
Acer rubrum	red maple	Tree																	
Alnus serrulata	Tag Alder	Shrub Tree											2						
Aronia arbutifolia	Red Chokeberry	Shrub																	
Betula nigra	River Birch, Red Birch	Tree	3	3	4												2	2	2
Carpinus caroliniana	American hornbeam	Shrub Tree	2	2	2	1	1	1	1										
Cephalanthus occidentalis	Buttonbush	Shrub Tree																	
Cornus amomum	Silky Dogwood	Shrub Tree																	
Diospyros virginiana	American Persimmon	Tree								1	1	1							
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	2	2	2	6	6	6	6	6	6	6	1	1	1	1	4	4	4
Juglans nigra	Black Walnut	Tree																	
Lindera benzoin	Northern Spicebush	Shrub Tree																	
Liriodendron tulipifera	tulip poplar	Tree																	
Nyssa sylvatica	Black Gum	Tree																	
Platanus occidentalis	Sycamore, Plane-tree	Tree	3	3	3	3	2	2	2	2	2	2	3	3	3	3	5	5	5
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	2	2	2	2								2	2	2
Salix sericea	silky willow	Tree																	
Stem count			11	11	12	12	11	11	11	9	9	9	7	4	4	4	13	13	13
size (ares)			1			1				1			1				1		
size (ACRES)			0.0247			0.0247				0.0247			0.0247				0.0247		
Species count			5	5	5	4	4	4	4	3	3	3	4	2	2	2	4	4	4
Stems per ACRE			445	445	486	486	445	445	445	364	364	364	283	162	162	162	526	526	526

[1]MY3 - MY7 vegetation plots one and two will use shrub density requirements to determine if success critera is met.
[2]MY7 vegetation plots including new and/or supplementary planted stems. Vegetation plots without MY7-NS column contained no new and/or supplementary stems

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

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

Table 9b. Planted and Total Stem Counts
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Current Plot Data (MY7 2023)															
			Vegetation Plot 11			Vegetation Plot 12				Vegetation Plot 13			Vegetation Plot 14		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree				1									
Acer rubrum	red maple	Tree										1			
Alnus serrulata	Tag Alder	Shrub Tree	1	1	1										
Aronia arbutifolia	Red Chokeberry	Shrub													
Betula nigra	River Birch, Red Birch	Tree	3	3	3	2	2	2	2						
Carpinus caroliniana	American hornbeam	Shrub Tree	3	3	3	1	1	1	1	1	1	1			
Cephalanthus occidentalis	Buttonbush	Shrub Tree													
Cornus amomum	Silky Dogwood	Shrub Tree													
Diospyros virginiana	American Persimmon	Tree							1	1	1	1			
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	1	1	1	3	3	3	3	1	1	1			
Juglans nigra	Black Walnut	Tree										1			
Lindera benzoin	Northern Spicebush	Shrub Tree													
Liriodendron tulipifera	tulip poplar	Tree													
Nyssa sylvatica	Black Gum	Tree				1	1	1	1						
Platanus occidentalis	Sycamore, Plane-tree	Tree	2	2	2	2	2	2	2	5	5	5	1	1	1
Quercus pagoda	Cherrybark Oak	Tree				2	2	2	2	2	2	2	2	2	2
Salix sericea	silky willow	Tree													
		Stem count	10	10	10	12	11	11	12	10	10	12	3	3	3
		size (ares)	1			1				1			1		
		size (ACRES)	0.0247			0.0247				0.0247			0.0247		
		Species count	5	5	5	7	6	6	7	5	5	7	2	2	2
		Stems per ACRE	405	405	405	486	445	445	486	405	405	486	121	121	121

Current Plot Data (MY7 2023)												
			Vegetation Plot 15				Vegetation Plot 16			Vegetation Plot 17		
Scientific Name	Common Name	Species Type	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree										
Acer rubrum	red maple	Tree										
Alnus serrulata	Tag Alder	Shrub Tree										
Aronia arbutifolia	Red Chokeberry	Shrub										
Betula nigra	River Birch, Red Birch	Tree					5	5	5			
Carpinus caroliniana	American hornbeam	Shrub Tree	3	3	3	3	1	1	1			
Cephalanthus occidentalis	Buttonbush	Shrub Tree										
Cornus amomum	Silky Dogwood	Shrub Tree										
Diospyros virginiana	American Persimmon	Tree	1							1	1	1
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree								1	1	1
Juglans nigra	Black Walnut	Tree										
Lindera benzoin	Northern Spicebush	Shrub Tree										
Liriodendron tulipifera	tulip poplar	Tree								2	2	2
Nyssa sylvatica	Black Gum	Tree										
Platanus occidentalis	Sycamore, Plane-tree	Tree	5	5	5	5				3	3	3
Quercus pagoda	Cherrybark Oak	Tree	1	1	1	1	1	1	1	1	1	1
Salix sericea	silky willow	Tree										
		Stem count	10	9	9	9	7	7	7	8	8	8
		size (ares)	1				1			1		
		size (ACRES)	0.0247				0.0247			0.0247		
		Species count	4	3	3	3	3	3	3	5	5	5
		Stems per ACRE	405	364	364	364	283	283	283	324	324	324

[1]MY3 - MY7 vegetation plots one and two will use shrub density requirements to determine if success critera is met.

[2]MY7 vegetation plots including new and/or supplementary planted stems. Vegetation plots without MY7-NS column contained no new and/or supplementary stems

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

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

Table 9c. Planted Stem Annual Means
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Current Permanent Vegetation Plot Data (MY7 2023) Total Stem Counts and Annual Means																								
			MY7 (9/2023)				MY6 (8/2022)			MY5 (9/2021)			MY3 (9/2019)			MY2 (9/2018)			MY1 (9/2017)			MY0 (3/2017)		
Scientific Name	Common Name	Species Type	MY7-NS[2]	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree	2						11															
Acer rubrum	red maple	Tree	1	1	1	23	1	1	127	1	1	69	1	1	1	1	1	2	1	1	1			
Alnus serrulata	Tag Alder	Shrub Tree	5	1	1	1	1	1	5			6						3						
Aronia arbutifolia	Red Chokeberry	Shrub																				1	1	1
Betula nigra	River Birch, Red Birch	Tree	19	19	19	20	22	22	24	20	20	20	27	27	27	29	29	29	43	43	43	55	55	55
Carpinus caroliniana	American hornbeam	Shrub Tree	13	13	13	13	13	13	19	12	12	12	13	13	13	16	16	16	21	21	21	21	21	21
Cephalanthus occidentalis	Buttonbush	Shrub Tree	10	10	10	10	10	10	10	10	10	10	8	8	8	12	12	12	12	12	12	14	14	14
Cornus amomum	Silky Dogwood	Shrub Tree	16	16	16	16	17	17	17	17	17	18	17	17	17	17	17	19	16	16	16	19	19	19
Diospyros virginiana	American Persimmon	Tree	4	3	3	4	4	4	5	5	5	5	7	7	7	9	9	9	11	11	11	12	12	12
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	30	30	30	30	30	30	30	33	33	33	34	34	34	35	35	35	36	36	36	35	35	35
Juglans nigra	Black Walnut	Tree				1																		
Lindera benzoin	Northern Spicebush	Shrub Tree											2	2	2	7	7	7	11	11	11	14	14	14
Liriodendron tulipifera	tulip poplar	Tree	2	2	2	2	5	5	10	6	6	7	15	15	16	18	18	18	24	24	24	38	38	38
Nyssa sylvatica	Black Gum	Tree	1	1	1	1	1	1	2															
Platanus occidentalis	Sycamore, Plane-tree	Tree	40	39	39	39	39	39	39	36	36	37	37	37	37	38	38	39	40	40	40	40	40	40
Quercus pagoda	Cherrybark Oak	Tree	16	16	16	16	20	20	20	22	22	22	26	26	26	29	29	29	35	35	35	39	39	39
Salix sericea	silky willow	Tree	2																					
Stem count			161	151	151	176	163	163	319	162	162	239	187	187	188	211	211	218	250	250	250	288	288	288
size (ares)			17				17			17			17			17			17			17		
size (ACRES)			0.420				0.420			0.420			0.420			0.420			0.420			0.420		
Species count			14	12	12	13	12	12	13	10	10	11	11	11	11	11	11	12	11	11	11	11	11	11
Stems per ACRE			383	359	359	419	388	388	759	386	386	569	445	445	448	502	502	519	595	595	595	686	686	686

[2]MY7 vegetation plots including new and/or supplementary planted stems. Vegetation plots without MY7-NS column contained no new and/or supplementary stems

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

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

Table 9d. Transect Plots and Planted Stem Annual Means
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Supplemental Planting Transect Vegetation Plot (T) Data (MY7 2023) and Total Stem Counts and Annual Means							
			T1	T2	MY7 (9/2023)	MY6 (8/2022)	MY5 (9/2021)
Scientific Name	**Common Name**	**Species Type**	**Pnols**	**Pnols**	**Pnols**	**PnoLS**	**PnoLS**
Acer rubrum	Red Maple	Tree					
Aronia arbutifolia	Red Chokeberry	Shrub					
Alnus serrulata	Tag Alder	Shrub Tree					
Betula nigra	River Birch	Tree	2	6	8	6	7
Carpinus caroliniana	Ironwood	Shrub Tree	3		3	4	2
Cephalanthus occidentalis	Buttonbush	Shrub Tree					
Cornus amomum	Silky Dogwood	Shrub Tree				1	
Diospyros virginiana	American Persimmon	Tree		2	2	1	
Fraxinus pennsylvanica	Green Ash	Tree					
Lindera benzoin	Northern Spicebush	Shrub Tree					
Liriodendron tulipifera	Tulip Poplar	Tree	1	1	2		1
Platanus occidentalis	Sycamore	Tree	3	5	8	9	8
Quercus pagoda	Cherrybark Oak	Tree		1	1	1	1
Nyssa sylvatica**	Blackgum	Tree					2
		Stem count	9	15	24	22	21
		size (ares)	1	1	2	2	2
		size (ACRES)	0.0247	0.0247	0.0490	0.049	0.049
		Species count	4	5	6	6	6
		Stems per ACRE	364	607	490	445	425

** Blackgum included in the approved supplimental planting list.

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

PnoLS: Number of Planted stems excluding live stakes

Table 9e. Additional Mobile Plots
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Additional Mobile Plot (MP) Data (MY7 2023)						
			MP1	MP2	MP3	MP4
Scientific Name	**Common Name**	**Species Type**	**Pnols**	**Pnols**	**Pnols**	**Pnols**
Acer negundo	box elder	Tree	1	3		
Acer rubrum	Red Maple	Tree				
Aronia arbutifolia	Red Chokeberry	Shrub				
Alnus serrulata	Tag Alder	Shrub Tree				1
Betula nigra	River Birch	Tree	4			2
Carpinus caroliniana	Ironwood	Shrub Tree	2			2
Cephalanthus occidentalis	Buttonbush	Shrub Tree				
Cornus amomum	Silky Dogwood	Shrub Tree				1
Diospyros virginiana	American Persimmon	Tree		1		1
Fraxinus pennsylvanica	Green Ash	Tree				
Lindera benzoin	Northern Spicebush	Shrub Tree				
Liriodendron tulipifera	Tulip Poplar	Tree		1	1	
Platanus occidentalis	Sycamore	Tree	3	3	2	1
Quercus pagoda	Cherrybark Oak	Tree			1	
Nyssa sylvatica**	Blackgum	Tree				
		Stem count	10	8	4	8
		size (ares)	1	1	1	1
		size (ACRES)	0.0247	0.0247	0.0247	0.0247
		Species count	4	4	3	6
		Average Height (ft)	6.3	4.8	7.4	4.3
		Stems per ACRE	405	324	162	324

** Blackgum included in the approved supplimental planting list.

Color For Density
Exceeds requirements by 10% or greater
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

PnoLS: Number of Planted stems excluding live stakes

Table 9f. Planted Herbaceous Cover (Bog Cells)
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Percent Cover %								
Plot ID	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
1	<5	30	65	100	N/A	100	100	100
2	10	75	100	100	N/A	95	98	95
3	<5	75	95	95	N/A	100	100	98
4	<5	90	100	100	N/A	100	100	100
5	<5	80	90	100	N/A	95	100	100
6	<5	85	95	100	N/A	98	100	98
7	<5	100	100	100	N/A	98	100	95
8	50	95	100	100	N/A	100	100	100

Table 9g. Planted Stem Average Heights

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Average Stem Height (ft) by Plot							
Plot	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY6**	**MY7**
VP3	3.2	3.1	2.9	2.7	2.8	2.7	2.5
VP4	1.9	2.1	2.3	2.8	4.3	5.5	6.5
VP5	1.8	1.7	1.7	2.0	2.3	3.2	4.3
VP6	1.8	1.9	2.6	3.1	4.0	4.6	5.9
VP7	2.0	2.2	2.4	3.5	4.2	5.2	5.8
VP8	1.7	1.8	2.0	2.5	4.3	5.0	5.8
VP9	1.7	2.1	3.1	4.9	9.0	9.3	8.0
VP10	1.9	2.0	2.3	3.0	6.1	5.8	7.2
VP11	1.8	2.0	2.1	2.8	4.5	5.8	7.8
VP12	2.0	2.3	2.3	2.6	4.8	4.8	6.6
VP13	1.9	1.8	1.8	1.9	3.3	4.6	5.7
VP14	1.9	2.1	1.9	2.6	3.2	3.5	4.5
VP15	2.0	1.8	2.7	4.0	6.8	8.0	9.9
VP16	1.8	1.9	2.8	4.5	7.0	7.8	7.7
VP17	1.8	1.9	2.5	3.8	6.8	7.9	11.4
Permanent Plot Site Average	**2.0**	**2.0**	**2.4**	**3.1**	**4.9**	**5.6**	**6.6**
T1						5.2	5.1
T2						5.0	4.5
Transect Plot Site Average						**5.1**	**4.8**

*VP1 and VP2 excluded; no height requirements for shrub plots

Table 9h. Stems Per Plot Across All Years
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Plot	MY7 (2023)			MY6 (2022)			MY5 (2021)			MY3 (2019)			MY2 (2018)			MY1 (2017)			MY0 (2017)		
	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac	Planted Stems	Total Stems	Total Stems/Ac
VP1	5	10	405	6	53	2,145	5	10	405	4	4	162	12	13	526	13	13	526	15	15	607
VP2	8	20	809	8	39	1,578	9	56	2,266	10	10	405	11	12	486	14	14	567	17	17	688
VP3	14	16	647	14	14	567	14	14	567	14	14	567	14	14	567	13	13	526	15	15	607
VP4	13	13	526	13	63	2,550	13	14	567	13	13	526	13	13	526	14	14	567	16	16	647
VP5	5	7	283	5	6	243	5	5	202	5	5	202	8	9	364	12	12	486	15	15	607
VP6	11	12	486	14	22	890	13	33	1,335	16	16	647	17	18	728	18	18	728	18	18	728
VP7	11	11	445	12	12	486	13	13	526	12	12	486	14	14	567	14	14	567	18	18	728
VP8	9	9	364	10	10	405	11	11	445	13	13	526	14	14	567	15	15	607	15	15	607
VP9	4	4	162	4	4	162	4	4	162	6	6	243	6	6	243	10	10	405	15	15	607
VP10	13	13	526	14	14	567	15	16	647	18	18	728	19	21	850	21	21	850	25	25	1,012
VP11	10	10	405	11	11	445	11	11	445	13	13	526	13	14	567	14	14	567	15	15	607
VP12	11	12	486	12	13	526	9	9	364	13	14	567	14	14	567	14	14	567	15	15	607
VP13	10	12	486	10	27	1,093	10	13	526	12	12	486	12	12	486	15	15	607	15	15	607
VP14	3	3	121	3	3	121	3	3	121	3	3	121	4	4	162	10	10	405	14	14	567
VP15	9	9	364	10	11	445	10	10	405	14	14	567	19	19	769	21	21	850	24	24	971
VP16	7	7	283	8	8	324	8	8	324	9	9	364	10	10	405	15	15	607	18	18	728
VP17	8	8	324	9	9	364	9	9	364	12	12	486	11	11	445	17	17	688	18	18	728

APPENDIX 4. Morphological Summary Data and Plots

Table 10a. Baseline Stream Data Summary

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Vile Creek Reach 1, Reach 2

	PRE-RESTORATION CONDITION				REFERENCE REACH DATA								DESIGN				AS-BUILT/BASELINE			
Parameter	**Vile Creek Reach 1**		**Vile Creek Reach 2**		**Meadow Creek**		**West Fork of Chestnut Creek**		**Brush Creek**		**Little Glade Creek**		**Vile Creek Reach 1**		**Vile Creek Reach 2**		**Vile Creek Reach 1**		**Vile Creek Reach 2**	
	Min	**Max**	**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)	19.3		22.4		26.0		18.3	20.3	22.8		34.7		17.0		19.0		17.1	18.8	18.7	19.2
Floodprone Width (ft)	333		119		52.0		---		---		---		37	85	42	95	>200		156	188
Bankfull Mean Depth	1.6		0.9		2.4		1.8	2.2	1.7		2.2		1.2		1.2		1.1	1.2	1.2	1.5
Bankfull Max Depth	2.7		1.6		3.3		2.2	2.8	2.3		2.4		1.4	1.7	1.5	1.9	1.9	2.1	2.0	2.3
Bankfull Cross-sectional Area (ft^2)	30.4	31.7	20.1	48.0	62.2		35.8	40.0	37.9		76.5		19.6		23.7		19.8	21.2	22.5	28.6
Width/Depth Ratio	12.2		25.1		10.9		8.3	11.5	13.4		15.8		14.7		15.2		13.7	17.8	12.9	15.5
Entrenchment Ratio	17.2		5.3		>2.2		>2.2		>2.2		>2.2		2.2	5.0	2.2	5.0	>2.2		>2.2	
Bank Height Ratio	1.4		1.8		---		1.3	1.4	1.1		1.5		1.0		1.0		1.0	1.1	1.0	
D50 (mm)	112.0		56.3		---		---		---		---		---		---		60.4	69.3	58.6	61.5
Riffle Length (ft)	---		---		---		---		---		---		---		---		19.7	74.1	18.3	94.1
Riffle Slope (ft/ft)	0.021	0.050	0.0190	0.063	---		0.0110	0.0280	0.0040		0.0140		0.0148	0.0333	0.016	0.0360	0.0164	0.0420	0.0187	0.0385
Pool Length (ft)	---		---		---		---		---		---		---		---		38.8	149.3	47.1	123.7
Pool Max Depth (ft)	2.9		3.1		---		3.8	4.1	---		---		1.4	2.9	1.5	3.1	3.1	4.4	3.4	5.5
Pool Spacing (ft)	36	69	33	88	---		31	124	---		---		34	119	38	133	55	161	87	172
Pool Volume (ft^3)	---		---		---		---		---		---		---		---		---		---	
Pattern																				
Channel Beltwidth (ft)	38	90	42	93	---		64	71	---		---		51	119	57	133	34	127	48	88
Radius of Curvature (ft)	22	80	55	125	---		26	40	---		---		34	68	38	76	34	50	38	76
Rc:Bankfull Width (ft/ft)	1.1	4.1	2.4	5.6	---		1.3	2.0	---		---		2.0	4.0	2.0	4.0	1.8	2.9	2.0	4.1
Meander Wavelength (ft)	160	190	100	330	---		---		---		---		119	238	133	266	125	214	177	235
Meander Width Ratio	2.0	4.7	1.9	4.2	---		---		---		---		3	7	3	7	2	7	3	5
Substrate, Bed and Transport Parameters																				
Ri%/Ru%/P%/G%/S%																				
SC%/Sa%/G%/C%/B%/Be%																				
d16/d35/d50/d84/d95/d100	8.7/30.2/99.4/180/243/>2048		0.16/6.1/38/95/139/>2048		---		---		---		---		---		---		0.15/0.39/25.7/90.0/163.3/362.0		0.19/0.53/9.6/69.2/120.3/362.0	
Reach Shear Stress (Competency) lb/ft^2	1.20		0.80		---		---		---		---		1.1		1.2		0.86	1.09	0.69	0.74
Max part size (mm) mobilized at bankfull	175		130		---		---		---		---		165		175		42	54	43	53
Stream Power (Capacity) W/m^2																	3.8	5.9	4.1	5.8
Additional Reach Parameters																				
Drainage Area (SM)	2.2		2.6		2.70		1.60		1.67		3.30		2.2		2.6		2.2		2.6	
Watershed Impervious Cover Estimate (%)	3%				---		---		---		---		3%				3%			
Rosgen Classification	C3		C4		C		E4		C4		C4		C		C		C		C	
Bankfull Velocity (fps)	3.3	3.2	6.0	2.5	---		4.6	5.3	4.4		5.5		4.7		5.0		4.4	5.2	5.5	5.2
Design Bankfull Discharge (cfs)	100		120		---		164	210	168		424		100		120		87	133	103	144
Q- Little River LWP Regional 1.25-yr(cfs)	107		124																	
Q- Little River LWP Regional 1.5-yr (cfs)	122		141																	
Q- Rural Mountain Regional Curve (cfs)	180		206																	
Q-Revised Piedmont/Mountain Regional Curve (cfs)	102		117																	
Q- Basin Ration Method 1.1-yr (cfs)	101		121																	
Q- Basin Ration Method 1.25-yr (cfs)	122		146																	
Valley Length (ft)	---		---		---		---		---		---		---		---		729		1042	
Channel Thalweg Length (ft)	962		1,247		---		---		---		---		920		1260		882		1,311	
Sinuosity	1.3		1.3		---		---		---		---		1.20	1.30	1.20	1.30	1.21		1.26	
Water Surface Slope (ft/ft)	0.014		0.011		---		0.010		0.012		0.010		0.0123	0.0133	0.0131	0.0142	0.014		0.012	
Bankfull Slope (ft/ft)	0.017		0.016		---		---		---		---		0.016		0.017		0.015		0.012	

(---): Data was not provided

Table 10b. Baseline Stream Data Summary
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

UT1 Reach 1, UT1 Reach 2

	PRE-RESTORATION CONDITION				REFERENCE REACH DATA								DESIGN				AS-BUILT/BASELINE			
Parameter	UT1 Reach 1		UT1 Reach 2		Little Pine III UT2A		Henry Fork UT Upstream		UT to Gap Branch		Group Camp Tributary		UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2	
	Min	Max	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)	7.9		19.2		12.6		3.2	7.7	6.2		4.2	4.4	8.0		9.0		7.7	8.6	9.0	
Floodprone Width (ft)	203.0		28.0		31.0		6	13	21		9	11	14	18	15	20	63	91	96	
Bankfull Mean Depth	0.9		0.4		1.4		0.5	0.6	0.6		0.8		0.5		0.6		0.5	0.7	0.8	
Bankfull Max Depth	1.7		0.9		2.0		0.7	0.8	1.0		1.0	1.2	0.7	0.8	0.7	0.9	1.1	1.1	1.3	
Bankfull Cross-sectional Area (ft^2)	7.3	10.3	8.4	11.8	18.1		1.9	3.6	3.8		3.4	3.6	4.3		5.2		4.1	5.9	7.8	
Width/Depth Ratio	8.6		43.9		8.7		5.2	16.4	10.1		5.2	5.5	14.9		15.6		12.4	14.7	11.4	
Entrenchment Ratio	25.6		1.5		2.4		1.7	2.0	3.4		1.9	2.5	1.8	2.3	1.7	2.2	>2.2		>2.2	
Bank Height Ratio	1.3		3.8		1.0		1.0	1.3	1.0		1.0		1.0		1.0		1.0	1.0	1.0	
D50 (mm)	32		28.5		---		---		---		---		---		---		22.6	34.3	28.1	
Profile																				
Riffle Length (ft)	---		---		---		---		---		---		---		---		11.0	53.1	13.5	60.7
Riffle Slope (ft/ft)	0.022	0.11	0.0280	0.071	0.0404	0.0517	0.0500	0.0700	0.0110	0.1400	0.0110	0.1220	0.0291	0.0640	0.0282	0.6200	0.0149	0.0410	0.0176	0.0897
Pool Length (ft)	---		---		---		---		---		---		---		---		13.0	36.9	8.6	42.5
Pool Max Depth (ft)	2.3		1.6		2.2	2.5	---		6.1		1.8	2.8	1.1	1.9	1.2	2	0.8	2.6	1.1	2.5
Pool Spacing (ft)	15	39	14	58	78		14	25	18	27	5	58	16	48	162	486	7	59	38	88
Pool Volume (ft^3)	---		---		---		---		---		---		---		---		---		---	
Pattern																				
Channel Beltwidth (ft)	40	55	60	80	---		---		---		16	17	N/A[1]		13	32	N/A[1]		6	66
Radius of Curvature (ft)	12	40	15	65	---		---		---		8	11.8	N/A[1]		20	59	N/A[1]		18	59
Rc:Bankfull Width (ft/ft)	1.5	5.1	0.8	3.4	---		---		---		1.9	2.7	N/A[1]		2.2	6.6	N/A[1]		2.0	6.5
Meander Length (ft)	57	100	115	140	---		---		---		31	34	N/A[1]		64	110	N/A[1]		56	152
Meander Width Ratio	5.1	7.0	3.1	4.2	---		---		---		3.6	3.8	N/A[1]		1.5	3.6	N/A[1]		1	7
Substrate, Bed and Transport Parameters																				
Ri%/Ru%/P%/G%/S%																				
SC%/Sa%/G%/C%/B%/Be%																				
d16/d35/d50/d84/d95/d100	0.4/1.7/25.9/137/203/256		0.17/0.55/26.9/133/205/256		---		---		---		---						0.21/0.79/8.6/51.0/126.9/256.0		0.25/4.47/12.1/70.5/101.2/180.0	
Reach Shear Stress (Competency) lb/ft^2	0.7		0.4		---		---		---		---		0.5		0.6		0.53	0.84	1.39	
Max part size (mm) mobilized at bankfull	115		75		---		---		---		---		95		100		26	41	68	
Stream Power (Capacity) W/m^2																	1.54	3.4	8.2	
Additional Reach Parameters																				
Drainage Area (SM)	0.30		0.34		0.12		0.20		0.04		0.10		0.30		0.34		0.30		0.34	
Watershed Impervious Cover Estimate (%)	1%				---		---		---		---		1%				1%			
Rosgen Classification	E4b		F4b		A/B		B4a		B4a/A4		E5b		B		B		B		B	
Bankfull Velocity (fps)	1.7	2.3	1.7	2.4	0.5		3.8	5.4	5.0		3.4	3.6	3.8		3.9		2.8	3.9	5.3	
Design Bankfull Discharge (cfs)	17		20		9		12		19		12		17		20		8	16	42	
Q- Little River LWP Regional 1.25-yr(cfs)	21		23																	
Q- Little River LWP Regional 1.5-yr (cfs)	24		26																	
Q- Rural Mountain Regional Curve (cfs)	40		44																	
Q-Revised Piedmont/Mountain Regional Curve (cfs)	21		24																	
Q- Basin Ration Method 1.1-yr (cfs)	16		16																	
Q- Basin Ration Method 1.25-yr (cfs)	17		19										---		---					
Valley Length (ft)	---		---		---		---		---		---		---		---		903		755	
Channel Thalweg Length (ft)	1,143		989		---		---		---		---		1,132		863		1,114		854	
Sinuosity	1.26		1.3		---		1.1		---		1.6		1.0 - 1.1		1.0 - 1.1		1.2		1.1	
Water Surface Slope $(ft/ft)^2$	0.022		0.028		0.0433		0.0420		0.0680		0.0167		0.0291	0.0320	0.0282	0.0310	0.0264		0.0288	
Bankfull Slope (ft/ft)	0.032		0.033		---		0.0460		---		0.0229		0.0320		0.0310		0.0261		0.0284	

(---): Data was not provided

[1] Design parameters for pattern features are not reported for UT1 Reach 1 because the channel was designed as Enhancement I.

Table 11. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 7 - 2023

	Cross-Section 1, Vile Creek Reach 1 (Pool)						Cross-Section 2, Vile Creek Reach 1 (Riffle)						Cross-Section 3, Vile Creek Reach 1 (Riffle)					
Dimension and Substrate[1]	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	2700.8	2700.7	2700.8	2700.8	2701.3	2701.1	2700.0	2700.0	2700.2	2700.2	2699.8	2700.1	2695.7	2695.7	2695.8	2695.6	2695.9	2695.5
Low Bank Elevation (ft)	2700.8	2700.7	2700.8	2700.8	2701.3	2701.1	2700.0	2700.0	2700.2	2700.2	2700.2	2700.1	2695.7	2695.7	2695.8	2695.6	2695.9	2695.8
Bankfull Width (ft)	25.1	24.6	25.6	15.8	25.3	15.3	17.1	17.6	20.4	18.9	17.7	16.8	18.8	17.9	19.4	19.9	14.2	20.2
Floodprone Width (ft)	---	---	---	---	---	---	>200	>200	143.9	145.9	144.8	145.7	>200	>200	108.6	110.9	110.7	110.8
Bankfull Mean Depth (ft)	1.2	1.1	1.0	1.5	1.6	1.7	1.2	1.3	1.6	1.7	1.5	1.3	1.1	1.2	1.2	1.1	1.4	1.3
Bankfull Max Depth (ft)	3.0	2.8	2.5	2.6	2.8	3.0	2.1	2.3	3.1	3.3	2.8	2.4	1.9	2.2	2.6	2.5	2.3	2.7
Bankfull Cross-Sectional Area (ft^2)	29.2	25.8	25.6	23.9	25.3	26.3	21.2	22.7	32.8	32.5	27.3	22.3	19.8	20.9	23.9	22.2	20.5	26.4
Bankfull Width/Depth Ratio	---	---	---	---	---	---	13.7	13.7	12.8	10.9	11.5	12.7	17.8	15.3	15.8	17.9	9.9	15.4
Bankfull Entrenchment Ratio[2]	---	---	---	---	---	---	>10.6	11.4	7.0	7.7	8.2	8.7	>10.7	>11.2	5.6	5.6	7.8	5.5
Bankfull Bank Height Ratio	---	---	---	---	---	---	1.1	1.1	1.3	1.3	1.2	1.0	1.0	1.0	1.1	1.1	1.0	1.2
	Cross-Section 4, Vile Creek Reach 2 (Riffle)						**Cross-Section 5, Vile Creek Reach 2 (Riffle)**						**Cross-Section 6, Vile Creek Reach 2 (Pool)**					
Dimension and Substrate[1]	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	2691.7	2691.7	2691.7	2691.5	2691.8	2691.6	2688.9	2688.9	2689.0	2689.0	2689.3	2689.2	2687.9	2687.9	2688.1	2687.9	2687.9	2687.9
Low Bank Elevation (ft)	2691.7	2691.7	2691.7	2691.5	2691.7	2691.6	2688.9	2688.9	2689.0	2689.0	2688.9	2689.2	2687.9	2687.9	2688.1	2687.9	2687.9	2687.9
Bankfull Width (ft)	18.7	19.4	19.5	17.6	15.0	13.2	19.2	19.8	19.9	19.5	22.6	20.0	24.1	24.0	26.1	18.2	18.2	18.4
Floodprone Width (ft)	188.0	188.0	88.6	89.2	89.0	89.3	156.0	156.0	96.9	101.0	100.1	100.5	---	---	---	---	---	---
Bankfull Mean Depth (ft)	1.2	1.2	1.1	1.3	1.4	1.6	1.5	1.5	1.6	1.6	1.5	1.5	1.8	1.6	1.6	2.0	2.0	2.0
Bankfull Max Depth (ft)	2.0	2.3	2.2	2.5	2.4	2.6	2.3	2.5	2.7	2.7	2.4	2.9	3.6	4.0	3.8	4.0	4.0	4.1
Bankfull Cross-Sectional Area (ft^2)	22.5	23.1	21.7	22.0	20.8	21.3	28.6	29.7	31.3	31.0	22.6	30.2	44.3	39.6	41.9	36.3	37.0	37.4
Bankfull Width/Depth Ratio	15.5	16.3	17.5	14.0	10.8	8.1	12.9	13.2	12.7	12.2	9.8	13.2	---	---	---	---	---	---
Bankfull Entrenchment Ratio[2]	10.1	9.7	4.6	5.1	5.9	6.8	8.1	7.9	4.9	5.2	6.7	5.0	---	---	---	---	---	---
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	0.9	1.0	---	---	---	---	---	---
	Cross-Section 7, UT1 Reach 1 (Riffle)						**Cross-Section 8, UT1 Reach 1 (Pool)**						**Cross-Section 9, UT1 Reach 1 (Riffle)**					
Dimension and Substrate[1]	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	2743.9	2743.9	2744.1	2744.0	2743.5	2744.7	2725.7	2725.7	2726.0	2726.1	2726.6	2726.7	2725.3	2725.3	2725.4	2725.3	2725.3	2725.5
Low Bank Elevation (ft)	2743.9	2743.9	2744.1	2744.0	2744.4	2744.4	2725.7	2725.7	2726.0	2726.1	2726.6	2726.7	2725.3	2725.3	2725.4	2725.3	2725.3	2725.6
Bankfull Width (ft)	8.6	8.1	8.9	8.5	9.5	9.3	11.3	8.2	6.8	8.2	8.2	7.8	7.7	6.5	7.2	5.3	5.2	5.0
Floodprone Width (ft)	63.0	63.0	83.7	85.5	83.9	84.5	---	---	---	---	---	---	97.0	97.0	81.8	83.2	85.7	86.1
Bankfull Mean Depth (ft)	0.7	1.2	1.2	1.1	1.3	1.2	0.6	0.5	0.7	0.8	0.9	1.1	0.5	0.7	0.6	0.7	0.8	0.9
Bankfull Max Depth (ft)	1.1	2.2	2.3	2.0	2.2	2.0	1.4	0.8	0.9	1.4	1.9	2.0	1.1	1.1	1.1	1.0	1.0	1.3
Bankfull Cross-Sectional Area (ft^2)	5.9	9.4	10.3	9.3	12.5	11.4	7.1	4.4	4.5	6.6	7.6	8.3	4.1	4.2	4.2	3.6	4.1	4.5
Bankfull Width/Depth Ratio	12.4	7.0	7.6	7.8	7.2	7.7	---	---	---	---	---	---	14.7	9.9	12.5	7.9	6.6	5.5
Bankfull Entrenchment Ratio[2]	7.3	7.8	9.5	10.1	8.9	9.1	---	---	---	---	---	---	12.5	15.0	11.3	15.6	16.5	17.4
Bankfull Bank Height Ratio	1.0	1.0	1.4	1.3	1.6	1.5	---	---	---	---	---	---	1.0	1.0	1.0	0.9	1.0	1.1
	Cross-Section 10, UT1 Reach 2 (Pool)						**Cross-Section 11, UT1 Reach 2 (Riffle)**											
Dimension and Substrate[1]	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**						
Bankfull Elevation (ft)	2713.5	2713.5	2713.3	2713.3	2713.9	2714.1	2712.9	2712.9	2712.9	2712.9	2713.0	2713.0						
Low Bank Elevation (ft)	2713.5	2713.5	2713.3	2713.3	2713.9	2714.1	2712.9	2712.9	2712.9	2712.9	2713.0	2713.0						
Bankfull Width (ft)	13.3	12.6	11.8	5.6	7.2	8.4	9.0	12.6	8.4	8.2	8.6	8.5						
Floodprone Width (ft)	---	---	---	---	---	---	96.0	96.0	85.3	86.8	86.9	86.9						
Bankfull Mean Depth (ft)	0.9	0.7	0.5	0.9	1.1	1.2	0.8	0.5	0.8	0.9	0.9	0.8						
Bankfull Max Depth (ft)	1.9	1.8	1.7	1.8	2.2	2.5	1.3	1.4	1.5	1.4	1.6	1.6						
Bankfull Cross-Sectional Area (ft^2)	12.6	9.0	6.3	4.8	7.6	9.8	7.8	6.5	7.0	7.4	7.6	6.9						
Bankfull Width/Depth Ratio	---	---	---	---	---	---	11.4	24.5	10.2	9.0	9.7	10.5						
Bankfull Entrenchment Ratio[2]	---	---	---	---	---	---	10.7	7.6	10.1	10.6	10.1	10.2						
Bankfull Bank Height Ratio	---	---	---	---	---	---	1.0	1.0	0.9	1.0	1.0	1.0						

[1] MY2 – MY7 Bank Height Ratio was calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

[2] ER in MY3 is based on the width of the cross-section, in lieu of assuming the width across the floodplain as was done in previous monitoring years.

Prior to MY2, bankfull dimensions were calculated using a fixed bankfull elevation.

Table 12a. Monitoring - Stream Reach Data Summary
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Vile Creek, Reach 1 and Reach 2

Parameter	As-Built/Baseline				MY1				MY2				MY3				MY5				MY7			
	Vile Reach 1		Vile Reach 2		Vile Reach 1		Vile Reach 2		Vile Reach 1		Vile Reach 2		Vile Reach 1		Vile Reach 2		Vile Reach 1		Vile Reach 2		Vile Reach 1		Vile Reach 2	
	Min	Max	Min	Max	Min	Max	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)	17.1	18.8	18.7	19.2	17.6	17.9	19.4	19.8	19.4	20.4	19.5	19.9	18.9	19.9	17.6	19.5	14.2	17.7	15.0	22.6	16.8	20.2	13.2	20.0
Floodprone Width (ft)	>200		156	188	>200		156.0	188.0	108.6	143.9	88.6	96.9	110.9	145.9	89.2	101.0	110.7	144.8	89.0	100.1	110.8	145.7	89.3	100.5
Bankfull Mean Depth	1.1	1.2	1.2	1.5	1.2	1.3	1.2	1.5	1.2	1.6	1.1	1.6	1.1	1.7	1.3	1.6	1.4	1.5	1.4	1.5	1.3		1.5	1.6
Bankfull Max Depth	1.9	2.1	2.0	2.3	2.2	2.3	2.3	2.5	2.6	3.1	2.2	2.7	2.5	3.3	2.5	2.7	2.3	2.8	2.4		2.4	2.7	2.6	2.9
Bankfull Cross Sectional Area (ft^2)	19.8	21.2	22.5	28.6	20.9	22.7	23.1	29.7	23.9	32.8	21.7	31.3	22.2	32.5	22.0	31.0	20.5	27.3	20.8	22.6	22.3	26.4	21.3	30.2
Width/Depth Ratio	13.7	17.8	12.9	15.5	13.7	15.3	13.2	16.3	12.8	15.8	12.7	17.5	10.9	17.9	12.2	14.0	9.9	11.5	9.8	10.8	12.7	15.4	8.1	13.2
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		7.0	5.6	4.6	4.9	5.6	7.7	5.1	5.2	7.8	8.2	5.9	6.7	5.5	8.7	5.0	6.8
Bank Height Ratio	1.0	1.1	1.0		1.0		1.0		1.1	1.3	1.0	1.1	1.0	1.3	1.0	1.1	1.0	1.2	0.9	1.0	1.0	1.2	1.0	
D50 (mm)	60.4	69.3	58.6	61.5	82.0	101.2	70.9	78.5	77.8	92.3	78.1	93.6	49.5	53.2	52.7	71.5	55.9	59.2	64.0	79.5	---	---	---	---
Profile																								
Riffle Length (ft)	19.7	74.1	18.3	94.1																				
Riffle Slope (ft/ft)	0.0164	0.0420	0.0187	0.0385																				
Pool Length (ft)	38.8	149.3	47.1	123.7																				
Pool Max Depth (ft)	3.1	4.4	3.4	5.5																				
Pool Spacing (ft)	55	161	87	172																				
Pool Volume (ft^3)	---		---																					
Pattern																								
Channel Beltwidth (ft)	34	127	48	88																				
Radius of Curvature (ft)	34	50	38	76																				
Rc:Bankfull Width (ft/ft)	1.8	2.9	2.0	4.1																				
Meander Wave Length (ft)	125	214	177	235																				
Meander Width Ratio	2	7	3	5																				
Additional Reach Parameters																								
Rosgen Classification	C		C																					
Channel Thalweg Length (ft)	882		1,311																					
Sinuosity (ft)	1.21		1.26																					
Water Surface Slope (ft/ft)	0.0135		0.0122																					
Bankfull Slope (ft/ft)	0.0145		0.0122																					
Ri%/Ru%/P%/G%/S%																								
SC%/Sa%/G%/C%/B%/Be%																								
d16/d35/d50/d84/d95/d100																								
% of Reach with Eroding Banks					0%		0%		<1%		<1%		<1%		<1%		<1%		<1%		4%		0%	

[1] MY2 – MY7 Bank Height Ratio was calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

[2] ER in MY3 is based on the width of the cross-section, in lieu of assuming the width across the floodplain as was done in previous monitoring years.

Prior to MY2, bankfull dimensions were calculated using a fixed bankfull elevation.

Table 12b. Monitoring - Stream Reach Data Summary
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

UT1 Reach 1 and Reach 2

Parameter	As-Built/Baseline				MY1				MY2				MY3				MY5				MY7			
	UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2		UT1 Reach 1		UT1 Reach 2	
	Min	Max	Min	Max	Min	Max	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)	7.7	8.6	9.0		6.5	8.1	12.6		7.2	8.9	8.4		5.3	8.5	8.2		5.2	9.5	8.6		5.0	9.3	8.5	
Floodprone Width (ft)	63	91	96		63.0	82.4	96.0		81.8	83.7	85.3		83.2	85.5	86.8		83.9	85.7	86.9		84.5	86.1	86.9	
Bankfull Mean Depth	0.5	0.7	0.8		0.7	1.2	0.5		0.6	1.2	0.8		0.7	1.1	0.9		0.8	1.3	0.9		0.9	1.2	0.8	
Bankfull Max Depth	1.1	1.1	1.3		1.1	2.2	1.4		1.1	2.3	1.5		1.0	2.0	1.4		1	2.2	1.6		1.3	2.0	1.6	
Bankfull Cross Sectional Area (ft^2)	4.1	5.9	7.8		4.2	9.4	6.5		4.2	10.3	7.0		3.6	9.3	7.4		4.1	12.5	7.6		4.5	11.4	6.9	
Width/Depth Ratio	12.4	14.7	11.4		7.0	9.9	24.5		7.6	12.5	10.2		7.8	7.9	9.0		6.6	9.9	9.7		5.5	7.7	10.5	
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		9.5	11.3	10.1		10.1	15.6	10.6		11.5	16.5	10.1		9.1	17.4	10.2	
Bank Height Ratio	1.0	1.0	1.0		1.0		1.0		1.0	1.4	0.9		0.9	1.3	1.0		1.0	1.6	1.0		1.1	1.5	1.0	
D50 (mm)	22.6	34.3	28.1		29.8	48.3	58.6		45	78.1	72.7		25.9	30.2	54.7		35.7	47.0	52.3		---	---	---	
Profile																								
Shallow Length (ft)	11.0	53.1	13.5	60.7																				
Shallow Slope (ft/ft)	0.0149	0.0410	0.0176	0.0897																				
Pool Length (ft)	13.0	36.9	8.6	42.5																				
Pool Max Depth (ft)	0.8	2.6	1.1	2.5																				
Pool Spacing (ft)	7	59	38	88																				
Pool Volume (ft^3)	---		---																					
Pattern																								
Channel Beltwidth (ft)	N/A[1]		6	66																				
Radius of Curvature (ft)	N/A[1]		18	59																				
Rc:Bankfull Width (ft/ft)	N/A[1]		2.0	6.5																				
Meander Wave Length (ft)	N/A[1]		56	152																				
Meander Width Ratio	N/A[1]		1	7																				
Additional Reach Parameters																								
Rosgen Classification	B		B																					
Channel Thalweg Length (ft)	1,114		854																					
Sinuosity (ft)	1.2		1.1																					
Water Surface Slope (ft/ft)	0.0264		0.0288																					
Bankfull Slope (ft/ft)	0.0261		0.0284																					
Ri%/Ru%/P%/G%/S%																								
SC%/Sa%/G%/C%/B%/Be%																								
d16/d35/d50/d84/d95/d100																								
% of Reach with Eroding Banks					0%		0%		<1%		<1%		<1%		0%		<1%		0%		0%		0%	

N/A: Not Applicable

[1] MY2 – MY7 Bank Height Ratio was calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

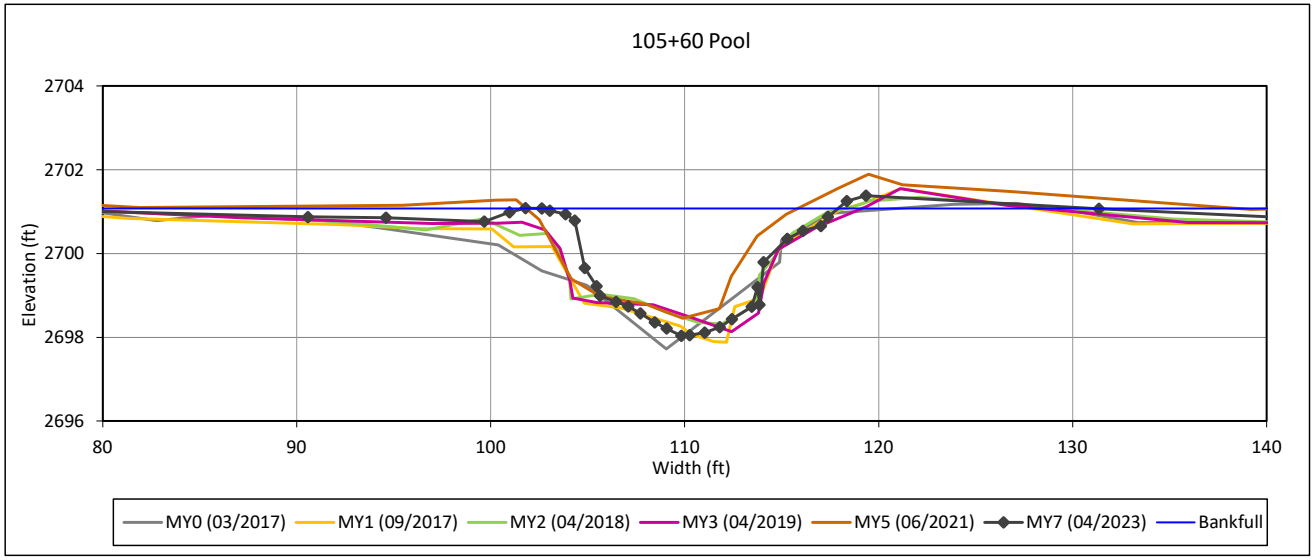
[2] ER in MY3 is based on the width of the cross-section, in lieu of assuming the width across the floodplain as was done in previous monitoring years.

Prior to MY2, bankfull dimensions were calculated using a fixed bankfull elevation.

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 1 - Vile Creek Reach 1



Bankfull Dimensions	
26.3	x-section area (ft.sq.)
15.3	width (ft)
1.7	mean depth (ft)
3.0	max depth (ft)
18.1	wetted perimeter (ft)
1.4	hydraulic radius (ft)
8.9	width-depth ratio

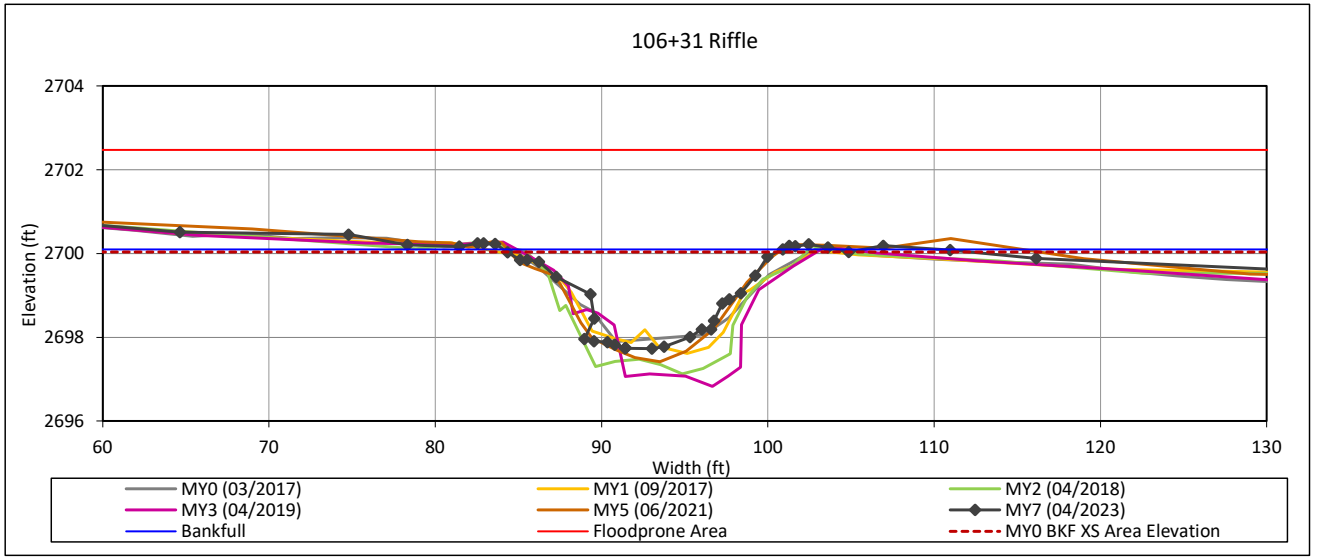
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 2 - Vile Creek Reach 1



Bankfull Dimensions	
22.3	x-section area (ft.sq.)
16.8	width (ft)
1.3	mean depth (ft)
2.4	max depth (ft)
19.3	wetted perimeter (ft)
1.2	hydraulic radius (ft)
12.7	width-depth ratio
145.7	W flood prone area (ft)
8.7	entrenchment ratio
1.0	low bank height ratio

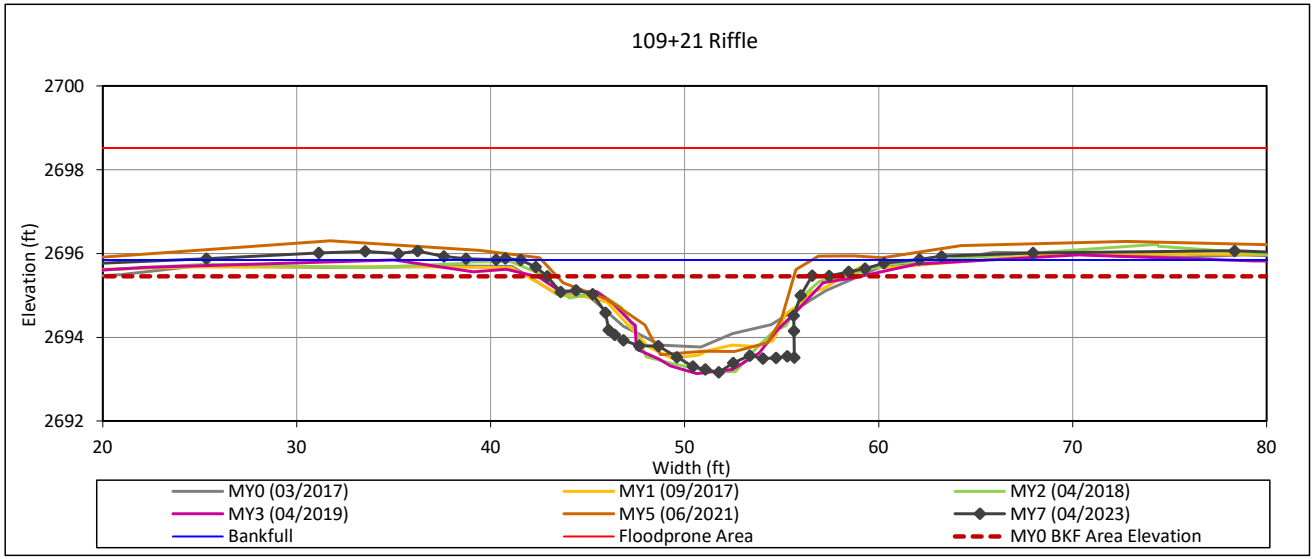
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 3 - Vile Creek Reach 1



Bankfull Dimensions	
26.4	x-section area (ft.sq.)
20.2	width (ft)
1.3	mean depth (ft)
2.7	max depth (ft)
22.4	wetted perimeter (ft)
1.2	hydraulic radius (ft)
15.4	width-depth ratio
110.8	W flood prone area (ft)
5.5	entrenchment ratio
1.2	low bank height ratio

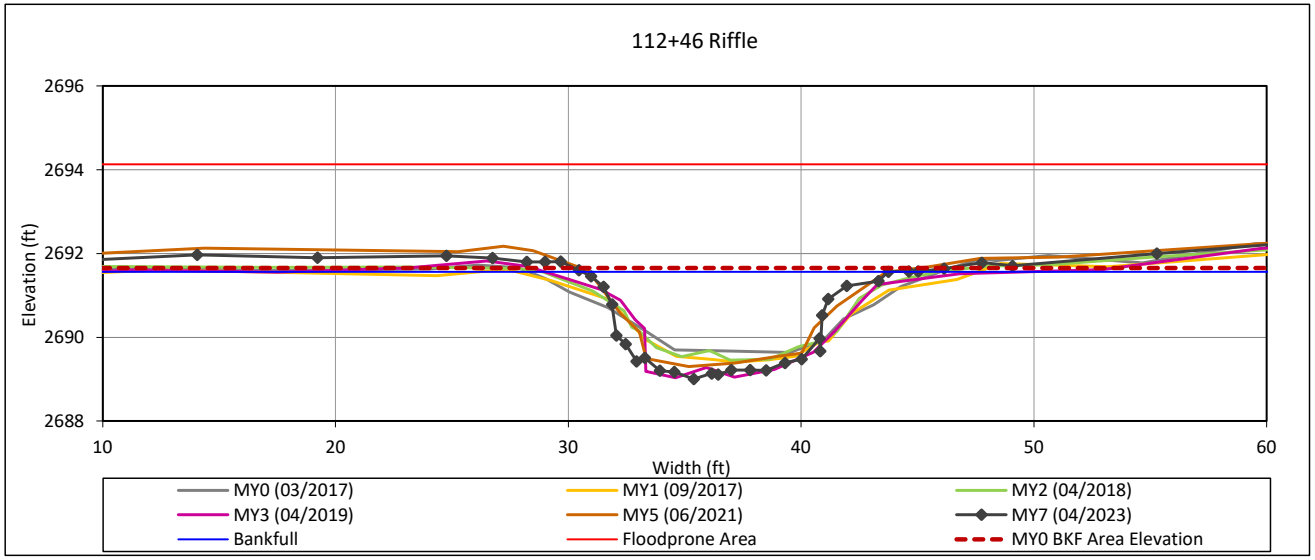
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 4 - Vile Creek Reach 2



Bankfull Dimensions	
21.3	x-section area (ft.sq.)
13.2	width (ft)
1.6	mean depth (ft)
2.6	max depth (ft)
15.9	wetted perimeter (ft)
1.3	hydraulic radius (ft)
8.1	width-depth ratio
89.3	W flood prone area (ft)
6.8	entrenchment ratio
1.0	low bank height ratio

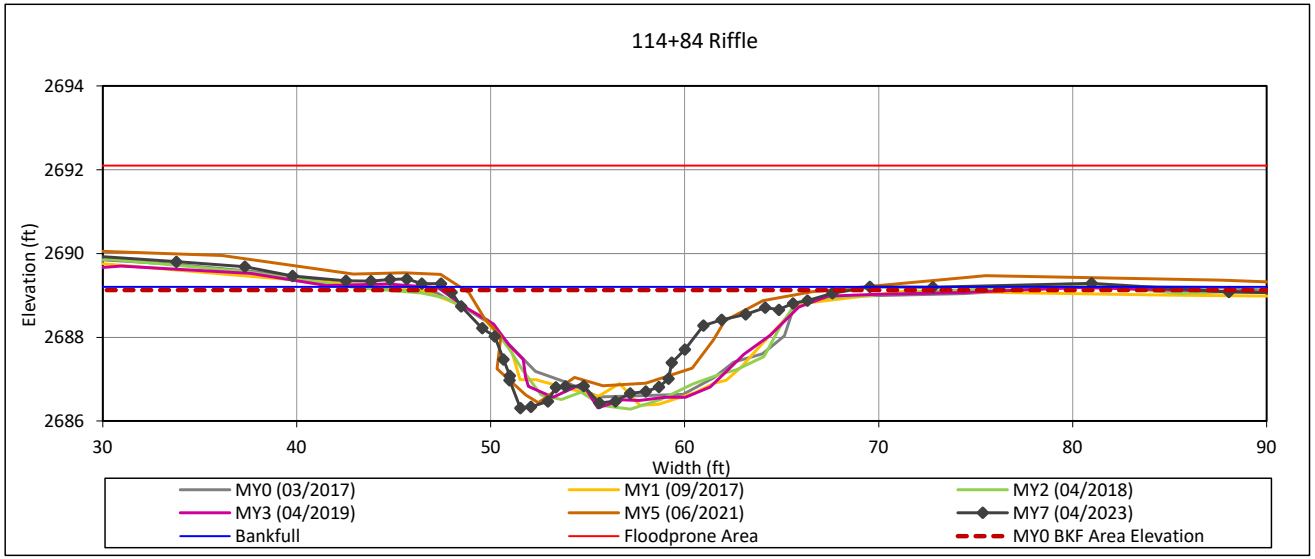
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 5 - Vile Creek Reach 2



Bankfull Dimensions	
30.2	x-section area (ft.sq.)
20.0	width (ft)
1.5	mean depth (ft)
2.9	max depth (ft)
21.9	wetted perimeter (ft)
1.4	hydraulic radius (ft)
13.2	width-depth ratio
100.5	W flood prone area (ft)
5.0	entrenchment ratio
1.0	low bank height ratio

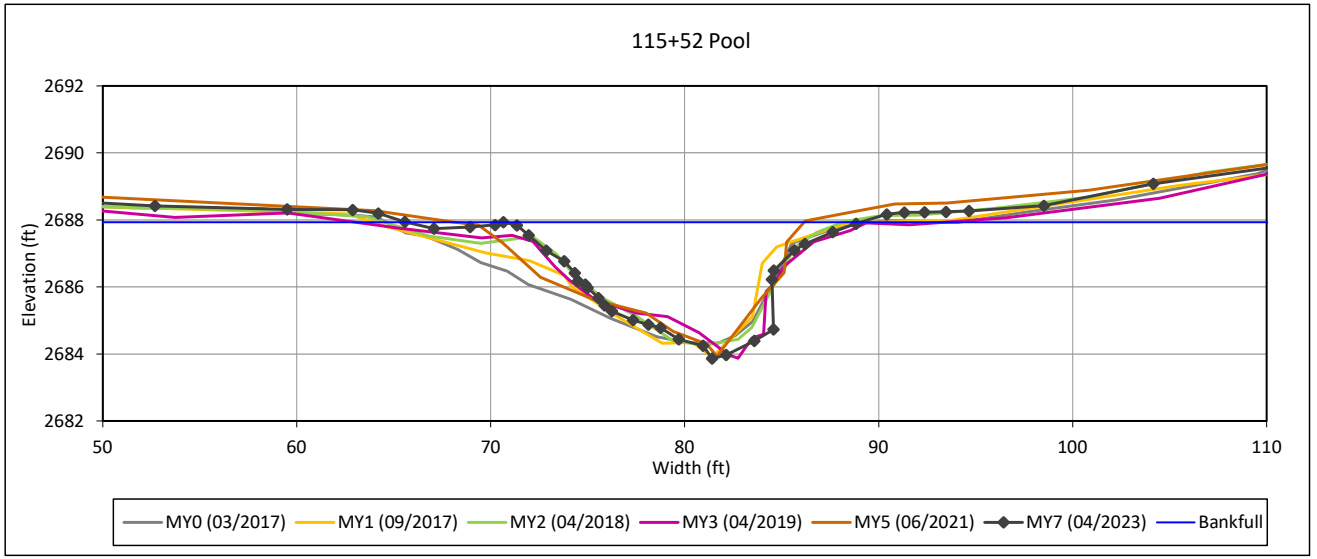
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 6 - Vile Creek Reach 2



Bankfull Dimensions	
37.4	x-section area (ft.sq.)
18.4	width (ft)
2.0	mean depth (ft)
4.1	max depth (ft)
21.6	wetted perimeter (ft)
1.7	hydraulic radius (ft)
9.1	width-depth ratio

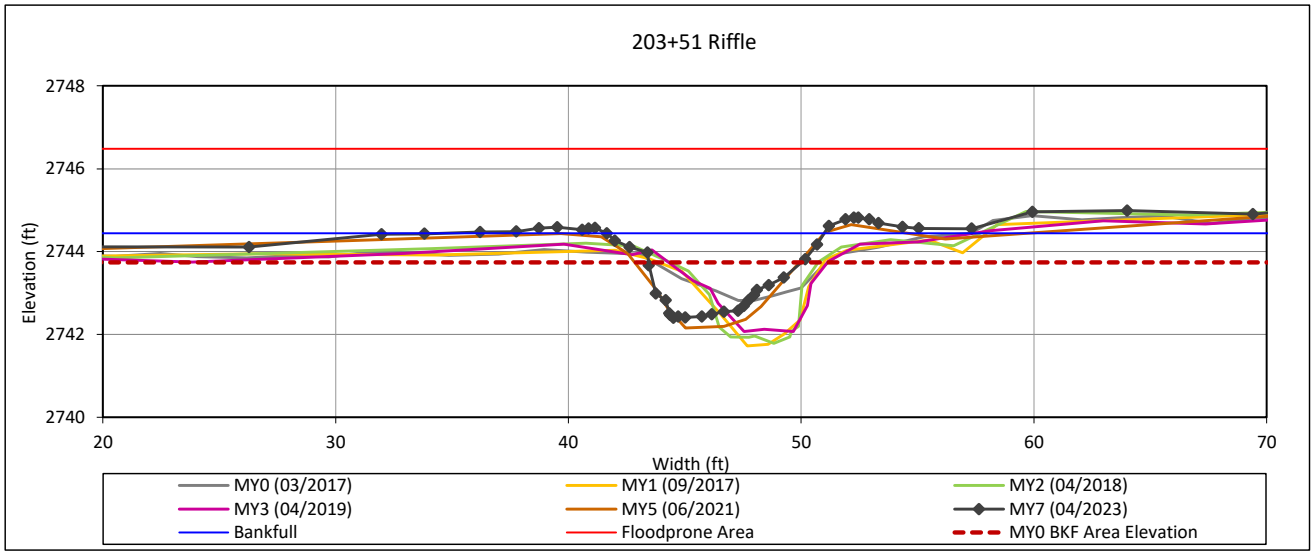
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 7 - UT1 Reach 1



Bankfull Dimensions	
11.4	x-section area (ft.sq.)
9.3	width (ft)
1.2	mean depth (ft)
2.0	max depth (ft)
10.9	wetted perimeter (ft)
1.0	hydraulic radius (ft)
7.7	width-depth ratio
84.5	W flood prone area (ft)
9.1	entrenchment ratio
1.5	low bank height ratio

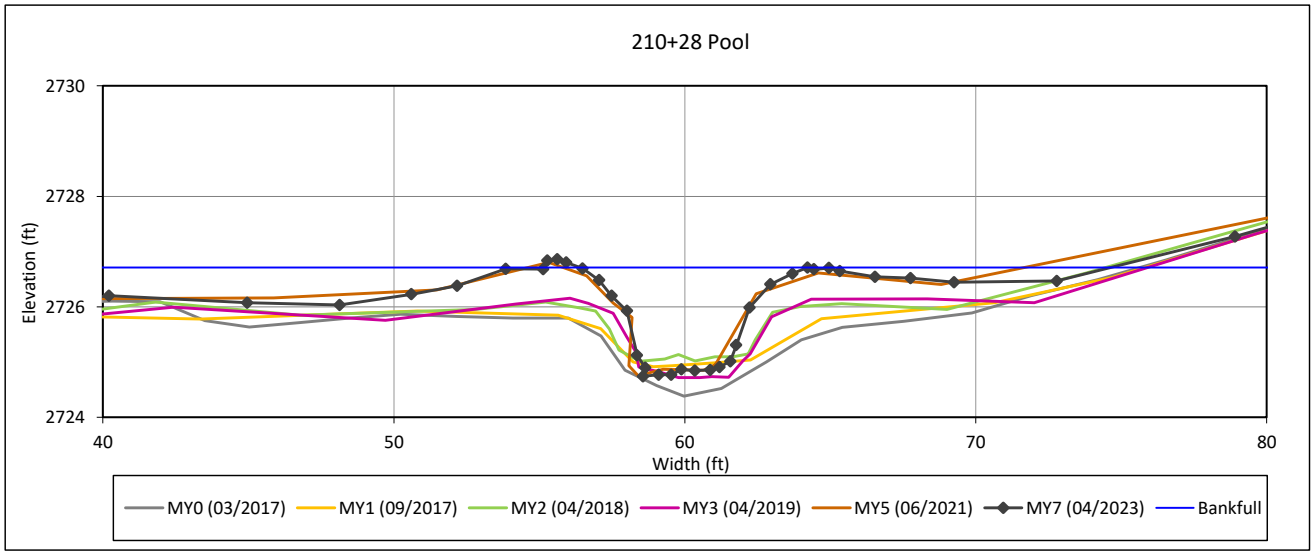
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 8 - UT1 Reach 1



Bankfull Dimensions	
8.3	x-section area (ft.sq.)
7.8	width (ft)
1.1	mean depth (ft)
2.0	max depth (ft)
9.6	wetted perimeter (ft)
0.9	hydraulic radius (ft)
7.4	width-depth ratio

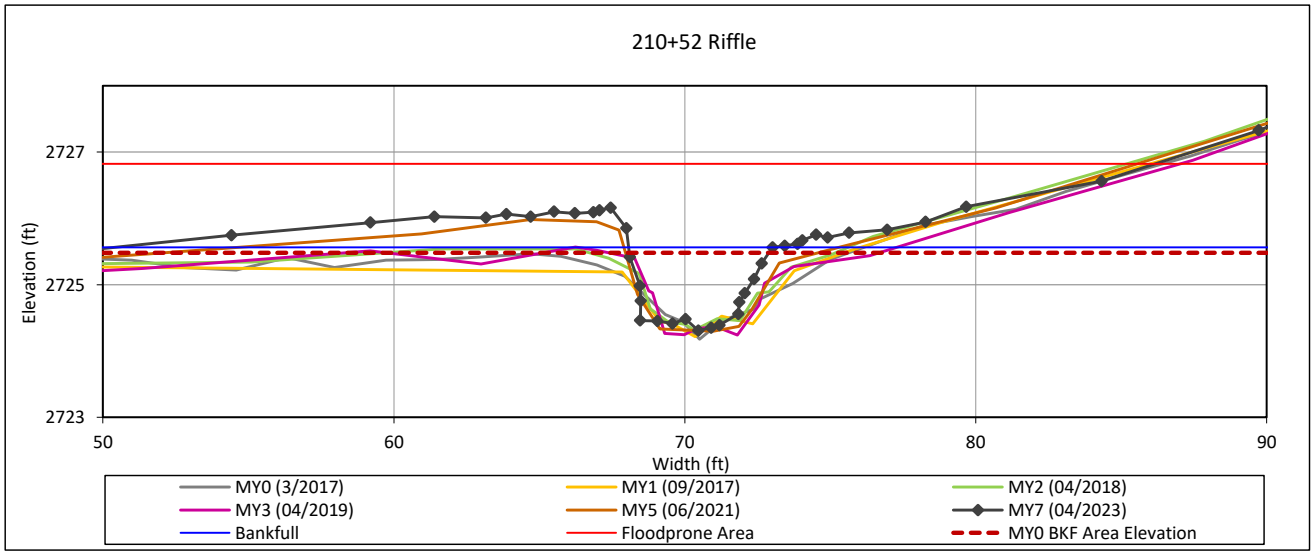
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 9 - UT1 Reach 1



Bankfull Dimensions	
4.5	x-section area (ft.sq.)
5.0	width (ft)
0.9	mean depth (ft)
1.3	max depth (ft)
6.3	wetted perimeter (ft)
0.7	hydraulic radius (ft)
5.5	width-depth ratio
86.1	W flood prone area (ft)
17.4	entrenchment ratio
1.1	low bank height ratio

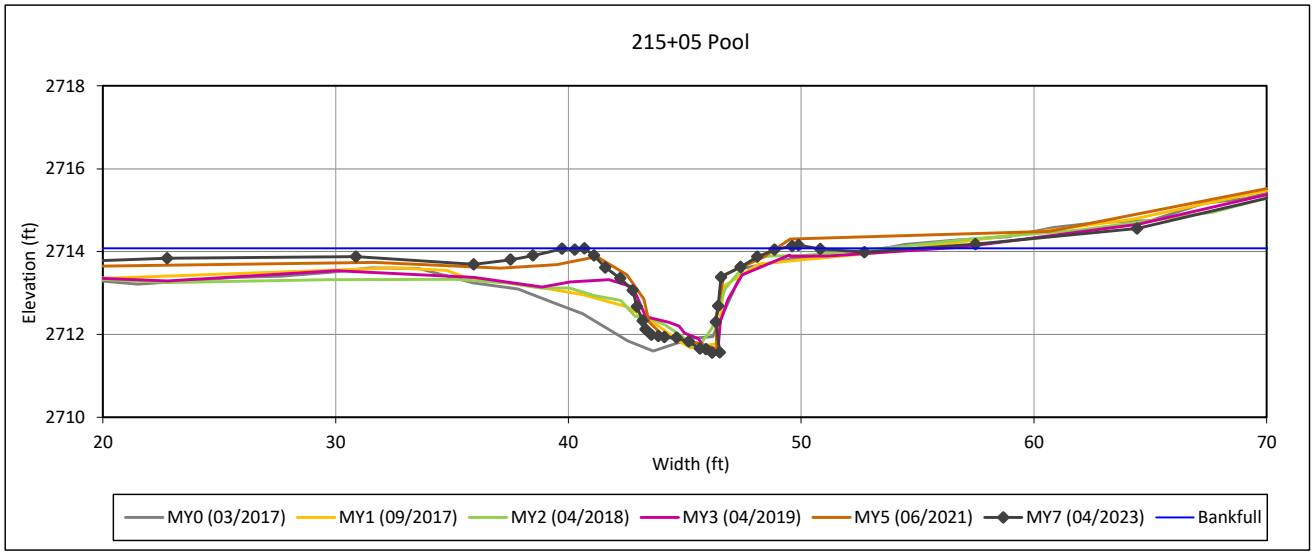
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 10 - UT1 Reach 2



Bankfull Dimensions	
9.8	x-section area (ft.sq.)
8.4	width (ft)
1.2	mean depth (ft)
2.5	max depth (ft)
11.2	wetted perimeter (ft)
0.9	hydraulic radius (ft)
7.3	width-depth ratio

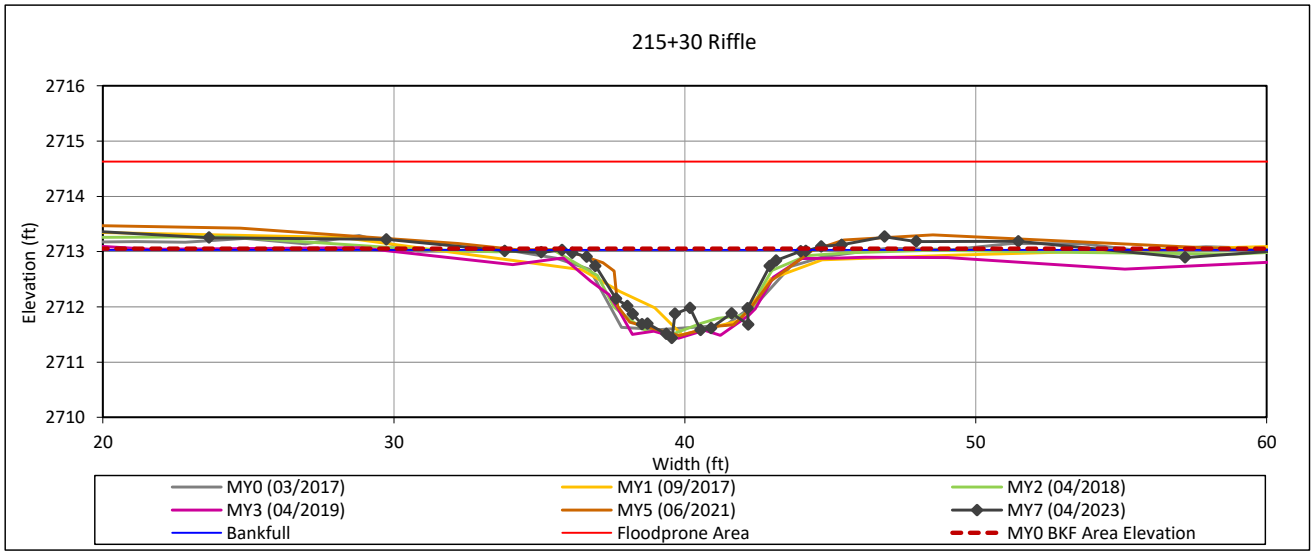
Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-section Plots

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Cross-section 11 - UT1 Reach 2



Bankfull Dimensions	
6.9	x-section area (ft.sq.)
8.5	width (ft)
0.8	mean depth (ft)
1.6	max depth (ft)
10.2	wetted perimeter (ft)
0.7	hydraulic radius (ft)
10.5	width-depth ratio
86.9	W flood prone area (ft)
10.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 04/2023
Field Crew: Wildlands Engineering

View Downstream

APPENDIX 5. Hydrology Summary Data and Plots

Table 13a. Verification of Bankfull Events
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Reach	Monitoring Year	Date of Occurrence	Method
Vile Reach 2	MY1	3/31/2017	Crest Gage
		4/24/2017	
		10/8/2017	
	MY2	9/16/2018	
		10/11/2018	
	MY4	1/11/2020	
		1/22/2020	
		2/7/2020	
		4/13/2020	
		5/20/2020	
		5/27/2020	
		8/15/2020	
		9/29/2020	
		10/29/2020	
	MY5	4/10/2021	
	MY7	3/3/2023	
UT1 Reach 2	MY1	5/5/2017	
		10/8/2017	
	MY2	10/11/2018	
	MY3	6/17/2019	
		8/1/2019	
		9/30/2019	
	MY4	1/11/2020	
		1/24/2020	
		2/6/2020	
		4/13/2020	
		4/29/2020	
		5/20/2020	
		5/27/2020	
		7/23/2020	
		8/15/2020	
		9/12/2020	
		9/29/2020	
		10/29/2020	
	MY5	2/3/2021	
		4/10/2021	
	MY7	3/3/2023	

Table 13b. Verification of Geomorphically Significant Events
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Reach	Monitoring Year	Date of Occurrence	Method
Vile Reach 2	MY3	2/23/2019	Crest Gage
		4/14/2019	
		4/19/2019	
		6/17/2019	
		7/5/2019	
		8/1/2019	
		9/30/2019	
	MY4	1/11/2020	
		1/21/2020	
		1/24/2020	
		2/6/2020	
		4/13/2020	
		4/29/2020	
		5/20/2020	
		5/27/2020	
		8/3/2020	
		8/15/2020	
		9/12/2020	
		9/29/2020	
		10/11/2020	
		10/29/2020	
	MY5	4/10/2021	
		8/17/2021	
	MY6	3/23/2022	
		9/5/2022	
UT1 Reach 2	MY3	2/23/2019	
		4/14/2019	
		4/19/2019	
		6/17/2019	
		7/30/2019	
		8/1/2019	
		9/30/2019	
	MY4	1/11/2020	
		1/21/2020	
		1/24/2020	
		2/6/2020	
		4/13/2020	
		4/29/2020	
		5/20/2020	
		5/27/2020	
		7/19/2020	
		7/23/2020	
		8/15/2020	
		8/20/2020	
		9/12/2020	
		9/29/2020	
		10/11/2020	
		10/29/2020	
	MY5	2/3/2021	
		4/10/2021	
	MY6	7/6/2022	
		7/17/2022	
		8/9/2022	
	MY7	7/15/2023	

Table 14. Wetland Gauge Attainment Summary

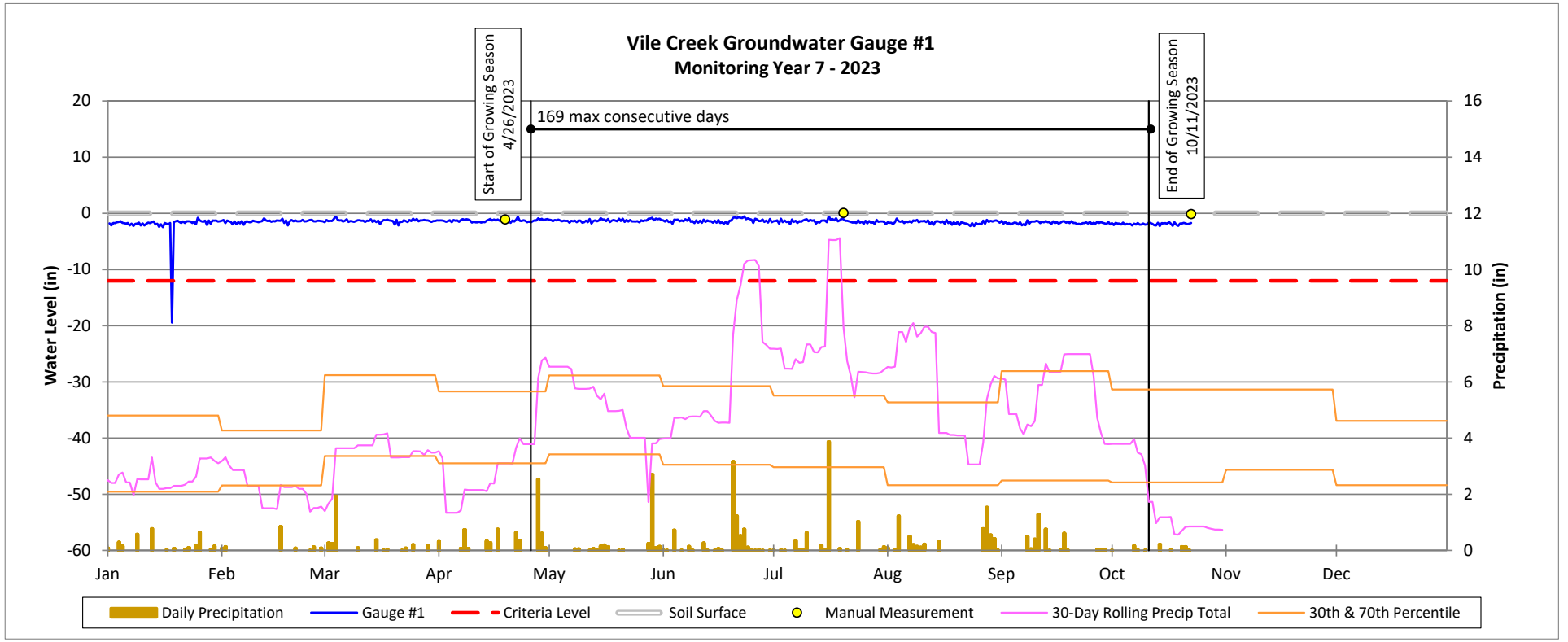
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Summary of Groundwater Gauge Results for Monitoring Years 1 through 7							
Gage	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)						
	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)**	Year 6 (2022)	Year 7 (2023)
1*	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/169 Days (100%)	Yes/169 Days (100%)
2	Yes/ 129 Days (77%)	Yes/33 Days (20%)	Yes/15 Days (9%)	Yes/70 Days (41%)	Yes/150 Days (89%)	Yes/24 Days (14%)	No/7 Days (4.1%)
3	Yes/169 Days (100%)	Yes/73 Days (43%)	Yes/14 Days (8.5%)	Yes/85 Days (50%)	Yes/127 Days (75%)	Yes/23 Days (14%)	Yes/16 Days (9.5%)
4	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/169 Days (100%)	Yes/169 Days (100%)
5	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/153 Days (91%)	Yes/169 Days (100%)
6	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/153 Days (91%)	Yes/169 Days (100%)
7	Yes/ 129 Days (77%)	Yes/33 Days (20%)	Yes/24 Days (14%)	Yes/85 Days (50%)	Yes/150 Days (89%)	Yes/169 Days (100%)	Yes/169 Days (100%)
8	Yes/125 Days (74%)	Yes/14 Days (8%)	No/4 Days (2%)	Yes/44 Days (26%)	Yes/27 Days (16%)	Yes/29 Days (17%)	Yes/34 Days (20.1%)
9	Yes/40 Days (24%)	Yes/33 Days (20%)	Yes/106 Days (63%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/153 Days (91%)	Yes/169 Days (100%)
10*	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/169 Days (100%)	Yes/150 Days (89%)	Yes/169 Days (100%)	Yes/169 Days (100%)

*Gauges are located in bog habitat.
**Vile Creek Barotroll malfunctioned on 9/22/21 and all subsequent data was omitted from the report
Growing season: April 26th -October 11th
Success criteria for wetlands is 14 consecutive days (8.5%) and 20 consecutive days (12%) for bogs.

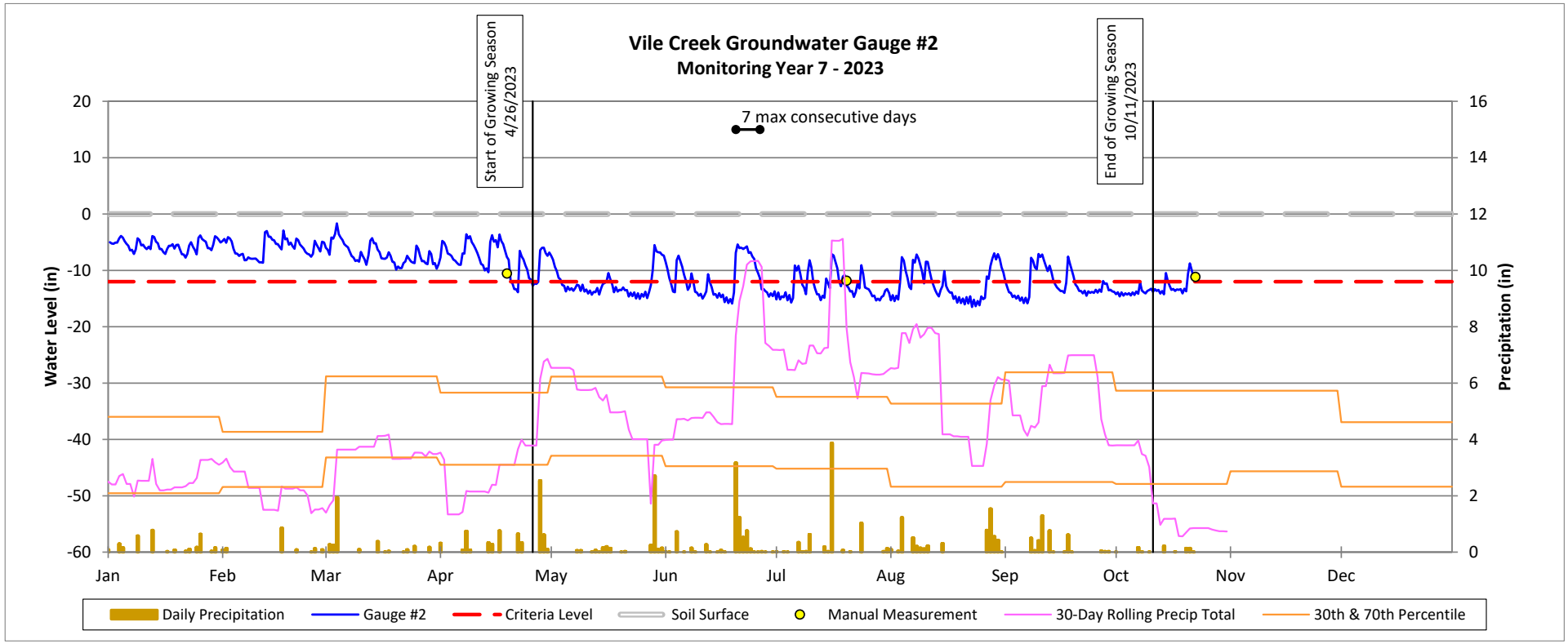
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Wetland Bog Rehabilitation



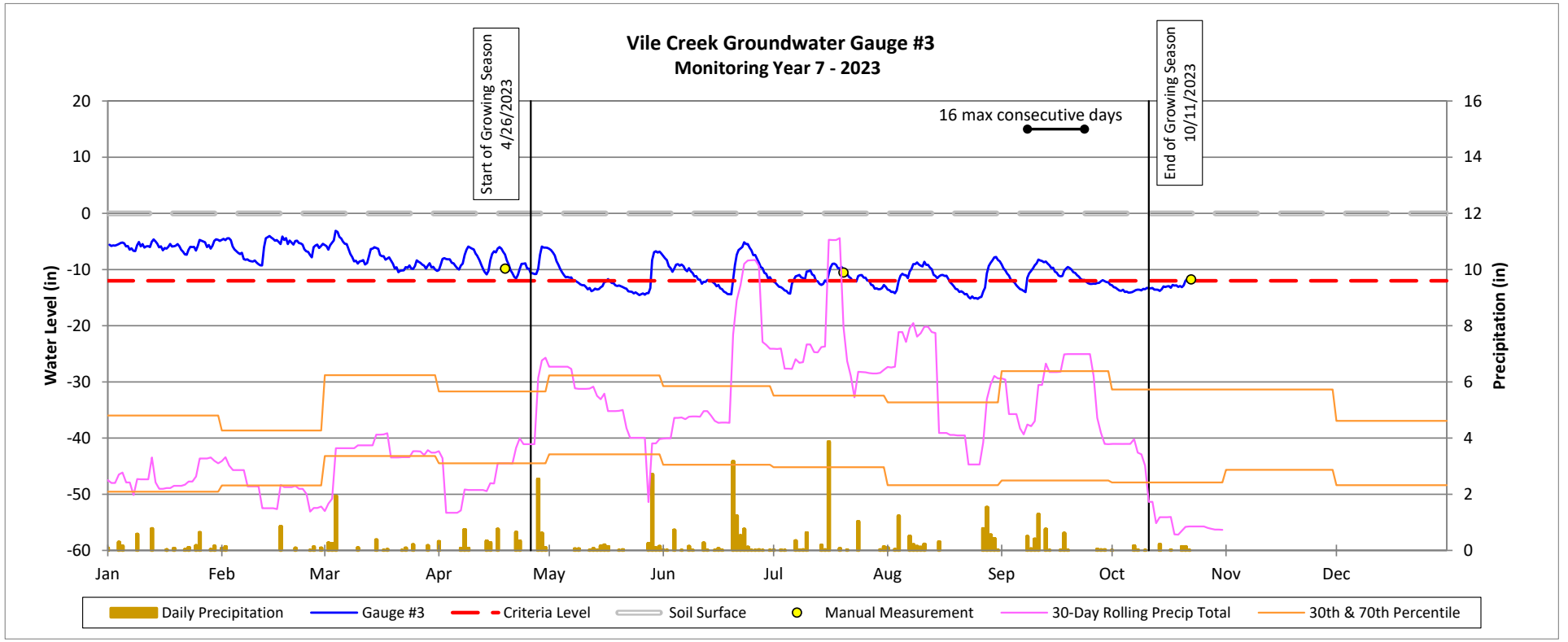
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



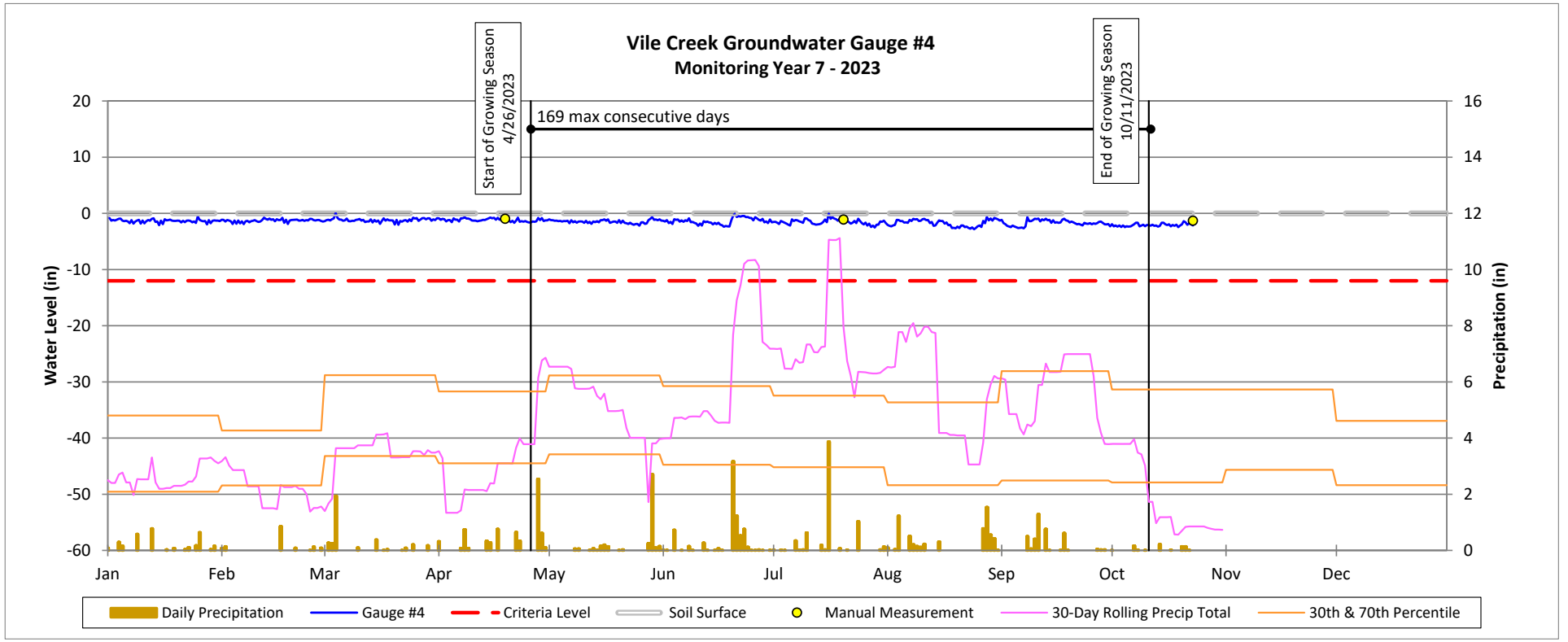
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



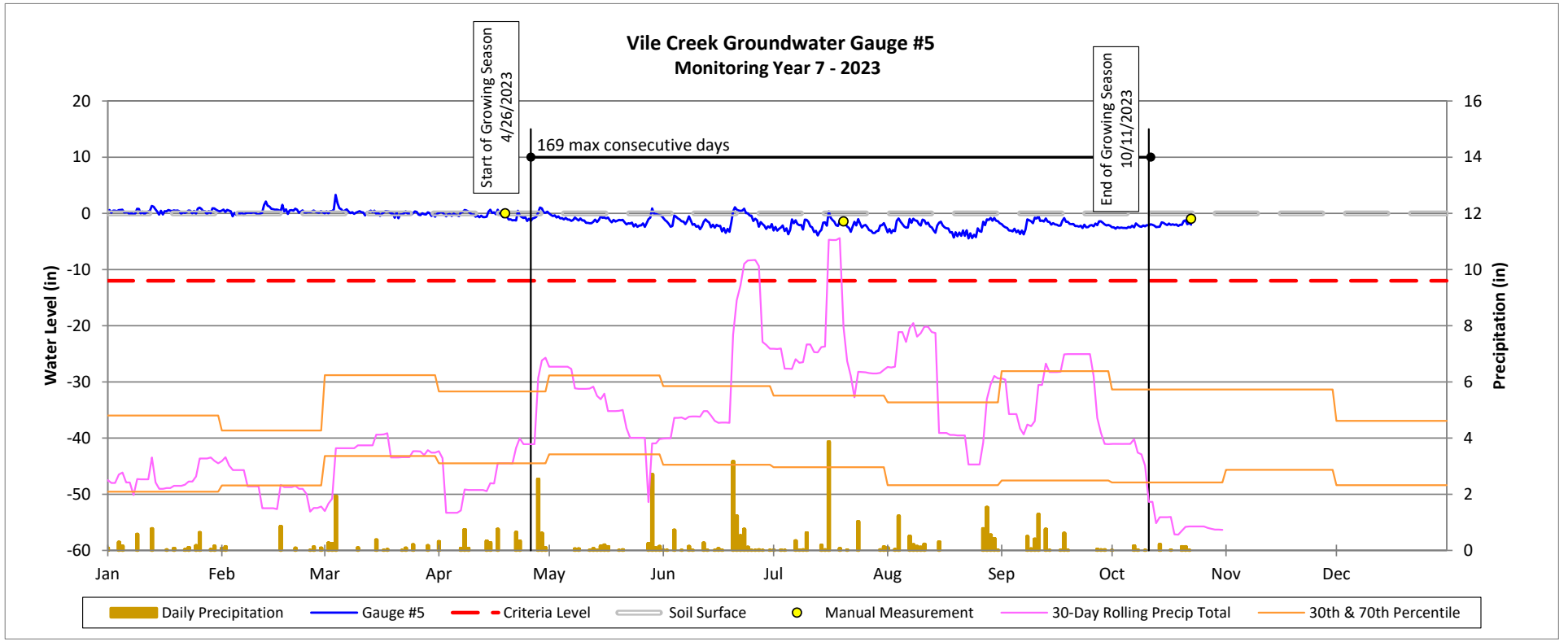
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



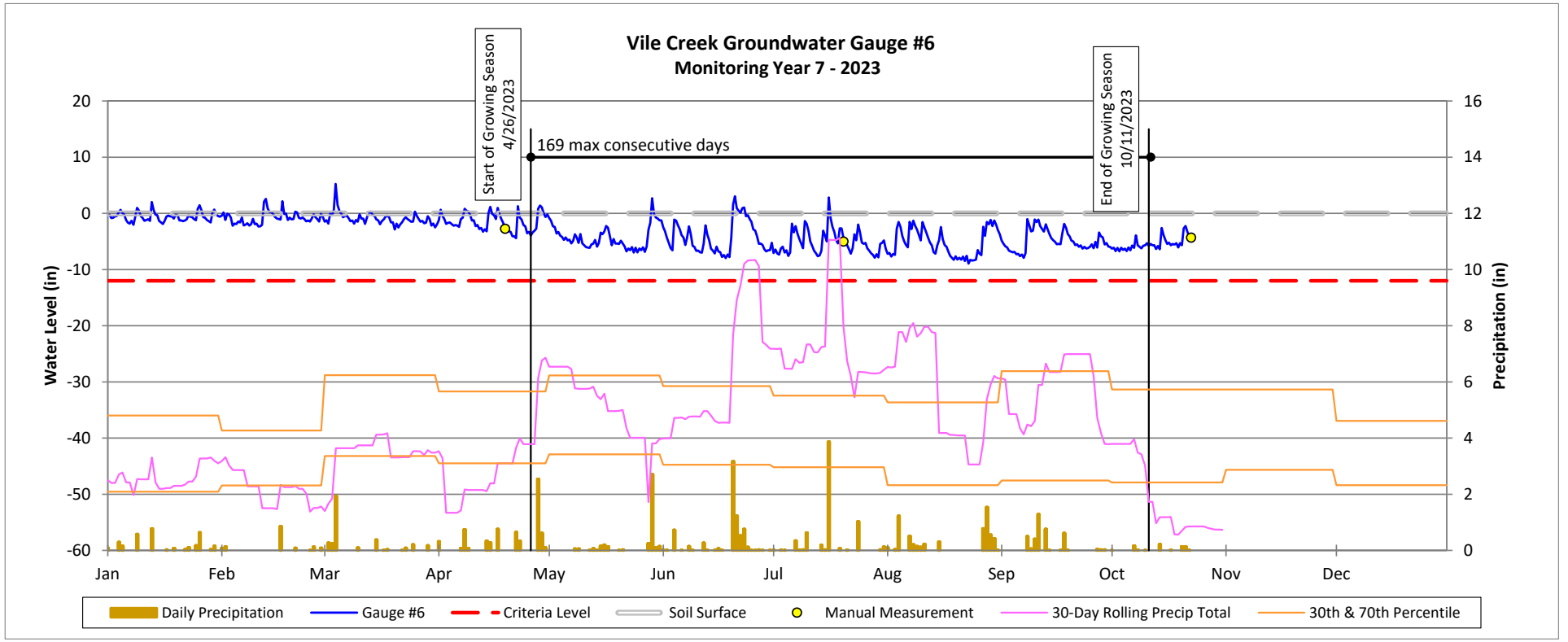
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



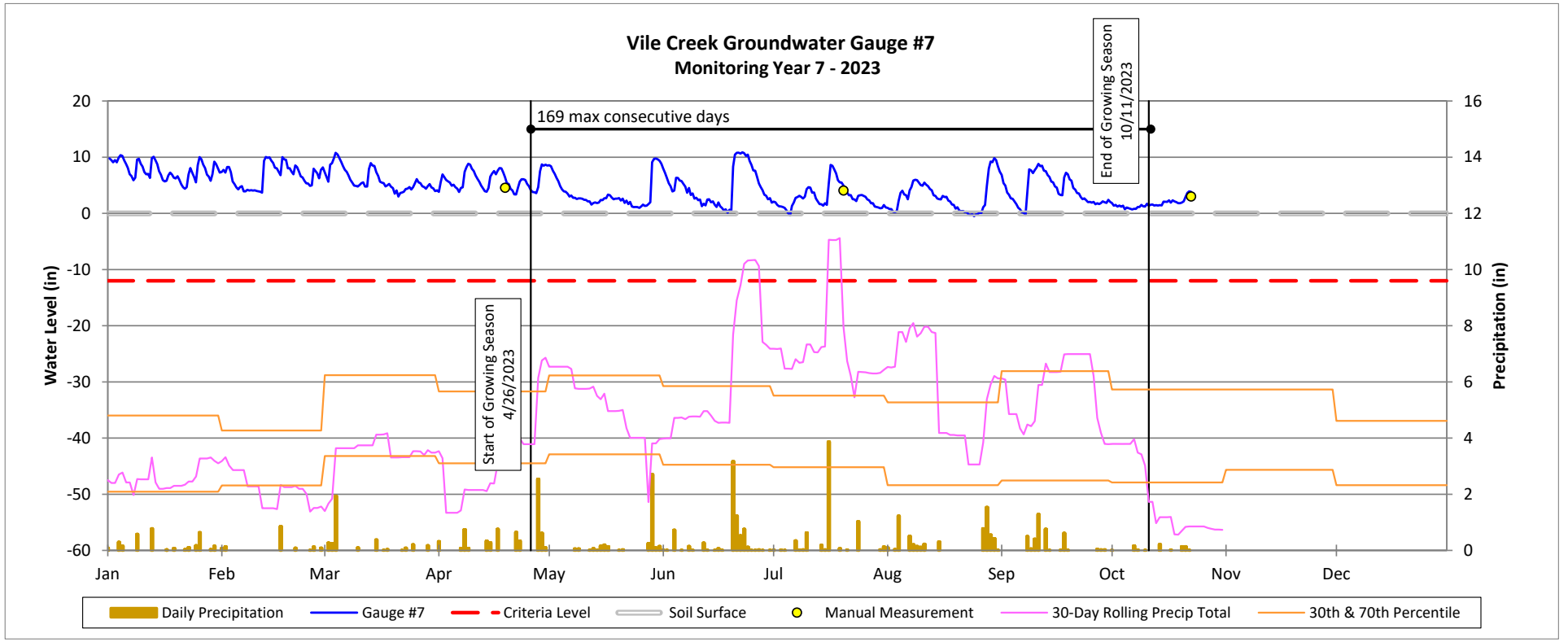
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



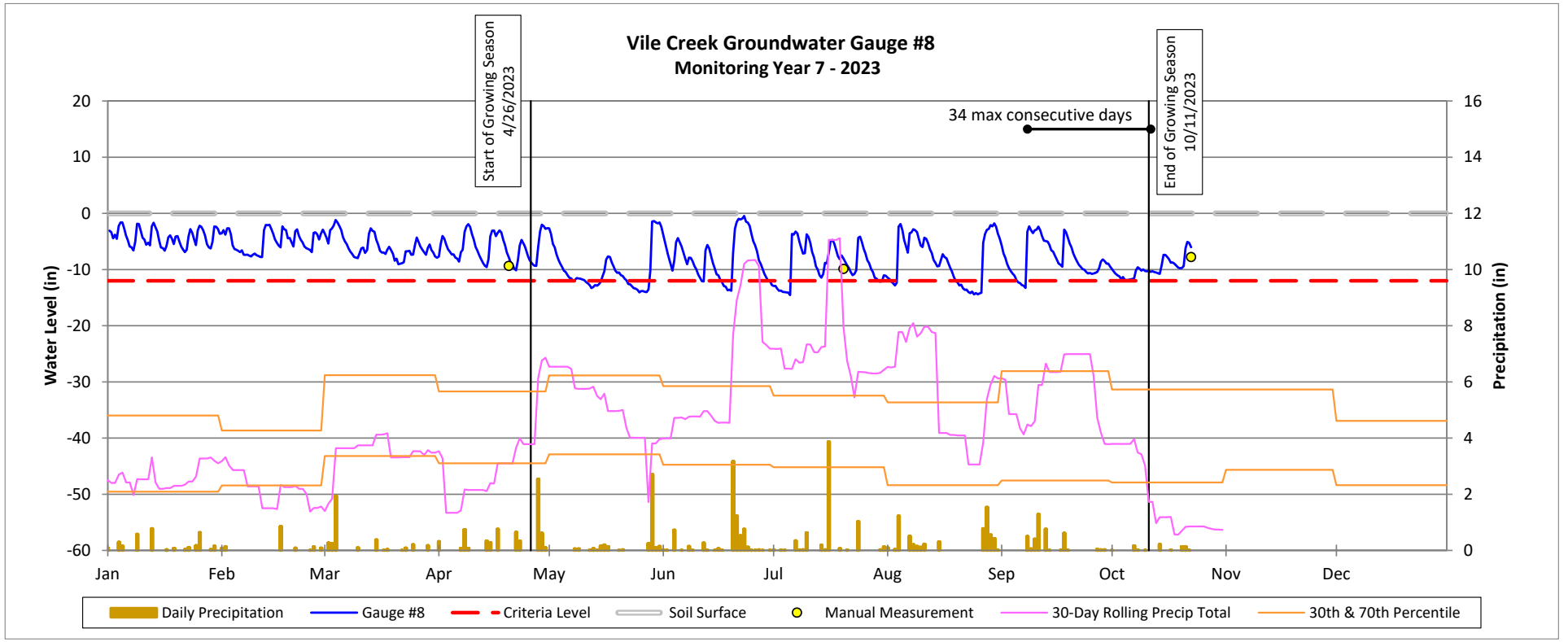
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



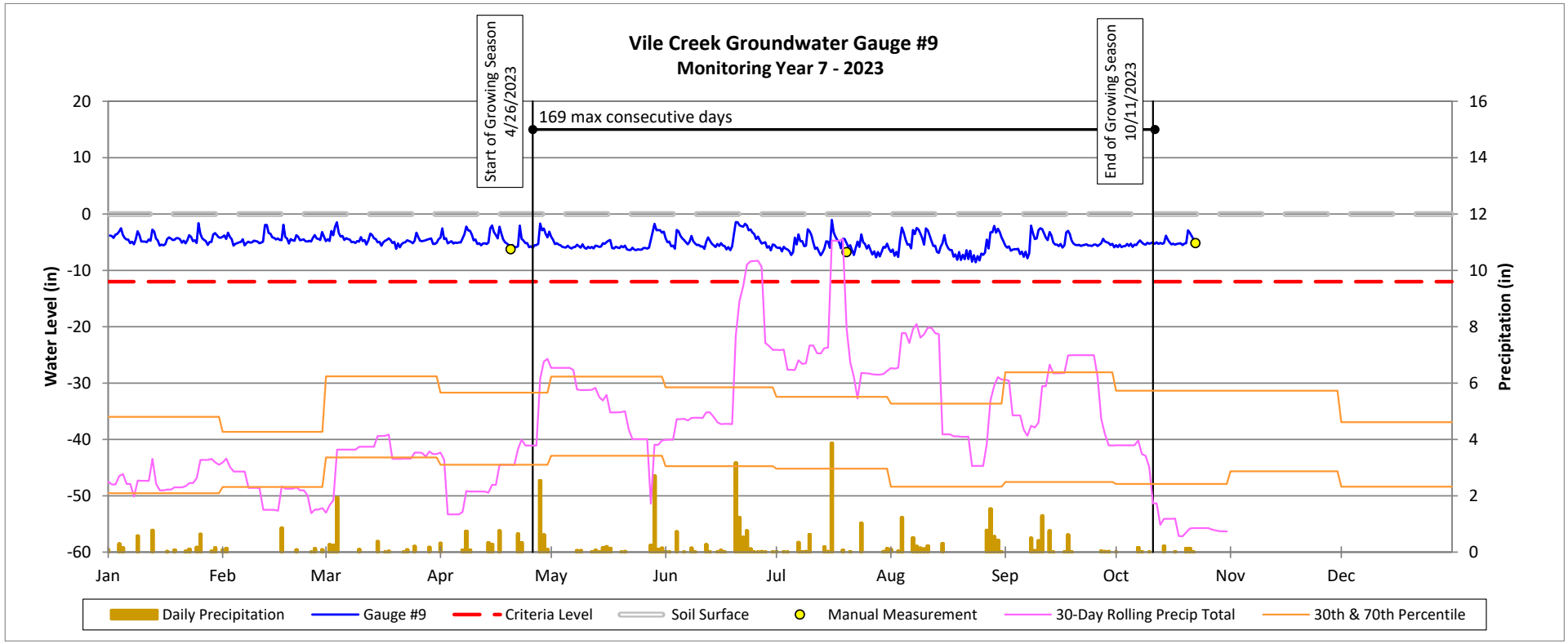
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



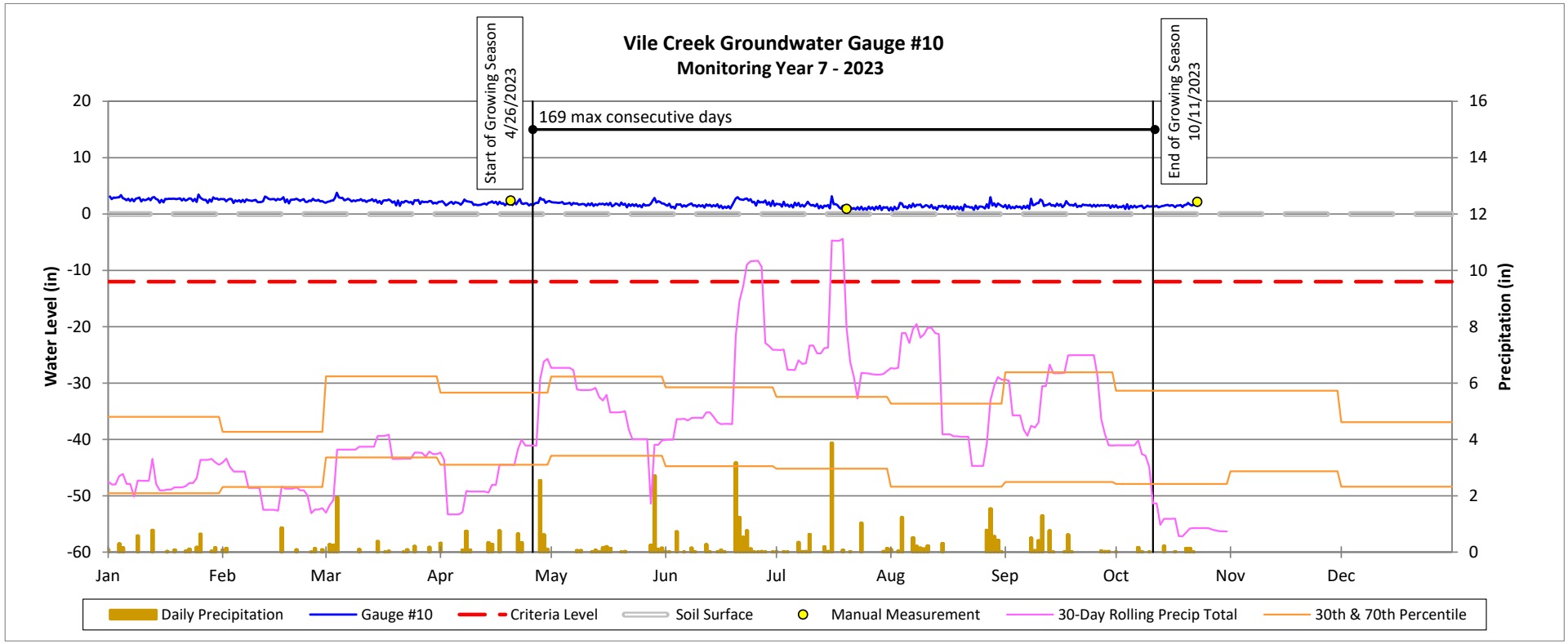
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Re-Establishment



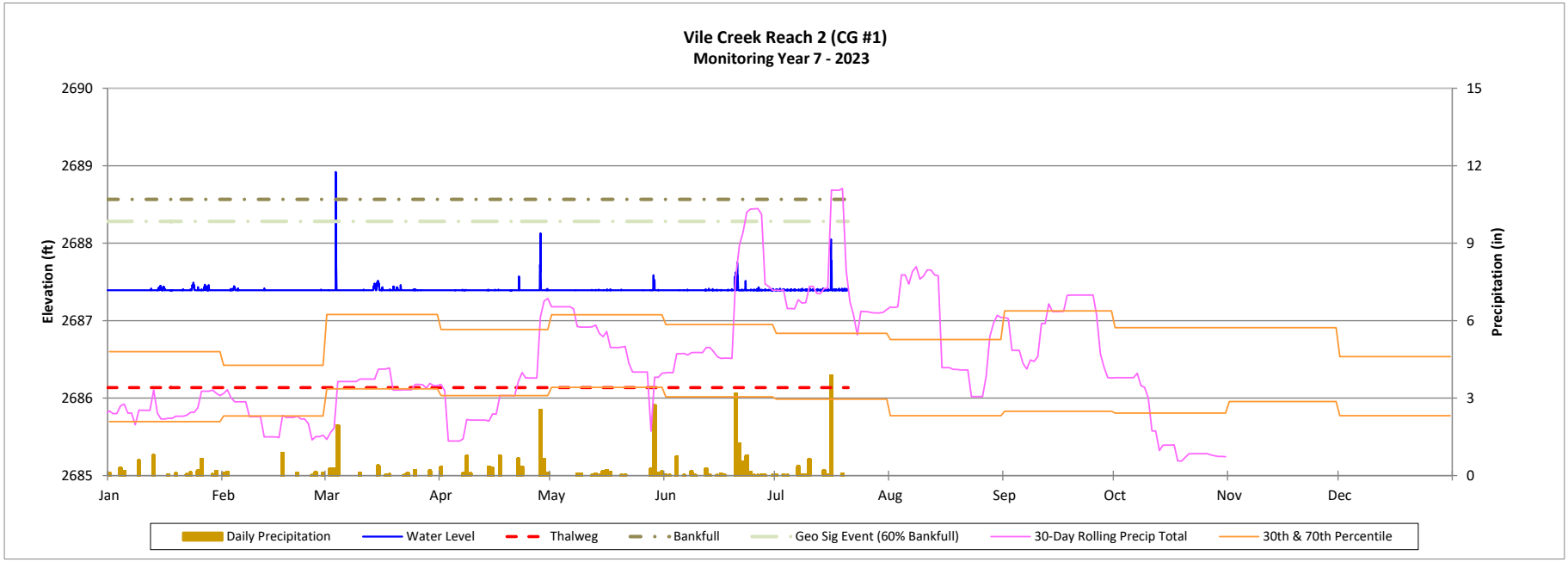
Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023
Wetland Wetland Bog Rehabilitation



Crest Gauge Plot

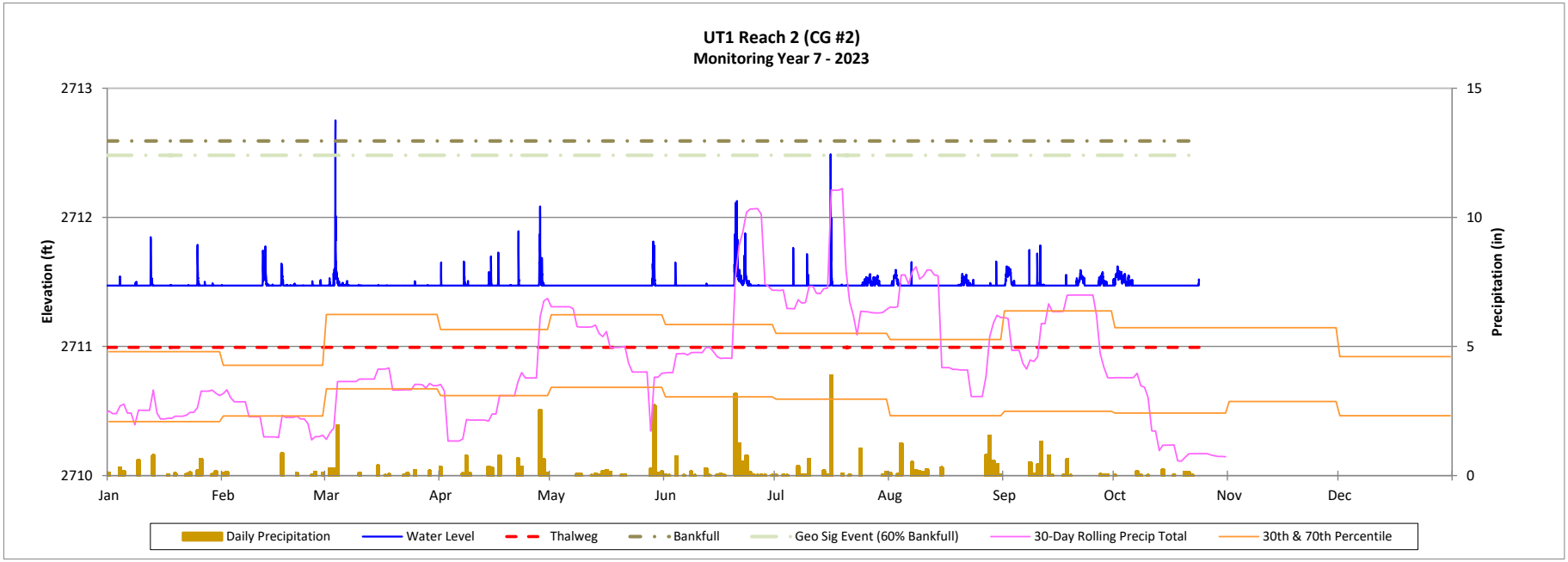
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023



*Probe malfunctioned after 7/20/2023

Crest Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

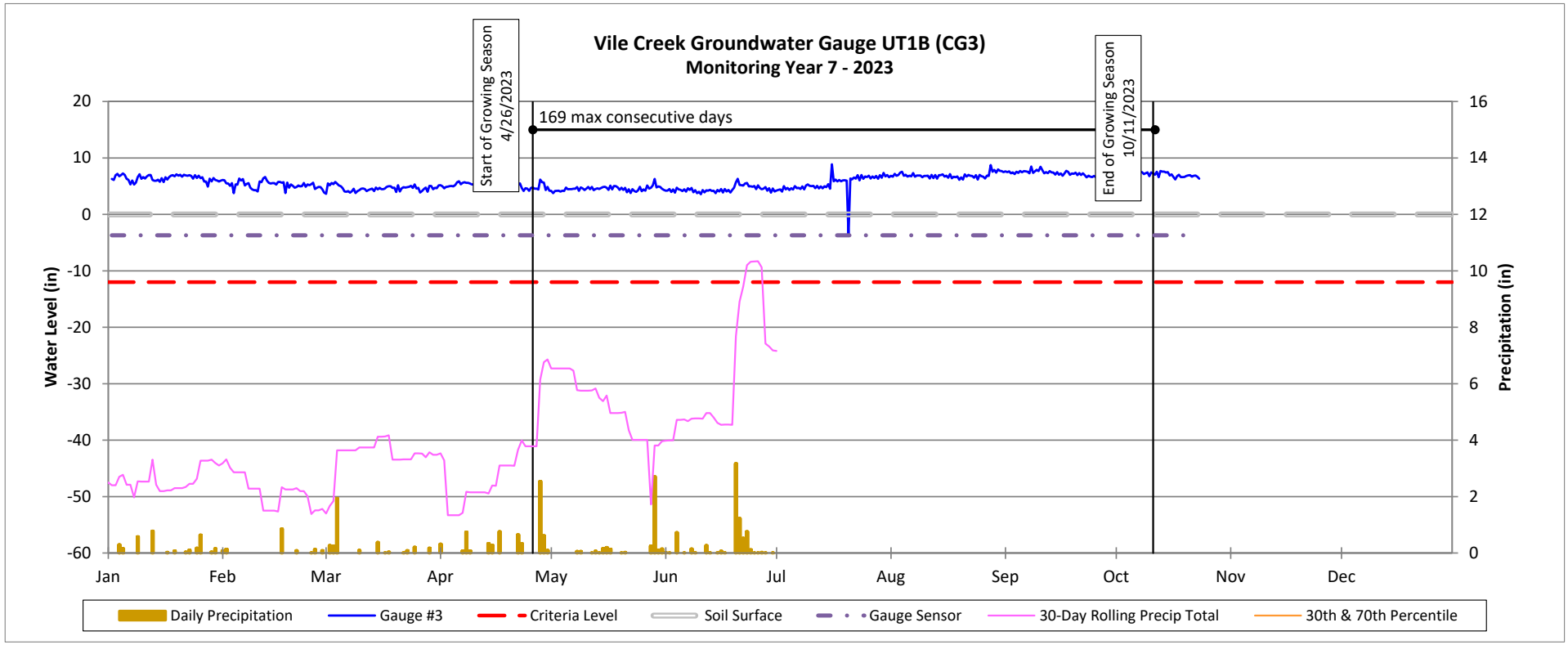


Supplemental Groundwater Gauge Plot

Vile Creek Mitigation Site

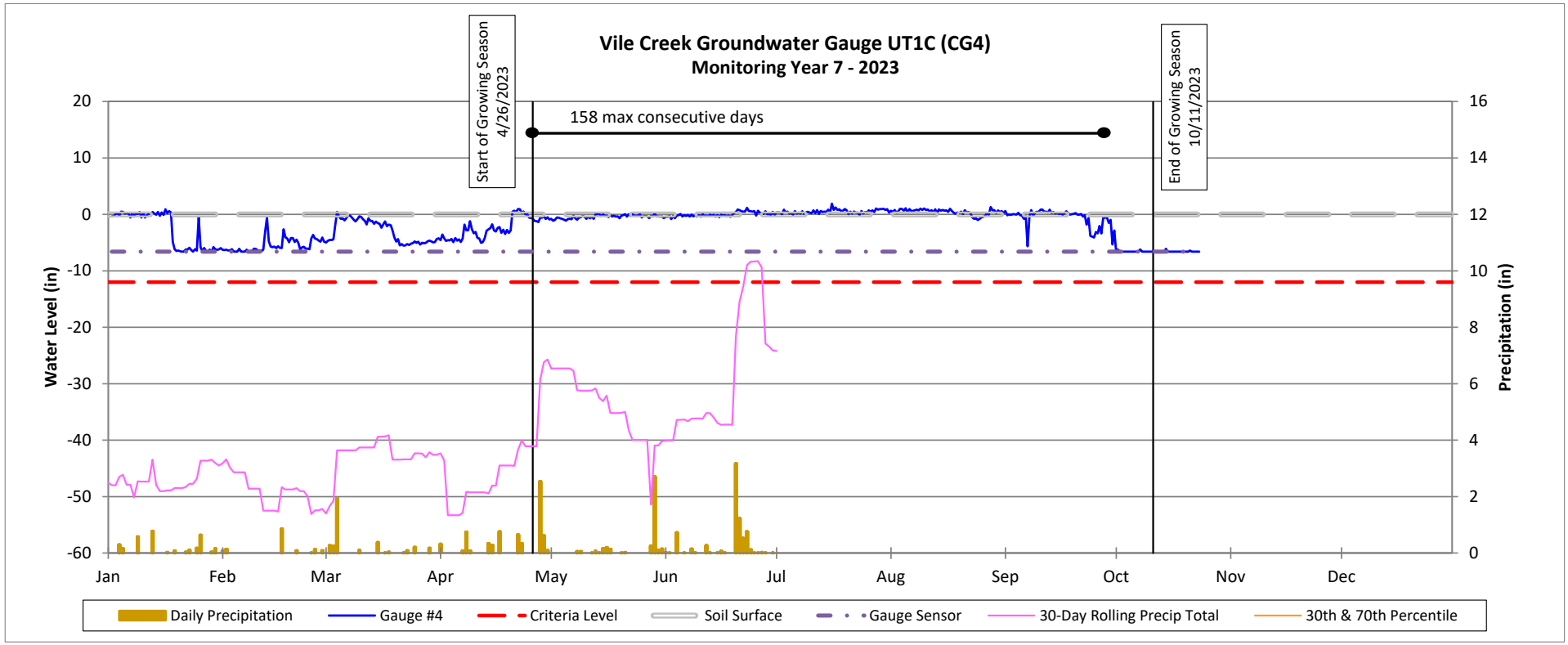
DMS Project No. 96582

Monitoring Year 7 - 2023



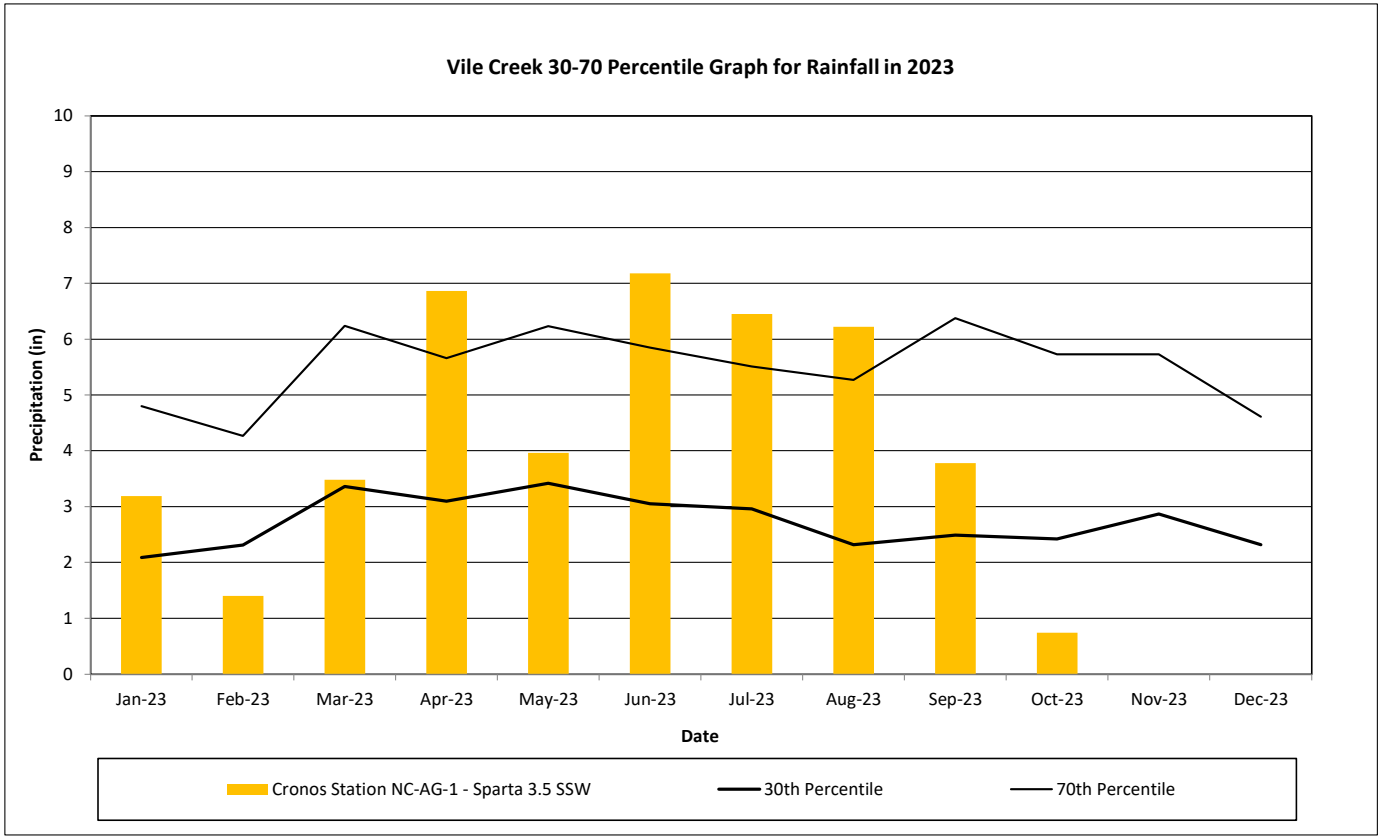
Supplemental Groundwater Gauge Plot

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023



Monthly Rainfall Data

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023



2023 rainfall collected by Cronos Station NC-AG-1 - Sparta 3.5 SSW (~4 miles from Site)
30th and 70th percentile rainfall data collected from Wets Station Sparta 3.5 SSW, NC (Years 1971 - 2021)

APPENDIX 6. 2023 Supplemental Planting List

2023 Vile Creek Supplemental Planting List

Container Plants*

Species	Common Name	Wetland Indicator Status	Percentage	Quantity
*Acer negundo***	box elder	FAC	15%	30
Platanus occidentalis	American sycamore	FACW	17.5%	35
Betula nigra	river birch	FACW	17.5%	35
Diospyros virginiana	persimmon	FAC	15%	30
*Alnus serrulata***	tag alder	OBL	10%	20
*Quercus alba***	white oak	FACU	15%	30
*Nyssa sylvatica***	black gum	FAC	10%	20

*Supplemental planting occurred April 2023 in select areas along UT1 Reach 1 and UT2 with three-gallon containerized trees
**Species not approved in 2016 Final Mitigation Plan; approved in 2021 Adaptive Management Plan

APPENDIX 7. Credit Adjustment Request

October 31, 2023

Mr. Harry Tsomides
NCDEQ - Division of Mitigation Services
Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

Subject: UT1B & UT1C Credit Adjustment Request Memo
Vile Creek Mitigation Site
DMS Project No. 96582
DEQ Contract No. 5999
New River Basin – HUC 05050001 Service Area
Alleghany County, North Carolina

Dear Mr. Tsomides,

Wildlands Engineering, Inc. (Wildlands) reassessed the stream boundaries of UT1B and UT1C and re-delineated associated created wetlands on the Vile Creek Mitigation Site (Site) in July 2023 during Monitoring Year (MY) 7. Supporting data including a potential wetland area table, map figure, groundwater gage plots, photo log, wetland data sheets, and Interagency Review Team (IRT) meeting notes have been included as attachments to this request memo (Wildlands 2021a).

Background

Aggradation and sheet flow were first observed along Enhancement II streams UT1B and UT1C in 2019 during MY3 (Wildlands, 2019). As these conditions persisted and expanded through MY6 (2022), former channelized streams and associated streamside areas within the narrow valleys converted to emergent wetlands (Wildlands, 2020a, 2021b, 2022). During the June 2021 IRT site walk, it was noted that if the trend continued to close out, UT1B and UT1C would be credited as wetlands (Wildlands 2021a). The items outlined in the IRT meeting notes are shown below and the actions taken are included in italics.

- The portions of UT1C and UT1B that are functioning as wetlands will be tracked in linear footage in the MY5, MY6, and MY7 monitoring reports to determine if the wetlands areas are increasing or decreasing.

  Wildlands noted in MY5, MY6, and MY7 text and figures the progression of aggradation in UT1B and UT1C.
- An additional photo point in each of these reaches will be added in the MY5-MY7 reports.

  Photo point 37 was added to UT1B in MY6 to visually track changes in stream and wetland conditions. MY5 stream aggradation on UT1B can be viewed in Photo 13 of the Stream Areas of Concern photo package in Appendix 2 of the MY5 Annual Report (Wildlands 2021b). Wildlands deemed existing photo point 28 sufficient to capture conditions along UT1C.

- Wildlands installed stream gages at baseline for internal data collection that can be used to verify the hydrology performance standards.
    Wildlands installed two crest gages (CG), CG3 and CG4, at baseline (2017) for internal data collection on UT1B and UT1C, respectively. These same gages were appropriately positioned for use as groundwater gages (GWG) in MY6 and MY7 to monitor wetland hydrology and provide groundwater data to support the potential expansion of wetland areas on the site.
- The vegetation will be visually monitored.
    Vegetation in the area of concern was visually monitored in MY5-MY7 during quarterly site visits. Species observed were consistently hydrophytic.
- At MY7 Wildlands will verify the jurisdictional limits of UT1C and UT1B and include it in the monitoring report.
    - *Wildlands delineated the limits of UT1B and UT1C and associated created wetlands in August 2023 and will include this request memo detailing the results in the MY7 report.*
- Wildlands will coordinate with the IRT and Division of Mitigation Services (DMS) prior to closeout to determine the mitigation approach, credit ratios, and acreage of these wetlands so that the appropriate amount of wetland credit can be added to the site and the necessary amount of stream credit can be removed.
    - *This request memo was written to provide a final update on the information collected to support the change from stream to wetland credit. It will be included in the MY7 report.*

Data Collection and Analysis

Wildlands personnel performed a Site investigation in July 2023 to identify current stream limits of UT1B and UT1C and additional potential wetland areas resulting from stream aggradation and hillslope seepage. Two new wetland areas (Wetlands A23 and B23) were delineated and mapped along UT1B and UT1C using global positioning system (GPS), and four new data points (DP1 – DP4) were collected.

The downstream extents of UT1B and UT1C were determined based on an evident loss of stream geomorphology. Down slope of these points, the single streams converted to multiple, weakly-developed, and likely transient flow paths. Sediment within these flow paths was similar to surrounding sediment and no sorting was observed. UT1B reduced from 128 linear feet (LF) to 41.79 LF and UT1C from 228 LF to 84.22 LF. Please refer to the attached figure and photo log for further detail.

Wetlands A23 (0.132 acres) and B23 (0.051 acres) were mapped in the aggraded areas where UT1B and UT1C formerly flowed, respectively, and in surrounding areas within the corresponding valleys. The associated GWGs greatly exceeded wetland hydrology criteria in MY6 and MY7. Because the GWGs are former flow gauges, the sensor depth below ground level is relatively shallow but still able to appropriately capture groundwater levels given the consistent proximity of groundwater to the ground surface. The “Gauge Sensor” lines on CG3 and GC4 hydrographs represent the limits of recorded water level data and all data at or below this line was not used in determining wetland hydrology. Irregular data flatlines in early 2022 are associated with a malfunctioning on-site barotroll from 1/1/2022 to 2/11/2022. GWG pressure data was unable to be corrected and water levels reported during this period are not reflective of true hydrologic conditions. Wildlands followed an 8.5% (14 consecutive day) success criteria in the IRT approved Mitigation Plan (Wildlands, 2016). The final performance standard for

hydrology of potential additional wetland areas will be a free groundwater surface within 12 inches of the ground surface for 14 consecutive days (8.5%) of the 169-day growing season (April 26 through October 11) under typical precipitation conditions. Soils in these wetlands met the F3 hydric soil indicator and vegetation was dominantly hydrophytic.

Wetland Credits

The combined area from Wetland A23 and B23 totals 0.183 acres. Prior to construction, these areas were not wetlands and were not identified as such in the approved Jurisdictional Determination for the Site. Based on credit ratios from similar wetland mitigation sites, a creation credit ratio of 3:1 is proposed for the newly-delineated wetland areas where a rise in groundwater elevations has created conditions necessary to support wetland conditions and promote wetland functions (Wildlands 2020b, Wildlands 2021c). This will result in an additional 0.061 riparian wetland mitigation units (WMUs) potentially available to offset stream credits for this Site. Please refer to the attached summary table of the additional wetland areas on the Site.

Stream Credits

A loss in stream credits will be necessary due to the decreased length of stream channels UT1B and UT1C as compared to lengths documented in the As-Built report. The loss in length for UT1B is 86.21 LF and for UT1C it is 143.78 LF. The total loss for the two streams is 229.99 LF which, at an enhancement II credit ratio of 2.5:1, results in a stream credit loss of 86.596 Stream Mitigation Units (SMUs).

Conclusion

This request memo summarizes the data collection and analysis of two created wetlands (Wetlands A23 and B23) that have been identified on the Site after construction was complete. Wildlands will document the additional wetland areas in the MY7 annual monitoring report as well as the loss of stream footage and the loss of stream credits. It will be stated in the report that these additional wetland areas will be used to offset the loss of stream credits.

Feel free to contact me at 919-302-6919 if you have any questions.

Thank you,

Jeff Keaton, PE
Project Manager
jkeaton@wildlandseng.com

References

Wildlands Engineering, Inc. (Wildlands) 2022. Vile Creek Monitoring Year 6 Annual Report. DMS, Raleigh, NC.

Wildlands. 2021a. Vile Creek Mitigation Site IRT Site Walk Meeting Notes.

Wildlands. 2021b. Vile Creek Monitoring Year 5 Annual Report. DMS, Raleigh, NC.

Wildlands. 2021c. Oak Hill Dairy Mitigation Site Final Mitigation Plan. NCDMS, Raleigh, NC.

Wildlands. 2020a. Vile Creek Monitoring Year 4 Annual Report. DMS, Raleigh, NC.

Wildlands. 2020b. Wyant Lands Mitigation Site Final Mitigation Plan. NCDMS, Raleigh, NC.

Wildlands. 2019. Vile Creek Monitoring Year 3 Annual Report. DMS, Raleigh, NC.

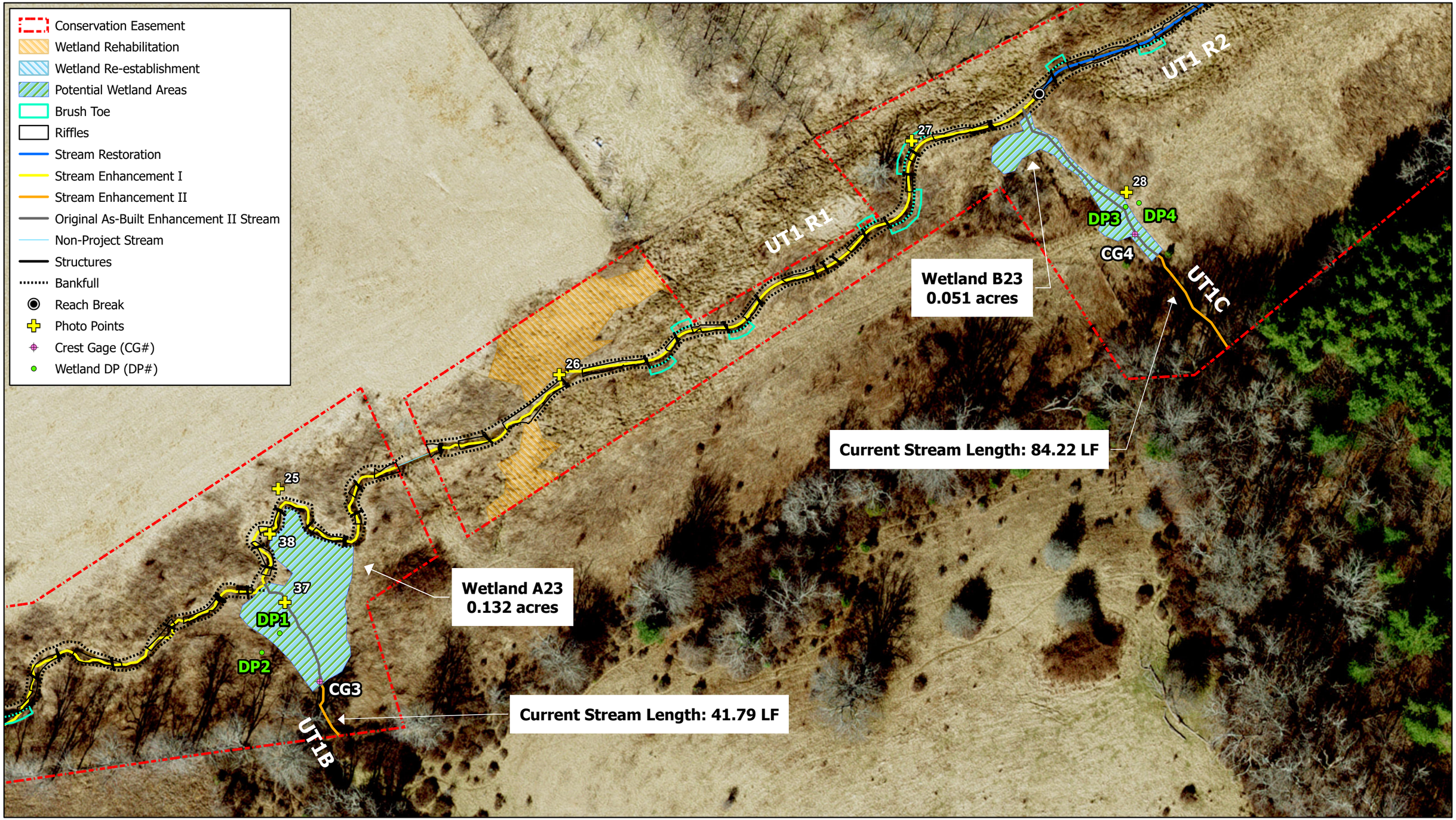
Wildlands. 2017. Vile Creek Stream Mitigation Site Baseline Monitoring Document and As-Built Baseline Report. DMS, Raleigh, NC.

Wildlands. 2016. Vile Creek Mitigation Site Final Mitigation Plan. NCDMS, Raleigh, NC.

Wetland and Stream Credits Adjustment
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Wetland ID	As-Built Acreage	Project Credits	MY7 Acreage	Mitigation Type	Mitigation Ratio	MY7 Credits (WMU)	Potential Credit Gain (WMU)
Wetland A23	0	0	0.132	Creation	3:1	0.044	**0.061**
Wetland B23	0	0	0.051	Creation	3:1	0.017	
TOTAL			**0.183**			**0.061**	
Stream ID	**As-Built Linear Feet**	**Project Credits**	**MY7 Linear Feet**	**Mitigation Type**	**Mitigation Ratio**	**MY7 Credits (SMU)**	**Potential Credit Loss (SMU)**
UT1B	128	48	41.79	Enhancement II	2.5:1	16.716	31.284
UT1C	228	89	84.22	Enhancement II	2.5:1	33.688	55.312
TOTAL	**356**	**137**	**126.01**			**50.40**	**86.596**

Re-Delineation Figure



WILDLANDS ENGINEERING

Mitigation Services ENVIRONMENTAL QUALITY

0 50 100 Feet

N

MY7 Stream and Wetland Assessment Map
Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Alleghany County, NC

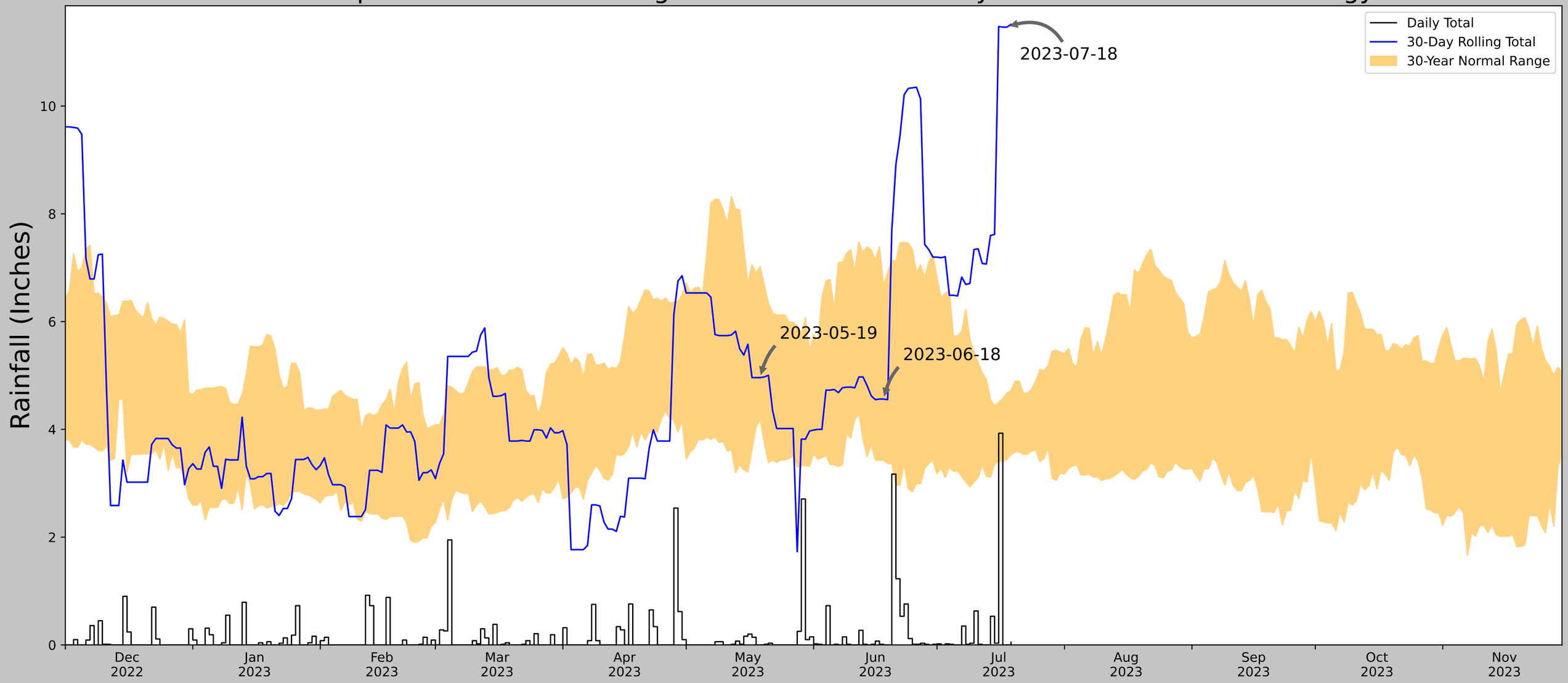
Hydrology Summary Data and Plots

Wetland Gage Attainment Summary

Vile Creek Mitigation Site
DMS Project No. 96582
Monitoring Year 7 - 2023

Summary of Groundwater Gage Results for Monitoring Years 6 &7		
Gage	**Success Criteria Achieved/Max Consecutive Days**	
	Year 6 (2022)	**Year 7 (2023)**
UT1B (CG3)	Yes/169 Days (100%)	Yes/169 Days (100%)
UT1C (CG4)	Yes/169 Days (100%)	Yes/158 Days (93%)

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	36.505859, -81.105898
Observation Date	2023-07-18
Elevation (ft)	2742.596
Drought Index (PDSI)	Mild wetness (2023-06)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-07-18	3.440945	4.67126	11.464567	Wet	3	3	9
2023-06-18	3.427165	6.679134	4.562992	Normal	2	2	4
2023-05-19	4.177953	7.019685	4.96063	Normal	2	1	2
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

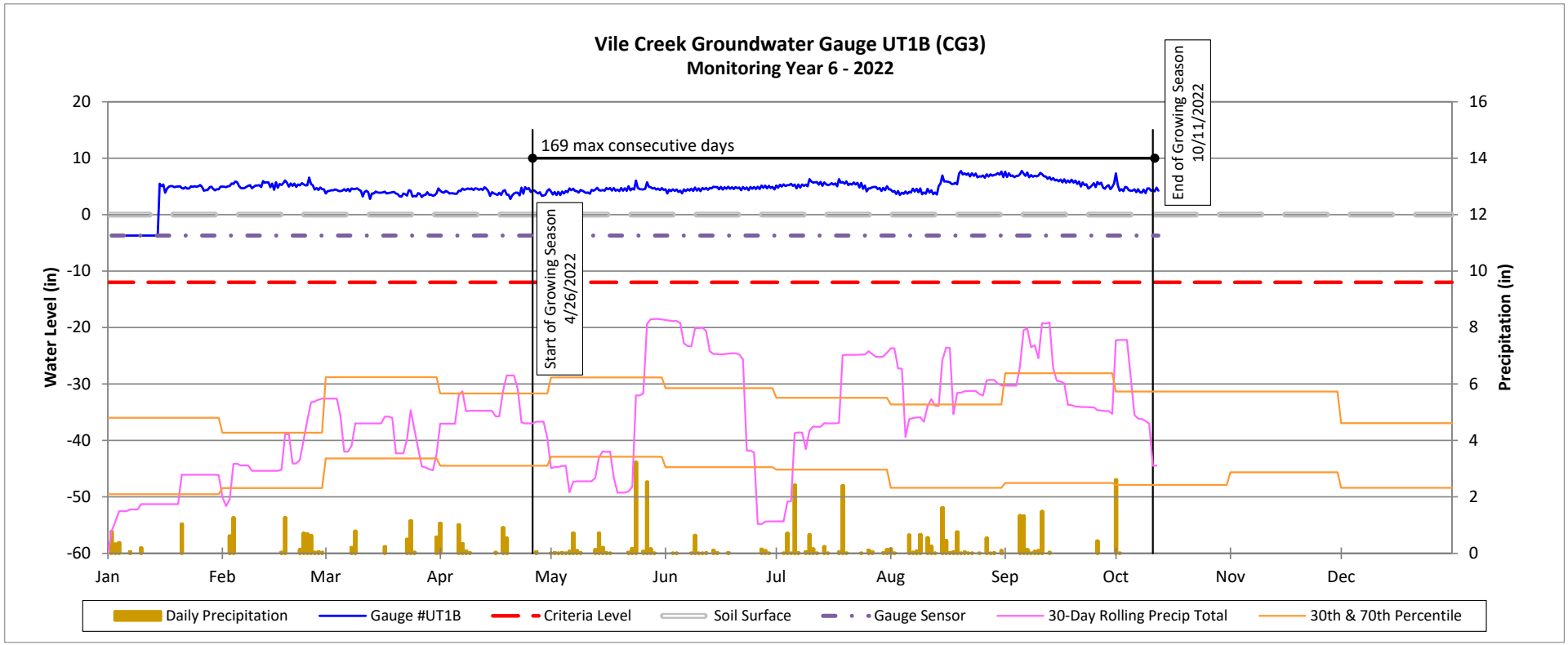
Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
SPARTA 3.5 SSW	36.4592, -81.1528	3011.155	4.145	268.559	2.979	11173	90
SPARTA 0.8 W	36.5018, -81.1353	3003.937	3.1	7.218	1.417	4	0
SPARTA 2.8 NE	36.5326, -81.0866	2745.079	6.264	266.076	4.486	78	0
SPARTA 3.6 NW	36.5439, -81.1633	2688.976	5.881	322.179	4.541	24	0
TRANSOU	36.4003, -81.3053	2833.99	9.404	177.165	5.898	72	0
JEFFERSON 2 E	36.4175, -81.4297	2758.858	15.659	252.297	10.997	2	0

Groundwater Gauge Plot

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 6 - 2022

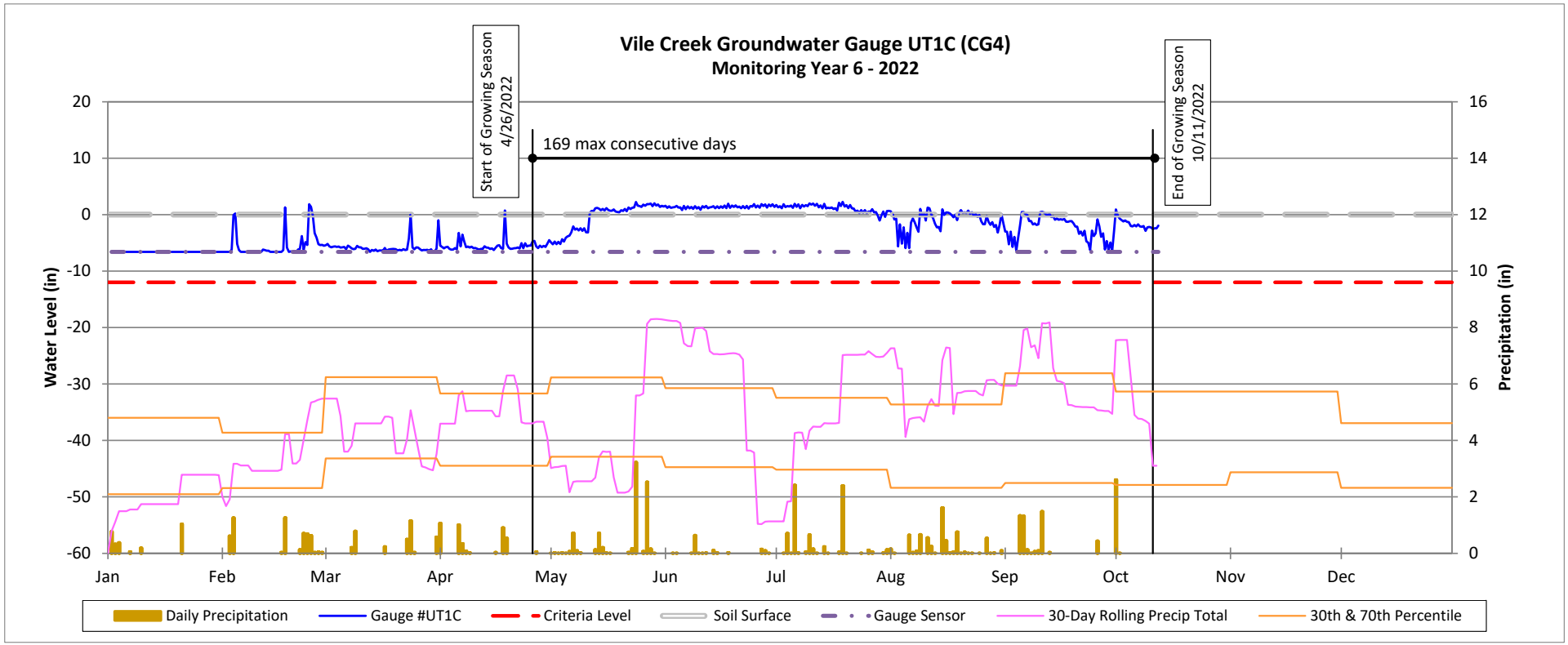


Groundwater Gauge Plot

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 6 - 2022

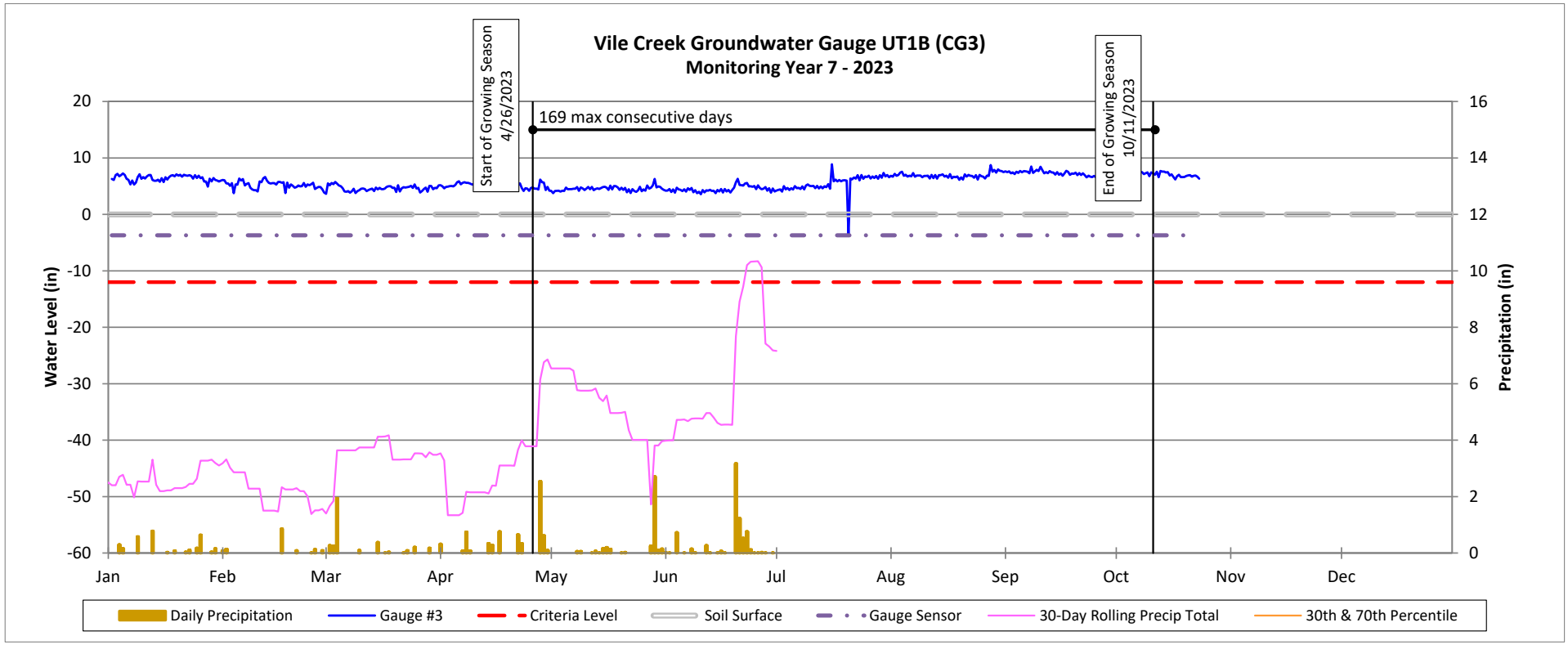


Groundwater Gauge Plot

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 7 - 2023

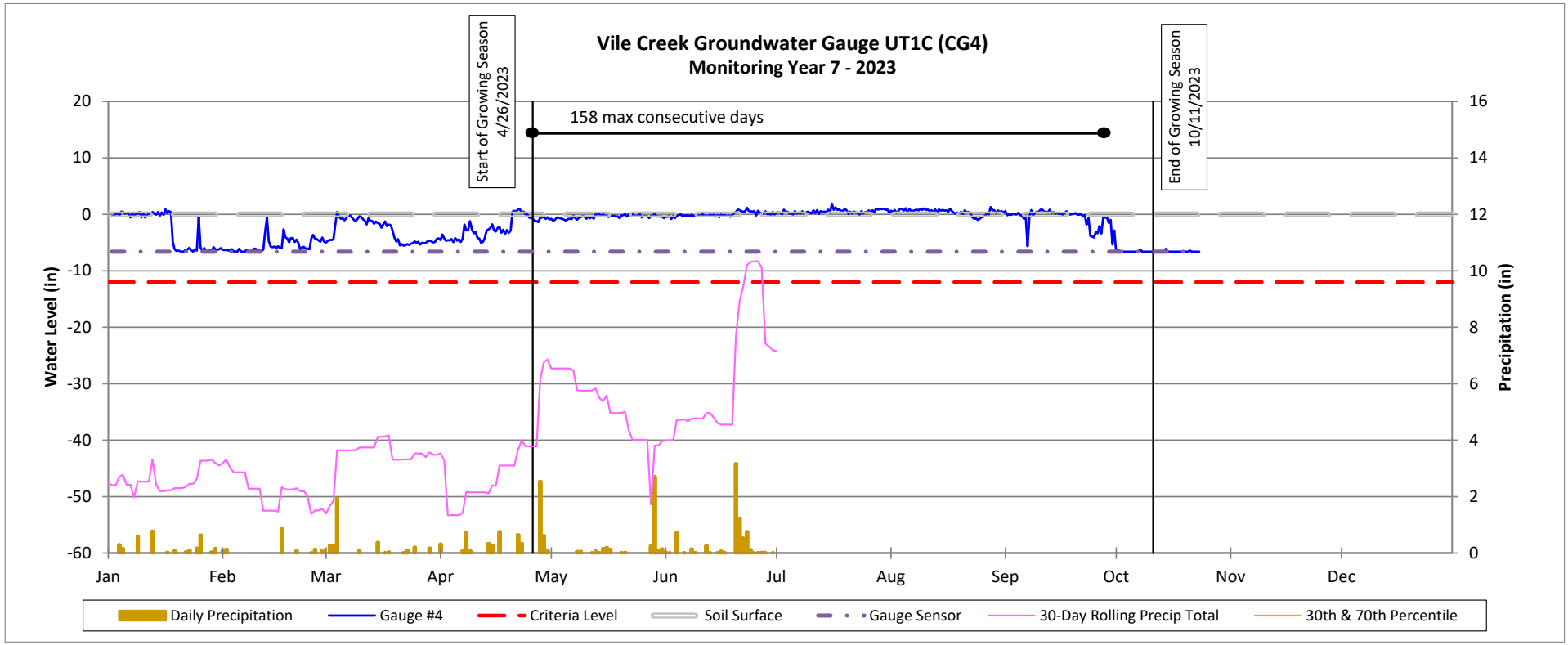


Groundwater Gauge Plot

Vile Creek Mitigation Site

DMS Project No. 96582

Monitoring Year 7 - 2023



Wetland Data Sheets

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 7/20/2023
Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP1
Investigator(s): Jess Waller Section, Township, Range:
Landform (hillside, terrace, etc.): seep Local relief (concave, convex, none): concanve Slope (%): 2-8%
Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 36.505859 Long: -81.105898 Datum: NAD83
Soil Map Unit Name: CaF- Chandler silt loam 25-45% slopes & TaD- Tate Loam 10-25% slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:
Data point collected in formerly aggraded stream now wetland area. Defined channel is lost further upslope and numerous rills and sheetflow are present across the wetland. The USACE Antecedent Precipitation Tool indicates that the site experienced normal conditions in the 2 months leading up to the sampling date and wetter than normal conditions at the time of sampling. Data point is representative of Wetland A23.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Platanus occidentalis*	2	No	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	2 =Total Cover		
50% of total cover: 1	20% of total cover: 1		
Herb Stratum (Plot size: 5)			
1. *Scirpus expansus*	65	Yes	OBL
2. *Leersia oryzoides*	15	No	OBL
3. *Impatiens capensis*	5	No	FACW
4. *Vernonia noveboracensis*	5	No	FAC
5. *Solidago rugosa*	3	No	FAC
6. *Persicaria sp.*	3	No	FAC
7. *Carex sp.*	2	No	FAC
8. *Persicaria sagittata*	2	No	OBL
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	82	x 1 =	82
FACW species	7	x 2 =	14
FAC species	13	x 3 =	39
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	102 (A)		135 (B)

Prevalence Index = B/A = 1.32

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
1-6	2.5Y 3/2	100					Loamy/Clayey	
6-12	2.5Y 4/1	98	10YR 4/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 7/20/2023
Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP2
Investigator(s): Jess Waller Section, Township, Range:
Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): none Slope (%): 10-20%
Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 36.505821 Long: -81.105940 Datum: NAD83
Soil Map Unit Name: CaF- Chandler silt loam, 25-45% slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Data point collected on upland hillside adjacent to Wetland A23. The USACE Antecedent Precipitation Tool indicates that the site experienced normal conditions in the 2 months leading up to the sampling date and wetter than normal conditions at the time of sampling.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Solidago rugosa*	98	Yes	FAC
2. *Vernonia noveboracensis*	2	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	98	x 3 =	294
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		298 (B)

Prevalence Index = B/A = 2.98

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/6	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 7/20/2023
Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP3
Investigator(s): Jess Waller Section, Township, Range:
Landform (hillside, terrace, etc.): seep Local relief (concave, convex, none): concave Slope (%): 2-5%
Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 36.506721 Long: -81.103886 Datum: NAD83
Soil Map Unit Name: TaD- Tate Loam, 10-25% NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Data point collected in formerly aggraded stream now wetland area. Defined channel is lost further upslope and numerous rills and sheetflow are present across the wetland. The USACE Antecedent Precipitation Tool indicates that the site experienced normal conditions in the 2 months leading up to the sampling date and wetter than normal conditions at the time of sampling. Data point is representative of Wetland B23.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Juncus effusus*	60	Yes	FACW
2. *Scirpus expansus*	15	No	OBL
3. *Carex sp.*	10	No	FAC
4. *Impatiens capensis*	5	No	FACW
5. *Solidago rugosa*	5	No	FAC
6. *Vernonia noveboracensis*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	70	x 2 =	140
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/1	98	10YR 5/8	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 7/20/2023
Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP4
Investigator(s): Jess Waller Section, Township, Range:
Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): none Slope (%): 2-5%
Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 36.506729 Long: -81.103854 Datum: NAD83
Soil Map Unit Name: TaD- Tate Loam, 10-25% slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Data point collected on upland hillside adjacent to Wetland B23. The USACE Antecedent Precipitation Tool indicates that the site experienced normal conditions in the 2 months leading up to the sampling date and wetter than normal conditions at the time of sampling.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Betula nigra*	5	Yes	FACW
2. *Platanus occidentalis*	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Herb Stratum (Plot size: 5)			
1. *Solidago rugosa*	70	Yes	FAC
2. *Festuca sp.*	10	No	FAC
3. *Dichanthelium clandestinum*	10	No	FAC
4. *Solanum carolinense*	5	No	FACU
5. *Sorghum halepense*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	90	x 3 =	270
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	110 (A)		330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
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- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Photo Log
Stream and Wetland Reassessment

Photo 1 – UT1B Wetland A23 (07/20/2023)

Photo 2 - UT1B Wetland A23 upland (07/20/2023)

Photo 3 – UT1B Wetland A23 soil sample (07/20/2023)

Photo 4 - UT1B Wetland A23 upland soil sample (07/20/2023)

Photo 5 – UT1B current stream (07/20/2023)

Photo 6 – UT1B GWG (04/20/2023)

Photo 7 – UT1C Wetland B23 (07/20/2023)

Photo 8 - UT1B Wetland B23 upland (07/20/2023)

Photo 9 - UT1C Wetland B23 soil sample (07/20/2023)

Photo 10 - UT1B Wetland B23 upland soil sample (07/20/2023)

Photo 11 – UT1C current stream (07/20/2023)

Photo 12 – UT1C GWG (04/20/2023)

WILDLANDS
ENGINEERING

MEETING NOTES

MEETING:	IRT Site Walk **VILE CREEK Mitigation Site** New River Basin 05050001; Alleghany County, NC DEQ Contract No. 5999 DMS Project No. 96582 USACE ID No.: 2014-01585 DWR No.: 14-0869 Wildlands Project No. 005-02147
DATE:	Thursday, June 24, 2021, 8:30 am to 12 pm
LOCATION:	Sparta Alleghany County, NC

Attendees

Todd Tugwell, USACE
Kim Browning, USACE
Casey Haywood, USACE
Erin Davis, NC DWR
Andrea Leslie, NC WRC
Paul Wiesner, NC DMS
Melonie Allen, NC DMS
Jeff Keaton, Wildlands Engineering
Kristi Suggs, Wildlands Engineering
Jordan Hessler, Wildlands Engineering

Meeting Notes

1. Jeff Keaton began the meeting with an overview of the project.
2. The group decided to shuttle up to the top of Vile Creek Reach 1 to start the site walk. The group briefly stopped to examine and discuss the existing BMP. IRT members expressed a minor concern the BMP has an existing cattail population and wildlands should consider removing or reducing it. The headcut at the inlet to the BMP was discussed. Although it didn't seem to be a priority to the IRT, Jeff said Wildlands would add some rock to stabilize it.
3. The group continued the tour at the top of Vile Creek Reach 1.
4. IRT members asked about the Bog vegetation criteria. Wildlands explained it was a visual assessment based on percent coverage of herbaceous vegetation in bog vegetation plots.
5. Erin Davis and others discussed the tree density in the riparian tree zone on Vile Creek Reach 1. Due to Vile Creek being cold stream credits, denser woody vegetation is expected to shade the stream, especially along the top of bank. This area should be shown as a problem area in the MY5 monitoring

report. Supplemental planting of containerized trees should be completed during the next dormant season. Note: Vile Creek Reach 1 only has trees planted withing the first ten feet from the top of the streambanks. Beyond that zone, shrubs were planted except in the bog areas, which were planted with herbaceous vegetation. A description of the planting zones and a detailed map are included in the mitigation plan.

6. The group continued to walk down the right floodplain of Vile Creek Reach 1 and moved on to the right bank of Vile Creek Reach 2 and UT1 Reach 2.
7. The group reviewed the newly planted trees. Jeff explained that the tree cones were used to prevent deer browse. When these new trees were planted, a pepper pellet was also placed beneath the root ball which gives the leaves and branches a bad taste, also to discourages deer browse. It was determined the tree cones protecting the newly planted trees from deer browse were not readily biodegradable and should be removed by closeout.
8. Jordan and Kristi asked for input of method of monitoring newly planted trees. Erin discussed the possibility of running transects through the planted areas to determine planting success. Wildlands will consider if adding the transect is the best approach. Wildlands will continue to monitor the vegetation plots in MY5, MY6, and MY7. If the vegetation plots are not trending towards success Wildlands will add a year of vegetation monitoring.
9. The group walked up the left floodplain of UT1 Reach 2 and stopped to discuss the aggradation on UT1C. Todd Tugwell and others determined the lower section was functioning as a linear wetland feature rather than a stream. If this trend continues to close out this stream and UT1B (which is in a similar situation) will be credited as wetlands. The portions of UT1C and UT1B that are functioning as wetlands will be tracked in linear footage in the MY5, MY6, and MY7 monitoring reports to determine if the wetlands areas are increasing or decreasing. An additional photo point in each of these reaches will be added in the MY5-MY7 reports as well. Wildlands believes these areas will meet the wetland performance standards for hydrology and vegetation. Wildlands installed stream gages at the baseline for internal data collection that can be used to verify the hydrology performance standard. The vegetation will be visually monitored. At MY7 Wildlands will verify the jurisdictional limits of UT1C and UT1B and include it in the monitoring report. Wildlands will coordinate with the IRT and DMS prior to closeout to determine the mitigation approach, credit ratios, and acreage of these wetlands so that the appropriate amount of wetland credit can be added to the site and the necessary amount of stream credit can be removed.
10. The group decided not to continue up and see UT1 Reach 1. The section of channel that naturally realigned itself and left an oxbow on UT1 Reach 1 was discussed. IRT decided they did not need to see the stream realignment. However, they want Wildlands to add a photo point to the monitoring report to document its stability over time.
11. Next the group walked Vile Creek Reach 2 and discussed the stream banks that have eroded and sill structures that have failed. After a review of all three banks and the structures, the IRT determined Wildlands will need to repair these areas. The repairs will be completed in MY5 and documented in the MY5 monitoring report. A map showing the locations of the repairs is attached.
12. IRT members noted treatment is needed for many small patches of multiflora rose throughout the site.
13. The site review continued to Vile Creek reach 3. IRT members expressed concern about the bare bank along the overflow channel. Wildlands will stabilize the erosion on the bank and replant this area with bare roots to establish woody vegetation. The repairs will be completed in MY5 and documented in the MY5 monitoring report. A map showing the locations of the repair is attached.
14. Concern was expressed over the lack of woody vegetation on the left bank of Vile Creek Reach 3. IRT suggested Wildlands supplementally plant the area if additional planting is done on the project.

15. The final stream the group reviewed was UT3. There was discussion that understory planting was not done along this reach. However, understory planting was done along this reach and the right floodplain of Vile Creek Reaches 2 and 3. Species planted included spicebush, winter berry, red chokeberry, and American hornbeam.
16. Part of the group tried to find one of the known Gray's Lily locations but couldn't find it. Wildlands will go back and resurvey during peak blooming time in June and July of MY6 to try both instances of the Gray's Lily on site.
17. There was a summary discussion at the end of the site review. The key points included:
    - Wildlands will repair the lower end of Vile Creek Reach 2 including bank repairs and repair/replace log sills and a boulder sill (see attached map).
    - Wildlands will plant bare spots along Vile Creek Reach 1 to provide shade for cold water stream habitat. The planting density will be 200 trees per acre, the plants will be 1-gallon containerized plants, and the likely species to be planted include persimmon, sycamore, tag alder, American basswood, and black cherry. The last two are deviations from the planting plan in the approved mitigation plan and need approval of the IRT before planting begins. Live stakes may also be planted on the stream banks. These will be species from the approved mitigation plan planting list but may also include black willow, if approved.
    - Wildlands will not repair UT1b and UT1c where they have filled in. These areas will likely be converted to wetland credits at closeout. Additional monitoring to be performed for MY5-MY7 is discussed in item #9 above.
    - Wildlands will treat invasives on the project site including multiflora rose, Chinese privet, and Japanese barberry.
    - As a follow-up to the discussion of cattails in the BMP at the top of UT2, Wildlands' position on this issue is that the cattails are not negatively affecting the performance of the BMP. So, at this time, we are not planning to treat cattails on the site unless IRT members inform us of a strong preference to treat them.
    - Wildlands will perform supplemental planting along the left bank of Vile Creek Reach 3 during the next dormant season.
    - The IRT noted that if the repairs and supplemental planting were completed in in MY5 (2021), MY6 and MY7 should be sufficient to close the site and additional monitoring would not be required. This is contingent upon the repairs and supplemental planting showing success during the remaining 2-year monitoring term. The MY5-MY7 monitoring reports will discuss the success of the repairs and supplemental plantings.
    - The IRT members agreed to release the MY4 (2020) credits as proposed.

Attachments:

1. Repair Plan Map
2. MY4 Project Components Map