

MONITORING YEAR 4 ANNUAL REPORT

FINAL

CANDY CREEK MITIGATION SITE

Guilford County, NC
NCDEQ Contract 5794
NCDMS Project Number 96315
USACE Action ID Number 2015-01209
DWR Project Number 14-0334
RFP Number 16-005568

Data Collection Period: March - October 2020
Final Submission Date: February 10, 2021

PREPARED FOR:



NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC27699-1652

Mitigation Project Name	Candy Creek Stream Mitigation Site	USACE Action ID	2015-01209
DMS ID	96315	DWR Permit	2014-0334
River Basin	Cape Fear	Date Project Instituted	2/21/2014
Cataloging Unit	03030002	Date Prepared	4/20/2020
County	Guilford	Stream/Wet. Service Area	Cape Fear 03030002

Todd J. [Signature] 9/21/2020

Signature & Date of Official Approving Credit Release

- 1 - For NCDMS, no credits are released during the first milestone
- 2 - For NCDMS projects, the initial credit release milestone occurs automatically when the as-built report (baseline monitoring report) has been made available to the IRT by posting it to the DMS portal, provided the following have been met:
 - 1) Approved of Final Mitigation Plan
 - 2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.
 - 3) Completion of all physical and biological improvements to the mitigation site pursuant to the mitigation plan.
 - 4) Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.
- 3 - A 10% reserve of credits is to be held back until the bankfull event performance standard has been met.

Credit Release Milestone	Warm Stream Credits						
	Scheduled Releases %	Proposed Releases %	Proposed Released #	Not Approved # Releases	Approved Credits	Anticipated Release Year	Actual Release Date
1 - Site Establishment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 - Year 0 / As-Built	30.00%	30.00%	4,651.940	0.000	4,651.940	2017	6/7/2017
3 - Year 1 Monitoring	10.00%	10.00%	1,550.647	0.000	1,550.647	2018	4/25/2018
4 - Year 2 Monitoring	10.00%	10.00%	1,550.647	0.000	1,550.647	2019	4/26/2019
5 - Year 3 Monitoring	10.00%	10.00%	1,550.647	0.000	1,550.647	2020	4/20/2020
6 - Year 4 Monitoring	5.00%					2021	
7 - Year 5 Monitoring	10.00%					2022	
8 - Year 6 Monitoring	5.00%					2023	
9 - Year 7 Monitoring	10.00%					2024	
Stream Bankfull Standard	10.00%						
			Totals	0.000	9,303.881		

Total Gross Credits	15,506.467
Total Unrealized Credits to Date	0.000
Total Released Credits to Date	9,303.881
Total Percentage Released	60.00%
Remaining Unreleased Credits	6,202.586

Project Quantities

Mitigation Type	Restoration Type	Physical Quantity
Warm Stream	Restoration	12,774.000
Warm Stream	Enhancement I	2,023.000
Warm Stream	Enhancement II	2,133.000
Warm Stream	Preservation	2,653.000

Notes

Contingencies (if any)

Mitigation Project Name Candy Creek Stream Mitigation Site
DMS ID 96315
River Basin Cape Fear
Cataloging Unit 03030002
County Guilford

USACE Action ID 2015-01209
DWR Permit 2014-0334
Date Project Instituted 2/21/2014
Date Prepared 4/20/2020
Stream/Wet. Service Area Cape Fear 03030002

Debits

							Stream Restoration Credits	Stream Restoration Equivalent Credits
Beginning Balance (mitigation credits)							14,975.867	530.600
Released Credits							8,985.521	318.360
Unrealized Credits							0.000	0.000
Owning Program	Req. Id	TIP #	Project Name	USACE Permit #	DWR Permit #	DCM Permit #		
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		1,497.587	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		3,639.000	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		404.600	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		255.960	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		1,277.590	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		134.867	
NCDOT Stream & Wetland ILF Program	REQ-006028	U-2525B U-2525C	Greensboro Eastern Loop	2005-21386	2013-0918		85.320	
NCDOT Stream & Wetland ILF Program	REQ-006413		SR 2158 - Bridge 85 - Division 7	2015-01791	2015-0819		64.010	
NCDOT Stream & Wetland ILF Program	REQ-006474		SR 2363 - Bridge 146 - Division 7	2015-02553			92.000	
NCDOT Stream & Wetland ILF Program	REQ-008126	U-2524C U-2524D	Greensboro Western Loop	2001-21125	2013-0223		37.000	
NCDOT Stream & Wetland ILF Program	REQ-007429	U-4734	Kernersville - Macy Grove Rd Extension	2009-02019	2017-1466			53.060
NCDOT Stream & Wetland ILF Program	REQ-007429	U-4734	Kernersville - Macy Grove Rd Extension	2009-02019	2017-1466			212.240
Total Credits Debited							7,487.934	265.300
Remaining Available balance (Released Credits)							1,497.587	53.060
Remaining balance (Unreleased Credits)							5,990.346	212.240

PREPARED BY:



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Charlotte, NC 28203

Phone: 704.332.7754
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February 10, 2021

Kelly Phillips
Project Manager
NCDEQ – Division of Mitigation Services
232 State Park Road
Troutman, NC 28166

RE: **Draft Monitoring Year 4 Report Comments
Candy Creek Mitigation Site (DMS #96315)**
Cape Fear River Basin 03030002, Guilford County
Contract No. 005794

Dear Mr. Phillips:

Wildlands Engineering, Inc. (Wildlands) has reviewed the Division of Mitigation Services (DMS) comments from the Draft Monitoring Year 4 report for the Candy Creek Mitigation Project. The report has been updated to reflect those comments. DMS' comments and observations from the report are listed below and noted in **bold**. Wildlands' response to those comments are noted in *Italics*.

DMS' comment: Cover Sheet: Please add the RFP # to the cover sheet.

Wildlands' response: The RFP Number (16-005568) has been added to the cover sheet.

DMS' comment: Section 1.0 Executive Summary: Please identify the thermal regime (warm) in the project summary information.

Wildlands' response: The text has been updated to reflect that the Site is expected to generate "(warm) Stream Mitigation Units".

DMS' comment: Section 1.2.5.1 Stream Assessment: Add a reference to the Area of Concern Photograph showing the sediment deposition in UT5.

Wildlands' response: The text has been updated to reference the Areas of Concern Photograph in Appendix 2 for the sedimentation observed on UT5.

DMS' comment: Section 1.2.5.2 Vegetative Assessment: Add a reference to the CCPV figures showing the mowing encroachments discussed at the end of this section.

Wildlands' response: The text has been updated to reference the specific CCPV Figures depicting the three areas of encroachment (Figures 3.1 and 3.5 of Appendix 2).

DMS' comment: Appendix 1, Table 2 - Project Activity and Reporting History: Include the easement signage installed during MY4 as a project activity in Table 2 and call out the locations on the CCPV figures.

Wildlands' response: As mentioned in Section 1.2.6: Adaptive Management Plan, additional signage was installed during a prior monitoring year (clarified to MY3), and additional signage may also be installed in the future; however, no signage was added during MY4. The Appendix 1 Table 2 was updated to reflect that an additional easement marker was installed in September 2019, and the location of the new sign was added to the CCPV Figure 3.1.



DMS' comment: Digital files:

- a. **The feature for UT2A in the DMS geodatabase has a length of 376 ft, but the Restoration Footage/Acreage column of the asset table reports a length of 353 ft. Please resubmit a set of stream features that accurately characterize the length of UT2A.**

Wildlands' response: The Enhancement I portion of UT2A in the GIS dataset was corrected to the As-Built survey length of 353 ft. The figures 2, 3.0, and 3.4 now reflect this correction.

- b. **The stream problem area and encroachment features include a monitoring year field, and have the prior monitoring year's features included, but some of these entries were not attributed. If you include multiple monitoring years' worth of data in the submission, please make sure the monitoring year field is attributed, and resubmit.**

Wildlands' response: The GIS dataset was updated. Where previous monitoring years were referenced in the attribute table, these attributes were removed to avoid confusion. The attribute tables now include an updated "MY" field with a value of only "MY4" to reflect that all features were present during MY4. The following layers are now corrected: Areas of Concern Points, Easement Encroachment, Stream Problem Areas, and Vegetation Problem Areas.

- c. **Photos were only included up to photo point 30. Please include all of the photos used for monitoring.**

Wildlands' response: All photo point and area of concern photos have been included in the updated, Final MY4 digital files for Candy.

Enclosed please find two (2) hard copies and one (1) electronic pdf copy of the Final Monitoring Report on CD along with the updated digital files. Please contact me at 704-332-7754 x110 if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Kristi Suggs".

Kristi Suggs
Senior Environmental Scientist
ksuggs@wildlandseng.com

EXECUTIVE SUMMARY

Wildlands Engineering Inc. (Wildlands) implemented a full delivery project at the Candy Creek Mitigation Site (Site) for the North Carolina Division of Mitigation Services (NCDMS) to restore, enhance, and preserve a total of 19,583 linear feet (LF) of perennial and intermittent streams, in Guilford County, NC. The Site is expected to generate approximately 15,507 (warm) Stream Mitigation Units (SMUs) through the restoration, enhancement, and preservation of Candy Creek and nine unnamed tributaries (Table 1).

The Site is located northeast of the Town of Brown Summit within the NCDMS targeted local watershed for the Cape Fear River Basin Hydrologic Unit Code (HUC) 03030002010020 and NC Division of Water Resources (DWR) Subbasin 03-06-01 (Figure 1) and is being submitted for mitigation credit in the Cape Fear River Basin HUC 03030002. The Site is located within the Haw River Headwaters Watershed, which is part of NCDMS' Cape Fear River Basin Restoration Priorities (RBRP). While Candy Creek is not mentioned specifically, this document identifies restoration goals for all streams within HUC 03030002; reducing sediment and nutrient pollution to downstream Jordan Lake is a primary goal of the RBRP as stated in the Jordan Lake Nutrient Management Strategy (NCDENR, 2005). The Haw River Watershed was also identified in the 2005 NC Wildlife Resources Commission's Wildlife Action Plan as a priority area for freshwater habitat conservation and restoration to protect rare and endemic aquatic fauna and enhance species diversity. No rare and endemic aquatic species have been documented onsite or are proposed for re-establishment onsite as part of the project. The Wildlife Action Plan calls for "support of conservation and restoration of streams and riparian zones in priority areas (acquisition, easements, and buffer)." Restoration at the Site directly and indirectly addressed these goals by excluding cattle from the stream, creating stable stream banks, restoring a riparian corridor, and placing land historically used for agriculture under permanent conservation easement.

The project goals established in the Mitigation Plan (Wildlands, 2016) were to provide ecological enhancement and mitigate site water quality stressors that will benefit the receiving waters in the Cape Fear River Basin. This will primarily be achieved by creating functional and stable stream channels, increasing and improving the interaction of stream hydrology within the riparian zone, and improving floodplain habitat and ecological function. This will also be achieved by restoring a Piedmont Bottomland Forest community as described by Schafale and Weakley (1990) along the stream reaches within open pastures. With careful consideration of goals and objectives that were described in the RBRP, the following project goals were established:

- Reduce in-stream water quality stressors resulting in enhanced habitat and water quality in riffles and pools.
- Construct stream channels that are laterally and vertically stable resulting in a network of streams capable of supporting hydrologic, biologic, and water quality functions.
- Improve on-site habitat by diversifying and stabilizing the stream channel form; installing habitat features such as undercut logs, brush toe, wood and stone-based riffles; and by establishing native stream bank vegetation and shading where none exists.
- Exclude cattle from project streams resulting in greater treatment and reduction of overland flow and landscape derived pollutants including fecal coliform, nitrogen, and phosphorus.
- Increase and improve hydrologic connectivity between streams and their riparian floodplains; promote temporary water storage and wetland and floodplain recharge during high flows; increase groundwater connectivity within floodplains and wetlands; promote nutrient and carbon exchange between streams and floodplains and reduce shear stress forces on channels during larger flow events.



The Site construction and as-built surveys were completed between July 2016 and March 2017, respectively. A conservation easement was recorded on 61.74 acres to protect the restored riparian corridor in perpetuity. Maintenance measures were implemented between 2017 and 2020. Monitoring Year (MY) 4 assessments and site visits were completed between May and October 2020 to assess the conditions of the project. Per IRT guidelines, detailed monitoring and analysis of vegetation and channel cross-sectional dimensions were omitted during MY4. Visual observations, hydrology data, and management practices are included in this report. To preserve clarity and continuity of reporting structure, this report maintains section and appendix numbering from previous monitoring reports. Omitted sections are denoted in the table of contents.

Overall, the majority of the Site has met the required stream, vegetation, and hydrology success criteria for MY4, and is on track to meet in MY5 and MY7.

Stream problem areas throughout the Site are minimal. Erosional areas, where present, are located along outer meander bends, behind lunker logs, at the tie-ins of in-stream structures, or as scour lines below vegetated tops of bank. Areas of in-stream aggradation were also noted on UT5 and in isolated areas throughout the project Site. Remedial action for these areas will be conducted as outlined in the Adaptive Management Section of the report, if deemed necessary.

The stream hydrology assessment criteria of having at least two bankfull events in separate monitoring years for each reach has been met. The stream flow gage established on the upstream, intermittent section of UT1D continues to meet and exceed the minimum 30 consecutive day hydrologic baseflow criteria.

Areas of invasive species were treated between 2017 and 2020 and currently make up approximately 1.8% of the total easement area. Overseeding and soil amendments reduced the size of bare herbaceous areas within the planted riparian zone. During MY4, three areas of mowing encroachment were documented along Candy Creek Reaches 1 and 3. The resident beaves and the two beaver dams documented in MY3 on Candy Creek Reach 4 were removed during MY4.

CANDY CREEK MITIGATION SITE
Monitoring Year 4 Annual Report

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*Content not required for Monitoring Year 4

Section 1: PROJECT OVERVIEW

The Site is located in Guilford County northeast of the Town of Brown Summit, off of Old Reidsville Road and Hopkins Road (Figure 1). The project watershed is primarily comprised of agricultural and forested land. The drainage area for the Site is 937 acres.

The project streams consist of Candy Creek and its unnamed tributaries (UT1, UT2, UT2A, UT2B, UT3, UT4, UT5, and UT5A). Stream restoration reaches included Candy Creek (Reach 1, 2, and 4), upper UT1C, UT1D, UT2 (lower Reach 1), lower UT3, UT4, and lower UT5. Stream enhancement (Level I and II) activities were utilized for Candy Creek Reach 3, UT2 (upper Reach 1 and Reach 2), UT2A, and UT2B. The intact and functional reaches associated with lower UT1C, upper UT3, and UT5A were preserved with the implementation of the conservation easement. The riparian areas along the restoration and enhancement reaches were planted with native vegetation to improve habitat and protect water quality.

Construction activities were completed by Land Mechanic Designs, Inc. in March 2017. Planting and seeding activities were completed by Bruton Natural Systems, Inc. in March 2017. A conservation easement has been recorded and is in place on 61.74 acres. The project is expected to generate approximately 15,507 (warm) SMUs. Annual monitoring will be conducted for seven years with the close-out anticipated to commence in 2023 given the success criteria are met. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

Directions and a map of the Site are provided in Figure 1 and project components are illustrated for the Site in Figure 2.

1.1 Project Goals and Objectives

Prior to construction activities, stream impairments included incised and over-widened channels, bank erosion with areas of mass wasting, historic channelization, floodplain alteration, degraded in-stream habitat, and impoundments. Riparian impairments included clearing and livestock grazing.

The overarching goals of the stream mitigation project are to provide ecological enhancement and mitigate site water quality stressors that will benefit the receiving waters in the Cape Fear River Basin. The Site will treat almost all the headwaters of Candy Creek and 47% of the entire 3.1-square mile Candy Creek watershed before flowing to the Haw River. A primary goal of the NCDMS' Cape Fear River Basin Restoration Priorities (RBRP) is to restore and maintain water quality as stated in the Jordan Lake Nutrient Management Strategy (NCDENR, 2005). The project goals established for the Site were completed with careful consideration of goals and objectives that were described in the RBRP and include the following:

- *Reduce in-stream water quality stressors.* Reconstruct stream channels with stable dimensions. Stabilize eroding stream banks. Add bank protection and in-stream structures to protect restored/enhanced streams.
- *Construct stream channels that are laterally and vertically stable.* 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.
- *Improve on-site habitat.* Construct diverse and stable channel form with varied and self-sustainable stream bedform. Install habitat features such as undercut logs, brush toe, wood and stone-based riffles. Establish native stream bank vegetation and shading where none exists.



- *Exclude cattle from project streams.* Install fencing around the conservation easement adjacent to cattle pastures.
- *Increase and improve the interaction of stream hydrology within the riparian zone to in turn improve floodplain habitat and ecological function.* Reconstruct stream channels with appropriate bankfull dimensions and raise them to the proper depths relative to a functioning floodplain.
- *Restore and enhance native floodplain forest.* Plant native trees and understory species and treat invasive species in the riparian zone.
- *Permanently protect the project Site from harmful uses.* Establish a conservation easement on the Site.

1.2 Monitoring Year 4 Data Assessment

Annual monitoring and quarterly site-visits were conducted during MY4 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 Candy Creek Mitigation Plan (Wildlands, 2016). The stream reaches were assigned specific performance criteria components for stream morphology, hydrology, and vegetation. Performance criteria will be evaluated throughout the seven-year post-construction monitoring period.

1.2.1 Stream Assessment

MY4 is a reduced monitoring year and detailed geomorphologic surveys, sediment collection, or analysis are not required. However, based on field observations during site assessments, site maintenance, and the implementation of land stewardship activities, the majority of the project reaches within the Site continue to remain stable and are functioning as designed. Areas where current and/or former instability or stream functional issues have been noted are discussed in Section 1.2.5, outlined in Tables 5a-5m, and depicted in Figures 3.1 – 3.7.

1.2.2 Stream Hydrology Assessment

At the end of the seven-year monitoring period, two or more bankfull events must have occurred in separate years within the restoration and enhancement I reaches. Seasonal flow must be documented in the intermittent stream (UT1D) at the Site. Under normal rainfall circumstances, the presence of stream flow on intermittent channels must be documented annually for at least 30 consecutive days during the seven-year monitoring period.

In MY3, the site was recorded as only achieving partial attainment of the hydrologic bankfull success criteria. UT1D was listed as the reach hindering the site from meeting this requirement; however, this was a mistake. UT1D is not being monitoring for bankfull flow. It is only being monitored for intermittent base flow; therefore, the site did meet full hydrologic bankfull flow attainment for all the monitored reaches in MY3.

In MY4, all reaches except for UT3 experienced at least one bankfull event during the monitoring year, with multiple occurrences along most reaches. UT1D also met and exceeded the minimum baseflow requirement by maintaining baseflow throughout the entire monitoring period. Currently the site has met the hydrologic bankfull criteria for the site and is on track to meet the intermittent baseflow requirement for UT1D. Refer to Appendix 5 for hydrologic summary data and plots.

1.2.3 Vegetative Assessment

Detailed vegetation inventory and analysis is not required during MY4. However, visual assessment during MY4 indicated that vegetation on the Site overall is performing sufficiently to attain the interim



success criteria of 260 stems per acre by MY5. Planted vegetation must average 10 feet in height in each plot at the end of the MY7.

Desirable volunteer species that have been present for at least two consecutive years and in plots where recorded density rates were low in previous monitoring years were recorded and tagged in MY4. Each volunteer species will be monitored in subsequent monitoring years (MY5 - MY7) and included in the overall density rates and subject to stem height requirements for the associated plots. These species will be documented in the associated plot when vegetation monitoring resumes in MY5. Refer to Appendix 2 for vegetation photographs and the vegetation condition assessment table.

1.2.4 Visual Assessment

An interim Site walk was performed during the spring of 2020 and a final Site walk was performed in October of 2020 to document field conditions. Overall, the majority of the site is stable and functioning as designed. Banks are low and well vegetated; structures are intact; and the channel is actively able to move sediment through the system, minimizing aggradation, and interact with their floodplain to dissipate erosive stream velocities. Riffles are stable and comprised of coarser bed material, while pools are deep and comprised mostly of silts and sands. The riparian buffer is well established with native herbaceous and woody species, while the presence of invasive species populations remains minimal; the conservation easement is intact and encroachments, when noted, are minimal in size and quantity.

However, a few areas of concern were noted during the Site's visual assessment and are described below.

1.2.5 Areas of Concern

At this time, most of the areas of instability or poor performance are either already restabilizing with herbaceous and woody vegetation, self-rectifying, or likely to do so and do not require additional maintenance. However, in areas where intervention is needed, an adaptive management plan is outlined in Section 1.2.6. See Appendix 2 for the visual stability assessment tables, Integrated Current Condition Plan View (CCPV) maps, and reference photographs.

1.2.5.1 Stream Assessment

Bank erosion was observed in isolated pockets along outer meander bends, behind lunker logs, at the tie-ins of in-stream structures, or as scour lines below vegetated tops of bank. Many of the small erosion areas noted in previous years appeared to have stabilized with woody and herbaceous vegetation and stream maintenance conducted during the summer of MY3 and in late winter and early spring of MY4 were effective at addressing any sizable areas of instability throughout the project. Visual assessments in subsequent monitoring years will continue to document these areas of instability.

Areas of existing and new aggradation were also noted during the MY4 site assessment. The new areas of aggradation are located along Candy Creek Reach 2, Reach 3, and UT4. The existing areas of aggradation are located along UT5 and a couple small sections of UT2 Reach 2. The new areas are likely due to in-stream vegetation trapping fines or from downed trees forming a debris jam along the channel, slowing down stream velocities, and backing up water. The area along UT2 Reach 2 was likely caused by floodplain erosion that occurred earlier in the monitoring phase when bare areas along UT2 were more prevalent. It was previously thought that over time UT2 would be able to flush the influx of sedimentation downstream, but recent investigations have determined that the channel has become clogged and discharge velocities are dispersing through the floodplain rather than concentrating in channel to flush out the clogged sediment. Though investigations have been conducted throughout the restoration portion of the reach, as well as cursory reviews of contributing drainage area, no definitive sources for the influx of sedimentation on UT5 have been found. However, it is suspected that an off-



site agricultural field upstream of the preservation portion of UT5 is a contributing factor to the sediment load. The sedimentation occurring along UT5 is shown in the Areas of Concern Photographs in Appendix 2. Section 1.2.6 for adaptive management strategies for these areas of concern.

The two beaver dams and the resident beavers previously documented on Candy Creek Reach 4 during MY3 were removed early in MY4 and have not returned.

1.2.5.2 Vegetative Assessment

On-going invasive treatments, as well as applications of riparian seed and soil amendments in bare areas along the floodplain, have kept the presence of invasive vegetation to a mere 1.8% of the easement area and reduced the size of bare herbaceous areas from 0.8% of the planted acreage in MY3 to 0.2% of the planted area in MY4. As previously stated, the majority of the easement is intact. Areas lacking herbaceous cover and low woody stem density are rare. Invasive species are present but not negatively affecting the establishment of native species, and areas of easement encroachment consist only of mowing overreach and constitute approximately 0.07 acres or 0.1% of the total easement acreage. Additional details from the MY4 vegetative assessment are outlined below and in Table 6 of Appendix 2. Locations of the areas described below are depicted in Figures 3.1 - 3.7.

Areas of low stem density noted in MY3 consisted of 0.6% of the Site. However, upon further investigation of these areas in MY4, it was determined that the areas noted in MY3 were isolated to eight of the forty vegetation plots within the project Site. These recorded low stem densities only reflected the number of planted stems, rather than total woody stem density if volunteers had been included. Therefore, after the MY4 site walk and reassessing the areas noted during MY3 to include volunteers listed on the as-built planting plan, only two areas of low woody stem density was documented within the Site, near vegetation plots 33 and 35. So now, the total low woody stem density constitutes of approximately 0.05 acres or 0.2% of the Site. Table 6 was revised MY4 to correctly reflect these updates.

Volunteers within the project Site, as well as within the monitored plots, include a large number of different species of both desirable and less desirable species. Suitable volunteer species include species listed on either the project's as-built planting list or other similar project planting lists and are present for at least two consecutive years. In order to better reflect the actual woody stem densities within the site, suitable volunteer species located within the eight previously mentioned vegetative plots were tagged and recorded in MY4 for inclusion in subsequent monitoring years. Each volunteer species will be monitored and included in the overall density rates and subject to stem height requirements for the associated plots in MY7. Volunteer species documented include those from the initial planting list, such as river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), and willow oak (*Quercus phellos*). Those documented that were not on the planting list for Candy Creek, but have often been included on comparable project planting lists include: American elm (*Ulmus americana*), elderberry (*Sambucus canadensis*), winged elm (*Ulmus alata*), tulip poplar (*Liriodendron tulipifera*), black willow (*Salix nigra*), black gum (*Nyssa sylvatica*), slippery elm (*Ulmus rubra*), and silky willow (*Salix sericea*).

In MY3, a couple of bare/poor herbaceous cover areas were noted along UT2 and UT2A. In MY4, the area along UT2A has revegetated with herbaceous cover and is no longer of issue; however, the area along UT2, though smaller in size due to on-going maintenance, still persists.

Invasive species present within the conservation easement during MY4 consist of English ivy (*Hedera helix*), Japanese honeysuckle (*Lonicera japonica*), Asian spiderwort (*Murdannia keisak*), water primrose (*Ludwigia hexapetala*), kudzu (*Pueraria montana*), multi-flora rose (*Rosa multiflora*), and tree of heaven (*Ailanthus altissima*). English ivy and Japanese honeysuckle persist primarily in mature forests, while Asian spiderwort and water primrose are present along stream reaches and vernal pools where breaks



in stream shade and canopy species are common. The remainder of the invasive species types are scattered throughout the easement. Locations of noted invasive species are depicted in Figures 3.1 - 3.7.

Three areas of mowing encroachment were documented in October of 2020. Two of the mowing encroachment areas are located on Candy Creek Reach 1, as shown in Figure 3.1 (Appendix 2). The one that is in the left floodplain at the upstream extent of the easement boundary (Stations 100+00-100+60) has existed since 2019, while the other is a small new area along the right floodplain easement boundary (Stations 111+00-113+00). The third encroachment area is shown in Figure 3.5 (Appendix 2). It is located along the left floodplain easement boundary of Candy Creek Reach 3 and just downstream of Hopkins Road (Stations 149+00-150+00). These three areas constitute approximately 0.07 acres, or 0.1% of the total easement acreage.

1.2.6 Adaptive Management Plan

As result of large storm events (precipitation greater than two inches per event) that occurred during the fall of 2018, including the remnants of Hurricane Florence and Michael, a maintenance repair plan was created to stabilize any significant areas of erosion. Most of maintenance repair plan was conducted in March and August of 2019 and consisted of live staking stream banks, trenching live fascines along top of bank, and rebuilding outside meander bends and replanting the banks with established vegetation transplanted from the floodplain. Additional repairs consisting of the same implementation measures were also conducted in late winter and early spring of MY4. These measures were effective at addressing any sizable areas of instability throughout the project while many of the other small erosion areas noted in previous years appeared to have stabilized with woody and herbaceous vegetation and are no longer of issue.

Erosion along the banks of a couple of areas on Candy Creek, which were previously thought to not require and maintenance, have worsened due to multiple large rain events in 2020. These areas include a collapsed structure with bank erosion near Station 136+00 on Candy Reach 2 and an area of bank erosion and one of bank slump on Candy Creek Reach 3. Repairs will restabilize these areas of concern and will be conducted during the winter of 2020.

Aggregational areas noted along Candy Creek Reach 2, Reach 3, and UT4 will be addressed with continued on-site maintenance to treat instream vegetation and the removal of channel debris and downed trees impeding stream flows. The aggradation on UT2 Reach 2 will need to be addressed with the use of hand tools to remove the sediment plug and re-establish instream channel velocities. Any areas of bank or floodplain disturbance due to maintenance activities will be revegetated, as needed. Before a management plan can be established for UT5, Wildlands will need to further investigate the source of the sedimentation into the system. Additional reviews of the drainage area are planned for the winter of 2020 - 2021. Once the sediment source has been determined, an adaptive management plan will be developed for the reach.

Invasive species treatments were conducted in the winter of 2020 and continued intermittently through October. These on-going treatments, both chemical and mechanical, have kept the presence of invasive vegetation to a mere 1.8% of the easement area and will continue to be conducted as needed during the preferred time of year for the target species. Most of the Site which had dense areas of the aquatic plant species such as Asian spiderwort and water primrose were treated during the summer of 2020. Their prevalence was greatly reduced by the time of the Site assessment in October of 2020; however, due to the dense nature of these two species, follow up treatments will be needed in subsequent monitoring years. While chemical treatment of the patch of kudzu along Candy Creek Reach 4 was completed during the end of MY3, mechanical removal of this species continued in 2020 as it reappeared in small numbers. Lastly, a site-wide treatment of tree of heaven and paulownia

populations occurred during MY4. These treatments greatly reduced the coverage of these species as well. However, they will also continue to be monitored to determine if additional treatments are required.

As previously stated in section 1.2.5.2, areas of low herbaceous coverage received an application of soil amendments and were overseeded with a riparian mix in early MY4. This application reduced the size of bare herbaceous areas from 0.8% of the planted acreage in MY3 to 0.2% of the planted area in MY4. Areas of low herbaceous cover will continue to be monitored and additional amendment applications will be conducted as needed.

Though the mowing encroachment areas along the upstream extents of Candy Creek Reach 1 and 3 have been addressed with the property owners in the past and additional signage along Reach 1 was installed in 2019, discussions will continue until the problems are thoroughly resolved. Additionally, the new area located on the easement boundary approximately mid-reach along Candy Creek Reach 1 will be discussed with the property owner. Vegetation growth within these encroachment areas will be subsequently monitored. If additional over-seeding or planting is needed a maintenance plan will be established. Additional signage, easement posts, and horse-tape fencing may also be installed to further discourage these activities from continuing.

1.3 Monitoring Year 4 Summary

The Candy Creek Mitigation Site is on track to meet monitoring success criteria for geomorphology, hydrology, and vegetation performance standards. All reaches except for UT3 experienced at least one bankfull event during the monitoring year, and the Site has met the hydrologic bankfull criteria for the project. UT1D continues to meet and exceed the minimum baseflow requirement for an intermittent stream and is on track to meet the requirement for the Site. Vegetation appears to be performing adequately to attain the MY5 density requirement of 260 stems per acre. Visual assessment surveys indicate that the majority of the site is stable and functioning as intended and the riparian buffer is well vegetated and intact.

Invasive species were treated during MY4 throughout the entire site and have been reduced to approximately 1.8% of the Site. Resident beavers and their dams were removed, and the areas were live-staked. In addition, several areas of stream bank erosion were repaired and replanted. Only a few areas of concern including pockets of invasive plant species, areas of low herbaceous cover and/or stem density, isolated areas of bank scour and/or aggradation, and easement encroachment continued to be documented at the end of MY4. All of which will continue to be monitored and adaptive management will be performed as needed.

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 NCDMS' website. All raw data supporting the tables and figures in the appendices are available from NCDMS upon request.



Section 2: METHODOLOGY

Geomorphic data collection follows the standards outlined in *Stream Channel Reference Site: An Illustrated Guide to Field Techniques* (Harrelson et al., 1994) and in *Stream Restoration: A Natural Channel Design Handbook* (Doll et al., 2003). All Integrated Current Condition Mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using Pathfinder and ArcGIS. 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., 2008). Crest gages were installed in surveyed riffle cross-sections. Hydrologic monitoring instrument installation and monitoring methods are in accordance with the United States Army Corps of Engineers (USACE, 2003) standards.



Section 3: REFERENCES

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- Harrelson, C.C., Rawlins, C.L., Potyondy, J.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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APPENDIX 1. General Figures and Tables

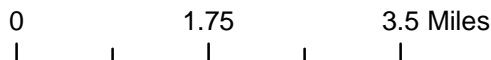
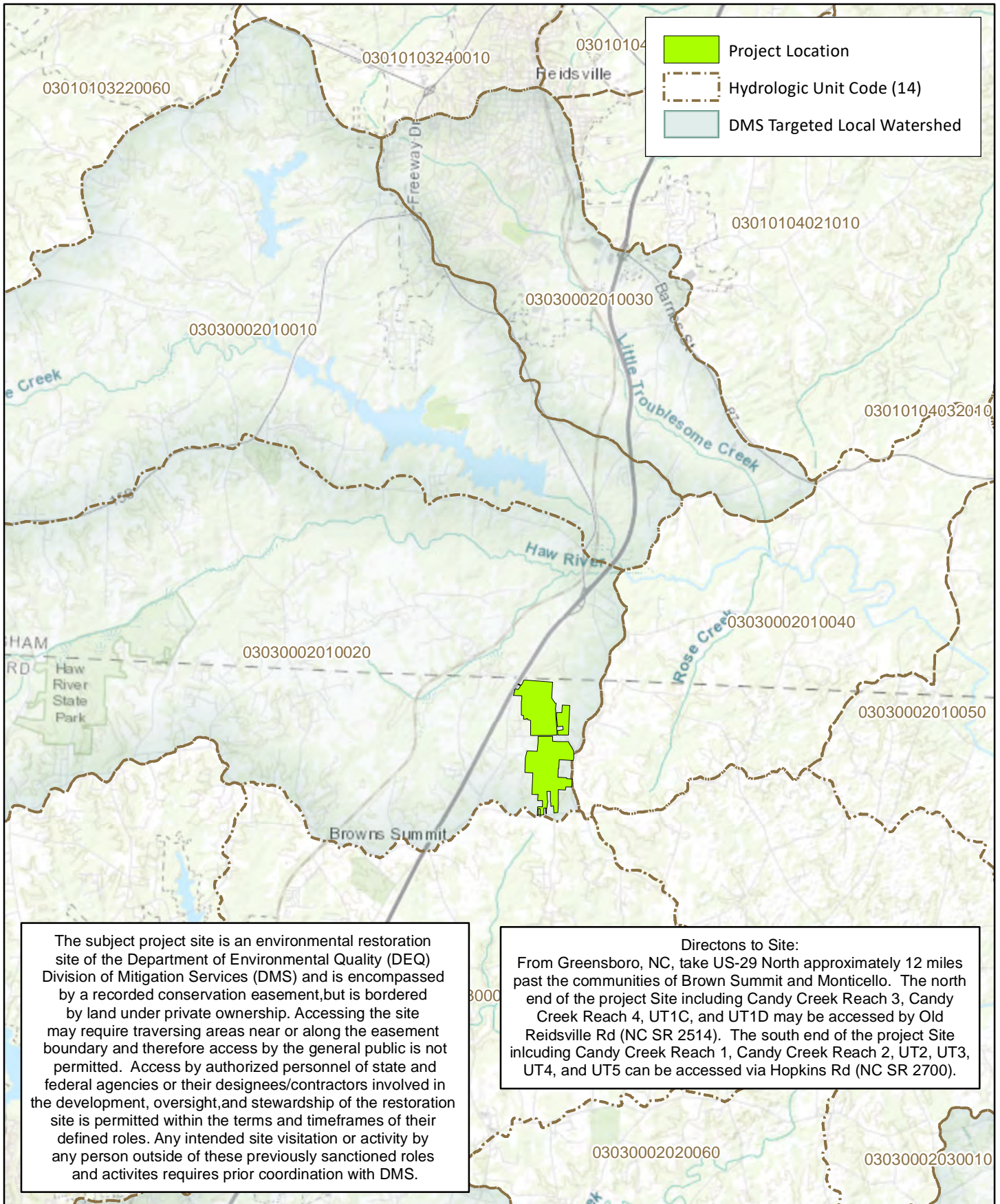


Figure 1 Project Vicinity Map
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC

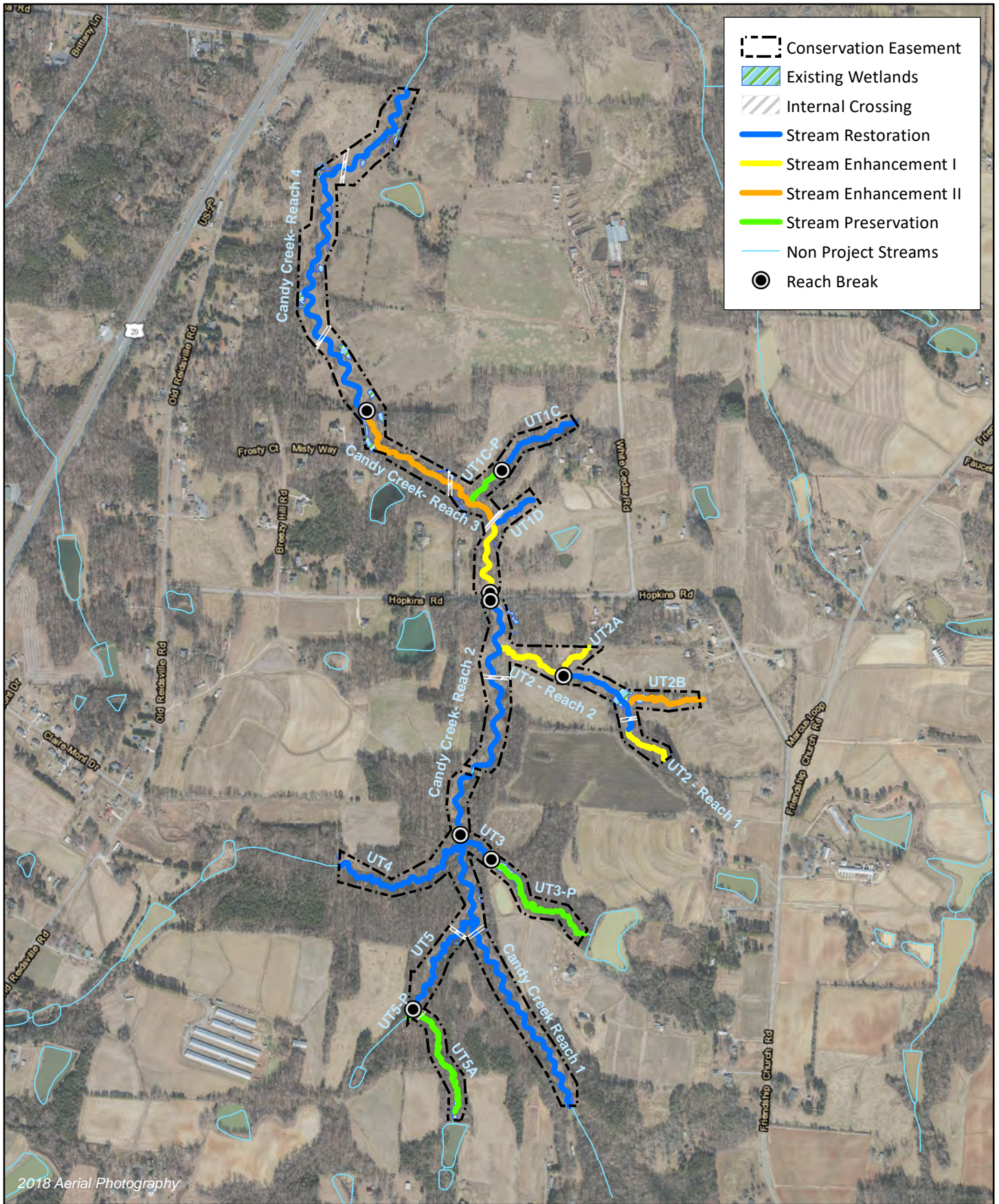


Figure 2 Project Components/Assets Map
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC

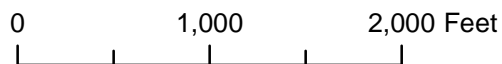


Table 1. Project Components and Mitigation Credits

Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020

Mitigation Credits									
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	14,975.867	530.600	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Reach ID	As-Built Stationing/ Location	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage/ Acreage	Mitigation Ratio	Credits (SMU/WMU)		
STREAMS									
Candy Creek Reach 1	100+08 - 117+19	2,885	P1	Restoration	1,711	1:1	1,711.000		
	117+45 - 126+27		P1	Restoration	882	1:1	882.000		
Candy Creek Reach 2	126+27 - 131+80	2,398	P1	Restoration	553	1:1	553.000		
	132+40 - 141+17		P1	Restoration	877	1:1	877.000		
	141+43 - 148+42		P1	Restoration	699	1:1	699.000		
Candy Creek Reach 3	149+02 - 155+05	2,333	EI	Enhancement	603	1.5:1	402.000		
	155+05 - 155+33		EII	Enhancement	28	2.5:1	11.200		
	155+62 - 160+35		EII	Enhancement	473	2.5:1	189.200		
	160+62 - 170+37		EII	Enhancement	975	2.5:1	390.000		
Candy Creek Reach 4	170+71 - 178+74	3,386	P1	Restoration	803	1:1	803.000		
	179+00 - 196+47		P1	Restoration	1,747	1:1	1,747.000		
	196+68 - 206+35		P1	Restoration	967	1:1	967.000		
UT1C	200+12 - 207+40	551	P1	Restoration	728	1:1	728.000		
UT1C - P	207+40 - 211+38	398	-	Preservation	398	5:1	79.600		
UT1D	250+00 - 253+79	437	P1	Restoration	379	1:1	379.000		
UT2 Reach 1	300+00 - 304+24	940	EI	Enhancement	424	1.5:1	282.667		
	304+24 - 305+01		P1	Restoration	77	1:1	77.000		
	305+26 - 311+88		P1	Restoration	662	1:1	662.000		
UT2 Reach 2	311+88 - 318+31	746	EI	Enhancement	643	1.5:1	428.667		
UT2A	350+84 - 354+37	376	EI	Enhancement	353	1.5:1	235.333		
UT2B	270+28 - 276+85	702	EII	Enhancement	657	2.5:1	262.800		
UT3 - P	400+00 - 411+50	1,150	-	Preservation	1,150	5:1	230.000		
UT3	411+50 - 414+96	729	P1	Restoration	346	1:1	346.000		
UT4	500+49 - 514+05	1,270	P1	Restoration	1,356	1:1	1,356.000		
UT5-P	599+19 - 600+00	81	-	Preservation	81	5:1	16.200		
UT5	600+00 - 607+91	1,297	P1	Restoration	791	1:1	791.000		
	608+16 - 610+12			Restoration	196	1:1	196.000		
UT5A	650+00 - 659+70	1,056	-	Preservation	970	5:1	194.000		
	659+99 - 660+56			Preservation	54	5:1	10.800		

Component Summation						
Restoration Level	Stream (LF)	Riparian Wetland (ac)		Non-Riparian Wetland (ac)	Buffer (sqft)	Upland (ac)
		Riverine	Non-Riverine			
Restoration	12,774	-	-	-	-	-
Enhancement		-	-	-	-	-
Enhancement I	2,023					
Enhancement II	2,133					
Preservation	2,653	-	-	-		

The linear feet associated with the stream crossings were excluded from the computations.

Table 2. Project Activity and Reporting History

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		November 2014	March 2016
Final Design - Construction Plans		July 2016	July 2016
Construction		July 2016 - March 2017	March 2017
Temporary S&E mix applied to entire project area ¹		July 2016 - March 2017	March 2017
Permanent seed mix applied to reach/segments		March 2017	March 2017
Bare root and live stake plantings for reach/segments		March 2017	March 2017
Baseline Monitoring Document (Year 0)	Stream Survey	October 2016 - March 2017	May 2017
	Vegetation Survey	March 2017	
Invasive Species Treatment		September / October 2017	
Year 1 Monitoring	Stream Survey	October 2017	December 2017
	Vegetation Survey	October 2017	
Year 2 Monitoring	Stream Survey	June 2018	November 2018
	Vegetation Survey	August 2018	
Live Staking and Live Facines		March 2019	
Riparian Seeding			
Stream Maintenance		August 2019	
Invasive Species Treatment		September 2019	
Additional Easement marker installed		September 2019	
Year 3 Monitoring	Vegetation Survey	September 2019	December 2019
	Stream Survey	October 2019	December 2019
Stream Maintenance		Jan - May 2020	
Invasive Species Treatment		April - October 2020	
Year 4 Monitoring		October 2020	December 2020
Year 5 Monitoring	Stream Survey		December 2021
	Vegetation Survey		
Year 6 Monitoring			December 2022
Year 7 Monitoring	Stream Survey		December 2023
	Vegetation Survey		

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

Table 3. Project Contact Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Designer Aaron Earley, PE	Wildlands Engineering, Inc. 1430 South Mint Street, Suite 104 Charlotte, NC 28203 704.332.7754
Construction Contractor	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592
Planting Contractor	Bruton Natural Systems, Inc P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592
Seed Mix Sources	Green Resource, LLC
Nursery Stock Suppliers Bare Roots Live Stakes	Dykes and Son Nursery 825 Maude Etter Rd. McMinnville, TN 37110
	Foggy Mountain Nursery 797 Helton Creek Rd. Lansing, NC 28643
	Bruton Natural Systems, Inc.
Monitoring Performers	Wildlands Engineering, Inc.
Monitoring, POC	Kristi Suggs 704.332.7754 ext. 110

Table 4. Project Information and Attributes

Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020

Project Information									
Project Name	Candy Creek Mitigation Site								
County	Guilford County								
Project Area (acres)	61.74								
Project Coordinates (latitude and longitude)	Upstream Project Limits – 36°13'27.27"N, 79°39'37.79"W Downstream Project Limits – 36°14'39.74"N, 79°39'50.46"W								
Project Watershed Summary Information									
Physiographic Province	Inner Piedmont Belt of the Piedmont Physiographic Province								
River Basin	Cape Fear								
USGS Hydrologic Unit 8-digit	03030002								
USGS Hydrologic Unit 14-digit	03030002010020								
DWR Sub-basin	03-06-01								
Project Drainage Area (acres)	937								
Project Drainage Area Percentage of Impervious Area	1%								
CGIA Land Use Classification	66% – Agriculture/Managed Herbaceous; 29% – Forested/Scrubland, 5% - Developed								
Reach Summary Information									
Parameters	Candy Creek Reach 1		Candy Creek Reach 2		Candy Creek Reach 3		Candy Creek Reach 4		
Length of Reach (linear feet) - Post-Restoration	2,593		2,129		2,079		3,517		
Drainage Area (acres)	560		694		809		937		
NCDWR Stream Identification Score	40.5		40.5		45.0		45.0		
NCDWR Water Quality Classification	WS-V (NSW)								
Morphological Description (stream type)	G4c		F5		G4c		G4c		
Evolutionary trend (Simon's Model) - Pre- Restoration	IV		IV		IV		III/IV		
Underlying mapped soils	Clifford Sandy Clay Loam, Codorus Loam, Nathalie Sandy Loam, Poplar Forest Gravelly Sandy Loam								
Drainage class	Well Drained to Somewhat Poorly Drained								
Soil hydric status	Codorus Loam - Hydric								
Slope	---								
FEMA classification	N/A								
Native vegetation community	Piedmont Bottomland Forest								
Percent composition exotic invasive vegetation -Post-Restoration	0%								
Parameters	UT1C	UT1D	UT2	UT2A	UT2B	UT3	UT4	UT5	UT5A
Length of Reach (linear feet) - Post-Restoration	1,126	379	1,806	353	657	1,496	1,356	1,068	1,024
Drainage Area (acres)	28	6	63	15	24	79	190	137	45
NCDWR Stream Identification Score	35.0	27.5	34.5	31.5	31.5	36.5	37.5	31.5	33.5
NCDWR Water Quality Classification	C								
Morphological Description (stream type)	E5b	C5	F5	G5	B5c	G4	G4	F4	N/A
Evolutionary trend (Simon's Model) - Pre- Restoration	III	II/III	III/V	III	III	IV	IV	IV	N/A
Underlying mapped soils	Casville Sandy Loam, Codorus Loam, Nathalie Sandy Loam								
Drainage class	Well Drained to Somewhat Poorly Drained								
Soil hydric status	Codorus Loam - Hydric								
Slope	---								
FEMA classification	N/A								
Native vegetation community	Piedmont Bottomland Forest								
Percent composition exotic invasive vegetation -Post-Restoration	0%								
Regulatory Considerations									
Regulation	Applicable?	Resolved?	Supporting Documentation						
Waters of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No.27 (Action ID# SAW-2015-01209) and DWR 401 Water Quality Certification (letter from DWR dated 5/13/2015).						
Waters of the United States - Section 401	Yes	Yes							
Division of Land Quality (Dam Safety)	No	N/A	N/A						
Endangered Species Act	Yes	Yes	Candy Creek Mitigation Plan; Wildlands determined "no effect" on Guilford County listed endangered species. USFWS responded on April 4, 2014 and stated the "proposed action is not likely to adversely affect any federally listed endangered or threatened species, their formally designated critical habitat or species currently proposed for listing under the Act".						
Historic Preservation Act	Yes	Yes	No historic resources were found to be impacted (letter from SHPO dated 3/24/2014).						
Coastal Zone Management Act (CZMA)/Coastal Area	No	N/A	N/A						
FEMA Floodplain Compliance	No	N/A	N/A						
Essential Fisheries Habitat	No	N/A	N/A						

APPENDIX 2. Visual Assessment Data

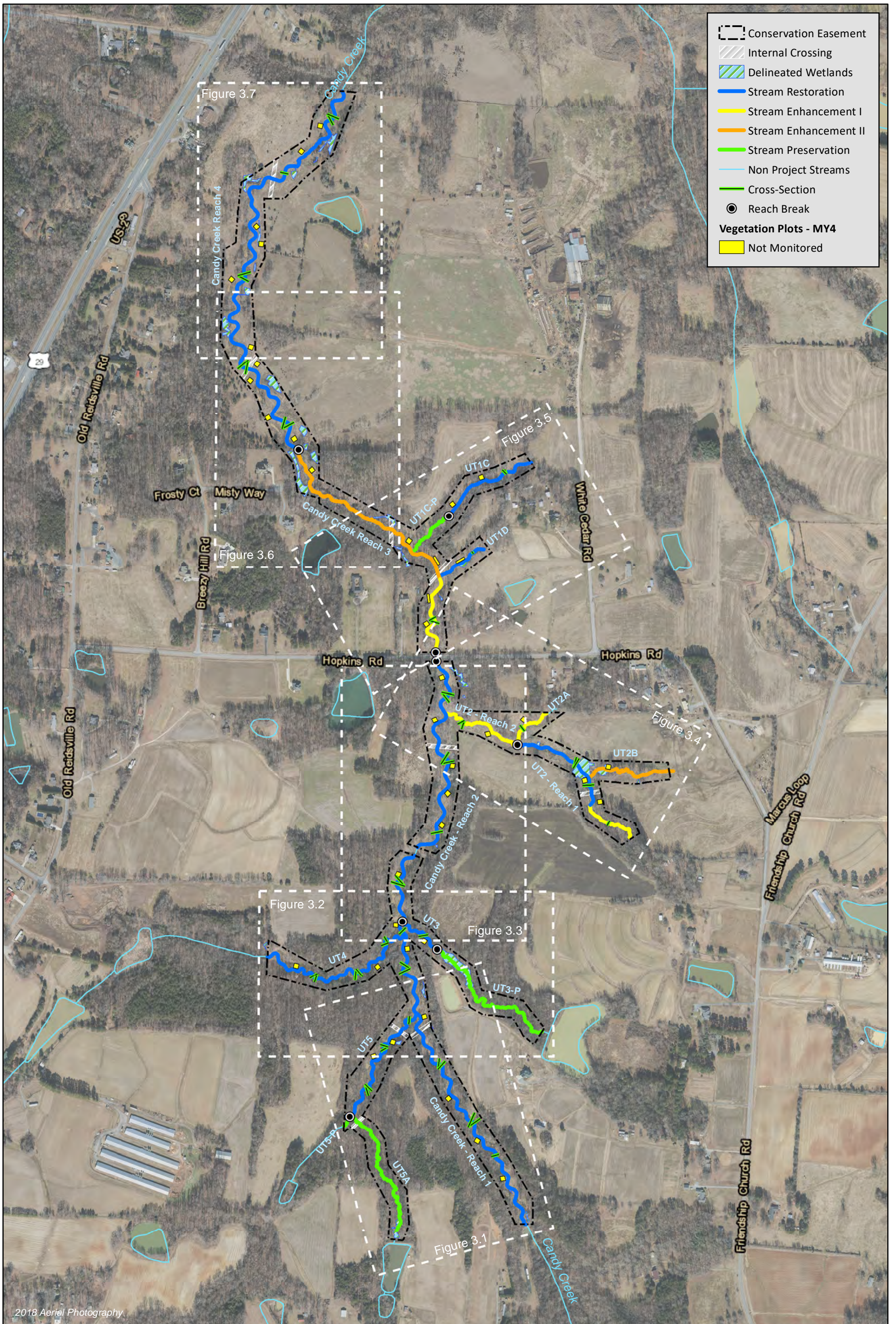
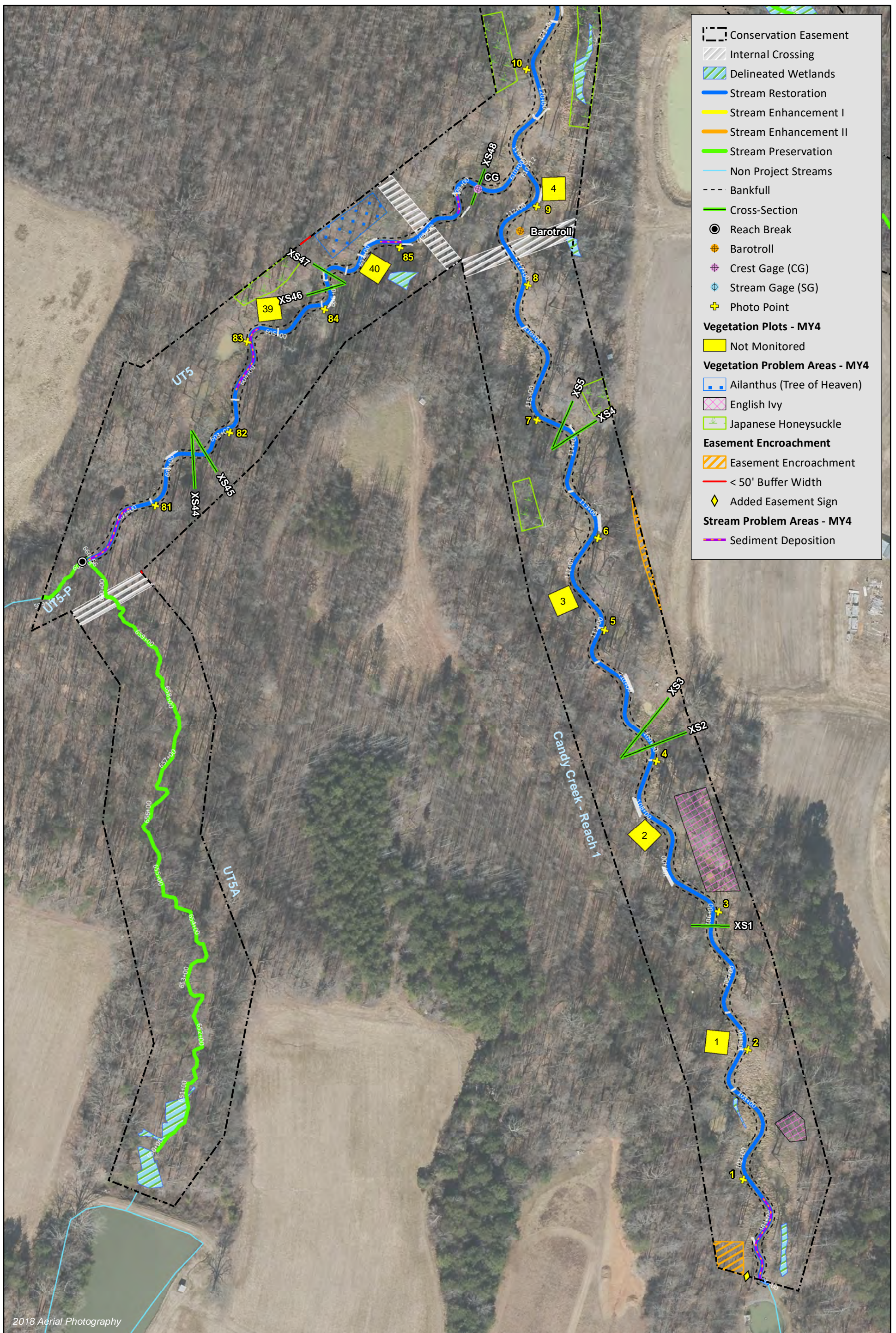


Figure 3.0 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC



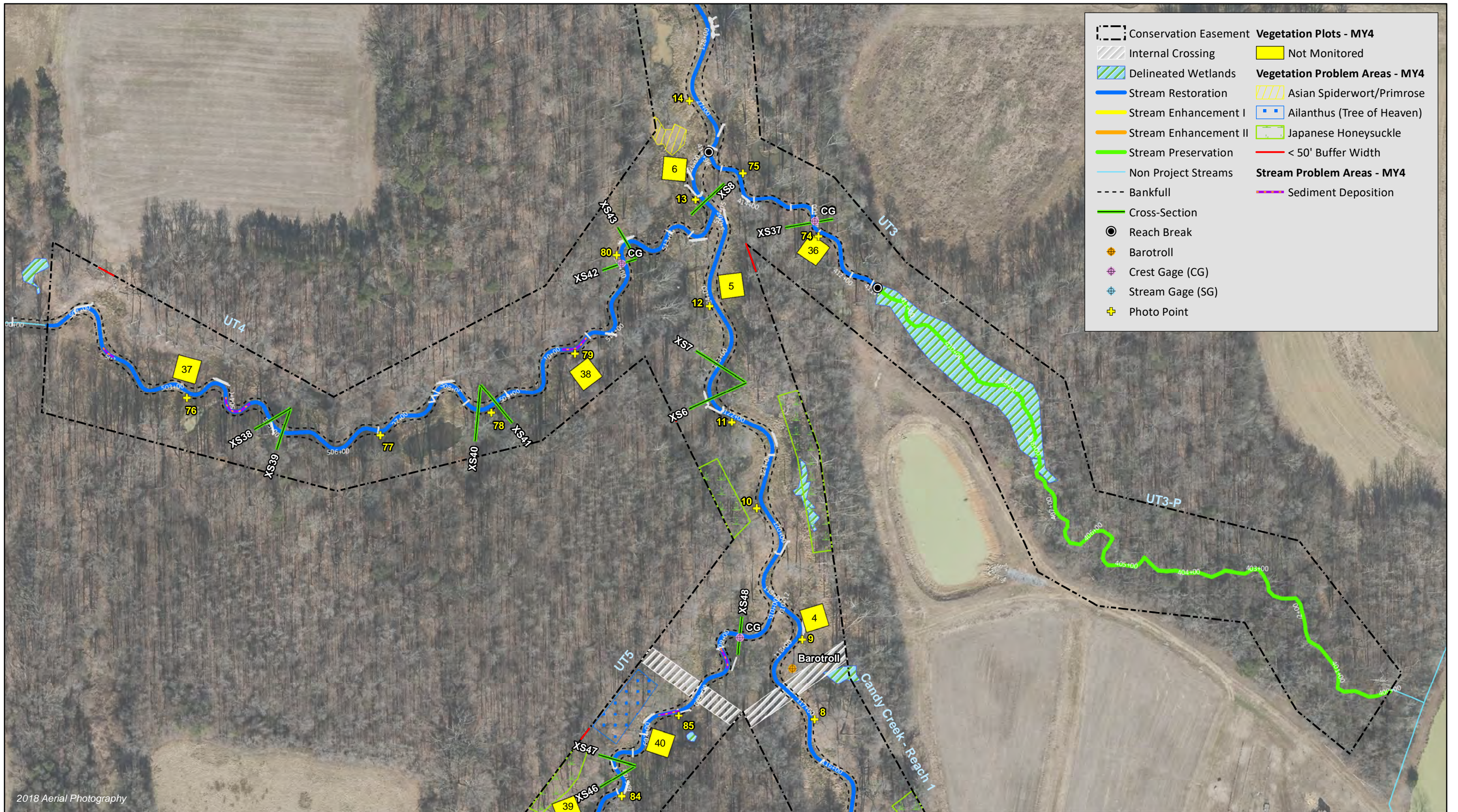
2018 Aerial Photography



0 125 250 Feet



Figure 3.1 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC



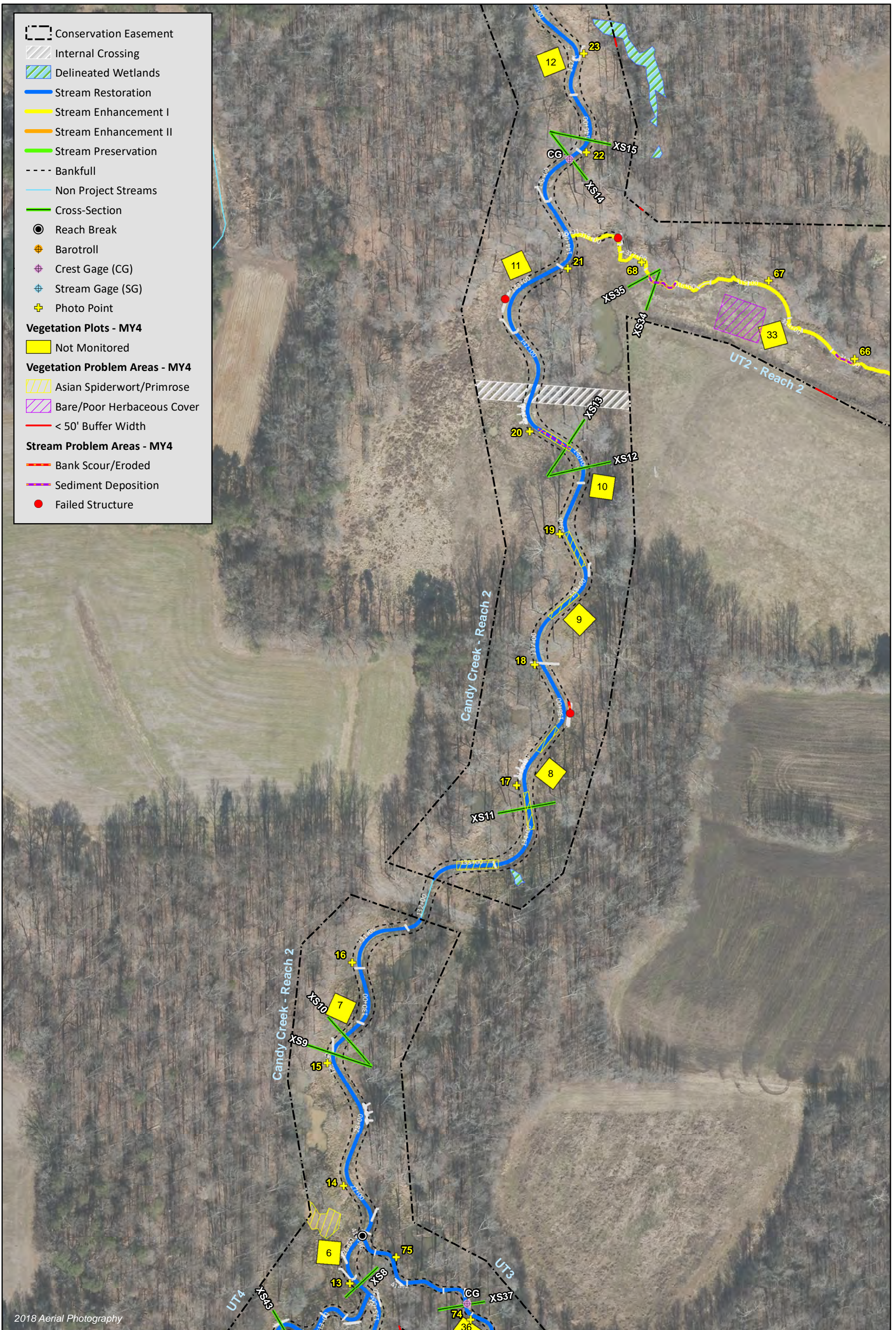
2018 Aerial Photography



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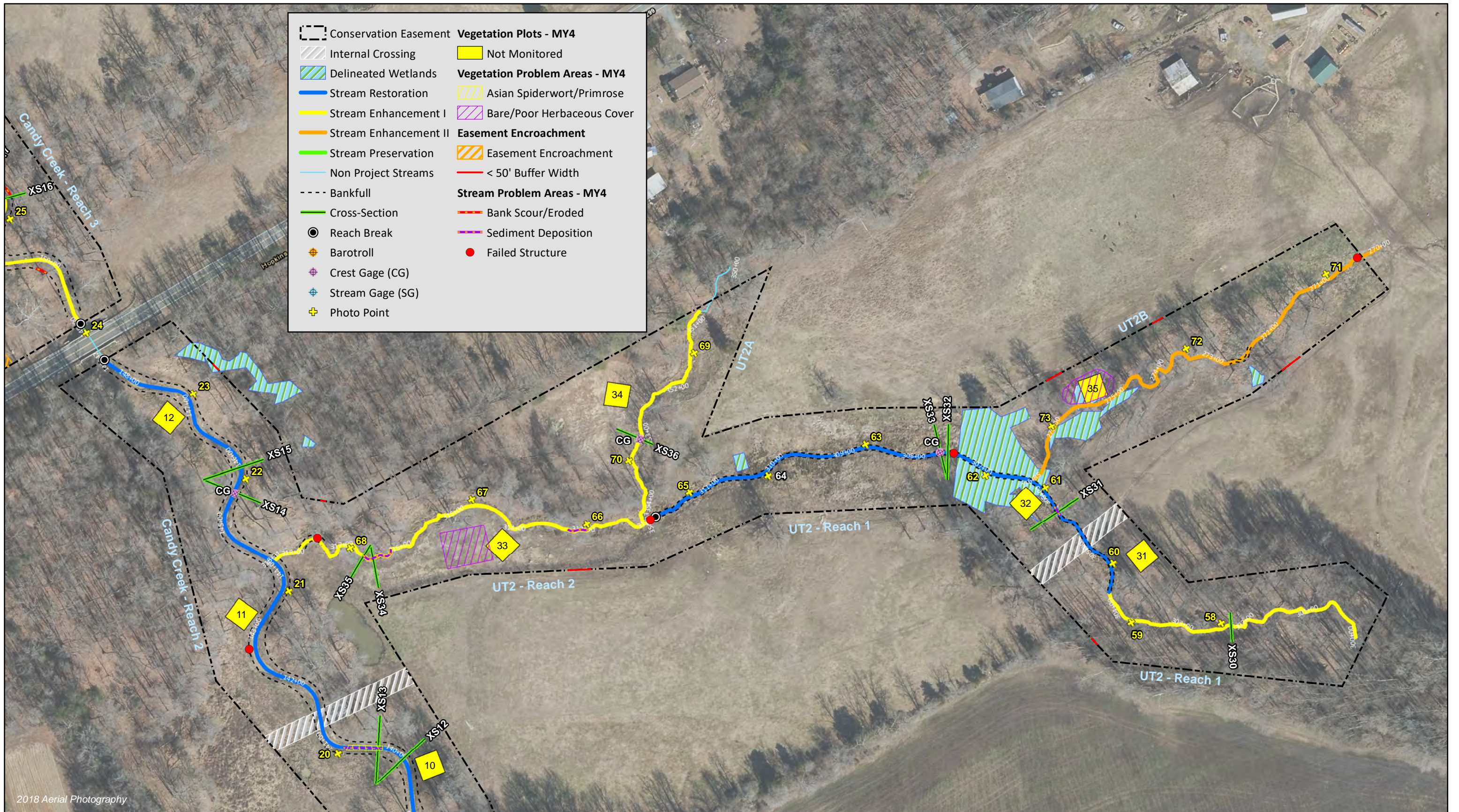
Figure 3.2 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC



0 125 250 Feet



Figure 3.3 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 2020
 Guilford County, NC



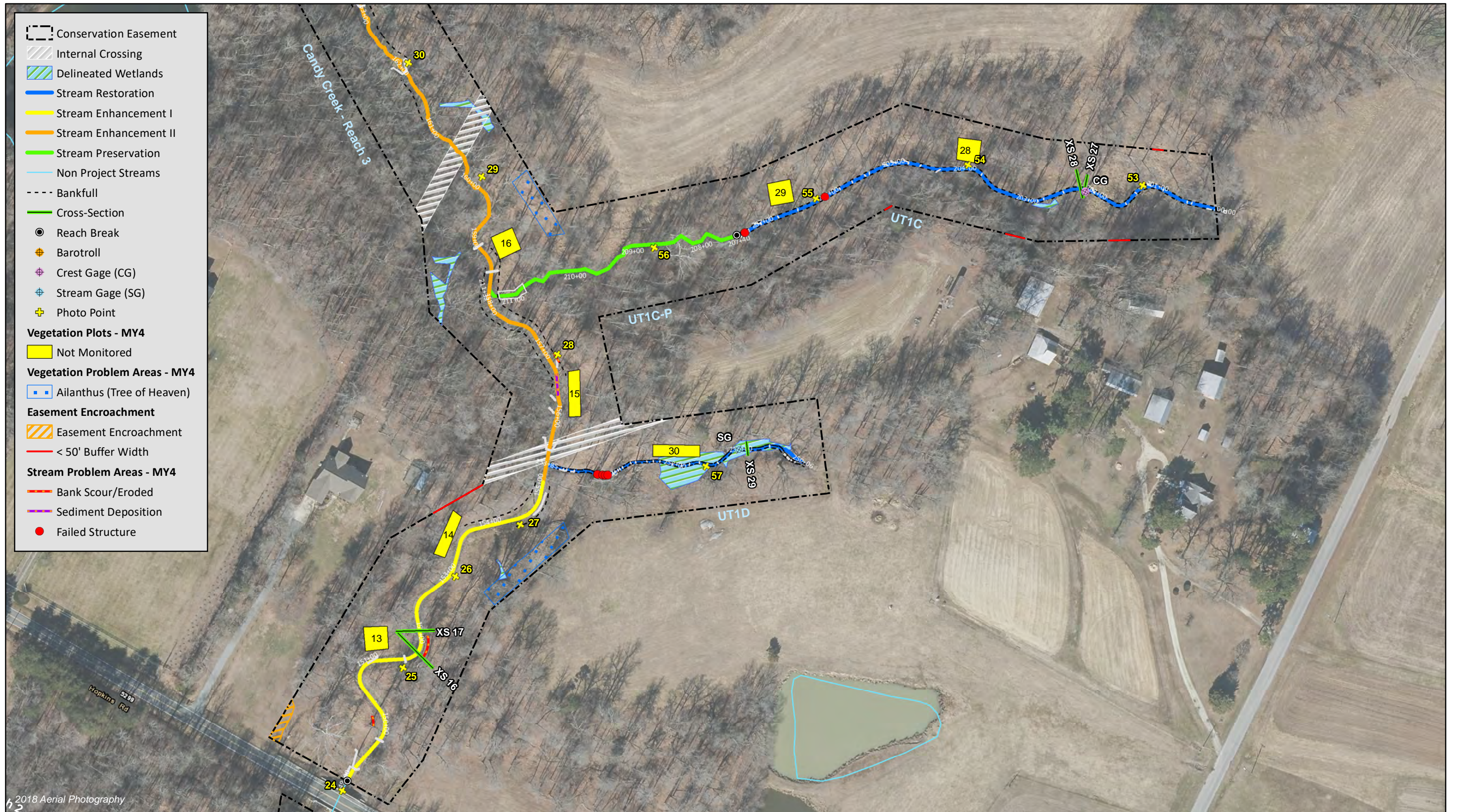
2018 Aerial Photography

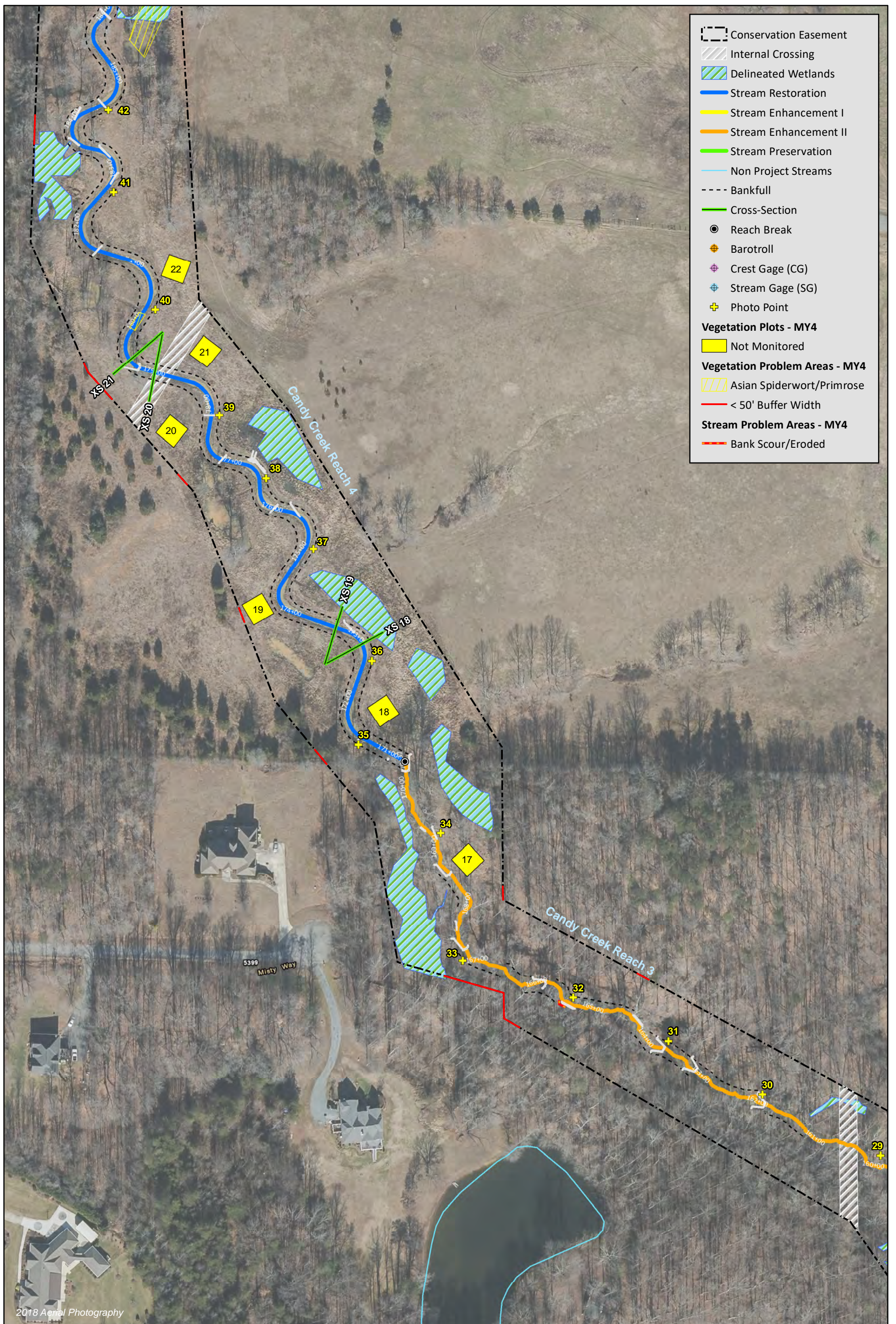


0 125 250 Feet



Figure 3.4 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC





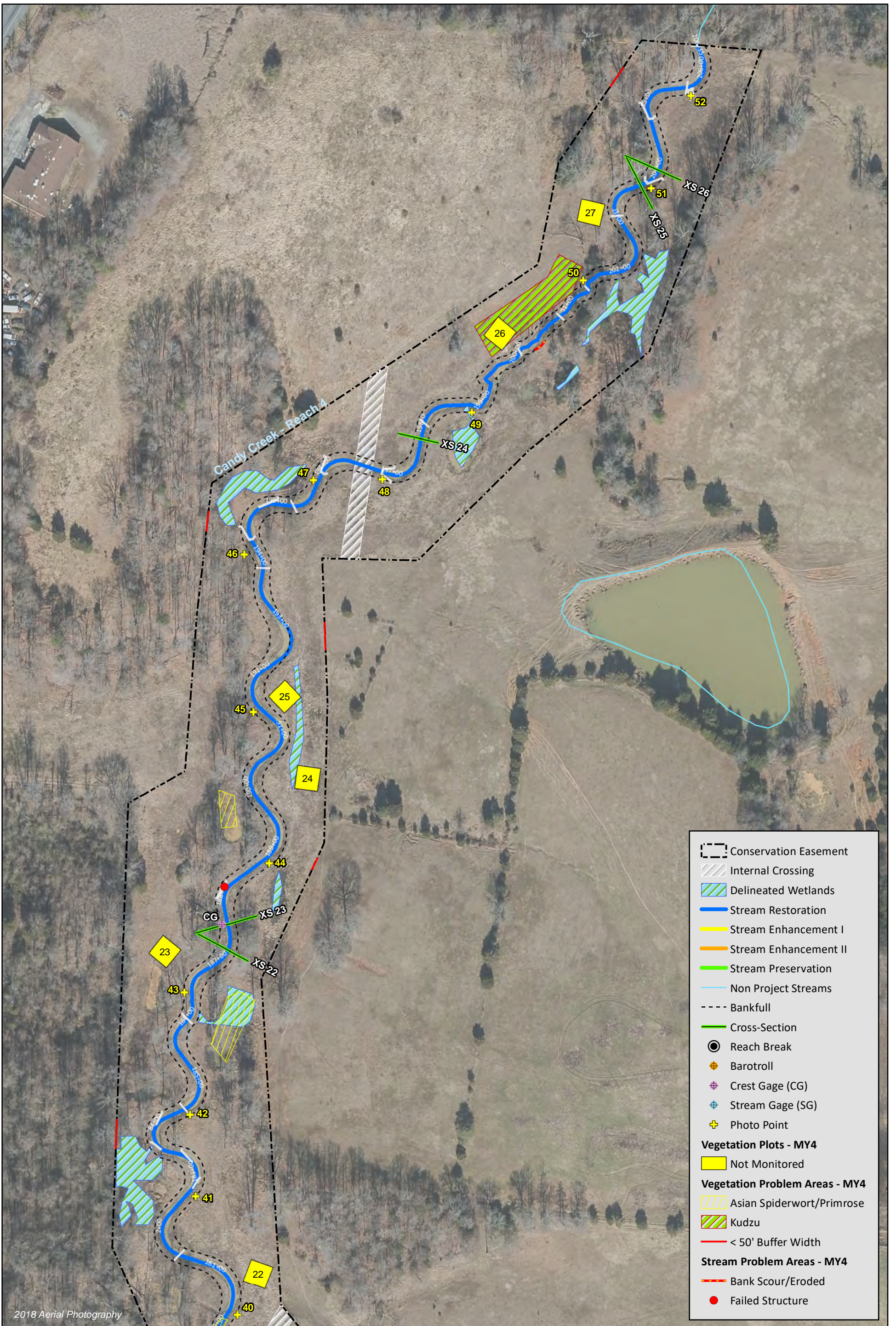


Figure 3.7 Integrated Current Condition Plan View
 Candy Creek Mitigation Site
 DMS Project No. 96315
 Monitoring Year 4 - 2020
 Guilford County, NC

Table 5a. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Candy Creek Reach 1 (2,619 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	130	95%				
		Degradation			0	0	100%				
	2. Riffle Condition	Texture/Substrate	36	39							92%
		Depth Sufficient	35	38							92%
	3. Meander Pool Condition	Length Appropriate	38	38							100%
		Thalweg centering at upstream of meander bend (Run)	38	38							100%
4. Thalweg Position	Thalweg centering at downstream of meander bend (Glide)	38	38	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.	32	32				100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8				100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8				100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	27	27				100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	26	27				96%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5b. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Candy Creek Reach 2 (2,215 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	55	98%				
		Degradation			0	0	100%				
	2. Riffle Condition	Texture/Substrate	23	24							96%
		3. Meander Pool Condition	Depth Sufficient	24							24
	Length Appropriate		24	24							100%
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	24	24							100%
Thalweg centering at downstream of meander bend (Glide)		24	24	100%							
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.						1	20	100%	0
	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	20	100%	0	0	100%	
3. Engineered Structures ¹	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	27	29							
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12							100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12							100%
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	17	17							100%
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	17	17							100%

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5c. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Candy Creek Reach 3 (2,135 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	30	99%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	22	23			96%			
		3. Meander Pool Condition	Depth Sufficient	17	17					
	4. Thalweg Position	Length Appropriate	17	17			100%			
		Thalweg centering at upstream of meander bend (Run)	16	17			94%			
		Thalweg centering at downstream of meander bend (Glide)	16	16			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			2	45	99%	0	0	99%
	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			2	30	99%	0	0	99%
Totals					4	75	98%	0	0	98%
3. Engineered Structures ¹	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	35	35			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	23	23			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	23	23			100%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5d. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Candy Creek Reach 4 (3,564 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	42	42							100%
		3. Meander Pool Condition	Depth Sufficient	39							39
	4. Thalweg Position	Length Appropriate	39	39							100%
		Thalweg centering at upstream of meander bend (Run)	38	38							100%
Thalweg centering at downstream of meander bend (Glide)		39	39	100%							
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	20	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					1	20	100%	0	0	100%	
3. Engineered Structures ¹	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	55	56				98%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	22	22				100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	22	22				100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	38	38				100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	38	38				100%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5e. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT1C (728 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	32	32							100%	
		3. Meander Pool Condition	Depth Sufficient	7							7	100%
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	Length Appropriate	7							7	100%
			Thalweg centering at downstream of meander bend (Run)	7							7	100%
Thalweg centering at downstream of meander bend (Glide)			7	7				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%		
		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.	29	29				100%				
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	22	22				100%				
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	20	22				91%				
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	7	7				100%				
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	7	7				100%				

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5f. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT1D (379 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	24	24			100%			
	3. Meander Pool Condition	Depth Sufficient	2	2			100%			
		Length Appropriate	2	2			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	2	2			100%			
Thalweg centering at downstream of meander bend (Glide)		2	2	100%						
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.					0	0	100%	0
	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.	30	30			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	29	29			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	25	29			86%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	20	20			100%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5g. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT2 Reach 1 (1,188 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	15	99%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	31	32		97%				
	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.			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.	32	32			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	31	31			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	30	31			97%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	22	22			100%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5h. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT2 Reach 2 (643 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			2	80	88%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	5	6		83%				
	3. Meander Pool Condition	Depth Sufficient	5	7		71%				
		Length Appropriate	6	7		86%				
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	6	7		86%				
Thalweg centering at downstream of meander bend (Glide)		6	7	86%						
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.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8			100%			
	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%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	3	4			75%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5i. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT2A (353 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	4	4		100%				
		Length Appropriate	4	4		100%				
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	4	4		100%				
Thalweg centering at downstream of meander bend (Glide)		4	4	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%
		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.	12	12		100%				
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12		100%				
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12		100%				
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a		n/a				
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	12	12		100%				

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5j. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT2B (657 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	5	5							100%			
		3. Meander Pool Condition	Depth Sufficient	6							6	100%		
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	Length Appropriate	6							6	100%		
			Thalweg centering at downstream of meander bend (Glide)	6							6	100%		
Totals														
								0	0	100%	0	0	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%				
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.	16	16				100%						
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	15	16				94%						
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a				n/a						
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	4	4				100%						

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5k. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT3 (346 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	10	10			100%			
		Length Appropriate	10	10			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	10	10			100%			
Thalweg centering at downstream of meander bend (Glide)		10	10	100%						
Totals										
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										
3. Engineered Structures ¹	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	15	15			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	5	5			100%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5I. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT4 (1,356 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			3	110	92%				
		Degradation			0	0	100%				
	2. Riffle Condition	Texture/Substrate	28	32							88%
		3. Meander Pool Condition	Depth Sufficient	28							30
	4. Thalweg Position	Length Appropriate	29	30							97%
		Thalweg centering at upstream of meander bend (Run)	29	30							97%
Thalweg centering at downstream of meander bend (Glide)			29	30				97%			
Totals											
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											
3. Engineered Structures ¹	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	22	22				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%.	15	15				100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	15	16				94%			

¹Excludes constructed riffles since they are evaluated in channel category.

Table 5m. Visual Stream Morphology Stability Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

UT5 (1,012 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			4	260	74%				
		Degradation			0	0	100%				
	2. Riffle Condition	Texture/Substrate	16	21			76%				
		3. Meander Pool Condition	Depth Sufficient	17			21				81%
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	Length Appropriate	17			21				81%
			Thalweg centering at upstream of meander bend (Run)	19			21				90%
Thalweg centering at downstream of meander bend (Glide)		19	21	90%							
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.					0	0	100%	0	0
		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.	22	22			100%				
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%				
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12			100%				
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	12	12			100%				
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	9	12			75%				

¹Excludes constructed riffles since they are evaluated in channel category.

Table 6. Vegetation Condition Assessment Table

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Planted Acreage

32

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	1	0.07	0.2%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 5, or 7 stem count criteria.	0.1	1	0.05	0.2%
Total			2	0.1	1.4%
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 Ac	0	0	0%
Cumulative Total			2	0.1	1.4%

Easement Acreage

62

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern¹	Areas of points (if too small to render as polygons at map scale).	1,000	12	1.12	1.8%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	3	0.07	0.1%

¹In-stream vegetation was counted as one polygon because each individual polygon would have been too small to meet the minimum mapping threshold.

STREAM PHOTOGRAPHS

Candy Creek Reach 1
Monitoring Year 4



Photo Point 1 – looking upstream (5/18/2020)



Photo Point 1 – looking downstream (5/18/2020)



Photo Point 2 – looking upstream (5/18/2020)



Photo Point 2 – looking downstream (5/18/2020)



Photo Point 3 – looking upstream (5/18/2020)



Photo Point 3 – looking downstream (5/18/2020)



Photo Point 4 – looking upstream (5/18/2020)



Photo Point 4 – looking downstream (5/18/2020)



Photo Point 5 – looking upstream (5/18/2020)



Photo Point 5 – looking downstream (5/18/2020)



Photo Point 6 – looking upstream (5/18/2020)



Photo Point 6 – looking downstream (5/18/2020)



Photo Point 7 – looking upstream (5/18/2020)



Photo Point 7 – looking downstream (5/18/2020)



Photo Point 8 – looking upstream (5/18/2020)



Photo Point 8 – looking downstream (5/18/2020)



Photo Point 9 – looking upstream (5/12/2020)



Photo Point 9 – looking downstream (5/12/2020)



Photo Point 10 – looking upstream (5/12/2020)



Photo Point 10 – looking downstream (5/12/2020)



Photo Point 11 – looking upstream (5/12/2020)



Photo Point 11 – looking downstream (5/12/2020)



Photo Point 12 – looking upstream (5/12/2020)

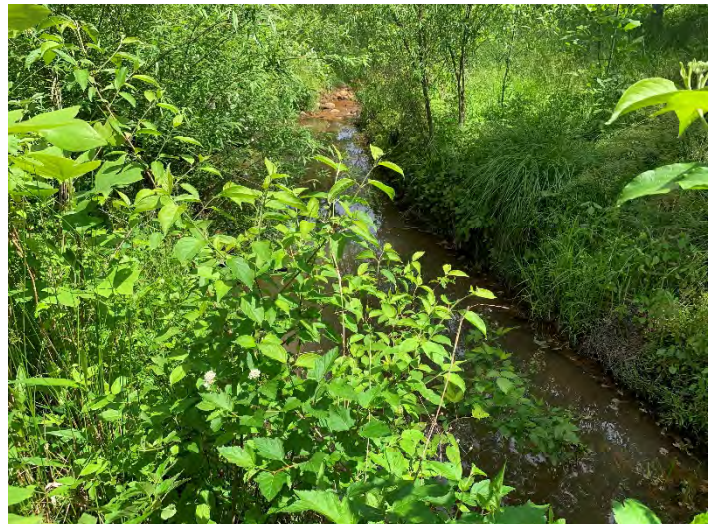


Photo Point 12 – looking downstream (5/12/2020)



Photo Point 13 – looking upstream (5/11/2020)



Photo Point 13 – looking downstream (5/11/2020)

STREAM PHOTOGRAPHS

Candy Creek Reach 2
Monitoring Year 4



Photo Point 14 – looking upstream (5/11/2020)



Photo Point 14 – looking downstream (5/11/2020)



Photo Point 15 – looking upstream (5/11/2020)



Photo Point 15 – looking downstream (5/11/2020)



Photo Point 16 – looking upstream (5/11/2020)



Photo Point 16 – looking downstream (5/11/2020)



Photo Point 17 – looking upstream (5/11/2020)



Photo Point 17 – looking downstream (5/11/2020)



Photo Point 18 – looking upstream (5/11/2020)



Photo Point 18 – looking downstream (5/11/2020)



Photo Point 19 – looking upstream (5/11/2020)



Photo Point 19 – looking downstream (5/11/2020)



Photo Point 20 – looking upstream (5/11/2020)



Photo Point 20 – looking downstream (5/11/2020)



Photo Point 21 – looking upstream (5/11/2020)



Photo Point 21 – looking downstream (5/11/2020)



Photo Point 22 – looking upstream (5/11/2020)



Photo Point 22 – looking downstream (5/11/2020)



Photo Point 23 – looking upstream (5/11/2020)



Photo Point 23 – looking downstream (5/11/2020)



Photo Point 24 – looking upstream (5/18/2020)

STREAM PHOTOGRAPHS

Candy Creek Reach 3
Monitoring Year 4



Photo Point 24 – looking downstream (5/18/2020)



Photo Point 25 – looking upstream (5/18/2020)



Photo Point 25 – looking downstream (5/18/2020)



Photo Point 26 – looking upstream (5/18/2020)



Photo Point 26 – looking downstream (5/18/2020)



Photo Point 27 – looking upstream (5/18/2020)



Photo Point 27 – looking downstream (5/18/2020)



Photo Point 28 – looking upstream (5/18/2020)



Photo Point 28 – looking downstream (5/18/2020)



Photo Point 29 – looking upstream (5/18/2020)



Photo Point 29 – looking downstream (5/18/2020)



Photo Point 30 – looking upstream (5/18/2020)



Photo Point 30 – looking downstream (5/18/2020)



Photo Point 31 – looking upstream (5/18/2020)



Photo Point 31 – looking downstream (5/18/2020)



Photo Point 32 – looking upstream (5/18/2020)



Photo Point 32 – looking downstream (5/18/2020)



Photo Point 33 – looking upstream (5/18/2020)



Photo Point 33 – looking downstream (5/18/2020)



Photo Point 34 – looking upstream (5/18/2020)



Photo Point 34 – looking downstream (5/18/2020)

STREAM PHOTOGRAPHS

Candy Creek Reach 4
Monitoring Year 4



Photo Point 35 – looking upstream (5/18/2020)



Photo Point 35 – looking downstream (5/18/2020)



Photo Point 36 – looking upstream (5/18/2020)



Photo Point 36 – looking downstream (5/18/2020)



Photo Point 37 – looking upstream (5/18/2020)



Photo Point 37 – looking downstream (5/18/2020)



Photo Point 38 – looking upstream (5/18/2020)



Photo Point 38 – looking downstream (5/18/2020)



Photo Point 39 – looking upstream (5/18/2020)



Photo Point 39 – looking downstream (5/18/2020)



Photo Point 40 – looking upstream (5/18/2020)



Photo Point 40 – looking downstream (5/18/2020)



Photo Point 41 – looking upstream (5/18/2020)



Photo Point 41 – looking downstream (5/18/2020)



Photo Point 42 – looking upstream (5/18/2020)



Photo Point 42 – looking downstream (5/18/2020)



Photo Point 43 – looking upstream (5/18/2020)



Photo Point 43 – looking downstream (5/18/2020)



Photo Point 44 – looking upstream (5/18/2020)



Photo Point 44 – looking downstream (5/18/2020)



Photo Point 45 – looking upstream (5/18/2020)



Photo Point 45 – looking downstream (5/18/2020)



Photo Point 46 – looking upstream (5/18/2020)



Photo Point 46 – looking downstream (5/18/2020)



Photo Point 47 – looking upstream (5/18/2020)



Photo Point 47 – looking downstream (5/18/2020)



Photo Point 48 – looking upstream (5/18/2020)



Photo Point 48 – looking downstream (5/18/2020)



Photo Point 49 – looking upstream (5/18/2020)



Photo Point 49 – looking downstream (5/18/2020)



Photo Point 50 – looking upstream (5/18/2020)



Photo Point 50 – looking downstream (5/18/2020)



Photo Point 51 – looking upstream (5/18/2020)



Photo Point 51 – looking downstream (5/18/2020)



Photo Point 52 – looking upstream (5/18/2020)



Photo Point 52 – looking downstream (5/18/2020)

STREAM PHOTOGRAPHS

UT1C and UT1D
Monitoring Year 4



Photo Point 53 – looking upstream (5/12/2020)



Photo Point 53 – looking downstream (5/12/2020)



Photo Point 54 – looking upstream (5/12/2020)



Photo Point 54 – looking downstream (5/12/2020)



Photo Point 55 – looking upstream (5/12/2020)



Photo Point 55 – looking downstream (5/12/2020)



Photo Point 56 – looking upstream (5/12/2020)



Photo Point 56 – looking downstream (5/12/2020)



Photo Point 57 – looking upstream (5/12/2020)



Photo Point 57 – looking downstream (5/12/2020)

STREAM PHOTOGRAPHS

UT2, UT2A, and UT2B
Monitoring Year 4



Photo Point 58 – looking upstream (5/11/2020)



Photo Point 58 – looking downstream (5/11/2020)



Photo Point 59 – looking upstream (5/11/2020)



Photo Point 59 – looking downstream (5/11/2020)



Photo Point 60 – looking upstream (5/11/2020)



Photo Point 60 – looking downstream (5/11/2020)



Photo Point 61 – looking upstream (5/11/2020)



Photo Point 61 – looking downstream (5/11/2020)



Photo Point 62 – looking upstream (5/11/2020)



Photo Point 62 – looking downstream (5/11/2020)



Photo Point 63 – looking upstream (5/11/2020)



Photo Point 63 – looking downstream (5/11/2020)



Photo Point 64 – looking upstream (5/11/2020)



Photo Point 64 – looking downstream (5/11/2020)



Photo Point 65 – looking upstream (5/11/2020)



Photo Point 65 – looking downstream (5/11/2020)



Photo Point 66 – looking upstream (5/11/2020)



Photo Point 66 – looking downstream (5/11/2020)



Photo Point 67 – looking upstream (5/11/2020)



Photo Point 67 – looking downstream (5/11/2020)



Photo Point 68 – looking upstream (5/11/2020)



Photo Point 68 – looking downstream (5/11/2020)



Photo Point 69 – looking upstream (5/11/2020)



Photo Point 69 – looking downstream (5/11/2020)



Photo Point 70 – looking upstream (5/11/2020)



Photo Point 70 – looking downstream (5/11/2020)



Photo Point 71 – looking upstream (5/11/2020)



Photo Point 71 – looking downstream (5/11/2020)



Photo Point 72 – looking upstream (5/11/2020)



Photo Point 72 – looking downstream (5/11/2020)



Photo Point 73 – looking upstream (5/11/2020)



Photo Point 73 – looking downstream (5/11/2020)

STREAM PHOTOGRAPHS

UT3, UT4, and UT5
Monitoring Year 4



Photo Point 74 – looking upstream (5/12/2020)



Photo Point 74 – looking downstream (5/12/2020)



Photo Point 75 – looking upstream (5/12/2020)



Photo Point 75 – looking downstream (5/12/2020)



Photo Point 76 – looking upstream (5/12/2020)



Photo Point 76 – looking downstream (5/12/2020)



Photo Point 77 – looking upstream (5/12/2020)



Photo Point 77 – looking downstream (5/12/2020)



Photo Point 78 – looking upstream (5/12/2020)



Photo Point 78 – looking downstream (5/12/2020)



Photo Point 79 – looking upstream (5/12/2020)



Photo Point 79 – looking downstream (5/12/2020)



Photo Point 80 – looking upstream (5/12/2020)



Photo Point 80 – looking downstream (5/12/2020)



Photo Point 81 – looking upstream (5/18/2020)



Photo Point 81 – looking downstream (5/18/2020)



Photo Point 82 – looking upstream (5/18/2020)



Photo Point 82 – looking downstream (5/18/2020)



Photo Point 83 – looking upstream (5/18/2020)



Photo Point 83 – looking downstream (5/18/2020)



Photo Point 84 – looking upstream (5/18/2020)



Photo Point 84 – looking downstream (5/18/2020)



Photo Point 85 – looking upstream (5/18/2020)



Photo Point 85 – looking downstream (5/18/2020)

VEGETATION PHOTOGRAPHS

Monitoring Year 4



Vegetation Plot 1 (5/18/2020)



Vegetation Plot 2 (5/18/2020)



Vegetation Plot 3 (5/18/2020)



Vegetation Plot 4 (5/12/2020)



Vegetation Plot 5 (5/12/2020)



Vegetation Plot 6 (5/11/2020)



Vegetation Plot 7 (5/11/2020)



Vegetation Plot 8 (5/11/2020)



Vegetation Plot 9 (5/11/2020)



Vegetation Plot 10 (5/11/2020)



Vegetation Plot 11 (5/11/2020)



Vegetation Plot 12 (5/11/2020)



Vegetation Plot 13 (5/18/2020)



Vegetation Plot 14 (5/18/2020)



Vegetation Plot 15 (5/18/2020)



Vegetation Plot 16 (5/18/2020)



Vegetation Plot 17 (5/18/2020)



Vegetation Plot 18 (5/18/2020)



Vegetation Plot 19 (5/18/2020)



Vegetation Plot 20 (5/18/2020)



Vegetation Plot 21 (5/18/2020)



Vegetation Plot 22 (5/18/2020)



Vegetation Plot 23 (5/18/2020)



Vegetation Plot 24 (5/18/2020)



Vegetation Plot 25 (5/18/2020)



Vegetation Plot 26 (5/18/2020)



Vegetation Plot 27 (5/18/2020)



Vegetation Plot 28 (5/12/2020)



Vegetation Plot 29 (5/12/2020)



Vegetation Plot 30 (5/12/2020)



Vegetation Plot 31 (5/11/2020)



Vegetation Plot 32 (5/11/2020)



Vegetation Plot 33 (5/11/2020)



Vegetation Plot 34 (5/11/2020)



Vegetation Plot 35 (5/11/2020)



Vegetation Plot 36 (5/12/2020)



Vegetation Plot 37 (5/12/2020)



Vegetation Plot 38 (5/12/2020)



Vegetation Plot 39 (5/18/2020)



Vegetation Plot 40 (5/18/2020)

AREAS OF CONCERN PHOTOGRAPHS

Monitoring Year 4



Candy Creek Reach 1 - Stream aggradation (Sta. 100+20-101+50) (10/07/2020)



Candy Creek Reach 1 - Easement encroachment at upstream extent, LB (Sta. 100+00-100+60) (10/07/2020)



Candy Creek Reach 1 - Easement encroachment, RB (Sta. 111+00-113+00) (10/07/2020)



Candy Creek Reach 3 - Easement encroachment at Hopkins Road, LB (Sta. 149+00-150+00) (10/06/2020)



Candy Creek Reach 3 - Bank erosion, RB (Sta. 151+70-152+00) (05/13/2020)



Candy Creek Reach 3 - Aggradation in channel (Sta. 156+10-156+40) (05/13/2020)



UT2 Reach 2 - Bare area, LB (Sta. 314+50-315+25)
(10/06/2020)



UT5 - Stream aggradation (Sta. 603+70-604+70)
(10/07/2020)

APPENDIX 3. Vegetation Plot Data

Vegetation assessment and analysis not required in Monitoring Year 4

APPENDIX 4. Morphological Summary Data and Plots

Morphological assessment and analysis not required in Monitoring Year 4

APPENDIX 5. Hydrology Summary Data and Plot

Table 13a. Verification of Bankfull Events

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

Reach	Monitoring Year	Date of Occurrence	Method	
Candy Creek Reach 2	MY2	10/11/2018	Automated Crest Gage	
		MY3		1/21/2019
				1/30/2019
				2/23/2019
				3/7/2019
	MY4	2/6/2020		
		5/21/2020		
Candy Creek Reach 4	MY1	6/19/2017	Automated Crest Gage	
	MY2	7/30/2018		
		9/17/2018		
		10/11/2018		
	MY3	2/23/2019		
	MY4	2/6/2020		
5/21/2020				
UT1C	MY2	2/9/2018	Automated Crest Gage	
		3/9/2018		
		10/22/2018		
	MY3	1/10/2019		
		1/16/2019		
		1/21/2019		
		1/31/2019		
	MY4	1/22/2020		
UT2	MY2	1/27/2018	Automated Crest Gage	
		7/30/2018		
		9/17/2018		
		10/11/2018		
	MY3	1/11/2019		
		1/21/2019		
		1/26/2019		
		1/30/2019		
	MY4	2/6/2020		
5/21/2020				
UT2A	MY2	2/9/2018	Automated Crest Gage	
	MY3	1/21/2019		
		1/27/2019		
		1/30/2019		
MY4	5/21/2020			
UT3	MY2	10/11/2018	Automated Crest Gage	
	MY3	1/21/2019		

Table 13b. Verification of Bankfull Events

Candy Creek Mitigation Site

DMS Project No. 96315

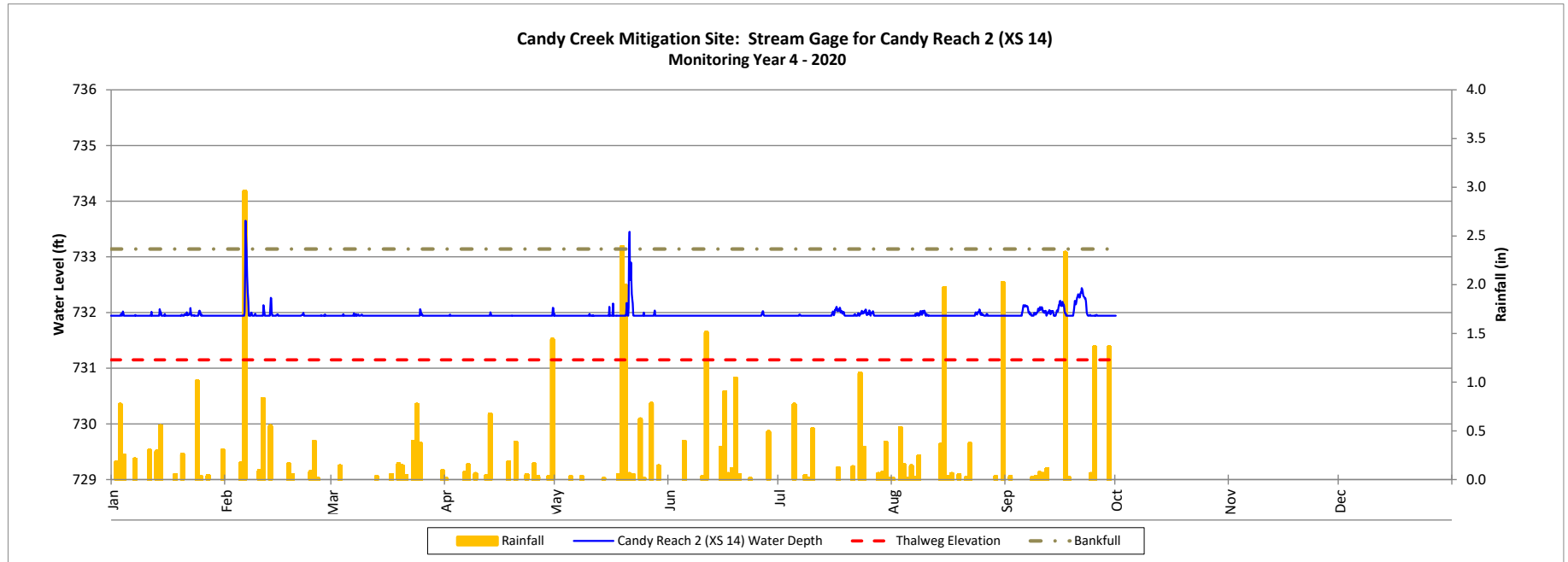
Monitoring Year 4 - 2020

Reach	Monitoring Year	Date of Occurrence	Method
UT4	MY2	1/31/2018	Automated Crest Gage
		7/30/2018	
		9/17/2018	
		10/11/2018	
	MY3	1/21/2019	
		2/23/2019	
		6/8/2019	
	MY4	2/6/2020	
		2/22/2020	
		5/21/2020	
UT5	MY1	4/24/2017	Automated Crest Gage
		6/19/2017	
	MY2	1/31/2018	
		2/6/2018	
		3/9/2018	
		7/30/2018	
		9/17/2018	
		10/11/2018	
	MY3	1/21/2019	
		1/26/2019	
		1/30/2019	
		2/23/2019	
		8/8/2019	
	MY4	10/31/2019	
		2/6/2020	
		5/20/2020	
		6/5/2020	
		6/8/2020	
		6/11/2020	

Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

Monitoring Year 4 - 2020

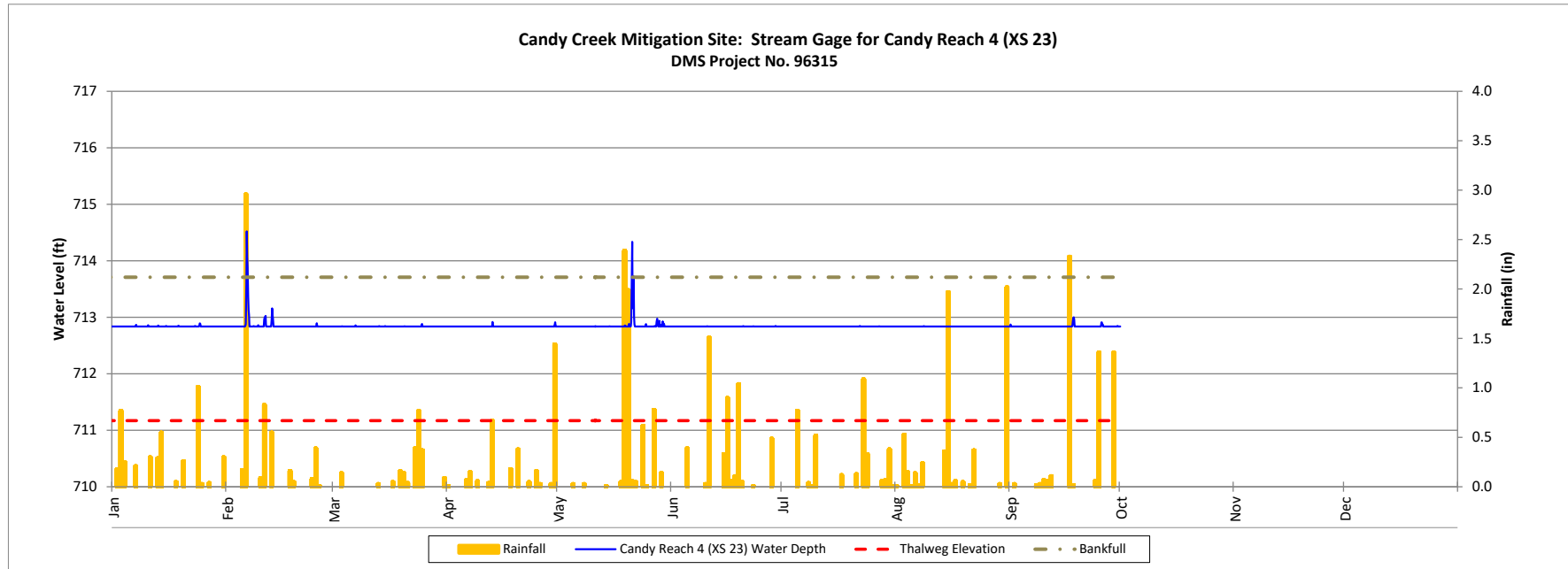


Stream Gage Plot

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

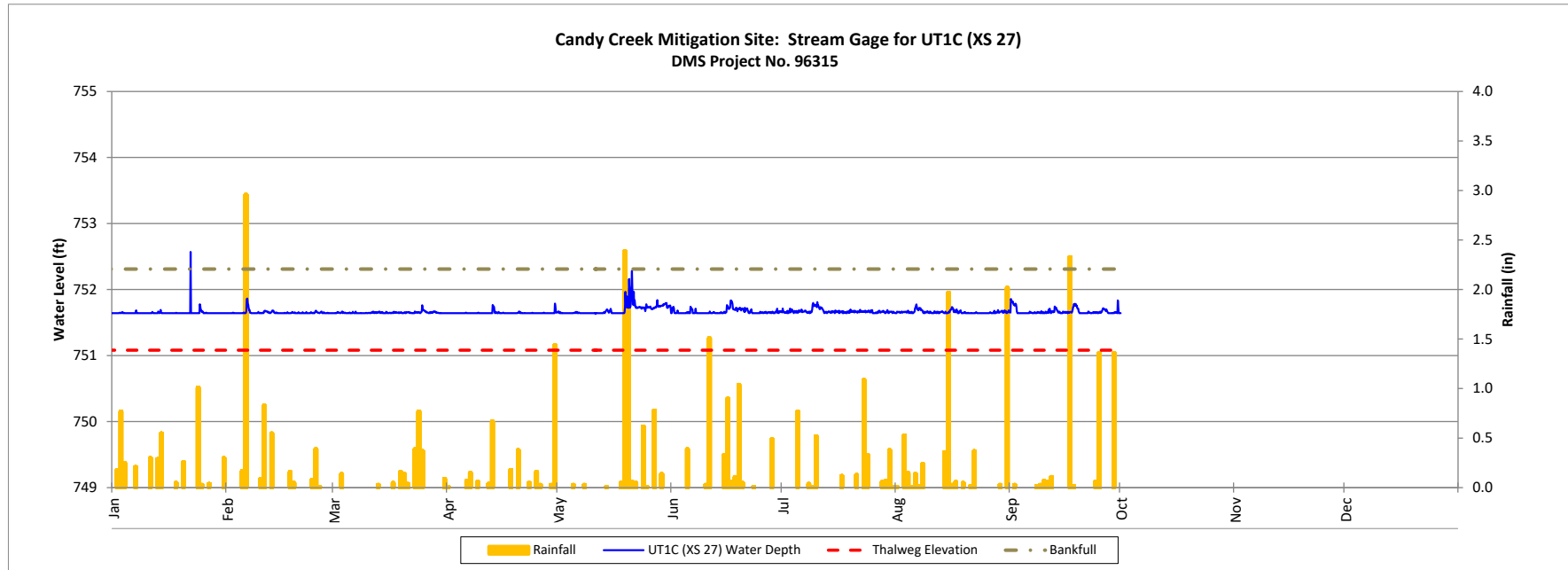


Stream Gage Plot

Candy Creek Mitigation Site

DMS Project No. 96315

Monitoring Year 4 - 2020

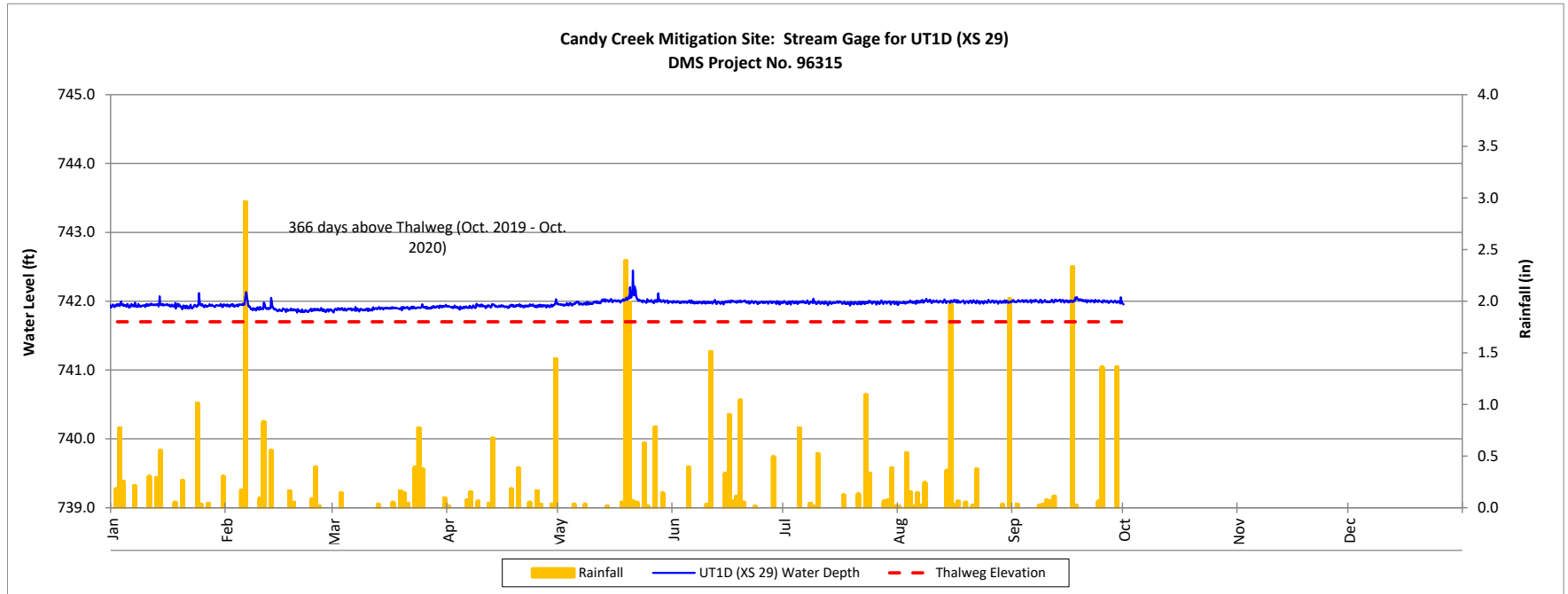


Stream Gage Plot

Candy Creek Mitigation Site

DMS Project No. 96315

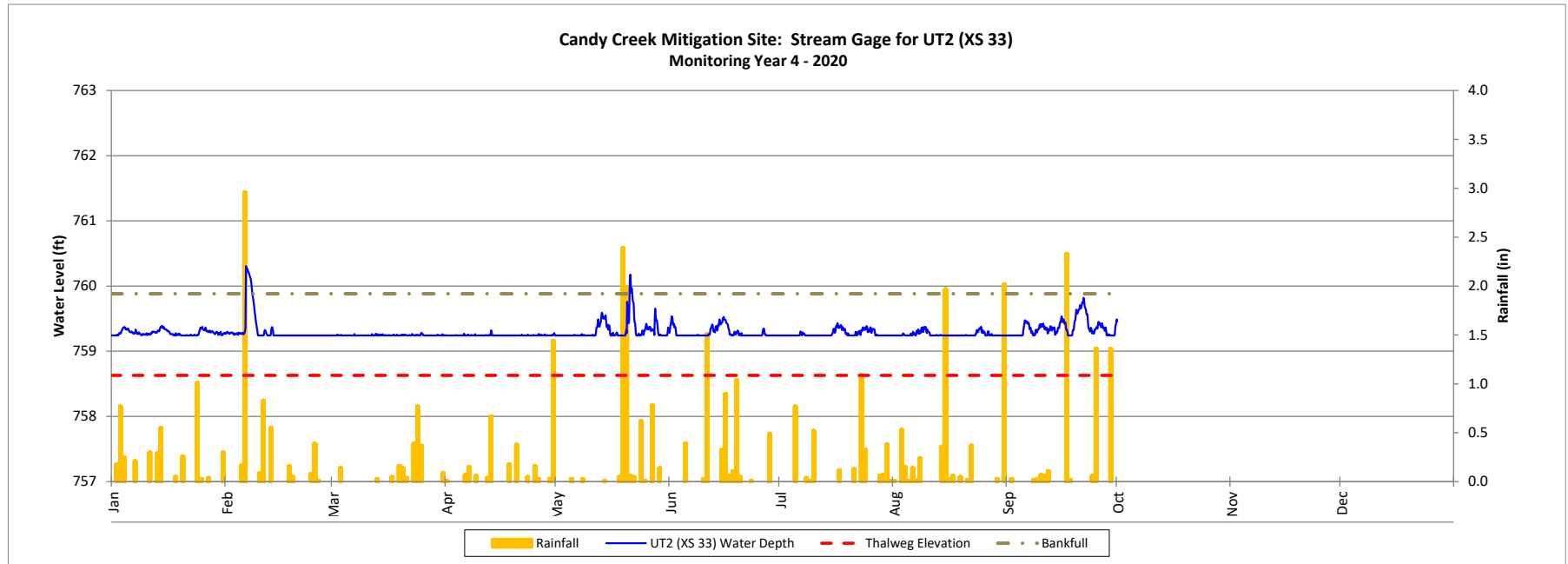
Monitoring Year 4 - 2020



Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

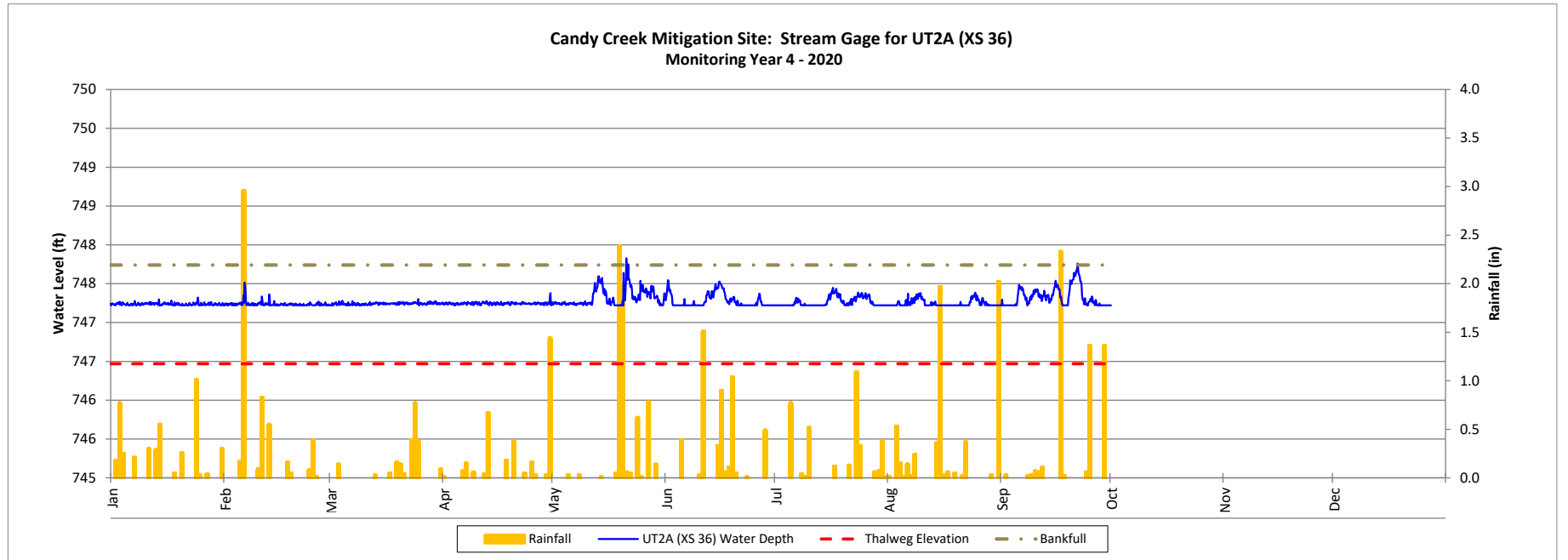
Monitoring Year 4 - 2020



Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

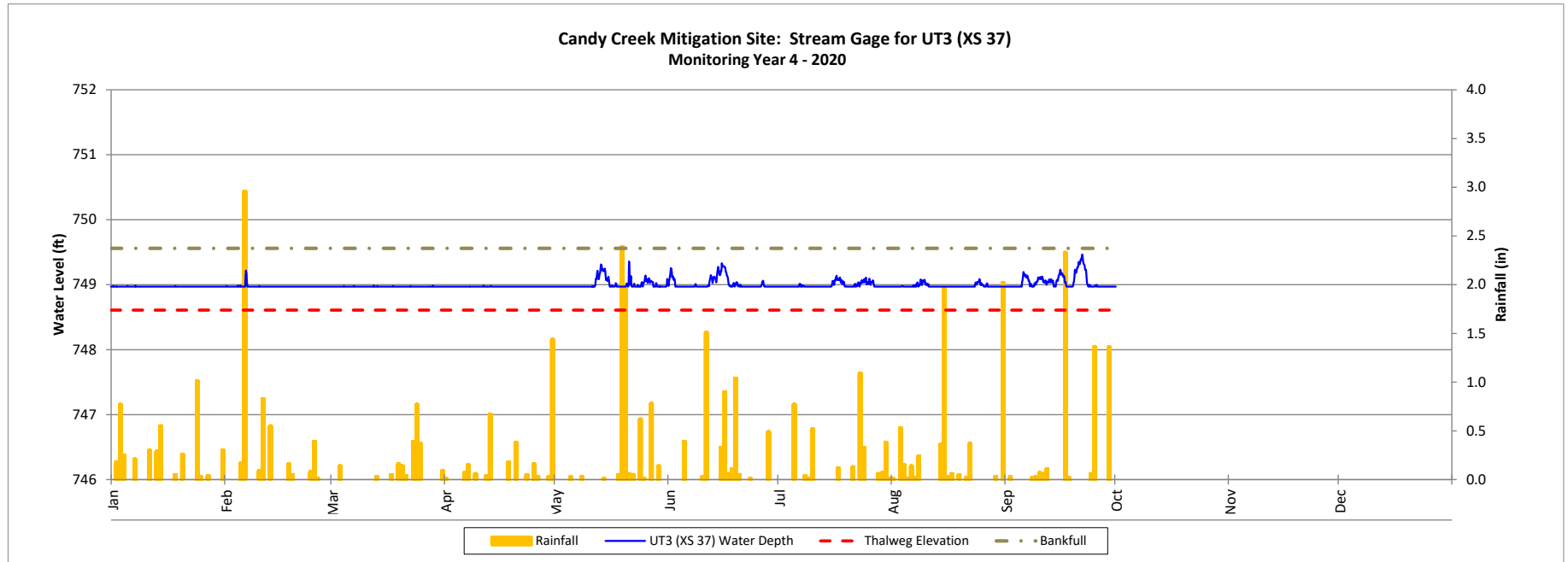
Monitoring Year 4 - 2020



Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

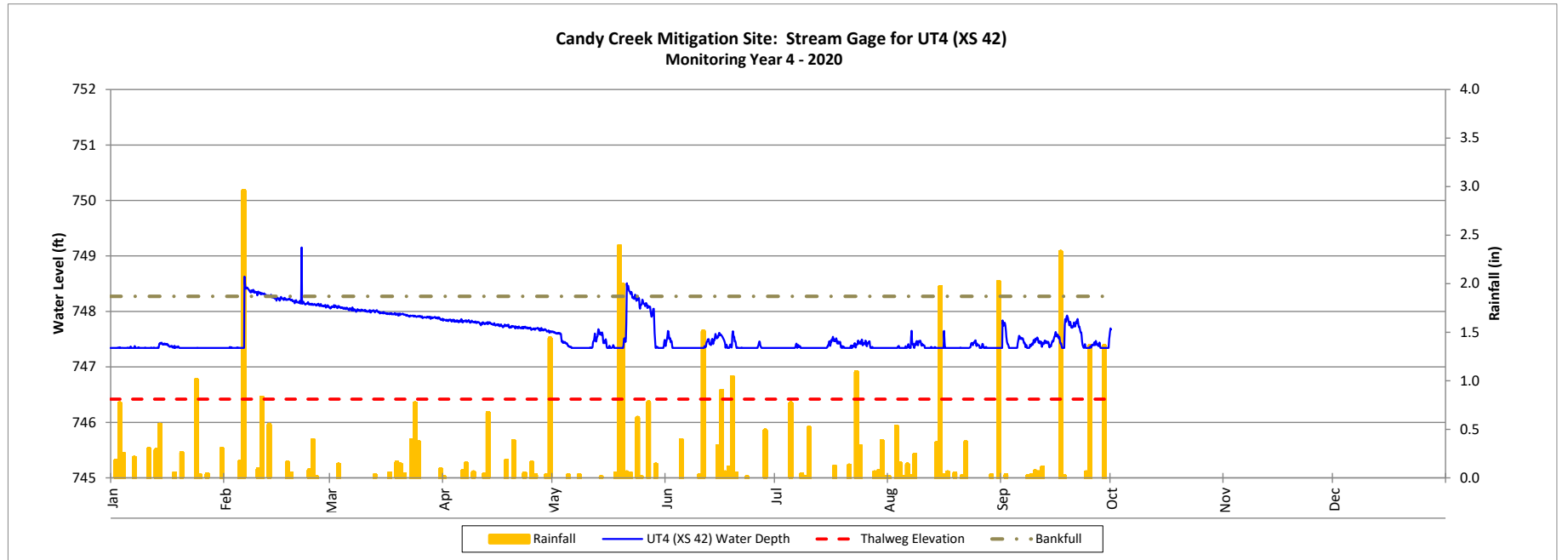
Monitoring Year 4 - 2020



Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

Monitoring Year 4 - 2020



Stream Gage Plot

Candy Creek Mitigation Site (DMS Project No. 96315)

Monitoring Year 4 - 2020

