Thomas Creek Restoration Project
Year 6 Monitoring Report - FINAL

Wake County, North Carolina

DMS Project ID Number – 96074, DEQ Contract No. 5549

Permits: SAW-2013-02009, DWR# 14-1328

Cape Fear River Basin: 03030004-020010

Project Info:	Monitoring Year: 6 of 7 Year of Data Collection: 2021 Year of Completed Construction (including planting): 2016 Submission Date: December 2021
Submitted To:	NCDEQ - Division of Mitigation Services 1625 Mail Service Center Raleigh, NC 27699 NC DEQ Contract ID No. 003992

Michael Baker
INTERNATIONAL

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December 6, 2021

Jeremiah Dow, Project Manager
NCDEQ, Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: Response to DMS Comments for DRAFT Monitoring Year 6 Report
Thomas Creek Restoration Project, Wake County
DMS Project # 96074, DEQ Contract #5549, RFP# 16-005020

Mr. Dow:

Please find below our responses to the NC Division of Mitigation Services (DMS) review comments received December 3, 2021 in reference to the Thomas Creek Restoration Project –DRAFT Monitoring Year 6 Report. We have revised the Draft document in response to the referenced review comments as outlined below:

1) For Table 1, the Total credits for the site should be 5,706.733. I attached a copy of Table for you to see the total credits and the credits for each Reach. The blue highlighted cells are numbers I had to reduce by 20 feet due to the non-credit generating stream length in crossings being included as part of the design length. I think you can leave those numbers what they were, but I wanted you to see what I did to do to get the credit numbers.
Response: Baker has modified Table 1 accordingly, though we did remove the non-creditable sections from the original mitigation plan lengths for clarity so any reader could follow how the final credits were established. A notation was added below the table to explain the revision.

2) Need to update the coordinates in Table 4.
Response: Project coordinates in Table 4 were updated as requested.

3) As a reminder, this project has a Monitoring Phase Performance Bond, so a new bond will need to be in place and approved through next year, MY7 before we can authorize payment.
Response: Baker is currently in the process of obtaining the final monitoring bond.

Baker has provided one hardcopy and a pdf copy of the Final report, along with all the updated digital files (to be sent by secure ftp link). Please do not hesitate to contact me should you have any questions regarding our response submittal.

Sincerely,

Scott King, LSS, PWS
Project Manager

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Report Prepared and Submitted by Michael Baker Engineering, Inc.

NC Professional Engineering License # F-1084

Michael Baker
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APPENDICES

* Note: The figures and tables marked above with an asterisk are not included as part of this Year 6 Monitoring Report, but were left listed in the Table of Contents to explain the otherwise out-of-sequence figure/table numbering and appendix designations. For clarity, Michael Baker wishes to preserve the continuity of the labeling for these features between monitoring years to avoid confusion (e.g. to allow Appendix C to always contain vegetation data, and Table 12 to always be the bankfull event table, etc. in each monitoring report). These figures and tables had been included in past reports and will be included again as part of the Year 7 monitoring report for 2022.

1.0 EXECUTIVE SUMMARY

Michael Baker Engineering, Inc. (Baker) restored 4,721 linear feet of perennial and intermittent stream and enhanced 3,948 linear feet of intermittent stream as documented in the As-built Baseline Report. Baker also planted approximately 14.4 acres of native riparian vegetation within the 22.7 acre recorded conservation easement areas along all or portions of the restored and enhanced reaches (Reaches R1, R2, R3, R4, R5, R6, R7, T1, and T2). The Thomas Creek Restoration Project (Site) is located in Wake County, North Carolina (Figure 1), approximately 1.5 miles southwest of the Community of New Hill. (Figure 1). The Site is located within the NC Division of Mitigation Services' (NCDMS) Targeted Local Watershed (TLW) 03030004-020010 (the Harris Lake Hydrologic Unit) of the Cape Fear River Basin and is located in what was formerly known as the NC Division of Water Resources (NCDWR) subbasin 03-06-07. The project involved the restoration and enhancement of a rural Piedmont stream system, which had been impaired due to past agricultural conversion and cattle grazing.

Based on the NCDMS 2009 Cape Fear River Basin Restoration Priority (RBRP) Plan, the Thomas Creek Restoration Project area is located in an existing targeted local watershed within the Cape Fear River Basin and is located within the Middle Cape Fear / Kenneth and Parker Creeks, Local Watershed Planning (LWP) area. The restoration strategy for the Cape Fear River Basin is to promote low impact development, stormwater management, restoration and buffer protection in urbanizing areas, and buffer preservation elsewhere.

The primary goal of the project was to improve ecologic functions through the restoration and enhancement of streams and buffers in a degraded, urbanizing area as described in the NCDMS 2009 Cape Fear RBRP. Detailed project goals are identified below:

- Create geomorphically stable conditions along the unnamed tributaries throughout the Site,
- Protect and improve water quality by reducing streambank erosion, and nutrient/sediment inputs,
- Restore stream and floodplain interaction by connecting historic flow paths and promoting natural flood processes,
- Restore and protect riparian buffer functions and corridor habitat in perpetuity by establishing a permanent conservation easement, and
- Improve aquatic and terrestrial habitat through improved substrate and in-stream cover, addition of woody debris, and reduction of water temperature.

To accomplish these goals, the following objectives were identified:

- Restore existing incised, eroding, and channelized streams by providing them access to their relic floodplains,
- Implement agricultural BMPs, including cattle watering stations, to reduce nonpoint source (NPS) inputs to receiving waters,
- Prevent cattle from accessing the conservation easement by installing permanent fencing and thus reduce excessive streambank erosion and undesired nutrient inputs,
- Enhance aquatic habitat value by providing more bedform diversity, creating natural scour pools and reducing sediment from accelerated streambank erosion,

- Plant native species riparian buffer vegetation along streambank and floodplain areas, protected by a permanent conservation easement, to increase stormwater runoff filtering capacity, improve streambank stability and riparian habitat connectivity, and shade the stream to decrease water temperature, and
- Control invasive species vegetation within much of the project area and, if necessary, continue treatments during the monitoring period.

In accordance with the Mitigation Plan and the project-applicable DMS guidance document "Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation" dated 11/7/2011, no formal vegetation plot monitoring was performed, nor were any stream cross-sectional surveys conducted as part of this Year 6 monitoring effort. A visual assessment of the site is emphasized this year, with the full vegetation and cross-section survey work to resume for the Year 7 monitoring in 2022.

From the Year 6 visual inspection monitoring, all stream reaches appear stable and functioning. All stream riffle beds are vertically stable, the pools are maintaining depth, stream banks are stable and vegetating, and in-stream structures are physically intact and performing as designed as reported in Table 5 (Appendix B). No Stream Problem Areas (SPAs) were identified in Year 6. The two short sections of minor bank scour from Hurricane Florence that were reported, repaired, and replanted in Year 4 (2019) monitoring report appear fully stable with vegetation continuing to establish well (see photos in Appendix B).

The Year 6 visual inspection monitoring also observed that the planted acreage performance categories were functioning at 100 percent with no eroding or bare areas to report, nor any areas of high mortality or poor growth as reported in Table 6 (Appendix B). No Vegetation Problem Areas (VPAs) were identified in Year 6. Additionally, there were no significant areas of invasive species vegetation observed during the Year 6 monitoring. There were a few small, isolated pockets of cattail (*Typha latifolia*) found along sections of Reach R2. They will be monitored closely over the next year and treated if necessary.

Also, as previously discussed in the Year 3 monitoring report in 2018, an area roughly 0.38 acres in size of low vigor/short stems had been noted within the left buffer of upper Reach R3, though stem density remains quite good. Based on soil test results, this area has periodically received small applications of soil amendments to help improve stem growth. In April of 2021, pelletized lime was applied to this area along with small amounts of fertilizer to the planted stems. The plant vigor and growth in this area certainly continues to improve but remains a little behind the growth observed on the rest of the site. As such, soil amendments will continue to be applied to this area. Please see the CCPV in Appendix B for the location of this amended area.

Additionally, there were no areas of non-native invasive species vegetation observed during the Year 6 monitoring. However, a few short sections of stream along the upper and middle portions of Reach R2 and the lower portion of Reach R4 were observed to have scattered pockets of native cattail (*Typha latifolia*) growing in the channel. These sections had been previously treated in March and April of 2019 as noted in previous monitoring reports. These areas will continue to be monitored in the future and treated again if necessary.

Year 6 flow monitoring demonstrated that both flow gauges (TMCK-FL1 and TMCK-FL2) met the stated success criteria of 30 days or more of consecutive flow through Reaches 2 and 5 respectively. Flow gauge TMCK-FL1 documented 279 days of consecutive flow in Reach 2, while flow gauge TMCK-FL2 documented 224 days of consecutive flow in Reach 5. The flow gauges demonstrated similar patterns relative to rainfall events and can corroborate reported bankfull events from the crest gauge, as shown in the flow gauge graphs in Appendix E.

As the observed monthly rainfall data for the project presented in Figure 9 in Appendix E demonstrates, the past 12 months have been wetter as compared to historic averages for Wake County. A total of 55.1 in. of rainfall was observed for the project using the nearest NC-CRONOS station, while Wake County averages 43.8

in. of annual rainfall. However, it should be noted that bulk of this excess rainfall came over the winter of 2020-2021, while the spring of 2021 was well below average monthly rainfalls and the summer and fall of 2021 were much closer to their average ranges.

During Year 5 monitoring, the Reach R2 crest gauge (crest gauge #1) documented one post-construction bankfull event in July 2021, as confirmed by both in-stream flow gauges (see Appendix E). As bankfull events have now been documented in all six years of monitoring, the project has exceeded the bankfull standard required for credit release.

Summary information/data related to the Site and statistics related to 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 Baseline Monitoring Report and in the Mitigation Plan available on the DMS website. Any raw data supporting the tables and figures in the Appendices is available from DMS upon request.

This report documents the successful completion of the Year 6 monitoring activities for the post-construction monitoring period.

2.0 METHODOLOGY

The seven-year monitoring plan for the Site includes criteria to evaluate the success of the stream and vegetation components of the Site. The methodology and report template used to evaluate these components adheres to the DMS guidance documents Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (DMS 2011), and to the Monitoring Report Template, Version 1.5 (DMS 2012), which will continue to serve as the template for subsequent monitoring years. In accordance with these documents and the approved Mitigation Plan, no formal vegetation plot monitoring was performed, nor were any stream cross-sectional surveys conducted as part of this Year 6 monitoring effort. A visual assessment of the site is emphasized this year, with the full vegetation and cross-section survey work to resume for the Year 7 monitoring in 2022.

The specific locations of monitoring features, such as vegetation plots, permanent cross-sections, reference photograph stations, crest gauges and flow gauges, are shown on the Current Condition Plan View (CCPV) map found in Appendix B.

All earthwork for project construction was completed in October of 2015, with subsequent as-built survey work completed in November of 2015. All site planting (bareroot stems and live-stakes) was completed in January of 2016. The Year 6 visual site assessment data contained in Appendix B were obtained throughout the year from field visits in February, May, August, and October 2021.

2.1 Stream Assessment

The Project involved the restoration and enhancement of a rural Piedmont stream system that had been impaired due to past agricultural conversion and cattle grazing. Restoration practices involved raising the existing streambed and reconnecting the stream to the relic floodplain to restore natural flood regimes to the system. The existing channels abandoned within the restoration areas were partially to completely filled to decrease surface and subsurface drainage and to raise the local water table. Permanent cattle exclusion fencing was provided around all proposed reaches and riparian buffers, except along reaches where no cattle are located or cattle lack stream access.

2.1.1 Morphological Parameters and Channel Stability

A longitudinal profile was surveyed for the entire length of channel immediately after construction to document as-built baseline conditions for the Monitoring Year 0 only. Annual longitudinal profiles will not be conducted during subsequent monitoring years unless channel instability has been

documented or remedial actions/repairs are required by the U.S. Army Corps of Engineers (USACE) or DMS.

As per the Mitigation Plan and DMS monitoring guidance for this project, no cross-section survey data were collected for this Monitoring Year 6 assessment. Consequently, none of the cross-sectional survey graphs (Figure 6), morphology data (Tables 11a and 11b), or pebble count data (Figure 7) are presented in Appendix D as in previous monitoring reports.

2.1.2 Hydrology

To monitor on-site bankfull events, one crest gauge (crest gauge #1) was installed along the downstream portion of Reach R2 at bankfull elevation along the left top of bank at approximately Station 38+90. During Year 6 monitoring, one above-bankfull event was documented in July 2021. Further details of the crest gauge readings are presented in Table 12 in Appendix E.

To monitor flow on restored reaches, two flow gauges were installed on site; TMCK-FL1 on Reach 2 (Station 20+75), and TMCK-FL2 on Reach 5 (Station 33+90). The Year 6 flow monitoring data demonstrated that both flow gauges met the stated success criteria of 30 days or more of consecutive flow. The pressure transducer device in Flow Gauge #1, which had failed in May 2020, was replaced in December of 2020, prior to all Year 6 monitoring.

2.1.3 Photographic Documentation

Representative stream photographs for Monitoring Year 6 were taken along each Reach in February 2021 and are provided in Appendix B. Additional photographs were taken at other times during the year as noted in the photologs.

2.1.4 Visual Stream Morphological Stability Assessment

The visual stream morphological stability assessment involves the qualitative evaluation of lateral and vertical channel stability, and the integrity and overall performance of in-stream structures throughout the Project reaches as a whole. Habitat parameters and pool depth maintenance are also evaluated. During Year 6 monitoring, Baker staff walked the entire length of each of the Project reaches several times throughout the year, noting geomorphic conditions of the stream bed profile (riffle/pool facets), both stream banks, and engineered in-stream structures. Representative photographs were taken per the Site's Mitigation Plan, and the locations of any SPAs were documented in the field for subsequent mapping on the CCPV figures. There were no SPAs noted during Year 6 monitoring. A more detailed summary of the results for the visual stream stability assessment can be found in Appendix B, which includes supporting data tables and figures, as well as the general stream photos.

2.2 Vegetation Assessment

In order to determine if the success criteria were achieved, vegetation-monitoring quadrants were installed and are monitored across the site in accordance with the CVS-DMS Protocol for Recording Vegetation, Version 4.1 (Lee 2007) using the CVS-DMS Data Entry Tool v. 2.3.1 (CVS 2012). The vegetation monitoring plots cover a minimum of 2 percent of the planted portion of the Site with sixteen plots established randomly within the planted riparian buffer areas per Monitoring Levels 1 and 2. The sizes of individual quadrants are 100 square meters for woody tree species.

As per the Mitigation Plan and DMS monitoring guidance for this project, there was no vegetation plot monitoring conducted for the Year 6 monitoring effort, and thus no vegetation data summary tables are included in Appendix C as in previous monitoring reports.

3.0 REFERENCES

Carolina Vegetation Survey (CVS) and NC Division of Mitigation Services (DMS). CVS-DMS Data Entry Tool v. 2.3.1. University of North Carolina, Raleigh, NC. 2012.

Lee, M., Peet R., Roberts, S., Wentworth, T. 2007. CVS-DMS Protocol for Recording Vegetation, Version 4.1.

North Carolina Division of Mitigation Services (DMS). 2012. NCDMS Monitoring Report Template, Version 1.5, June 8, 2012.

North Carolina Division of Mitigation Services (DMS). 2011. NCDMS Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. November 7, 2011.

North Carolina Division of Mitigation Services (DMS). 2009. Cape Fear River Basin Restoration Priorities.

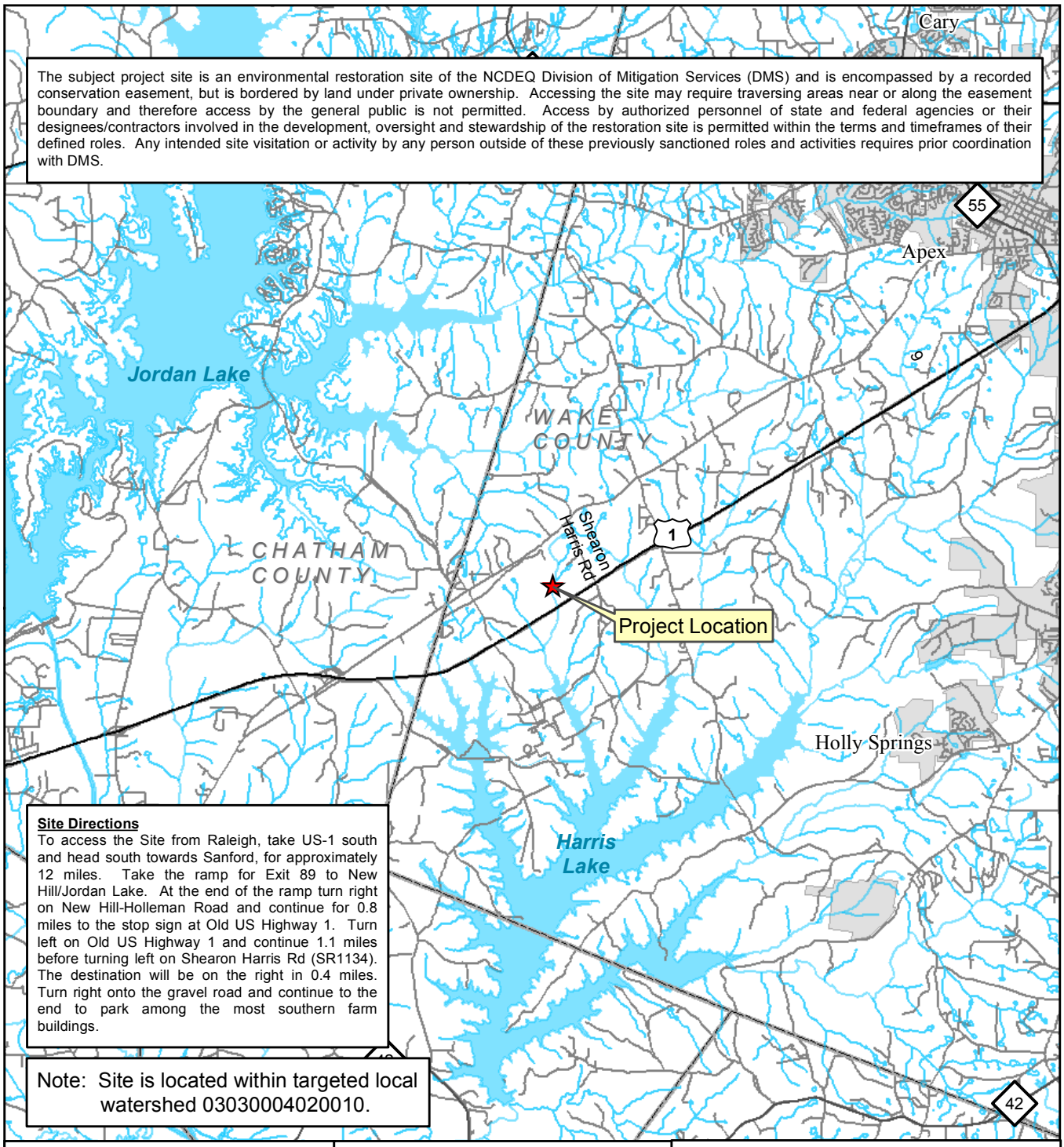
Rosgen, D.L. 1994. A Classification of Natural Rivers. Catena 22:169-199.

Rosgen, D.L. 1996. Applied River Morphology. Wildlands Hydrology. Pagosa Springs, CO.

Appendix A

Project Vicinity Map and Background Tables

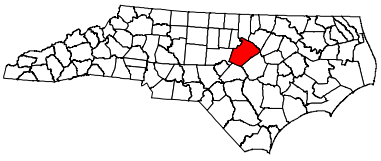
The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary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



Site Directions

To access the Site from Raleigh, take US-1 south and head south towards Sanford, for approximately 12 miles. Take the ramp for Exit 89 to New Hill/Jordan Lake. At the end of the ramp turn right on New Hill-Holleman Road and continue for 0.8 miles to the stop sign at Old US Highway 1. Turn left on Old US Highway 1 and continue 1.1 miles before turning left on Shearon Harris Rd (SR1134). The destination will be on the right in 0.4 miles. Turn right onto the gravel road and continue to the end to park among the most southern farm buildings.

Note: Site is located within targeted local watershed 03030004020010.



Wake County

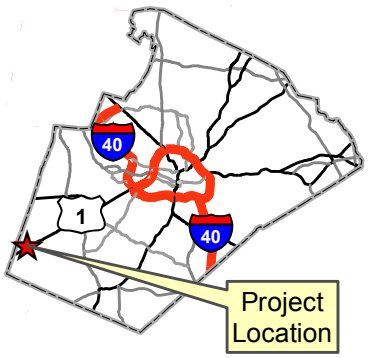


Figure 1 - Project Vicinity Map
Thomas Creek Site
DMS Project ID No. 96074

NCDEQ - Division of Mitigation Services

N

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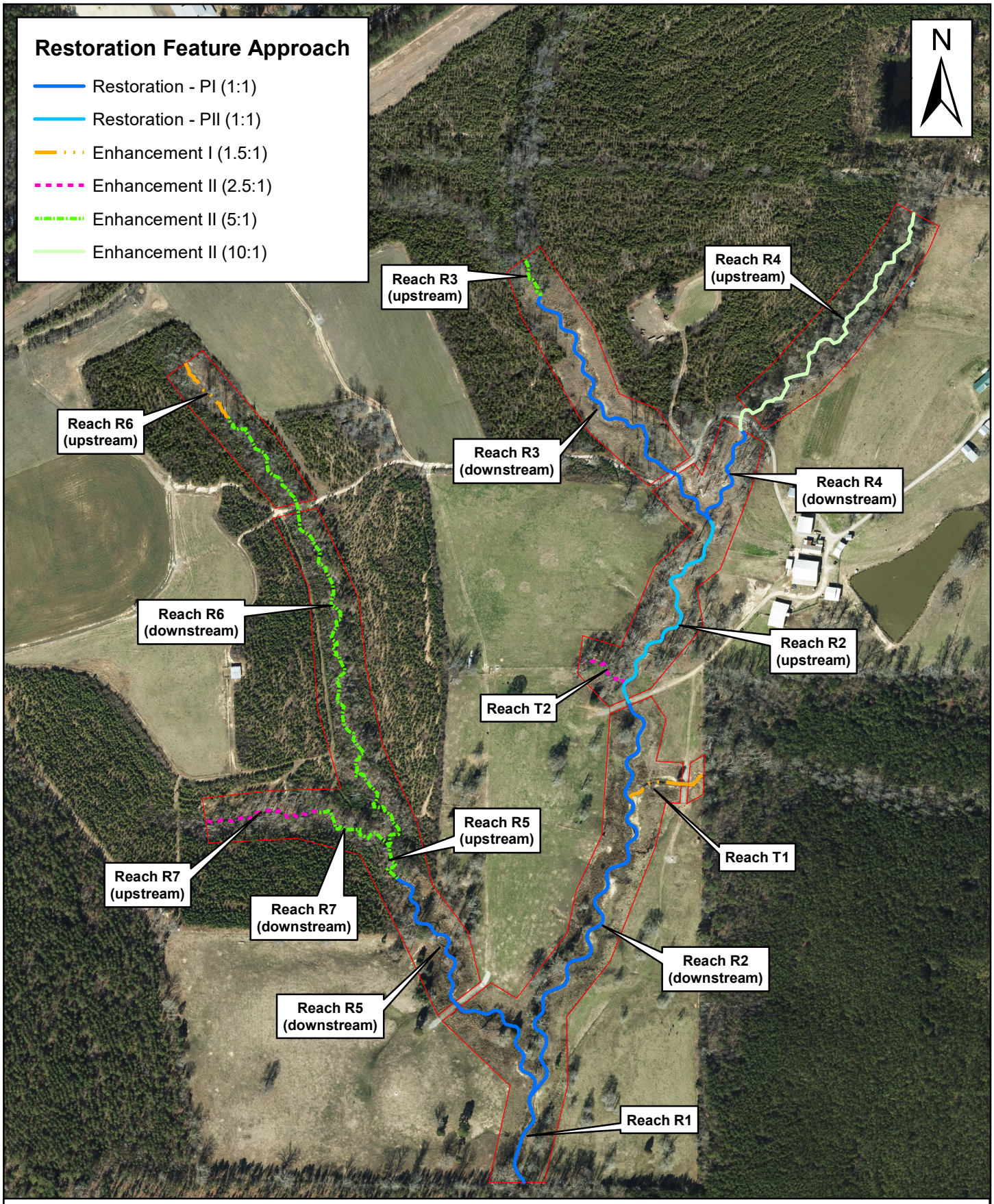
0 0.5 1 2 3 Miles



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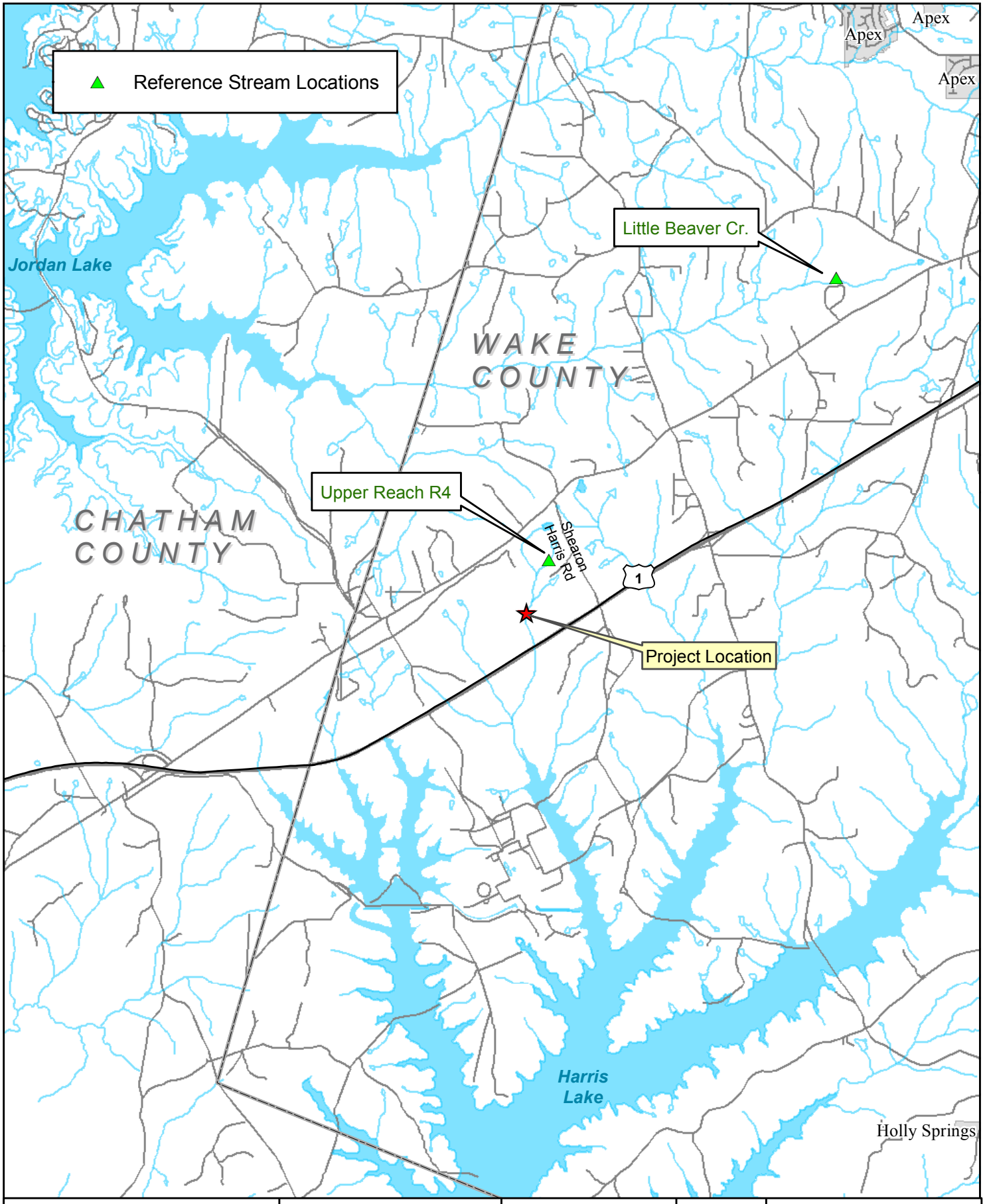
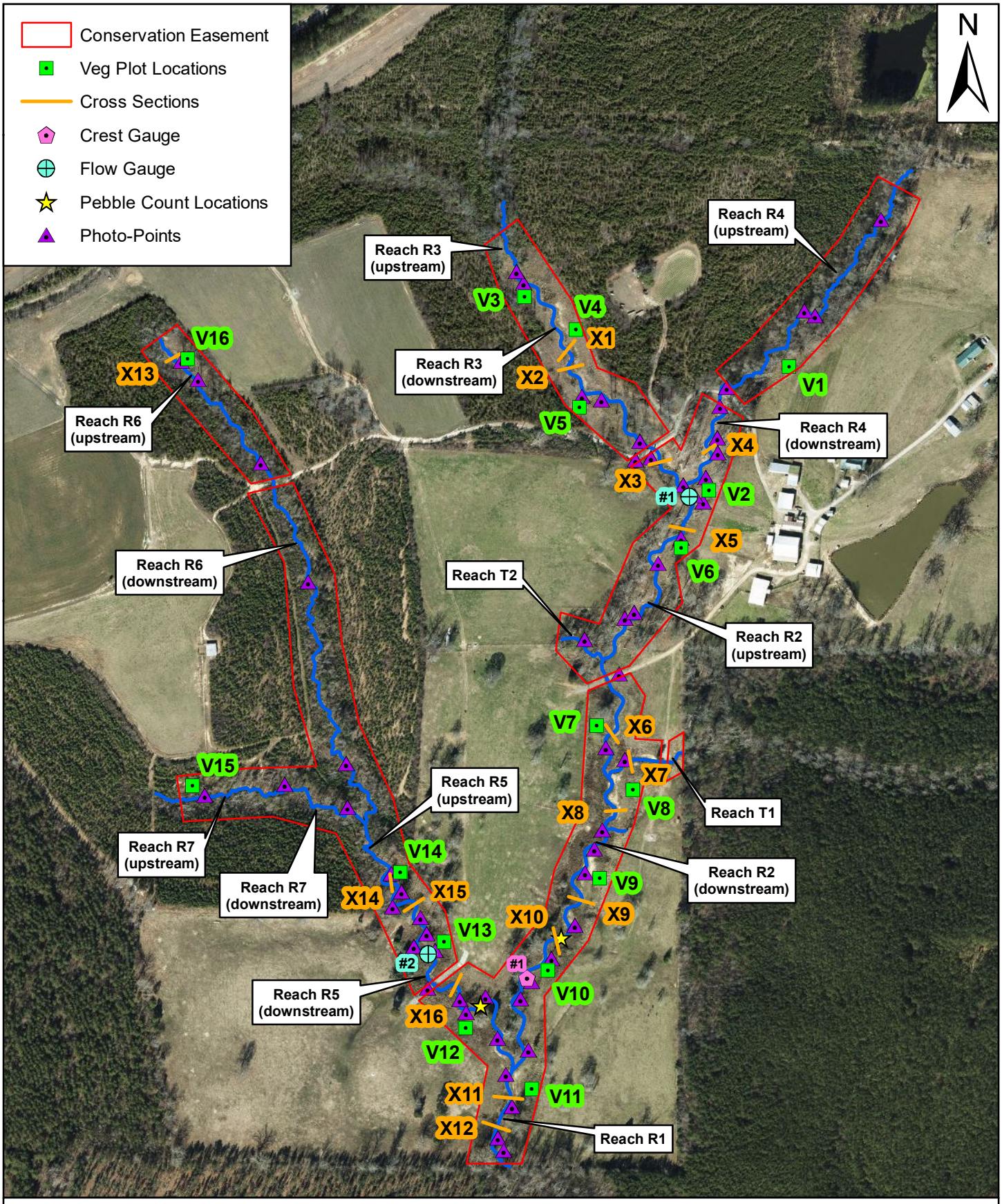
0 250 500 Feet

Figure 2
Restoration Summary Map
Thomas Creek Site



Michael Baker INTERNATIONAL	NCDEQ - Division of Mitigation Services	0 0.5 1 Miles	N	**Figure 3 Reference Stream Locations Map Thomas Creek Site**



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0 250 500 Feet

Figure 4
Monitoring Features Overview Map
Thomas Creek Site

Table 1. Project Components and Mitigation Credits

Thomas Creek Restoration Project: DMS Project ID No. 96074

Mitigation Credits

	Stream (SMUs)	Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R, E1, EII							
Totals	5,706.733							

Project Components

Project Component or Reach ID	As-Built Stationing/ Location	Existing Footage/ Acreage (LF)	Approach	Restoration/ Restoration Equivalent (SMU) from Mitigation Plan*	Design Reach Length (LF) from Mitigation Plan**	As-Built Restoration Footage (LF)	Mitigation Ratio
Reach 1	42+01 to 44+99	397	Restoration	266.000	266	298	1:1
Reach 2 (downstream)†	27+78 to 42+01	1,238	Restoration (PI)	1,384.000	1,384	1,423	1:1
Reach 2 (upstream)†	20+55 to 27+58 (at CE Break)	757	Restoration (PII)	703.000	703	703	1:1
Reach 3 (downstream)	11+17 to 18+70 / CE Break / 18+94 to 20+55	937	Restoration	929.000	929	914	1:1
Reach 3 (upstream)	10+00 to 11+17	130	Enhancement II	26.000	130	117	5:1
Reach 4 (downstream)	10+41 to 13+83	327	Restoration	361.000	361	342	1:1
Reach 4 (upstream)	00+99 to 09+95	870	Enhancement II	87.000	870	896	10:1
Reach 5 (downstream)	29+30 to 34+97 / CE Break / 35+17 to 39+91	883	Restoration	1,044.000	1,044	1,041	1:1
Reach 5 (upstream)	28+02 to 29+30	137	Enhancement II	27.400	137	128	5:1
Reach 6 (downstream)	12+10 to 15+55 / CE Break / 15+81 to 28+02	1,592	Enhancement II	319.600	1,598	1,566	5:1
Reach 6 (upstream)	10+00 to 12+10	210	Enhancement I	140.000	210	210	1.5:1
Reach 7 (downstream)	13+60 to 16+47	287	Enhancement II	57.200	286	287	5:1
Reach 7 (upstream)	10+00 to 13+60	360	Enhancement II	144.000	360	360	2.5:1
Reach T1	10+00 to 10+55 / CE Break / 10+75 to 12+47	242	Enhancement I	155.333	233	227	1.5:1
Reach T2	10+00 to 11+57	171	Enhancement II	63.200	158	157	2.5:1

Component Summation

Restoration Level	Stream (LF)	Riparian Wetland (AC)		Non-riparian Wetland (AC)	Buffer (SF)	Upland (AC)
Restoration	4,721					
Enhancement I	437					
Enhancement II	3,511					

BMP Elements

Element	Location	Purpose/Function	Notes

BMP Elements: BR= Bioretention Cell; SF= Sand Filter; SW= Stormwater Wetland; WDP= Wet Detention Pond; DDP= Dry Detention Pond; FS= Filter Strip; S= Grassed Swale; LS= Level Spreader; NI=Natural Infiltration Area

Notes:

† Starting in MY2, Reach 2 was broken up into an upstream and downstream component based on restoration approach as per DMS request. None of the actual restored lengths have changed, although the credits for R2 (downstream) were adjusted as explained below.

* Starting in MY2, the SMU credit numbers used for these reaches were taken directly from the mitigation plan credit table (Table 5.1) as per DMS/IRT instruction, and vary from those presented in the baseline and MY1 monitoring reports. This was done because credits were originally calculated along the as-built thalweg but have been updated to be calculated along stream centerlines for MY2 onward after discussions with the IRT stemming from the April 3, 2017 Credit Release Meeting. Stationing and Restoration Footage numbers reported herein and on all subsequent monitoring reports will remain as reported from the as-built survey. As Reach R2 was not originally subdivided, the credits were reduced from the downstream section where the bulk of differences are expected to have occurred, though the total combined credits equal the original value for R2 as found in the approved mitigation plan.

** Starting in MY3, as per DMS/IRT instruction, this column was added to the table showing the design reach lengths taken from the mitigation plan (Table ES.1). Please note that some of the numbers presented here vary slightly from the mit plan as they originally did not remove non-creditable sections such as easement breaks for crossings from their calculations. The numbers presented here have those non-creditable sections removed.

Table 2. Project Activity and Reporting History **Thomas Creek Restoration Project: DMS Project ID No. 96074**		
Elapsed Time Since Grading Completed in Oct. 2015	6 Years, 1 Month	
Elapsed Time Since Planting Completed in Jan. 2016	5 Years, 10 Months	
Number of Reporting Years [1]	6	
Activity or Deliverable	**Data Collection Complete**	**Actual Completion or Delivery**
Mitigation Plan Prepared	N/A	Oct-14
Mitigation Plan Amended	N/A	Mar-15
Mitigation Plan Approved	N/A	Mar-15
Final Design – (at least 90% complete)	N/A	Mar-15
Construction Begins	N/A	Apr-15
Temporary S&E mix applied to entire project area	N/A	Oct-15
Permanent seed mix applied to entire project area	N/A	Oct-15
Planting of live stakes	N/A	Jan-16
Planting of bare root trees	N/A	Jan-16
End of Construction	N/A	Oct-15
Survey of As-built conditions (Year 0 Monitoring-baseline)	Nov-15	Nov-15
Baseline Monitoring Report	Mar-16	Oct-16
Year 1 Monitoring	Nov-16	Jan-17
Stream structure and bank repairs made to Reach R1	Repairs made in July 2016	
Year 2 Monitoring	Oct-17	Nov-17
Livestakes re-planted along sections of lower Reach R2	Planted in January 2017	
Year 3 Monitoring	Nov-18	Dec-18
Bank scour repair on 3 sections of Reach R2	Repairs made in March 2018	
Supplemental planting (1-gal.) on R3	Planted in March 2018	
Year 4 Monitoring	Oct-19	Jan-20
Bank scour repair on 2 sections of Reach R2	January 2019	
Supplemental planting (bareroots) on Reach T1	Planted in January 2019	
Cattail treated on sections of R2 and R4	Treated in March and April 2019	
Soil amendments on Reach R3	March and September 2019	
Year 5 Monitoring	Oct-20	Jan-21
Soil amendments on Reach R3	May and October 2020	
Year 6 Monitoring	Oct-21	Dec-21 (Final)
Soil amendments on Reach R3	April 2021	
Year 7 Monitoring	-	-

[1] The number of reports or data points produced excluding the baseline

Table 3. Project Contacts Thomas Creek Restoration Project: DMS Project ID No. 95729	
Designer	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact: Katie McKeithan, Telephone: 919-481-5703
Construction Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Planting Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Seeding Contractor	
KBS Earthworks	5616 Coble Church Rd Julian, NC 27283 Contact: Chris Sizemore, Telephone: 336-362-0289
Seed Mix Source	Green Resources, Telephone: 336-855-6363
Nursery Stock Suppliers	Mellow Marsh Farm, Telephone: 919-742-1200 ArborGen, Telephone: 843-528-3204
Monitoring Performers	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact:
Stream Monitoring Point of Contact	Scott King, Telephone 919-412-6102
Vegetation Monitoring Point of Contact	Scott King, Telephone 919-412-6102

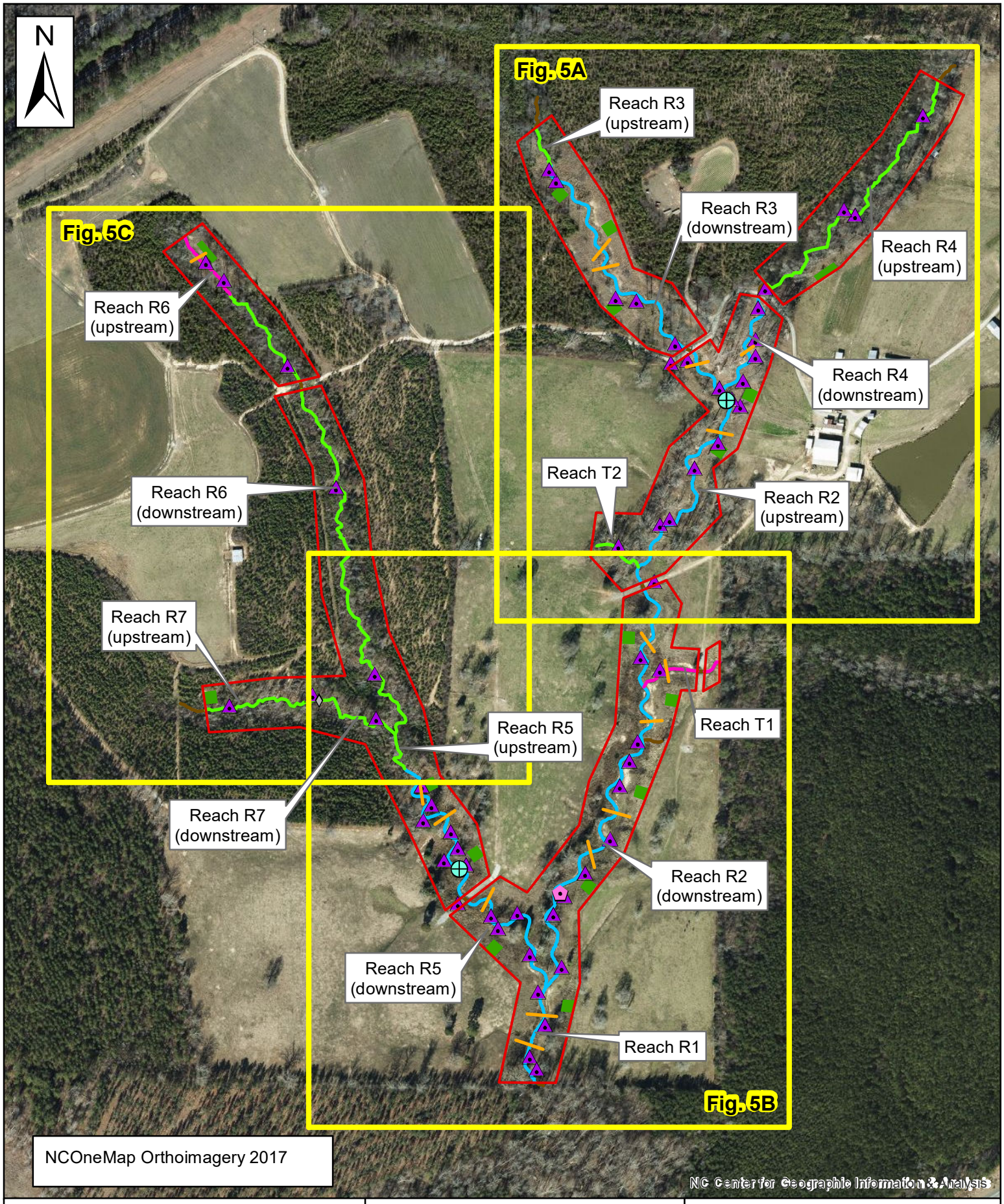
Table 4. Project Attributes (Pre-Construction Conditions)
Thomas Creek Restoration Project: DMS Project No. ID 96074

Project Information					
Project Name	Thomas Creek Restoration Project				
County	Wake				
Project Area (acres)	22.7				
Project Coordinates (latitude and longitude)	35.660521 N, -79.954475 W				
Project Watershed Summary Information					
Physiographic Province	Piedmont				
River Basin	Cape Fear				
USGS Hydrologic Unit 8-digit and 14-digit	03030004 / 03030004020010				
NCDWR Sub-basin	03-06-07				
Project Drainage Area (acres)	246 (Reach R1 main stem at downstream extent)				
Project Drainage Area Percent Impervious	<1%				
CGIA / NCEEP Land Use Classification	2.01.01.01, 2.03.01, 2.99.01, 3.02 / Forest (66%) Agriculture (19%) Impervious Cover (1%)				
Reach Summary Information					
Parameters	**Reach R1**	**Reach R2**	**Reach R3**	**Reach R4**	**Reach R5**
Length of Reach (linear feet)	397	1,995	1,067	342	1,020
Valley Classification (Rosgen)	VII	VII	VII	VII	VII
Drainage Area (acres)	246	176	62	36	62
NCDWR Stream Identification Score	37.5	38	25 / 37	31	31 / 34
NCDWR Water Quality Classification	C				
Morphological Description (Rosgen stream type)	Bc	F (upstream)/ Gc (downstream)	Gc (upstream)/ Bc (downstream)	Bc	Bc
Evolutionary Trend	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F
Underlying Mapped Soils	WoA	WoA	WoA	WoA	WoA
Drainage Class	Poorly drained	Poorly drained	Poorly drained	Poorly drained	Poorly drained
Soil Hydric Status	Hydric	Hydric	Hydric	Hydric	Hydric
Average Channel Slope (ft/ft)	0.0165	0.0083	0.014	0.0102	0.0172
FEMA Classification	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Piedmont Small Stream				
Percent Composition of Exotic/Invasive Vegetation	<5%	25%	<5%	<5%	<5%
Parameters	**Reach R6**	**Reach R7**	**Reach T1**	**Reach T2**	
Length of Reach (linear feet)	1,828	646	242	171	
Valley Classification (Rosgen)	VII	VII	VII	VII	
Drainage Area (acres)	32	14	49	5	
NCDWR Stream Identification Score	25 / 30	23 / 35	23.75	20.75	
NCDWR Water Quality Classification	C				
Morphological Description (Rosgen stream type)	G5c (upstream)/ B5c (downstream)	G5 (upstream)/ B5c (downstream)	B5c	B5c	
Evolutionary Trend	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	Bc→Gc→F	
Underlying Mapped Soils	WoA	WoA	WoA	WoA	
Drainage Class	Poorly drained	Poorly drained	Poorly drained	Poorly drained	
Soil Hydric Status	Hydric	Hydric	Hydric	Hydric	
Average Channel Slope (ft/ft)	0.015/0.025	0.025	0.02	0.041	
FEMA Classification	N/A	N/A	N/A	N/A	
Native Vegetation Community	Piedmont Small Stream				
Percent Composition of Exotic/Invasive Vegetation	<5%	<5%	<5%	<5%	

Regulatory Considerations			
Regulation	**Applicable**	**Resolved**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	Categorical Exclusion (Appendix B)
Waters of the United States – Section 401	Yes	Yes	Categorical Exclusion (Appendix B)
Endangered Species Act	No	N/A	Categorical Exclusion (Appendix B)
Historic Preservation Act	No	N/A	Categorical Exclusion (Appendix B)
Coastal Area Management Act (CAMA)	No	N/A	Categorical Exclusion (Appendix B)
FEMA Floodplain Compliance	No	Yes	Categorical Exclusion (Appendix B)
Essential Fisheries Habitat	No	N/A	Categorical Exclusion (Appendix B)

Appendix B

Visual Assessment Data

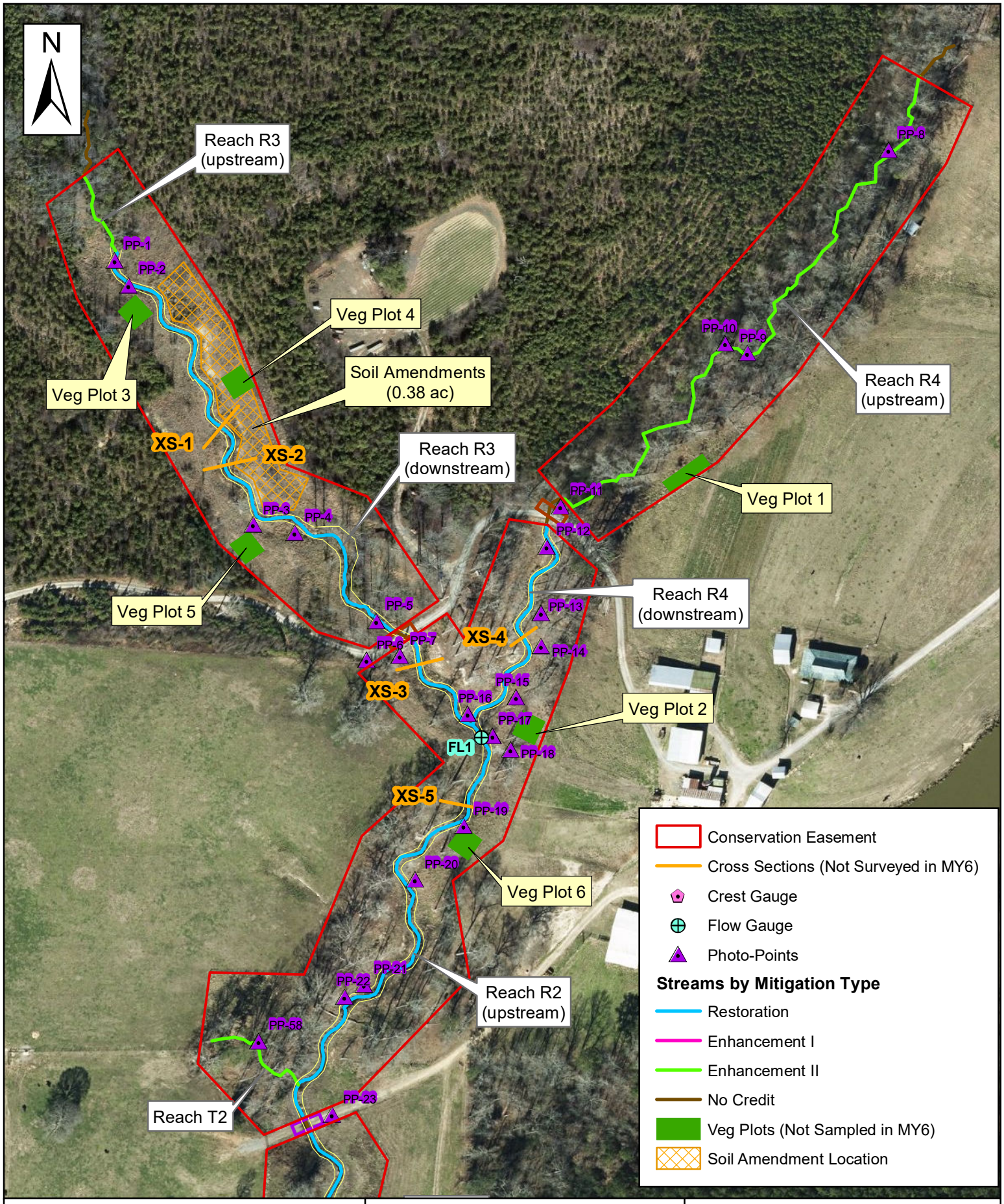


Michael Baker INTERNATIONAL

0 250 500 Feet

DEQ DMS Project # 96074

Figure 5 Index Map
Current Condition Plan View
Thomas Creek Site - MY6

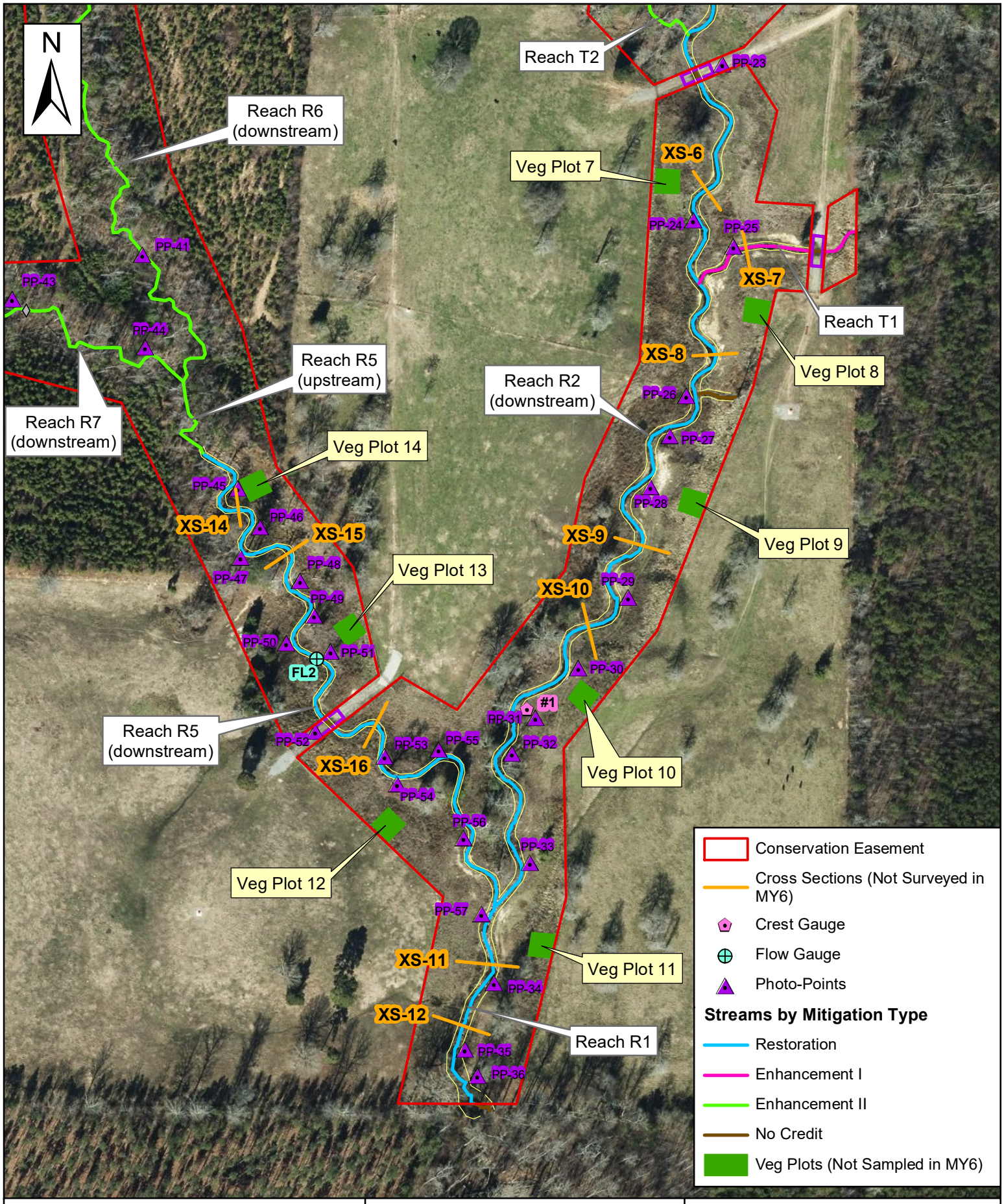


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5A
Current Condition Plan View
Thomas Creek Site - MY6

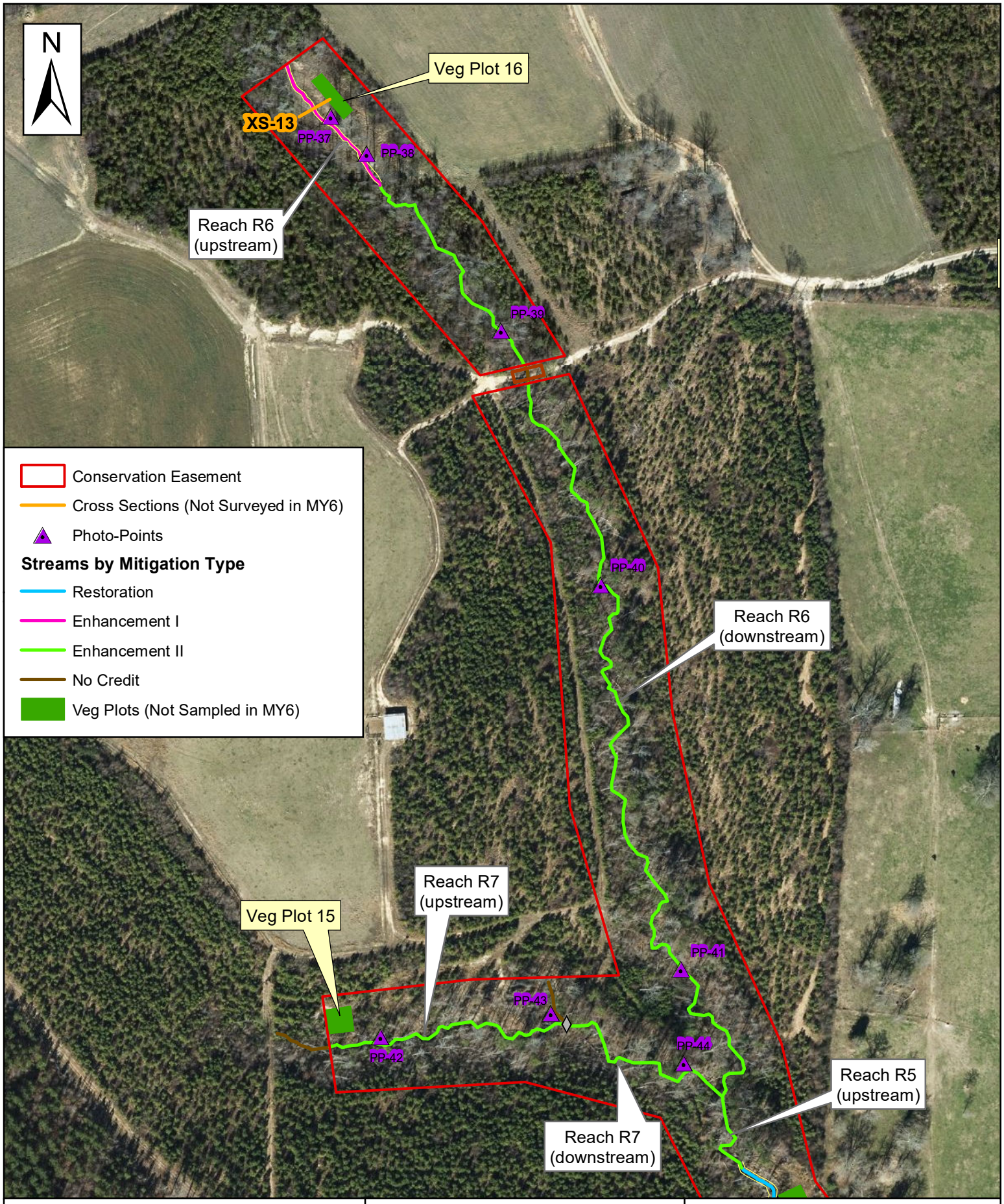


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5B
Current Condition Plan View
Thomas Creek Site - MY6



Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5C
Current Condition Plan View
Thomas Creek Site - MY6

Table 5. Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 1
Assessed Length (LF): 298

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	3	3			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	3	3			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	3	3			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	3	3			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	3	3			100%			

Table 5. Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 2
Assessed Length (LF): 2,126

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	38	38			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	41	41			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	41	41			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	41	41			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	41	41			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	27	27			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	24	24			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	27	27			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	27	27			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	13	13			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 3
Assessed Length (LF): 1,031

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	16	16			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	15	15			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	15	15			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	15	15			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	15	15			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	10	10			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	10	10			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	10	10			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	7	7			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 4
Assessed Length (LF): 1,238

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	8	8			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	8	8			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	8	8			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	8	8			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	4	4			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	4	4			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	4	4			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	3	3			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 5
Assessed Length (LF): 1,169

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	17	17			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	18	18			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	18	18			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	18	18			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	18	18			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	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	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	16	16			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	16	16			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	15	15			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 6
Assessed Length (LF): 1,776

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	6	6			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	5	5			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	0	0			-			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	0	0			-			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	0	0			-			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	0	0			-			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	0	0			-			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach 7
Assessed Length (LF): 647

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	5	5			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	6	6			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	6	6			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	6	6			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	6	6			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	2	2			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	2	2			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	2	2			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach ID: Reach T1
Assessed Length (LF): 227

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	4	4			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	5	5			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	1	1			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	1	1			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	1	1			100%			

Table 5. Continued Visual Steam Morphology Stability Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach ID: Reach T2

Assessed Length (LF): **157**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number per As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1.Vertical Stability	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture Substrate - Riffle maintains coarser substrate	3	3			100%			
	3. Meander Pool Condition	1. Depth - Sufficent (Max Pool Depth/Mean Bkf Depth ≥ 1.5)	2	2			100%			
		2. Length - Sufficent (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2	2			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	2	2			100%			
		2. Thalweg centering at downstream of meander bend (Glide)	2	2			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover due to active scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting is expected			0	0	100%	0	0	100%
	3. Mass Wasting	Banks slumping, caving or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineering Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath or around sills or arms	1	1			100%			
	3. Bank Position	Bank erosion within the structures extent of influence **does not** exceed 15%	1	1			100%			
	4. Habitat	Pool forming structures maintaining - Max Pool Depth/Mean Bankfull Depth ratio ≥ 1.5. Rootwads/logs providing some cover at low flow	1	1			100%			

Table 6. Vegetation Conditions Assessment
Thomas Creek Restoration Project: DMS Project ID No. 96074

Planted Acreage: 14.4

Vegetation Category	Defintions	Mapping Threshold (acres)	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover both woody and herbaceous material.	0.1	N/A	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	N/A	0	0.00	0.0%
			Total	**0**	**0.00**	**0.0%**
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems or a size class that are obviously small given the monitoring year.	0.25	N/A	0	0.00	0.0%
			Cumulative Total	**0**	**0.00**	**0.0%**

Easement Acreage: 22.7

Vegetation Category	Defintions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale)	1000 ft²	N/A	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale)	none	N/A	0	0.00	0.0%

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-1: Reach 3, view upstream, Station 11+50

PP-2: Reach 3, view downstream, Station 12+00

PP-3: Reach 3, view upstream, Station 15+75

PP-4: Reach 3, view downstream, Station 16+25

PP-5: Reach 3, view downstream towards pipe crossing, Station 18+50

PP-6: Reach 3, stream crossing, Station 18+80

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-7: Reach 3, Station 19+00

PP-8: Reach 4, view downstream at Station 01+90

PP-9: Reach 4, view downstream at Station 05+75

PP-10: Reach 4, view downstream at Station 06+10

PP-11: Reach 4, view upstream at Station 10+10

PP-12: Reach 4, view upstream at Station 10+50

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-13: Reach 4, view upstream at Station 11+75

PP-14: Reach 4, view downstream at Station 12+25

PP-15: Reach 4, view upstream at Station 13+00

PP-16: Reach 2, view upstream at Station 20+60

PP-17: Reach 2, Flow Gauge #1 at Station 20+75

PP-18: Reach 2, view of stabilized drainage on left bank at Station 20+80

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-19: Reach 2, view upstream at Station 22+00

PP-20: Reach 2, view upstream at Station 23+00

PP-21: Reach 2, view upstream at Station 25+25

PP-22: Reach 2, view downstream at Station 25+50

PP-23: Reach 2, view of crossing at Station 27+75

PP-24: Reach 2, view downstream at Station 30+20

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-25: Reach T1, view downstream at Station 11+75

PP-26: Reach 2, view of drainage on left bank at Station 32+90

PP-27: Reach 2, view downstream at Station 33+25

PP-28: Reach 2, view downstream at Station 34+30

PP-29: Reach 2, view downstream at Station 36+90

PP-30: Reach 2, view upstream at Station 38+25

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-31: Reach 2, Crest Gauge at Station 38+90

PP-32: Reach 2, view downstream at Station 39+40

PP-33: Reach 2, view upstream at Station 41+50

PP-34: Reach 1, view upstream at Station 42+75

PP-35: Reach 1, view downstream at Station 43+25

PP-36: Reach 1, view of drainage on left bank at Station 44+00

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-37: Reach 6, view upstream at Station 10+75

PP-38: Reach 6, view upstream at Station 11+50

PP-39: Reach 6, view upstream at Station 15+25

PP-40: Reach 6, view upstream at Station 18+90

PP-41: Reach 6, view upstream at Station 25+50

PP-42: Reach 7, view upstream at Station 10+40

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-43: Reach 7, view of stabilized drainage at Station 13+50

PP-44: Reach 7, view upstream at Station 15+00

PP-45: Reach 5, view upstream at Station 30+25

PP-46: Reach 5, view downstream at Station 30+75

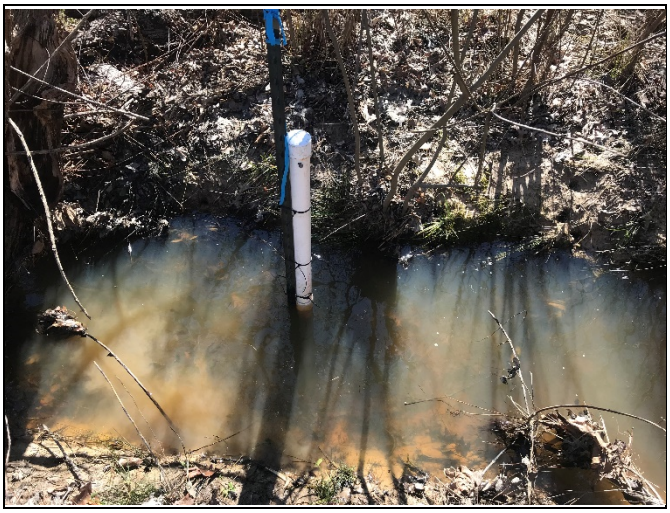
PP-47: Reach 5, view downstream at Station 31+40

PP-48: Reach 5, view downstream at Station 32+50

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-49: Reach 5, view upstream at Station 33+10

PP-50: Reach 5, view downstream at Station 33+75



PP-51: Reach 5, Flow Gauge #2 at Station 33+90

PP-52: Reach 5, view of crossing at Station 35+00 (note: no cattle in upper field so gate is OK to have open)

PP-53: Reach 5, view upstream at Station 36+40

PP-54: Reach 5, view upstream at Station 36+75

Thomas Creek: MY6 Stream Station Photo-Points (from 2/16/21)

PP-55: Reach 5, view downstream at Station 37+30

PP-56: Reach 5, view upstream at Station 38+50

PP-57: Reach 5, view upstream at Station 39+90
(the confluence of R5 and R2)

PP-58: Reach T2, view upstream at Station 10+80

Thomas Creek: MY6 Crest Gauge Photographs

Crest Gauge on Reach R2 at Station 38+90
(photo from 2/18/21)

Overbank event of 0.62 ft on 7/8/21
(photo from 8/10/21)

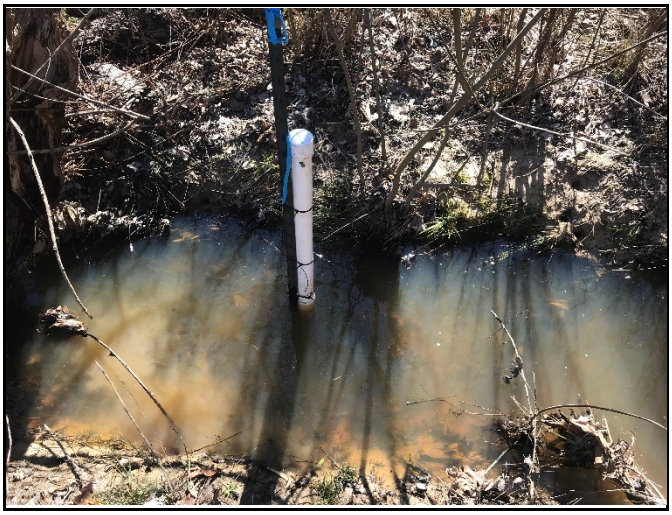
Overbank event of 0.62 ft (7.4 in) on 7/8/21
(photo from 8/10/21)

Thomas Creek: MY6 Additional Monitoring Photographs

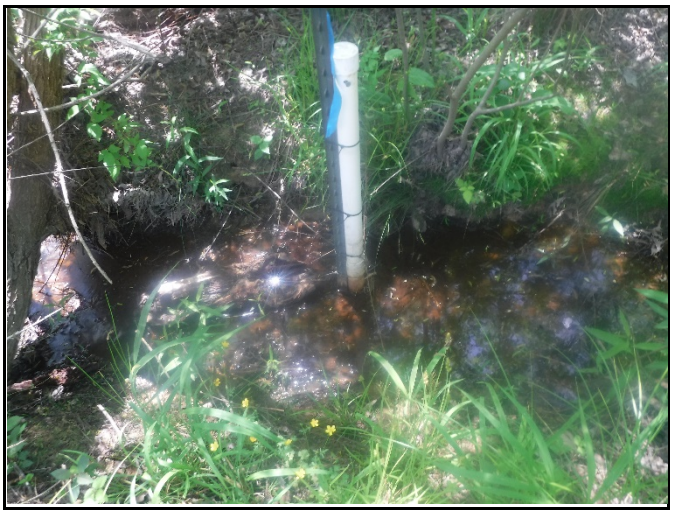
Flow Gauge #1 on Reach R2 (photo: 2/16/21)

Flow Gauge #1 on Reach R2 (photo: 5/5/21)

Flow Gauge #1 on Reach R2 (photo: 8/10/21)



Flow Gauge #2 on Reach R5 (photo: 2/16/21)



Flow Gauge #2 on Reach R5 (photo: 5/5/21)

Flow Gauge #2 on Reach R5 (photo: 8/10/21)

Thomas Creek: MY6 Additional Monitoring Photographs

Flow in pipe culvert on R4 (photo: 2/16/21)

Flow in pipe culvert on R4 (photo: 2/16/21)

Flow on T2, upstream (photo: 2/16/21)

Flow on T2, upstream (photo: 5/5/21)

Flow on T2, downstream (photo: 5/5/21)

Flow on upper R6, upstream (photo: 2/16/21)

Thomas Creek: MY6 Additional Monitoring Photographs

Flow on upper R6, upstream (photo: 2/16/21)

Flow on upper R6, upstream (photo: 4/13/21)

Flow on upper R6, upstream (photo: 4/13/21)

Flow on upper R6, upstream (photo: 5/5/21)

Flow on upper R6, upstream (photo: 5/5/21)

Flow on upper R6, upstream (photo: 5/5/21)

Thomas Creek: MY6 Additional Monitoring Photographs

Stable Rock Ford Crossing on Reach R2 (photo: 2/16/21)

Stable Rock Ford Crossing on Reach R5 (photo: 2/16/21)

Stable Rock Ford Crossing on Reach T1 (photo: 2/16/21)

Previously repaired bend along Reach R2 (photo: 2/16/21)

Previously repaired bend along Reach R2 (photo: 2/16/21)

Previously repaired bend along Reach R2 (photo: 2/16/21)

Thomas Creek: MY6 Additional Monitoring Photographs

Previously repaired bend a long Reach R2 (photo: 5/5/21)

Previously repaired bend a long Reach R2 (photo: 5/5/21)

Vegetation growth within the left buffer of upper Reach R3, looking up-valley (photo: 8/10/21)

Vegetation growth within the left buffer of upper Reach R3, looking down-valley (photo: 8/10/21)

Appendix C

Vegetation Plot Data*

***No vegetation plot monitoring was required for Year 6.**

Appendix D

Stream Survey Data*

***No cross-section survey monitoring was required for Year 6.**

Table 10. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 1 - Length 298 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	-----	-----	-----	9.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.5	----	----	-----	-----	-----	13.9	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	9.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	>25	----	----	-----	-----	-----	30.6	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.9	----	----	-----	-----	-----	0.8	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	1.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	----	----	-----	-----	-----	1.1	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	11.2	-----	-----	-----	-----	11.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.2	----	----	-----	-----	-----	11.1	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	7.2	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	----	----	-----	-----	-----	17.4	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.8	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	>2.2	----	----	-----	-----	-----	2.2	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.5	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.0	-----	----	-----	-----	-----	34.4	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25.0	-----	-----	35.0	-----	-----	-----	33.1	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	2.8	-----	-----	-----	2.4	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	105.0	-----	-----	-----	103.4	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8.0	-----	-----	-----	2.4	-----	----	-----	-----	-----	2.5	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.028	-----	-----	-----	0.025	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24	-----	-----	60	-----	-----	-----	64.0	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.4	-----	-----	-----	2.5	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.15 / 0.27 / 0.34 / 0.75 / 1.39																					
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	0.38	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.4	4.0	-----	-----	-----	-----	3.9	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	4	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	27.6	44.6	-----	-----	-----	-----	44.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	44.6	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	271.1	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	397	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	266	-----	-----	-----	-----	-----	324.3	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.18	-----	-----	1.1	-----	-----	1.3	-----	-----	-----	-----	-----	1.22	-----	-----	-----	-----	-----	1.2	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0028	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	0.0168	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0050	-----	-----	0.002	-----	-----	0.015	-----	-----	-----	-----	-----	0.0165	-----	-----	-----	-----	-----	0.0201	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 2 - Length 2,126 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	6.5	-----	-----	9.4	-----	-----	-----	-----	-----	-----	-----	-----	9.2	-----	-----	10.4	-----	-----	10.2	10.3	-----	10.4	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	9.0	-----	-----	13.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	>18	-----	----	-----	-----	38.2	58.5	-----	74.5	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.6	-----	-----	1.2	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	0.7	-----	-----	0.7	0.8	-----	1.0	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	1.6	-----	-----	2.6	-----	-----	-----	-----	-----	-----	-----	-----	0.8	-----	-----	1.0	-----	-----	1.0	1.2	-----	1.5	-----	-----
BF Cross-sectional Area (ft^2)	-----	6.0	7.7	-----	7.7	-----	-----	15.7	-----	-----	-----	-----	-----	-----	-----	-----	6.0	-----	-----	7.7	-----	-----	7.4	8.6	-----	10.2	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	3.4	-----	-----	5.4	-----	-----	10.0	-----	-----	15.0	-----	-----	14.0	-----	-----	14.0	-----	-----	10.1	12.5	-----	14.8	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.4	-----	-----	1.4	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	----	-----	-----	3.7	5.7	-----	7.2	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.2	-----	-----	3.3	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	0.9	1.0	-----	1.0	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.0	-----	-----	45.0	-----	-----	-----	56.6	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.0	-----	-----	30.0	-----	-----	-----	22.0	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	3.0	-----	-----	-----	2.1	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	75.0	-----	-----	107.0	-----	-----	-----	83.2	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	-----	14.0	-----	-----	3.3	-----	-----	4.7	-----	-----	-----	5.5	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	17.7	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0094	-----	-----	0.02	-----	-----	-----	0.012	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	75	-----	-----	-----	50.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.7	-----	-----	1.9	-----	-----	-----	1.7	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.11 / 0.22 / 0.32 / 0.85 / 1.89																	20.2 / 47.6 / 62.5 / 133.1 / 173.1				
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.153	-----	-----	0.275	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.275	-----	-----	-----	-----	-----	0.275	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	G5c	-----	-----	F5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.2	3.9	-----	3.8	-----	-----	3.9	-----	-----	3.5	-----	-----	5	-----	-----	3.8	-----	-----	3.9	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	17.8	29.7	-----	22.9	-----	-----	35.0	-----	-----	-----	-----	-----	-----	-----	-----	23.0	-----	-----	29.7	-----	-----	-----	-----	-----	----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2549.3	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,995	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,089	-----	-----	-----	-----	-----	3413.7	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	1.2	-----	-----	1.5	-----	-----	-----	-----	-----	1.20	-----	-----	-----	-----	-----	1.3	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0082	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0047	-----	-----	0.0083	-----	-----	-----	-----	-----	0.0092	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	0.0098	-----	-----	-----	-----	0.002	-----	-----	0.01	-----	-----	-----	-----	-----	0.01	-----	-----	-----	-----	-----	0.0123	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle, As-Built measurement taken on constructed rock riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Reach 3 - Length 1,031 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data: Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	4.5	-----	-----	5.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	----	-----	-----	7.5	8.4	-----	9.3	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	6.7	-----	-----	9.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	>16	-----	----	-----	-----	37.3	46.3	-----	55.3	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.7	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	0.6	0.7	-----	0.8	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	1.0	-----	-----	1.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	0.9	0.9	-----	1..29	-----	-----
BF Cross-sectional Area (ft^2)	-----	26.8	36.2	-----	3.0	-----	-----	4.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.1	-----	----	-----	-----	4.5	5.9	-----	7.3	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	6.5	-----	-----	6.7	-----	-----	10	-----	-----	14.0	-----	-----	11.0	12.0	-----	13.0	-----	-----	11.9	12.1	-----	12.3	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.5	-----	-----	1.8	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	-----	-----	-----	5.0	5.5	-----	5.9	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.3	-----	-----	3.2	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	1.0	1.0	-----	1.0	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	18	-----	-----	28	-----	-----	-----	32.2	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15	-----	-----	21	-----	-----	-----	19.1	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	2.0	-----	-----	2.7	-----	-----	-----	2.3	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	70	-----	-----	80	-----	-----	-----	77.5	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.6	-----	-----	4.0	-----	-----	-----	3.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.5	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	-----	-----	2.0	-----	-----	-----	0.031	-----	----	-----	-----	-----	0.013	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.0	-----	-----	48.0	-----	-----	-----	47.2	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	----	-----	-----	-----	1.3	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			.014 / .029 / 0.41 / 1.16 / 3.05																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.083	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.083	-----	-----	-----	-----	-----	0.083	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	---	-----	-----	E/C5	-----	-----	----	-----	-----	E/C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.0	3.6	-----	3.8	-----	-----	2.3	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	9.4	16.5	-----	12.2	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	873	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,067	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,231	-----	-----	-----	-----	-----	1,031	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.22	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.20	-----	-----	-----	-----	-----	1.2	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0150	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0150	-----	-----	-----	-----	-----	0.0092	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0182	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.0182	-----	-----	-----	-----	-----	0.0123	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 4 - Length 1,238 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	-----	-----	-----	4.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.3	-----	----	-----	-----	-----	6.8	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	9.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	>13	-----	----	-----	-----	-----	21.9	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	0.5	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	3.1	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.1	-----	----	-----	-----	-----	3.6	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	6.4	-----	-----	10.0	-----	-----	14.0	-----	-----	12.0	----	-----	14.0	-----	-----	-----	12.7	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.1	-----	----	-----	-----	-----	3.2	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	3.0	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.0	-----	-----	29.0	-----	-----	-----	34.0	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	16.9	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	-----	-----	3.0	-----	-----	-----	2.5	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	60.0	-----	-----	75.0	-----	-----	-----	66.2	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8.0	-----	-----	3.2	-----	-----	4.6	-----	-----	-----	5.0	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.4	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.029	-----	-----	-----	0.035	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28-	-----	-----	43	-----	-----	-----	42.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	-----	1.3	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.056	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.056	-----	-----	-----	-----	-----	0.056	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	3.2	3.9	-----	-----	-----	-----	3.6	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	17.8	29.7	-----	-----	-----	-----	11.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.1	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	285.55	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,197	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,201	-----	-----	-----	342.91	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.16	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.13	-----	-----	-----	1.20	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0121	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.015	-----	-----	-----	0.0156	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0105	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.024	-----	-----	-----	0.0188	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 5 - Length 1,169 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data – Little Beaver Creek (Wake County)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	11.6	11.9	-----	4.4	-----	-----	8.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.8	-----	----	-----	-----	-----	8.6	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	7.8	-----	-----	>30	-----	-----	-----	-----	-----	-----	-----	-----	-----	>16	-----	----	-----	-----	-----	49.9	-----	-----	-----	-----
BF Mean Depth (ft)	-----	1.2	1.5	-----	0.4	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	0.8	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	-----	1.2	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	4.0	-----	3.4	-----	-----	4.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.6	-----	----	-----	-----	-----	6.8	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	4.2	-----	-----	3.4	-----	-----	10.0	-----	-----	14.0	-----	-----	-----	13.0	-----	----	-----	-----	-----	8.4	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.8	-----	-----	5.4	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.3	-----	----	-----	-----	-----	6.6	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.4	-----	-----	1.0	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28	-----	-----	45	-----	-----	-----	58.6	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14	-----	-----	20	-----	-----	-----	17.5	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	-----	2.0	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	60	-----	-----	90	-----	-----	-----	81.5	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8	-----	-----	4.1	-----	-----	6.6	-----	-----	-----	6.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.2	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0265	-----	----	-----	-----	-----	0.0196	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	55	-----	-----	-----	57.8	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.3	-----	----	-----	-----	-----	1.7	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Bc%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																				17.6 / 36.9 / 53.7 / 130.6 / 184.8				
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.097	-----	-----	0.083	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.097	-----	-----	-----	-----	-----	0.097	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	B5c	-----	-----	C	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	E5	-----	-----
BF Velocity (fps)	-----	3.4	3.7	-----	3.7	-----	-----	4.2	-----	-----	3.5	-----	-----	5	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	9.4	14.7	-----	14.4	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	726.02	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,022	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,828	-----	-----	-----	1069.32	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	1.31	-----	-----	1.42	-----	-----	1.20	-----	-----	1.50	-----	-----	-----	-----	-----	1.42	-----	-----	-----	1.47	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0177	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0124	-----	-----	-----	0.0123	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0133	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.0134	-----	-----	-----	0.0185	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle, As-Built measurement taken on constructed rock riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 6 - Length 1,776 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	3.2	-----	-----	4.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.6	-----	----	-----	-----	-----	6.3	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	4.5	-----	-----	6.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	>9	-----	----	-----	-----	-----	19.4	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.60	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.3	-----	----	-----	-----	-----	0.3	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.4	-----	----	-----	-----	-----	0.6	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	1.8	-----	-----	2.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	----	-----	-----	-----	2.1	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	0.9	-----	-----	5.8	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	-----	----	-----	-----	-----	18.7	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	1.4	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	>2.0	-----	----	-----	-----	-----	3.1	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	2.9	-----	-----	4.4	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	----	-----	-----	-----	0.8	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	12.5	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.04	-----	----	-----	-----	-----	0.027	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	34.6	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.0	-----	----	-----	-----	-----	1.2	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----				----												---								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	0.019	-----	-----	0.050	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.05	-----	-----	-----	-----	-----	0.05	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	B5c	-----	-----	G5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	2.8	-----	-----	4.1	-----	-----	4	-----	-----	6	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	5.1	-----	-----	10.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	201	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1,828	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,808	-----	-----	-----	-----	-----	210	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.13	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.05	-----	-----	-----	-----	-----	1.04	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	0.0148	-----	-----	0.0250	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.030	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	0.0250	-----	-----	0.0361	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.033	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 7 - Length 647 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	8.4	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	4.2	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Bc%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[1] d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			.012 / 0.29 / 0.43 / 0.87 / 1.39																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	0.022	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	4	-----	-----	6	-----	-----	-----	-----	-----	3.33	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	5.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	646	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	646	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.11	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.11	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.025	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.032	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.036	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.036	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach T1 - Length 227 ft

Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																												
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	7.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	-----	-----	-----	-----	8.5	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	10.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.6	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	0.9	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----	-----	5.3	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	18.6	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	13.0	-----	-----	-----	-----	-----	13.6	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.5	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.6	-----	-----	1.0	-----	-----	1.1	-----	-----	-----	1.0	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.5	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.5	-----	-----	18.0	-----	-----	-----	14.0	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	-----	-----	2.6	-----	-----	-----	1.7	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	48.0	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14.7	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0135	-----	-----	-----	-----	-----	0.0113	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25	-----	-----	42	-----	-----	-----	41.2	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Bc%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.077	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.077	-----	-----	-----	-----	-----	0.077	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	C5	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	5.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.66	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	14.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.9	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	218	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	242	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	253	-----	-----	-----	227	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.09	-----	-----	1.10	-----	-----	1.30	-----	-----	-----	-----	-----	1.16	-----	-----	-----	1.04	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0203	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.004	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0120	-----	-----	0.005	-----	-----	0.015	-----	-----	-----	-----	-----	0.005	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

Table 10 continued. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach T2 - Length 157 ft

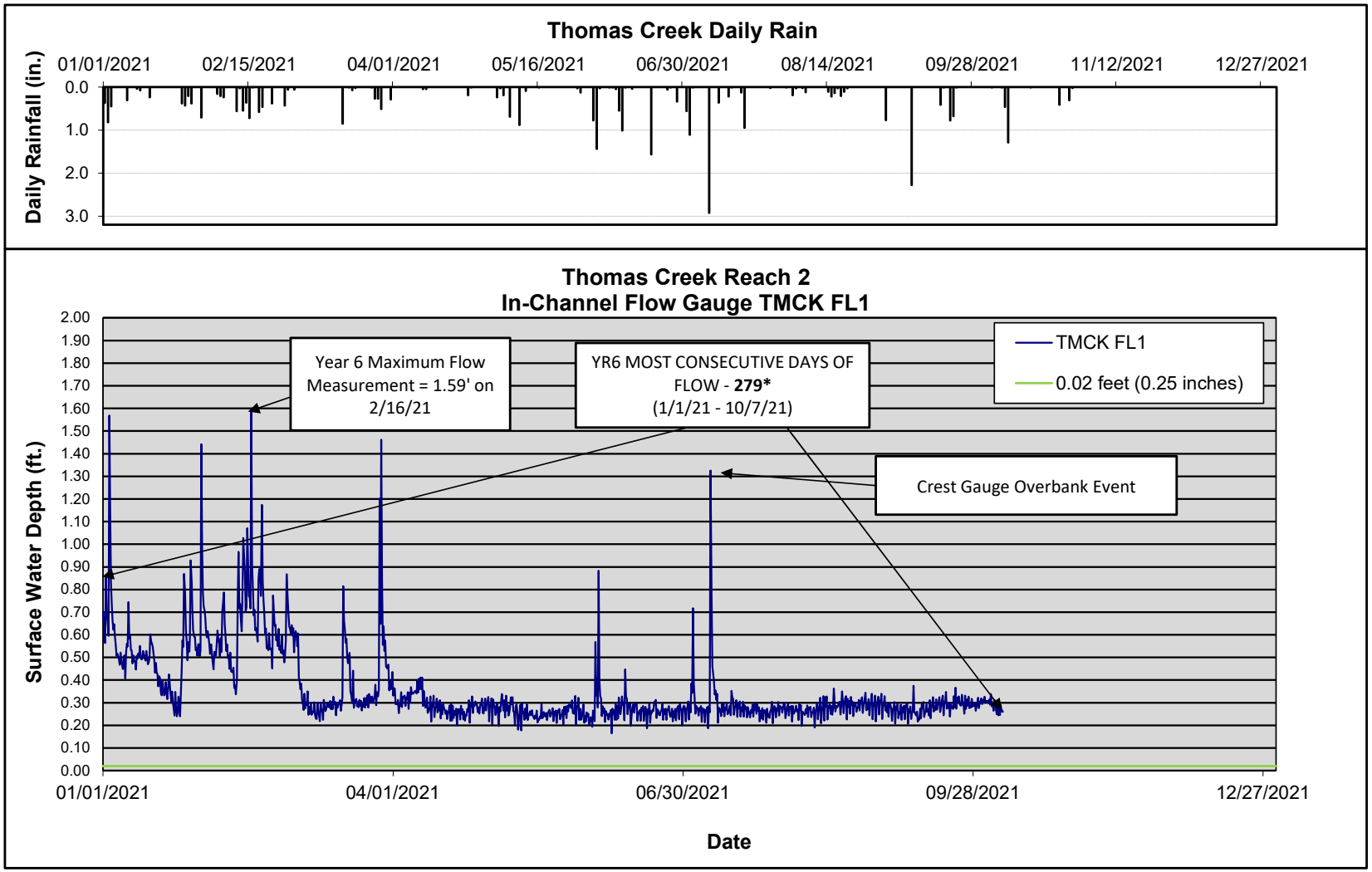
Parameter	USGS Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data — Thomas Creek Site Upper Reach 4 (On-site)						Design						As-built					
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	-----	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	-----	-----	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	5.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----																								
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	0.008	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.008	-----	-----	-----	-----	-----	0.008	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	2.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	171	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	157	-----	-----	-----	-----	-----	157	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0414	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	0.0417	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 - Pre-Existing Condition measurment taken on existing sandbed riffle

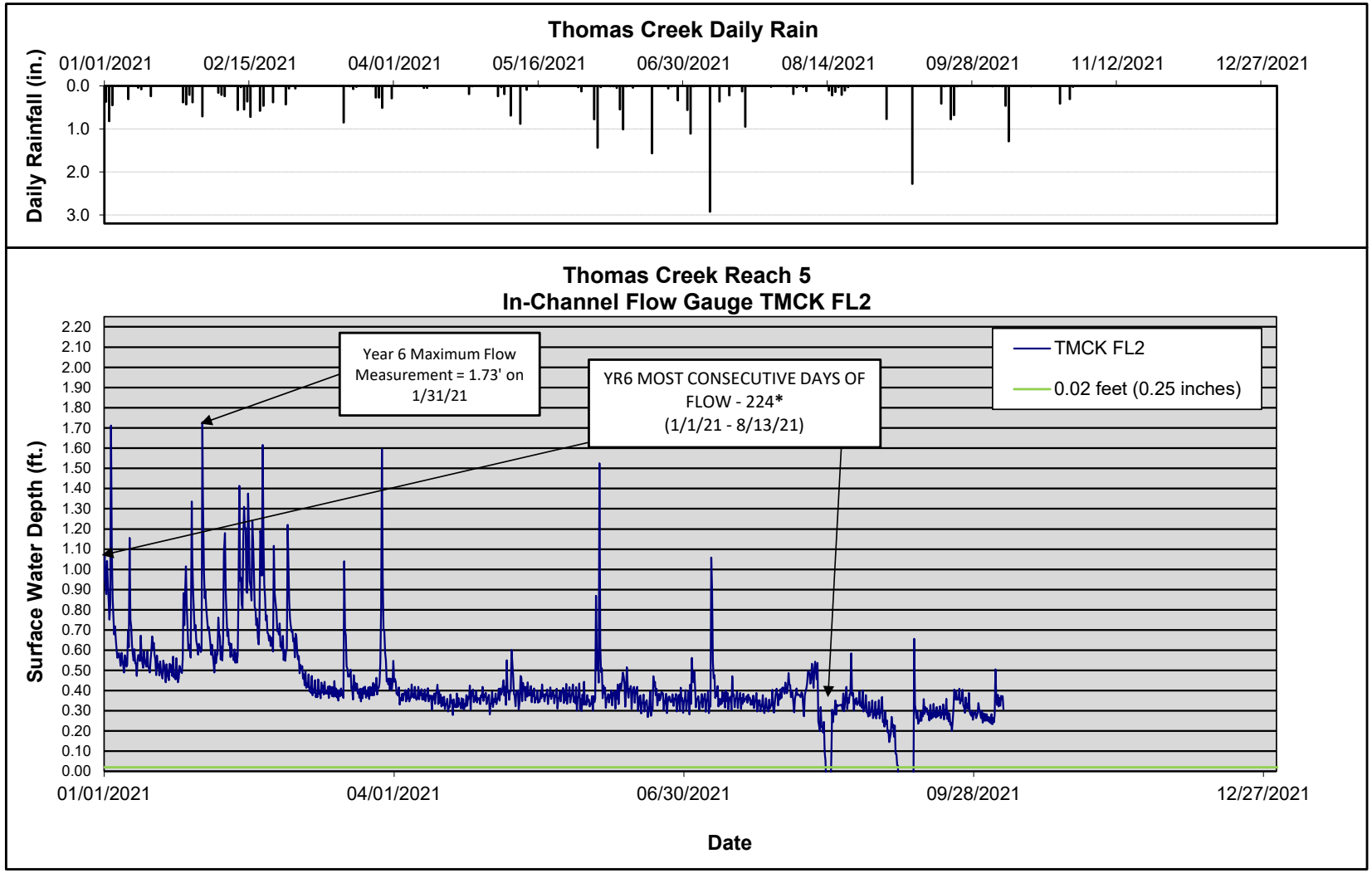
Appendix E

Hydrologic Data

Figure 8. Flow Gauge Graphs

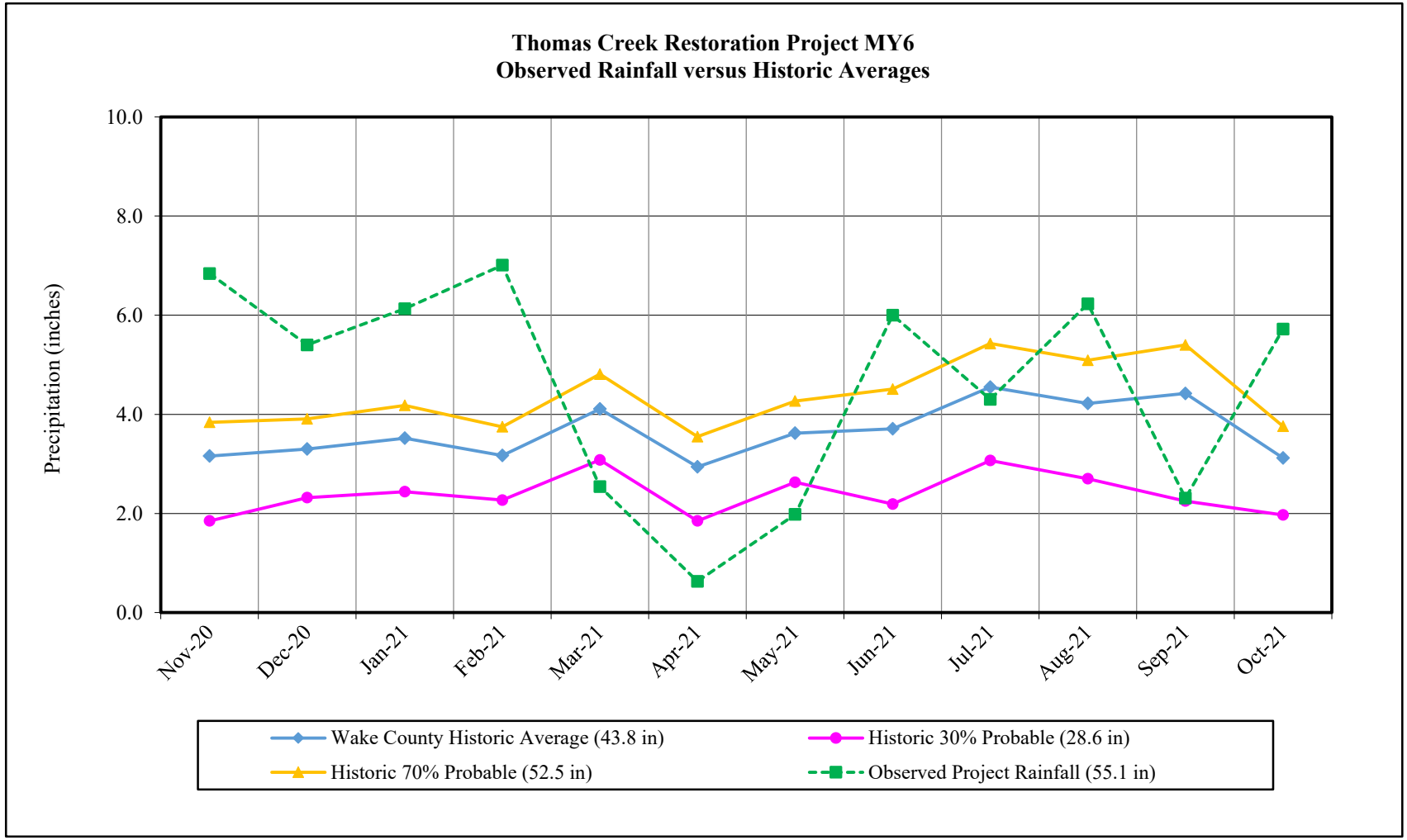


* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.



* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.

Figure 9. Observed Rainfall Versus Historic Averages



Note: Historic average annual rainfall for Wake County is 43.8", while the observed project rainfall recorded a total of 55.1" over the previous 12 months (from 11/1/2020 to 10/31/2021). Project rainfall data was collected from the NC-CRONOS station LAKE.

Table 12. Verification of Bankfull Events
Thomas Creek Restoration Project: DMS Project ID No. 96074

Date of Data Collection	Reach 2 Crest Gauge (feet)	Estimated Occurrence of Bankfull Event	Method of Data Collection
Year 1 Monitoring (2016)			
10/27/2016	1.1	10/8/2016 (Hurricane Matthew)	Crest Gauge, Flow Gauge
Year 2 Monitoring (2017)			
05/02/2017	0.21	4/25/2017 (3.2" rain event)	Crest Gauge, Flow Gauge
Year 3 Monitoring (2018)			
04/23/2018	0.97	4/15/2018 (1.8" rain event)	Crest Gauge, Flow Gauge
10/10/2018	1.49	9/15-17/2018 (6.1" from Hurricane Florence)	Crest Gauge, Flow Gauge
Year 4 Monitoring (2019)			
04/25/2019	0.89	4/19/2019 (0.71" rain event)	Crest Gauge, Flow Gauge
Year 5 Monitoring (2020)			
02/21/2020	0.98	2/6/20 (3.1" rain event)	Crest Gauge, Flow Gauge
Year 6 Monitoring (2021)			
08/10/2021	0.62	7/8/21 (2.93" rain event)	Crest Gauge, Flow Gauge

Note: Crest gauge readings can be corroborated with associated spikes in the flow gauge reading graphs (see Appendix E).

Table 13. Flow Gauge Success
Thomas Creek Restoration Project: DMS Project ID No. 96074

Flow Gauge ID	Most Consecutive Days Meeting Criteria[1]							Cumulative Days Meeting Criteria[2]						
	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)	Year 6 (2021)	Year 7 (2022)	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)	Year 6 (2021)	Year 7 (2022)
Reach 2 Flow Gauge #1 (Installed March 30, 2016)														
TCFL1	229	248	357	179	129*	279		229	248	357	240	129*	279	
Reach 5 Flow Gauge #2 (Installed March 30, 2016)														
TCFL2	126	138	82	94	295	224		182	218	204	191	295	272	

Notes:

* Flow Gauge #1 failed on 5/8/20 and was replaced on 12/18/20.

[1]Indicates the single greatest number of consecutive days within the monitoring year where flow was measured.

[2]Indicates the total number of days within the monitoring year where flow was measured.

Success Criteria: A restored stream reach will be considered at least intermittent when the flow duration occurs for a minimum of 30 consecutive days during the monitoring year.

Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.