FINAL

Thomas Creek Restoration Project
Year 2 Monitoring Report

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: 2 of 7 Year of Data Collection: 2017 Year of Completed Construction (including planting): 2016 Submission Date: November 2017
Submitted To:	NCDEQ - Division of Mitigation Services 1625 Mail Service Center Raleigh, NC 27699 NC DEQ Contract ID No. 003992

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January 26, 2018

Jeff Schaffer
NCDENR, Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Subject: Response to DMS Comments for DRAFT Monitoring Year 2 Report
Thomas Creek Restoration Project, Wake County
DMS Project # 96074, DEQ Contract #5549, RFP# 16-005020

Mr. Schaffer:

Please find enclosed our responses to the NC Division of Mitigation Services (DMS) review comments dated January 3, 2018 in reference to the Thomas Creek Restoration Project –DRAFT Monitoring Year 2 Report. We have revised the Draft document in response to the referenced review comments. Each comment and its corresponding response is outlined below.

1. In accordance with RFP#16-005020 Addendum#1, Baker must submit an updated Monitoring Phase Performance Bond (MPPB) for Monitoring Year 3 (Task 9). Be advised that no payment will be made for this deliverable nor will DMS submit for MY 2 credit release until Baker has a DMS approved updated Monitoring Phase Performance Bond (MPPB) in place, as required by contract.

   Response: Baker received approval from Mr. Jeff Jurek via email on 1/23/18 for the submitted Monitoring Phase Performance Bond covering the next two years of monitoring (MY3 and MY4).

2. The review of the digital data and drawings have been reviewed and determined to meet DMS requirements.

   Response: A CD containing the final digital data and drawings has been submitted here.

3. During the April 3, 2017 Credit Release meeting, the IRT decided that the assets for this project were to revert to those contained in the approved Mitigation Plan due to a 22.33 increase in stream credits from mitigation plan to as-built. Throughout this report, Baker is using assets & credits from both the approved mitigation plan and the as-built baseline report. Please change all references to linear footages and credits in the report narrative to reflect the approved mitigation plan numbers. In addition, do a wholesale replacement of Table 1 with the approved assets from the approved mitigation plan, and add the following footnote:

   * Credit calculations were originally calculated along the as-built thalweg and updated to be calculated along stream centerlines for Monitoring Year X after discussions with NC IRT stemming from the April 3, 2017 Credit Release Meeting.

   Response: Table 1 was revised to reflect the approved mitigation plan credit values for each reach, and a footnote was added to explain the changes from previous report credit tables. The total credit numbers now match the total approved credits from the mitigation plan. The survey stationing and restoration footage numbers reported in Table 1 will remain as reported from the as-built survey and baseline (MY0) report.

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4. In Sections 1.0 and 2.1.1, you reference planting livestakes in the three (3) stream problem areas "in the winter of 2018." Please clarify if you mean the dormant season of 2017/2018 or provide the specific month of when you expect the livestakes to be installed.

   Response: The report has been revised to indicate that livestake planting will occur in the dormant season of 2017/2018.

5. In Section 2.1.2 Baker stated that the crest gauge on Reach R2 documented one bankfull event during monitoring year 2. In addition, Table 12 in Appendix E shows that a bankfull event was documented in monitoring year 1. Based on this information it appears that this site has now met the bankfull standard for credit release. Baker should state this in Section 2.1.2.

   Response: The report has been revised as suggested.

6. Table 11a.: Provide a footnote with the tables stating the method by which Baker is calculating Bank Height Ratio and Entrenchment Ratio. In addition, please provide context to any observed changes in these calculated ratios in the report narrative. DMS has proposed a method for these calculations that can be found in the As Built baseline template guidance As-built Baseline Monitoring Report – June 2017 Page 22, specifically the paragraphs 8 and 9.

   Response: As requested, a footnote has been added to the relevant tables stating the method by which Baker is calculating Bank Height Ratio and Entrenchment Ratio, and similar language has been added to the narrative as well. Baker will now use the method described in DMS' template guidance from June 2017 as recommended and has modified the cross-section figures accordingly. The values for previous years have also been retroactively revised in all relevant figures and tables as well for comparative purposes as explained in the footnotes.

Baker has provided the requested three (3) hardcopies, and one (1) CD containing the pdf copy of the FINAL report and all updated digital files. Please do not hesitate to contact me should you have any questions regarding our response submittal.

Sincerely,

Scott King, LSS, PWS
Project Manager

Enclosures

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Report Prepared and Submitted by Michael Baker Engineering, Inc.

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APPENDICES

1.0 EXECUTIVE SUMMARY

Michael Baker Engineering, Inc. (Baker) restored 4,721 linear feet (LF) of perennial and intermittent stream and enhanced 3,948 LF of intermittent stream. 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 HU) 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.

The Year 2 monitoring survey data of sixteen cross-sections indicates that those stream sections are stable and are within the lateral/vertical stability and in-stream structure performance categories. Most reaches are geomorphically stable and performing as designed, as confirmed by the visual stability assessment. However, there are three areas of concern noted on Reach R2 (downstream). Each is a short section along the left bank where woody vegetation has failed to establish, and though the banks currently appear to be stable and show no indication of having any scour or erosion issues for this monitoring period, without woody vegetation they will be vulnerable in the future. As such, these sections will be planted with livestakes in the dormant season of 2017/2018. The three sections total 85 ft of bank and each has been designated a Stream Problem Area (SPA) as further described in Table 5 and shown in photographs, both of which can be found in Appendix B.

A short section of the left bank on the lower portion of Reach R2 at Station 40+50 (see Figure 5 for exact location) had previously been identified as an SPA as part of the Year 1 monitoring assessment. This section had suffered bank scour resulting from Hurricane Matthew. In January of 2017, livestakes were planted along that section of bank to stabilize it. Additional livestakes were subsequently planted along a few other sections of Reach R2 where previous livestake efforts had not fully established as a preventive measure.

During Year 2 monitoring, the planted acreage performance categories were functioning at 100 percent with no bare areas to report (Appendix C). The average density of total planted stems, based on data collected from the sixteen monitoring plots following Year 2 monitoring in September 2017, was 617 stems per acre. Thus, the Year 2 vegetation data demonstrate that the Site is on track to meet the minimum success interim criteria of 320 trees per acre by the end of Year 3. Additionally, there were no areas of invasive species vegetation observed during the Year 2 monitoring. No Vegetation Problem Areas (VPAs) were identified during the Year 2 monitoring.

Year 2 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 248 days of consecutive flow in Reach 2, while flow gauge TMCK-FL2 documented 138 days of consecutive flow in Reach 5. The flow gauges demonstrated similar patterns relative to rainfall events as shown in the flow gauge graphs in Appendix E.

During Year 2 monitoring, the Reach R2 crest gauge (crest gauge #1) documented one post-construction bankfull event in April 2017. As a bankfull event was previously documented during MY1 from Hurricane Matthew, the project has now met 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 2 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 monitoring report template document Version 1.5 (June 8, 2012), which will continue to serve as the template for subsequent monitoring years. The vegetation-monitoring quadrants follow CVS-DMS monitoring levels 1 and 2 in accordance with CVS-DMS Protocol for Recording Vegetation, Version 4.1 (2007).

Stream survey data was collected to a minimum of Class C Vertical and Class A Horizontal Accuracy using Leica TS06 Total Station and was georeferenced to the NAD83 State Plane Coordinate System, FIPS3200 in US Survey Feet, which was derived from the As-built Survey. This survey system collects point data with an accuracy of less than one tenth of a foot.

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 Monitoring Year 2 vegetation plot data was collected in September 2017, while the visual site assessment data contained in Appendix B and the cross-section data in Appendix D were both collected in October 2017.

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 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.

Cross-sections were classified using the Rosgen Stream Classification System, and all monitored cross-sections fall within the quantitative parameters defined for channels of the design stream type. Morphological survey data are presented in Appendix D.

As per DMS/IRT request, the method by which bank height ratio (BHR) and entrenchment ratio (ER) values are calculated have been modified from previous reports. The new methodology follows the guidance found in the DMS template document *As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017*. As stated in that document "For the purposes of monitoring trends in the BHR, the maximum As-built bankfull depth, which is the denominator in the calculation,

needs to be held constant during the monitoring period, even if the actual thalweg elevation changes. For the BHR calculation, the depth from each year's LTOB to each year's thalweg will be input as the numerator in the calculation" and "Calculating the ER for the purposes of monitoring change will also use a fixed depth. The elevation of the floodprone width will be 2 times the max bankfull depth calculated at the as-built using the as-built bankfull datum. This will be applied to the thalweg elevation for each monitoring year to accurately track changes in the ER. The bankfull width at the as-built bankfull datum will be used in the ER calculation." For comparative purposes, Baker has retroactively revised the BHR and ER values for previous years using this methodology as well.

The Year 2 monitoring survey data of sixteen cross-sections indicates that those stream sections are stable and are within the lateral/vertical stability and in-stream structure performance categories. Most reaches are geomorphically stable and performing as designed, as confirmed by the visual stability assessment. However, there are three areas of concern noted on Reach R2 (downstream). Each is a short section along the left bank where woody vegetation has failed to establish, and though the banks currently appear to be stable and show no indication of having any scour or erosion issues for this monitoring period, without woody vegetation they will be vulnerable in the future. As such, these sections will be planted with livestakes in the dormant season of 2017/2018. The three sections total 85 ft of bank and each has been designated a Stream Problem Area (SPA) as further described in Table 5 and shown in photographs, both of which can be found in Appendix B.

A short section of the left bank on the lower portion of Reach R2 at Station 40+50 (see Figure 5 for exact location) had previously been identified as an SPA as part of the Year 1 monitoring assessment. This section had suffered bank scour resulting from Hurricane Matthew. In January of 2017, livestakes were planted along that section of bank to stabilize it. Additional livestakes were subsequently planted along a few other sections of Reach R2 where previous livestake efforts had not fully established as a preventive measure.

Two pebble counts were conducted on the site. The pebble count or R2 shows the bed material size distribution is slightly finer than the samples collected in previous years while the sample on R5 shows that the bed material is slightly coarser.

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 2 monitoring, one above-bankfull stage event was documented in April 2017 by the crest gauge, and confirmed by the flow gauge data for the same time period. The details of the crest gauge reading are presented in Table 12 found in Appendix E. As a bankfull event was previously documented during MY1 from Hurricane Matthew, the project has now met the bankfull standard required for credit release.

Year 2 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 248 days of consecutive flow in Reach 2, while flow gauge TMCK-FL2 documented 138 days of consecutive flow in Reach 5. The gauges demonstrated similar patterns relative to rainfall events as shown in the flow gauge graphs in Appendix E.

As the observed monthly rainfall data for the project presented in Figure 9 demonstrates, the past 12 months have been quite dry as compared to historic averages. A total of just 30.3" of rainfall was observed for the project (using the nearest NC-CRONOS station KTTA), while Wake County averages 43.8" of annual rainfall, a deficit of over 13". The NCDWR drought monitoring history for Wake

County also indicates that for significant periods of time over the past 12 months the County has been in Abnormally Dry (D0) or Moderate Drought (D1) conditions. Appendix E contains more details on the observed and historic rainfall data for the Site.

2.1.3 Photographic Documentation

Reference photograph transects were taken at each permanent cross-section in October of 2017. The survey tape was centered in the photographs of the bank. The water line was located in the lower edge of the frame, and as much of the bank as possible is included in each photograph.

Representative stream photographs for Monitoring Year 2 were taken along each Reach in October 2017 and are provided in Appendix B.

Photographs of each Vegetation Plot taken in September 2017 can be found in Appendix B.

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 measured and scored. During Year 2 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 discovered during Year 2 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, 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 (2007). 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.

Based on the recent Year 2 data collected from the vegetation monitoring plots, the planted stem density is 617 stems per acre. Therefore, the vegetation data demonstrate that the Site is on track for meeting the minimum success criteria of 320 trees per acre by the end of Year 3. No Vegetation Problem Areas (VPAs) were identified during the Year 2 monitoring.

Additionally, there were no significant areas of invasive species vegetation observed during the Year 2 monitoring. There were a few very 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.

The complete Year 2 vegetation assessment information is provided in Appendix B and C.

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.

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). 2011. Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. Version 1.4, November 7, 2011.

North Carolina Division of Mitigation Services (DMS). 2010. Baseline Monitoring Template and Guidance. Version 2.0, October 14, 2010.

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.

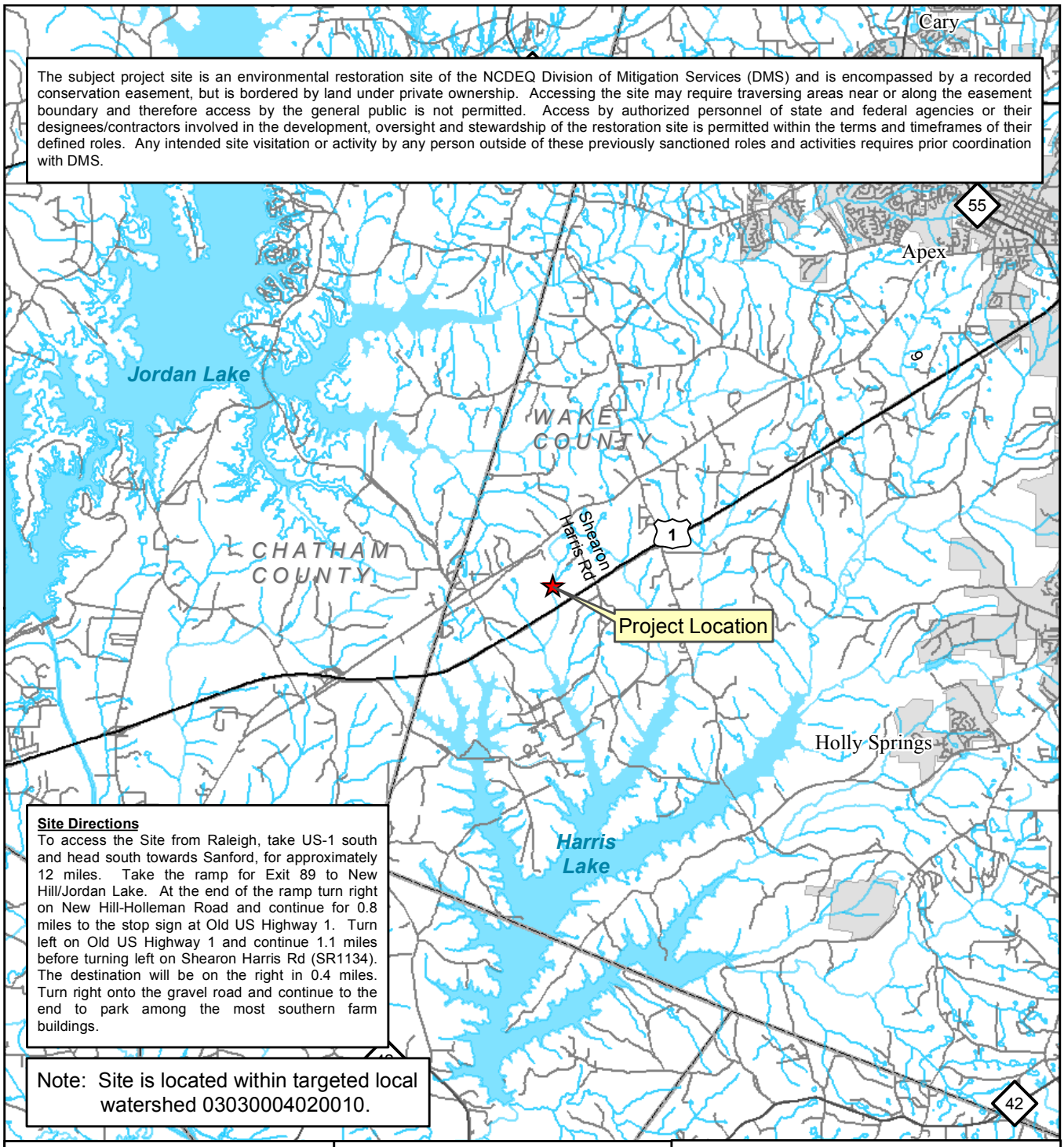
Schafale, M. P., and A. S. Weakley. 1990. Classification of the natural communities of North Carolina, third Approximation. North Carolina Natural Heritage Program. Division of Parks and Recreation, NCDEQ. Raleigh, NC.

U.S. Army Corps of Engineers. 2003. Stream Mitigation Guidelines, April 2003, U.S. Army Corps of Engineers (USACE). Wilmington District.

Appendix A

Project Vicinity Map and Background Tables

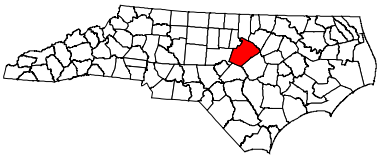
The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary 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

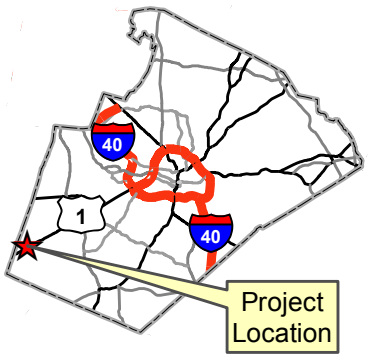


Figure 1 - Project Vicinity Map
Thomas Creek Site
DMS Project ID No. 96074

NCDEQ - Division of Mitigation Services

N

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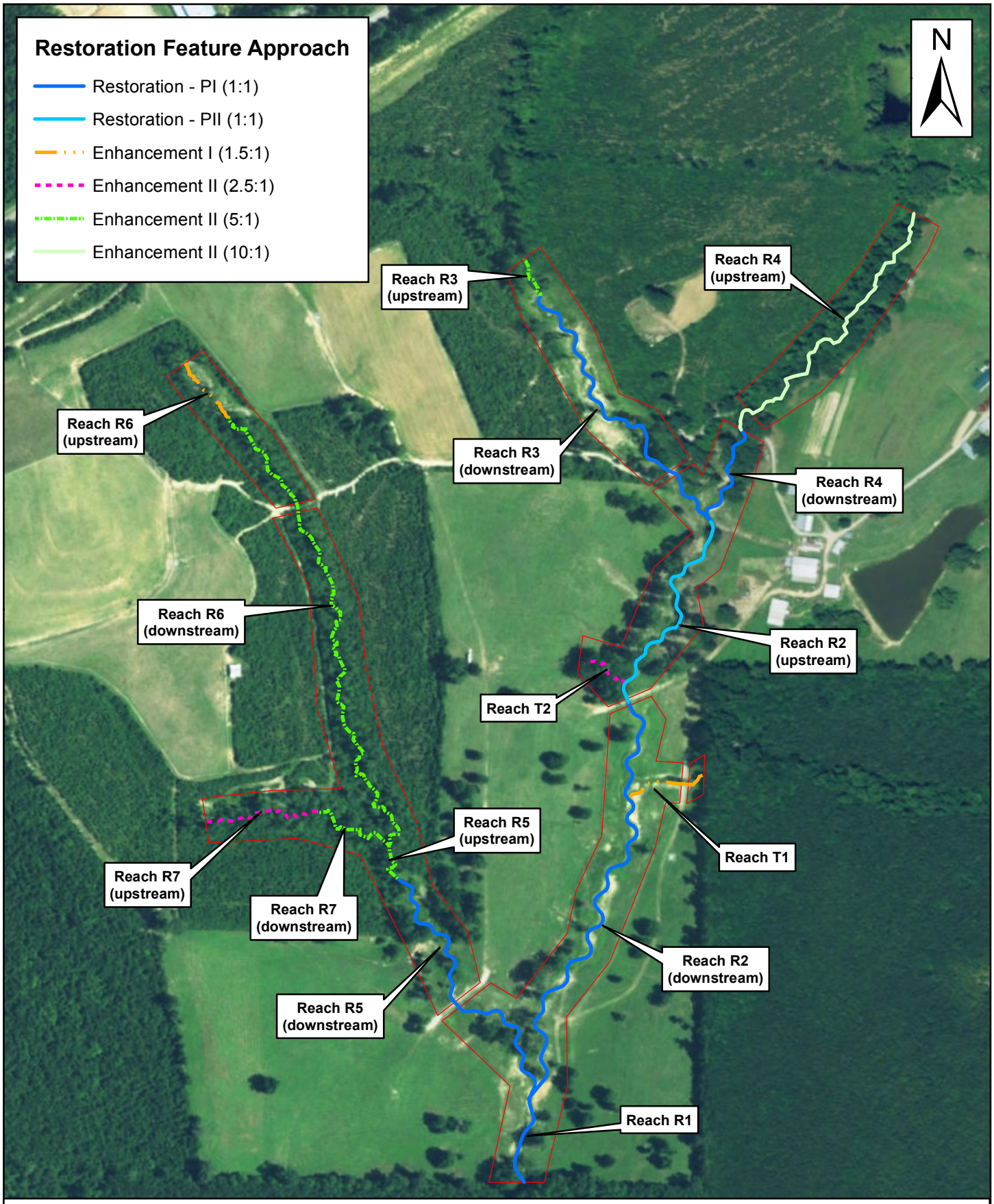
0 0.5 1 2 3 Miles



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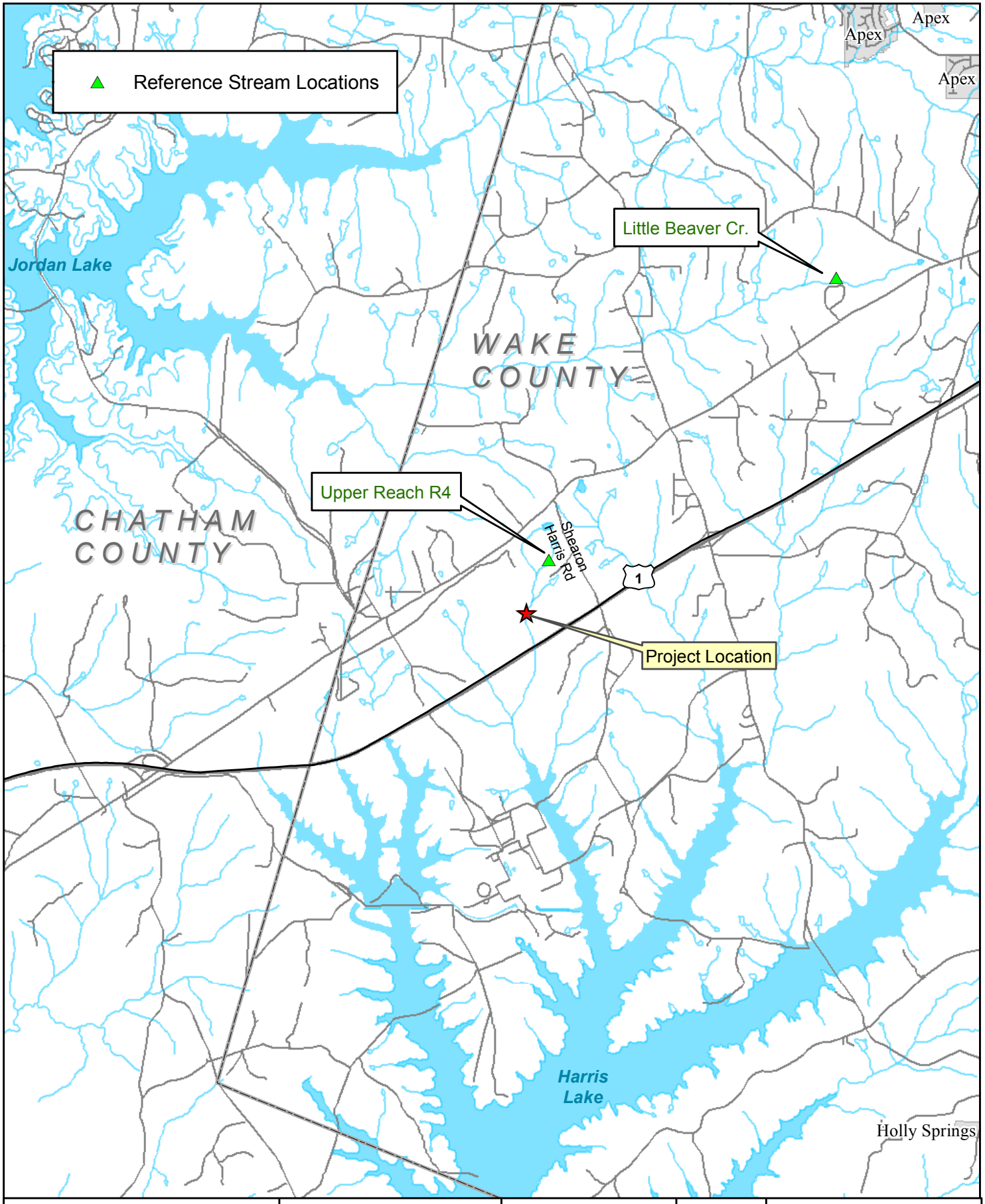
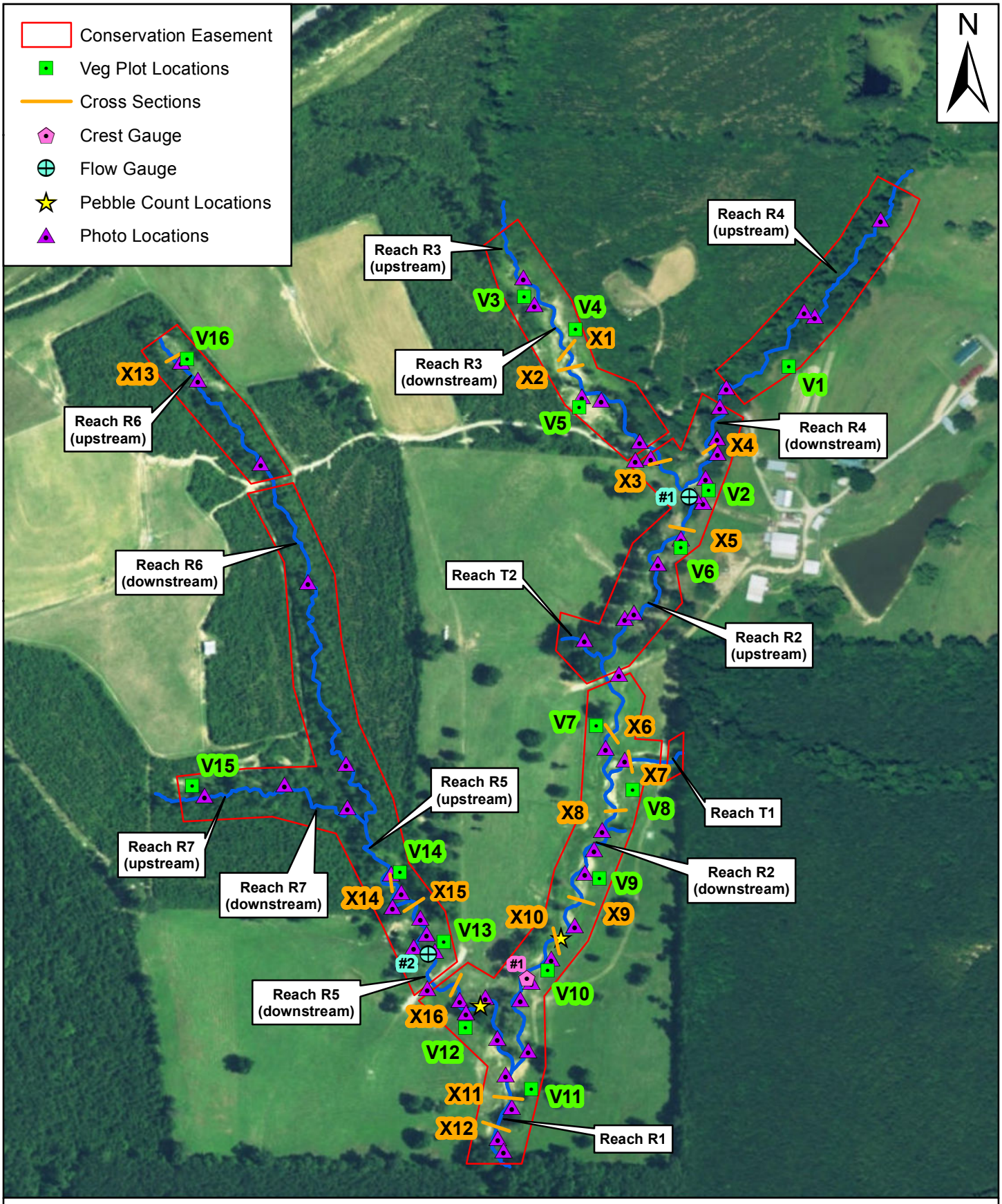
0 250 500 Feet

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
Type	R, E1, EII							
Totals	5,706							

Project Components

Project Component or Reach ID	Stationing/ Location	Existing Footage/ Acreage (LF)	Approach	Restoration/ Restoration Equivalent (SMU)*	Restoration Footage or Acreage (LF)	Mitigation Ratio
Reach 1	42+01 to 44+99	397	Restoration	266	298	1:1
Reach 2 (downstream)†	27+78 to 42+01	1,238	Restoration (PI)	1,384	1,423	1:1
Reach 2 (upstream)†	20+55 to 27+58 (at CE Break)	757	Restoration (PII)	703	703	1:1
Reach 3 (downstream)	11+17 to 18+70 / CE Break / 18+94 to 20+55	937	Restoration	929	914	1:1
Reach 3 (upstream)	10+00 to 11+17	130	Enhancement II	26	117	5:1
Reach 4 (downstream)	10+41 to 13+83	327	Restoration	361	342	1:1
Reach 4 (upstream)	0+99 to 9+95	870	Enhancement II	87	896	10:1
Reach 5 (downstream)	29+30 to 34+97 / CE Break / 35+17 to 39+91	883	Restoration	1,044	1,041	1:1
Reach 5 (upstream)	28+02 to 29+30	137	Enhancement II	27	128	5:1
Reach 6 (downstream)	12+10 to 15+55 / CE Break / 15+81 to 28+02	1,592	Enhancement II	320	1,566	5:1
Reach 6 (upstream)	10+00 to 12+10	210	Enhancement I	140	210	1.5:1
Reach 7 (downstream)	13+60 to 16+47	287	Enhancement II	57	287	5:1
Reach 7 (upstream)	10+00 to 13+60	360	Enhancement II	144	360	2.5:1
Reach T1	10+00 to 10+55 / CE Break / 10+75 to 12+47	242	Enhancement I	155	227	1.5:1
Reach T2	10+00 to 11+57	171	Enhancement II	63	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:

† For MY2, Reach 2 has been 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.

* 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 previous 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 Monitoring Year 2 onward after discussions with the NC-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.

Table 2. Project Activity and Reporting History Thomas Creek Restoration Project: DMS Project ID No. 96074		
Elapsed Time Since Grading Completed in Oct. 2015	2 Years, 1 Months	
Elapsed Time Since Planting Completed in Jan. 2016	1 Year, 10 Months	
Number of Reporting Years [1]	2	
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
Year 2 Monitoring	Oct-17	Nov-17
Year 3 Monitoring	Nov-18	N/A
Year 4 Monitoring	Nov-19	N/A
Year 5 Monitoring	Nov-20	N/A
Year 6 Monitoring	Nov-21	N/A
Year 7 Monitoring	Nov-22	N/A
[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.	797 Haywood Rd, Suite 201 Asheville, NC 28806 Contact: Jake Byers, Telephone: 828-412-6101
Construction Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Bill Wright, Telephone: 919-582-3574
Planting Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Bill Wright, Telephone: 919-582-3574
Seeding Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Bill Wright, Telephone: 919-582-3574
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, Tel. 919-481-5731
Vegetation Monitoring Point of Contact	Scott King, Tel. 919-481-5732

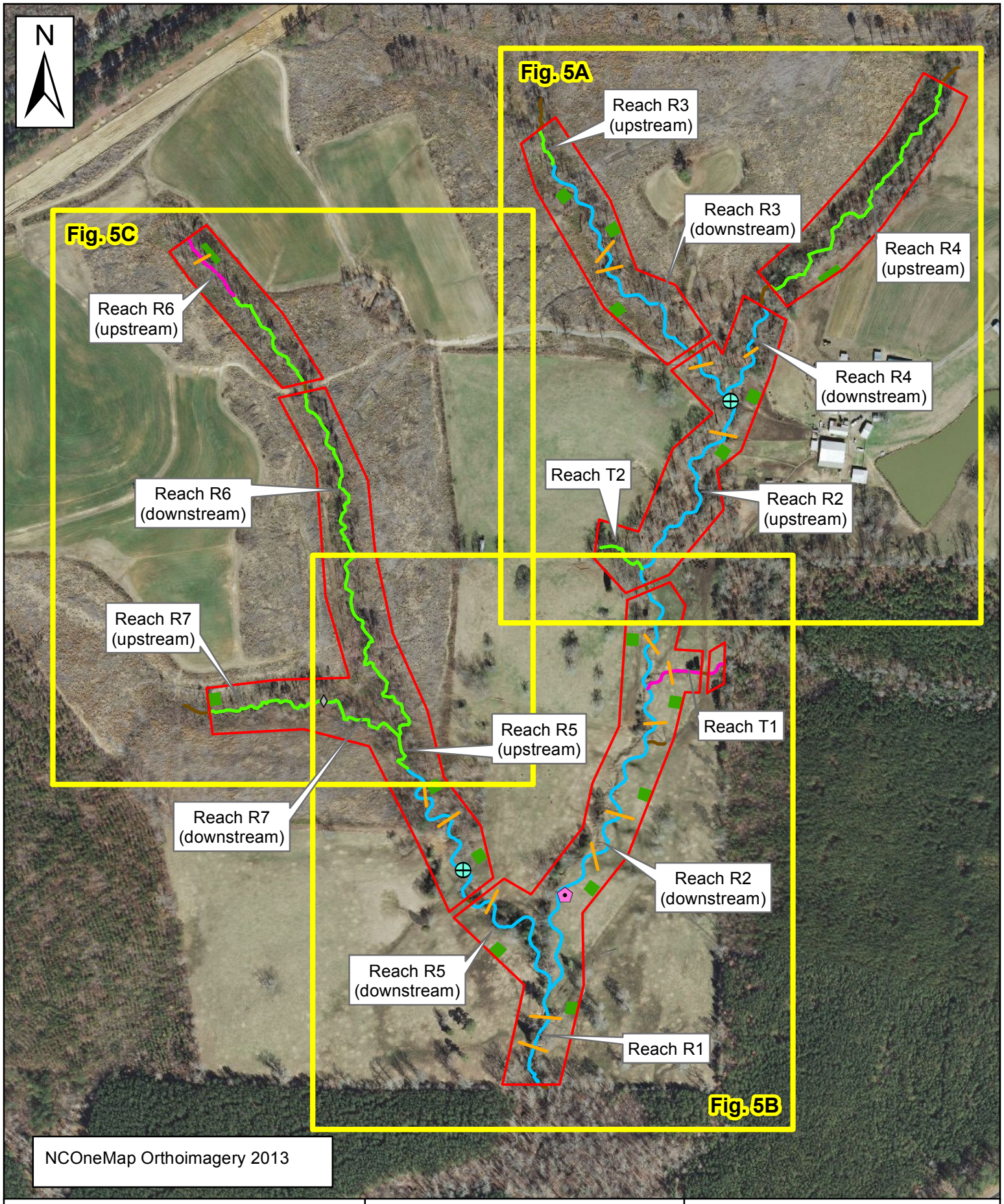
Table 4. Project Attributes (Pre-Construction Conditions)
Thomas Creek Restoration Project: DMS Project No. ID 96074

Project Information					
Project Name	Thomas Creek Restoration Project				
County	Wake				
Project Area (acres)	22.7				
Project Coordinates (latitude and longitude)	35.6636 N, -79.9547 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

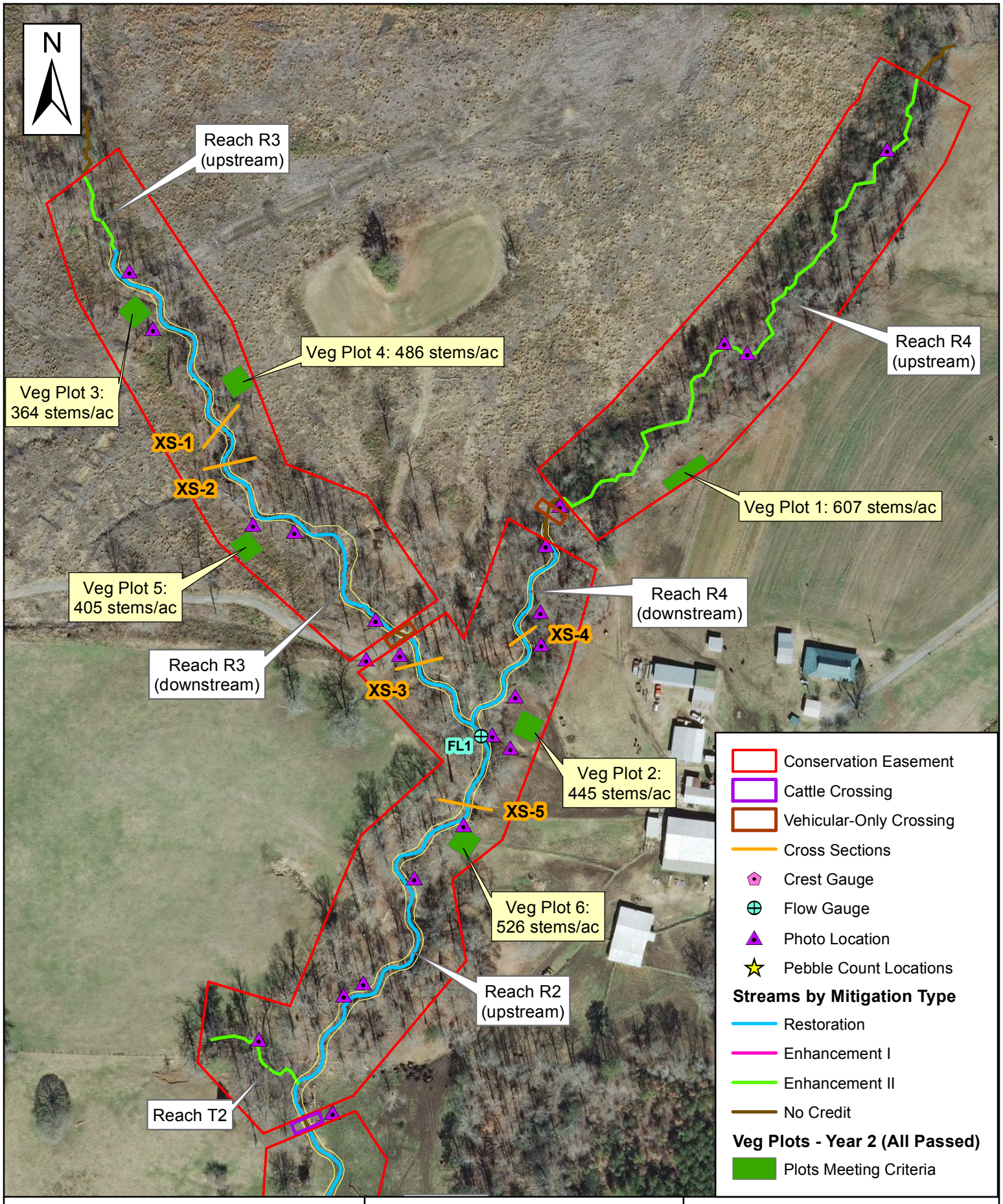


Michael Baker INTERNATIONAL

0 250 500 Feet

DEQ DMS Project # 96074

Figure 5 Index Map
Current Condition Plan View
Thomas Creek Site - MY2

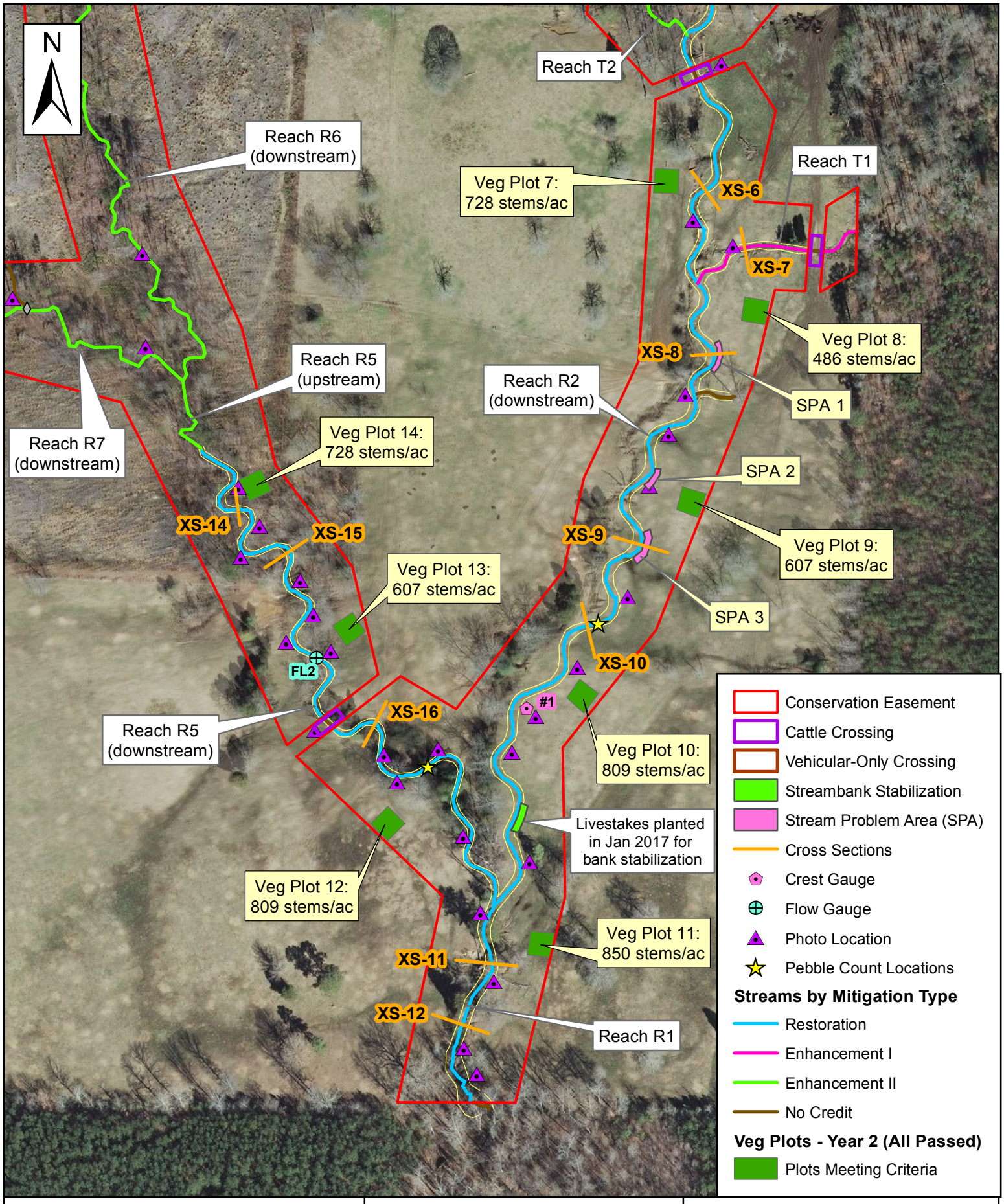


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5A
Current Condition Plan View
Thomas Creek Site - MY2

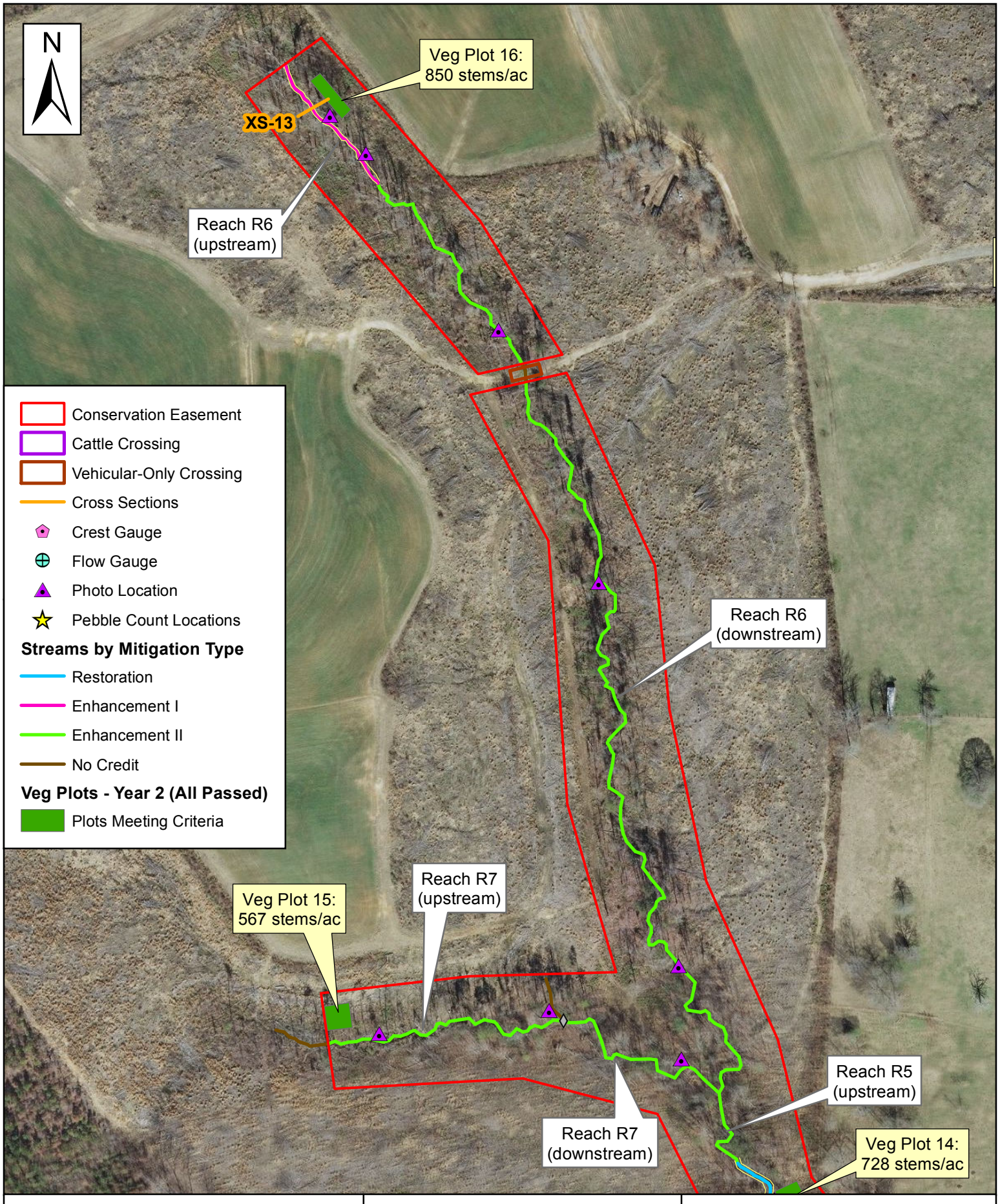


Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5B
Current Condition Plan View
Thomas Creek Site - MY2



Michael Baker INTERNATIONAL

0 100 200 Feet

DENR DMS Project # 96074

Figure 5C
Current Condition Plan View
Thomas Creek Site - MY2

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			3	85	98%	0	0	98%
	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	3	85	98%	0	0	98%
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 Restoration Site: Stream Photographs

Reach 3, view upstream, Station 11+75

Reach 3, view downstream, Station 11+75

Reach 3, view upstream, Station 15+75

Reach 3, view downstream, Station 16+25

Reach 3, view downstream at pipe crossing, Station 18+50

Reach 3, stream crossing, Station 18+80

Thomas Creek Restoration Site: Stream Photographs

Reach 3, Station 19+00

Reach 4, view downstream at Station 01+90

Reach 4, view downstream at Station 05+75

Reach 4, view downstream at Station 06+10

Reach 4, view upstream at Station 10+10

Reach 4, view upstream at Station 10+50

Thomas Creek Restoration Site: Stream Photographs

Reach 4, view upstream at Station 11+75

Reach 4, view downstream at Station 12+25

Reach 4, view upstream at Station 13+00

Reach 2, view upstream at Station 20+60

Reach 2, Flow Gauge #1 at Station 20+75

Reach 2, view of stabilized drainage on left bank at Station 20+80

Thomas Creek Restoration Site: Stream Photographs

Reach 2, view upstream at Station 22+00

Reach 2, view upstream at Station 23+00

Reach 2, view upstream at Station 25+25

Reach 2, view downstream at Station 25+50

Reach 2, view of crossing at Station 27+75

Reach 2, view downstream at Station 30+20

Thomas Creek Restoration Site: Stream Photographs

Reach T1, view upstream at Station 11+75

Reach 2, view of drainage on left bank at Station 32+90

Reach 2, view downstream at Station 33+25

Reach 2, view downstream at Station 34+30

Reach 2, view downstream at Station 36+90

Reach 2, view upstream at Station 38+25

Thomas Creek Restoration Site: Stream Photographs

Reach 2, Crest Gauge at Station 38+75

Reach 2, view downstream at Station 39+40

Reach 2, view upstream at Station 41+50

Reach 1, view upstream at Station 42+75

Reach 1, view downstream at Station 43+25

Reach 1, view of drainage on left bank at Station 44+00

Thomas Creek Restoration Site: Stream Photographs

Reach 6, view upstream at Station 10+75

Reach 6, view upstream at Station 11+50

Reach 6, view upstream at Station 15+25

Reach 6, view upstream at Station 18+90

Reach 6, view upstream at Station 25+50

Reach 7, view upstream at Station 10+40

Thomas Creek Restoration Site: Stream Photographs

Reach 7, view of stabilized drainage at Station 13+50

Reach 7, view upstream at Station 15+00

Reach 5, view upstream at Station 30+25

Reach 5, view downstream at Station 30+75

Reach 5, view downstream at Station 31+40

Reach 5, view downstream at Station 32+50

Thomas Creek Restoration Site: Stream Photographs

Reach 5, view upstream at Station 33+10

Reach 5, view downstream at Station 33+75

Reach 5, Flow Gauge #2 at Station 33+90

Reach 5, view of crossing at Station 35+00

Reach 5, view upstream at Station 36+40

Reach 5, view upstream at Station 36+75

Thomas Creek Restoration Site: Stream Photographs

Reach 5, view downstream at Station 37+30

Reach 5, view upstream at Station 38+50

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

Reach T2, view upstream at Station 10+80

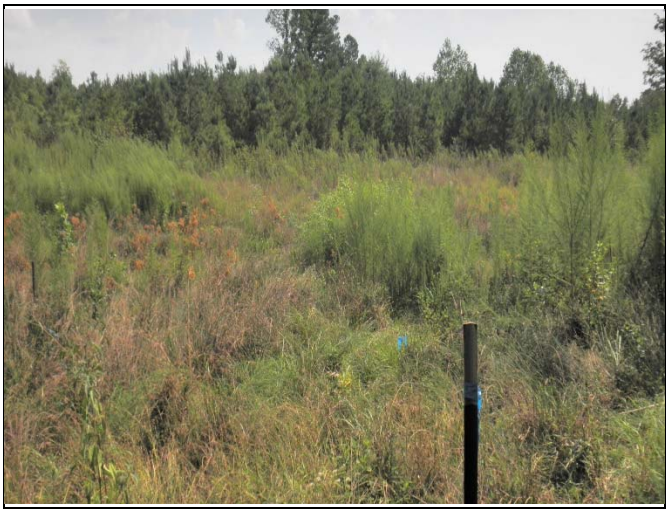
Reach 2: Crest Gauge, 0.21 ft on 5/2/17 (from 3.2” rain on 4/25/17, see associated spikes in flow gauge graphs)

Reach 2: Station 40+50, bank stabilization work (livestakes shown here were planted in January 2017)

Thomas Creek: Vegetation Plot Photos

Vegetation Plot 1 – September 2017

Vegetation Plot 2 – September 2017



Vegetation Plot 3 – September 2017

Vegetation Plot 4 – September 2017

Vegetation Plot 5 – September 2017

Vegetation Plot 6 – September 2017

Vegetation Plot 7 – September 2017

Vegetation Plot 8 – September 2017

Vegetation Plot 9 – September 2017

Vegetation Plot 10 – September 2017

Vegetation Plot 11 – September 2017

Vegetation Plot 12 – September 2017

Vegetation Plot 13 – September 2017

Vegetation Plot 14 – September 2017

Vegetation Plot 15 – September 2017

Vegetation Plot 16 – September 2017

Stream Problem Area Photos

Stream Problem Area 1 (lack of woody vegetation establishment along left bank), R2 Station 32+25

Stream Problem Area 2 (lack of woody vegetation establishment along left bank), R2 Station 34+50

Stream Problem Area 3 (lack of woody vegetation establishment along left bank), R2 Station 35+60

Appendix C

Vegetation Plot Data

Table 7. CVS Density Per Plot
Thomas Creek Restoration Project: DMS Project ID No. 96074

			Current Plot Data (MY2 2017)																									
			96074-01-0001			96074-01-0002			96074-01-0003			96074-01-0004			96074-01-0005			96074-01-0006			96074-01-0007			96074-01-0008			96074-01-0009		
Scientific Name	Common Name	Species Type	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T
Asimina triloba	pawpaw	Tree																											
Betula nigra	river birch	Tree	1		1	1		1	1		1				1		1	2		2	1		1	4		4	2		2
Carpinus caroliniana	American hornbeam	Tree	4	1	5										1		1				5		5						
Carya glabra	pignut hickory	Tree		1	1								1	1														1	1
Diospyros virginiana	common persimmon	Tree	5		5	1		1	2		2	5		5				1		1				1		1	1		1
Fraxinus pennsylvanica	green ash	Tree										1		1	1		1				3		3	1		1	2		2
Liriodendron tulipifera	tuliptree	Tree	2		2					1	1	1	1	2	1		1	1		1				2		2			
Nyssa sylvatica	blackgum	Tree																											
Platanus occidentalis	American sycamore	Tree	1		1	1		1				3		3	1		1	5		5	2	1	3	3		3	1		1
Quercus michauxii	swamp chestnut oak	Tree	1		1	2		2	1		1										2		2	1		1	4		4
Quercus pagoda	cherrybark oak	Tree				1		1	1		1	1		1	3		3	1		1							2		2
Quercus phellos	willow oak	Tree											3	3															
Quercus rubra	northern red oak	Tree											4	4															
Rhus copallinum	winged sumac	Shrub														1	1												
Viburnum dentatum	southern arrowwood	Shrub	1		1	5		5	4		4	1		1	2		2	3		3	5	1	6				3		3
	Stem count		15	2	17	11	0	11	9	1	10	12	9	21	10	1	11	13	0	13	18	2	20	12	0	12	15	1	16
	size (ares)		1			1			1			1			1			1			1			1			1		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
	Species count		7	2	8	6	0	6	5	1	6	6	4	9	7	1	8	6	0	6	6	2	6	6	0	6	7	1	8
	Stems per ACRE		607	80.9	688	445	0	445	364	40.5	405	486	364	850	405	40.5	445	526	0	526	728	80.9	809	486	0	486	607	40.5	647

			Current Plot Data (MY2 2017) Continued																					Annual Means					
			96074-01-0010			96074-01-0011			96074-01-0012			96074-01-0013			96074-01-0014			96074-01-0015			96074-01-0016			MY2 (2017)*			MY1 (2016)		
Scientific Name	Common Name	Species Type	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T	P	V	T
Asimina triloba	pawpaw	Tree										3		3										3		3	5		5
Betula nigra	river birch	Tree	3		3	2		2	2		2	2		2	1		1	1		1	2		2	26		26	38		38
Carpinus caroliniana	American hornbeam	Tree	4		4	1		1	2		2				5		5	5		5	5		5	32	1	33	34		34
Carya glabra	pignut hickory	Tree											1	1											4	4			
Diospyros virginiana	common persimmon	Tree	2		2	2		2	1		1				2	2	4				2	1	3	25	3	28	31		31
Fraxinus pennsylvanica	green ash	Tree				3		3							1		1	2		2	1		1	15		15	16		16
Liriodendron tulipifera	tuliptree	Tree				1		1	4		4	2		2				1		1	3	2	5	18	4	22	28		28
Nyssa sylvatica	blackgum	Tree								1	1														1	1			
Platanus occidentalis	American sycamore	Tree	2		2	2		2	5		5	5		5	6		6	1		1				38	1	39	40		40
Quercus michauxii	swamp chestnut oak	Tree	2		2				2	1	3				2		2				4		4	21	1	22	23		23
Quercus pagoda	cherrybark oak	Tree	4		4	1		1	4		4	3		3							1		1	22		22	27		27
Quercus phellos	willow oak	Tree																							3	3			
Quercus rubra	northern red oak	Tree																							4	4			
Rhus copallinum	winged sumac	Shrub																				2	2		3	3			
Viburnum dentatum	southern arrowwood	Shrub	3		3	9		9							1		1	4		4	3		3	44	1	45	46		46
	Stem count		20	0	20	21	0	21	20	2	22	15	1	16	18	2	20	14	0	14	21	5	26	244	26	270	288	0	288
	size (ares)		1			1			1			1			1			1			1			16			16		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.40			0.40		
	Species count		7	0	7	8	0	8	7	2	8	5	1	6	7	1	7	6	0	6	8	3	9	10	11	15	10	0	10
	Stems per ACRE		809	0	809	850	0	850	809	80.9	890	607	40.5	647	728	80.9	809	567	0	567	850	202	1052	617	65.8	683	728	0	728

P=Planted
V=Volunteer
T=Total

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Includes volunteer stems

*Note: The Monitoring Year 2 values provided above include the identified volunteer species, while previous Year 1 data did not.

Table 8. CVS Density Per Plot
Thomas Creek Restoration Project: DMS Project ID No. 96074

Thomas Creek Restoration Project: DMS Project ID No. 96074

Year 2 (September 2017)

Vegetation Plot Summary Information

Plot #	Riparian Buffer Stems[1]	Stream/ Wetland Stems[2]	Live Stakes	Invasives	Volunteers[3]	Total[4]	Unknown Growth Form
1	n/a	15	0	0	2	**17**	0
2	n/a	11	0	0	0	**11**	0
3	n/a	9	0	0	1	**10**	0
4	n/a	12	0	0	9	**21**	0
5	n/a	10	0	0	1	**11**	0
6	n/a	13	0	0	0	**13**	0
7	n/a	18	0	0	2	**20**	0
8	n/a	12	0	0	0	**12**	0
9	n/a	15	0	0	1	**16**	0
10	n/a	20	0	0	0	**20**	0
11	n/a	21	0	0	0	**21**	0
12	n/a	20	0	0	2	**22**	0
13	n/a	15	0	0	1	**16**	0
14	n/a	18	0	0	2	**20**	0
15	n/a	14	0	0	0	**14**	0
16	n/a	21	0	0	5	**26**	0

Wetland/Stream Vegetation Totals
(per acre)

Riparian Buffer Vegetation Totals
(per acre)

Plot #	Stream/ Wetland Stems[2]	Volunteers[3]	Total[4]	Success Criteria Met?	Plot #	Riparian Buffer Stems[1]	Success Criteria Met?
1	607	81	688	Yes	**1**	n/a	n/a
2	445	0	445	Yes	**2**	n/a	n/a
3	364	40	405	Yes	**3**	n/a	n/a
4	486	364	850	Yes	**4**	n/a	n/a
5	405	40	445	Yes	**5**	n/a	n/a
6	526	0	526	Yes	**6**	n/a	n/a
7	728	81	809	Yes	**7**	n/a	n/a
8	486	0	486	Yes	**8**	n/a	n/a
9	607	40	647	Yes	**9**	n/a	n/a
10	809	0	809	Yes	**10**	n/a	n/a
11	850	0	850	Yes	**11**	n/a	n/a
12	809	81	890	Yes	**12**	n/a	n/a
13	607	40	647	Yes	**13**	n/a	n/a
14	728	81	809	Yes	**14**	n/a	n/a
15	567	0	567	Yes	**15**	n/a	n/a
16	850	202	1052	Yes	**16**	n/a	n/a
Project Avg	**617**	**66**	683	**Yes**	**Project Avg**	**n/a**	**n/a**

Stem Class	**Characteristics**
[1]Buffer Stems	Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
[2]Stream/ Wetland	Native planted woody stems. Includes shrubs, does NOT include live stakes. No vines
[3]Volunteers	Native woody stems. Not planted. No vines.
[4]Total	Planted + volunteer native woody stems. Includes live stakes. Excl. exotics. Excl. vines.

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Includes volunteer stems

Table 9. Total Stem Counts for Each Species Arranged by Plot
Thomas Creek Restoration Project; DMS Project ID No. 96074

Botanical Name	Common Name	Plots																Average Stems Per Acres
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Tree Species																		
Betula nigra	river birch	1	1	1		1	2	1	4	2	4	2	2	2	5	1	2	
Carya glabra	pignut hickory	1			1					1				1				
Diospyros virginiana	common persimmon	4	1	2	4		1	1	1	1	2	2	1		4		3	
Fraxinus pennsylvanica	green ash	1			1	1		4	1	2		3			1	2	1	
Liriodendron tulipifera	tuliptree	2	1	1	2	1	2		2			1	4	2		1	5	
Nyssa sylvatica	blackgum												1					
Platanus occidentalis	American sycamore	1	1		3	1	5	3	3	1	2	2	5	5	6	1		
Quercus michauxii	swamp chestnut oak	2	1	1			1	2	1	4	2		3		2		4	
Quercus pagoda	cherrybark oak		1	1	2	3				2	4	1	4	3			1	
Quercus phellos	willow oak				3													
Quercus rubra	northern red oak				4													
Shrub Species																		
Asimina triloba	pawpaw													3				
Carpinus caroliniana	American hornbeam	4				1		4			2	1	2		1	5	5	
Rhus copallinum	winged sumac					1											2	
Viburnum dentatum	southern arrowwood	1	5	4	1	2	2	5		3	4	9			1	4	3	
Total Stems Per Plot - Year 2*		17	11	10	21	11	13	20	12	16	20	21	22	16	20	14	26	
Total Stems/Acre - Year 2*		688	445	405	850	445	526	809	486	648	809	850	890	647	809	567	1052	683
Total Stems/Acre - Year 1		809	526	567	526	526	607	890	728	648	931	931	850	769	728	688	931	728
Total Stems/Acre for As-Built (Year 0)		850	688	607	648	648	607	971	728	648	971	971	931	890	809	688	890	784

*Note: The Monitoring Year 2 values provided above include the identified volunteer species, while Monitoring Year 0 and Year 1 data did not.

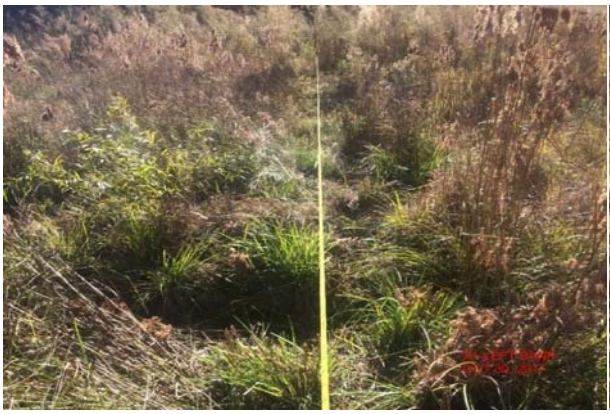
Appendix D

Stream Survey Data

Figure 6.

Permanent Cross-Section 1

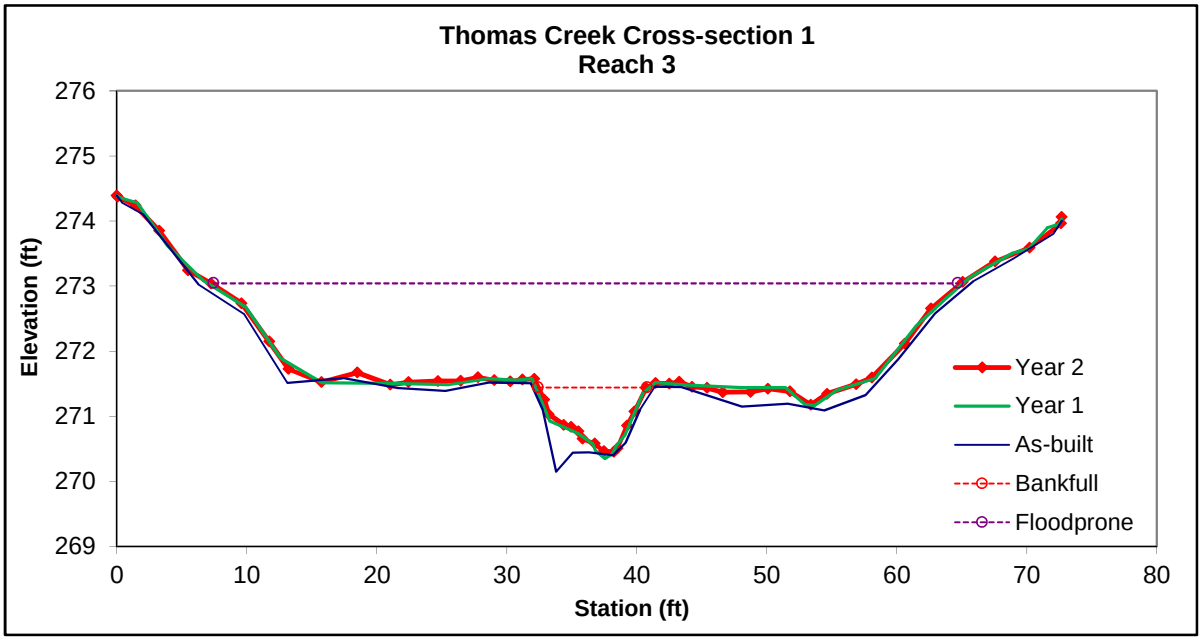
(Year 2 Data - Collected October 2017)



Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	5.1	8.34	0.61	0.99	13.67	0.8	6.1	271.44	271.43



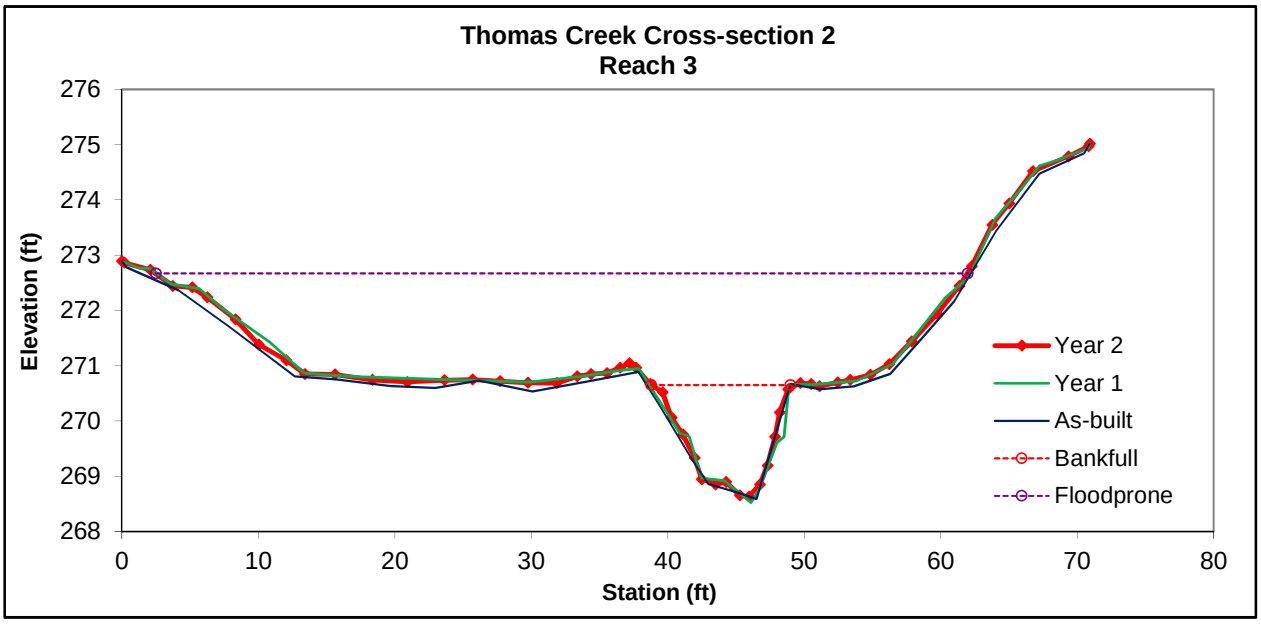
Permanent Cross-Section 2

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		12.24	10.17	1.2	1.99	8.47			270.65	270.57



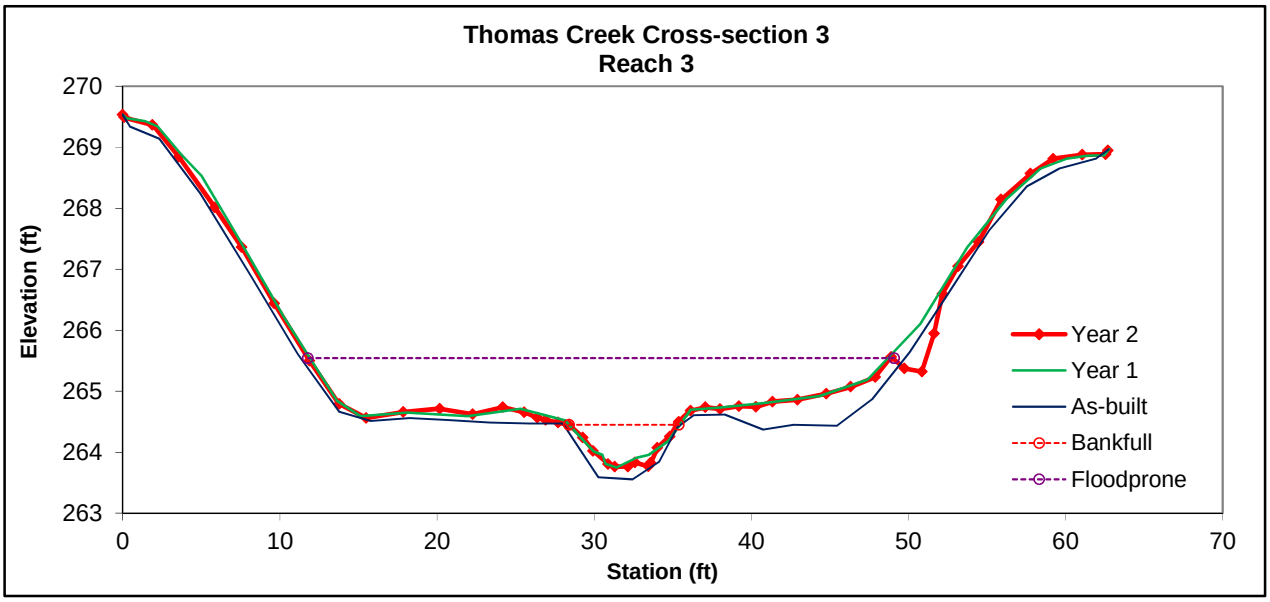
Permanent Cross-Section 3

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	3.1	6.96	0.45	0.69	15.47	0.8	5.0	264.45	264.44



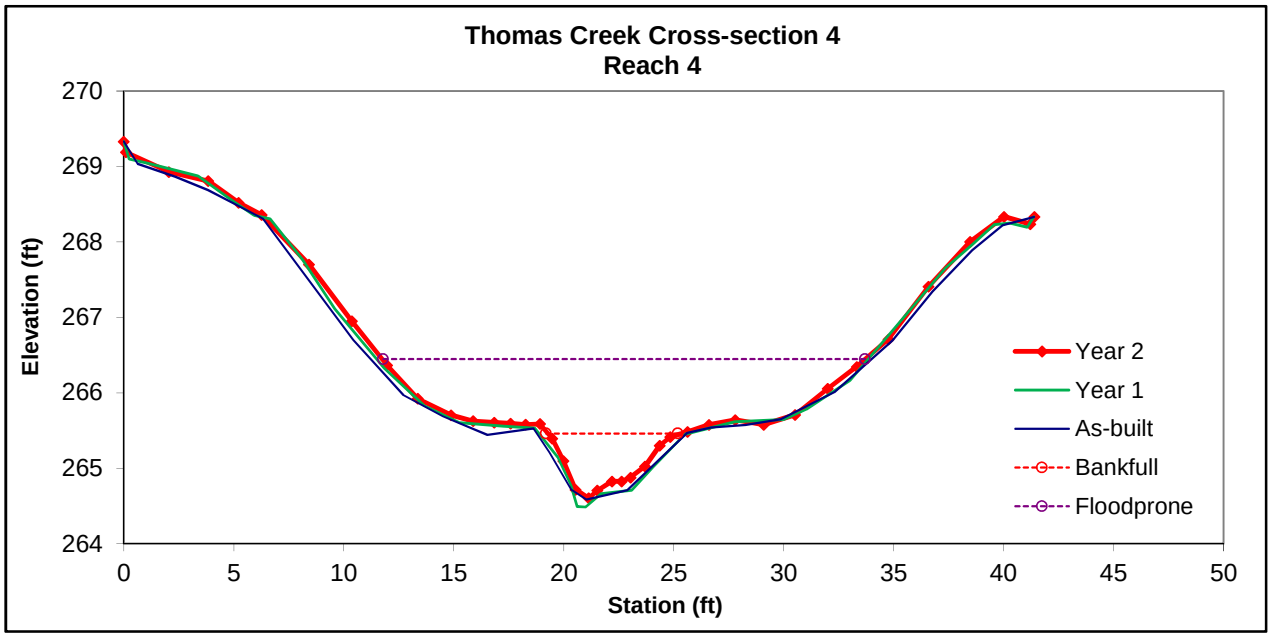
Permanent Cross-Section 4

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	2.8	6.08	0.45	0.78	13.51	0.9	3.2	265.46	265.42



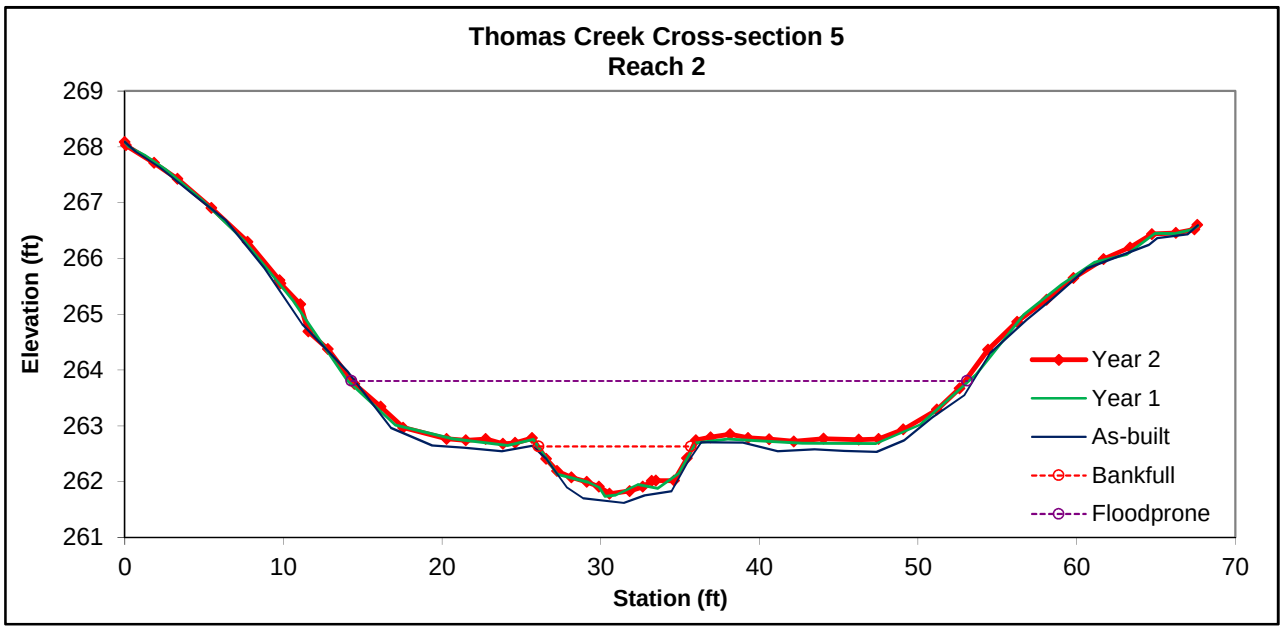
Permanent Cross-Section 5

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	5.6	9.77	0.58	0.85	16.84	1.0	3.7	262.63	262.74



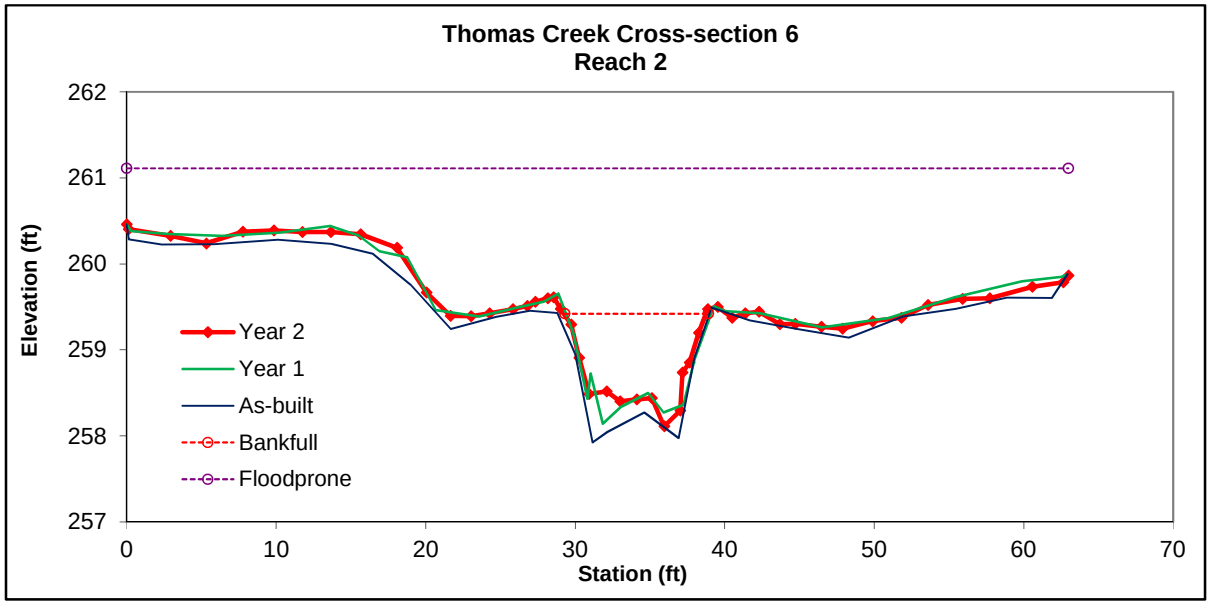
Permanent Cross-Section 6

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	7.7	9.51	0.81	1.31	11.74	0.9	6.2	259.42	259.47



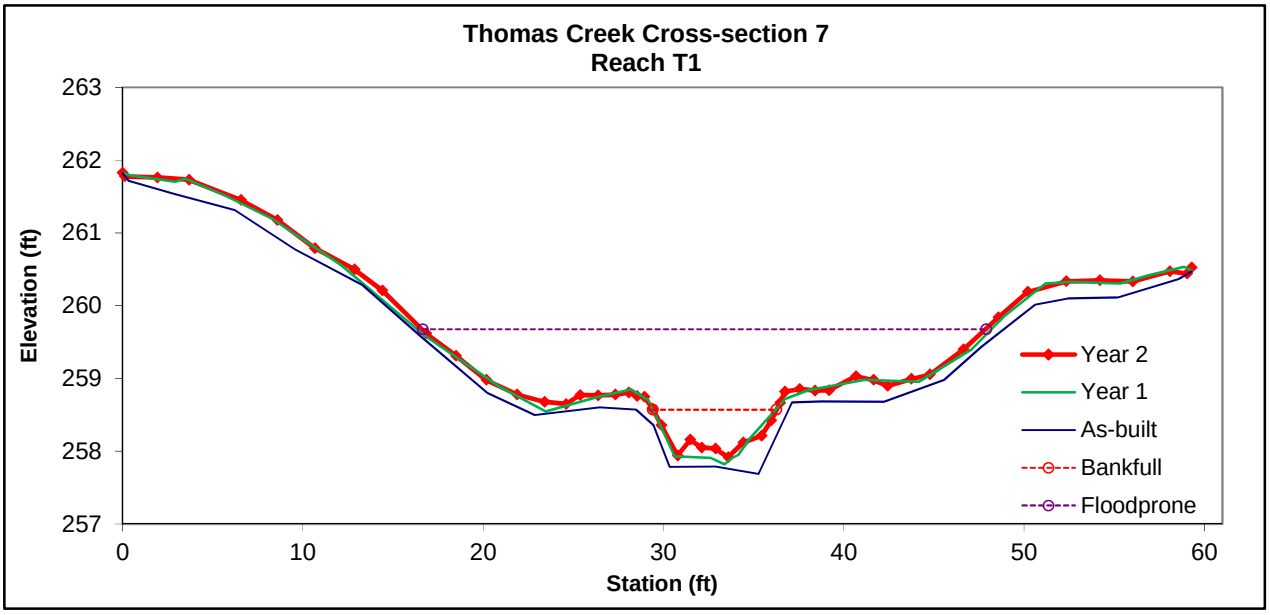
Permanent Cross-Section 7

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	2.95	6.86	0.43	0.65	15.95	0.9	3.7	258.57	258.75



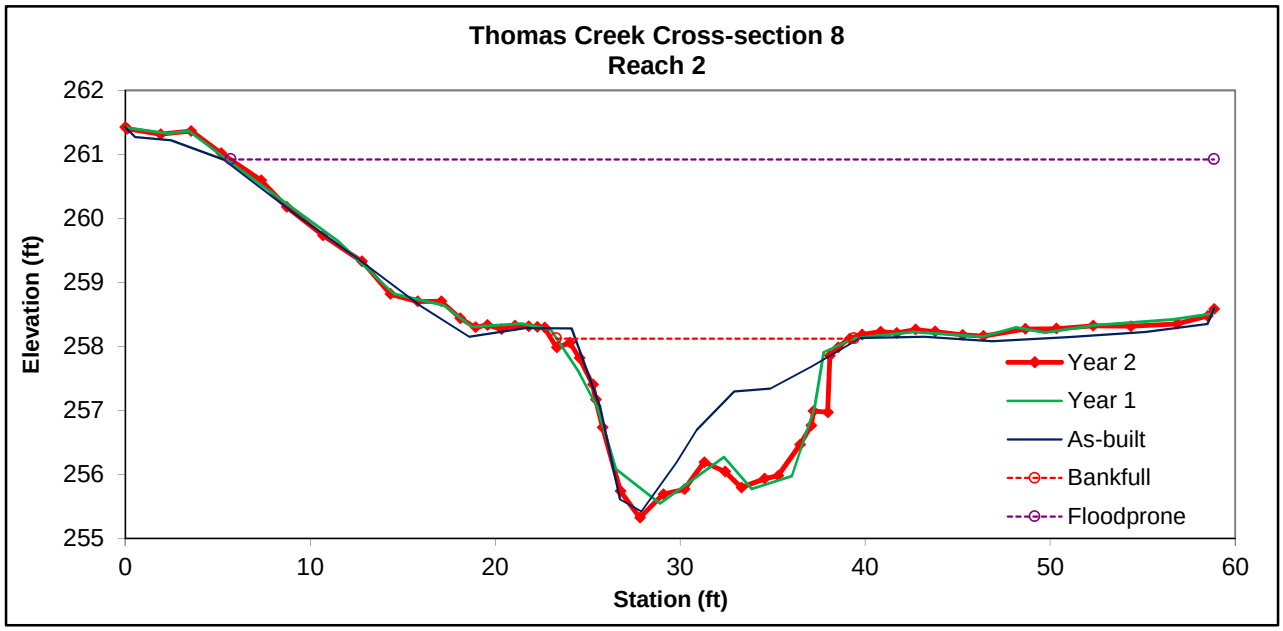
Permanent Cross-Section 8

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		27.03	16.13	1.68	2.8	9.6			258.12	257.98



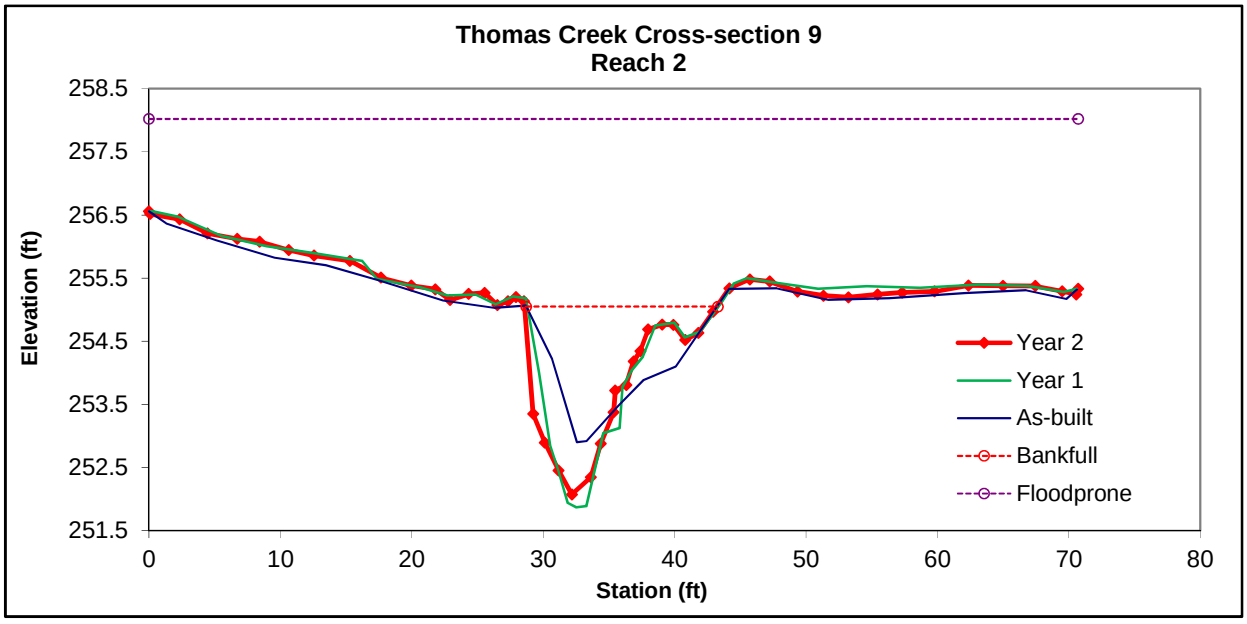
Permanent Cross-Section 9

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		19.7	14.64	1.35	2.97	10.84			255.05	254.69



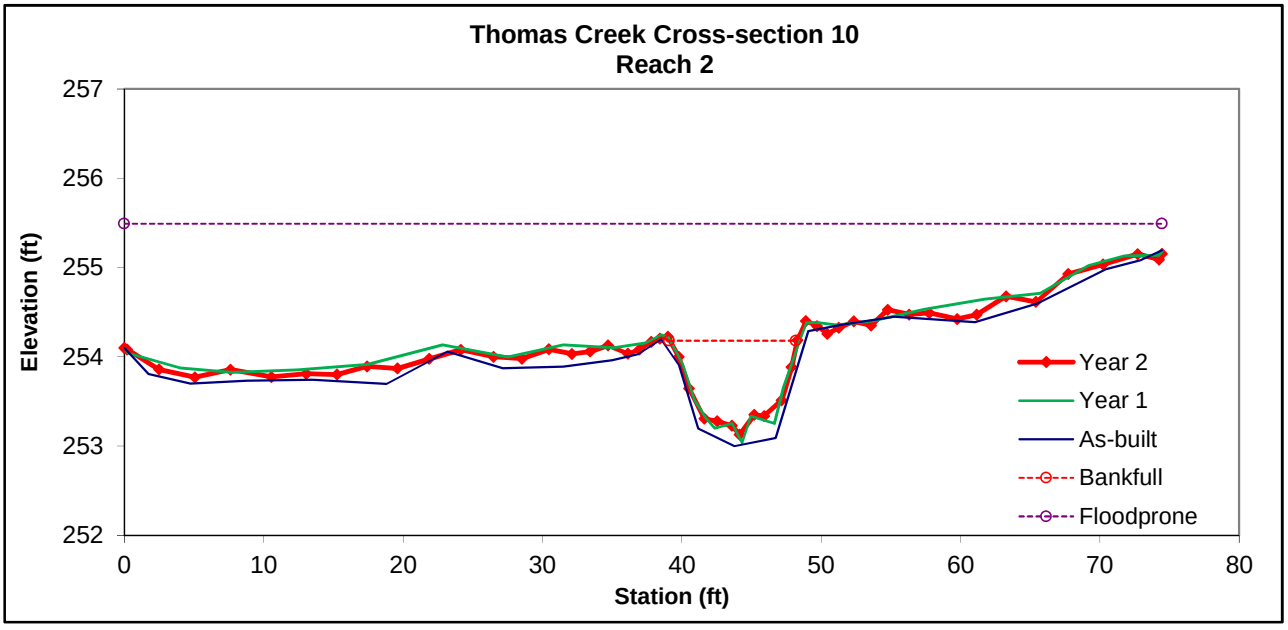
Permanent Cross-Section 10

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	6.4	9.13	0.7	1.05	13.04	0.9	7.3	254.18	254.23



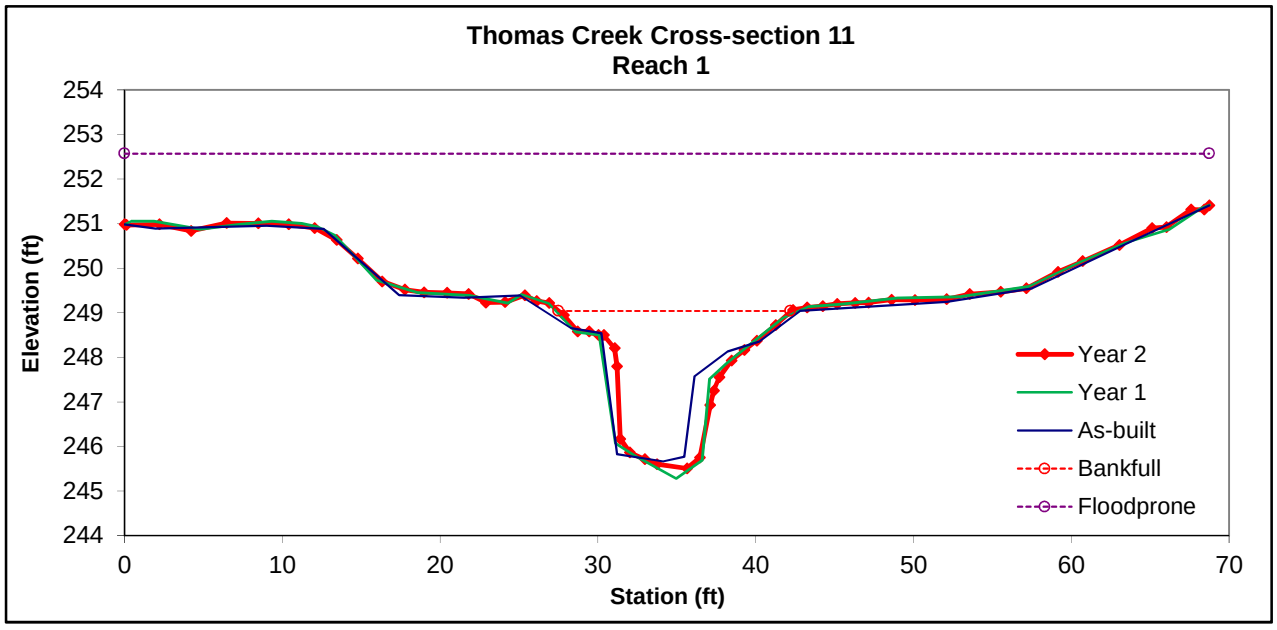
Permanent Cross-Section 11

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		25.0	14.75	1.69	3.53	8.73			249.04	249.06



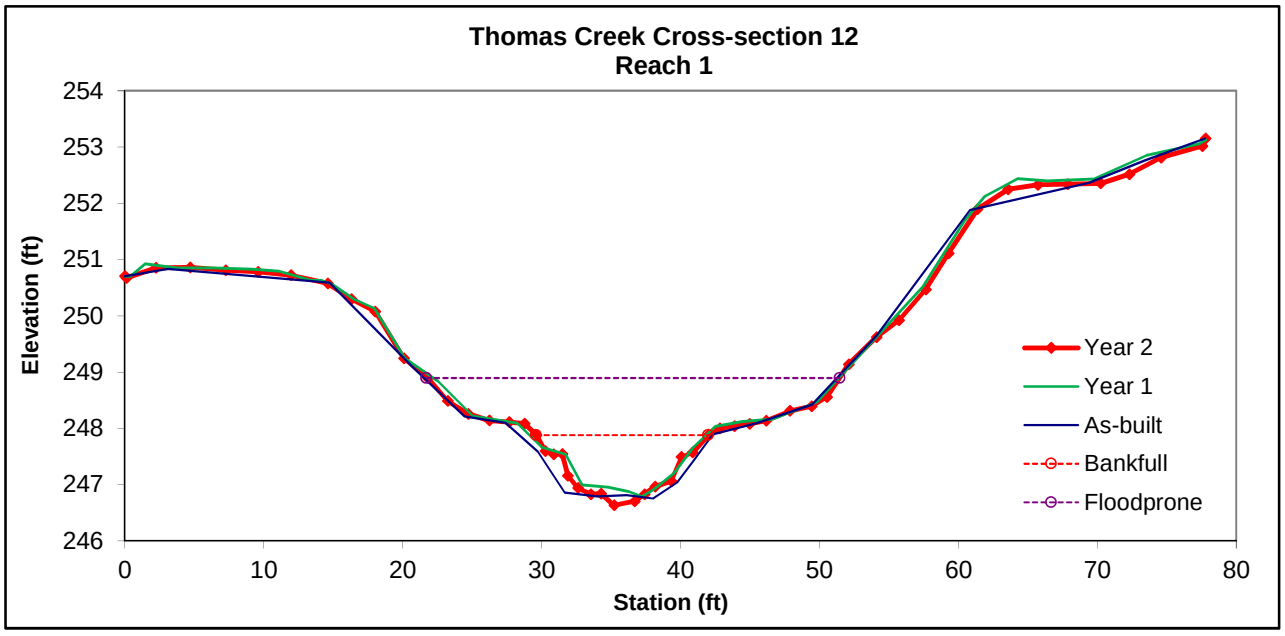
Permanent Cross-Section 12

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	9.3	12.38	0.75	1.25	16.51	1.1	2.1	247.88	247.88



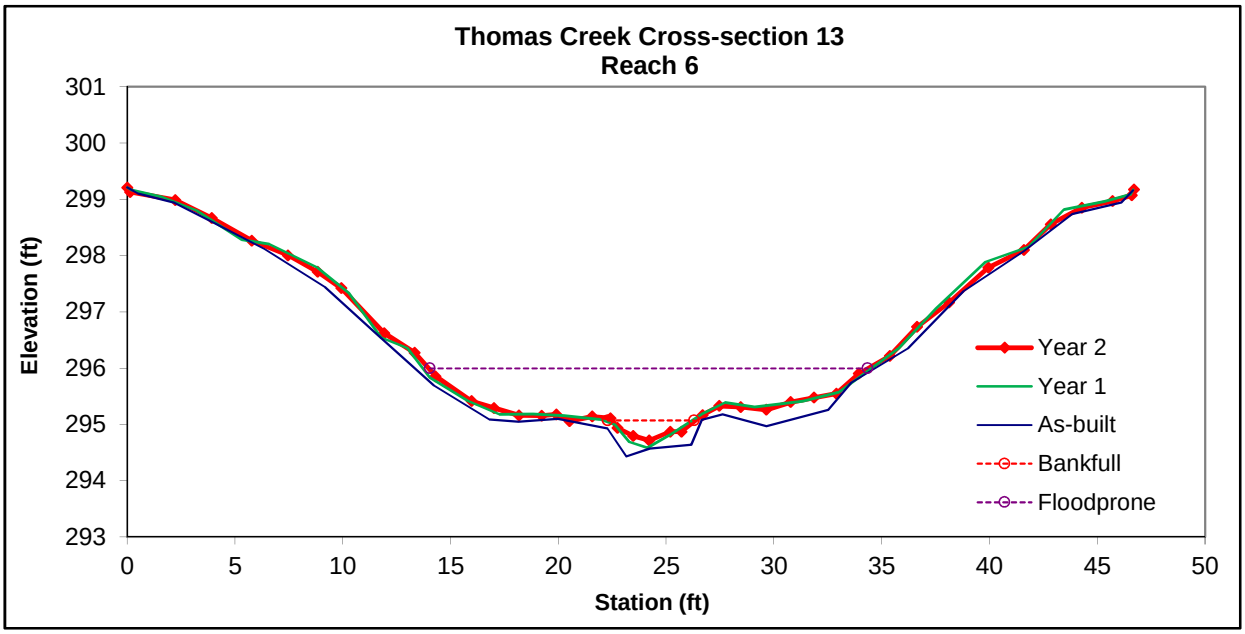
Permanent Cross-Section 13

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	0.84	4.1	0.21	0.36	19.52	0.7	3.2	295.07	295.14



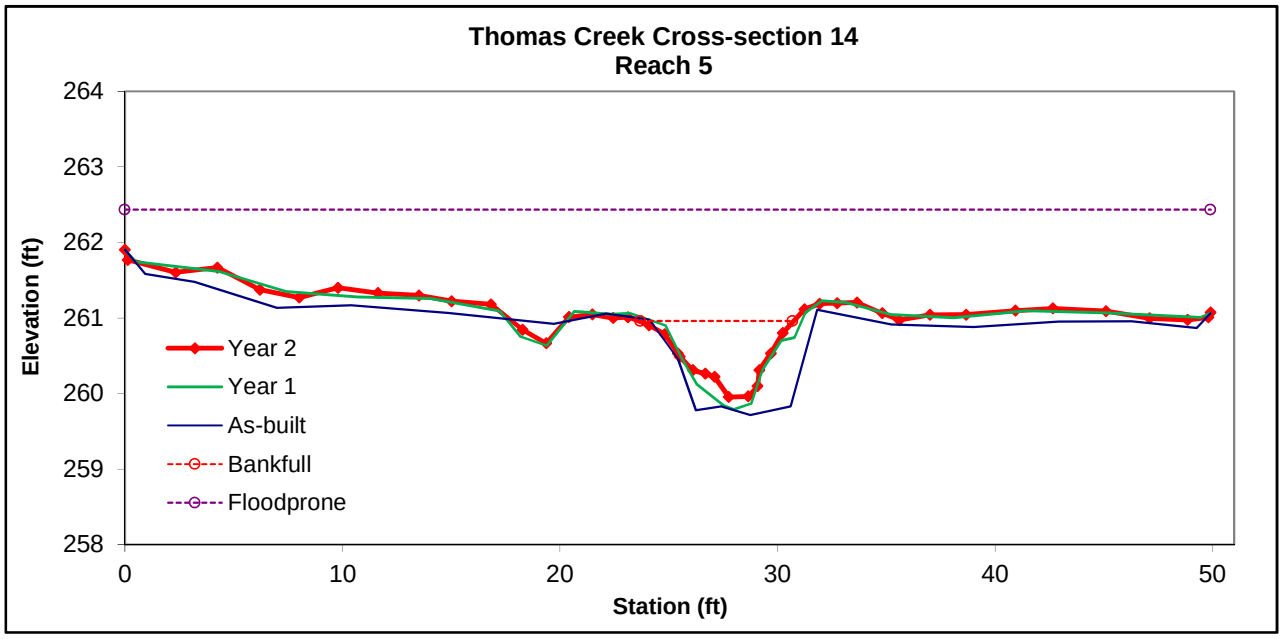
Permanent Cross-Section 14

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	3.8	7.17	0.53	1.01	13.53	0.8	6.6	260.96	260.90



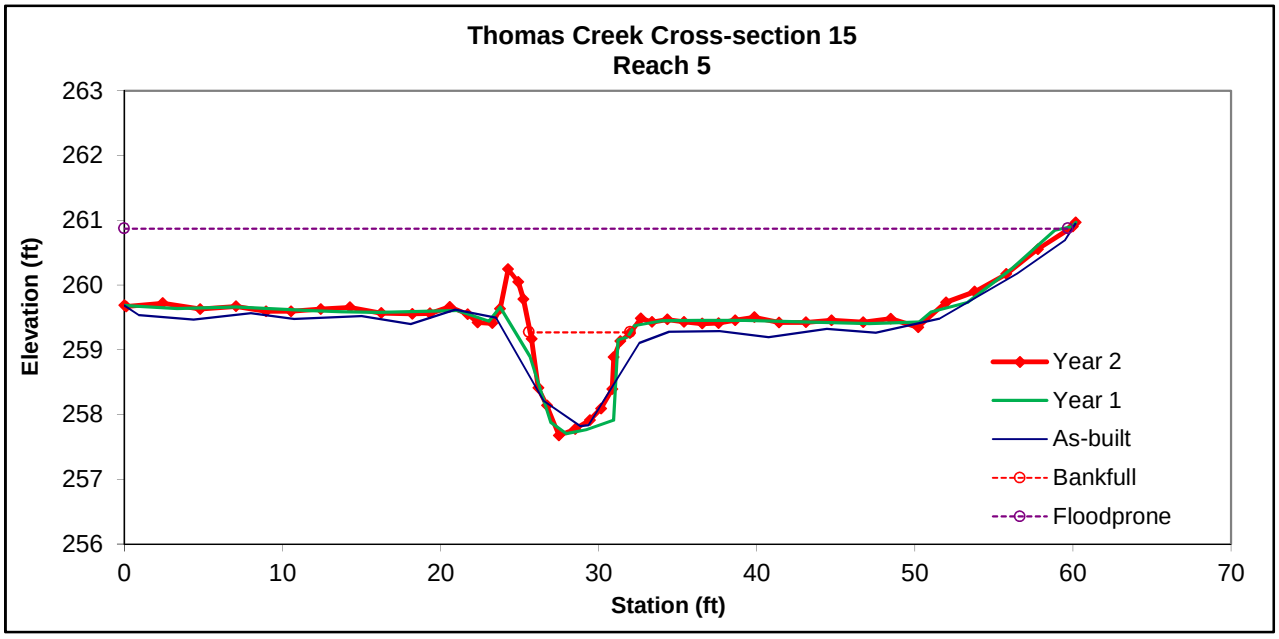
Permanent Cross-Section 15

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		6.5	6.36	1.03	1.6	6.17			259.27	259.48



Permanent Cross-Section 16

(Year 2 Data - Collected October 2017)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		10.2	8.47	1.21	2.45	7.0			255.05	254.92

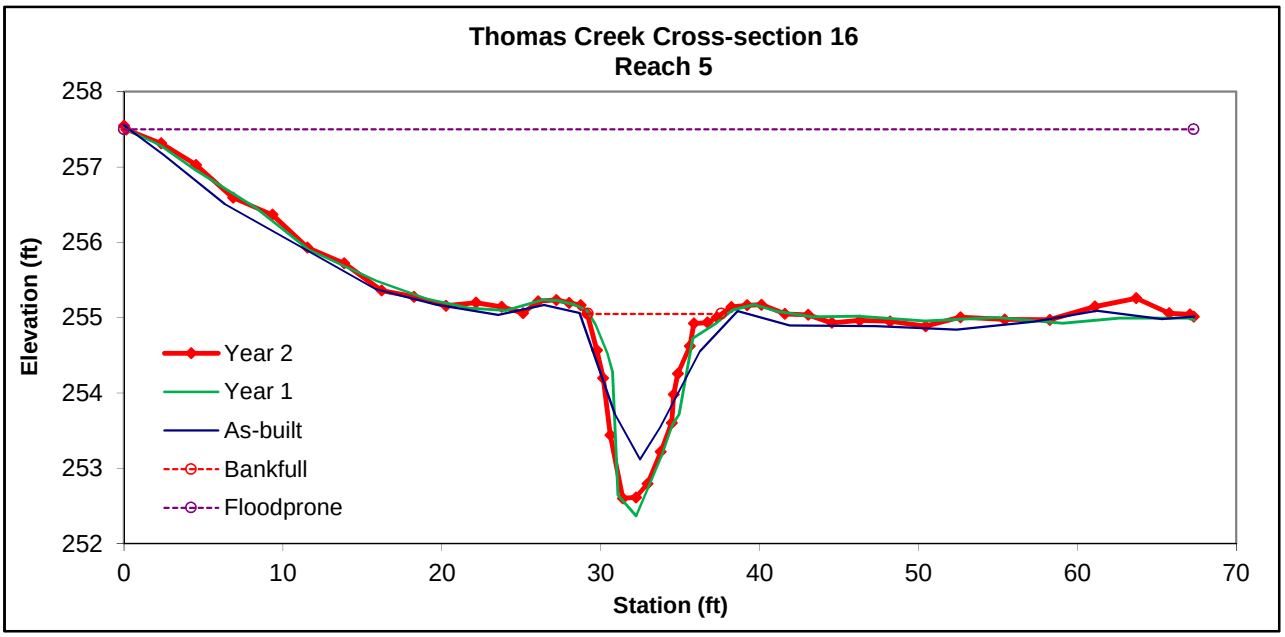


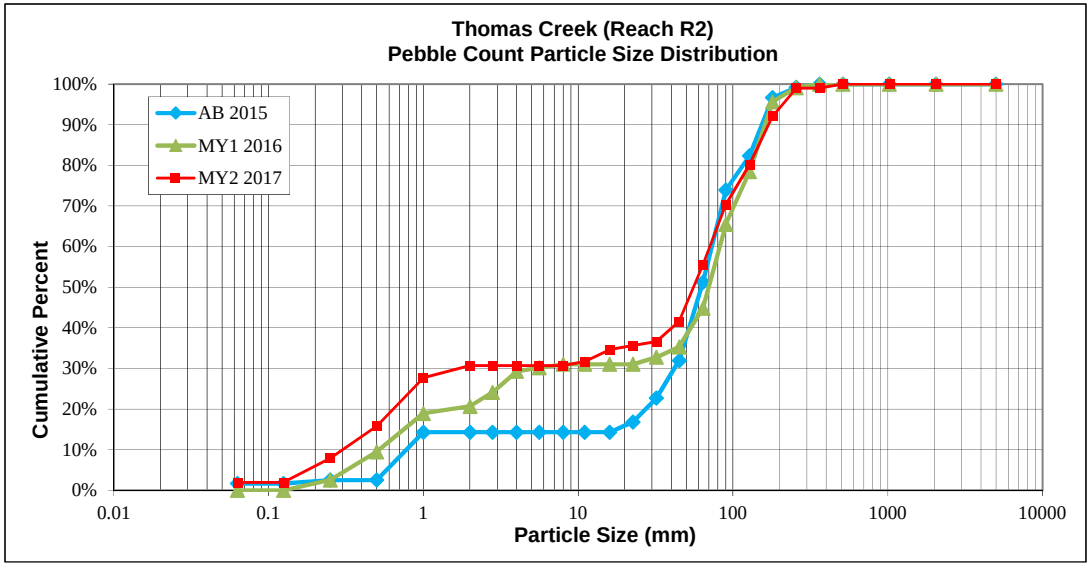
Figure 7. Pebble Count - Monitoring Year 2
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R2 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	6-Sep-17

			MY2 2017			Distribution
MATERIAL	PARTICLE	SIZE (mm)	Total	Class %	% Cum	Plot Size (mm)
Silt/Clay	Silt / Clay	< .063	2	2%	2%	0.063
Sand	Very Fine	.063 - .125			2%	0.125
	Fine	.125 - .25	6	6%	8%	0.25
	Medium	.25 - .50	8	8%	16%	0.50
	Coarse	.50 - 1.0	12	12%	28%	1.0
	Very Coarse	1.0 - 2.0	3	3%	31%	2.0
Gravel	Very Fine	2.0 - 2.8			31%	2.8
	Very Fine	2.8 - 4.0			31%	4.0
	Fine	4.0 - 5.6			31%	5.6
	Fine	5.6 - 8.0			31%	8.0
	Medium	8.0 - 11.0	1	1%	32%	11.0
	Medium	11.0 - 16.0	3	3%	35%	16.0
	Coarse	16 - 22.6	1	1%	36%	22.6
	Coarse	22.6 - 32	1	1%	37%	32
	Very Coarse	32 - 45	5	5%	42%	45
	Very Coarse	45 - 64	14	14%	55%	64
Cobble	Small	64 - 90	15	15%	70%	90
	Small	90 - 128	10	10%	80%	128
	Large	128 - 180	12	12%	92%	180
	Large	180 - 256	7	7%	99%	256
Boulder	Small	256 - 362			99%	362
	Small	362 - 512	1	1%	100%	512
	Medium	512 - 1024			100%	1024
	Large-Very Large	1024 - 2048			100%	2048
Bedrock	Bedrock	> 2048			100%	5000
Total % of whole count			101	100%		

Largest particle= 256

Summary Data			
Channel materials			
D16 =	0.8	D84 =	142.9
D35 =	43.0	D95 =	177.6
D50 =	69.7	D100 =	256 - 362



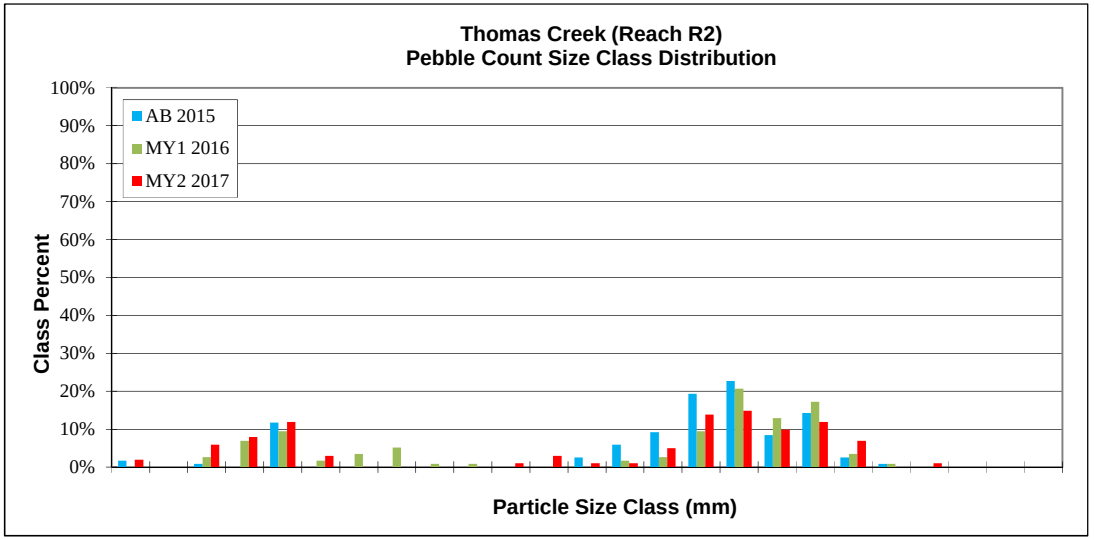


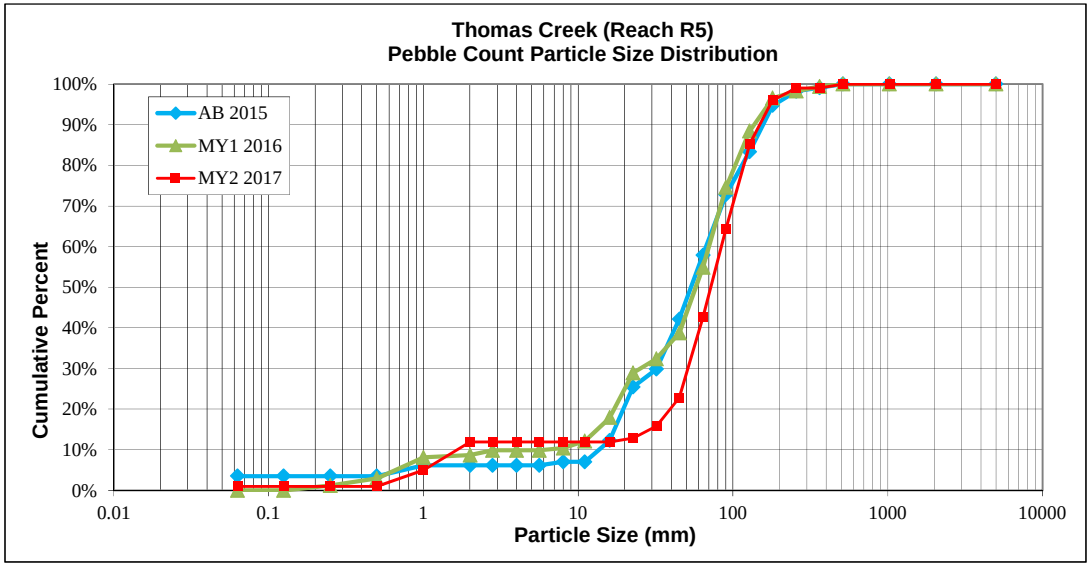
Figure 7. Pebble Count - Monitoring Year 2
Thomas Creek Mitigation Project, DMS# 96074

SITE OR PROJECT:	Thomas Creek
REACH/LOCATION:	Reach R5 (Station 37+00)
FEATURE:	Rock Riffle
DATE:	6-Sep-17

			MY2 2017			Distribution
MATERIAL	**PARTICLE**	**SIZE (mm)**	**Total**	**Class %**	**% Cum**	**Plot Size (mm)**
Silt/Clay	Silt / Clay	< .063	1	1%	1%	0.063
Sand	Very Fine	.063 - .125			1%	0.125
	Fine	.125 - .25			1%	0.25
	Medium	.25 - .50			1%	0.50
	Coarse	.50 - 1.0	4	4%	5%	1.0
	Very Coarse	1.0 - 2.0	7	7%	12%	2.0
Gravel	Very Fine	2.0 - 2.8			12%	2.8
	Very Fine	2.8 - 4.0			12%	4.0
	Fine	4.0 - 5.6			12%	5.6
	Fine	5.6 - 8.0			12%	8.0
	Medium	8.0 - 11.0			12%	11.0
	Medium	11.0 - 16.0			12%	16.0
	Coarse	16 - 22.6	1	1%	13%	22.6
	Coarse	22.6 - 32	3	3%	16%	32
	Very Coarse	32 - 45	7	7%	23%	45
	Very Coarse	45 - 64	20	20%	43%	64
Cobble	Small	64 - 90	22	22%	64%	90
	Small	90 - 128	21	21%	85%	128
	Large	128 - 180	11	11%	96%	180
	Large	180 - 256	3	3%	99%	256
Boulder	Small	256 - 362			99%	362
	Small	362 - 512	1	1%	100%	512
	Medium	512 - 1024			100%	1024
	Large-Very Large	1024 - 2048			100%	2048
Bedrock	Bedrock	> 2048			100%	5000
Total % of whole count			101	100%		

Largest particle= 256

Summary Data			
Channel materials			
D16 =	14.1	D84 =	114.4
D35 =	36.8	D95 =	168.8
D50 =	57.5	D100 =	362 - 512



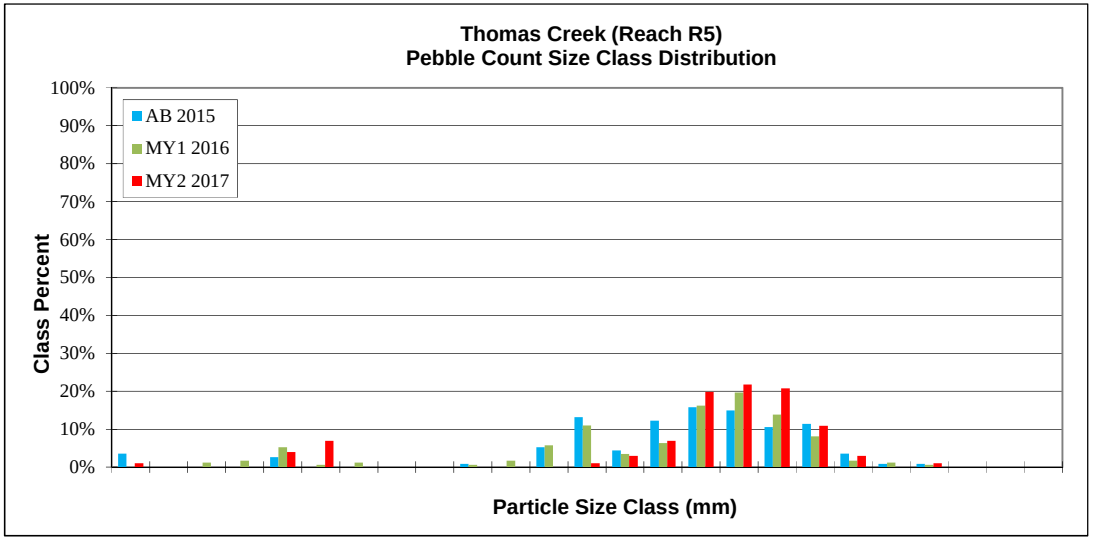


Table 10. Baseline Stream Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 1 - Length 298 ft

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 (ft²)	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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						Design						As-built					
											Thomas Creek Site Upper Reach 4 (On-site)																	
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)	-----	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 (ft²)	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	-----	-----	-----	-----	-----	0.056	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	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 (ft²)	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[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 (ft²)	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	-----	-----	0.019	-----	-----	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 (ft²)	-----	-----	-----	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
[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 (ft²)	-----	-----	-----	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	-----	-----	-----	-----	-----	0.077	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	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					
		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)	-----	-----	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	-----	-----	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 (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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

Table 11a. Cross-Section Morphology and Hydraulic Monitoring Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Stream Reach	Reach 3 (1,032 LF)																				
	Cross-section X-1 (Riffle)							Cross-section X-2 (Pool)							Cross-section X-3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	9.3	8.8	8.3					10.5	10.2	10.2					7.5	7.1	7.0				
BF Mean Depth (ft)	0.8	0.6	0.6					1.3	1.3	1.2					0.6	0.4	0.5				
Width/Depth Ratio	11.9	14.1	13.7					8.3	8.0	8.5					12.3	16.9	15.5				
BF Cross-sectional Area (ft²)	7.3	5.4	5.1					13.4	13.2	12.2					4.5	3.0	3.1				
BF Max Depth (ft)	1.3	1.1	1.0					2.1	2.1	2.0					0.9	0.7	0.7				
Width of Floodprone Area (ft)	55.3	51.8	51.4					61.3	62.2	59.5					37.3	34.1	34.1				
Entrenchment Ratio	5.9	6.0	6.1					-							5.0	4.9	5.0				
Bank Height Ratio	1.0	0.9	0.8					-							1.0	0.9	0.8				
Wetted Perimeter (ft)	10.9	10.0	9.6					13.1	12.8	12.6					8.7	7.9	7.9				
Hydraulic Radius (ft)	0.7	0.5	0.5					1.0	1.0	1.0					0.5	0.4	0.4				
Cross Sectional Area between end pins (ft²)	-							-							-						
d50 (mm)	-							-							-						

Stream Reach	Reach 4 (1,238 LF)							Reach 2 upstream (703 LF)							Reach 2 downstream (1,423 LF)							Reach T1 (227 LF)						
	Cross-section X-4 (Riffle)							Cross-section X-5 (Riffle)							Cross-section X-6 (Riffle)							Cross-section X-7 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	6.8	6.8	6.1					10.4	9.8	9.8					10.2	9.7	9.5					8.5	6.8	6.9				
BF Mean Depth (ft)	0.5	0.5	0.5					0.7	0.6	0.6					1.0	0.9	0.8					0.6	0.5	0.4				
Width/Depth Ratio	12.7	12.6	13.5					14.8	16.6	16.8					10.1	11.4	11.7					13.6	13.8	16.0				
BF Cross-sectional Area (ft²)	3.6	3.6	2.8					7.4	5.8	5.6					10.2	8.3	7.7					5.3	3.4	3.0				
BF Max Depth (ft)	0.9	1.0	0.8					1.0	0.9	0.9					1.5	1.3	1.3					0.9	0.8	0.7				
Width of Floodprone Area (ft)	21.9	22.3	20.6					38.2	37.0	36.3					62.9	62.9	63.0					30.6	28.2	27.1				
Entrenchment Ratio	3.2	3.1	3.2					3.7	3.7	3.7					6.2	6.2	6.2					3.6	3.7	3.7				
Bank Height Ratio	1.0	1.2	0.9					1.0	0.9	1.0					0.9	0.9	0.9					1.0	1.2	0.9				
Wetted Perimeter (ft)	7.8	7.9	7.0					11.8	11.0	10.9					12.2	11.4	11.1					9.7	7.8	7.7				
Hydraulic Radius (ft)	0.5	0.5	0.4					0.6	0.5	0.5					0.8	0.7	0.7					0.5	0.4	0.4				
Cross Sectional Area between end pins (ft²)	-							-							-							-						
d50 (mm)	-							-							-							-						

Stream Reach	Reach 2 downstream (1,423 LF)																				
	Cross-section X-8 (Pool)							Cross-section X-9 (Pool)							Cross-section X-10 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	15.3	16.1	16.1					14.5	14.5	14.6					10.3	9.3	9.1				
BF Mean Depth (ft)	1.2	1.6	1.7					1.1	1.3	1.4					0.8	0.7	0.7				
Width/Depth Ratio	13.3	9.8	9.6					12.9	10.8	10.8					12.6	13.2	13.0				
BF Cross-sectional Area (ft²)	17.6	26.3	27.0					16.3	19.5	19.7					8.4	6.5	6.4				
BF Max Depth (ft)	2.7	2.6	2.8					2.2	3.2	3.0					1.2	1.1	1.1				
Width of Floodprone Area (ft)	53.1	52.4	53.2					70.6	70.6	70.7					74.5	74.5	74.5				
Entrenchment Ratio	-							-							7.2	7.3	7.3				
Bank Height Ratio	-							-							1.0	1.0	0.9				
Wetted Perimeter (ft)	17.6	19.3	19.5					16.8	17.2	17.3					11.9	10.7	10.5				
Hydraulic Radius (ft)	1.0	1.4	1.4					1.0	1.1	1.1					0.7	0.6	0.6				
Cross Sectional Area between end pins (ft²)	-							-							-						
d50 (mm)	-							-							-						

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11a. (Continued) Cross Section Morphology and Hydraulic Monitoring Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074

Stream Reach	Reach 1 (208 LF)														Reach 6 (1,776 LF)							
	Cross-section X-11 (Pool)							Cross-section X-12 (Riffle)							Cross-section X-13 (Riffle)							
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	
BF Width (ft)	16.2	15.4	14.8					13.9	12.7	12.4					6.3	4.1	4.1					
BF Mean Depth (ft)	1.5	1.7	1.7					0.8	0.7	0.8					0.3	0.3	0.2					
Width/Depth Ratio	11.1	8.8	8.7					17.4	19.8	16.5					18.7	16.1	19.5					
BF Cross-sectional Area (ft²)	23.7	26.8	25.0					11.1	8.2	9.3					2.1	1.1	0.8					
BF Max Depth (ft)	3.4	3.8	3.5					1.1	1.1	1.3					0.6	0.5	0.4					
Width of Floodprone Area (ft)	68.8	68.8	68.7					30.6	30.0	31.3					19.4	17.6	16.0					
Entrenchment Ratio	-							2.2	2.2	2.1					3.1	3.2	3.2					
Bank Height Ratio	-							1.0	1.2	1.1					0.8	0.6	0.7					
Wetted Perimeter (ft)	19.2	18.9	18.1					15.5	14.0	13.9					6.9	4.6	4.5					
Hydraulic Radius (ft)	1.2	1.4	1.4					0.7	0.6	0.7					0.3	0.2	0.2					
Cross Sectional Area between end pins (ft²)	-							-							-							
d50 (mm)	-							-							-							

Stream Reach	Reach 5 (1,168 LF)																					
	Cross-section X-14 (Riffle)							Cross-section X-15 (Pool)							Cross-section X-16 (Pool)							
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	
BF Width (ft)	7.5	6.9	7.2					10.3	7.3	6.4					9.3	8.7	8.5					
BF Mean Depth (ft)	0.9	0.6	0.5					0.8	1.0	1.0					0.8	1.2	1.2					
Width/Depth Ratio	8.4	10.8	13.5					13.8	7.1	6.2					11.9	7.3	7.0					
BF Cross-sectional Area (ft²)	6.8	4.4	3.8					7.7	7.5	6.5					7.3	10.4	10.2					
BF Max Depth (ft)	1.2	1.2	1.0					1.5	1.6	1.6					1.3	2.7	2.5					
Width of Floodprone Area (ft)	49.9	49.9	49.9					59.6	58.8	59.7					63.8	67.4	67.3					
Entrenchment Ratio	6.6	6.6	6.6					-							-							
Bank Height Ratio	1.0	1.0	0.8					-							-							
Wetted Perimeter (ft)	9.3	8.1	8.2					11.8	9.3	8.4					10.9	11.1	10.9					
Hydraulic Radius (ft)	0.7	0.5	0.5					0.7	0.8	0.8					0.7	0.9	0.9					
Cross Sectional Area between end pins (ft²)	-							-							-							
d50 (mm)	-							-							-							

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 1 (298 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	-----	13.9	-----	-----	-----	-----	-----	12.7	-----	-----	-----	-----	-----	12.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	17.4	-----	-----	-----	-----	-----	19.8	-----	-----	-----	-----	-----	16.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	11.1	-----	-----	-----	-----	-----	8.2	-----	-----	-----	-----	-----	9.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	1.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	30.6	-----	-----	-----	-----	-----	30.0	-----	-----	-----	-----	-----	31.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	2.2	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	2.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 2 upstream (703 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	----	10.4	-----	-----	-----	-----	----	9.8	-----	-----	-----	-----	-----	9.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	----	0.7	-----	-----	-----	-----	----	0.6	-----	-----	-----	-----	-----	0.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	----	14.8	-----	-----	-----	-----	----	16.6	-----	-----	-----	-----	-----	16.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	----	7.4	-----	-----	-----	-----	----	5.8	-----	-----	-----	-----	-----	5.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft	----	38.2	-----	-----	-----	-----	----	37.0	-----	-----	-----	-----	-----	36.3	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	----	3.7	-----	-----	-----	-----	----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	----	1.0	-----	-----	-----	-----	----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 2 downstream (1,423 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	10.2	10.2	-----	10.3	-----	2	9.3	9.5	-----	9.7	-----	2	9.1	9.3	-----	9.5	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	0.8	0.9	-----	1.0	-----	2	0.7	0.8	-----	0.9	-----	2	0.7	0.8	-----	0.8	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	10.1	11.4	-----	12.6	-----	2	11.4	12.3	-----	13.2	-----	2	11.7	12.4	-----	13.0	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft^2)	8.4	9.3	-----	10.2	-----	2	6.5	7.4	-----	8.3	-----	2	6.4	7.1	-----	7.7	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	1.2	1.3	-----	1.5	-----	2	1.1	1.2	-----	1.3	-----	2	1.1	1.2	-----	1.3	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft	62.9	68.7	-----	74.5	-----	2	62.9	68.7	-----	74.5	-----	2	63.0	68.7	-----	74.5	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	6.2	6.7	-----	7.2	-----	2	6.2	6.8	-----	7.3	-----	2	6.2	6.8	-----	7.3	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	0.9	1.0	-----	1.0	-----	2	0.9	1.0	-----	1.0	-----	2	0.9	0.9	-----	0.9	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 3 (1,031 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	7.5	8.4	-----	9.3	-----	2	7.1	7.9	-----	8.8	-----	2	7.0	7.7	-----	8.3	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	0.6	0.7	-----	0.8	-----	2	0.4	0.5	-----	0.6	-----	2	0.5	0.5	-----	0.6	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	11.9	12.1	-----	12.3	-----	2	14.1	15.5	-----	16.9	-----	2	13.7	14.6	-----	15.5	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	4.5	5.9	-----	7.3	-----	2	3.0	4.2	-----	5.4	-----	2	3.1	4.1	-----	5.1	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	0.9	1.1	-----	1.3	-----	2	0.7	0.9	-----	1.1	-----	2	0.7	0.8	-----	1.0	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	37.3	46.3	-----	55.3	-----	2	34.1	43.0	-----	51.8	-----	2	34.1	42.8	-----	51.4	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	5.0	5.5	-----	5.9	-----	2	4.9	5.5	-----	6.0	-----	2	5.0	5.6	-----	6.1	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	1.0	1.0	-----	1.0	-----	2	0.9	0.9	-----	0.9	-----	2	0.8	0.8	-----	0.8	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 4 (1,238 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	-----	6.8	-----	-----	-----	-----	-----	6.8	-----	-----	-----	-----	-----	6.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	12.7	-----	-----	-----	-----	-----	12.6	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	3.6	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	2.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	21.9	-----	-----	-----	-----	-----	22.3	-----	-----	-----	-----	-----	20.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.2	-----	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 5 (1,169 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	-----	7.5	-----	-----	-----	-----	-----	6.9	-----	-----	-----	-----	-----	7.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	8.4	-----	-----	-----	-----	-----	10.8	-----	-----	-----	-----	-----	13.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	6.8	-----	-----	-----	-----	-----	4.4	-----	-----	-----	-----	-----	3.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	1.2	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	-----	-----	49.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach 6 (1,776 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	-----	6.3	-----	-----	-----	-----	-----	4.1	-----	-----	-----	-----	-----	4.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.3	-----	-----	-----	-----	-----	0.3	-----	-----	-----	-----	-----	0.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	18.7	-----	-----	-----	-----	-----	16.1	-----	-----	-----	-----	-----	19.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	2.1	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft)	-----	19.4	-----	-----	-----	-----	-----	17.6	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.1	-----	-----	-----	-----	-----	3.2	-----	-----	-----	-----	-----	3.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	0.8	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Table 11b. Stream Reach Morphology Summary
Thomas Creek Restoration Project: DMS Project ID No. 96074
Reach T1 (227 LF)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	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)	-----	8.5	-----	-----	-----	-----	-----	6.8	-----	-----	-----	-----	-----	6.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	13.6	-----	-----	-----	-----	-----	13.8	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	5.3	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	0.9	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	0.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Width of Floodprone Area (ft	-----	30.6	-----	-----	-----	-----	-----	28.2	-----	-----	-----	-----	-----	27.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	3.6	-----	-----	-----	-----	-----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	1.0	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																																				
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																																				
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																																				
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Thalweg Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Note: As per DMS request, Baker has calculated the BHR and ER values using the DMS guidance from the document 'As-Built Baseline Monitoring Report Format, Data, and Content Requirement – June 2017'. BHR is calculated by using the depth from the current monitoring year's LTOB to the current monitoring year's thalweg in the numerator, and the as-built maximum bankfull depth in the denominator. ER is calculated by using the elevation of 2-times the as-built max bankfull depth from the current year's thalweg to determine the current year's floodprone width for the numerator, and the as-built bankfull width in the denominator. For comparative purposes, Baker has also retroactively revised the BHR and ER values for all previous years using this methodology, so some values may have changed from those presented in previous report tables and figures.

Appendix E

Hydrologic Data

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
Year 2 Monitoring (2017)			
5/2/2017	0.21	4/25/2017 (3.2" rain event)	Crest Gauge

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						229	248					
Reach 5 Flow Gauge #2 (Installed March 30, 2016)														
TCFL2	126	138						182	218					

Notes:

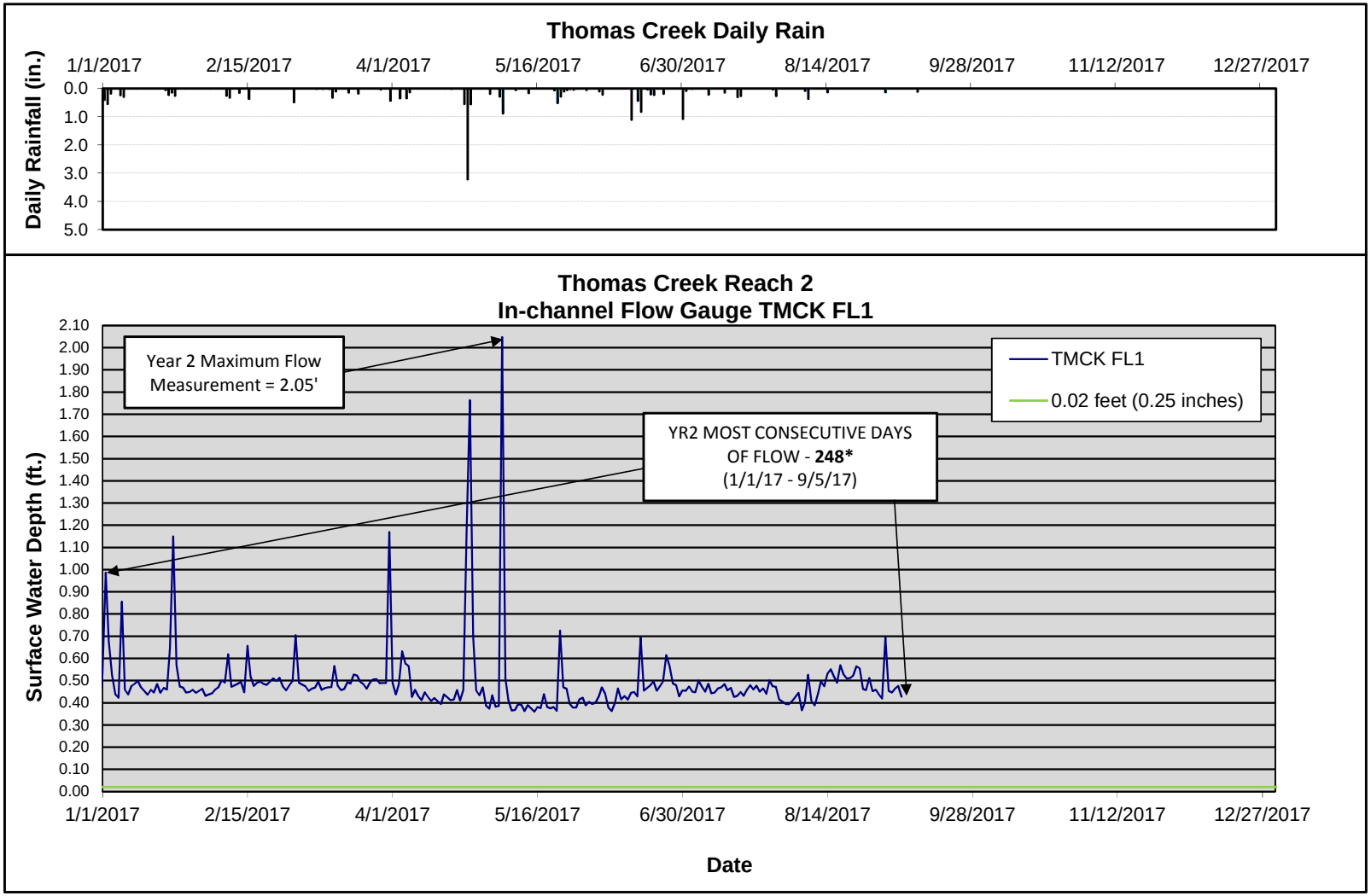
[1]Indicates the greatest number of consecutive days within the monitoring year where flow was measured.

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

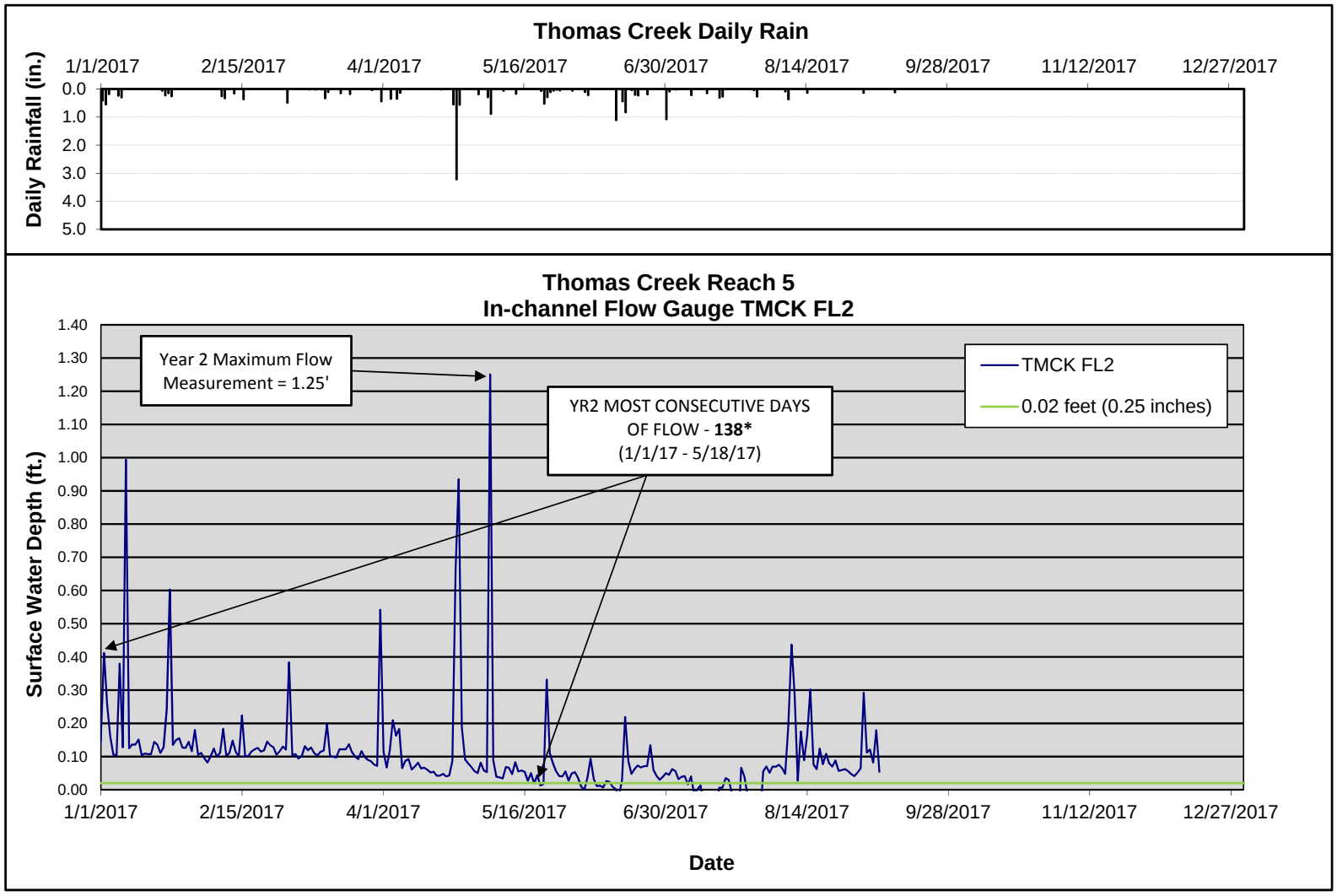
Success Criteria per Thomas Creek Mitigation Plan: "Two bankfull flow events must be documented within the five- to seven-year monitoring period. The two bankfull events must occur in separate years; otherwise, the monitoring will continue until two bankfull events have been documented in separate years."

*** 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 8.

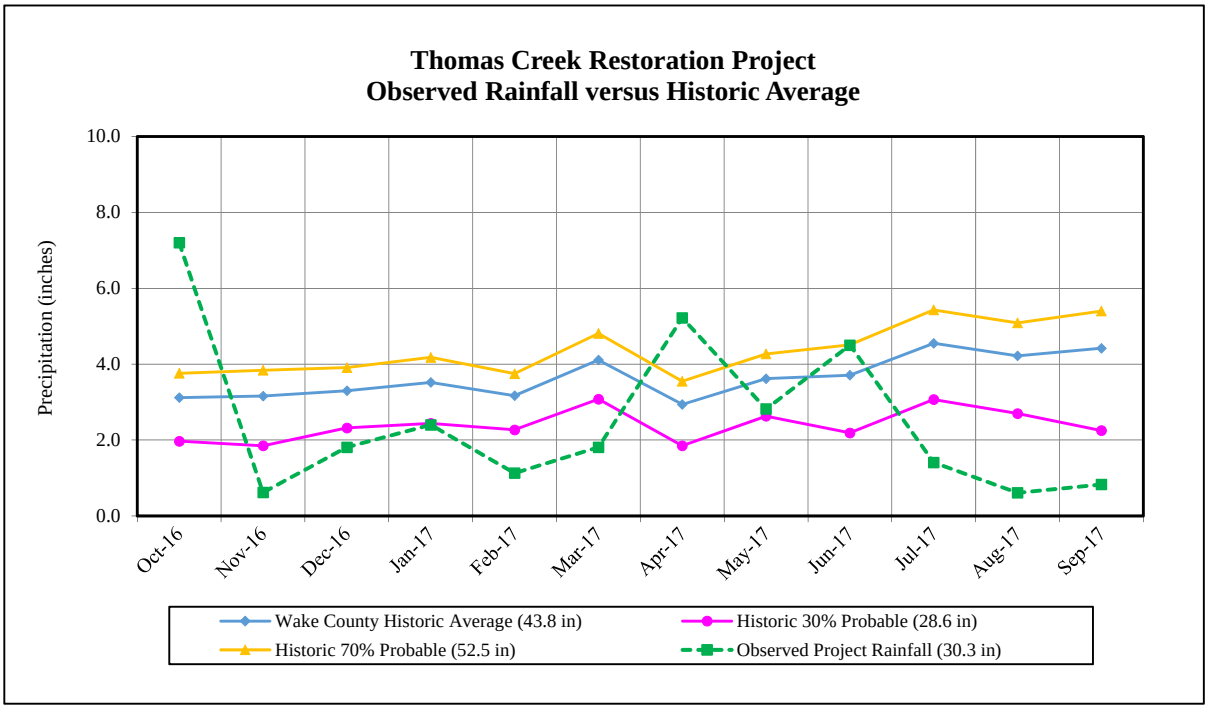


* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.



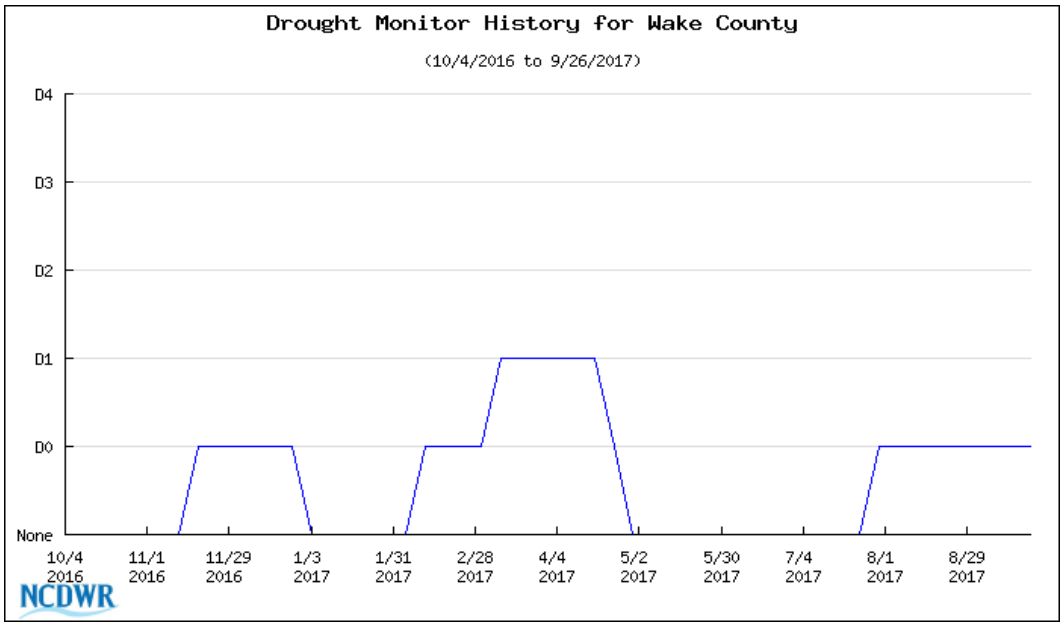
* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.02 feet (0.25 inches) in depth.

Figure 9.



Note: Historic average annual rainfall for Wake County is 43.8", while the observed project rainfall recorded just a total of 30.3" over the previous 12 months (from 10/1/2016 to 9/30/2017). Project rainfall data was collected from the nearest NC-CRONOS station KTTA.

NCDEQ's Division of Water Resources Drought Monitor History also recorded significant periods of Abnormally Dry (D0) and Moderate Drought (D1) conditions for Wake County during the previous 12 months as shown below:



Source: https://www.ncwater.org/Drought_Monitoring/dmhistory/