Browns Summit Creek Restoration Project
Year 5 Monitoring Report

Guilford County, North Carolina

DMS Project ID No. 96313, DEQ Contract No. 5792

Permits: SAW-2014-01642, DWR No. 14-0332, RFP 16-005568

Cape Fear River Basin: 03030002-010020

Project Info:	Monitoring Year: 5 of 7 Year of Data Collection: 2021 Year of Completed Construction (including planting): 2017 Submission Date: December 2021
Submitted To:	NCDEQ - Division of Mitigation Services 1652 Mail Service Center Raleigh, NC 27699-1652

Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600, Cary NC 27518
Office: 919.463.5488 | Fax: 919.463.5490

January 24, 2022

Kelly Phillips
NCDEQ - Division of Mitigation Services
610 East Center Avenue, Suite 301
Mooresville, NC 28115

Subject: Response to Task 11 Draft Year 5 Monitoring Report Comments for Browns Summit (DMS #96313) Cape Fear River Basin; CU 03030002; Guilford County, North Carolina Contract No. 005792

Dear Mr. Phillips:

Please find enclosed our responses to the Year 5 Monitoring Report Comments dated January 24, 2022 regarding the Browns Summit Creek Mitigation Project. We have revised the Year 5 Monitoring Report document in response to this review.

Comment: ***Section 1.0 Executive Summary:*** *You have requested discontinuing flow monitoring due to the consistently strong flow data. Please continue monitoring until you receive IRT approval to stop.*
Response: Michael Baker will continue monitoring flow data unless told otherwise.

Comment: ***Section 2.1.1 Morphological Parameters and Channel Stability:*** *Thank you for retaining the summary information detailing why the survey data was used from the MY0 report.*
Response: You are welcome. Michael Baker will continue to include this in the report until closeout.

Comment: ***2.1.1 Morphological Parameters and Channel Stability:*** *For consistency with terminology please update the term bankfull ratio to bank height ratio.*
Response: Section 2.1.1 has been updated using bank height ratio instead of bankfull ratio.

Comment: **Section 2.1.4 Visual Assessment:** *Add discussion for the Reach 2 (upstream) grade control structure identified in Table 5 as not functioning. Evaluate any concern associated with the reduced function of the structure and potential impact on the system.*
Response: Reach 2 grade control failed during MY3 but repaired in MY4. Table 5 has been updated to show no structures failing.

Comment: ***Table 1 Project Components and Mitigation Credits:*** *Update the stream credits from 5,301.867 to 5,300.867 and the wetland credits from 2.50 to 2.501.*
Response: Table 1 has been revised and included in the final report.

Comment: ***Appendix A - CCPV Figures:*** *Thank you for including the summary call-outs on the CCPVs. These are very helpful during review.*
Response: You are welcome. Michael Baker will continue to include this in the report until closeout.

Comment: ***Appendix A - CCPV:*** *Indicate the location of the Reach 2 structure of concern on the CCPV.*
Response: Reach 2 grade control failed during MY3 but repaired in MY4. The CCPV has been updated to show no structures failing.

Digital files:

Comment: *Please submit the data that supports the groundwater and surface water gauge figures.*
Response: Groundwater and surface water gauge data is now included in the support files under hydrologic data.

Comment: *Please submit the hydrology monitoring station photos.*
Response: All hydrology monitoring station photos have been included in the support files under Visual Assessment Data.

Comment: *Please include a figure or table that illustrates the 70th and 30th percentiles of monthly precipitation relative to observed monthly precipitation.*
Response: Figure 8. Observed Rainfall Versus Historic Averages has been included in Appendix E of the report along with the supported files located in the e-submission folder.

Two hard copies and one pdf copy along with updated digital files uploaded to a thumb drive are being provided. If you have any questions concerning the Year 5 Monitoring Report, please contact me at 919-481-5703 or via email at Katie.McKeithan@mbakerintl.com.

Sincerely,

Kathleen McKeithan

Kathleen McKeithan, PE, CPESC, CPSWQ, CFM

Michael Baker Engineering, Inc.

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Report Prepared and Submitted by Michael Baker Engineering, Inc.

NC Professional Engineering License # F-1084

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APPENDICES

1. EXECUTIVE SUMMARY

Michael Baker Engineering, Inc. (Michael Baker) restored approximately 3,903 linear feet (LF) of jurisdictional stream and enhanced 2,478 LF of stream (of which 559 is for BMPs) along unnamed tributaries (UT) to the Haw River and restored over 4.44 acres of wetland (existing channel lengths). The unnamed tributary (mainstem) has been referred to as Browns Summit Creek for this project. All of these stream features are in the warm-temperature thermal regime. In addition, Baker constructed two best management practices (BMPs) within the conservation easement boundary. The Browns Summit Creek Restoration Project (project) is located in Guilford County, North Carolina (NC) (Figure 1) approximately three miles northwest of the Community of Browns Summit. The project is located in the NC Division of Water Resources (NCDWR) subbasin 03-06-01 and the NC Division of Mitigation Services (NCDMS) Targeted Local Watershed (TLW) 03030002-010020 (the Haw River Headwaters) of the Cape Fear River Basin. The purpose of the project is to restore and/or enhance the degraded stream, wetland, and riparian buffer functions within the site. A recorded conservation easement consisting of 20.2 acres (Figure 2) will protect all stream reaches, wetlands, and riparian buffers in perpetuity. Examination of the available hydrology and soil data indicate the project will potentially provide numerous water quality and ecological benefits within the Haw River watershed, and the Cape Fear River Basin.

Based on the NCDMS 2009 Cape Fear River Basin Restoration Priority (RBRP) Plan, the Browns Summit Creek Restoration Project area is located in an existing targeted local watershed (TLW) within the Cape Fear River Basin (2009 Cape Fear RBRP), but is not located in a Local Watershed Planning (LWP) area. The restoration strategy for the Cape Fear River Basin targets specific projects, which focuses on developing creative strategies for improving water quality flowing to the Haw River in order to reduce non-point source (NPS) pollution to Jordan Lake.

The primary goals of the project, set in the Mitigation Plan, are to improve ecologic functions and to manage nonpoint source loading to the riparian system as described in the NCDMS 2009 Cape Fear RBRP. These goals are identified below:

- Create geomorphically stable conditions along the unnamed tributaries across the site,
- Implement agricultural BMPs to reduce nonpoint source inputs to receiving waters,
- Address known and obvious water quality and habitat stressors present on site,
- Restore stream and floodplain connectivity, and
- Restore and protect riparian buffer functions and corridor habitat.

To accomplish these goals, the following objectives were identified:

- Restore existing incised, eroding, and channelized streams by creating stable dimension and connecting them to their relic floodplains;
- Re-establish and rehabilitate site wetlands that have been impacted by cattle, spoil pile disposal, channelization, subsequent channel incision, and wetland vegetation loss;
- Prevent cattle from accessing the conservation easement boundary by installing permanent fencing and thus reduce excessive stream bank erosion and undesired nutrient inputs;
- Increase aquatic habitat value by improving bedform diversity, riffle substrate and in-stream cover; creating natural scour pools; adding woody debris and reducing sediment loading from accelerated stream bank erosion;

- Construct a wetland BMP on the upstream extent of Reach R6 to capture and retain and for sediment to settle out of the water column;
- Construct a step pool BMP channel to capture and disperse volumes and velocities by allowing discharge from a low density residential development to spread across the floodplain of Reach R4; thereby, diffusing energies and promoting nutrient uptake within the riparian buffer;
- Plant native species within the riparian corridor to increase runoff filtering capacity, improve stream bank stability and riparian habitat connectivity, and shade the stream to decrease water temperature;
- Control invasive species vegetation within the project area and, if necessary, continue treatments during the monitoring period; and
- Establish a conservation easement to protect the project area in perpetuity.

The Year 5 monitoring survey data of seventeen cross-sections indicates that the site is geomorphically stable and performing at 100 percent for all the parameters evaluated. Certain cross-sections (located in Appendix D) have shown minor fluctuations in their geometry as compared to their MY1 conditions; however, visually the site has remained stable. Therefore, no Stream Problem Area (SPA) were discovered during Year 5 monitoring. SPA 3-1 reported during Monitoring Year 3 (MY3) was repaired during MY4 and remained stable throughout MY5. Small areas of invasive species (Privet and Multiflora Rose) were treated during April and July 2021. Michael Baker plans on retreating these areas for future monitoring years.

During Year 5 monitoring, all plots meet the planted acreage performance categories (Appendix B and C). The lowest number of stems per acre was vegetation plot 10 with 7 stems. Even though the mortality was high in the early growing stages of this plot the remaining trees are very healthy with large volunteer species coming up as well. Therefore, it is not expected that the number of stems decrease over the remaining monitoring years. The average stems per acre for the site is 506 as compared to MY3 average of 517 stems per acre.

Year 5 flow monitoring demonstrated that all flow gauges (BSFL1, BSFL2 and BSFL3) continue to meet the stated success criteria of 30 days or more of consecutive flow through R4, T3 and T1 respectively. Flow gauge BSFL1 documented 156 days of consecutive flow in R4, while flow gauge BSFL2 documented 181 days of consecutive flow in T3, and BSFL3 documented 293 days of consecutive flow in T1. The minimal consecutive flow for the gauges within five years of monitoring was 122 days, thus we recommend discontinuing this monitoring effort. The gauges demonstrated similar patterns relative to rainfall events observed in the vicinity of the site as shown in the flow gauge graphs in Appendix E.

During Year 5 monitoring, the R1 crest gauge documented two post-construction bankfull event from July 2021 at 1.43 feet and second event in October of 2021 at 1.01 feet. The site had already meet the bankfull flow requirement of two bankfull events within two separate monitoring years in previous monitoring years (MY1 and MY2).

Eight wells (total) have been installed in the wetland restoration areas. BSAW8 was installed during MY4 to gather additional data in adjacent wetlands. BSAW8 is located adjacent to wetland type 5 (Hydrologic reestablishment) where BSAW1 is located. BSAW8 data shows the wetland preforming well above success criteria. Seven of the eight are preforming successfully. One well did not meet success (BSAW2). However, BSAW2 shows hydrology improving each monitoring year and falling short of the success criteria by only 4 days. It is anticipated that wetland hydrology will continue to improve.

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 5 monitoring activities for the post-construction monitoring period.

2. 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.

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 CCPV map found in Appendix B.

Channel construction began in October 10, 2016 at the upstream extent of the site and worked in the downstream direction (begin on Reach 6 and ended with Reach 1). The construction was completed on March 8, 2017. Planting was installed as major reaches were completed and finalized by March 10, 2017. Minor supplemental planting occurred in March of 2018.

The Monitoring Year 5 visual site assessment was collected in November 2021. Visual Assessment is contained in Appendix B.

2.1 Stream Assessment

Historically, the Browns Summit site has been utilized for agriculture. Cattle have had direct access to the entire site. Ponds were located throughout the project, including within the alignment of R1, R3, R4, and R6. Channelization was clearly confirmed by the historical aerial photo from 1937 and spoil piles were found along several of the reaches. The project involved the restoration and enhancement of the headwater system. Restoration practices involved raising the existing streambed and reconnecting the stream to the relic floodplain to restore natural flow regimes to the system. The existing channels abandoned within the restoration areas were 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.

2.1.1 Morphological Parameters and Channel Stability

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.

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 were not planned to 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. However, during preparation of the MY1 monitoring report, it was discovered that the data provided by the construction contractor's survey subcontractor for as-built was of low quality and insufficient. The quality of the sealed as-built survey provided by the contractor was not discovered until the MY1 survey was overlain on top of the MY0 cross sections. The channel in reality had not fluctuated nearly as dramatically as shown in Figure 5 (cross section overlays) and has remained stable and is performing as designed. This has been documented through field inspections throughout subsequent monitoring years by Michael Baker and DMS staff. Due to the MY0 survey quality discovered during MY1, Michael Baker proposed to utilize the detailed survey data and associated parameters collected during MY1 by a different surveyor as the basis of comparison through the monitoring phase of the project. This will ensure an accurate assessment of success and trends throughout the life of the project. The contractor had the site's longitudinal profile re-surveyed incase future comparisons are required. The longitudinal profile overlay was provided in previous reports.

Additionally, per DMS request, bank height ratio is calculated by adjusting the bankfull line vertically to recreate the as-built cross-sectional area. Once the cross-sectional area is the same bank height ratio is calculated and recorded. After bank height ratio is recorded then previous bankfull elevation is set and the remaining data is calculated. However, in this case, due to a poor as-built survey we are referencing all calculations to the MY1 survey. This will help ensure that the cross-sections best represent the actual characteristics of the stream.

2.1.2 Hydrology

To monitor on-site bankfull events, one crest gauge (crest gauge #1) was installed along R1's left bank at bankfull elevation. The crest gauge readings are presented in Appendix E. Thus, the site has meet the bankfull flow requirements of two bankfull events within two separate years.

Year 5 flow monitoring demonstrated that all flow gauges (BSFL1, BSFL2 and BSFL3) met the stated success criteria of 30 days or more of consecutive flow through R4, T3 and T1 respectively. The gauges demonstrated similar patterns relative to rainfall events observed in the vicinity of the Site as shown in the flow gauge graphs in Appendix E.

2.1.3 Photographic Documentation

Visual inspection of the site is conducted at a minimum of twice a year. Representative photographs for Monitoring Year 5 were taken along each Reach in March 2021 and are provided 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 integrity and of in-stream structures throughout the project. Habitat parameters and pool depth maintenance are also evaluated and scored. During Year 5 monitoring, Michael Baker staff walked the entire project 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 Mitigation Plan, and locations of any SPAs were documented in the field for subsequent mapping on the CCPV figures.

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 general stream photos.

3.1 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 are a minimum of 2 percent of the planted portion of the Site with fourteen 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.

4.1 Wetland Assessment

Eight (8) groundwater monitoring wells were installed across the site to document hydrologic conditions of the restored wetland area. The wetland gauges are depicted on the CCPV figures (Figure 2) found in Appendix B. Installation and monitoring of the groundwater stations have been conducted in accordance with the USACE standard methods.

3. 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). 2012. Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. Version 1.5, June 8, 2012.

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.

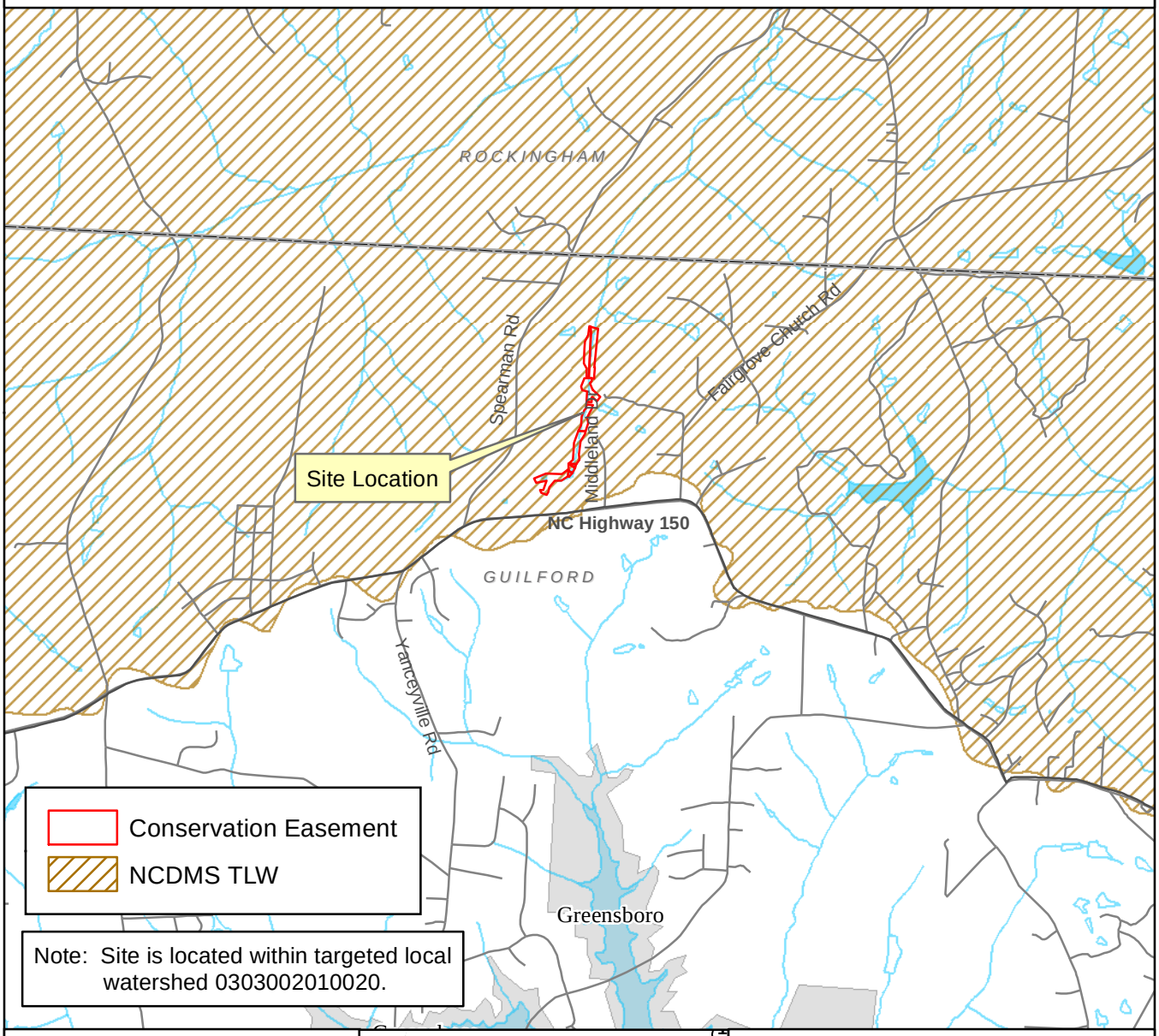
Schafale, M. P., and A. S. Weakley. 1990. Classification of the natural communities of North Carolina, third Approximation. North Carolina Natural Heritage Program. Division of Parks and Recreation, NCDEQ. Raleigh, NC.

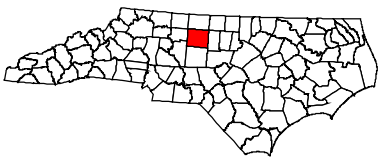
U.S. Army Corps of Engineers. 2003. Stream Mitigation Guidelines, April 2003, U.S. Army Corps of Engineers (USACE). Wilmington District.

Appendix A

Project Vicinity Map and Background Tables

To access the site from Raleigh, take Interstate 40 and head west on I-40 towards Greensboro, for approximately 68 miles. Take the exit ramp to E. Lee St. (exit 224) towards Greensboro and continue for 2 miles before turning onto U.S. Highway 29 North. Once on U.S. Highway 29 North, travel north for approximately 10 miles before exiting and turning on to NC-150 West. Continue west on NC-150 for 5 miles. The project site is located along and between NC-150 and Spearman Rd., with access points through residences on Middleland Dr. and Broad Ridge Ct. 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.





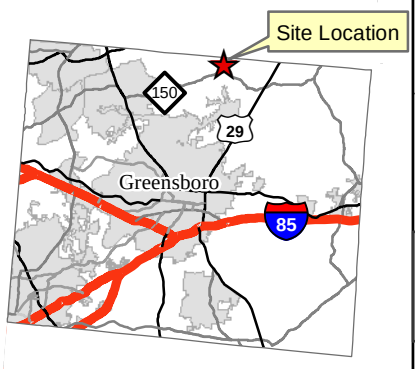
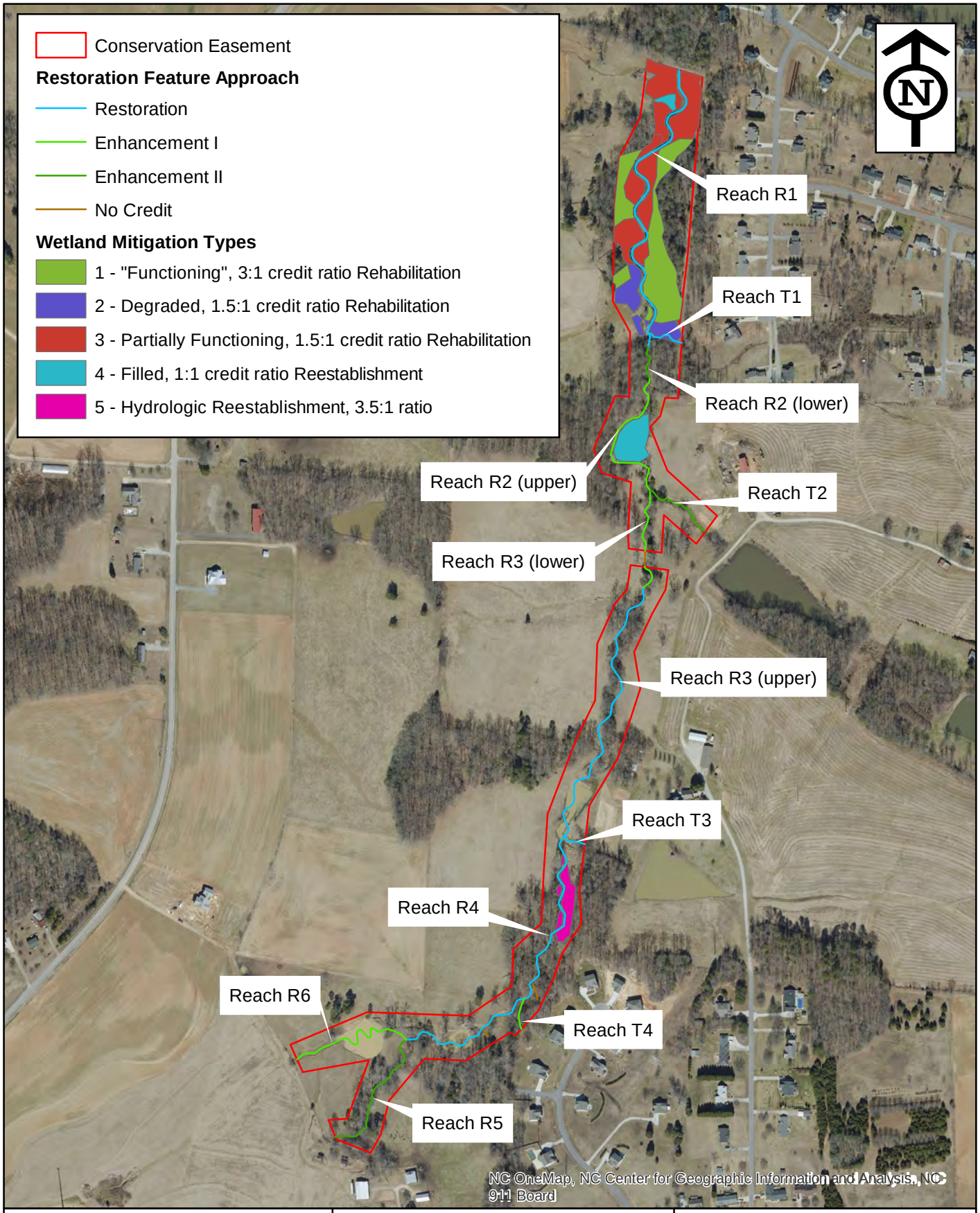


Figure 1
Project Vicinity Map
Browns Summit (DMS# 96313)

NCDEQ - Division of Mitigation Services

Michael Baker INTERNATIONAL

0.5 0 0.5 Miles

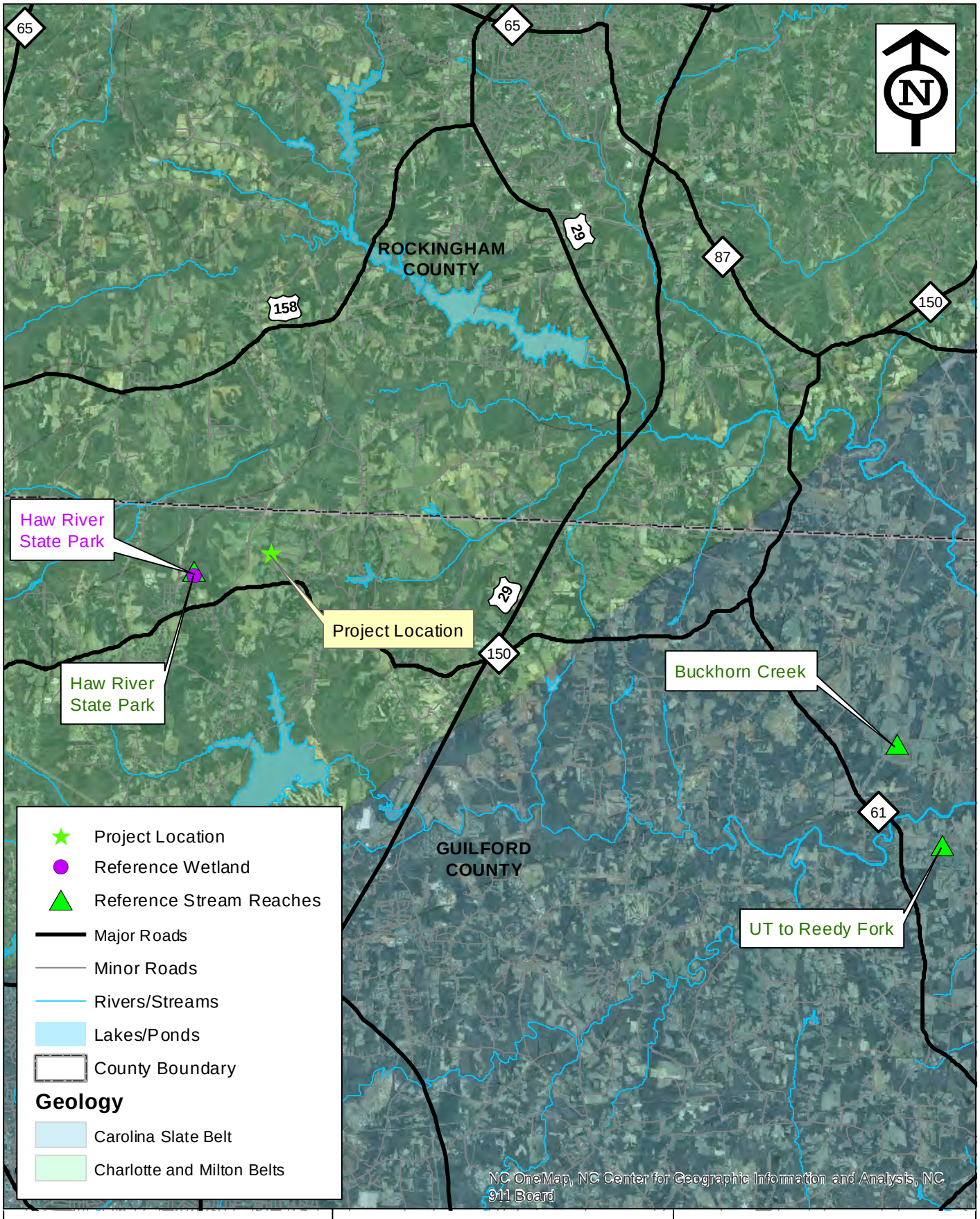


Michael Baker INTERNATIONAL

0 250 500 1,000

Feet

Figure 2
Restoration Summary Map
Browns Summit Site
(DMS #96313)



Michael Baker INTERNATIONAL

2 1 0 2

Miles

Figure 3
Reference Stream Locations Map
Browns Summit Site

Table 1. Project Components and Mitigation Credits

Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Mitigation Credits

	Stream	Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R, E1, EII	R	E					
Totals	5,300.867 SMU	2.501	0.0					

Project Components

Project Component or Reach ID	Stationing/ Location (As-Built)*	Existing Footage/ Acreage (LF/AC)*	Approach	Restoration/ Restoration Equivalent (SMU/WMU)	Restoration Footage or Acreage (LF/AC)**	Mitigation Ratio
R1	51+00.00 - 63+89.87	1,217	Restoration	1,290	1,290	1:1
R2 (downstream section)	49+65.28 - 51+00.00	167	Enhancement II	54	134	2.5:1
R2 (upstream section)	43+48.17 - 49+65.28	701	Enhancement I	409	614	1.5:1
R3 (downstream section) 60' easement break subtracted from stream lengths	39+35.73 - 43+48.17 (CE 40+45.09 - 41+05.52)	362	Enhancement I	235	352	1.5:1
R3 (upstream section)	28+31.92 - 39+35.73	1,224	Restoration	1,102	1,102	1:1
R4	15+35.86 - 28+31.92	1,350	Restoration	1,296	1,296	1:1
R5	10+00 - 15+35.86	536	Enhancement II	214	536	2.5:1
R6	10+00 - 15+19.39	536	Enhancement I/BMP	295	442 LF (valley length)	1.5:1
T1	10+00 - 11+44.99	121	Restoration	145	145	1:1
T2	10+00 - 12+85.21	283	Enhancement II	113	283	2.5:1
T3	10+04.88 - 10+92.84	83	Restoration	70	70	1:1
T4	10+30.18 - 11+49.36	47	Enhancement I/BMP	78	117 LF (valley length)	1.5:1
Wetland Area - Type 1	See Figures	1.57	Rehabilitation	0.51	1.53	3:1
Wetland Area - Type 2	See Figures	0.49	Rehabilitation	0.29	0.43	1.5:1
Wetland Area - Type 3	See Figures	2.06	Rehabilitation	1.17	1.75	1.5:1
Wetland Area - Type 4	See Figures	0.49	Re-establishment	0.46	0.46	1:1
Wetland Area - Type 5	See Figures	0.27	Re-establishment	0.08	0.27	3.5:1

*Wetland existing acrage and restoration acrages were swapped in Table 5.1 of the Mitigation Plan.

**Stations and lengths are taken from the 2017 As-Built survey and may thus differ slightly from the Mitigation Plan.

Component Summation

Restoration Level	Stream (LF)	Riparian Wetland (AC)		Non-riparian Wetland (AC)	Buffer (SF)	Upland (AC)
Restoration	3,903	4.44				
Enhancement I	1,525					
Enhancement II	953					

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

Table 2. Project Activity and Reporting History			
Browns Summit Creek Restoration Project: DMS Project No ID. 96313			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Mitigation Plan Prepared	not specified in proposal	Summer 2015	May 1, 2015
Mitigation Plan Amended	not specified in proposal	Summer 2015	September 17, 2015
Mitigation Plan Approved	December 4, 2014	Winter 2015	November 2, 2015
Final Mitigation Plan with PCN (minor revisions requested in approval letter)	not specified in proposal	Winter 2015	January 29, 2016
Final Design – (at least 90% complete)	not specified in proposal		September 20, 2016
Construction Begins	not specified in proposal		October 10, 2016
Temporary S&E mix applied to entire project area	June 1, 2015		March 10, 2017
Permanent seed mix applied to entire project area	June 2, 2015		March 10, 2017
Planting of live stakes	June 3, 2015		March 10, 2017
Planting of bare root trees	June 3, 2015		March 10, 2017
End of Construction	May 4, 2015		March 8, 2017
Survey of As-built conditions (Year 0 Monitoring-baseline)	June 3, 2015	Spring 2017	July 1, 2017
Baseline Monitoring Report*	May 7, 2017	Spring 2017	November 30, 2017
Year 1 Monitoring	December 1, 2017	November 2017	January 8, 2018
Year 2 Monitoring	December 1, 2018	November 2018	December 31, 2018
Year 3 Monitoring	December 1, 2019	November 2019	February 12, 2020
Year 4 Monitoring	December 1, 2020	November 2020	February 11, 2021
Year 5 Monitoring	December 1, 2021	November 2021	
Year 6 Monitoring	December 1, 2022		
Year 7 Monitoring	December 1, 2023		
* Monitoring schedule completion dates updated based on completion of construction.			

Table 3. Project Contacts **Browns Summit Creek Restoration Project: DMS Project No ID. 96313**	
Designer	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact: Katie McKeithan, Tel. 919-481-5703
Construction Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Stephen Carroll, Tel. 919-428-8368
Planting Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Stephen Carroll, Tel. 919-428-8368
Seeding Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Stephen Carroll, Tel. 919-428-8368
Seed Mix Sources	Green Resources, Rodney Montgomery 336-215-3458
Nursery Stock Suppliers	Dykes and Son, 931-668-8833 Mellow Marsh Farm, 919-742-1200 ArborGen, 843-528-3204
Live Stakes Suppliers	Foggy Mountain Nursery, 336-384-5323
Monitoring Performers	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518
Stream Monitoring Point of Contact	Contact: Katie McKeithan, Tel. 919-481-5703
Vegetation Monitoring Point of Contact	Katie McKeithan, Tel. 919-481-5703
Surveyers	Kee Mapping and Surveying, 828-575-9021

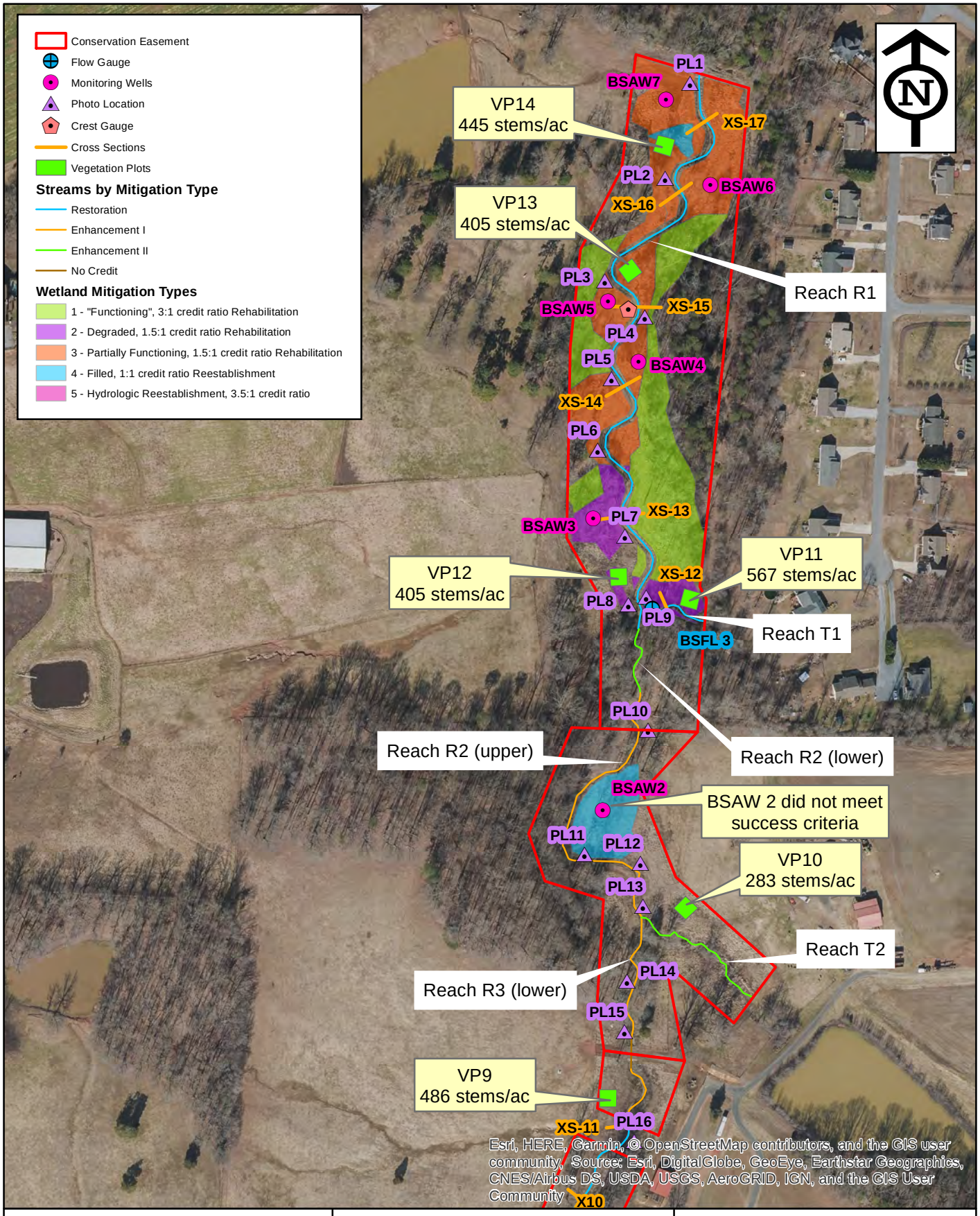
Table 4. Project Attributes
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Project Information					
Project Name	Browns Summit Creek Restoration Project				
County	Guilford				
Project Area (acres)	20.2				
Project Coordinates (latitude and longitude)	36.237 N, -79.749 W				
Project Watershed Summary Information					
Physiographic Province	Piedmont				
River Basin	Cape Fear				
USGS Hydrologic Unit 8-digit and 14-digit	03030002 / 03030002010020				
NCDWR Sub-basin	3/6/2001				
Project Drainage Area (acres)	438				
Project Drainage Area Percent Impervious	1%				
CGIA Land Use Classification	2.01.01.01, 2.03.01, 2.99.01, 3.02 / Forest (53%) Agriculture (39%) Impervious Cover (1%) Unclassified (7%)				
Reach Summary Information					
Parameters	**Reach R1**	**Reach R2**	**Reach R3**	**Reach R4**	**Reach R5**
Length of Reach (linear feet)	1,290	748	1,454	1,296	536
Valley Classification (Rosgen)	VII	VII	VII	VII	VII
Drainage Area (acres)	438	299	242	138/95	24
NCDWR Stream Identification Score	35.5	35.5	41.5	41.5/25	28.5
NCDWR Water Quality Classification	C; NSW				
Morphological Description (Rosgen stream type)	E	Bc incised	Bc incised	Gc	Bc
Evolutionary Trend	Incised E→Gc→F	Bc→G→F	Bc→G→F	G→F	Bc→G
Underlying Mapped Soils	CnA	CnA	CnA, PpE2	CnA, CkC	CkC
Drainage Class	Somewhat Poorly Drained	Somewhat Poorly Drained	Somewhat Poorly Drained and Well Drained	Somewhat Poorly Drained and Well Drained	Well Drained
Soil Hydric Status	Hydric	Hydric	Partially Hydric	Partially Hydric	Upland
Average Channel Slope (ft/ft)	0.0069	0.0068	0.0095	0.017	0.023
FEMA Classification	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Piedmont Headwater Stream Forest				
Percent Composition of Exotic/Invasive Vegetation	25%	15%	5%	<5%	<5%
Parameters	**Reach R6**	**Reach T1**	**Reach T2**	**Reach T3**	**Reach T4**
Length of Reach (linear feet)	442	145	283	70	117
Valley Classification (Rosgen)	VII	VII	VII	VII	VII
Drainage Area (acres)	61	55	47	41	10
NCDWR Stream Identification Score	18	26.75	27.25	19	-
NCDWR Water Quality Classification	C; NSW				
Morphological Description (Rosgen stream type)	Bc incised	E incised	F	E incised	-
Evolutionary Trend	Bc→G→F	E→G→F	Bc→G→F	E→G→F	
Underlying Mapped Soils	CkC	CnA	CnA, PpE2	CnA	CkC
Drainage Class	Well Drained	Somewhat Poorly Drained	Somewhat Poorly Drained and Well Drained	Somewhat Poorly Drained	Well Drained
Soil Hydric Status	Upland	Hydric	Partially Hydric	Hydric	Upland
Average Channel Slope (ft/ft)	0.014	0.024	0.022	0.02	-
FEMA Classification	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Piedmont Headwater Stream Forest				
Percent Composition of Exotic/Invasive Vegetation	5%	10%	10%	10%	10%

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	N/A	Categorical Exclusion (Appendix B)
Essential Fisheries Habitat	No	N/A	Categorical Exclusion (Appendix B)

Appendix B

Visual Assessment Data

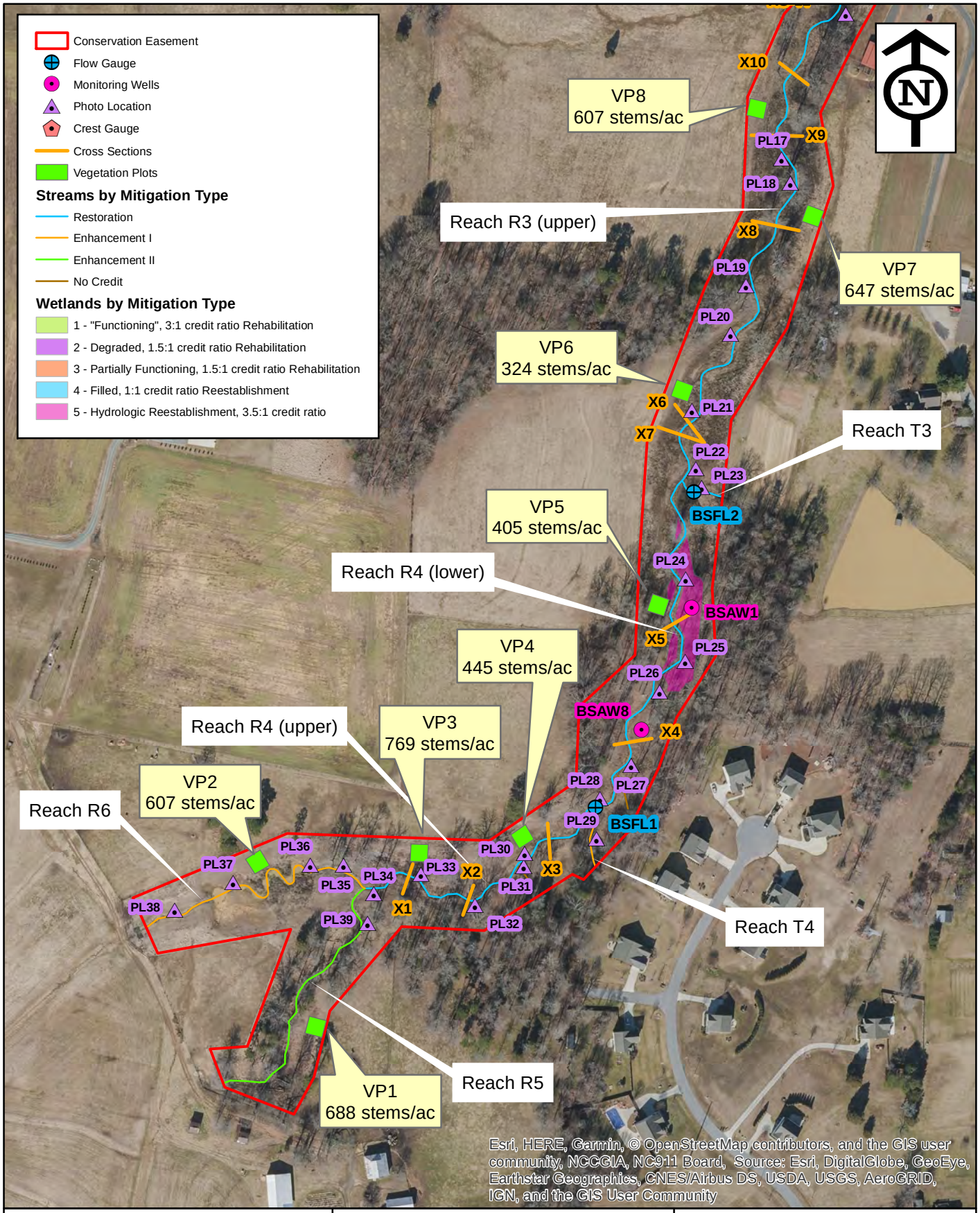


Michael Baker INTERNATIONAL

0 125 250 500

Feet

Figure 4.1
Current Conditions
Plan View
Browns Summit Site
(DMS #96313)



Michael Baker INTERNATIONAL

0 125 250 500

Feet

Figure 4.2
Current Conditions Plan View
Browns Summit Site
(DMS #96313)

Table 5. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R1**
Assessed Length	**1,290**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	20	20			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	11	11			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	20	20			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	20	20			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	20	20			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R2 (downstream section)**
Assessed Length	**134**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	0	0			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	0	0			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	0	0			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	0	0			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R2 (upstream section)**
Assessed Length	**614**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R3 (downstream section)**
Assessed Length	**352**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody	Footage with Stabilizing Woody	Adjusted % for Stabilizing Woody
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	7	7			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	7	7			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	7	7			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R3 (upstream section)**
Assessed Length	**1,102**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody	Footage with Stabilizing Woody	Adjusted % for Stabilizing Woody
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	15	15			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	10	10			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	15	15			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	15	15			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	15	15			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID	**R4**
Assessed Length	**1,296**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody	Footage with Stabilizing Woody	Adjusted % for Stabilizing Woody
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	14	14			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4	4			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	14	14			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	14	14			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID R5
Assessed Length 536

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
*	**2. Undercut**	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	6	6			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID R6
Assessed Length 442

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	9	9			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID T1
Assessed Length 145

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	6	6			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID **T2**
Assessed Length **283**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered 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 sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	2	2			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID T3
Assessed Length 70

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered 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 sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%			

Table 5 continued. Visual Stream Morphology Stability Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach ID T4
Assessed Length 117

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			
				Totals	0	0	100%			
2. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	8	8			100%			

Table 6. Vegetation Conditions Assessment
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Planted Acreage[1] 20.24

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	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 acres	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 of a size class that are obviously small given the monitoring year.	0.25 acres	N/A	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] 20.24

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	N/A	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	N/A	0	0.00	0.0%

1 = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

2 = The acreage within the easement boundaries.

3 = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

4 = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern spcies are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by EEP such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likley trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 1 – Station 63+75, Reach 1

Photo Point 2 – Station 61+50, Reach 1

Photo Point 3 – Station 58+75, Reach 1

Photo Point 4 – Station 57+85, Reach 1

Photo Point 5 – Station 56+75, Reach 1

Photo Point 6 – Station 55+00, Reach 1

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 7 – Station 53+50, Reach 1

Photo Point 8 – Station 51+75, Reach 1

Photo Point 9 – Station 11+25, Reach T1

Photo Point 10 – Station 49+00, Reach 2

Photo Point 11 – Station 46+00, Reach 2

Photo Point 12 – Station 44+75, Reach 2

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 13 – Station 43+75, Reach 2/Reach T2

Photo Point 14 – Station 42+25, Reach 3

Photo Point 15 – Station 41+50, Reach 3

Photo Point 16 – Station 36+25, Reach 3

Photo Point 17 – Station 36+00, Reach 3

Photo Point 18 – Station 35+00, Reach 3

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 19 – Station 33+00, Reach 3

Photo Point 20 – Station 32+00, Reach 3

Photo Point 21 – 31+50, Reach 3

Photo Point 22 – Station 28+75, Reach 3/T3

Photo Point 23 – Station 10+25, Reach T3

Photo Point 24 – Station 26+50, Reach 4

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 25 – Station 24+50, Reach 4

Photo Point 26 – Station 24+00, Reach 4

Photo Point 27 – Station 22+50, Reach 4

Photo Point 28 – Station 21+50, Reach 4/T4

Photo Point 29 – Station 11+00, Reach T4

Photo Point 30 – Station 19+50, Reach 4

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 31 – Station 19+10, Step Pools

Photo Point 32 – Station 18+00, Reach 4

Photo Point 33 – Station 16+75, Reach 4

Photo Point 34 – Sta. 15+75, Reaches 4, 5 and 6

Photo Point 35 – Station 15+00, Reach 6, Step Pools

Photo Point 36 – Station 14+50, Reach 6, BMP

Browns Summit Creek Restoration Project – Stream Stations Photos
Photos take March 23, 2021 (All photos are viewing upstream)

Photo Point 37 – Station 11+90, Reach 6, BMP

Photo Point 38 – Station 10+50, Reach 6, Step Pools

Photo Point 39 – Station 15+00, Reach 5

Browns Summit Creek Restoration Project – Vegetation Plot Photo Stations
Photos taken November 8, 2021

Vegetation Plot 1

Vegetation Plot 2

Vegetation Plot 3

Vegetation Plot 4

Vegetation Plot 5

Vegetation Plot 6

Browns Summit Creek Restoration Project – Vegetation Plot Photo Stations
Photos taken November 8, 2021

Vegetation Plot 7

Vegetation Plot 8

Vegetation Plot 9

Vegetation Plot 10

Vegetation Plot 11

Vegetation Plot 12

Browns Summit Creek Restoration Project – Vegetation Plot Photo Stations
Photos taken November 8, 2021

Vegetation Plot 13

Vegetation Plot 14

Appendix C

Vegetation Plot Data

Table 7. CVS Density Per Plot
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

CVS Project Code 140048. Project Name: Browns Summit

		Current Plot Data (MY5 2021)																								
		140048-01-0001			140048-01-0002			140048-01-0003			140048-01-0004			140048-01-0005			140048-01-0006			140048-01-0007			140048-01-0008		
Scientific Name	Common Name	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T
Acer negundo	Box Elder	1		1	3		3	3		3													1		1
Acer rubrum	Red Maple		10	10								5	5					4	4		6	6		1	1
Alnus serrulata	Tag Alder, Smooth Alder, Hazel Alder																	1	1						
Baccharis	Silverling, High-tide Bush, Mullet Bush, Groundsel Tree					2	2		1	1								1	1						
Betula nigra	River Birch, Red Birch	3		3	4		4	2		2				3		3	3		3	2	8	10	1		1
Callicarpa americana	Beautyberry, American Beautyberry, French-mulberry																								
Carpinus caroliniana	American Hornbeam				1		1	4		4	2		2	1		1				1		1	1		1
Celtis laevigata	Southern Hackberry, Sugarberry																								
Cornus amomum	Silky Dogwood																								
Diospyros virginiana	American Persimmon, Possumwood	1		1				2		2															
Euonymus americanus	Strawberry-bush, Heart's-a-bustin'-(with-love										1		1												
Fraxinus pennsylvanica	Green Ash, Red Ash	4		4	2		2	2		2	4		4	3		3	2		2	4		4	4		4
Hamamelis virginiana	Witch Hazel																						2		2
Ilex opaca	American Holly, Christmas Holly																						1		1
Ilex verticillata	Winterberry							1		1															
Juniperus virginiana	Juniper					2	2																		
Liquidambar styraciflua	Sweet Gum, Red Gum		6	6		2	2		5	5		4	4		2	2									
Liriodendron tulipifera	Tulip Poplar	1	2	3	2		2							1	2	3				3	5	8			
Nyssa sylvatica	Sour Gum, Black Gum, Pepperidge										1		1										1		1
Pinus echinata	Shortleaf Pine, Rosemary Pine, Yellow Pine					5	5					3	3					2	2						
Platanus occidentalis	Sycamore, Plane-tree	2		2	2		2	4		4		1	1	1		1	3		3	3	2	5	2		2
Quercus alba	White Oak																								
Quercus lyrata	Overcup Oak	1		1																1		1	1		1
Quercus michauxii	Basket Oak, Swamp Chestnut Oak	2		2				1		1				1		1				1		1			
Quercus phellos	Willow Oak	2		2																					
Rhus copallinum	Sumac		1	1																					
Salix nigra	Black Willow														3	3									
Ulmus americana	American Elm										1		1							1		1			
Viburnum dentatum	Arrow-wood										1		1										1		1
Viburnum nudum	Southern Wild Raisin, Possumhaw				1		1				1		1												
	Stem count	17	19	36	15	11	26	19	6	25	11	13	24	10	7	17	8	8	16	16	21	37	15	1	16
	size (ares)	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		
	Species count	9	4	12	7	4	11	8	2	10	7	4	11	6	3	8	3	4	7	8	4	9	10	1	11
	Stems per ACRE	688	769	1457	607	445	1052	769	243	1012	445	526	971	405	283	688	324	324	647	647	850	1497	607	40	647

		Current Plot Data (MY5 2021)																		Annual Means					
		140048-01-0009			140048-01-0010			140048-01-0011			140048-01-0012			140048-01-0013			140048-01-0014			MY5 (2021)			MY3 (2019)		
Scientific Name	Common Name	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T	Planted	Vol	T
Acer negundo	Box Elder	1		1				1		1							1		1	11		11	13		13
Acer rubrum	Red Maple					2	2														28	28			
Alnus serrulata	Tag Alder, Smooth Alder, Hazel Alder																				1	1			
Baccharis	Silverling, High-tide Bush, Mullet Bush, Groundsel Tree																				4	4			
Betula nigra	River Birch, Red Birch				2	4	6	2	2	4	5	2	7	2	1	3	3	2	5	32	19	51	26		26
Callicarpa americana	Beautyberry, American Beautyberry, French-mulberry																								
Carpinus caroliniana	American Hornbeam	1		1										3		3				14		14	14		14
Celtis laevigata	Southern Hackberry, Sugarberry							1		1										1		1	3		3
Cornus amomum	Silky Dogwood																							1	1
Diospyros virginiana	American Persimmon, Possumwood		1	1							1		1				1		1	5	1	6	4		4
Euonymus americanus	Strawberry-bush, Heart's-a-bustin'-(with-love)																			1		1	3		3
Fraxinus pennsylvanica	Green Ash, Red Ash	1		1	1	1	2	2	1	3	2	1	3				2	1	3	33	4	37	29	1	30
Hamamelis virginiana	Witch Hazel	2		2	1		1													5		5	5		5
Ilex opaca	American Holly, Christmas Holly																			1		1	5		5
Ilex verticillata	Winterberry																			1		1	1		1
Juniperus virginiana	Juniper																				2	2			
Liquidambar styraciflua	Sweet Gum, Red Gum		1	1																	20	20			
Liriodendron tulipifera	Tulip Poplar																			7	9	16	8	14	22
Nyssa sylvatica	Sour Gum, Black Gum, Pepperidge							1		1				1		1	2		2	6		6	7		7
Pinus echinata	Shortleaf Pine, Rosemary Pine, Yellow Pine								1	1											11	11			
Platanus occidentalis	Sycamore, Plane-tree	5	1	6	1		1	2		2	1		1				1		1	27	4	31	23	4	27
Quercus alba	White Oak																						1		1
Quercus lyrata	Overcup Oak							2		2	1		1	2	1	3				8	1	9	11		11
Quercus michauxii	Basket Oak, Swamp Chestnut Oak							1		1				1	1	2				7	1	8	8		8
Quercus phellos	Willow Oak							1		1				1	1	2				4	1	5	1		1
Rhus copallinum	Sumac																				1	1			
Salix nigra	Black Willow																1		1	1	3	4			
Ulmus americana	American Elm	1		1	1		1													4		4	6		6
Viburnum dentatum	Arrow-wood																			2		2	5		5
Viburnum nudum	Southern Wild Raisin, Possumhaw	1		1	1		1	1		1										5		5	6		6
	Stem count	12	3	15	7	7	14	14	4	18	10	3	13	10	4	14	11	3	14	175	110	285	179	20	199
	size (ares)		1			1			1			1			1			1			14			14	
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.35			0.35	
	Species count	7	3	9	6	3	7	10	3	11	5	2	5	6	4	6	7	2	7	20	16	27	20	4	21
	Stems per ACRE	486	121	607	283	283	567	567	162	728	405	121	526	405	162	567	445	121	567	506	318	824	517	12	575

		Annual Means					
		MY2 (2018)			MY1 (2017)		
Scientific Name	Common Name	Planted	Vol	T	Planted	Vol	T
Acer negundo	Box Elder	12		12	15		15
Acer rubrum	Red Maple						
Alnus serrulata	Tag Alder, Smooth Alder, Hazel Alder						
Baccharis	Silverling, High-tide Bush, Mullet Bush, Groundsel Tree						
Betula nigra	River Birch, Red Birch	29		29	33		33
Callicarpa americana	Beautyberry, American Beautyberry, French-mulberry					1	1
Carpinus caroliniana	American Hornbeam	14		14	23		23
Celtis laevigata	Southern Hackberry, Sugarberry	3		3	4		4
Cornus amomum	Silky Dogwood		1	1			
Diospyros virginiana	American Persimmon, Possumwood	5	1	6	5		5
Euonymus americanus	Strawberry-bush, Heart's-a-bustin'-(with-love)	3		3	6		6
Fraxinus pennsylvanica	Green Ash, Red Ash	32		32	36	1	37
Hamamelis virginiana	Witch Hazel	6		6	8		8
Ilex opaca	American Holly, Christmas Holly	5		5	10		10
Ilex verticillata	Winterberry	1		1	2		2
Juniperus virginiana	Juniper						
Liquidambar styraciflua	Sweet Gum, Red Gum						
Liriodendron tulipifera	Tulip Poplar	7	1	8	12		12
Nyssa sylvatica	Sour Gum, Black Gum, Pepperidge	7		7	10		10
Pinus echinata	Shortleaf Pine, Rosemary Pine, Yellow Pine						
Platanus occidentalis	Sycamore, Plane-tree	23	1	24	29		29
Quercus alba	White Oak	1		1	1		1
Quercus lyrata	Overcup Oak	12		12	15		15
Quercus michauxii	Basket Oak, Swamp Chestnut Oak	10		10	13		13
Quercus phellos	Willow Oak	1		1	1		1
Rhus copallinum	Sumac						
Salix nigra	Black Willow						
Ulmus americana	American Elm	6		6	7		7
Viburnum dentatum	Arrow-wood	5		5	8		8
Viburnum nudum	Southern Wild Raisin, Possumhaw	5		5	6		6
	Stem count	187	4	191	244	2	246
	size (ares)		14		14		
	size (ACRES)		0.35		0.35		
	Species count	20	4	21	20	2	21
	Stems per ACRE	541	12	552	705	6	711

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%

Table 8. Vegetation Plot Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Browns Summit (#140048)

Year 5

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	17	0	0	19	**36**	36
2	n/a	15	0	0	11	**26**	26
3	n/a	19	0	0	6	**25**	25
4	n/a	11	0	0	13	**24**	24
5	n/a	10	0	0	7	**17**	17
6	n/a	8	0	0	8	**16**	16
7	n/a	16	0	0	21	**37**	37
8	n/a	15	0	0	1	**16**	16
9	n/a	12	0	0	3	**15**	15
10	n/a	7	0	0	7	**14**	8
11	n/a	14	0	0	4	**18**	18
12	n/a	10	0	0	3	**13**	11
13	n/a	10	0	0	4	**14**	10
14	n/a	11	0	0	3	**14**	11

Wetland/Stream Vegetation Totals

(per acre)

Plot #	Stream/ Wetland Stems[2]	Volunteers[3]	Total[4]	Success Criteria Met?
1	17	769	1457	Yes
2	15	162	1052	Yes
3	19	81	1012	Yes
4	11	162	971	Yes
5	10	121	688	Yes
6	8	162	647	Yes
7	16	162	1497	Yes
8	15	40	647	Yes
9	12	121	607	Yes
10	7	283	567	Yes, barely
11	14	162	728	Yes
12	10	121	526	Yes
13	10	162	567	Yes
14	11	121	567	Yes
Project Avg	13	188	824	Yes

Stem Class	**characteristics**
[1]Buffer Stems	Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
[2]Stream/ Wetland Stems	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%

Table 9. Stem Count for Each Species Arranged by Plot

Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Botanical Name	Common Name	Browns Summit Creek Vegetation Plots													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Acer negundo	Box Elder	1	3	3					1	1		1			1
Acer rubrum	Red Maple														
Alnus serrulata	Tag Alder, Smooth Alder, Hazel Alder														
Baccharis	Silverling, High-tide Bush, Mullet Bush, Groundsel Tree														
Betula nigra	River Birch, Red Birch	3	4	2		3	3	2	1		2	2	5	2	3
Callicarpa americana	Beautyberry, American Beautyberry, French-mulberry														
Carpinus caroliniana	American Hornbeam		1	4	2	1		1	1	1				3	
Celtis laevigata	Southern Hackberry, Sugarberry											1			
Cornus amomum	Silky Dogwood														
Diospyros virginiana	American Persimmon, Possumwood	1		2									1		1
Euonymus americanus	Strawberry-bush, Heart's-a-bustin'-(with-love)				1										
Fraxinus pennsylvanica	Green Ash, Red Ash	4	2	2	4	3	2	4	4	1	1	2	2		2
Hamamelis virginiana	Witch Hazel								2	2	1				
Ilex opaca	American Holly, Christmas Holly								1						
Ilex verticillata	Winterberry			1											
Juniperus virginiana	Juniper														
Liquidambar styraciflua	Sweet Gum, Red Gum														
Liriodendron tulipifera	Tulip Poplar	1	2			1		3							
Nyssa sylvatica	Sour Gum, Black Gum, Pepperidge				1				1			1		1	2
Pinus echinata	Shortleaf Pine, Rosemary Pine, Yellow Pine														
Platanus occidentalis	Sycamore, Plane-tree	2	2	4		1	3	3	2	5	1	2	1		1
Quercus alba	White Oak														
Quercus lyrata	Overcup Oak	1						1	1			2	1	2	
Quercus michauxii	Basket Oak, Swamp Chestnut Oak	2		1		1		1				1		1	
Quercus phellos	Willow Oak	2										1		1	
Rhus copallinum	Sumac														
Salix nigra	Black Willow														1
Ulmus americana	American Elm				1			1		1	1				
Viburnum dentatum	Arrow-wood				1				1						
Viburnum nudum	Southern Wild Raisin, Possumhaw		1		1					1	1	1			
Initial count of planted bareroot material		18	22	24	17	18	19	18	19	18	20	17	16	21	18
Stems/plot		17	15	19	11	10	8	16	15	12	7	14	10	10	11
Stems/acre		688	607	769	445	405	324	648	607	486	283	567	405	405	445
Average Stems / Acre for Year 5 (Planted + Volunteer)		**824**													

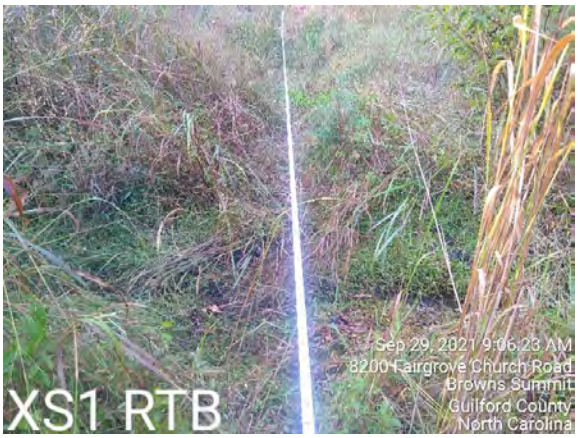
Appendix D

Stream Survey Data

Permanent Cross-section 1

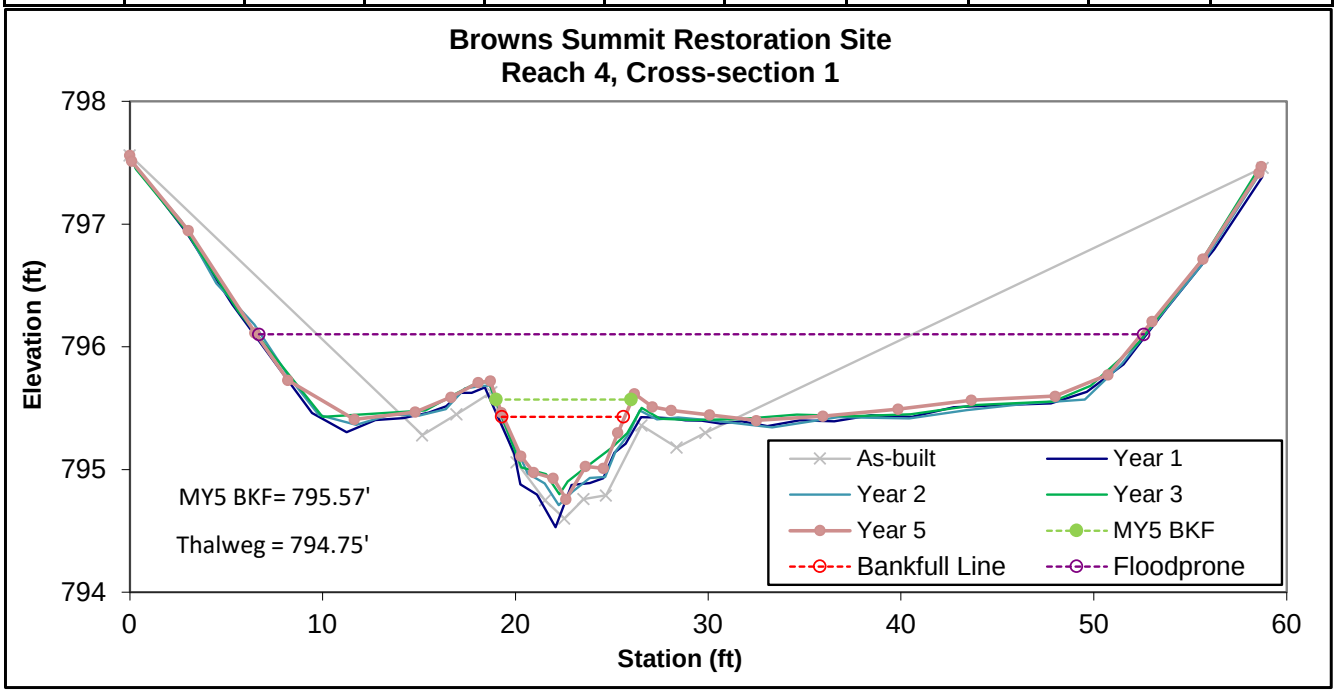
(Year 5 Data - Collected September 2021)

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	2.4	6.3	0.4	0.7	16.3	1.1	7.3	795.43	795.62



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

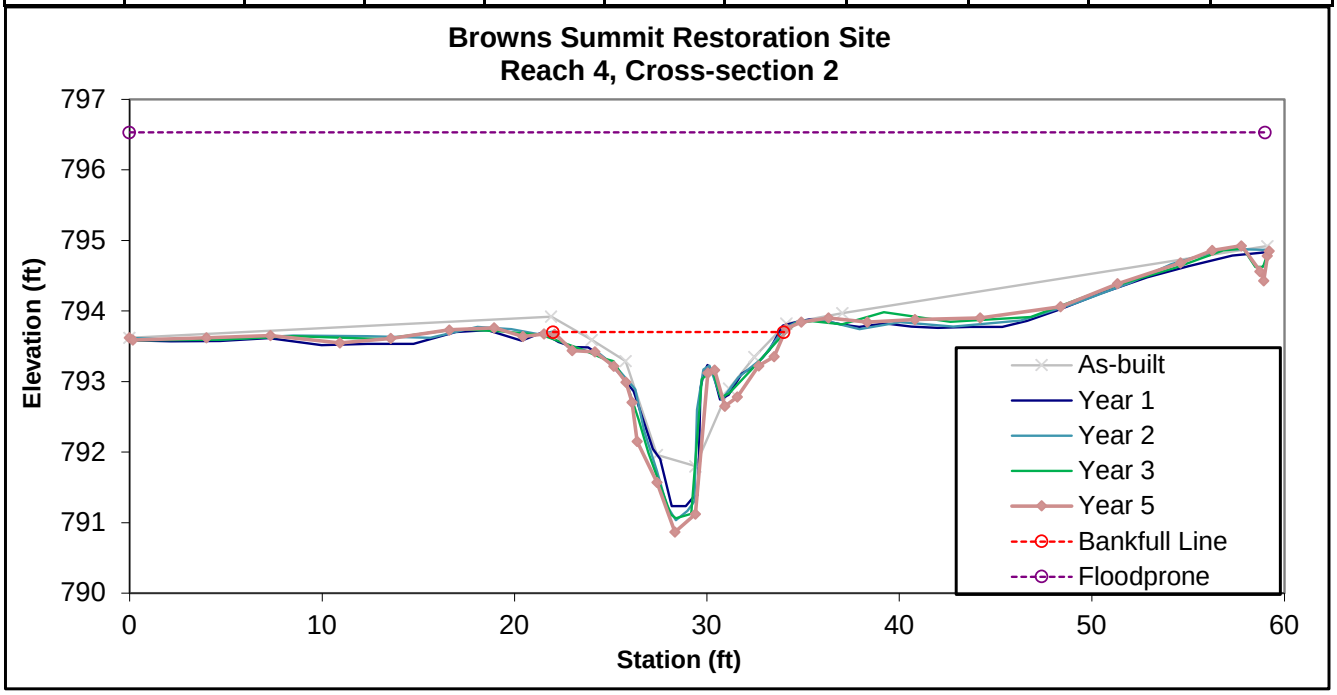
Permanent Cross-section 2

(Year 5 Data - Collected September 2021)

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	--	12.4	14.3	0.9	2.8	16.5	--	--	793.70	793.67



Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

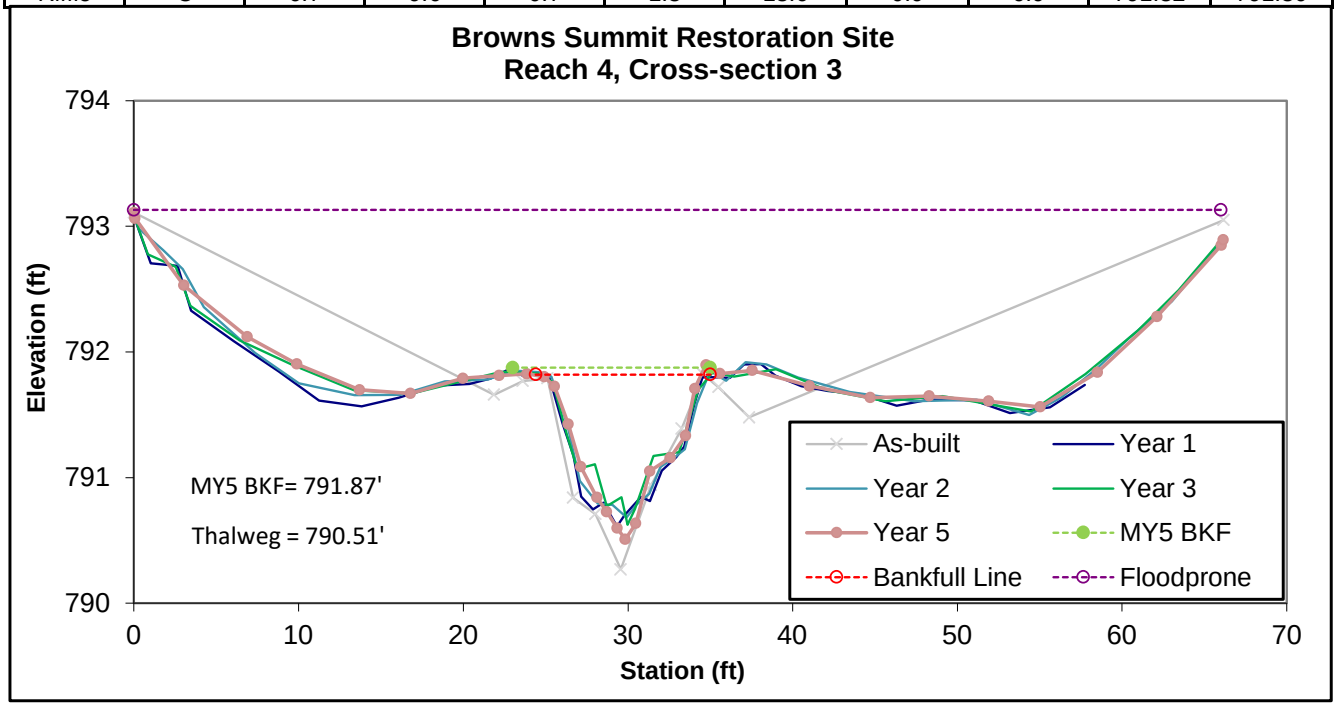
Permanent Cross-section 3

(Year 5 Data - Collected September 2021)

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	6.7	9.6	0.7	1.3	13.6	0.9	6.9	791.82	791.80



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

Figure 5 Cross-sections

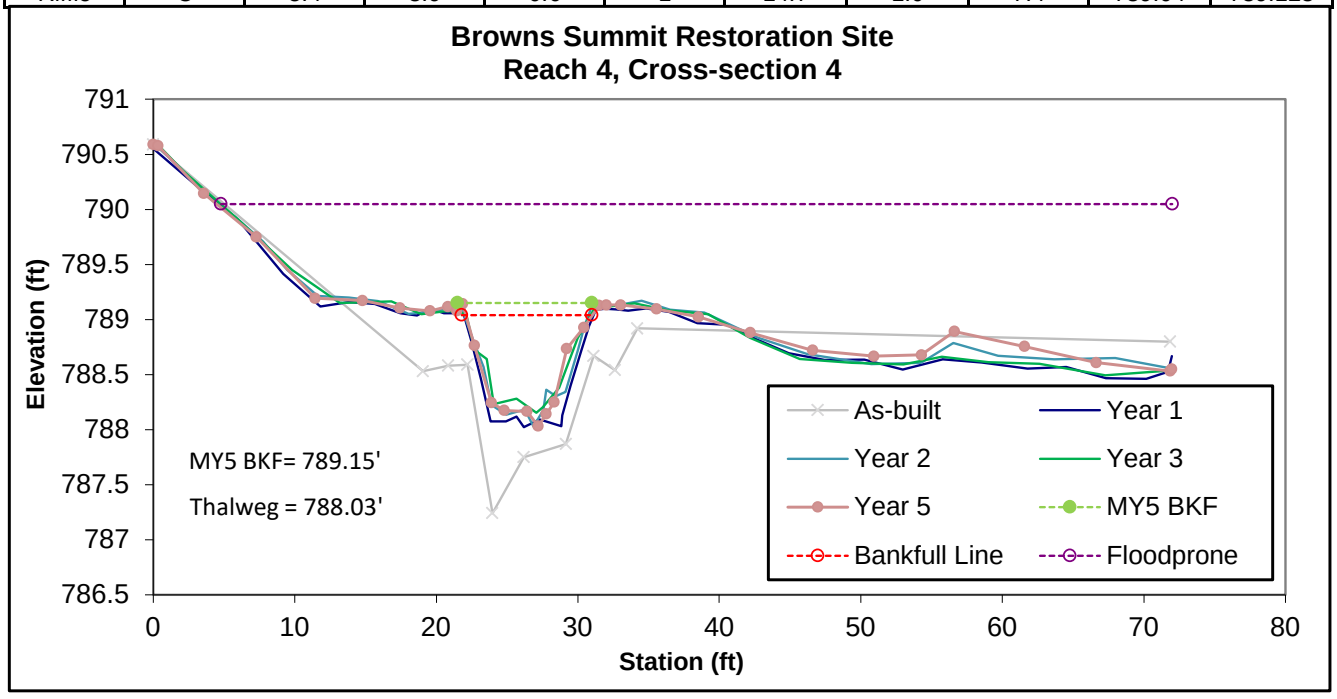
Permanent Cross-section 4

(Year 5 Data - Collected September 2021)

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	5.4	8.9	0.6	1	14.7	1.0	7.4	789.04	789.128



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

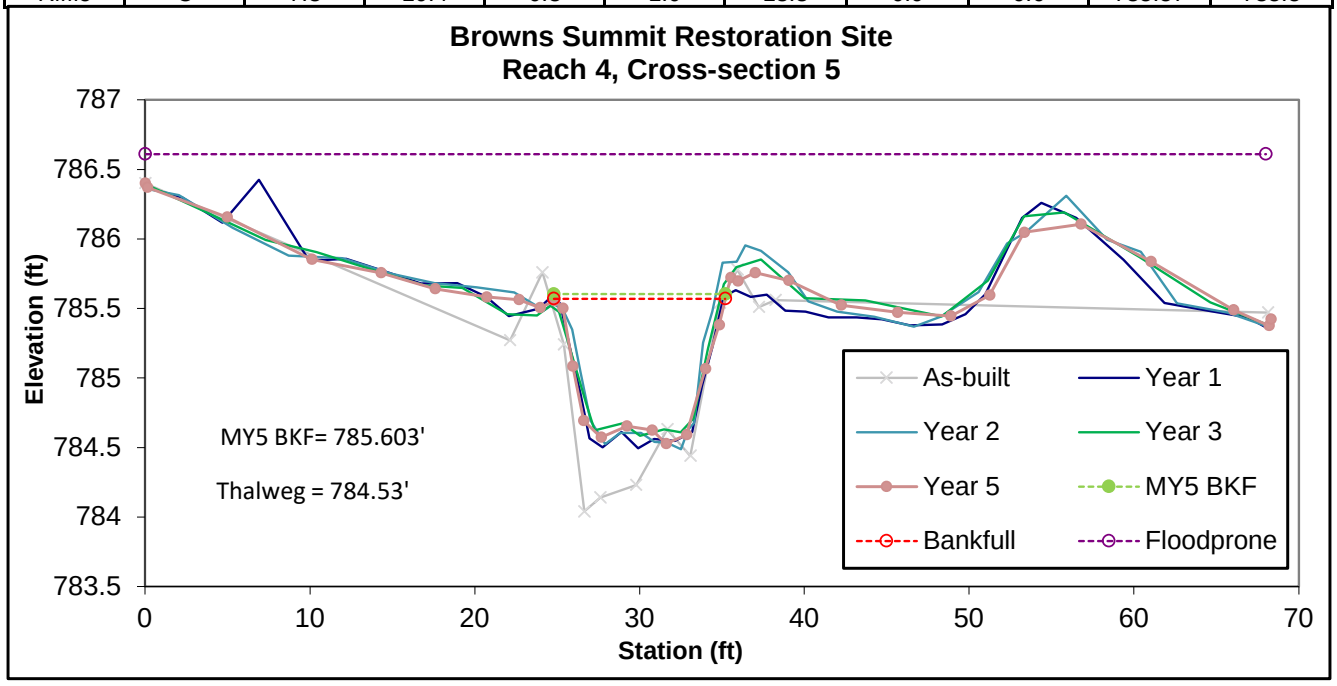
Permanent Cross-section 5

(Year 5 Data - Collected September 2021)

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	7.8	10.4	0.8	1.0	13.8	0.9	6.6	785.57	785.5



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

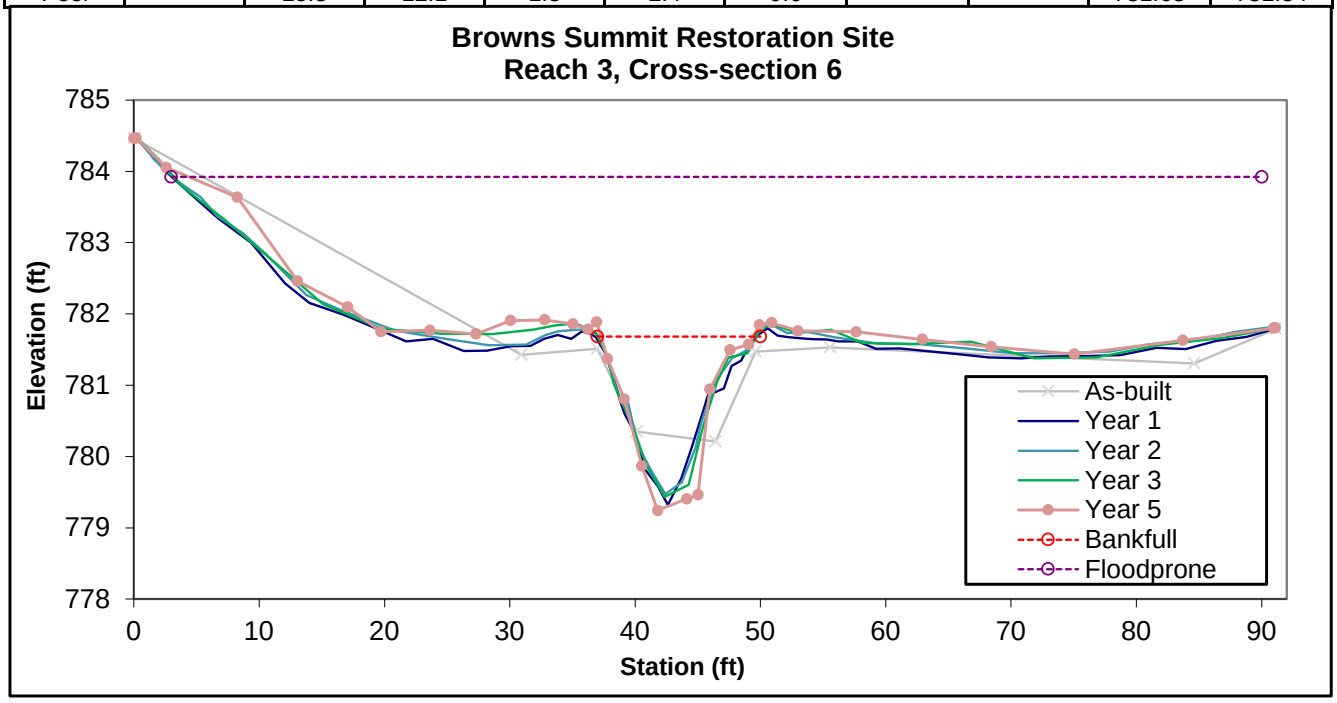
Permanent Cross-section 6

(Year 5 Data - Collected September 2021)

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	--	15.3	12.1	1.3	2.4	9.6	--	--	781.68	781.84



Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

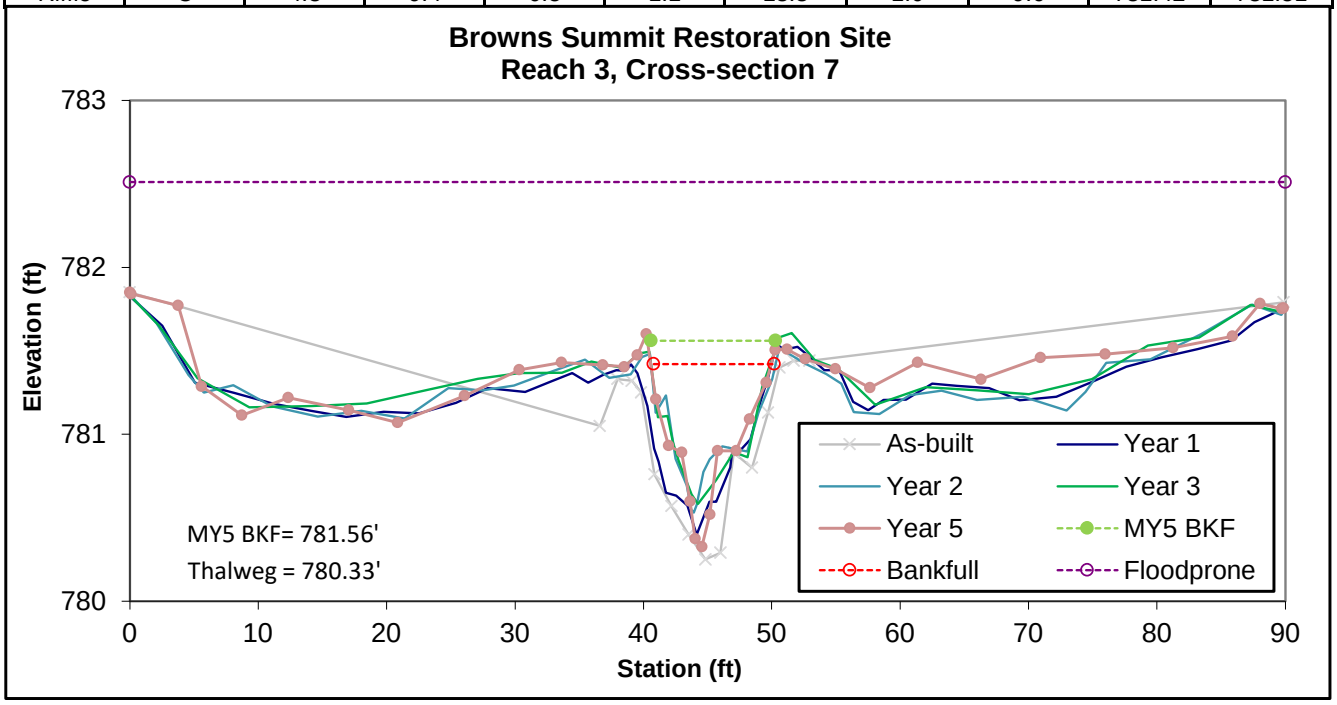
Permanent Cross-section 7

(Year 5 Data - Collected September 2021)

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	4.8	9.4	0.5	1.1	18.3	1.0	9.6	781.42	781.51



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

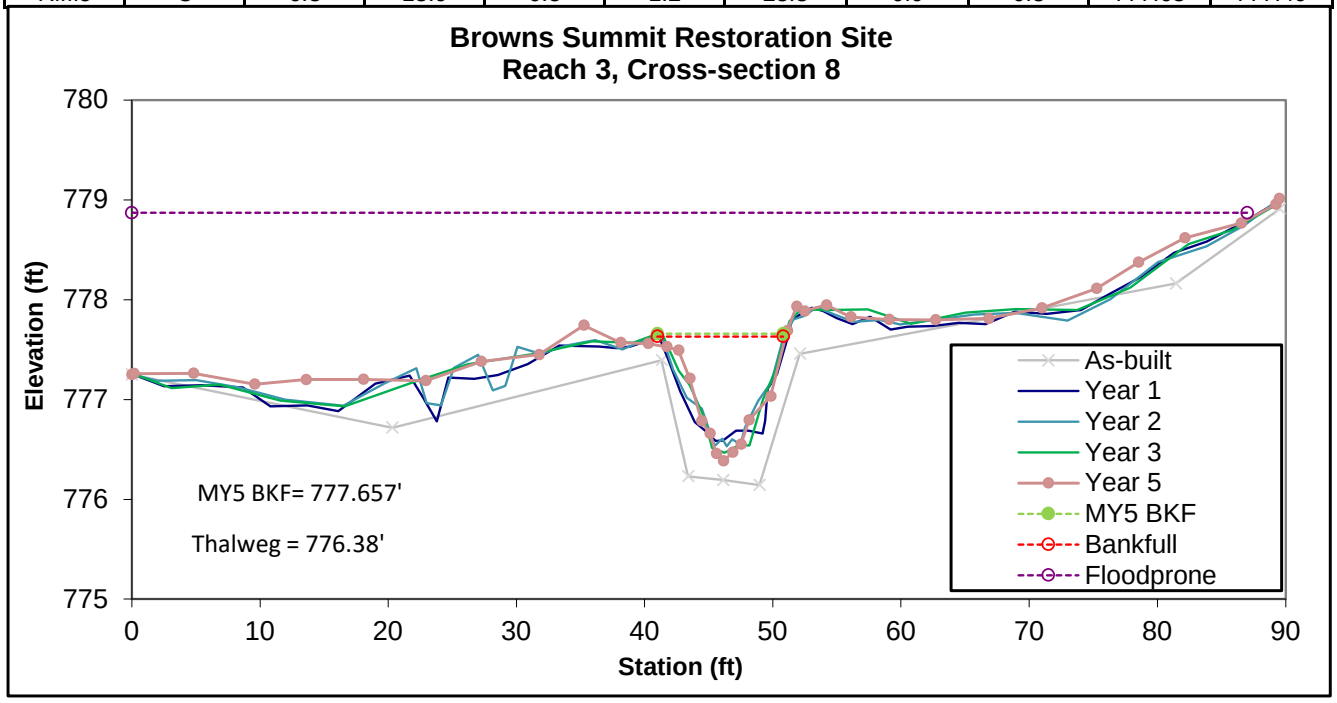
Permanent Cross-section 8

(Year 5 Data - Collected September 2021)

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	6.8	13.9	0.5	1.2	28.3	0.9	6.3	777.63	777.49



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

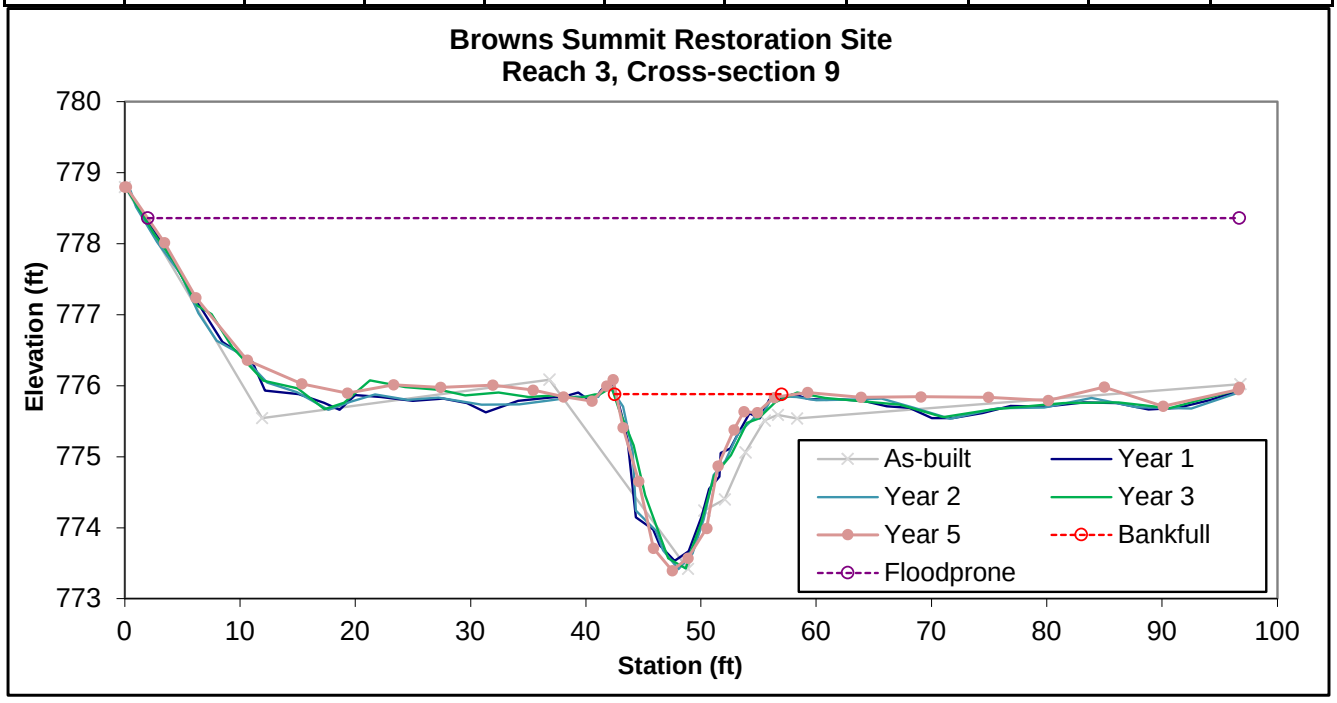
Permanent Cross-section 9

(Year 5 Data - Collected September 2021)

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	--	17.3	15.6	1.1	2.5	14	--	--	775.88	775.64



Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

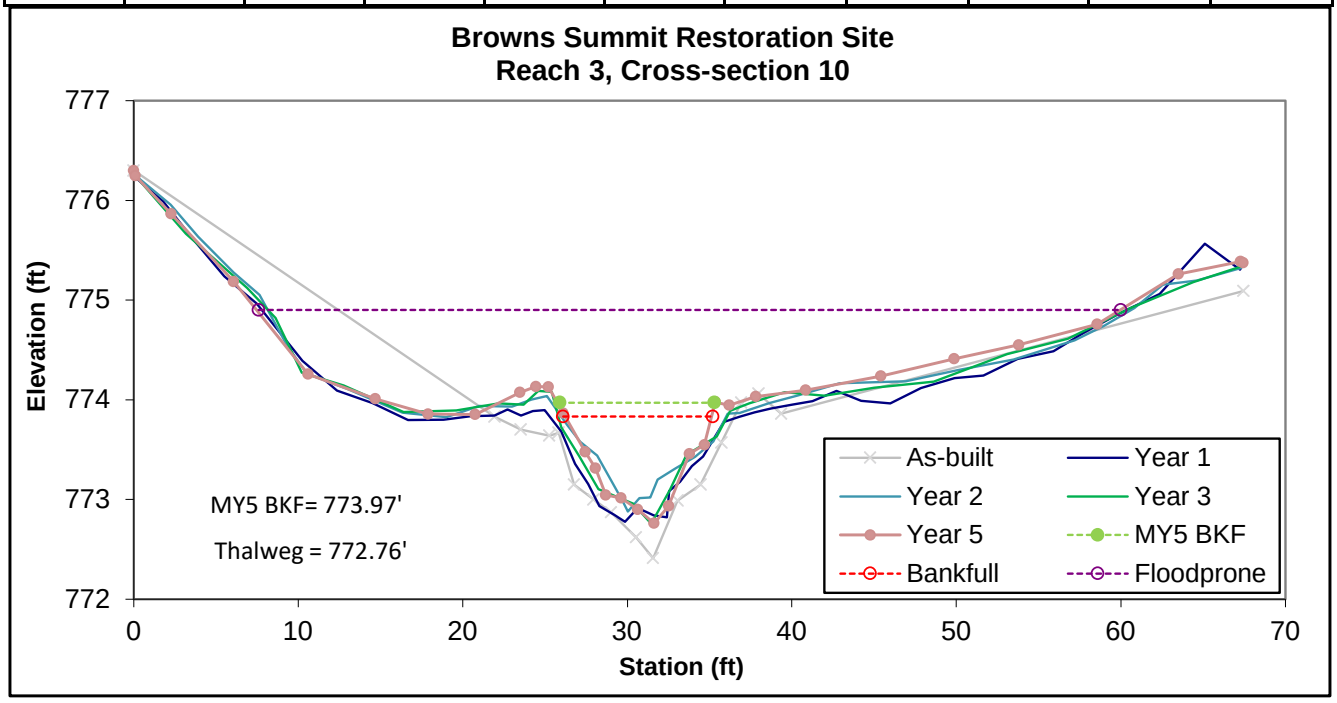
Permanent Cross-section 10

(Year 5 Data - Collected September 2021)

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	8.9	0.6	1.1	14.3	1	5.9	773.83	773.98



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

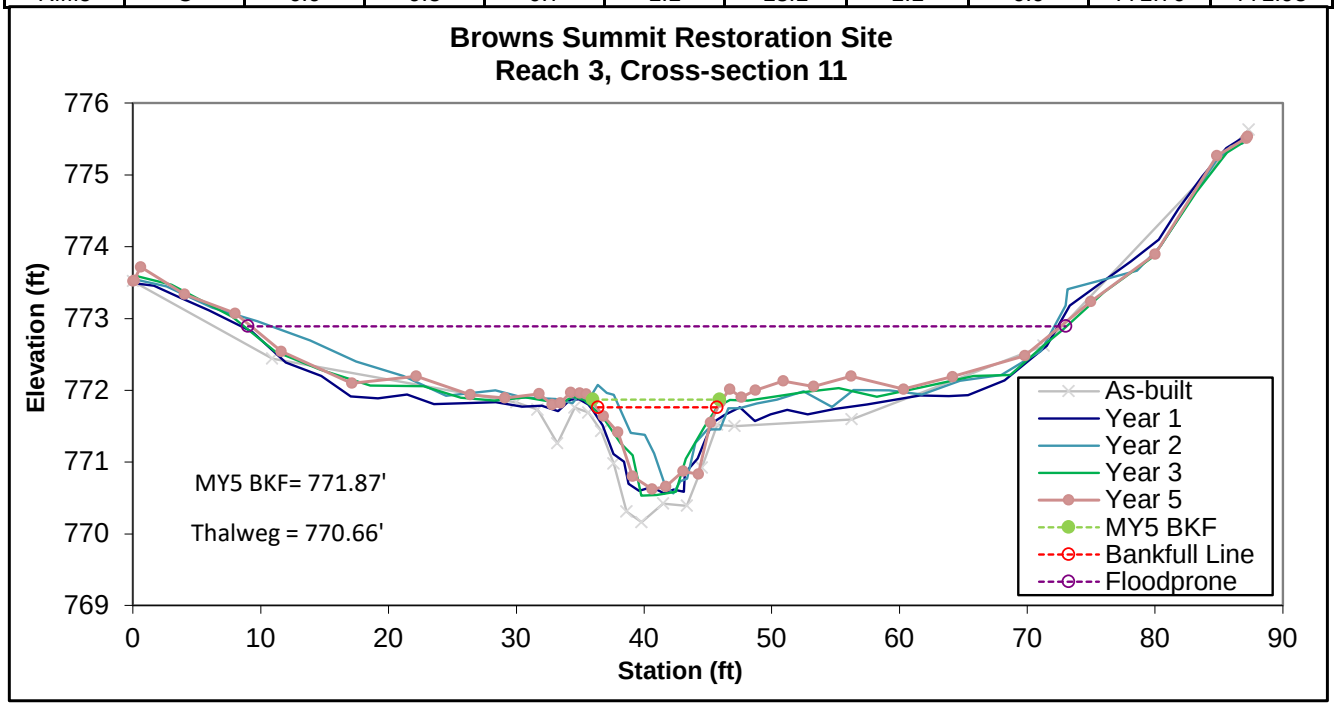
Permanent Cross-section 11

(Year 5 Data - Collected September 2021)

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	6.9	9.5	0.7	1.1	13.1	1.1	6.9	771.76	771.95



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

Figure 5 Cross-sections

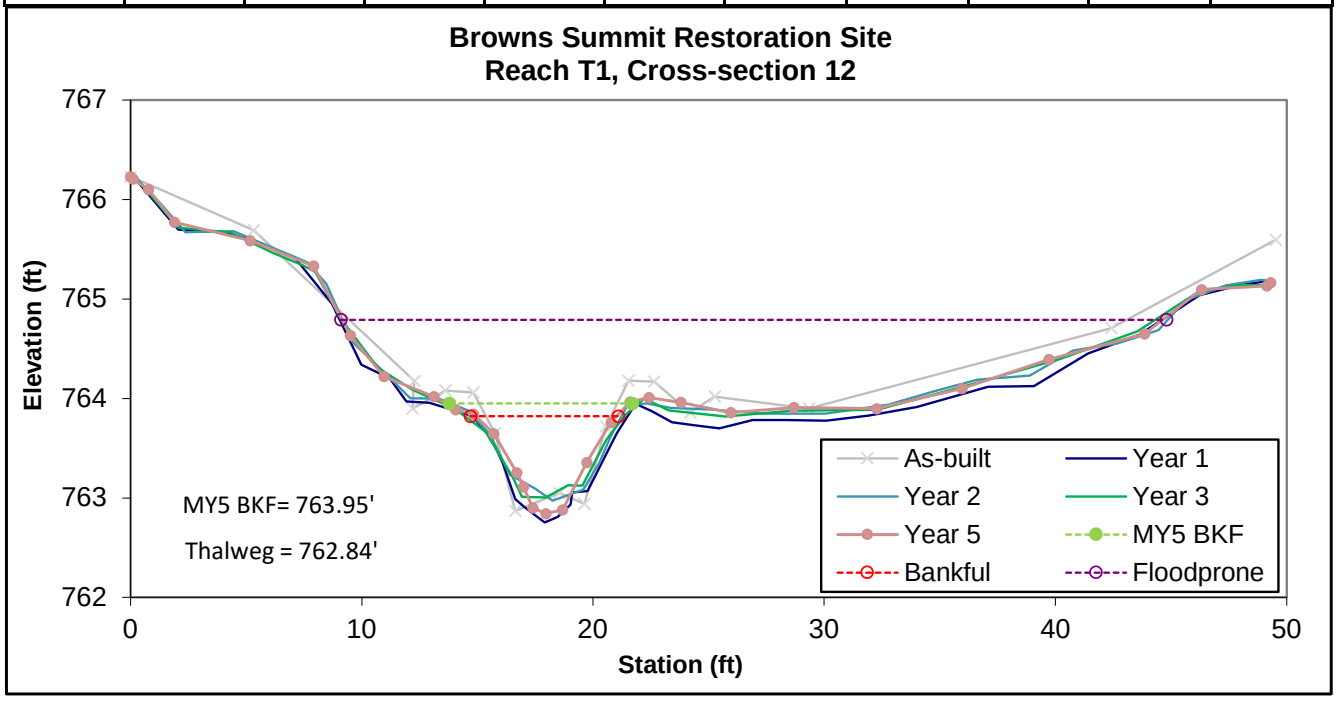
Permanent Cross-section 12

(Year 5 Data - Collected October 2021)

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	3.2	6.1	0.5	1	11.5	0.9	5.5	763.82	763.84



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

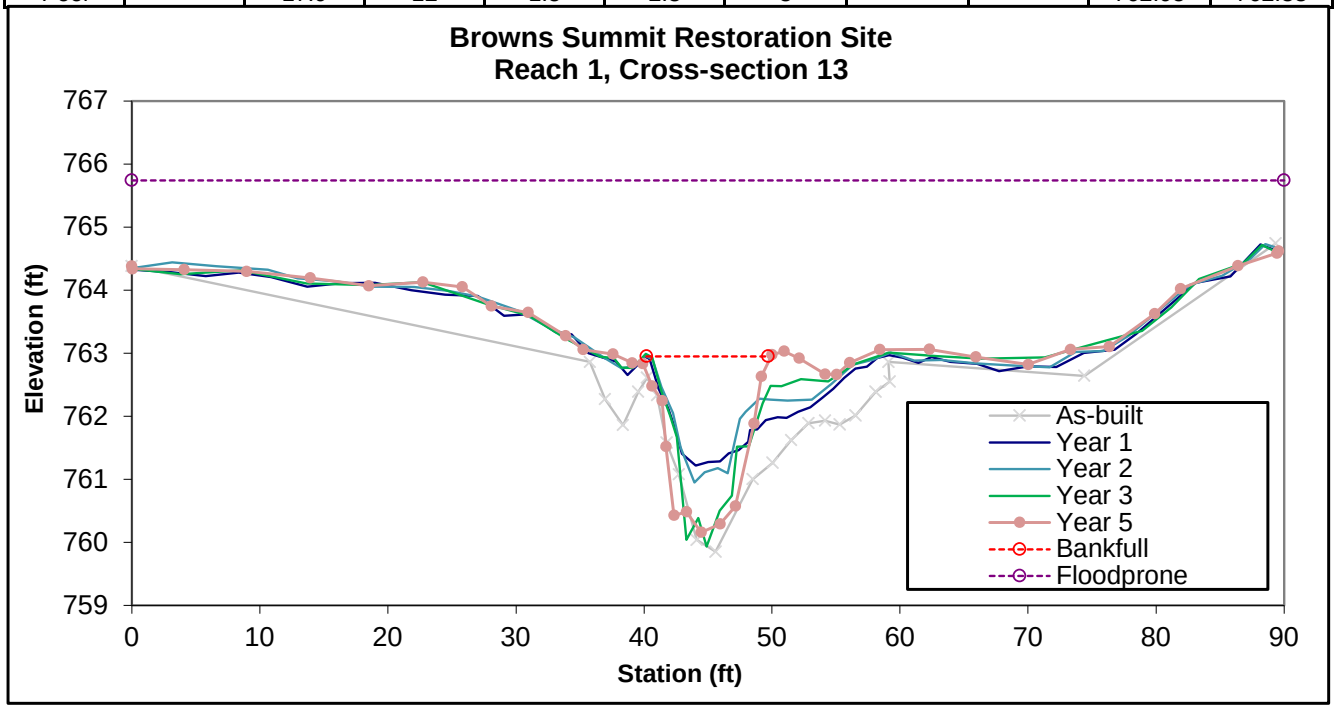
Permanent Cross-section 13

(Year 5 Data - Collected September 2021)

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	--	17.9	12	1.5	2.8	8	--	--	762.95	762.83



Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

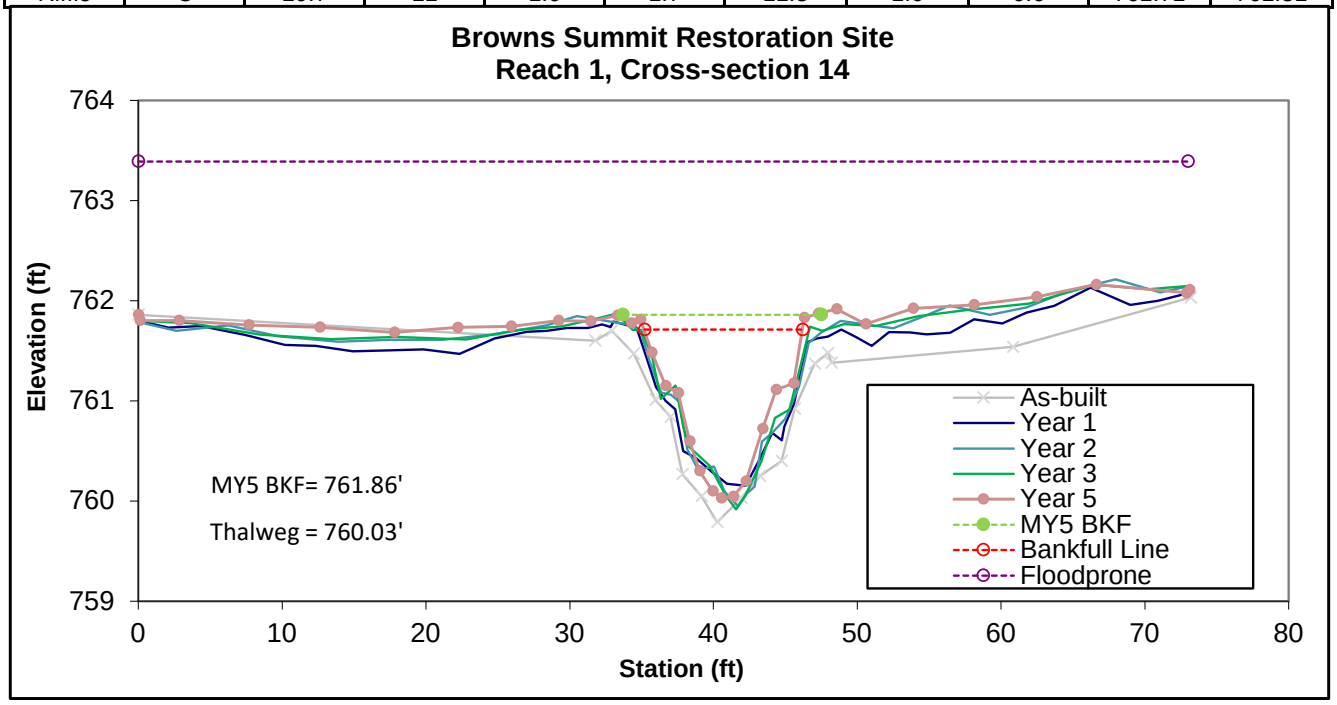
Permanent Cross-section 14

(Year 5 Data - Collected September 2021)

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	10.7	11	1.0	1.7	11.3	1.0	6.6	761.71	761.81



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

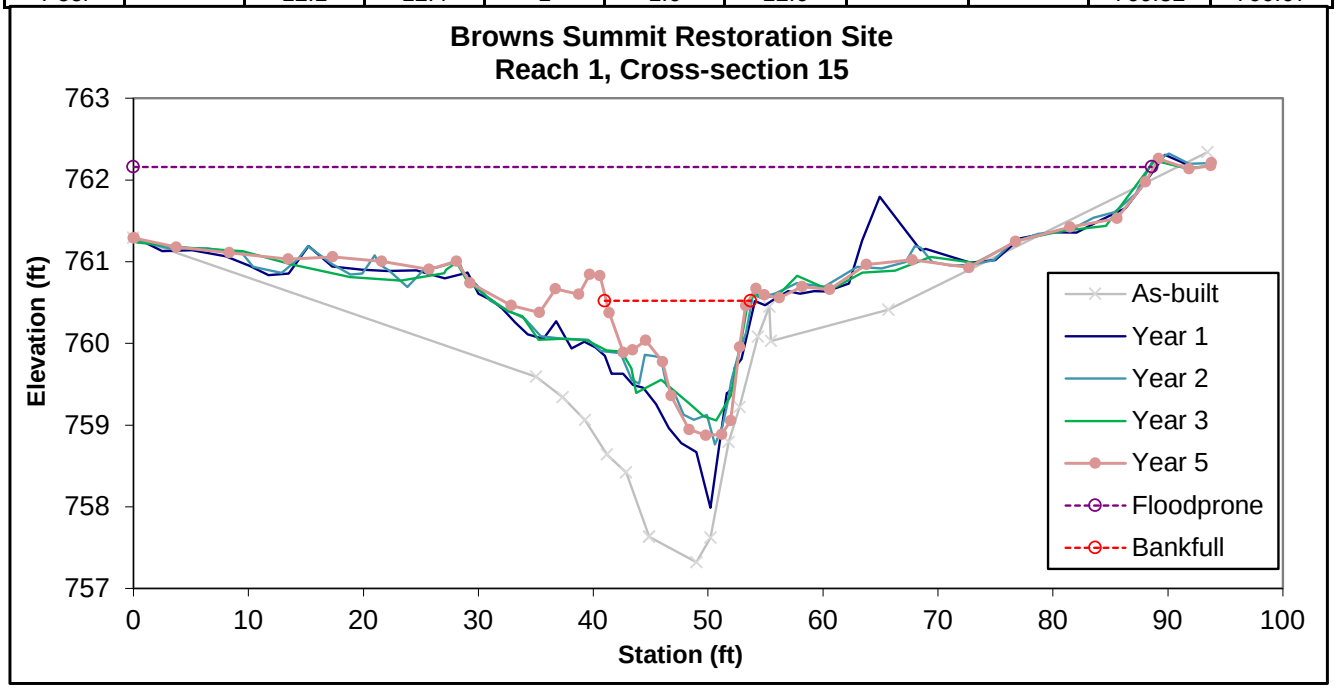
Permanent Cross-section 15

(Year 5 Data - Collected September 2021)

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	--	12.1	12.4	1	1.6	12.6	--	--	760.52	760.67



Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

Figure 5 Cross-sections

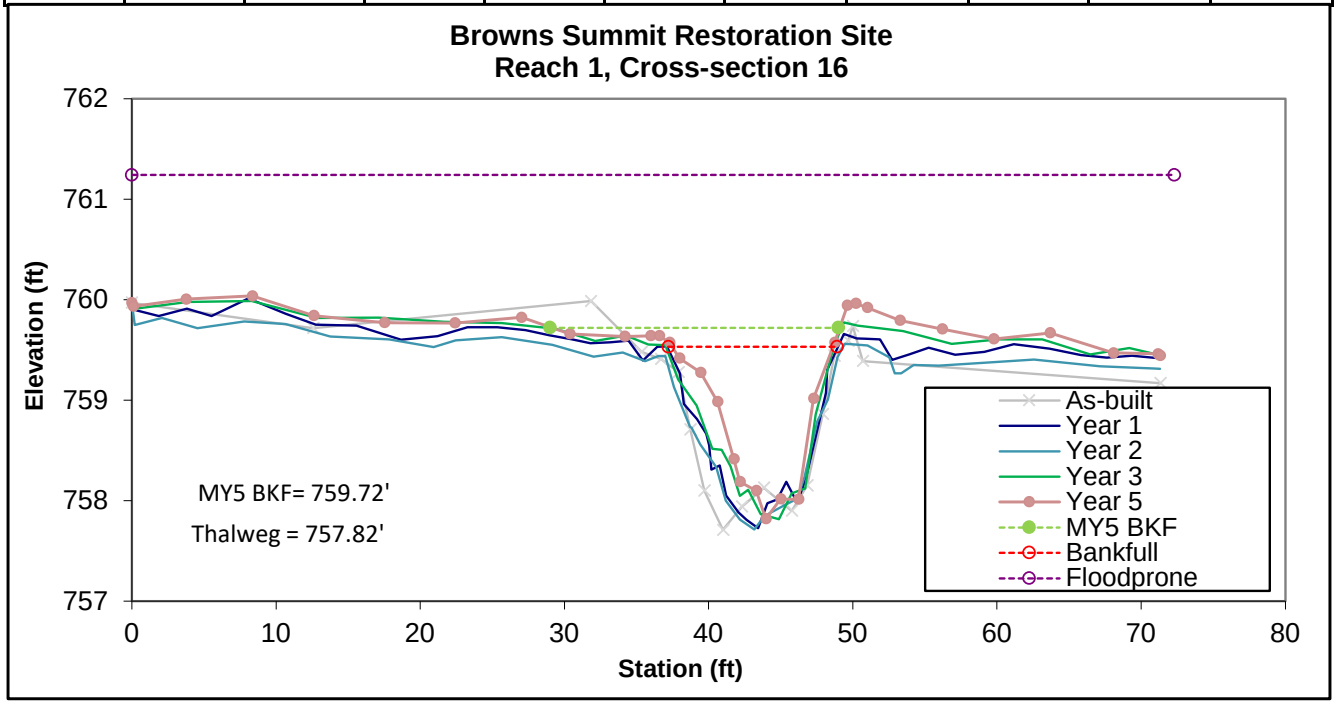
Permanent Cross-section 16

(Year 5 Data - Collected September 2021)

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	9.8	11.1	0.9	1.7	12.7	0.9	6.4	759.53	759.57



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

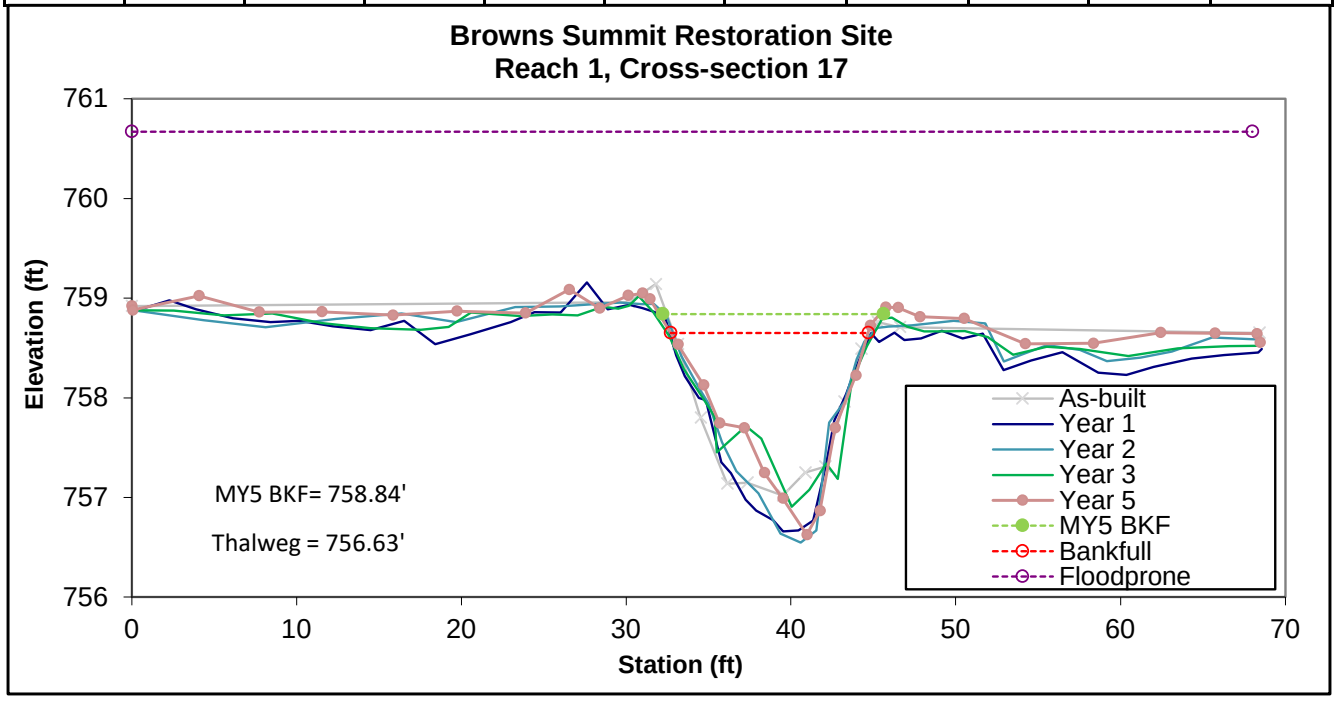
Permanent Cross-section 17

(Year 5 Data - Collected September 2021)

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	12.2	12	1.0	2	11.7	1.0	5.7	758.65	758.91



Note: Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth. Note: MY1 data is being utilized as asbuilt data due to poor quality asbuilt survey.

Table 10. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 1

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
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)	-----	-----	-----	-----	-----	12.3	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	12.9	----	----	-----	-----	12.6	13.0	12.6	13.8	0.6	3
Floodprone Width (ft)	-----	-----	-----	-----	-----	>100	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	>100	----	----	-----	-----	100.0	100.0	100.0	100.0	0.0	3
BF Mean Depth (ft)	-----	-----	-----	-----	-----	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	----	----	-----	-----	0.9	1.1	1.1	1.2	0.1	3
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	----	----	-----	-----	1.7	1.7	1.7	1.7	0.0	3
BF Cross-sectional Area (ft²)	-----	12.0	16.5	-----	-----	16.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.2	----	----	-----	-----	12.5	13.4	13.2	14.5	0.8	3
Width/Depth Ratio	-----	-----	-----	-----	-----	9.3	-----	-----	-----	-----	10	-----	-----	12	-----	-----	-----	11.0	----	----	-----	-----	10.9	12.7	12.0	15.2	1.8	3
Entrenchment Ratio	-----	-----	-----	-----	-----	8.7	-----	-----	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>6.7	----	----	-----	-----	5.3	5.5	5.4	5.7	0.2	3
Bank Height Ratio	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	----	----	-----	-----	1	1	1	1	0	3
d50 (mm)	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	50.0	-----	-----	75.0	-----	-----	72.6	88.2	75.3	136.9	24.7	5
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	26.0	-----	-----	39.0	-----	-----	25.9	34.5	35.4	42.0	5.3	7
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	2.0	-----	-----	3.0	-----	-----	2.0	2.7	2.7	3.2	0.4	7
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	140	-----	-----	170	-----	-----	130.2	162.0	161.3	190.9	24.9	5
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	10	-----	-----	4	-----	-----	6		-----	5.6	6.8	5.8	10.5	1.9	5
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	20.5	13.0	47.7	14.6	13
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.013	-----	-----	-----	-----	0.001	0.019	0.010	0.091	0.023	13
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	50	-----	-----	87	-----	-----	41.4	63.2	59.1	100.8	18.2	12
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	-----	-----	2.5	-----	-----	-----	2.7	-----	-----	-----	-----	2.8	2.8	2.8	2.8	0.0	2
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.3/0.5/0.8/5.8/10.2																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	114	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	88	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	25.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	0.68	-----	-----	-----	-----	0.68	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.68	-----	-----	-----	-----	-----	0.68	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	-----	-----	C	-----	-----
BF Velocity (fps)	-----	3.6	4.1	-----	-----	3.56	-----	-----	-----	-----	4	-----	-----	6	-----	-----	-----	3.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	43.2	67.4	-----	-----	58	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	49	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	1086.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1036.3	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1217	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1279.7	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.12	-----	-----	-----	-----	1.3	-----	-----	1.6	-----	-----	-----	1.40	-----	-----	-----	-----	-----	-----	-----	1.2	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0058	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0058	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0043	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 2

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
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)	-----	-----	-----	-----	-----	10.06	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.0	----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	22.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	1.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.0	----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.3	----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	11.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.1	----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	9.1	-----	-----	-----	-----	10	-----	-----	12	-----	-----	-----	11	----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	-----	----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	----	----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	0.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	22	-----	-----	33.0	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	2	-----	-----	3.0	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	10	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	-----	-----	2.5	-----	-----	-----	2.2	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.2/0.4/0.6/2.9/6.9																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	100.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	90	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	20.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	19.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters					-----																							
Drainage Area (SM)	-----	-----	0.47	-----	-----	-----	-----	0.47	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.47	-----	-----	-----	-----	-----	0.47	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	Bc	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	3.50	4.03	-----	-----	3.87	-----	-----	-----	-----	4	-----	-----	6	-----	-----	-----	2.91	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	32.4	51.6	-----	-----	43	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	643.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	868.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.35	-----	-----	-----	-----	1.3	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0054	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0054	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 3

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data – Composite						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)	-----	-----	-----	-----	-----	8.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.3	----	----	-----	-----	9.3	10.7	10.9	11.6	0.9	4
Floodprone Width (ft)	-----	-----	-----	-----	-----	17.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	>23	----	----	-----	-----	51.6	73.4	76.1	89.9	15.7	4
BF Mean Depth (ft)	-----	-----	-----	-----	-----	1.15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.9	----	----	-----	-----	0.6	0.8	0.8	0.9	0.2	4
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	----	----	-----	-----	1.1	1.3	1.3	1.3	0.1	4
BF Cross-sectional Area (ft²)	-----	6.5	9.3	-----	-----	9.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.7	----	----	-----	-----	6.8	7.9	7.6	9.8	1.2	4
Width/Depth Ratio	-----	-----	-----	-----	-----	7.15	-----	-----	-----	-----	10	-----	-----	12	-----	-----	-----	11.0	----	----	-----	-----	10.8	15.0	15.1	19.2	3.9	4
Entrenchment Ratio	-----	-----	-----	-----	-----	2.0	-----	-----	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	----	-----	-----	4.4	6.9	7.5	8.2	1.5	4
Bank Height Ratio	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	-----	----	-----	-----	1	1	1	1	0	4
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	35	-----	-----	56.0	-----	-----	37.4	54.0	59.9	64.7	11.9	3
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	20	-----	-----	30.0	-----	-----	20.0	27.8	25.8	37.2	6.3	10
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	2	-----	-----	3.0	-----	-----	1.9	2.6	2.4	3.5	0.6	10
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	90	-----	-----	130.0	-----	-----	90.4	108.9	101.0	137.2	17.2	5
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	10	-----	-----	-----	-----	-----	----	-----	-----	3.5	5.1	5.6	6.1	1.1	3
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.018	-----	----	-----	-----	0.005	0.021	0.019	0.040	0.010	13
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	47	-----	-----	70.0	-----	-----	20.1	55.2	59.2	81.3	18.3	13
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	-----	-----	2.5	-----	-----	-----	2	-----	----	-----	-----	1.3	1.8	1.8	2.2	0.5	2
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.1/0.2/0.4/10.4/22.4																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	141	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	116	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	30.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	26.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters					-----																							
Drainage Area (SM)	-----	-----	0.38	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----	-----	-----	0.38	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	Bc	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	E5	-----	-----	-----	-----	-----	-----	-----	C	-----	-----
BF Velocity (fps)	-----	3.42	3.97	-----	-----	3.5	-----	-----	-----	-----	4	-----	-----	6	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	25.7	41.7	-----	-----	34.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	31.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	1441.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1323.2	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1586.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1495.2	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	1.3	-----	-----	1.6	-----	-----	-----	1.20	-----	-----	-----	-----	-----	-----	-----	1.13	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0082	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0082	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.010	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 4

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design (lower/upper)						As-built					
											Composite																	
		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)	-----	-----	-----	-----	-----	7.60	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.2 / 8.1	-----	-----	-----	-----	7.2	9.3	9.1	11.8	1.7	4
Floodprone Width (ft)	-----	-----	-----	-----	-----	9.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	>19 / >17	-----	-----	-----	-----	31.3	57.9	66.0	68.1	15.4	4
BF Mean Depth (ft)	-----	-----	-----	-----	-----	0.86	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7 / 0.6	-----	-----	-----	-----	0.5	0.8	0.9	1.1	0.2	4
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.39	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.9 / 0.8	-----	-----	-----	-----	0.8	1.4	1.5	1.7	0.3	4
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	6.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.5 / 5.0	-----	-----	-----	-----	3.3	7.7	7.4	12.7	3.4	4
Width/Depth Ratio	-----	-----	-----	-----	-----	8.8	-----	-----	-----	-----	10.0	-----	-----	14.0	-----	-----	-----	13.0	-----	----	-----	-----	11.0	12.3	11.3	15.4	1.8	4
Entrenchment Ratio	-----	-----	-----	-----	-----	1.2	-----	-----	-----	-----	-----	-----	-----	>2.2	-----	-----	-----	>2.2	-----	----	-----	-----	4.4	5.9	5.8	7.6	1.3	3
Bank Height Ratio	-----	-----	-----	-----	-----	7	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	-----	----	-----	-----	1	1	1	1	0	3
d50 (mm)	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30-42/22-43	-----	----	-----	-----	36.9	43.0	42.8	49.7	4.7	4
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	-----	18-28/16-25	-----	-----	-----	-----	17.2	24.5	25.1	34.3	4.9	10
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.1 / 2.0	-----	-----	-----	-----	1.8	2.6	2.7	3.7	0.5	10
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	120.0 / 80.0	-----	-----	-----	-----	63.1	94.5	93.0	123.0	20.2	9
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8	-----	-----	-----	12.0 / 2.7	-----	-----	-----	-----	4.0	4.6	4.6	5.3	0.5	4
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.019	-----	----	-----	-----	0.013	0.021	0.018	0.036	0.008	7
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	36-64/29-52	-----	----	-----	-----	31.2	58.1	56.1	87.8	18.7	6
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0 / 1.9	-----	----	-----	-----	2.0	2.0	2.0	2.0	0.0	1
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.2/0.3/0.4/0.9/1.8																					
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	208	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	141	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	45.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters					-----						-----																	
Drainage Area (SM)	-----	-----	0.22	-----	-----	-----	-----	0.22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.22	-----	-----	-----	-----	-----	0.22	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	Gc	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	-----	-----	E	-----	-----
BF Velocity (fps)	-----	3.29	3.90	-----	-----	3.69	-----	-----	-----	-----	3.5	-----	-----	5.0	-----	-----	-----	3.8 / 4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	17.9	29.8	-----	-----	24	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.8 / 21.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	1173.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1173.9	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	1350.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1263.4	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.15	-----	-----	-----	-----	1.2	-----	-----	1.5	-----	-----	-----	1.13/1.22	-----	-----	-----	-----	-----	-----	-----	1.08	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.016	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.011 / 0.016	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.0	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 5

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
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)	-----	-----	-----	-----	-----	7.38	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	11.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	0.44	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	0.67	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	3.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	16.77	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	0.04	-----	-----	-----	-----	0.04	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.04	-----	-----	-----	-----	-----	0.04	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	Bc	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.97	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	12.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	470.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	470	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	536.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	520	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.14	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.11	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.017	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach 6

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
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)	-----	-----	-----	-----	-----	9.09	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.1	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	12.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	13.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	0.48	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	4.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.1	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	18.94	-----	-----	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	14.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	1.4	-----	-----	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	<2.2	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	5	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.06	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	30	-----	-----	54.0	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.7	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			0.2/0.3/0.4/0.9/1.8																					
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)	-----	-----	0.10	-----	-----	-----	-----	0.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.10	-----	-----	-----	-----	-----	0.10	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	Bc	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.75	-----	-----	-----	-----	4	-----	-----	6.0	-----	-----	-----	5.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	16.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	16	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	468.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	501.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	468.2	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.07	-----	-----	-----	-----	1.1	-----	-----	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.014	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.016	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach T1

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
		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)	-----	-----	-----	-----	-----	6.80	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	-----	----	-----	-----	7.7	7.7	7.7	7.7	0.0	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	89.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	39.9	39.9	39.9	39.9	0.0	1
BF Mean Depth (ft)	-----	-----	-----	-----	-----	0.67	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	0.7	0.7	0.7	0.7	0.0	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.53	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.7	-----	----	-----	-----	1.2	1.2	1.2	1.2	0.0	1
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	4.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.8	-----	----	-----	-----	5.1	5.1	5.1	5.1	0.0	1
Width/Depth Ratio	-----	-----	-----	-----	-----	10.15	-----	-----	-----	-----	10.0	-----	-----	14.0	-----	-----	-----	13.0	-----	----	-----	-----	11.7	11.7	11.7	11.7	0.0	1
Entrenchment Ratio	-----	-----	-----	-----	-----	13.1	-----	-----	-----	-----		-----	-----	>2.2	-----	-----	-----	-----	-----	----	-----	-----	5.2	5.2	5.2	5.2	0.0	1
Bank Height Ratio	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	-----	-----	----	-----	-----	1	1	1	1	0	1
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	29.6	29.6	29.6	29.6	0.0	1
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14	-----	-----	21.0	-----	-----	16.3	17.4	17.4	18.5	1.1	2
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3	-----	-----	-----	-----	-----	----	-----	-----	2.1	2.3	2.3	2.4	0.1	2
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	60.0	-----	----	-----	-----	56.0	57.9	57.9	59.7	1.8	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.5	-----	-----	8	-----	-----	-----	4.0	-----	----	-----	-----	3.8	3.8	3.8	3.8	0.0	1
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.029	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	27	-----	-----	35.0	-----	-----	18.2	23.8	26.6	34.6	7.6	3
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.2	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----																		
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters					-----						-----																	
Drainage Area (SM)	-----	-----	0.09	-----	-----	-----	-----	0.09	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.09	-----	-----	-----	-----	-----	0.09	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	C5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.76	-----	-----	-----	-----	3.5	-----	-----	5.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	16.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	114.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	114.2	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	121.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	139.6	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.06	-----	-----	-----	-----	1.2	-----	-----	1.5	-----	-----	-----	1.12	-----	-----	-----	-----	-----	-----	-----	1.22	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.024	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.019	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Reach T2

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
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)	-----	-----	-----	-----	-----	18.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	23.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	0.22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	0.78	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	4.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	81.82	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	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)	-----	-----	0.07	-----	-----	-----	-----	0.07	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.07	-----	-----	-----	-----	-----	0.07	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	F	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	14.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	252.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	252.7	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	283.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	284.2	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.12	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.12	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.022	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313
Reach T3

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
		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)	-----	-----	-----	-----	-----	2.93	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.8	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	66.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	15.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	1.12	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	2.62	-----	-----	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	12.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	22.7	-----	-----	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	<2.2	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																												
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	3.0	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																												
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.033	-----	----	-----	-----	0.017	0.025	0.017	0.017	0.007	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	36	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.9	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----																		
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters											-----																	
Drainage Area (SM)	-----	-----	0.06	-----	-----	-----	-----	0.06	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.06	-----	-----	-----	-----	-----	0.06	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	3.6	-----	-----	-----	-----	4	-----	-----	6.0	-----	-----	-----	2.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	11.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	44.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	80.5	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	47.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	88.0	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.06	-----	-----	-----	-----	1.1	-----	-----	1.3	-----	-----	-----	1.20	-----	-----	-----	-----	-----	-----	-----	1.09	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.02	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.014	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 10 continued. Baseline Stream Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313
Reach T4

Parameter	USGS Gauge	Regional Curve*			Pre-Existing Condition						Reference Reach(es) Data						Design						As-built					
											Composite																	
		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)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.8	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Floodprone Width (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Mean Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
BF Cross-sectional Area (ft²)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Width/Depth Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	12.0	-----	-----	18.0	-----	-----	-----	12.0	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Entrenchment Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.4	-----	-----	2.2	-----	-----	-----	<2.2	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Bank Height Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	-----	-----	1	-----	-----	-----	1	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
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)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.051	-----	----	-----	-----	0.007	0.047	0.048	0.072	0.023	11
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool to Pool Spacing (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	14	-----	----	-----	-----	12.3	16.1	14.6	21.6	3.5	11
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.9	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																												
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----																		
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																												
Drainage Area (SM)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	B5c	-----	-----	-----	-----	-----	-----	-----	B5c	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	-----	-----	6.0	-----	-----	-----	3.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	10.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	117.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	143.34	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	119.18	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	-----	-----	1.3	-----	-----	-----	1.20	-----	-----	-----	-----	-----	-----	-----	0.8314497	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.047	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

* 1999 Regional Cruve and Esitmate from Revised Regional Curve. See Mitigation Plan for more information.

Table 11a. Morphology and Hydraulic Monitoring Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Stream Reach	**Reach 4**																													
	Cross-section X-1 (Riffle)							**Cross-section X-2 (Pool)**							**Cross-section X-3 (Riffle)**															
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+									
Based on fixed baseline bankfull elevation																														
BF Width (ft)	7.2	8.1	7.0	7.0	-	6.3		11.6	12.8	12.3	14.30	-	14.30		9.5	12.49	10.6	11.0	-	9.6										
BF Mean Depth (ft)	0.5	0.4	0.4	0.4	-	0.4		0.9	0.8	0.9	0.8	-	0.9		0.9	0.58	0.7	0.6	-	0.7										
Width/Depth Ratio	15.4	19.4	16.5	19.6	-	16.3		12.7	15.6	14.4	18.3	-	16.5		11	21.5	16.1	19.2	-	13.6										
BF Cross-sectional Area (ft²)	3.3	3.4	3.0	2.5	-	2.4		10.5	10.5	10.5	11.1	-	12.4		8.2	7.25	6.9	6.3	-	6.7										
BF Max Depth (ft)	0.8	0.9	0.7	0.6	-	0.7		2	2.5	2.7	2.6	-	2.8		1.6	1.21	1.1	1.2	-	1.3										
Width of Floodprone Area (ft)	31.3	58.8	46.3	45.7	-	45.7		-	-	-	-	-	-		66.2	66.1	65.6	65.6	-	65.6										
Entrenchment Ratio (MY1 will provide standard)*	4.4	5.9	6.6	6.6	-	7.3		-	-	-	-	-	-		7.0	5.3	6.2	5.9	-	6.9										
Bank Height Ratio (MY1 will provide standard)*	1	1.0	1.0	0.9	-	1.1		-	-	-	-	-	-		1.0	1.0	1.0	0.9	-	0.9										
Wetted Perimeter (ft)	7.4	8.5	7.2	7.1	-	6.5		12.6	15.3	15.0	16.8	-	17.2		10.1	13.0	11.0	11.5	-	10.0										
Hydraulic Radius (ft)	0.5	0.4	0.4	0.3	-	0.4		0.8	0.7	0.7	0.7	-	0.7		0.8	0.6	0.6	0.5	-	0.7										
Cross Sectional Area between end pins (ft²)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-										
d50 (mm)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-										

Stream Reach	**Reach 4**														**Reach 3**															
	Cross-section X-4 (Riffle)							**Cross-section X-5 (Riffle)**							**Cross-section X-6 (Pool)**							**Cross-section X-7 (Riffle)**						
Dimension and substrate	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+
Based on fixed baseline bankfull elevation																												
BF Width (ft)	8.7	9.16	8.8	8.8	-	8.9		11.8	10.93	11.6	14.5	-	10.4		12.5	12.9	12.4	12.7	-	12.1		11.2	11.5	9.7	9.3	-	9.4	
BF Mean Depth (ft)	0.8	0.73	0.6	0.6	-	0.6		1.1	0.75	0.7	0.5	-	0.8		0.9	1.1	1.1	1.1	-	1.3		0.6	0.5	0.5	0.5	-	0.5	
Width/Depth Ratio	11.6	12.55	13.6	15.3	-	14.7		11	14.57	17.7	26.9	-	13.8		14	11.6	11.2	11.1	-	9.6		18.6	21.3	21.0	18.3	-	18.3	
BF Cross-sectional Area (ft²)	6.6	6.72	5.6	5.0	-	5.4		12.7	8.18	7.5	7.8	-	7.8		11.2	14.4	13.7	14.5	-	15.3		6.8	6.2	4.5	4.8	-	4.8	
BF Max Depth (ft)	1.4	1.0	1.0	0.9	-	1.0		1.7	1.08	1.1	1.0	-	1.0		1.3	2.4	2.2	2.2	-	2.4		1.1	1.0	0.9	0.8	-	1.1	
Width of Floodprone Area (ft)	65.8	72.0	67.5	66.1	-	66.1		68.1	69.3	68.3	68.3	-	68.3		-	-	-	-	-	-		89.9	89.9	89.9	89.9	-	89.9	
Entrenchment Ratio (MY1 will provide standard)*	7.6	7.4	7.7	7.5	-	7.4		5.8	6.3	5.9	4.7	-	6.6		-	-	-	-	-	-		8	7.8	9.3	9.7	-	9.6	
Bank Height Ratio (MY1 will provide standard)*	1.0	1.0	1.0	0.9	-	1.0		1.0	1.0	1.0	0.9	-	0.9		-	-	-	-	-	-		1.0	1.0	1.0	1.0	-	1.0	
Wetted Perimeter (ft)	9.4	6.94	9.2	9.1	-	9.3		12.8	11.47	12	14.9	-	10.8		13.0	13.92	13.4	13.7	-	13.7		11.6	11.8	10.1	9.6	-	9.8	
Hydraulic Radius (ft)	0.7	0.7	0.6	0.6	-	0.6		1.0	0.71	0.6	0.5	-	0.7		0.9	1.03	1.0	1.1	-	1.1		0.6	0.5	0.4	0.5	-	0.5	
Cross Sectional Area between end pins (ft²)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	
d50 (mm)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	

Stream Reach	**Reach 3**																													
	Cross-section X-8 (Riffle)							**Cross-section X-9 (Pool)**							**Cross-section X-10 (Riffle)**							**Cross-section X-11 (Riffle)**						
Dimension and substrate	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+
Based on fixed baseline bankfull elevation																												
BF Width (ft)	10.60	10.05	9.8	9.5	-	13.9		17.60	15.3	14.5	15.1	-	15.6		11.60	11.5	10	10.3	-	8.9		9.30	11.7	10.5	9.7	-	9.5	
BF Mean Depth (ft)	0.90	0.71	0.7	0.7	-	0.5		1.00	1.1	1.2	1.1	-	1.1		0.60	0.6	0.5	0.6	-	0.6		0.90	0.7	0.6	0.7	-	0.7	
Width/Depth Ratio	11.5	14.15	15.1	13.5	-	28.3		17.7	13.5	12.1	13.7	-	14.0		19.2	19.2	20.8	17.9	-	14.3		10.8	17.2	18.5	14.5	-	13.1	
BF Cross-sectional Area (ft²)	9.8	7.16	6.4	6.7	-	6.8		17.5	17.2	17.3	16.7	-	17.3		7.0	6.9	4.8	5.9	-	5.6		8.1	8.0	6.0	6.6	-	6.9	
BF Max Depth (ft)	1.30	1.05	1.1	1.2	-	1.2		2.20	2.4	2.5	2.5	-	2.5		1.30	1.1	1	1.1	-	1.1		1.30	1.2	1.2	1.2	-	1.1	
Width of Floodprone Area (ft)	86.6	89.5	88.3	87.1	-	87.1		-	-	-	-	-	-		51.6	67.5	50.9	52.3	-	52.3		65.6	87.3	65.2	65.7	-	65.7	
Entrenchment Ratio (MY1 will provide standard)*	8.2	8.5	9.0	9.2	-	6.3		-	-	-	-	-	-		4.4	4.5	5.1	5.1	-	5.9		7.0	5.5	6.2	6.7	-	6.9	
Bank Height Ratio (MY1 will provide standard)*	1.0	1.0	0.9	1.0	-	0.9		-	-	-	-	-	-		1.0	1.0	1.0	1.1	-	1.0		1.0	1.0	1.0	1.0	-	1.1	
Wetted Perimeter (ft)	11.2	11.3	10.6	9.9	-	14.3		18.2	11.3	15.9	16.1	-	16.8		12.0	11.9	10.2	10.6	-	9.3		9.9	12.3	11.0	10.3	-	10.0	
Hydraulic Radius (ft)	0.9	0.6	0.6	0.7	-	0.5		1.0	0.6	1.1	1.0	-	1.0		0.6	0.6	0.5	0.6	-	0.6		0.8	0.7	0.5	0.6	-	0.7	
Cross Sectional Area between end pins (ft²)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	
d50 (mm)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	

*Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by

Table 11a. Morphology and Hydraulic Monitoring Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Table 11a continued. Morphology and Hydraulic Monitoring Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Stream Reach	**Reach T1**							**Reach 1**																		
	Cross-section X-12 (Riffle)							**Cross-section X-13 (Pool)**							**Cross-section X-14 (Riffle)**							**Cross-section X-15 (Pool)**						
Dimension and substrate	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+
Based on fixed baseline bankfull elevation																												
BF Width (ft)	7.7	6.7	6.4	6.9	-	6.1		19.6	18.7	17.3	17.6	-	12.0		13.80	14.7	13.1	12.2	-	11.0		29.4	24.3	22.8	22.4	-	12.4	
BF Mean Depth (ft)	0.7	0.6	0.5	0.5	-	0.5		1.2	0.9	0.6	1.0	-	1.5		0.90	0.9	0.9	1.0	-	1.0		1.1	0.9	0.7	0.7	-	1.0	
Width/Depth Ratio	11.7	11	12.1	14.1	-	11.5		16.4	20.6	29	16.9	-	8.0		15.2	17.3	14	12.5	-	11.3		26.1	28.3	31.8	30.8	-	12.6	
BF Cross-sectional Area (ft^2)	5.1	4.1	3.4	3.4	-	3.2		23.5	17.1	10.3	18.3	-	17.9		12.5	12.5	12.3	11.8	-	10.7		33.2	20.8	16.3	16.3	-	12.1	
BF Max Depth (ft)	1.2	1.1	0.8	0.8	-	1.0		2.8	1.7	2.0	3.0	-	2.8		1.70	1.6	0.9	1.8	-	1.7		2.80	2.5	1.8	1.5	-	1.6	
Width of Floodprone Area (ft)	39.9	49.4	34.7	33.4	-	33.4		-	-	-	-	-	-		100.0	73.1	73.2	73.1	-	73.1		100.0	93.8	92.5	87.5	-	87.5	
Entrenchment Ratio (MY1 will provide standard)*	5.2	5.4	5.4	4.9	-	5.5		-	-	-	-	-	-		5.3	5.0	5.6	6.0	-	6.6		-	-	-	-	-	-	
Bank Height Ratio (MY1 will provide standard)*	1.0	1.0	1.0	1.1	-	0.9		-	-	-	-	-	-		1.0	1.0	1.0	1.0	-	1.0		-	-	-	-	-	-	
Wetted Perimeter (ft)	8.5	7.18	6.7	7.2	-	6.4		21.0	19.4	18.1	20.2	-	14.3		14.4	15.4	13.9	13.0	-	11.8		30.5	25.7	23.7	23.0	-	13.3	
Hydraulic Radius (ft)	0.6	0.57	0.5	0.5	-	0.5		1.1	0.9	0.6	0.9	-	1.3		0.9	0.8	0.9	0.9	-	0.9		1.1	0.8	0.7	0.7	-	0.9	
Cross Sectional Area between end pins (ft^2)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	
d50 (mm)	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-	

Stream Reach	**Reach 1**													
	Cross-section X-16 (Riffle)							**Cross-section X-17 (Riffle)**						
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Based on fixed baseline bankfull elevation														
BF Width (ft)	12.6	11.9	19.7	11.6	-	11.1		12.60	12.2	12.1	12.6	-	12.0	
BF Mean Depth (ft)	1.1	1.09	0.7	1.0	-	0.9		1.20	1.2	1.1	1.0	-	1.0	
Width/Depth Ratio	12.0	10.9	26.6	11.3	-	12.7		10.9	10.3	10.6	13.0	-	11.7	
BF Cross-sectional Area (ft^2)	13.2	13	14.6	12.0	-	9.8		14.5	14.6	13.9	12.2	-	12.2	
BF Max Depth (ft)	1.70	1.8	1.8	1.7	-	1.7		1.70	2	2.1	1.7	-	2.0	
Width of Floodprone Area (ft)	100.0	71.4	71.3	71.3	-	71.3		100.0	68.6	68.5	68.5	-	68.5	
Entrenchment Ratio (MY1 will provide standard)*	5.7	6	3.6	6.1	-	6.4		5.4	5.6	5.7	5.5	-	5.7	
Bank Height Ratio (MY1 will provide standard)*	1.0	1.0	1.0	1.0	-	0.9		1.0	1.0	1.0	1.0	-	1.0	
Wetted Perimeter (ft)	13.5	13.0	20.4	12.4	-	12.0		13.3	13.1	13.2	13.7	-	12.8	
Hydraulic Radius (ft)	1.0	1.0	0.9	1	-	0.8		1.1	1.1	1.1	0.9	-	1.0	
Cross Sectional Area between end pins (ft^2)	-	-	-	-	-	-		-	-	-	-	-	-	
d50 (mm)	-	-	-	-	-	-		-	-	-	-	-	-	

Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by

Table 11b. Stream Reach Morphology Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313
Reach 4

Parameter	Baseline (Poor survey quality)						MY-1 (Utilize for comparison)						MY-2						MY- 3						MY- 5						MY- 7					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	7.2	9.3	9.1	11.8	1.7	4	8.1	10.2	10.0	12.5	1.7	4	7	9.5	9.7	11.6	1.8	4	7	10.33	9.9	14.5	2.8	4	6.30	8.80	9.25	10.40	1.54	4						
Floodprone Width (ft)	31.3	57.9	66.0	68.1	15.4	4	58.8	66.6	67.7	72.0	4.9	4	46.3	61.93	66.55	68.3	9.1	4	45.7	61.43	65.85	68.3	9.1	4	45.70	61.43	65.85	68.30	9.14	4						
Bankfull Mean Depth (ft)	0.5	0.8	0.9	1.1	0.2	4	0.4	0.6	0.7	0.8	0.1	4	0.4	0.6	0.65	0.7	0.1	4	0.4	0.525	0.55	0.6	0.1	4	0.40	0.63	0.65	0.80	0.15	4						
[1]Bankfull Max Depth (ft)	0.8	1.4	1.5	1.7	0.3	4	0.9	1.1	1.1	1.2	0.1	4	0.7	0.975	1.05	1.1	0.2	4	0.6	0.925	0.95	1.2	0.2	4	0.70	1.00	1.00	1.30	0.21	4						
Bankfull Cross Sectional Area (ft^2)	3.3	7.7	7.4	12.7	3.4	4	3.4	6.4	7.0	8.2	1.8	4	3	5.75	6.25	7.5	1.7	4	2.5	5.40	5.65	7.8	1.9	4	2.40	5.58	6.05	7.80	2.02	4						
Width/Depth Ratio	11.0	12.3	11.3	15.4	1.8	4	12.6	17.0	17.0	21.5	3.6	4	13.6	15.98	16.3	17.7	1.5	4	15.3	20.25	19.4	26.9	4.2	4	13.60	14.60	14.25	16.30	1.07	4						
Entrenchment Ratio (MY1 will provide standard)*	4.4	6.2	6.4	7.6	1.2	4	5.3	6.2	6.1	7.4	0.8	4	5.9	6.6	6.4	7.7	0.7	4	4.7	6.175	6.25	7.5	1.0	4	6.60	7.05	7.10	7.40	0.32	4						
Bank Height Ratio (MY1 will provide standard)*	1	1	1	1	0	4	1	1	1	1	0	4	1	1	1	1	0	4	0.9	0.9	0.9	0.9	0	4	0.90	0.98	0.95	1.10	0.08	4						
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification																																				
Channel Thalweg length (ft)																																				
Sinuosity (ft)																																				
Water Surface Slope (Channel) (ft/ft)																																				
BF slope (ft/ft)																																				
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth.

Table 11b continued. Stream Reach Morphology Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313
Reach 3

Parameter	Baseline (Poor survey quality)						MY-1 (Utilize for comparison)						MY-2						MY- 3						MY- 5						MY- 7					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	9.3	10.7	10.9	11.6	0.9	4	10.1	11.2	11.5	11.7	0.7	4	9.7	10.0	9.9	10.5	0.3	4.0	9.3	9.7	9.6	10.3	0.4	4.0	8.9	10.4	9.5	13.9	2.0	4.0						
Floodprone Width (ft)	51.6	73.4	76.1	89.9	15.7	4	67.5	83.5	88.4	89.9	9.3	4	50.9	73.6	76.8	89.9	16.3	4.0	52.3	73.8	76.4	89.9	15.5	4.0	52.3	73.8	76.4	89.9	15.5	4.0						
Bankfull Mean Depth (ft)	0.6	0.8	0.8	0.9	0.2	4	0.5	0.6	0.7	0.7	0.1	4	0.5	0.6	0.6	0.7	0.1	4.0	0.5	0.6	0.7	0.7	0.1	4.0	0.5	0.6	0.6	0.7	0.1	4.0						
[1]Bankfull Max Depth (ft)	1.1	1.3	1.3	1.3	0.1	4	1.0	1.1	1.1	1.2	0.1	4	0.9	1.1	1.1	1.2	0.1	4.0	0.8	1.1	1.2	1.2	0.2	4.0	1.1	1.1	1.1	1.2	0.0	4.0						
Bankfull Cross Sectional Area (ft^2)	6.8	7.9	7.6	9.8	1.2	4	6.2	7.1	7.0	8.0	0.6	4	4.5	5.4	5.4	6.4	0.8	4.0	4.8	6.0	6.3	6.7	0.8	4.0	4.8	6.0	6.2	6.9	0.9	4.0						
Width/Depth Ratio	10.8	15.0	15.1	19.2	3.9	4	14.2	18.0	18.2	21.3	2.6	4	15.1	18.9	19.7	21.0	2.4	4.0	13.5	16.1	16.2	18.3	2.1	4.0	13.1	18.5	16.3	28.3	6.0	4.0						
Entrenchment Ratio (MY1 will provide standard)*	4.4	6.9	7.5	8.2	1.5	4	4.5	6.6	6.7	8.5	1.6	4	5.1	7.4	7.6	9.3	1.8	4.0	5.1	7.7	8.0	9.7	1.9	4.0	5.9	7.2	6.6	9.6	1.4	4.0						
Bank Height Ratio (MY1 will provide standard)*	1	1	1	1	0	4	1	1	1	1	0	4	0.9	1.0	1.0	1.0	0.0	4.0	1.0	1.0	1.0	1.1	0.0	4.0	0.9	1.0	1.0	1.1	0.1	4.0						
Profile																																				
Riffle Length (ft)																																				
Riffle Slope (ft/ft)																																				
Pool Length (ft)																																				
Pool Max depth (ft)																																				
Pool Spacing (ft)																																				
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification																																				
Channel Thalweg length (ft)																																				
Sinuosity (ft)																																				
Water Surface Slope (Channel) (ft/ft)																																				
BF slope (ft/ft)																																				
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth.

Table 11b continued. Stream Reach Morphology Summary
Browns Summit Creek Restoration Project: DMS Project No ID. 96313
Reach 1

Parameter	Baseline (Poor survey quality)						MY-1 (Utilize for comparison)						MY-2						MY- 3						MY- 5						MY- 7					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	12.6	13.0	12.6	13.8	0.6	3	11.9	12.9	12.2	14.7	1.3	3	12.1	15.0	13.1	19.7	3.4	3.0	11.6	12.1	12.2	12.6	0.4	3.0	11.0	11.4	11.1	12.0	0.4	3.0						
Floodprone Width (ft)	100.0	100.0	100.0	100.0	0.0	3	68.6	71.0	71.4	73.1	1.9	3	68.5	71.0	71.3	73.2	1.9	3.0	68.5	71.0	71.3	73.1	1.9	3.0	68.5	71.0	71.3	73.1	1.9	3.0						
Bankfull Mean Depth (ft)	0.9	1.1	1.1	1.2	0.1	3	0.9	1.1	1.1	1.2	0.1	3	0.7	0.9	0.9	1.1	0.2	3.0	1.0	1.0	1.0	1.0	0.0	3.0	0.9	1.0	1.0	1.0	0.0	3.0						
[1]Bankfull Max Depth (ft)	1.7	1.7	1.7	1.7	0.0	3	1.6	1.8	1.8	2.0	0.2	3	0.9	1.6	1.8	2.1	0.5	3.0	1.7	1.7	1.7	1.8	0.0	3.0	1.7	1.8	1.7	2.0	0.1	3.0						
Bankfull Cross Sectional Area (ft^2)	12.5	13.4	13.2	14.5	0.8	3	12.5	13.4	13.0	14.6	0.9	3	12.3	13.6	13.9	14.6	1.0	3.0	11.8	12.0	12.0	12.2	0.2	3.0	9.8	10.9	10.7	12.2	1.0	3.0						
Width/Depth Ratio	10.9	12.7	12.0	15.2	1.8	3	10.3	12.8	10.9	17.3	3.2	3	10.6	17.1	14.0	26.6	6.9	3.0	11.3	12.3	12.5	13.0	0.7	3.0	11.3	11.9	11.7	12.7	0.6	3.0						
Entrenchment Ratio (MY1 will provide standard)*	5.3	5.5	5.4	5.7	0.2	3	5.0	5.5	5.6	6.0	0.4	3	3.6	5.0	5.6	5.7	1.0	3.0	5.5	5.9	6.0	6.1	0.3	3.0	5.7	6.2	6.4	6.6	0.4	3.0						
Bank Height Ratio (MY1 will provide standard)*	1	1	1	1	0	3	1	1	1	1	0	3	1.0	1.0	1.0	1.0	0.0	3.0	1.0	1.0	1.0	1.0	0.0	3.0	0.9	1.0	1.0	1.0	0.0	3.0						
Profile																																				
Riffle Length (ft)																																				
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4. = Of value/needed only if the n exceeds 3
Per DMS/IRT request, bank height ratio is calculated by setting the current bankfull area to match the asbuilt bankfull area and dividing by the current max depth.

Appendix E

Hydrologic Data

Table 12. Verification of Bankfull Events

Browns Summit Creek Restoration Project: DMS Project No ID. 96313

Date of Collection	Reach1 Crest Gauge (feet ABOVE bankfull)	Approximate Date of Occurrence (Source: on-site rain gauge)	Method of Data Collection
Year 1 Monitoring (2017)			
6/7/2017	0.46	4/25/2017	Crest Gauge Measurement
10/3/2017	0.22	8/17/2017	Crest Gauge Measurement
Year 2 Monitoring (2018)			
3/22/2018	0.35	2/7/2018	Crest Gauge Measurement
10/22/2018	0.4	9/16/2018 (Hurricane Florance)	Crest Gauge Measurement
11/16/2018	0.78	10/26/2018	Crest Gauge Measurement
Year 3 Monitoring (2019)			
3/28/2019	0.74	1/24/2019	Crest Gauge Measurement
10/17/2019	0.94	6/8/2019	Crest Gauge Measurement
Year 4 Monitoring (2020)			
2/10/2020	0.91	1/24/2020	Crest Gauge Measurement
11/6/2020	1.49	7/23/2020	Crest Gauge Measurement
Year 5 Monitoring (2021)			
7/1/2021	1.43	6/11/2021	Crest Gauge Measurement
10/21/2021	1.01	9/22/2021	Crest Gauge Measurement

Table 13. Flow Gauge Success

Browns Summit Creek Restoration Project: DMS Project ID No. 96313

Flow Gauge ID	Consecutive Days of Flow[1]	Cumulative Days of Flow[2]
R4 Gauge		
BSFL1	156	232
T3 Gauge		
BSFL2	181	290
T1 Gauge		
BSFL3	293	293

Notes:

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

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

Flow success criteria for the Site is stated as: 30 days of consecutive baseflow for monitoring wells installed in T1 and T3 during a normal rainfall year.

* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above **0.05** feet in depth.

Table 14. Flow Gauge Success
Browns Summit Restoration Project: DMS Project ID No. 96313

Flow Gauge ID	Most Consecutive Days Meeting Criteria[1]							Cumulative Days Meeting Criteria[2]						
	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)
Flow Gauges (Installed March 4, 2017)														
BSFL1	127.0	122.0	140.0	137.0	156.0			171.0	248.0	199.0	286.0	232.0		
BSFL2	166.0	158.0	198.0	202.0	181.0			173.0	303.0	284.0	305.0	290.0		
BSFL3	263.0	319.0	289.0	310.0	293.0			263.0	319.0	289.0	310.0	293.0		

Notes:

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

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

Success Criteria per Browns Summit Mitigation Plan (1/13/2016): "Success criteria wil include 30 days of consecutive baseflow for monitoirng wells installed in T1 and T3 during a normal rainfall year."

Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.05 feet in depth.

Figure 6. Flow Gauge Graphs

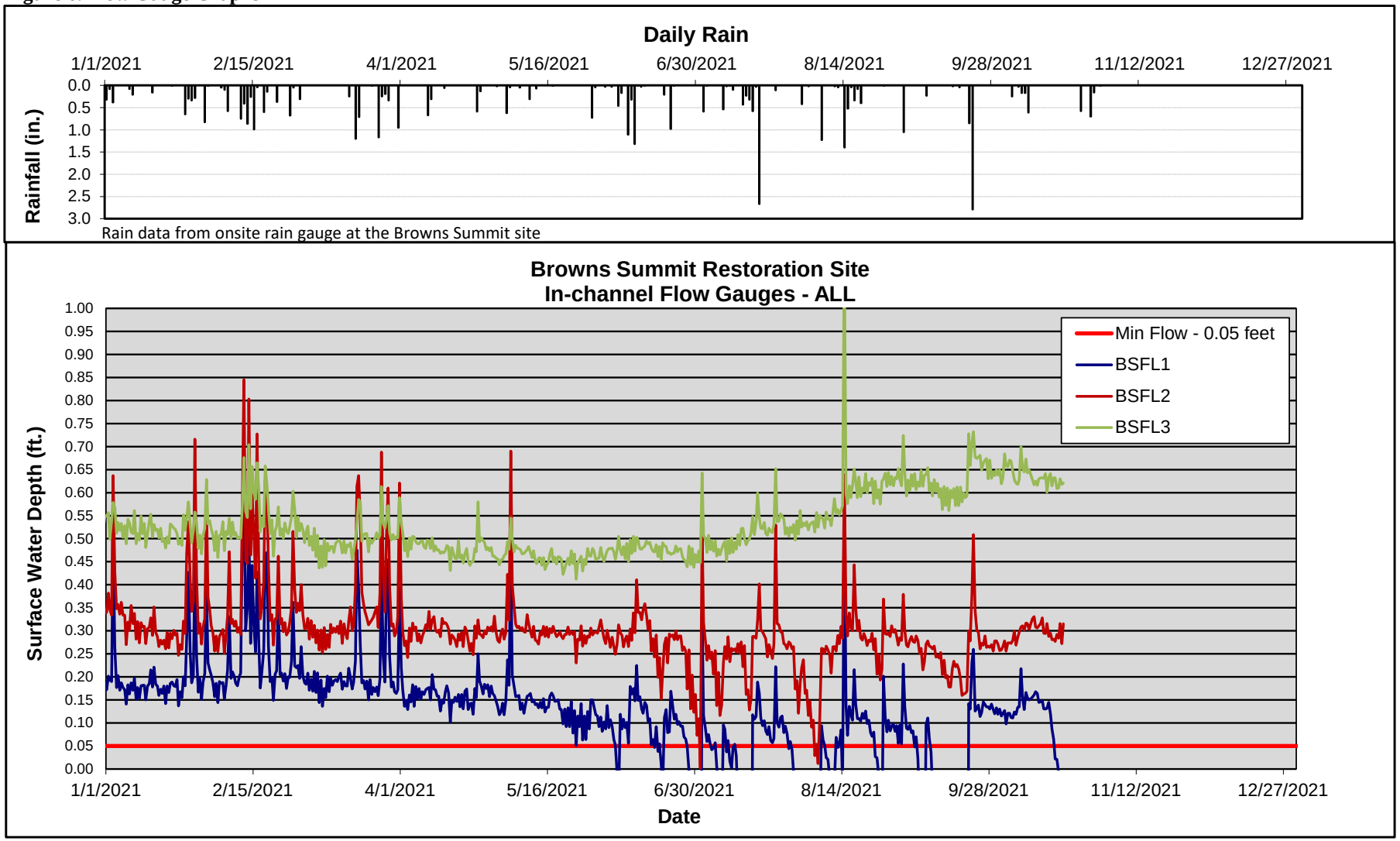
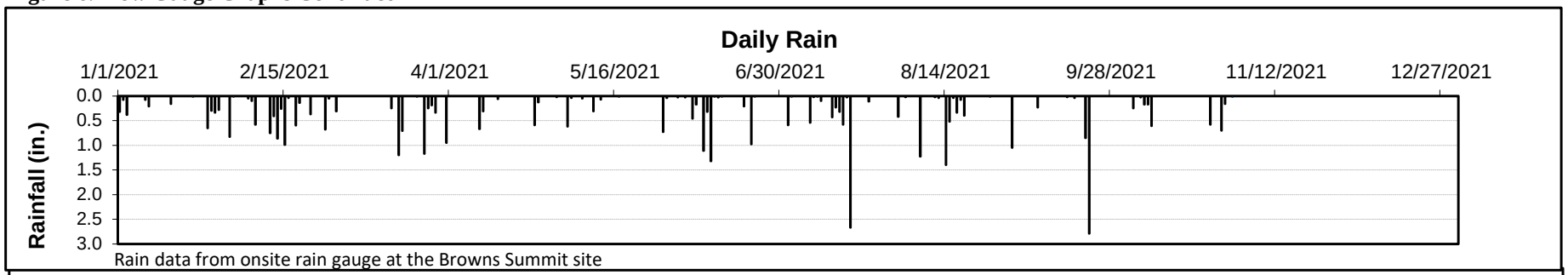
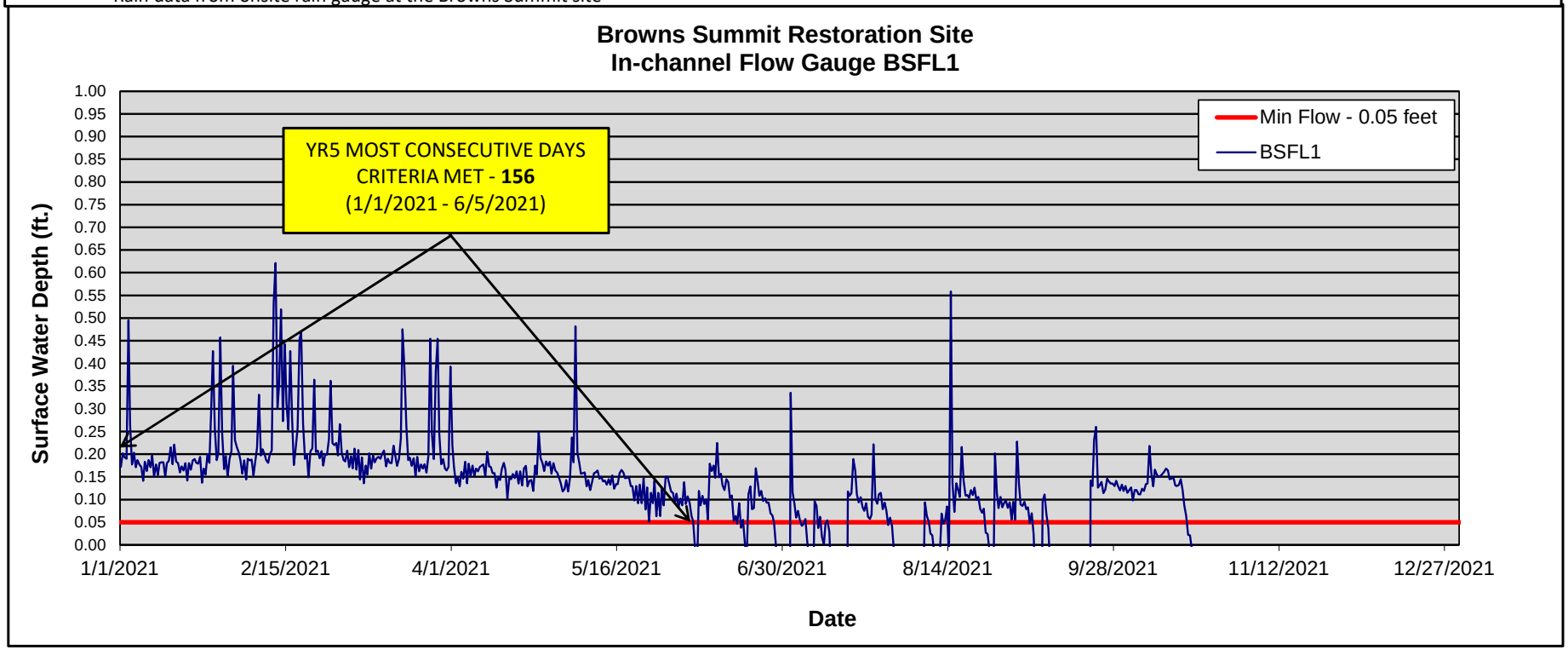


Figure 6. Flow Gauge Graphs Continued

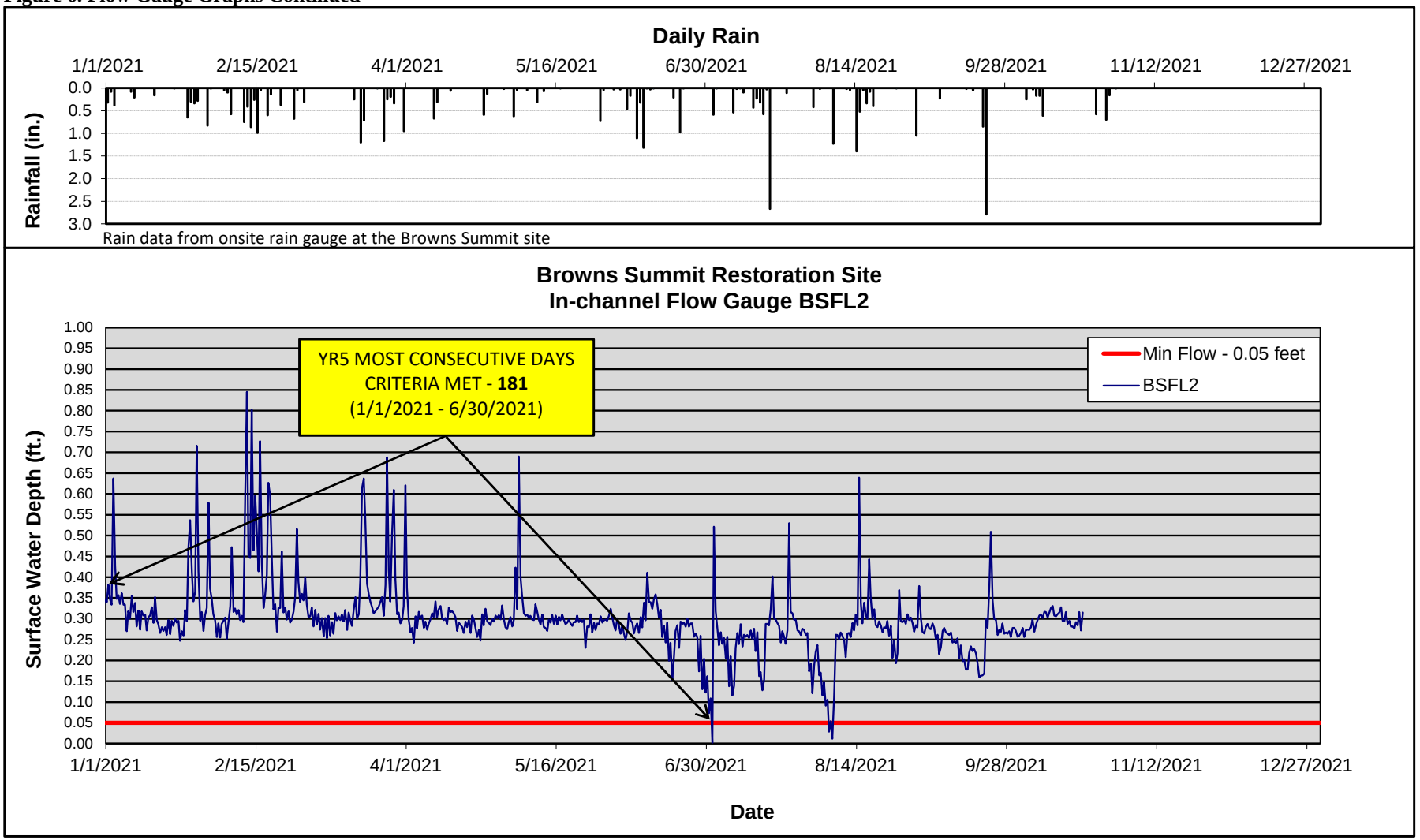


Rain data from onsite rain gauge at the Browns Summit site



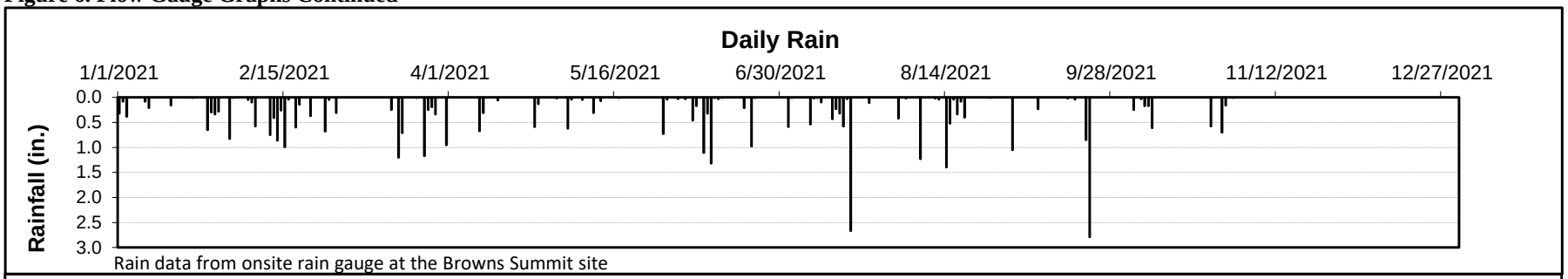
* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.05 feet in depth.

Figure 6. Flow Gauge Graphs Continued

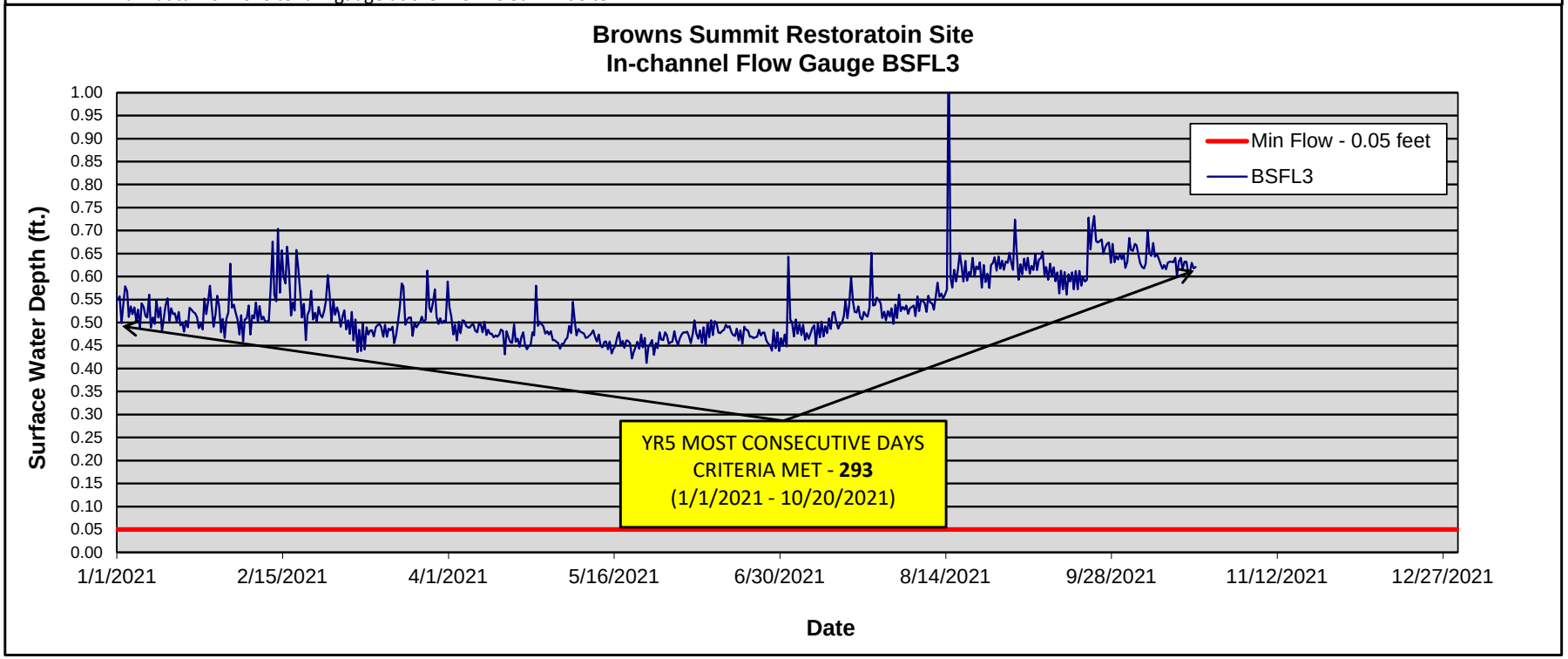


* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.05 feet in depth.

Figure 6. Flow Gauge Graphs Continued



Rain data from onsite rain gauge at the Browns Summit site



* Surface water flow is estimated to have occurred when the pressure transducer reading is equal to or above 0.05 feet in depth.

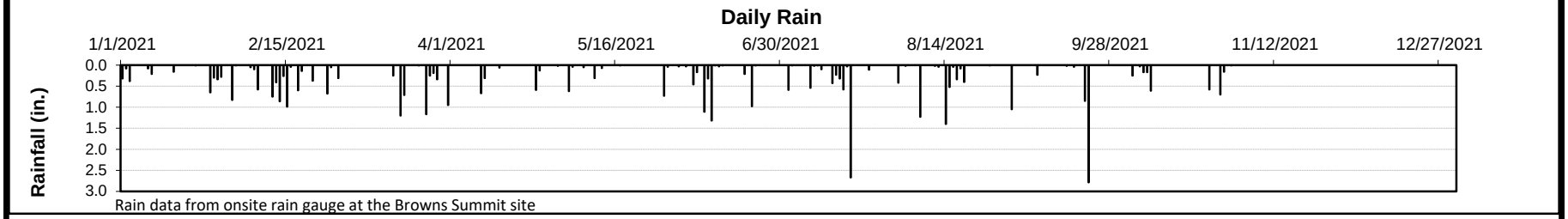
Table 16. Wetland Restoration Area Success
Browns Summit Restoration Project: DMS Project ID No. 96313

Well ID	Percentage of Consecutive Days <12 inches from Ground Surface[1]							Most Consecutive Days Meeting Criteria[2]							Percentage of Cumulative Days <12 inches from Ground Surface[1]							Cumulative Days Meeting Criteria[3]						
	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Year 7 (2023)
Type 5 (3.5:1 Ratio - Success Criteria 9% of Growing Season)																											
BSAW1	44.7	45.1	88.6	97.0	90.3			105.5	106.5	209.0	229.0	213.0			74.8	80.5	88.6	97.0	90.3			176.5	190.0	209.0	229.0	213.0		
BSAW8				97.0	90.3						229.0	213.0						97.0	90.3						229.0	213.0		
Type 4 (1:1 Ratio - Success Criteria 12% of Growing Season)																											
BSAW2	3.2	6.8	7.2	6.8	10.2			7.5	16.0	17.0	16.0	24.0			13.8	38.8	18.4	42.4	17.8			32.5	91.5	43.5	100.0	42.0		
Type 2 (1.5:1 Ratio - Success Criteria 12% of Growing Season)																											
BSAW3	47.7	48.7	83.1	97.0	90.3			112.5	115.0	196.0	229.0	213.0			91.7	97.9	87.7	97.0	90.3			216.5	231.0	207.0	229.0	213.0		
Type 3 (1.5:1 Ratio - Success Criteria 12% of Growing Season)																											
BSAW4	97.0	100.0	88.6	97.0	73.3			229.0	236.0	209.0	229.0	173.0			97.0	100.0	88.6	97.0	89.8			229.0	236.0	209.0	229.0	212.0		
BSAW5	34.1	48.7	88.6	97.0	90.3			80.5	115.0	209.0	229.0	213.0			73.7	86.0	88.6	97.0	90.3			174.0	203.0	209.0	229.0	213.0		
BSAW6	46.0	48.7	48.7	50.4	90.3			108.5	115.0	115.0	119.0	213.0			89.4	91.9	71.6	94.9	90.3			211.0	217.0	169.0	224.0	213.0		
BSAW7	51.1	48.7	88.6	97.0	90.3			120.5	115.0	209.0	229.0	213.0			91.1	91.7	88.6	97.0	90.3			215.0	216.5	209.0	229.0	213.0		

Notes:
[1]Indicates the percentage of most consecutive or cumulative number of days within the monitored growing season with a water 12 inches or less from the soil surface.
[2]Indicates the most consecutive number of days within the monitored growing season with a water table 12 inches or less from the soil surface.
[3]Indicates the cumulative number of days within the monitored growing season with a water table 12 inches or less from the soil surface.

According to the Baseline Monitoring Report, the growing season for Guilford County is from March 22 to November 13 and is 229 days long. 12% of the growing season is 28 days and 9% of the growing season is 21 days.

Figure 7. Wetland Restoration Graphs (2021)



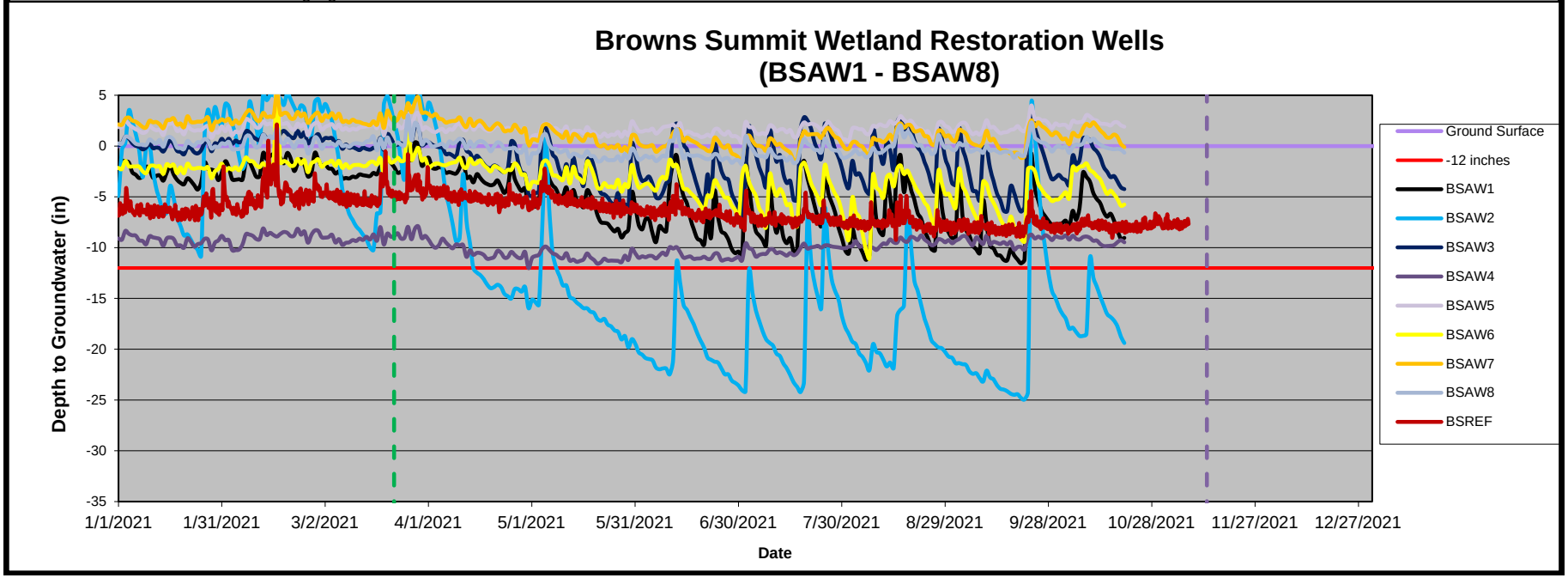
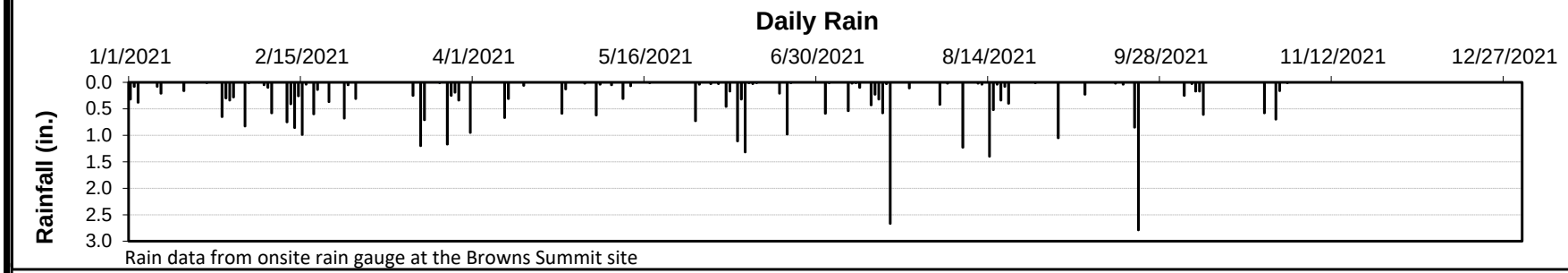


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

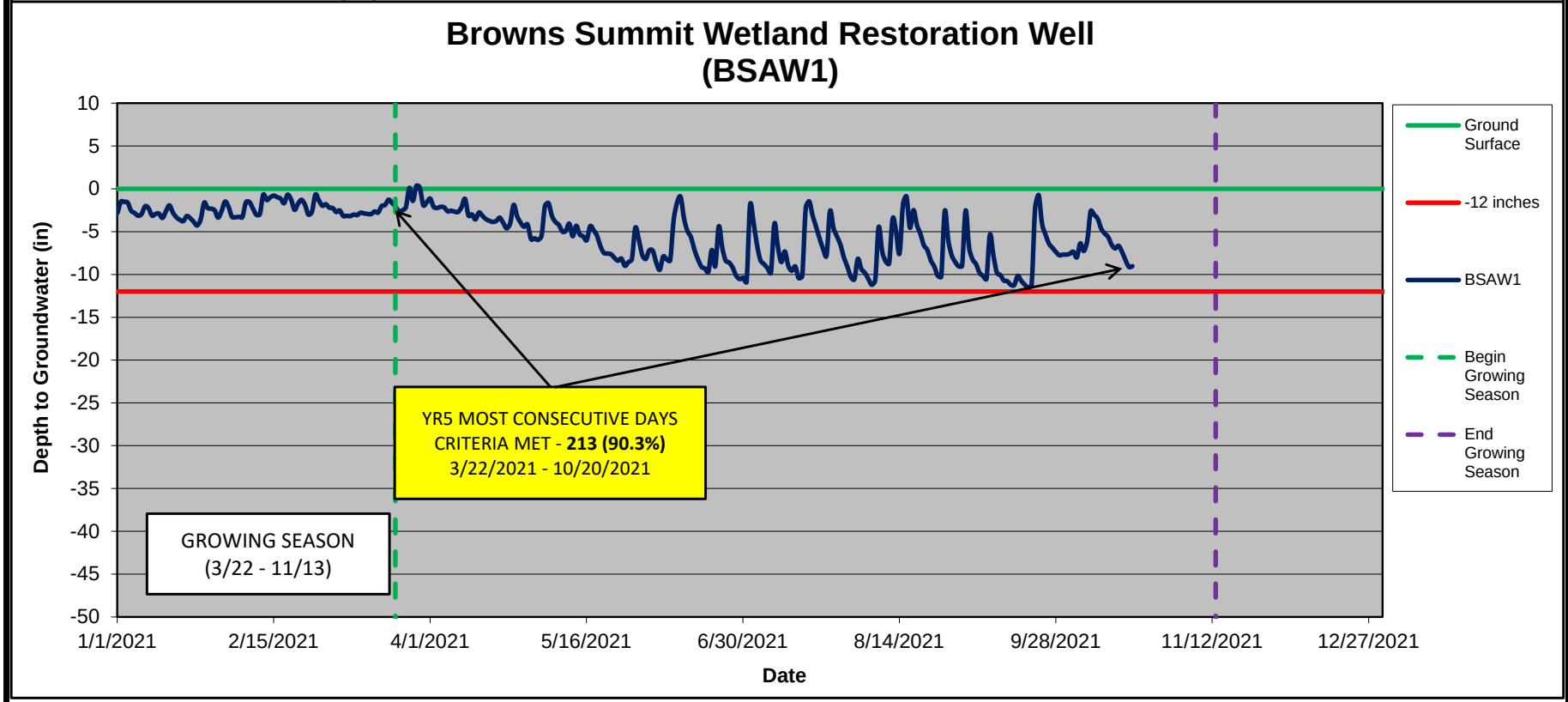
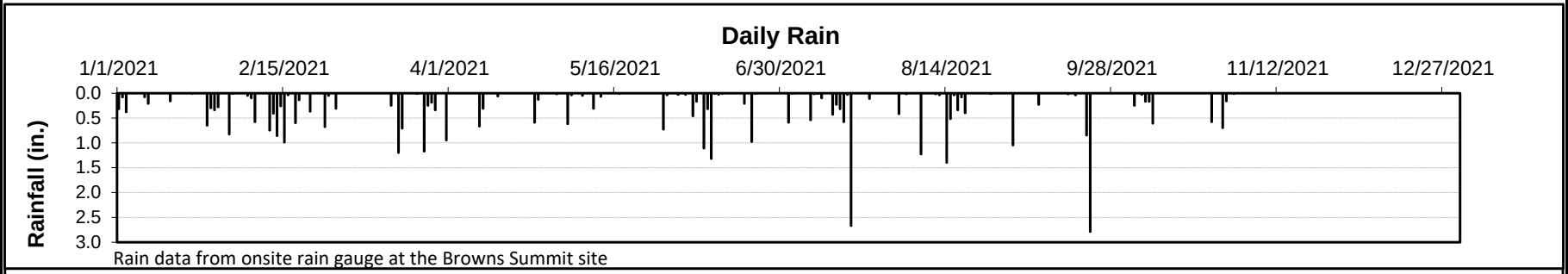


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

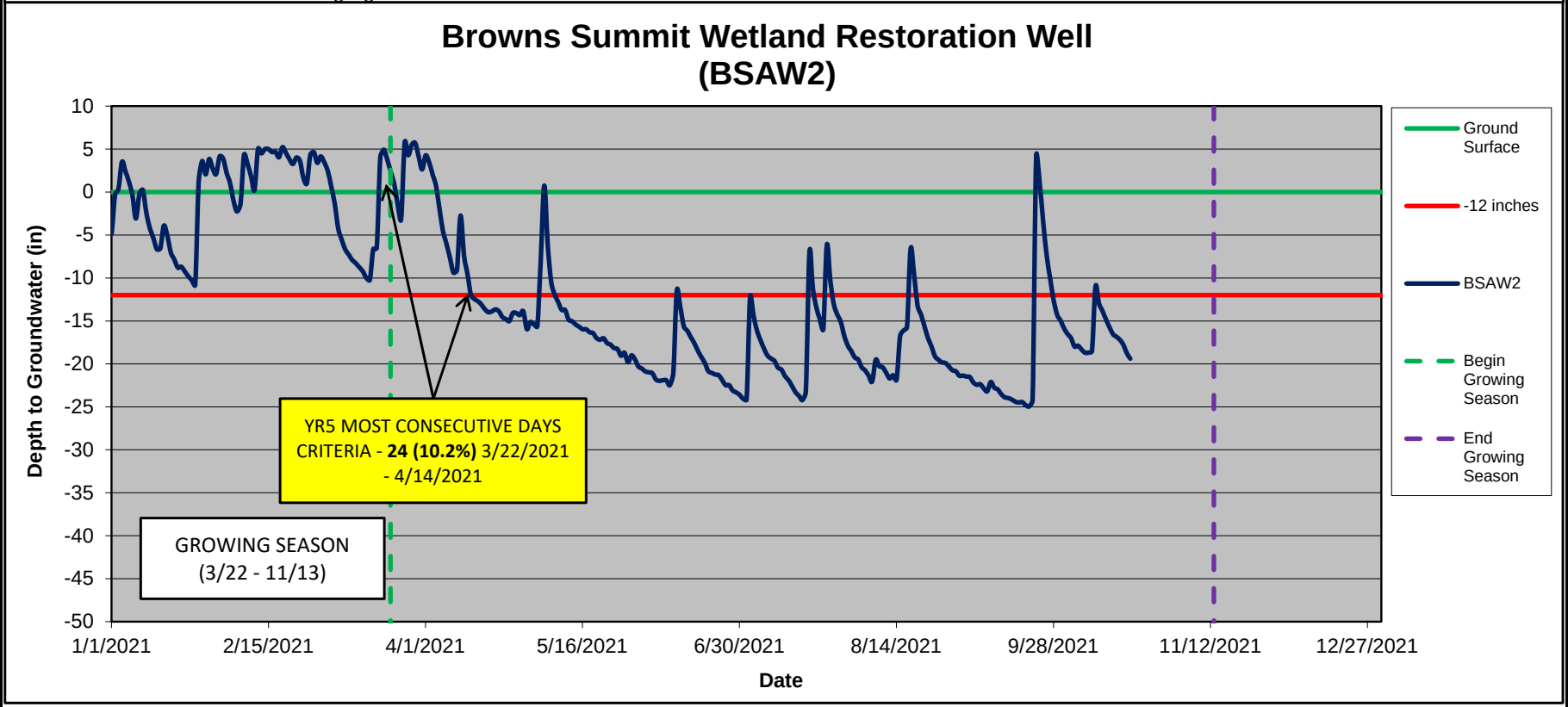
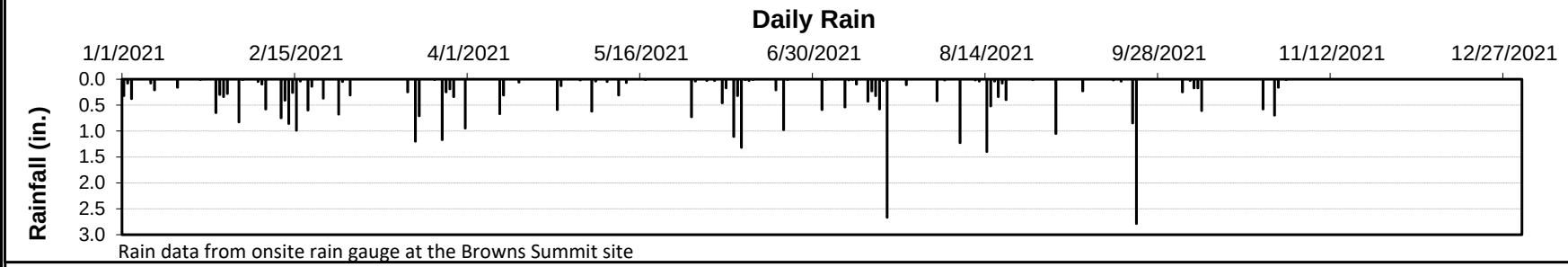


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

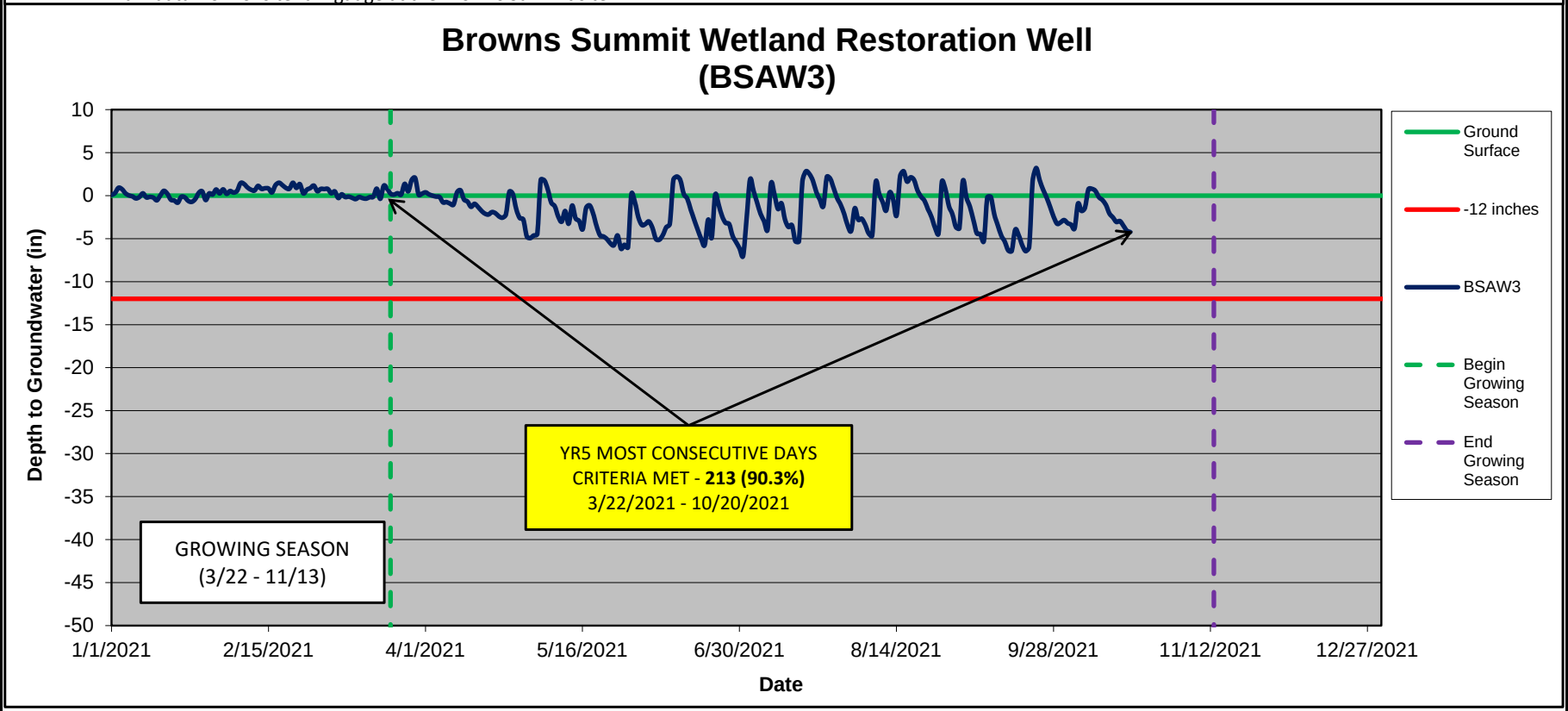
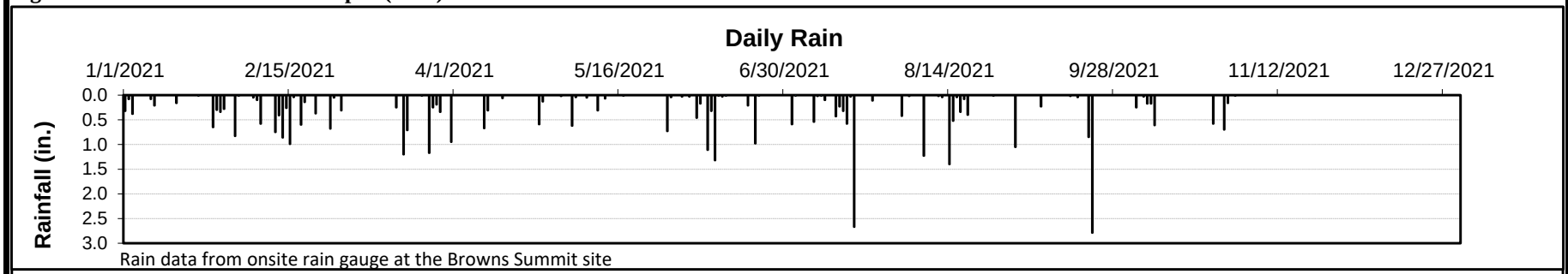


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

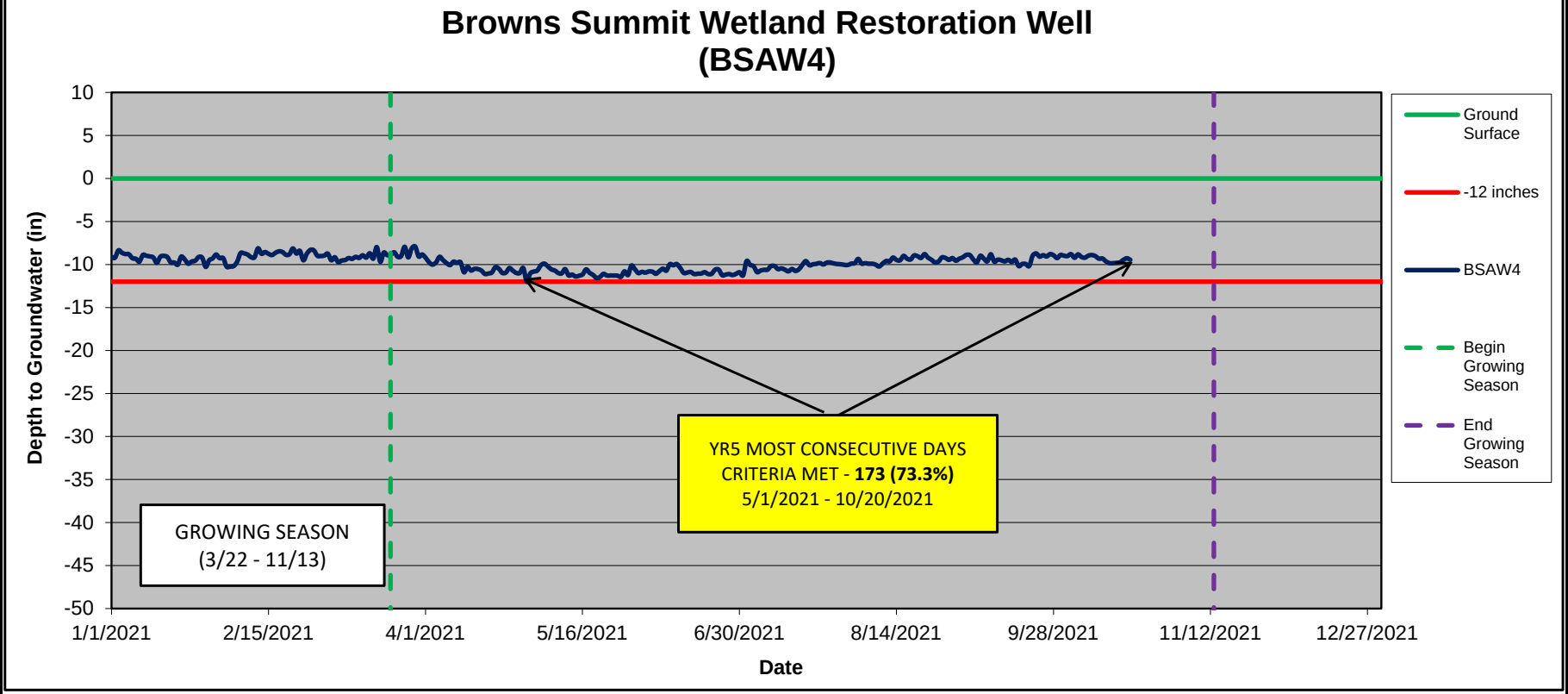
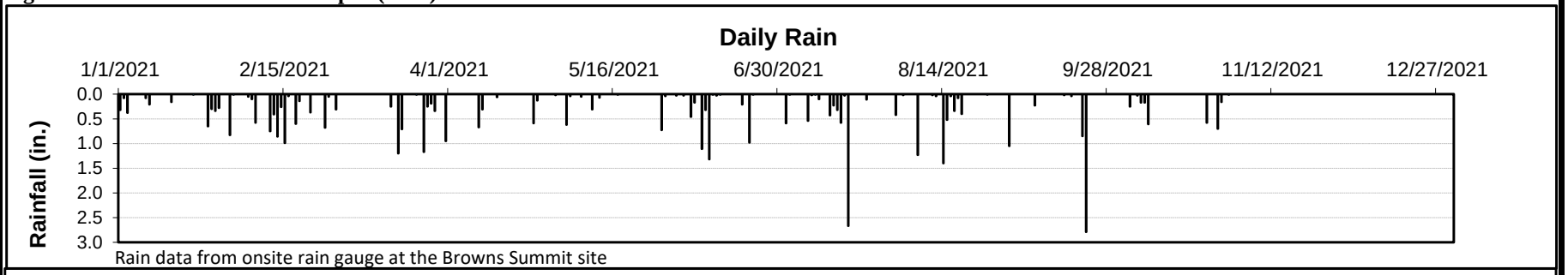


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

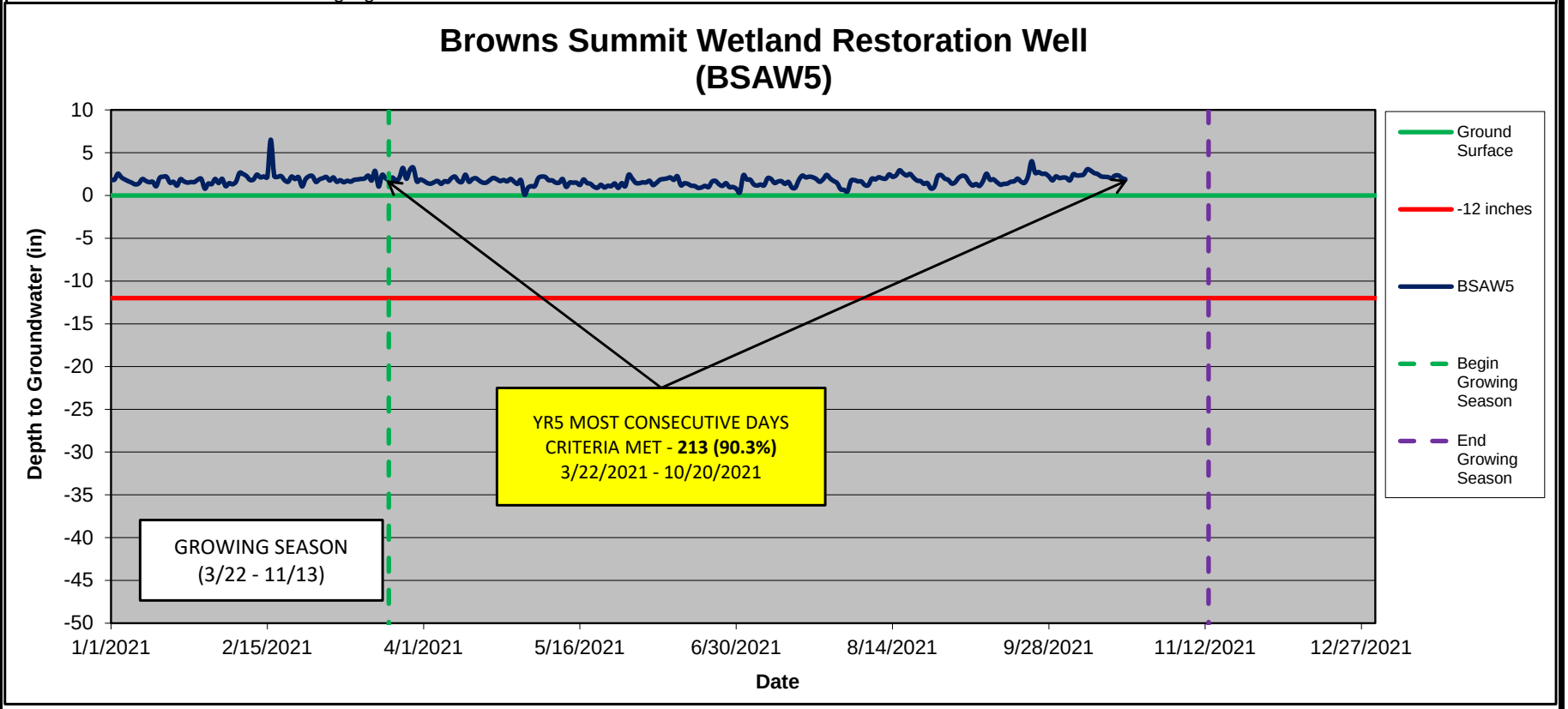
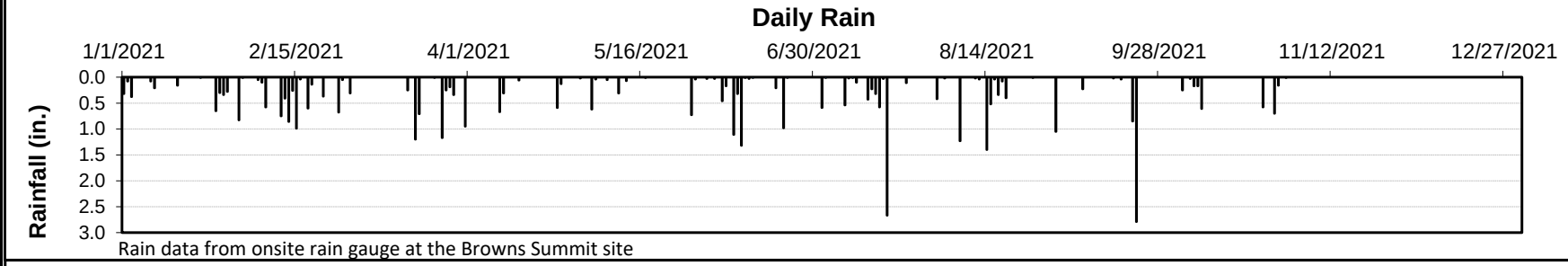


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

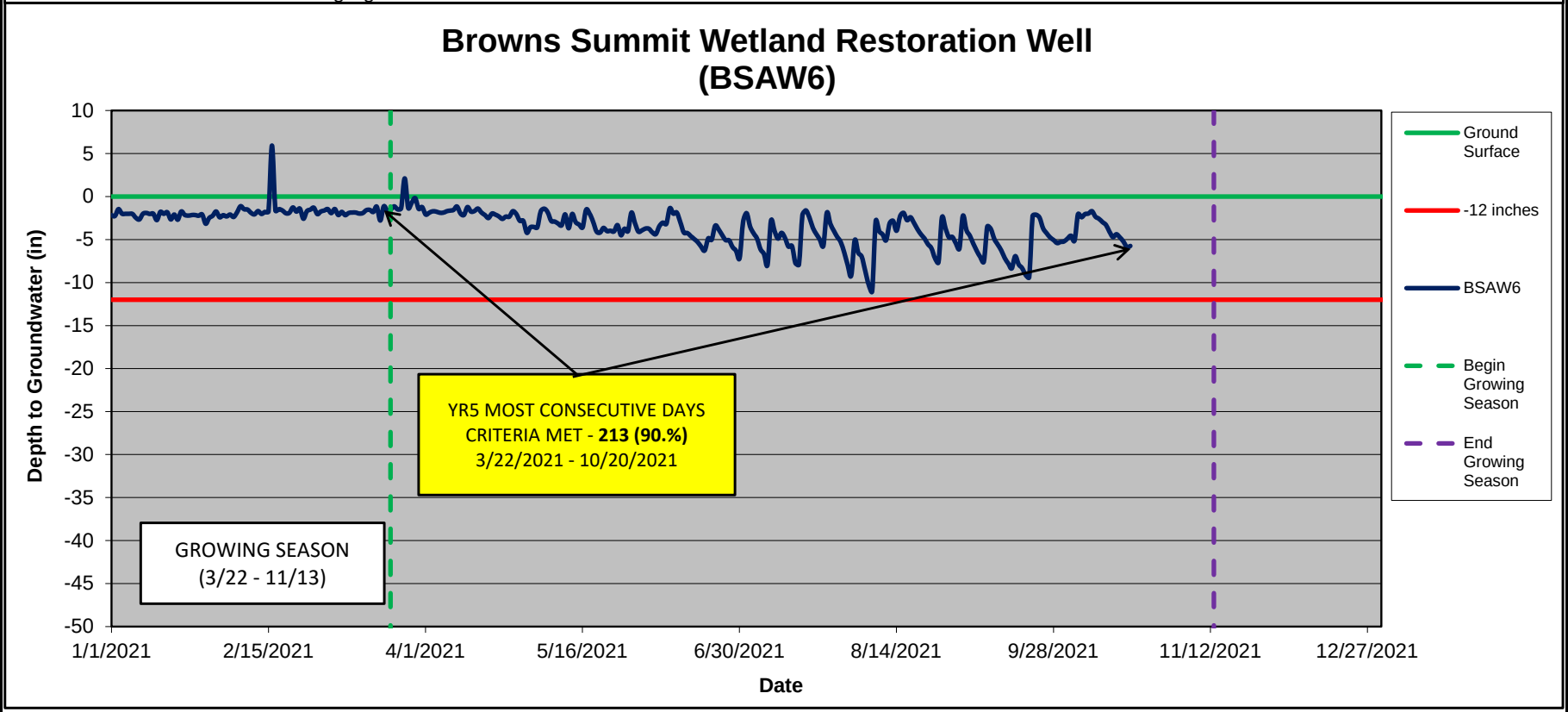
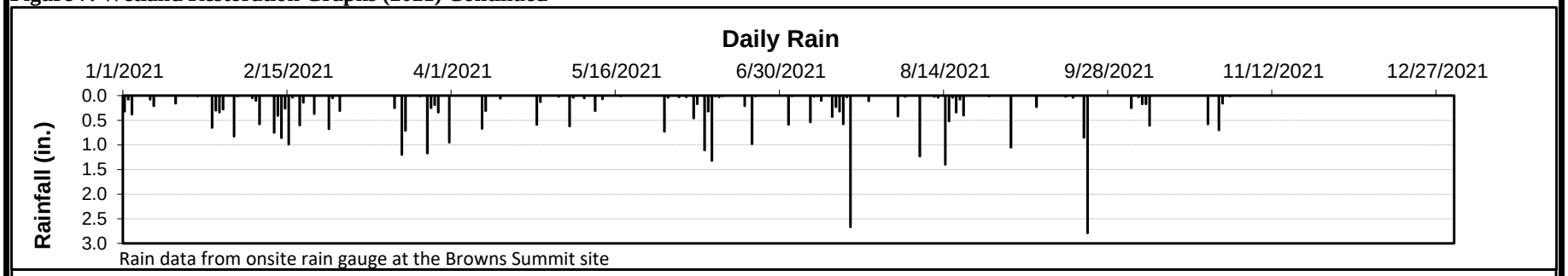


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

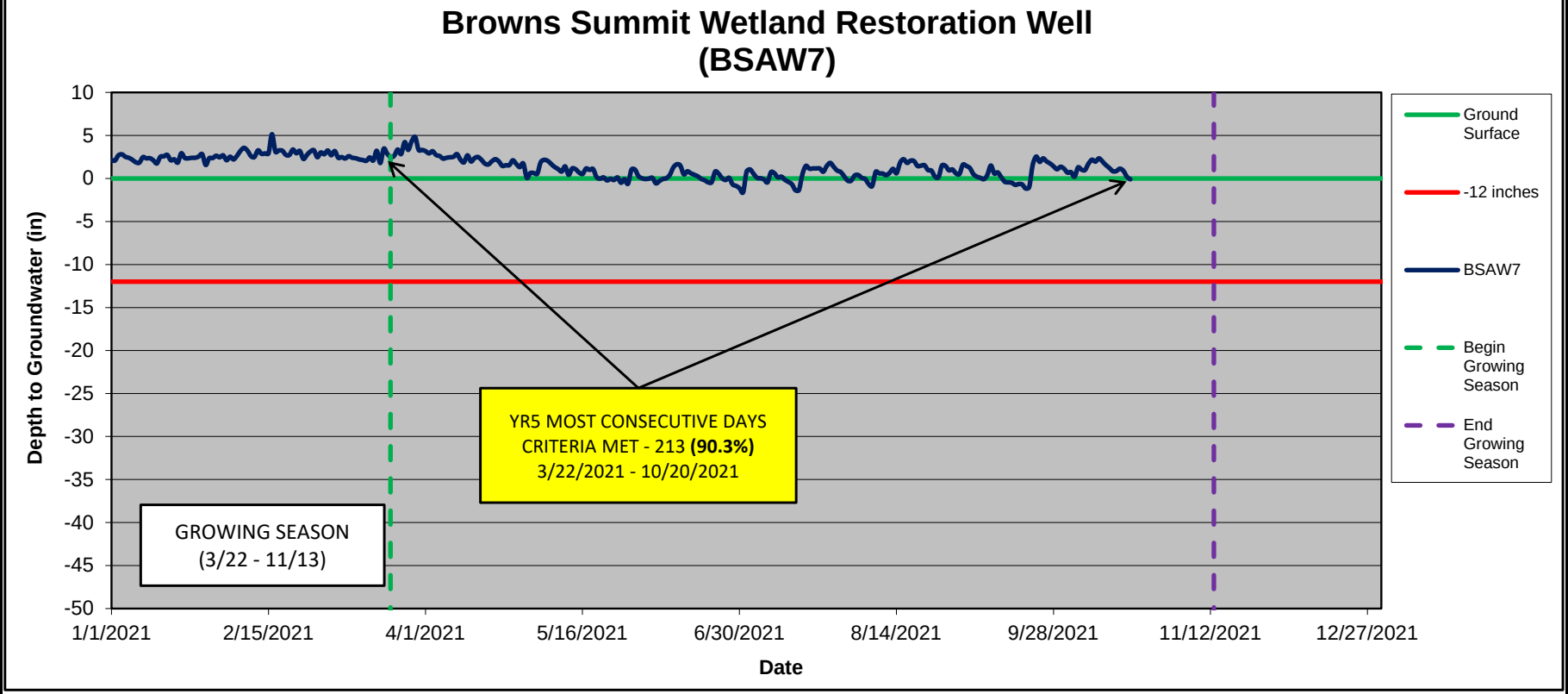
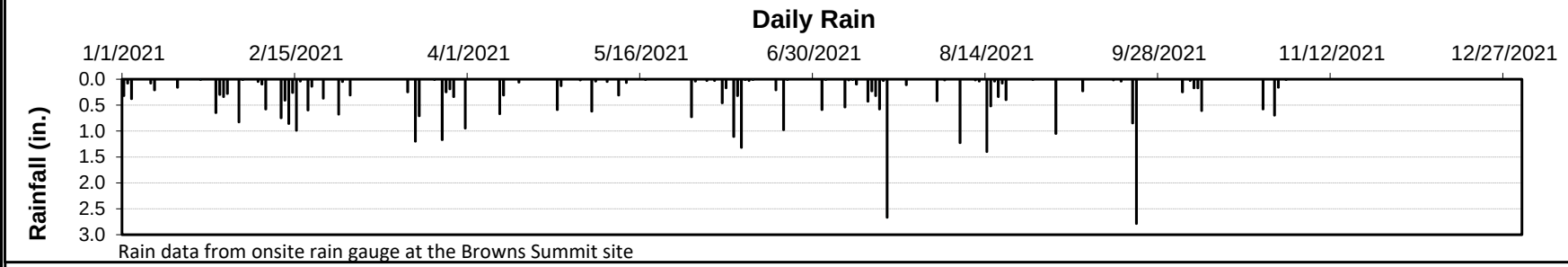


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

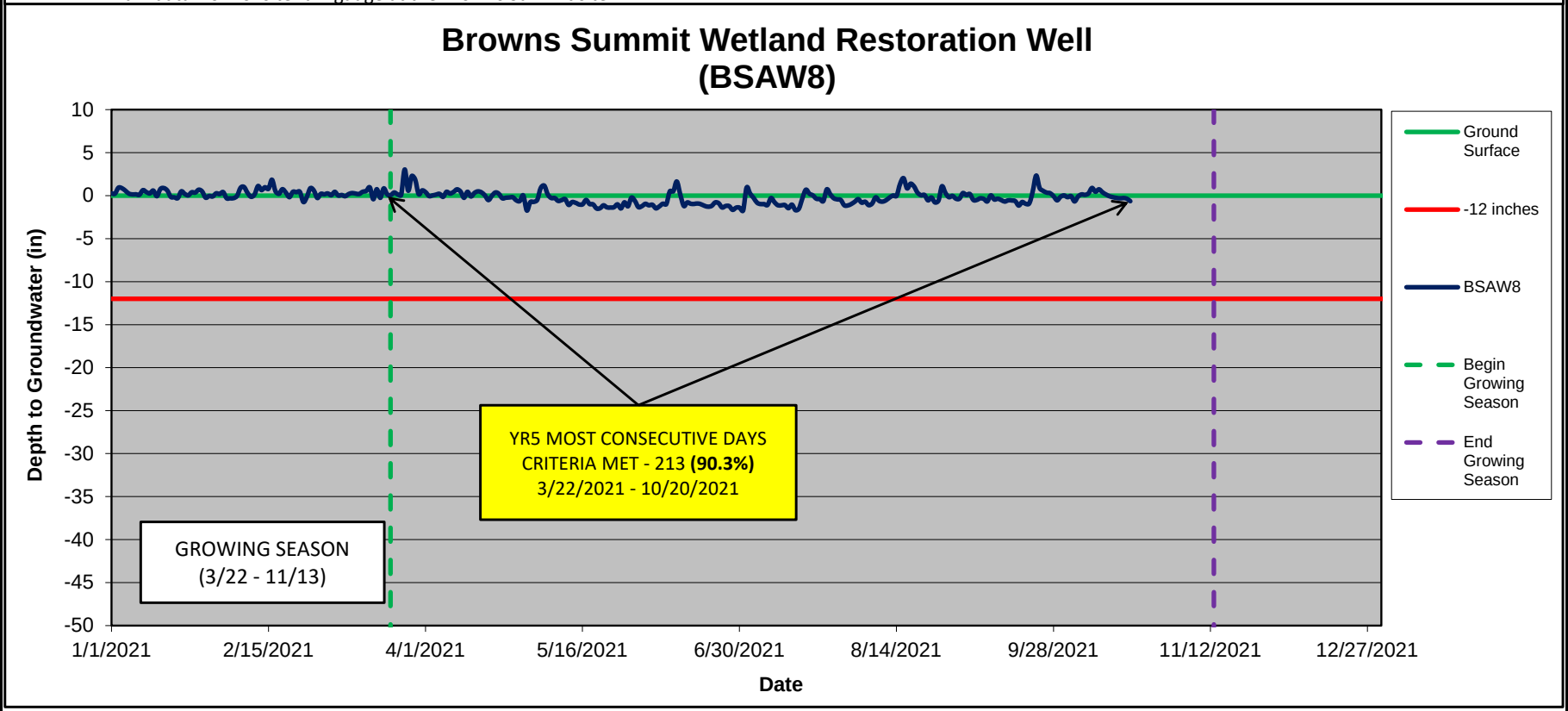
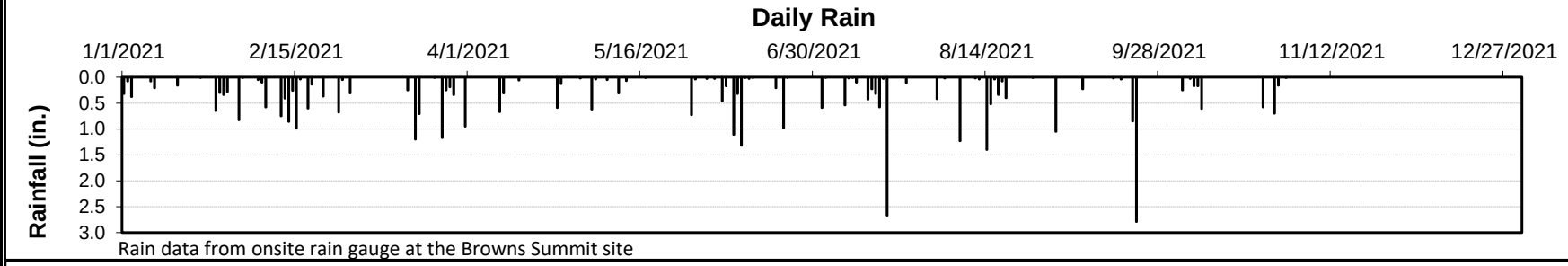


Figure 7. Wetland Restoration Graphs (2021) Continued



Rain data from onsite rain gauge at the Browns Summit site

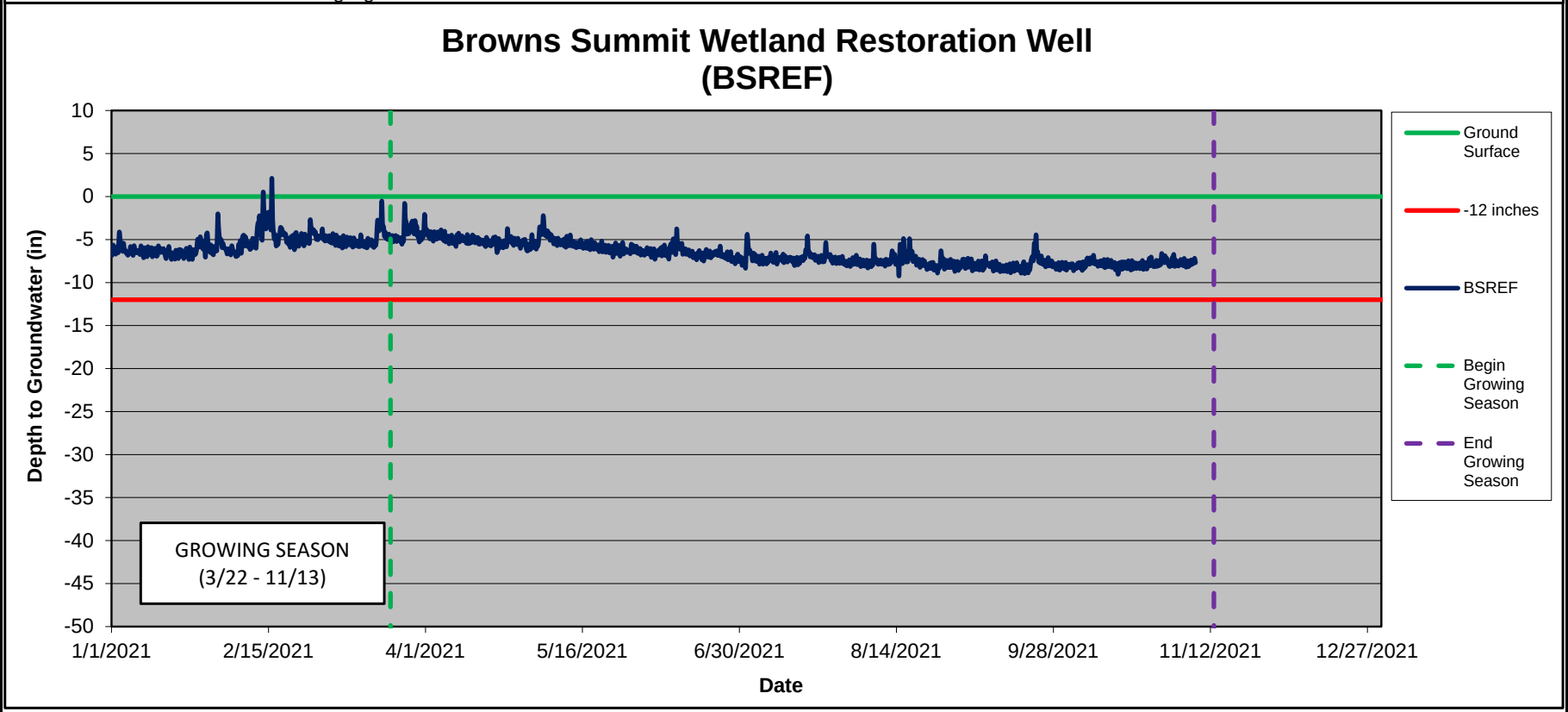
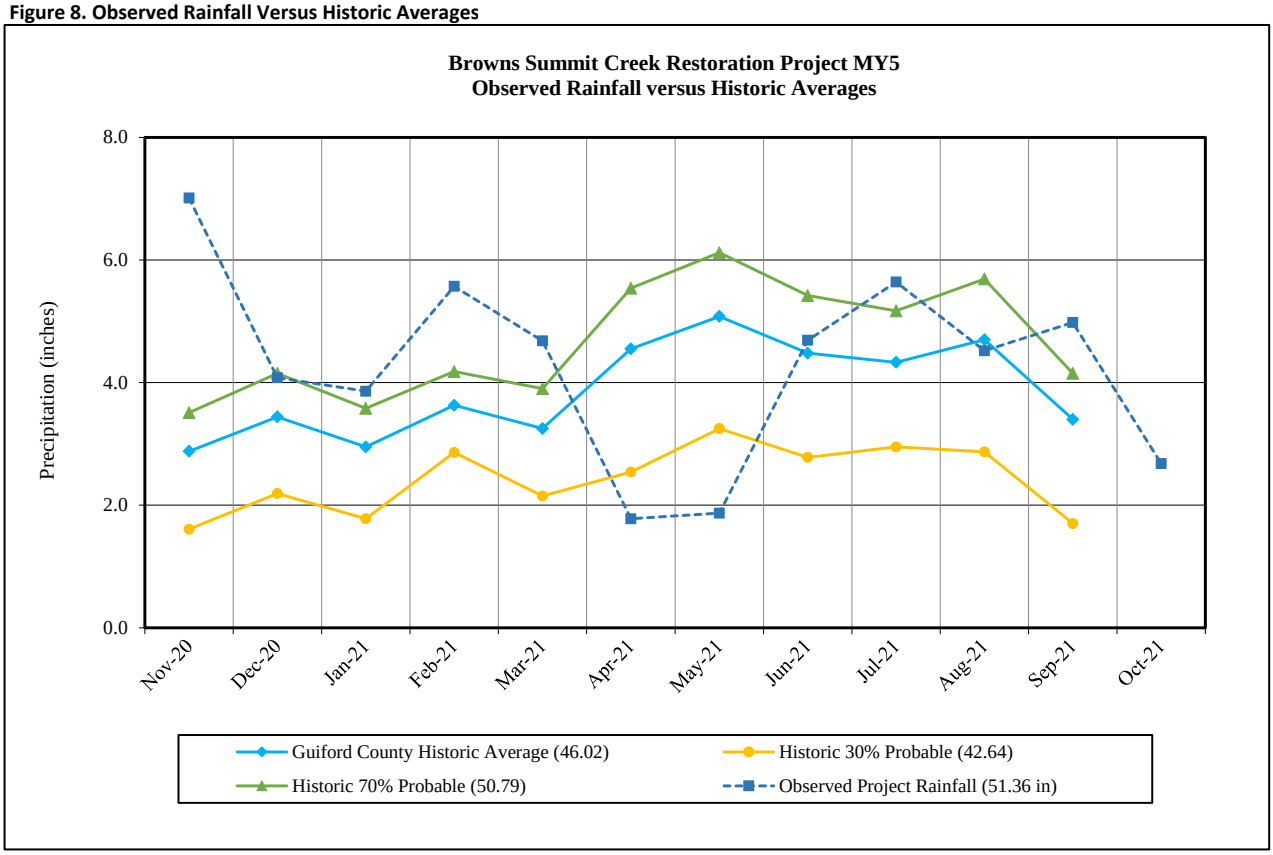


Figure 8. Observed Rainfall Versus Historic Averages



Browns Summit Creek Restoration Project – Hydrology Monitoring Stations Photos
Photos taken on (10/21/2021) unless noted different

Manual Crest Gauge – Reading 7/1/2021 (1.43’)

Manual Crest Gauge – Reading 7/1/2021 (1.43’)

Manual Crest Gauge – Reading 10/21/2021 (1.01’)

Wrack Line Showing High Flow (3/23/2021)

Wrack Line Showing High Flow (3/23/2021)

Manual Crest Gauge – Reach 1

Browns Summit Creek Restoration Project – Hydrology Monitoring Stations Photos
Photos taken on (10/21/2021) unless noted different

Flow Gauge 1 – Reach 4

Flow Gauge 2 – Reach T3

Flow Gauge 3 – Reach T1

Wetland Well 1 – Reach 4, Station 25+00

Wetland Well 2 – Reach 2, Station 47+00

Wetland Well 3 – Reach 1, Station 52+00

Browns Summit Creek Restoration Project – Hydrology Monitoring Stations Photos
Photos taken on (10/21/2021) unless noted different

Wetland Well 4 – Reach 1, Station 55+00

Wetland Well 5 – Reach 1, Station 58+00

Wetland Well 6 – Reach 1, Station 61+00

Wetland Well 7 – Reach 1, Station 63+50

Wetland Well 8 – Reach 4, Station 23+00