

**Newfound Creek Stream Restoration  
2015 Final Monitoring Report  
Monitoring Year Four**

**NC Division of Mitigation Services Project Number 92497**



Submitted to: North Carolina Division of Mitigation Services  
1652 Mail Service Center  
Raleigh, NC 27699-1652

Project Designed by: URS Corporation – North Carolina  
1600 Perimeter Park Drive, Suite 400  
Morrisville, NC 27560  
Construction Complete: October 2011

Submitted: March 21, 2016

**Newfound Creek Stream Restoration  
2015 Final Monitoring Report  
Monitoring Year Four**

**NC Division of Mitigation Services Project Number 92497**



**AECOM**

Prepared by:

AECOM  
701 Corporate Center Drive, Suite 475  
Raleigh, NC 27607

Project Manager:

Ron Johnson  
[ron.johnson@aecom.com](mailto:ron.johnson@aecom.com)  
919-854-6210

March 21, 2016

---

## Table of Contents

1.0	Executive Summary/Project Abstract .....	1
2.0	Methodology .....	4
2.1	Stream Methodology.....	4
2.2	Vegetation Methodology.....	5
3.0	References .....	6

## List of Tables

Table 1:	Project Components and Mitigation Credits .....	12
Table 2:	Project Activity and Reporting History.....	14
Table 3:	Project Contacts Table .....	15
Table 4:	Project Attribute Table.....	17
Table 5a:	Visual Stream Morphology Stability Assessment Table – Tributary 3.....	36
Table 5b:	Visual Stream Morphology Stability Assessment Table – Tributary 4.....	38
Table 5c:	Visual Stream Morphology Stability Assessment Table – Tributary 5.....	40
Table 5d:	Visual Stream Morphology Stability Assessment Table – Tributary 6.....	42
Table 5e:	Visual Stream Morphology Stability Assessment Table – Tributary 7.....	44
Table 5f:	Visual Stream Morphology Stability Assessment Table – Tributary 8.....	46
Table 5g:	Visual Stream Morphology Stability Assessment Table – Mainstem Upstream of Browntown Road .....	48
Table 5h:	Visual Stream Morphology Stability Assessment Table – Mainstem Downstream of Browntown Road .....	49
Table 6:	Vegetation Condition Assessment Table .....	52
Table 7:	Vegetation Plot Success by Project Asset Type – CVS Generated Table.....	71
Table 8:	CVS Stem Count Total and Planted with/without Livestakes by Plot and Species – CVS Generated Table .....	72
Table 9a:	Baseline Stream Data Summary – Tributary 3 .....	110
Table 9b:	Baseline Stream Data Summary – Tributary 4 .....	112
Table 9c:	Baseline Stream Data Summary – Tributary 5 .....	114
Table 9d:	Baseline Stream Data Summary – Tributary 6.....	116
Table 9e:	Baseline Stream Data Summary – Tributary 7 .....	118
Table 9f:	Baseline Stream Data Summary – Tributary 8.....	120
Table 9g:	Baseline Stream Data Summary – Mainstem Upstream of Browntown Road .....	122
Table 9h:	Baseline Stream Data Summary – Mainstem Downstream of Browntown Road .....	124
Table 10a:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 3 .....	126
Table 10b:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 4 .....	126
Table 10c:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 5 .....	126
Table 10d:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 6 .....	126
Table 10e:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 7 .....	127
Table 10f:	Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 8 .....	127

---

Table 10g: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Upstream of Browntown Road.....	127
Table 10h: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Downstream of Browntown Road.....	128
Table 11a: Monitoring Data – Dimensional Morphology Summary – Tributary 3 .....	129
Table 11b: Monitoring Data – Dimensional Morphology Summary – Tributary 4 .....	129
Table 11c: Monitoring Data – Dimensional Morphology Summary – Tributary 5 .....	130
Table 11d: Monitoring Data – Dimensional Morphology Summary – Tributary 6 .....	130
Table 11e: Monitoring Data – Dimensional Morphology Summary – Tributary 7 .....	131
Table 11f: Monitoring Data – Dimensional Morphology Summary – Tributary 8.....	131
Table 11g: Monitoring Data – Dimensional Morphology Summary – Mainstem .....	132
Table 12a: Monitoring Data – Stream Reach Data Summary – Tributary 3.....	134
Table 12b: Monitoring Data – Stream Reach Data Summary – Tributary 4 .....	135
Table 12c: Monitoring Data – Stream Reach Data Summary – Tributary 5.....	136
Table 12d: Monitoring Data – Stream Reach Data Summary – Tributary 6 .....	136
Table 12e: Monitoring Data – Stream Reach Data Summary – Tributary 7.....	137
Table 12f: Monitoring Data – Stream Reach Data Summary – Tributary 8.....	138
Table 12g: Monitoring Data – Stream Reach Data Summary – Mainstem Upstream of Browntown Road .. .....	139
Table 12h: Monitoring Data – Stream Reach Data Summary – Mainstem Downstream of Browntown Road .....	141
Table 13: Verification of Bankfull Events.....	143

## List of Figures

Figure 1: Vicinity Map and Directions .....	9
Figure 2: Project Site .....	10
Figure 3: Restoration Reaches .....	11
Figures 4a-n: Current Condition Plan View (CCPV).....	22
Figure 5: Tributary 3 Cross Sections with Annual Overlays .....	75
Figure 6: Tributary 4 Cross Sections with Annual Overlays .....	79
Figure 7: Tributary 5 Cross Sections with Annual Overlays .....	83
Figure 8: Tributary 6 Cross Sections with Annual Overlays .....	86
Figure 9: Tributary 7 Cross Sections with Annual Overlays .....	88
Figure 10: Tributary 8 Cross Sections with Annual Overlays .....	91
Figure 11: Mainstem – Upstream of Browntown Road Cross Sections with Annual Overlays .....	94
Figure 12: Mainstem – Downstream of Browntown Road Cross Sections with Annual Overlays.....	98
Figure 13: Tributary 3 Longitudinal Profile with Annual Overlays.....	104
Figure 14: Tributary 4 Longitudinal Profile with Annual Overlays.....	104
Figure 15: Tributary 5 Longitudinal Profile with Annual Overlays.....	105
Figure 16: Tributary 6 Longitudinal Profile with Annual Overlays.....	105
Figure 17: Tributary 7 Longitudinal Profile with Annual Overlays.....	106
Figure 18: Tributary 8 Longitudinal Profile with Annual Overlays.....	106
Figure 19: Mainstem – Upstream of Browntown Road Longitudinal Profile with Annual Overlays .....	107
Figure 20: Mainstem – Downstream of Browntown Road Longitudinal Profile with Annual Overlays .	107
Figure 21: Pebble Count Plot – Mainstem Upstream of Browntown Road (Riffle Cross Section 3).....	108
Figure 22: Pebble Count Plot – Mainstem Downstream of Browntown Road (Riffle Cross-Section 7)..	109
Figure 23: USGS Proximal Gauge Pigeon River near Hepco, NC .....	148
Figure 24: USGS Proximal Gauge Ivy River near Marshall, NC .....	148
Figure 25: Newfound Creek 30-70 Percentile Graph for Rainfall in Past Year, Leicester, NC.....	149

---

## List of Appendices

Appendix A:	Project Vicinity Map and Background Tables .....	8
Appendix B:	Visual Assessment Data.....	20
Appendix C:	Vegetation Plot Data.....	70
Appendix D:	Stream Survey Data.....	74
Appendix E:	Hydrology Data.....	142

---

## 1.0 EXECUTIVE SUMMARY/PROJECT ABSTRACT

The overall restoration strategy/approach was to restore and enhance the site through the use of pattern changes and in-stream structures that will provide grade control, enhance stability, promote efficient sediment transport, and produce/enhance in-stream habitat. A buffer was planted along the stream banks to help stabilize the banks. The buffer is also intended to enhance water quality through root filtration and shading, while also providing habitat for amphibians, reptiles, small mammals, and birds.

The goals of the project include:

- Reducing erosion from within the Project Study Area;
- Restoring a channel that is able to properly transport watershed flows and sediment loads efficiently;
- Improving aquatic habitat;
- Enhancing wildlife habitat;
- Providing ecological corridor with native vegetation;
- Reducing direct nutrient inputs; and
- Improving overall water quality.

The objectives of the project include:

- Restore the stream channels to an appropriate dimension, pattern, and profile;
- Provide grade control in areas of streambed erosion;
- Provide the stream channels with an adequate flood prone area;
- Establish a more diverse bed morphology with riffle-pool sequences supported by in-stream structures;
- Create native riparian buffer and corridors; and
- Exclude cattle from the stream channels (fencing and watering facilities provided by Natural Resources Conservation Service (NRCS)).

As an important part of this project, the North Carolina Division of Mitigation Services (NCDMS) [formerly the Ecosystem Enhancement Program (NCEEP)] contracted with the Buncombe Soil and Water Conservation District (SWCD) to prepare a Farm Conservation Plan that identified and implemented agricultural and livestock Best Management Practices (BMPs) important for improving water quality. The farm plan and associated BMPs are intended to address water quality issues along Newfound Creek and unnamed tributaries through practices such as livestock exclusion, stabilizing heavy use areas, and enabling alternative watering systems, which will all help to ensure the long-term success of the Newfound Creek Stream Restoration Project. This farm plan included BMPs related to livestock watering (21 tanks and 2 drilled wells), fencing (21,000 linear feet), and stock trails (4,000 linear feet). All installed BMPs meet the standards and specifications of either the US Department of Agriculture Natural Resources Conservation Service Technical Guide or the Soil and Water Conservation Commission standards.

---

The Newfound Creek Stream Restoration site is located off of Browntown Road in western Buncombe County, North Carolina, in the Newfound Community near the town of Leicester (Figure 1). Newfound Creek and its unnamed tributaries are located in the French Broad River Basin, US Geological Survey (USGS) cataloging unit 06010105, hydrologic unit 06010105090020, and NC Division of Water Resources (NCDWR) subbasin 04-03-02. The total watershed area is 10.3 square miles and is characterized by steep slopes leading to a broad bottomland valley. The dominant land use in the watershed is forest, primarily on the surrounding ridges and steep slopes. As the slopes decrease, agricultural land uses increase. The majority of the valley floor has been cleared and is being used for agricultural and residential practices. The land uses directly adjacent to the project site are agricultural and residential. The conservation easement is bordered by agricultural fields that support beef cattle and row crops (mainly tomatoes). Prior to restoration, farming activities occurred right up to the streambank (including cattle access to the channel). Drainage ditches around the row crops discharged directly into Newfound Creek, and appeared to carry a large sediment load. Marjorie Lynn Brown owns all of the land bordering the conservation easement.

The project consists of a portion of Newfound Creek and six unnamed tributaries situated within 25.33 acres of Permanent Conservation Easement held by the State of North Carolina. The restored portion of Newfound Creek and six unnamed tributaries total 11,020 linear feet (Figure 2). The tributaries identified for this project are designated as: Tributary 3, Tributary 4, Tributary 5, Tributary 6, Tributary 7, and Tributary 8. Tributaries 3 through 6 and 8 flow directly into Newfound Creek. Tributary 7 flows into Round Hill Branch upstream of its confluence with Newfound Creek. The stream restoration project design was broken into 29 reaches (Figure 3). The six unnamed tributaries and mainstem (upstream and downstream of Newfound Road) will be used for monitoring purposes.

Tributaries 1 and 2 were located on an adjacent property and were initially considered for inclusion in the project. These tributaries were subsequently dropped from the project and do not enter the current Project Study Area. The original numbering of tributaries used in the early stages of project development has been maintained throughout the life of the project for consistency.

2015 Monitoring Year (MY) 4 monitoring indicates that the planted woody vegetation is doing poorly at the site. The site-wide average stem count is 225 stems/acre. Nine of the 14 planted plots (64%) are not meeting the success criteria of 260 stems/acre at MY5 (plots 1, 2, 3, 4, 5, 6, 7, 8, and 12). Streamside livestock survival is successful throughout all reaches and tributaries, but is not necessarily captured within the plot data as most vegetation plots include few livestock stems. Herbaceous vegetation, including goldenrod, joe pye weed, and tearthumb are thriving along the banks of the tributaries and mainstem. In many areas, the herbaceous cover is over five feet tall. Locating planted stems has become problematic in this dense vegetation, therefore survival rates may be better than reported. The banks and channels of some of the smaller tributaries have filled in with dense mats of vegetation, dominated by soft rush (*Juncuseffusus*). This is the case within Tributary 4, upstream of Browntown Road, Tributary 7, and Tributary 8.

Chinese privet (*Ligustrum sinense*) was noted along Tributaries 4 and 5 during MY1, and has remained present through MY4. Treatment for Chinese privet stems has occurred along

---

Tributary 4. Evidence of treatment is present near the crossing with Browntown Road. Cut stems were observed during MY3 and unvegetated plants were noted on the downstream end of Tributary 4 right below Browntown Road. VAC3b and VAC5 were removed during MY4 as no live privet was observed in these two areas. However, Chinese privet is still present in some of the treatment areas and a new population was observed at the head of Tributary 4 (VAC14) during MY4. Further, some unvegetated stems contained small amounts of new growth, indicating that treatment has not killed the stems. Another new population of privet was observed along Tributary 7 during MY4 (VAC15). Populations of multiflora rose (*Rosa multiflora*) were also noted during MY2 along Tributaries 4, 5, and 7.

Evidence of treatment is present along Tributary 7, and VAC11 was removed in MY3. VAC12 along Tributary 7 is still present and does not appear to have been treated. New occurrences of kudzu (*Pueraria lobata*) were noted at the top of the mainstem and on Tributary 4, at the crossing with Browntown Road, during MY2. The population along the mainstem was not observed during MY4. The population along Tributary 4 near Browntown Road has been destroyed in conjunction with Chinese privet treatments in that area. However, some live stems of privet are still present in the area as of MY4 (VAC10). Oriental bittersweet (*Celastrus orbiculatus*) was also noted in the canopy along Tributaries 3 and 4 during MY3. The presence and abundance of all invasive species will be monitored each year and any notable changes will be documented.

In MY4, the stream morphology components of the Newfound Creek Stream Restoration project are functioning reasonably well, although the lower portion of the main stem is making a few adjustments from past beaver activity. The majority of the bed features on the mainstem appear stable; though there is some aggradation in the vicinity of the Browntown Road bridge. The channel is dominated by riffles and runs, with most of the well-developed pools associated with structures. A few of the structures upstream of Browntown Road are now even with the channel bed and are not maintaining pools. The structures are largely stable and do not appear to be causing erosion or scour. There are several areas of bank erosion, some of them severe, which have been noted for reassessment during future monitoring efforts.

The mainstem (downstream of Browntown Road) was exhibiting a number of issues during Year 3 monitoring due to beaver activity (stem chews), beaver dams, beaver lodges, and irrigation ditches draining the adjacent tomato fields. Minor beaver activity was noted between sta 23+00 and 26+00, and a small dam is located at the end of the project just outside the project limits. The beaver dams and beaver lodge observed during Year 3 monitoring are no longer present. The channel is still recovering from the backwater effect these structures had on the system. Sediment is still present, especially from sta 38+50 downstream. The stream crossing has improved. The cross vane below the crossing is no longer buried. The drainage ditches noted during Year 3 monitoring have not been maintained and are now grown over with vegetation. The largest of the ditches (adjacent to cross section 9) is still present and draining the fields. Area of Concern 15 was removed, as the banks have stabilized and are supporting herbaceous and some woody vegetation.



---

The six tributaries were all functioning well and appear stable. Small headcuts were noted in Tributaries 4, 5, and 6. These will be monitored for any changes in severity from year to year. As noted above, streamside livestock are thriving, and along most tributaries are more than 15 feet tall. Stream surveying will be conducted after frost for MY5 to ensure that profile data will be obtainable.

Overall, the site is doing well. The fences that were constructed to exclude cattle are all in good condition except for those along the east side of Tributary 8. Cattle are accessing the easement along the tributary as evidenced by trampling of vegetation and several paths are starting to form.

Summary information/data related to the occurrence of such things as beaver or encroachment, and statistics related to performance of various project and monitoring elements can be found in the Newfound Creek Stream Restoration Mitigation Report (2012) and in the Mitigation Plan (formerly the Restoration Plan) documents available on NCDMS's website. All raw data supporting the tables and figures in the appendices are available from NCDMS upon request.

## **2.0 METHODOLOGY**

All monitoring methodologies follow the June 2012 *Procedural Guidance and Content Requirements for EEP Monitoring Reports* (EEP 2012). Coordinate information was collected in 2012 during the As-Built survey using a Topcon GTS 225 Total Station by Kee Mapping and Surveying. Stream and vegetation areas of concern were noted in the field on As-Built Plan Sheets (URS 2012). Permanent photo station photographs were taken from locations established during initial monitoring set-up, recorded by Kee Mapping and Surveying, and are shown on As-Built Plan Sheets and Current Condition Plan View Sheets.

### **2.1 STREAM METHODOLOGY**

The methods used to generate the data in this report are standard fluvial geomorphology techniques as described in *Applied River Morphology* (Rosgen 1996) and related publications from US Forest Service and the interagency Stream Mitigation Guidelines (USACE 2003). Field morphology survey for the mainstem and tributaries 3, 4, 7, and 8 was conducted using a survey grade GPS (Trimble TCS3 with an R8 Model 3 GNSS receiver). Surveys on tributary 5 were conducted using a standard measuring tape, transit level (Topcon AT-G6), and survey rod. On tributary 6 the reach above the culvert was surveyed using the transit level while the reach below the culvert was surveyed using the survey grade GPS. Data for the mainstem and tributaries were analyzed and displayed using the Reference Reach Spreadsheet, Version 4.2T (Mecklenburg 2006). The entirety of the mainstem portion of the Newfound Creek Stream Restoration site, tributary 3, 4, 6, 7, and 8 was surveyed during MY4. The longitudinal profile for tributary 5 began about 40 feet above cross-section 1. Pebble counts were conducted by sampling a total of 100 pebbles from the feature of the cross section (the entire riffle or pool). According to the most recent guidance issued in Rosgen courses, the pebble count was concentrated within the wetted perimeter of the channel and did not include the banks. Photographs were taken at each of the 28 cross sections. A photo was taken from the left bank towards the right bank and from the right bank towards the left bank.

---

## 2.2 VEGETATION METHODOLOGY

According to the 2008, Version 4.2 CVS-EEP Protocol for Recording Vegetation (Lee *et al* 2008), the Newfound Creek Stream Restoration Project requires the monitoring of 14 vegetation plots. These plots were established during initial monitoring set-up in 2012 and are shown on the As-Built Plan Sheets and Current Condition Plan View Sheets.

Vegetation monitoring methods followed the 2008, Version 4.2 CVS-EEP Protocol for Recording Vegetation (<http://cvs.bio.unc.edu/methods.htm>). Vegetation plot photographs were collected at the southwest corner of each vegetation plot. Vegetation monitoring plots were re-marked in the field by replacing all old flagging with new flagging. AECOM placed orange flagging at the southwest corner of each vegetation plot and blue flagging at the remaining corners. Planted stems were flagged in white. Volunteer/natural regeneration stems were inventoried, but not flagged. Monitoring taxonomy follows the US Department of Agriculture (USDA) Plants Database (USDA 2006). Stem height was measured with a folding one-meter ruler. Diameter at breast height (when applicable) was measured with calipers.

---

### 3.0 REFERENCES

EEP. 2012. Procedural Guidance and Content Requirements for EEP Monitoring Reports. Version 1.5, adopted June 8, 2012. NCDENR, NCEEP. 47pp.

Harman, W.H., Jennings, G.D., Patterson, J.M., Clinton, D.R., Slate, L.O., Jessup, A.G., Everhart, J.R., and R.E Smith. 1999. Bankfull Hydraulic Geometry Relationships for North Carolina Streams. AWRA Wildland Hydrology Symposium Proceedings. Edited By: D.S. Olsen and J.P. Potyondy. AWRA Summer Symposium. Bozeman, MT.

Lee, Michael T., Peek, Robert K., Roberts, Steven D., Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. (<http://cvs.bio.unc.edu/methods.htm>).

Mecklenburg, Dan. 2006. The Reference Reach Spreadsheet for Channel Survey Data Management. Version 4.2T. Ohio Department of Natural Resources.

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

USACE, Wilmington District, US Environmental Protection Agency, NC Wildlife Resources Commission, and NC Division of Water Quality. 2003. Stream Mitigation Guidelines. April 2003. 26 pp.

URS. 2008. Newfound Creek Stream Restoration Mitigation Report. Prepared by URS Corporation – North Carolina. Prepared for NC Ecosystem Enhancement Program. July 25, 2012.

URS. 2012. Newfound Creek Stream Restoration Project. Final Restoration Plan. Prepared by URS Corporation – North Carolina. Prepared for NC Ecosystem Enhancement Program. June 2008.

USDA. 2006. Plants Database. United States Department of Agriculture, Natural Resources Conservation Service. <http://plants.usda.gov>.

USGS. 2015a. Ivy River near Marshall, NC streamflow gage. USGS Real-Time Water Data. Gage 03453000. <http://waterdata.usgs.gov>.

USGS. 2015b. Pigeon River near Hepco, NC streamflow gage. USGS Real-Time Water Data. Gage 03459500. <http://waterdata.usgs.gov>.

NC CRONOS. 2015a. NC Climate Retrieval and Observations Network of the Southeast. State Climate Office of North Carolina. Station NC-BC-14 – Leicester 2 SE. <http://www.nc-climate.ncsu.edu/cronos>.

NC CRONOS. 2015b. NC Climate Retrieval and Observations Network of the Southeast. State Climate Office of North Carolina. Station NC-BC-73 – Leicester 0.9 SE. <http://www.nc-climate.ncsu.edu/cronos>.

---

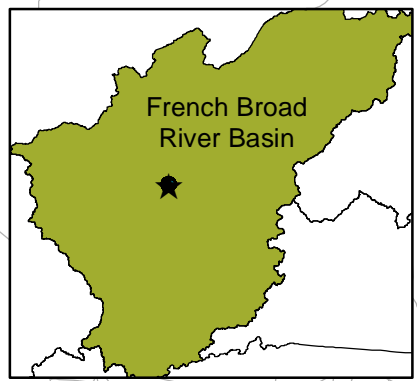
## **Appendices for Project Background, Condition, and Performance Data**

---

**Appendix A: Project Vicinity Map and Background Tables**

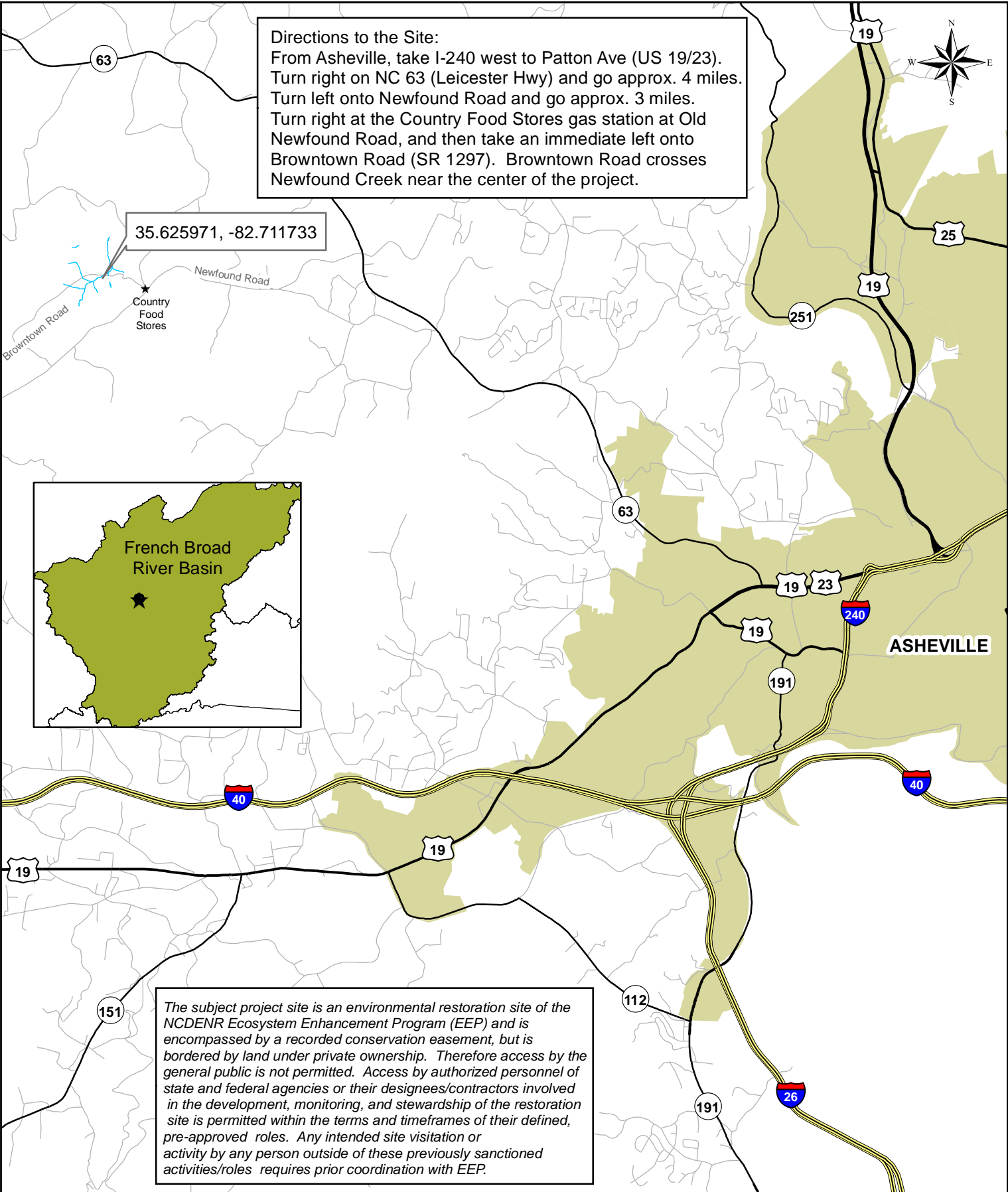
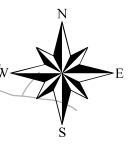
**Directions to the Site:**  
 From Asheville, take I-240 west to Patton Ave (US 19/23). Turn right on NC 63 (Leicester Hwy) and go approx. 4 miles. Turn left onto Newfound Road and go approx. 3 miles. Turn right at the Country Food Stores gas station at Old Newfound Road, and then take an immediate left onto Browntown Road (SR 1297). Browntown Road crosses Newfound Creek near the center of the project.


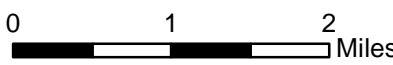
35.625971, -82.711733



*The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. 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, monitoring, and stewardship of the restoration site is permitted within the terms and timeframes of their defined, pre-approved roles. Any intended site visitation or activity by any person outside of these previously sanctioned activities/roles requires prior coordination with EEP.*


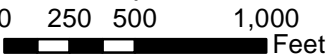
ASHEVILLE

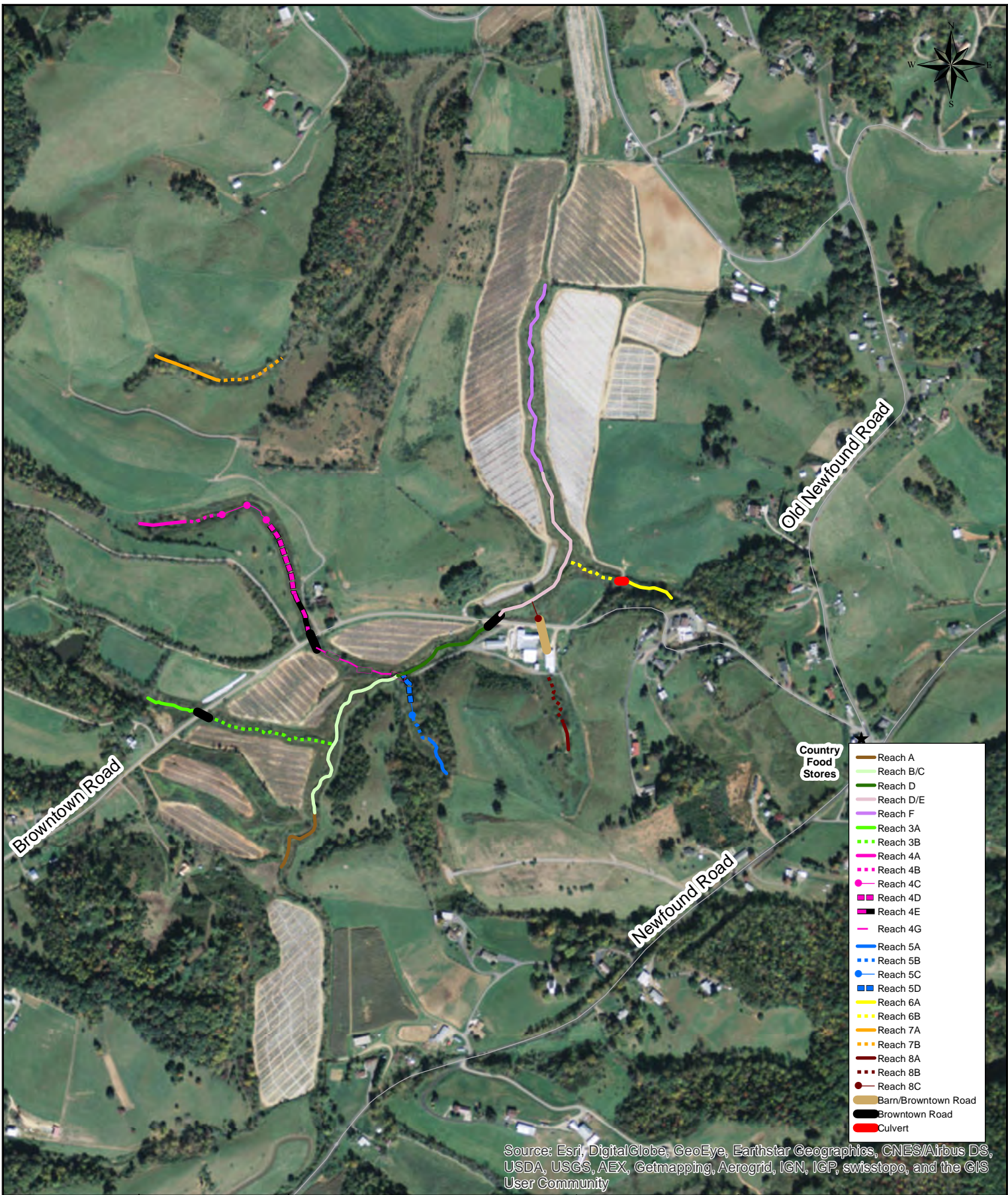


<p><b>Prepared By:</b>          AECOM          701 Corporate Center Drive,          Suite 475          Raleigh, NC 27607          Phone: 919-854-6200          Fax: 919-854-6259</p>	<p><b>Prepared For:</b>          NCDEQ          Division of Mitigation Services</p> 	<p><b>Project:</b> Newfound Creek Stream Restoration          Buncombe County, NC          CU 06010105</p> <p><b>Project Number:</b> 92497</p> <p><b>Date:</b> November 2015</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Project Reach</li> <li><span style="border-bottom: 2px solid black; width: 20px; display: inline-block;"></span> Interstate</li> <li><span style="border-bottom: 2px solid gray; width: 20px; display: inline-block;"></span> US Hwy</li> <li><span style="border-bottom: 2px solid black; width: 20px; display: inline-block;"></span> NC Hwy</li> <li><span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> Local Road</li> <li><span style="background-color: #d4edda; width: 20px; height: 10px; display: inline-block;"></span> Municipal Boundary</li> </ul>	<p><b>Figure 1</b>          Project Vicinity</p> 
--	---	--	---	--





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

<p><b>Prepared By:</b> AECOM 701 Corporate Center Drive Suite 475 Raleigh, NC 27607 Phone: 919-854-6200 Fax: 919-854-6259</p>	<p><b>Prepared For:</b> NCDEQ Division of Mitigation Services</p> 	<p><b>Project:</b> Newfound Creek Stream Restoration Buncombe County, NC CU 06010105</p> <p><b>Project Number:</b> 92497</p> <p><b>Date:</b> November 2015</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Project Reach</li> <li><span style="border-bottom: 1px dashed yellow; width: 20px; display: inline-block;"></span> Conservation Easement</li> <li><span style="border: 1px solid green; width: 20px; display: inline-block;"></span> Municipal Boundary</li> </ul>	<p style="text-align: center;"><b>Figure 2</b> Project Site</p> <p style="text-align: center;">0 250 500 1,000 Feet</p> 
---	---	--	--	---



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

<p><b>Prepared By:</b> AECOM 701 Corporate Center Drive Suite 475 Raleigh, NC 27607 Phone: 919-854-6200 Fax: 919-854-6259</p>	<p><b>Prepared For:</b> NCDEQ Division of Mitigation Services</p> 	<p><b>Project:</b> Newfound Creek Stream Restoration Buncombe County, NC CU 06010105</p> <table border="1"> <tr> <td data-bbox="483 1969 688 2041"><b>Project Number:</b> 92497</td> <td data-bbox="688 1969 919 2041"><b>Date:</b> November 2015</td> </tr> </table>	<b>Project Number:</b> 92497	<b>Date:</b> November 2015	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li> Interstate</li> <li> US Hwy</li> <li> NC Hwy</li> <li> Local Road</li> </ul>	<p><b>Figure 3</b> Restoration Reaches</p> <p>0 250 500 1,000 Feet</p> 
<b>Project Number:</b> 92497	<b>Date:</b> November 2015					



**Table 1: Project Components and Mitigation Credits**

Newfound Creek Stream Restoration Project									
DMS Project Number 92497									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen	Phosphorous Nutrient Offset
	R	RE	R	RE	R	RE		Nutrient Offset	
Type	R	RE	R	RE	R	RE			
Totals	<b>7,998</b>			<b>0.35</b>					
Project Components									
Project Component -or- Reach ID	Stationing/Location	Existing Footage or Acreage	Approach		Level (P1, P2, P3, EI, EII etc)	Restoration Footage or Acreage	Mitigation Ratio		
			(Restoration, Enhancement, etc.)						
Mainstem A	0+00 - 2+95	450	Enhancement		E I	295	1.5 to 1		
Mainstem B/C	2+95 - 20+10	1,050	Restoration		P2	1,715	1 to 1		
Mainstem D	20+10 - 20+90	500	Enhancement		E I	80	1.5 to 1		
Mainstem D/E	21+80 - 29+15	1,300	Enhancement		E I	735	1.5 to 1		
Mainstem F	29+15 - 45+00	1,100	Restoration		P2	1,585	1 to 1		
Tributary 3A	0+00 - 2+95	300	Enhancement		E I	295	1.5 to 1		
Tributary 3B	3+73 - 11+25	760	Restoration		P2	752	1 to 1		
Tributary 4B	0+00 - 2+25	225	Restoration		P2	225	1 to 1		
Tributary 4C	2+25 - 5+25	350	Enhancement		E I	300	1.5 to 1		
Tributary 4D	5+25 - 9+70	425	Enhancement		E II	445	2.5 to 1		
Tributary 4E	9+70 - 12+35	250	Enhancement		E I	265	1.5 to 1		
Tributary 4G	13+10 - 18+32	340	Restoration		P2	522	1 to 1		
Tributary 5A	0+00 - 2+25	225	Enhancement		E II	225	2.5 to 1		
Tributary 5B	2+25 - 4+25	200	Restoration		P2	200	1 to 1		
Tributary 5C	4+25 - 5+00	75	Enhancement		E II	75	2.5 to 1		
Tributary 5D	5+00 - 6+75	175	Enhancement		E I	175	1.5 to 1		
Tributary 6A	0+00 - 3+15	300	Enhancement		E II	315	2.5 to 1		
Tributary 6B	3+55 - 7+18	300	Restoration		P2	363	1 to 1		

Tributary 7A	0+00	0	Enhancement	E II	100	2.5 to 1
Tributary 7B	0+00 - 3+80	400	Enhancement	E I	380	1.5 to 1
Tributary 8A	-2+15 - 0+15	100	Enhancement	E II	200	2.5 to 1
Tributary 8B	0+15 - 3+42	460	Restoration	P3	357	1 to 1
Tributary 8C	13+45 - 14+75	120	Enhancement	E II	130	2.5 to 1
Wetland A		0.26	Enhancement		0.26	2 to 1
Wetland B/C		0.46	Enhancement		0.44	2 to 1

**Component Summation**

Mitigation Component	Stream	Riparian Wetland		Non-riparian Wetland	Buffer	Upland
	(linear feet)	(acres)		(acres)	(square feet)	(acres)
		Riverine	Non-Riverine			
Restoration	5,719.00					
Enhancement*		0.70				
Enhancement I	2,525.00					
Enhancement II	1,490.00					
Creation						
Preservation*						
High Quality Preservation						
<b>Totals</b>	9,734	0.70				

\*indicative of a Restoration Equivalent (RE) mitigation class

**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; FB = Forested Buffer

**Table 2: Project Activity and Reporting History**

<b>Newfound Creek Stream Restoration Project</b> <b>DMS Project Number 92497</b>		
<b>Elapsed Time Since Grading Complete: 4 yrs 0 months</b> <b>Elapsed Time Since Planting Complete: 3 yrs 9 months</b> <b>Number of Reporting Years: 4</b>		
<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	February 2007	June 2008
Final Design – Construction Plans	February 2007	July 2007
Construction	N/A	October 2011
Planting	N/A	January 2012
Mitigation Report / As-built	January 2012	July 2012
Year 1 Monitoring	February 2013	June 2013
Year 2 Monitoring	October 2013	November 2013
Year 3 Monitoring	October 2014	November 2014
Year 4 Monitoring	November 2015	March 2016
Year 5 Monitoring		

**Table 3: Project Contacts Table**

<b>Newfound Creek Stream Restoration</b>	
<b>DMS Project Number 92497</b>	
<b>Designer</b>	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Primary project design POC	Kathleen McKeithan 919-461-1597
<b>Construction Contractor</b>	Eagle Wood, Inc. PO Box 1046 Denver, NC 28037
Construction contractor POC	Bill Anderson 704-483-5853
<b>Survey Contractor</b>	Kee Mapping and Surveying PO Box 2566 Asheville, NC 28802
Survey contractor POC	Brad Kee 828-645-8275
<b>Planting Contractor</b>	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273
Planting contractor POC	Gregg Antemann 704-527-1177
<b>Seeding Contractor</b>	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273
Contractor point of contact	Gregg Antemann 704-527-1177
<b>Seed Mix Sources</b>	Green Resource, Colfax NC 336-855-6363
<b>Nursery Stock Suppliers</b>	Cumberland Mountain Nursery 357 Middle Ridge Road Beersheba Springs, TN 37305 931-692-2164
<b>Monitoring Performers – MY1</b>	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Stream Monitoring POC	Kathleen McKeithan 919-461-1597
Vegetation Monitoring POC	Susan Westberry 910-343-5994
Wetland Monitoring POC	Susan Westberry 910-343-5994
<b>Monitoring Performers – MY2, MY3</b>	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Stream Monitoring POC	Melissa Bauguess 828-226-1790
Vegetation Monitoring POC	Susan Westberry 910-343-5994
Wetland Monitoring POC	Susan Westberry 910-343-5994

---

<b>Monitoring Performers – MY4</b>	AECOM Corporation - North Carolina 701 Corporate Center Drive, Suite 475 Morrisville, NC 27560
Stream Monitoring POC	Ron Johnson 919-654-6210
Vegetation Monitoring POC	Ron Johnson 919-654-6210
Wetland Monitoring POC	Ron Johnson 919-654-6210

**Table 4: Project Attribute Table**

Newfound Creek Stream Restoration								
DMS Project Number 92497								
Project Information								
Project Name	Newfound Creek Stream Restoration							
County	Buncombe							
Project Area (acres)	25.33							
Project Coordinates (latitude and longitude)	35.625971, -82.711733							
Project Watershed Summary Information								
Physiographic Province	Mountain							
River Basin	French Broad							
USGS Hydrologic Unit 8-digit	06010105							
USGS Hydrologic Unit 14-digit	06010105090020							
DWQ Sub-basin	04-03-02							
Project Drainage Area (acres)	6,620							
Project Drainage Area Percentage of Impervious Area	U							
CGIA Land Use Classification	U							
Reach Summary Information								
Parameters	Mainstem Part I	Mainstem Part II	Tributary 3	Tributary 4	Tributary 5	Tributary 6	Tributary 7	Tributary 8
Length of Reach (linear feet)	2,090	2,320	1,047	1,757	675	678	480	687
Valley Classification	VIII	VIII	VIII	II	II	VIII	VIII	VIII
Drainage Area (acres)	6,620		70	70	45	51	32	26
NCDWQ Stream Identification Score	44		31.5	33.5	40.5	38	33	32.5
NCDWQ Water Quality Classification	C	C	C	C	C	C	C	C
Parameters	Mainstem Part I	Mainstem Part II	Tributary 3	Tributary 4	Tributary 5	Tributary 6	Tributary 7	Tributary 8
Morphological Description (stream type)	C4/1	B4/1	G5/F5	A5/G5/B5/E5	E4b/G4/B4/E4	B4/E5	E5	G5/E5
Evolutionary Trend	C->C	B->C	G/F->B	A/G/B/E->E	E/G/B/E->Eb	B/E->E	E->E	G/E->E
Underlying Mapped Soils	French Loam, 0-3%	French Loam, 0-3%	Tate Loam 2-8%	Evard-Cowee Complex 30-50%	Evard-Cowee Complex 30-50%	Tate Loam 2-8%	Tate Loam 8-15%	Tate Loam 8-15%
Drainage Class	Somewhat Poorly	Somewhat Poorly	Well Drained	Well Drained	Well Drained	Well Drained	Well Drained	Well Drained

Soil Hydric Status	Hydric B	Hydric B	Non-Hydric	Non-Hydric	Non-Hydric	Non-Hydric	Non-Hydric	Non-Hydric
Slope	0.0076	0.0054	0.024	0.0373	0.0625	0.0387	0.0416	0.0499
FEMA Classification	Detailed Study	Detailed Study	N/A	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Agriculture	Agriculture	Agriculture	Agriculture/Livestock pasture grass	Forest/Livestock pasture grass	Agriculture/Livestock pasture grass	Livestock pasture grass	Livestock pasture grass
<b>Wetland Summary Information</b>								
Parameters	Wetland A		Wetland B/C					
Size of Wetland (acres)	0.26		0.44					
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Riparian Riverine		Riparian Riverine					
Mapped Soil Series	Tate Loam, 8-15%		Tate Loam, 8-15%					
Drainage Class	Very Deep, Well Drained		Very Deep, Well Drained					
Soil Hydric Status	Non-Hydric		Non-Hydric					
Source of Hydrology	Seep		Stream Channel					
Hydrologic Impairment	None		Pond Berm					
Native Vegetation Community	Scrub-Shrub		Emergent					
Percent Composition of Exotic Invasive Vegetation	U		U					
<b>Regulatory Considerations</b>								
Regulation	Applicable?	Resolved?	Supporting Documentation					
Waters of the United States - Section 404	Yes	Jul-07	Restoration Plan					
Waters of the United States - Section 401	Yes	Feb-07	Restoration Plan					
Endangered Species Act	Yes	Jul-07	Restoration Plan					
Historic Preservation Act	Yes	Jul-07	Restoration Plan					
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A					
FEMA Floodplain Compliance	Yes	Ongoing	LOMR submitted November 2012					
Essential Fisheries Habitat	Yes	Jan-07	Restoration Plan					

---

This page left intentionally blank



---

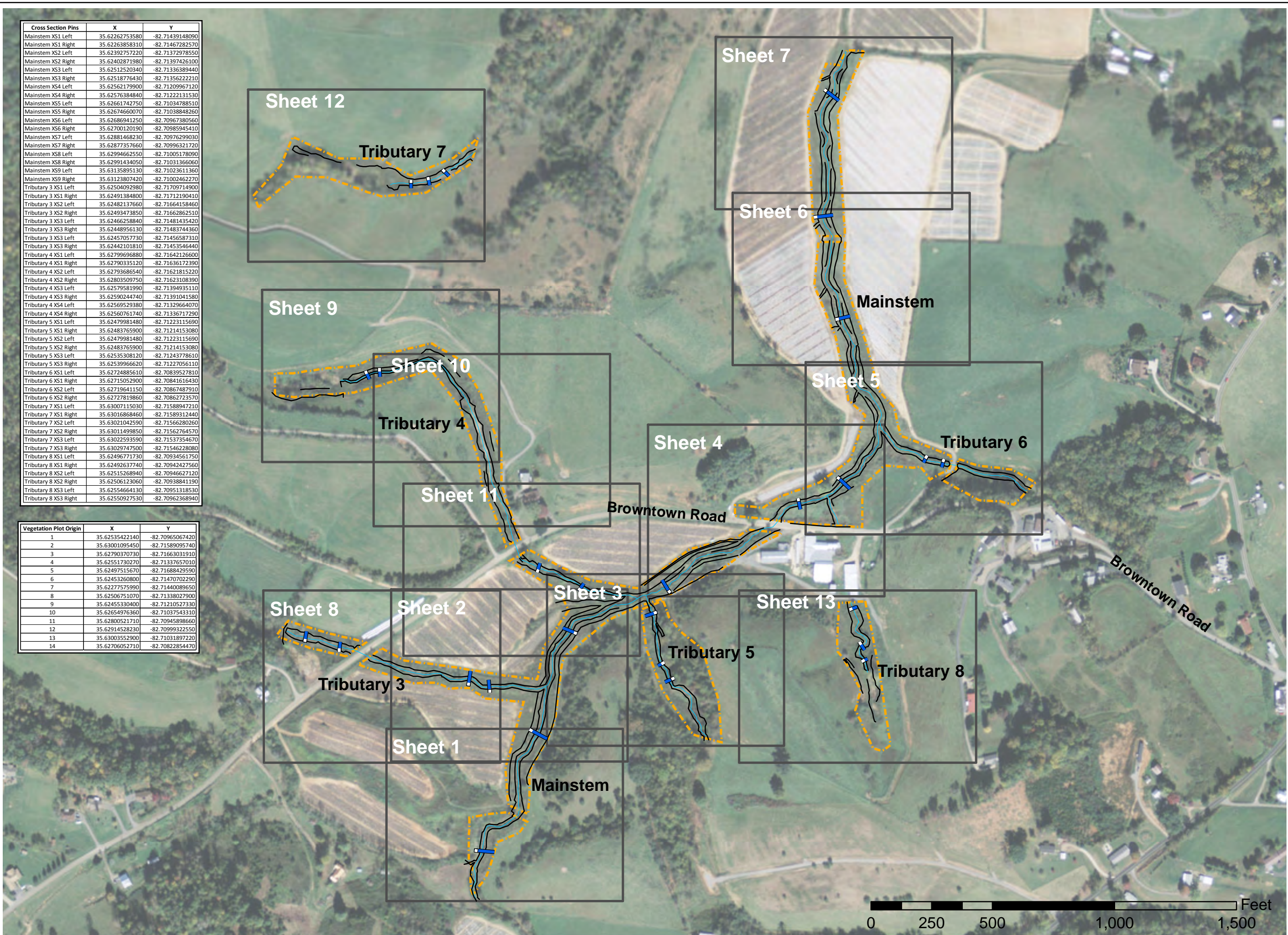
**Appendix B: Visual Assessment Data**

---

This page left intentionally blank

Cross Section Pins	X	Y
Mainstem XS1 Left	35.62262753580	-82.71439148090
Mainstem XS1 Right	35.62263858310	-82.71467282570
Mainstem XS2 Left	35.62392757220	-82.71372978550
Mainstem XS2 Right	35.62402871980	-82.71397426100
Mainstem XS3 Left	35.62512520340	-82.71336389440
Mainstem XS3 Right	35.62518776430	-82.71356222210
Mainstem XS4 Left	35.62562179900	-82.71209967120
Mainstem XS4 Right	35.62576384840	-82.71222131530
Mainstem XS5 Left	35.62661742750	-82.71034788510
Mainstem XS5 Right	35.62674660070	-82.71038848260
Mainstem XS6 Left	35.62686941250	-82.70967380560
Mainstem XS6 Right	35.62700120190	-82.70985945410
Mainstem XS7 Left	35.62881468230	-82.70976299030
Mainstem XS7 Right	35.62877357660	-82.70996321720
Mainstem XS8 Left	35.62994662550	-82.71005178090
Mainstem XS8 Right	35.62991434050	-82.71031366060
Mainstem XS9 Left	35.63135895130	-82.71023611360
Mainstem XS9 Right	35.63123807420	-82.71002462270
Tributary 3 XS1 Left	35.62504092980	-82.71709714900
Tributary 3 XS1 Right	35.62491384800	-82.71712190410
Tributary 3 XS2 Left	35.62482137660	-82.71664158460
Tributary 3 XS2 Right	35.62493473850	-82.71662862510
Tributary 3 XS3 Left	35.62466258840	-82.71481435420
Tributary 3 XS3 Right	35.62448956130	-82.71483744360
Tributary 3 XS4 Left	35.62457057730	-82.71456587310
Tributary 3 XS4 Right	35.62442101810	-82.71453546440
Tributary 4 XS1 Left	35.62799696880	-82.71642126600
Tributary 4 XS1 Right	35.62790335120	-82.71636172390
Tributary 4 XS2 Left	35.62793686540	-82.71621815220
Tributary 4 XS2 Right	35.62803509750	-82.71623108390
Tributary 4 XS3 Left	35.62579581990	-82.71394935110
Tributary 4 XS3 Right	35.62590244740	-82.71391041580
Tributary 4 XS4 Left	35.62569529380	-82.71329664070
Tributary 4 XS4 Right	35.62560761740	-82.71336717290
Tributary 5 XS1 Left	35.62479981480	-82.71223115690
Tributary 5 XS1 Right	35.62483765900	-82.71214153080
Tributary 5 XS2 Left	35.62479981480	-82.71223115690
Tributary 5 XS2 Right	35.62483765900	-82.71214153080
Tributary 5 XS3 Left	35.62535308120	-82.71243778610
Tributary 5 XS3 Right	35.62539966620	-82.71227056110
Tributary 6 XS1 Left	35.62724885610	-82.70839527810
Tributary 6 XS1 Right	35.62715052900	-82.70841616430
Tributary 6 XS2 Left	35.62719641150	-82.70867487910
Tributary 6 XS2 Right	35.62727819860	-82.70862723570
Tributary 7 XS1 Left	35.63007115030	-82.71588947210
Tributary 7 XS1 Right	35.63016868460	-82.71589312440
Tributary 7 XS2 Left	35.63021042590	-82.71566280260
Tributary 7 XS2 Right	35.63011499850	-82.71562764570
Tributary 7 XS3 Left	35.63022593590	-82.71537354670
Tributary 7 XS3 Right	35.63029747500	-82.71546228080
Tributary 8 XS1 Left	35.62496771730	-82.70934561750
Tributary 8 XS1 Right	35.62492637740	-82.70942427560
Tributary 8 XS2 Left	35.62515268940	-82.70946627120
Tributary 8 XS2 Right	35.62506123060	-82.70938841190
Tributary 8 XS3 Left	35.62554664130	-82.70951318530
Tributary 8 XS3 Right	35.62550927530	-82.70962368940

Vegetation Plot Origin	X	Y
1	35.62535422140	-82.70965067420
2	35.63001095450	-82.71589095740
3	35.62790370730	-82.71663031910
4	35.62551730270	-82.71337657010
5	35.62497515670	-82.71688429590
6	35.62453260800	-82.71470702290
7	35.62277575990	-82.71440089650
8	35.62506751070	-82.71338027900
9	35.62455330400	-82.71210527330
10	35.62654976360	-82.71037543310
11	35.62800521710	-82.70945898660
12	35.62914528230	-82.70999322550
13	35.63003552900	-82.71031897220
14	35.62706052710	-82.70822854470



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services






**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105


**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

**Legend**

-  Conservation Easement
-  Top of Bank
-  Thalweg
-  Cross Section



2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

Current Condition  
 Plan View  
 Overview

**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

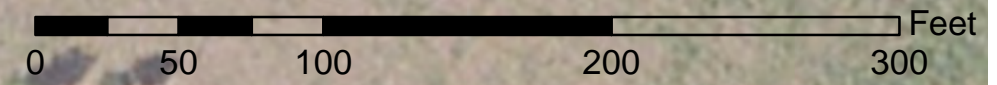
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 1**



Browntown Road

VP4

AC31

Crest Gauge 1

VP8

Mainstem

PS36,37

AC7

AC22

PS38

Tributary 3

PS29,30

VP6

AC5

PS34,35


AC3

AC4

M-2

This irrigation hose that was in this area in previous years has been removed

Prepared By:  
AECOM  
701 Corporate Center Drive  
Suite 475  
Raleigh, NC 27607 Phone:  
919-854-6200 Fax:  
919-854-6259










Prepared For:  
NCDEQ  
Division of Mitigation Services  




Project:  
Newfound Creek  
Stream Restoration  
Buncombe County, NC  
CU 06010105




Monitoring Year:  
4 (2015)




Project Number:  
92497

Date:  
November 2015

Legend  
 Conservation Easement  
 5-Foot Contour Lines  
 Top of Bank  
 Thalweg  
 Cross Section  
 Stream Stations  
 Photo Stations  
 In-Stream Structures  
 In-Stream Structure Condition

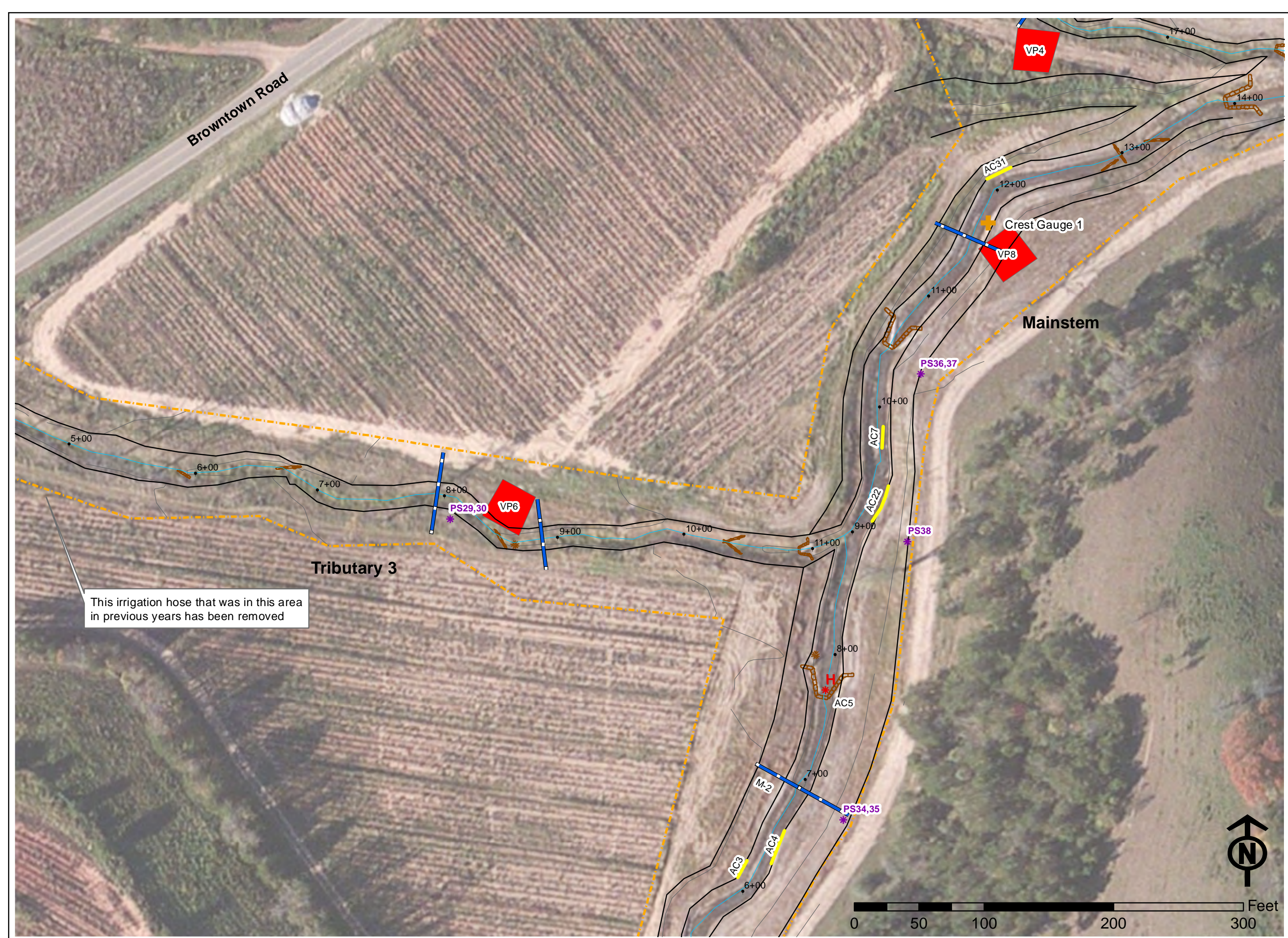
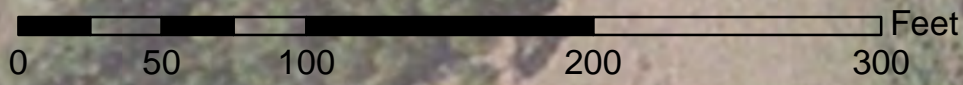
Vegetation Plot  
 Success Criteria Met  
 Success Criteria Not Met

Bed/Bank Area of Concern  
 Scoured/Eroding Bank  
 Mass Wasting  
 Degradation/Headcut

Vegetation Area of Concern  
 Invasive Population  
 Low Stem Density Area  
 Cattle Encroachment

2012 Aerial  
Orthophotography  
(Source: ESRI Basemap)

Current Condition  
Plan View  
Sheet 2



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

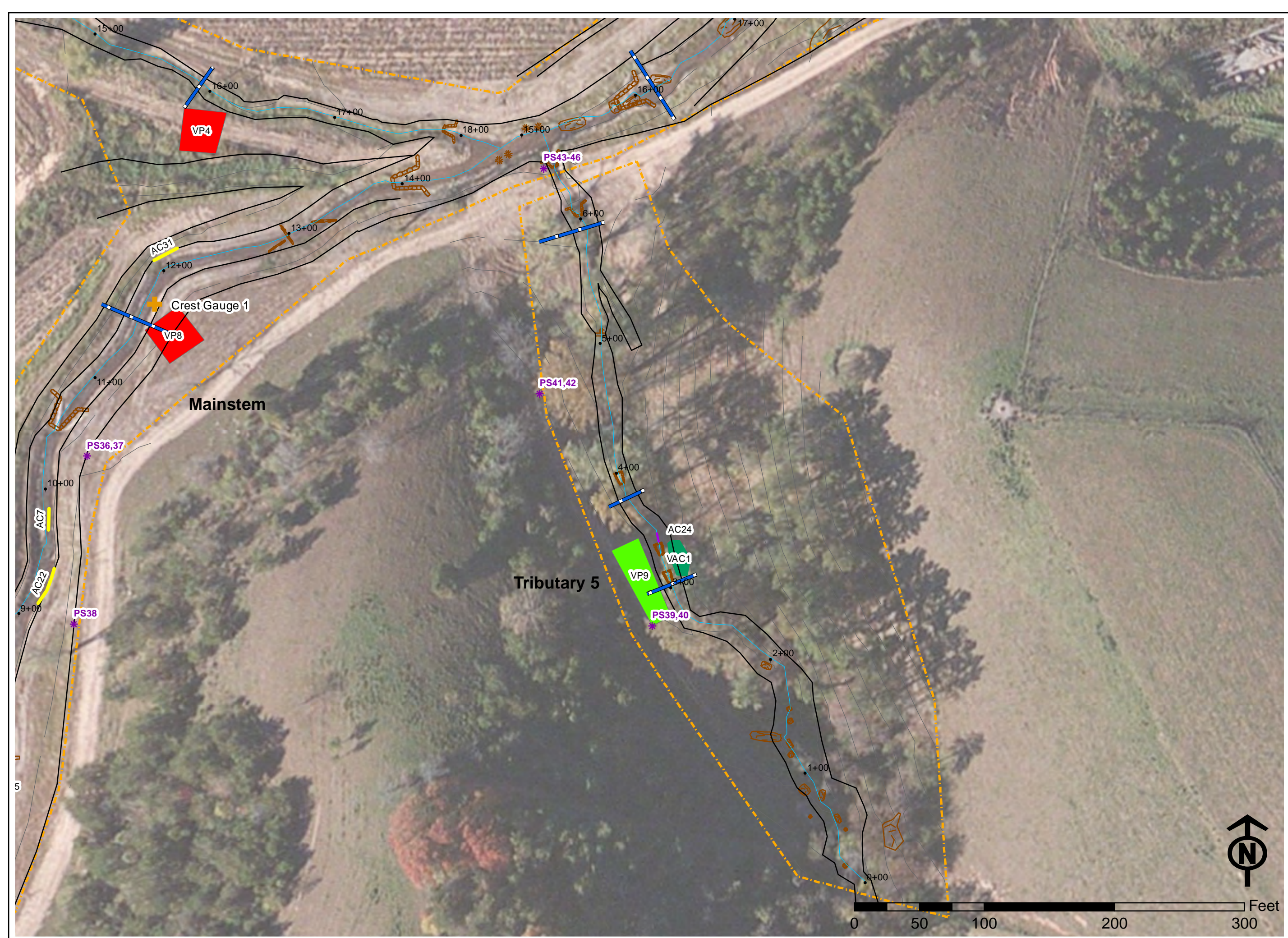
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 3**



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

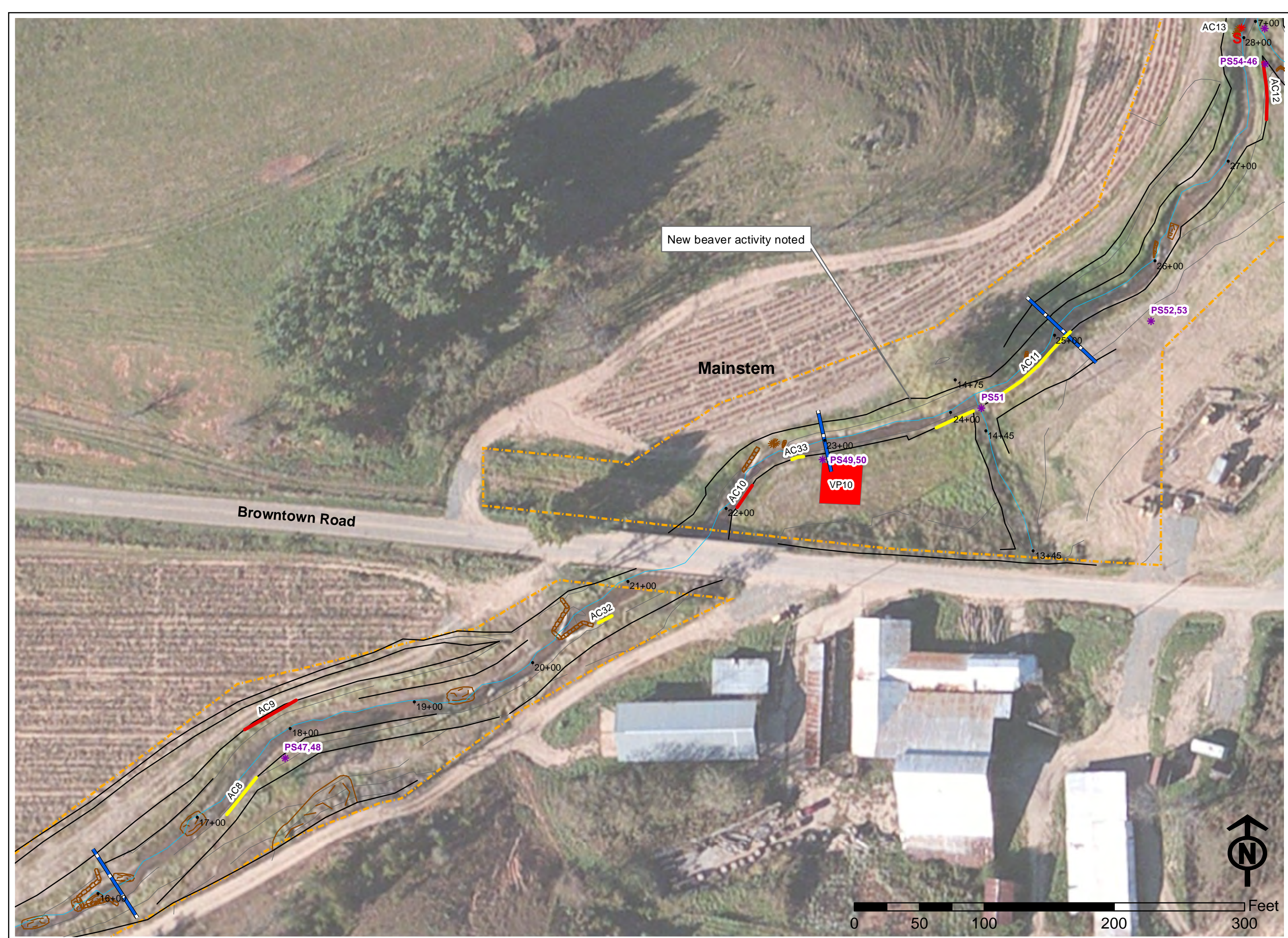
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 4**



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 5**





**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

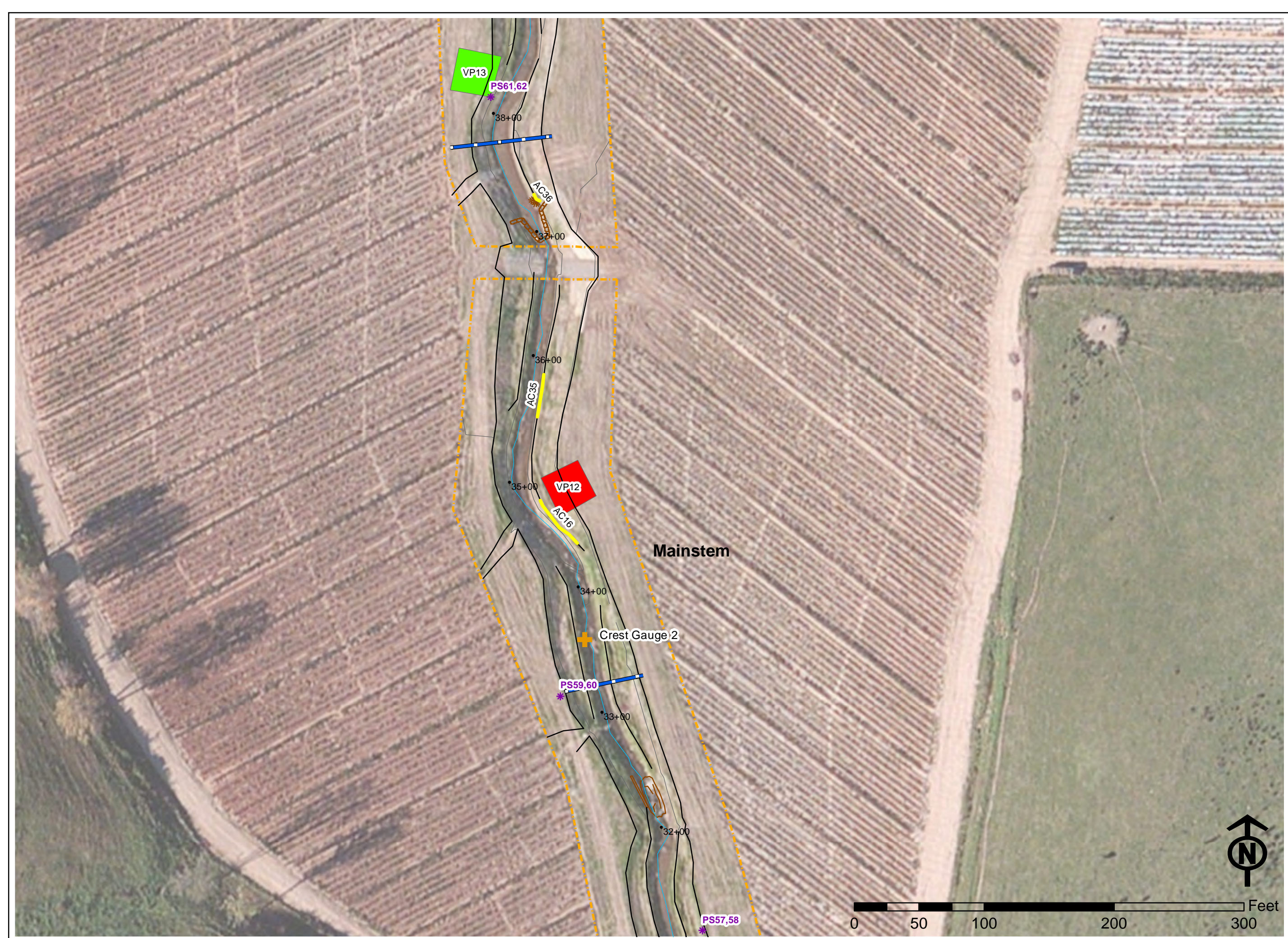
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 6**



**Prepared By:**  
AECOM  
701 Corporate Center Drive  
Suite 475  
Raleigh, NC 27607 Phone:  
919-854-6200 Fax:  
919-854-6259

**Prepared For:**  
NCDEQ  
Division of Mitigation Services



**Project:**  
Newfound Creek  
Stream Restoration  
Buncombe County, NC  
CU 06010105

**Monitoring Year:**  
4 (2015)

**Project Number:**  
92497

**Date:**  
November 2015

**Legend**

- Conservation Easement
- 5-Foot Contour Lines
- Top of Bank
- Thalweg
- Cross Section
- Stream Stations
- Photo Stations
- In-Stream Structures
- In-Stream Structure Condition

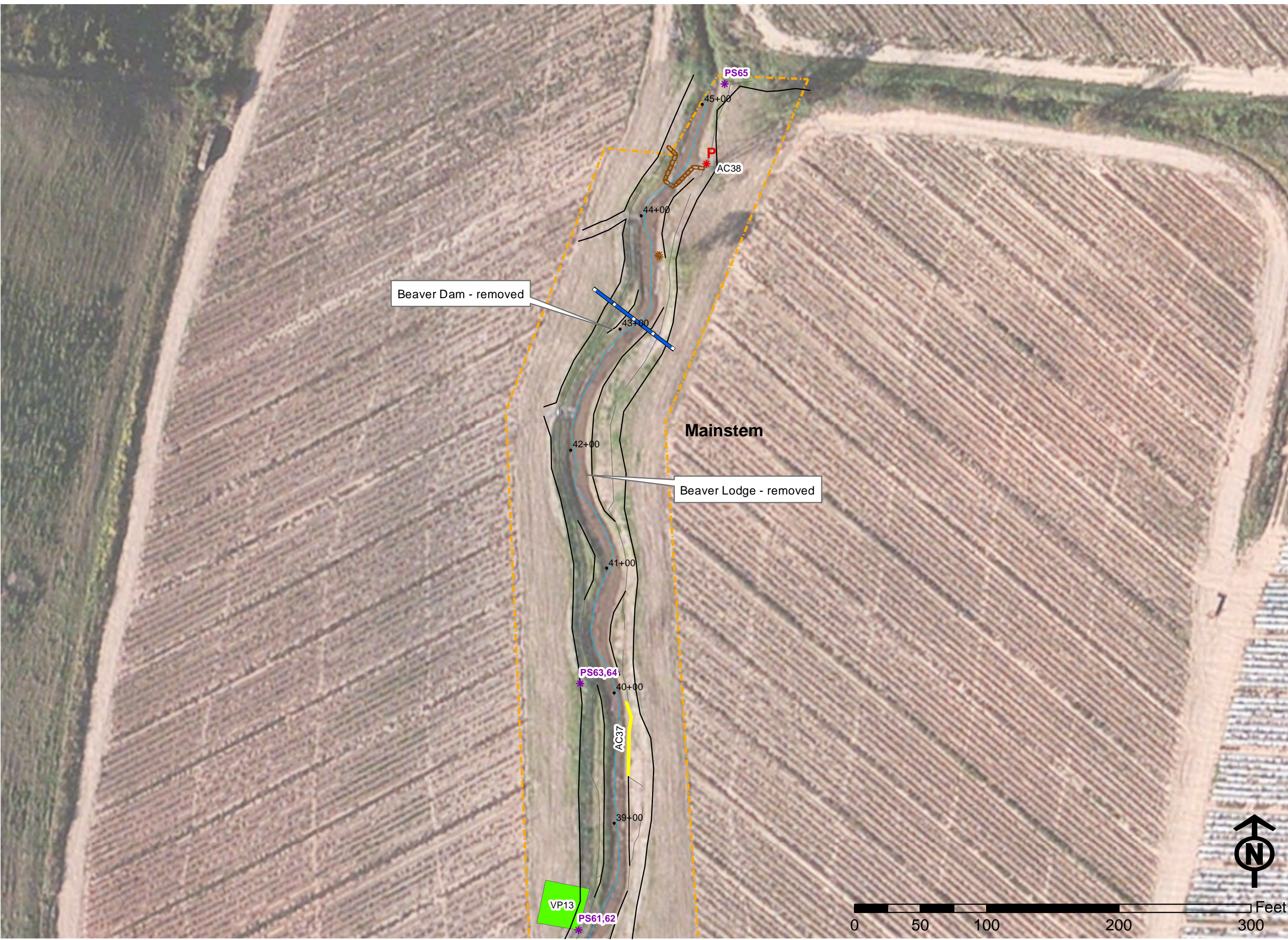
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
Orthophotography  
(Source: ESRI Basemap)

**Current Condition  
Plan View  
Sheet 7**



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 8**

Browntown Road

Tributary 3

Tributary 3

AC20

This irrigation hose that was in this area  
 in previous years has been removed

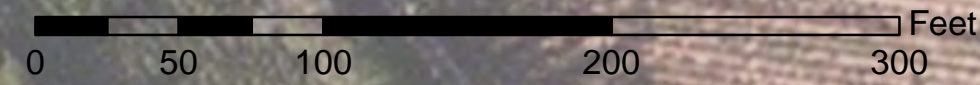
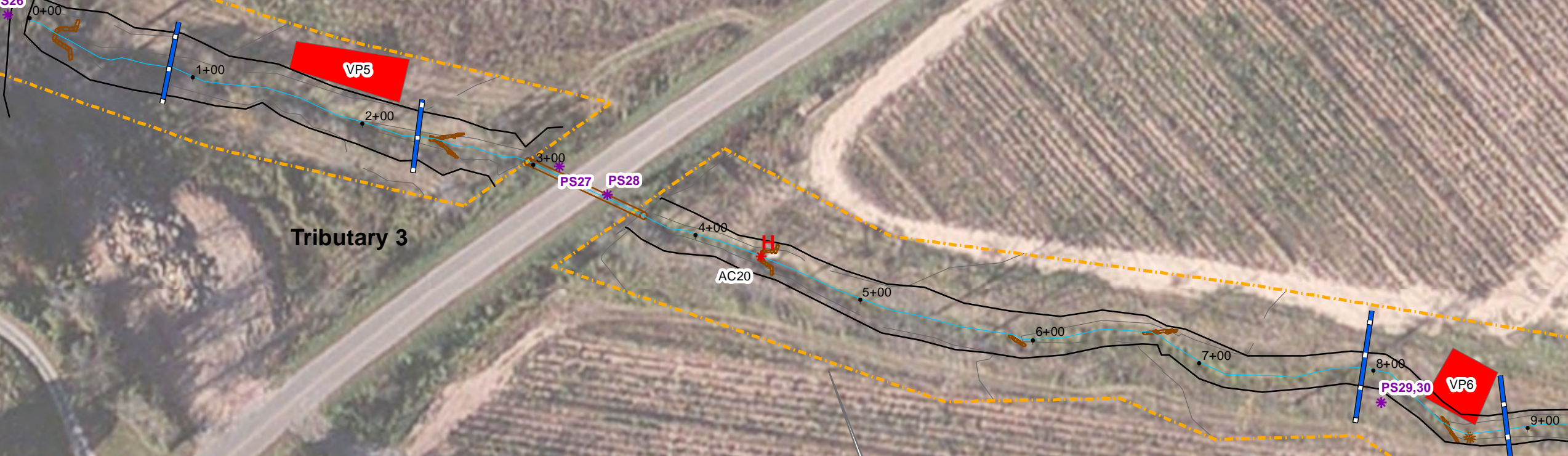
PS26

VP5

PS27 PS28

PS29,30

VP6



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

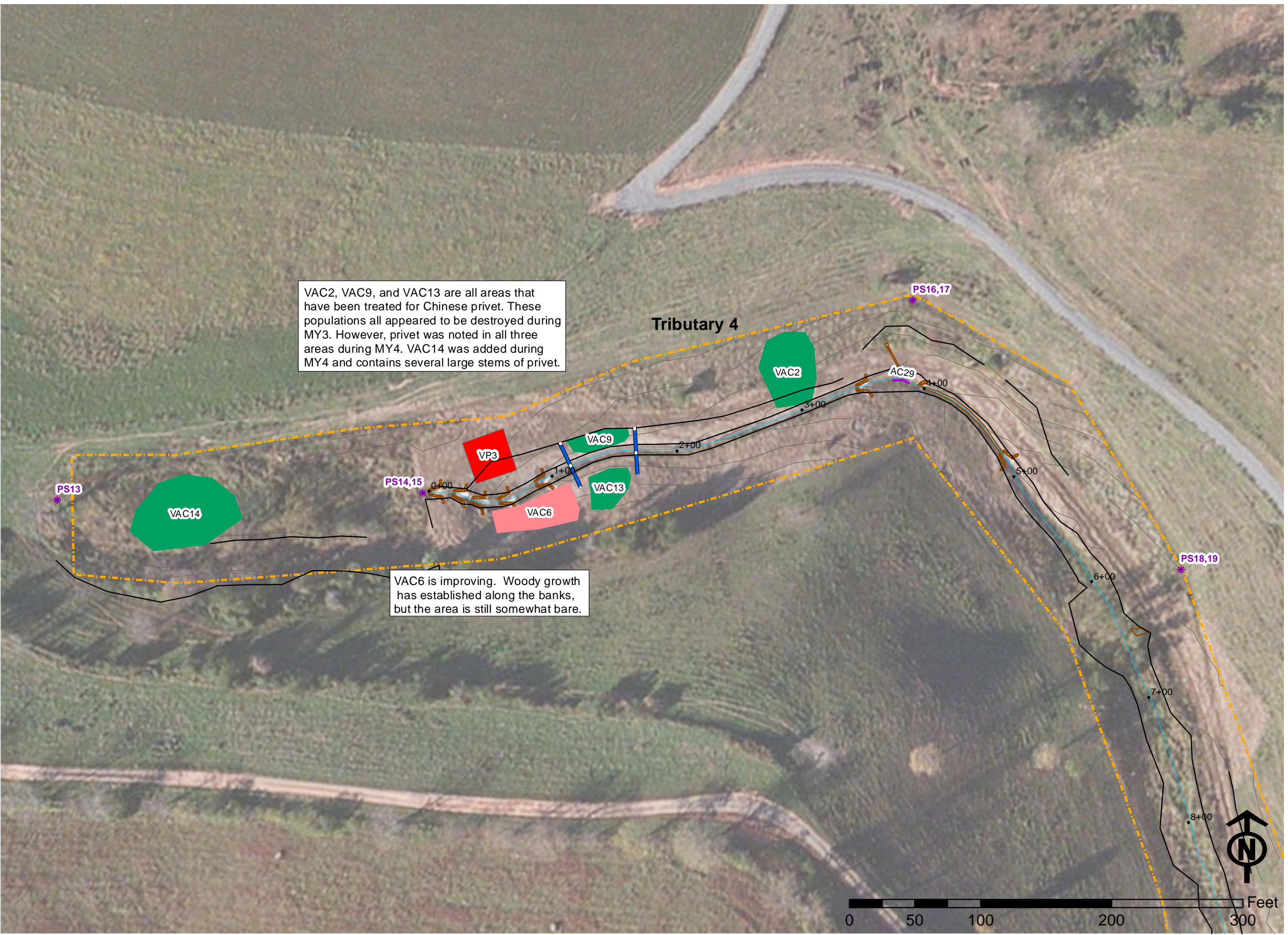
- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 9**

VAC2, VAC9, and VAC13 are all areas that have been treated for Chinese privet. These populations all appeared to be destroyed during MY3. However, privet was noted in all three areas during MY4. VAC14 was added during MY4 and contains several large stems of privet.

VAC6 is improving. Woody growth has established along the banks, but the area is still somewhat bare.



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

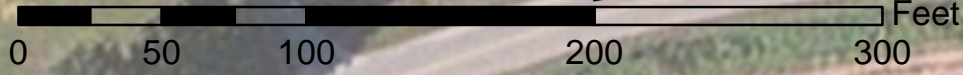
- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 10**



VAC3 has been treated for Chinese privet, but several stems were still noted in this area during MY4.



**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

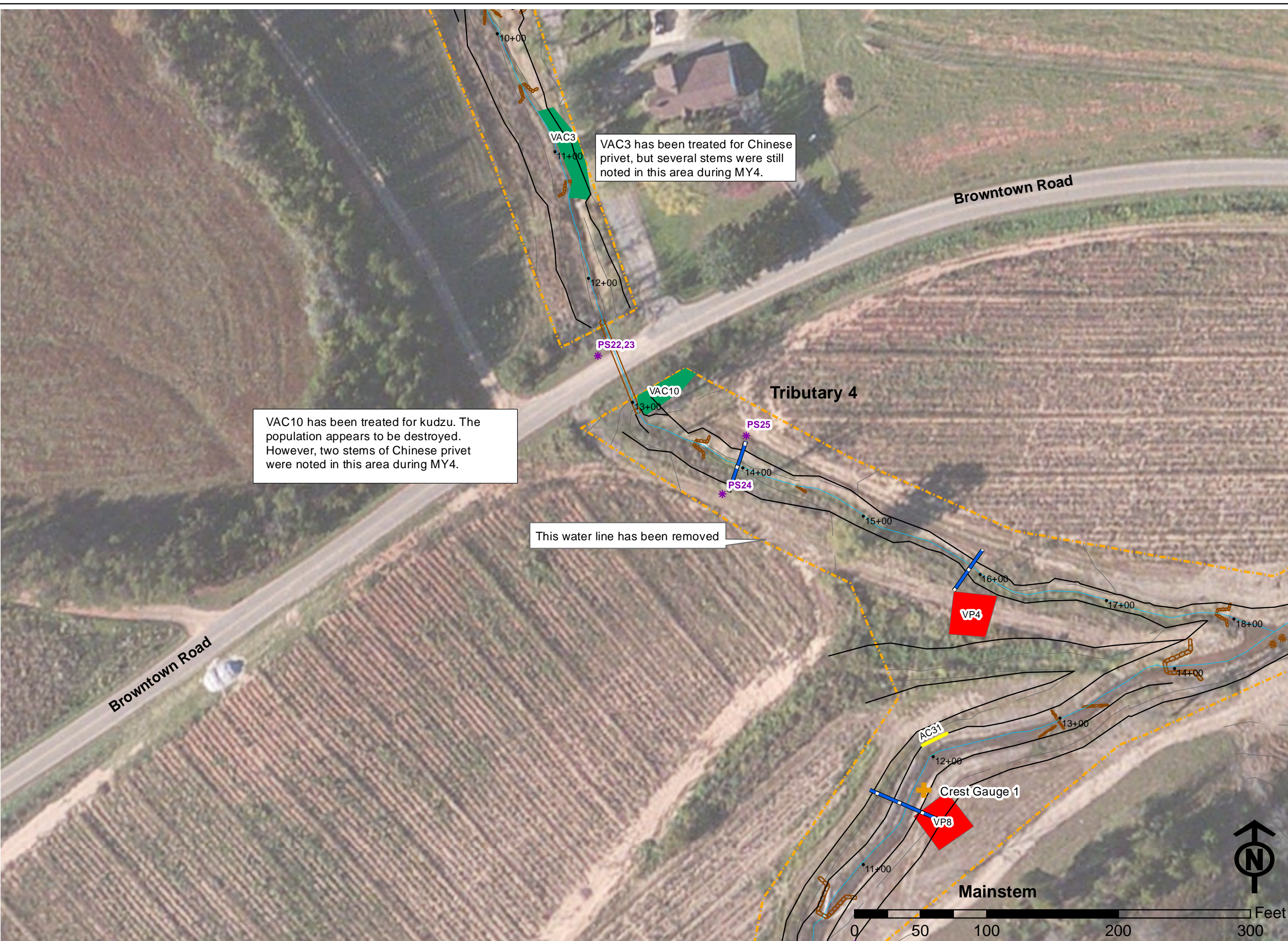
- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 11**



VAC3 has been treated for Chinese privet, but several stems were still noted in this area during MY4.

VAC10 has been treated for kudzu. The population appears to be destroyed. However, two stems of Chinese privet were noted in this area during MY4.

This water line has been removed

**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 12**



VAC15 was added during MY4 and contains several large stems of Chinese privet. VAC16 was added during MY4 as well.

**Prepared By:**  
 AECOM  
 701 Corporate Center Drive  
 Suite 475  
 Raleigh, NC 27607 Phone:  
 919-854-6200 Fax:  
 919-854-6259

**Prepared For:**  
 NCDEQ  
 Division of Mitigation Services



**Project:**  
 Newfound Creek  
 Stream Restoration  
 Buncombe County, NC  
 CU 06010105

**Monitoring Year:**  
 4 (2015)

**Project Number:**  
 92497

**Date:**  
 November 2015

- Legend**
- Conservation Easement
  - 5-Foot Contour Lines
  - Top of Bank
  - Thalweg
  - Cross Section
  - Stream Stations
  - Photo Stations
  - In-Stream Structures
  - In-Stream Structure Condition

- Vegetation Plot**
- Success Criteria Met
  - Success Criteria Not Met

- Bed/Bank Area of Concern**
- Scoured/Eroding Bank
  - Mass Wasting
  - Degradation/Headcut

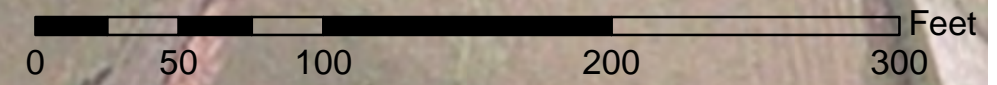
- Vegetation Area of Concern**
- Invasive Population
  - Low Stem Density Area
  - Cattle Encroachment

2012 Aerial  
 Orthophotography  
 (Source: ESRI Basemap)

**Current Condition  
 Plan View  
 Sheet 13**

VAC4 is improving, but still contains mostly herbaceous vegetation and is bare in some area. VAC7 is dominated by emergent wetland vegetation.

**Tributary 8**





**Table 5a: Visual Stream Morphology Stability Assessment Table – Tributary 3**

Reach ID - Reach 3 - Tributary 3										
Assessed Length: 1128										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	19	19			100%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq 1.6$ )	15	15			100%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	15	15			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	15	15			100%			
		2. Thalweg centering at downstream of meander (Glide)	15	15			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and			0	0	100%	0	0	100%

		are providing habitat.								
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	9	9			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	7	8			88%			

**Table 5b: Visual Stream Morphology Stability Assessment Table – Tributary 4**

Reach ID - Reach 4 - Tributary 4										
Assessed Length: 1826										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			1	4'	99.8%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	14	24			58%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq 1.6$ )	6	12			50%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	6	12			50%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	12	12			100%			
		2. Thalweg centering at downstream of meander (Glide)	12	12			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and			0	0	100%	0	0	100%

		are providing habitat.								
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	13	13			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	13	13			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	13	13			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	6	13			46%			

**Table 5c: Visual Stream Morphology Stability Assessment Table – Tributary 5**

Reach ID - Reach 5 - Tributary 5										
Assessed Length: 624										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			1	4	99%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	5	7			71%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	2	3			67%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2	3			67%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander (Glide)	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					0			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%

	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	5	5			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	4	5			80%			

**Table 5d: Visual Stream Morphology Stability Assessment Table – Tributary 6**

Reach ID - Reach 6 - Tributary 6										
Assessed Length: 615										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			3	15	97.6%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	4	5			80%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3			100%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander (Glide)	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%

	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	2	2			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq 1.6$ Rootwads/logs providing some cover at base-flow.	2	2			100%			



**Table 5e: Visual Stream Morphology Stability Assessment Table – Tributary 7**

Reach ID - Reach 7 - Tributary 7												
Assessed Length: 375												
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%					
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%					
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	1	3			33%					
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq 1.6$ )	2			2				100%	
			2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2			2				100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	1	1			100%					
		2. Thalweg centering at downstream of meander (Glide)	1	1			100%					
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.					0	0	100%	0	0	100%

	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	2	2			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth: Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	2	2			100%			

**Table 5f: Visual Stream Morphology Stability Assessment Table – Tributary 8**

Reach ID - Reach 8 - Tributary 8										
Assessed Length: 380										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	2	9			22%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	2	3			67%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2	3			67%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander (Glide)	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					0			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%

	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
<b>Totals</b>					0	0	100%	0	0	100%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	4	4			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	4	4			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	4	4			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	4	4			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth: ean Bankfull Depth ratio $\geq 1.6$ Rootwads/logs providing some cover at base-flow.	2	4			50%			

**Table 5g: Visual Stream Morphology Stability Assessment Table – Mainstem Upstream of Browntown Road**

Reach ID - Reach 1 - Mainstem, Upstream of Browntown Rd.										
Assessed Length: 2398.4										
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
<b>1. Bed</b>	1. <b>Vertical Stability</b> (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	<b>2. Riffle Condition</b>	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	18	19			95%			
	<b>3. Meander Pool Condition</b>	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq 1.6$ )	13	13*			100%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	13	13*			100%			
	<b>4. Thalweg Position</b>	1. Thalweg centering at upstream of meander bend (Run)	19	19*			100%			
		2. Thalweg centering at downstream of meander (Glide)	10	10			100%			
<b>2. Bank</b>	<b>1. Scoured /Eroding</b>	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					9			

	<b>2. Undercut</b>	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			1	45	99%	0	0	99%
<b>Totals</b>					10	274	94%	0	0	94%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	18	18			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	18	18			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq 1.6$ Rootwads/logs providing some cover at base-flow.	6	8			75%			

\* Note: number adjusted to match what was recorded on the ground during MY2. Actual numbers are greater than those shown on As-Built plan sheets.

**Table 5h: Visual Stream Morphology Stability Assessment Table – Mainstem Downstream of Browntown Road**

Reach ID - Reach 2 - Mainstem, Downstream of Browntown Rd.										
Assessed Length: 2244										
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. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	25	100%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	21	21		100%				
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	14	14		100%				
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	14	14		100%				
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	14	14		100%				
		2. Thalweg centering at downstream of meander (Glide)	14	14		100%				
	2. Bank	1. Scoured/ Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion				8			

	<b>2. Undercut</b>	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			2	64	99%	0	0	99%
<b>Totals</b>					10	346	92%	0	0	92%
<b>3. Engineered Structures</b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	4	4			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	4	4			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	6	7			86%			



**Table 6: Vegetation Condition Assessment Table**

Newfound Creek Stream Restoration						
DMS Project Number 92497						
Planted Acreage 20.8						
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
<b>1. Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.1 acres	N/A	0	0.00	0.0%
<b>2. Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Solid coral	4	0.34	1.6%
<b>Total</b>				4	0.34	1.6%
<b>3. Areas of Poor Growth Rates or Vigor</b>	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%
<b>Cumulative Total</b>				4	0.34	1.6%
Easement Acreage 25.3						
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
<b>4. Invasive Areas of Concern</b>	Presence of Chinese privet, multiflora rose, and kudzu.	1000 SF	Solid green	9	0.10	0.4%
<b>5. Easement Encroachment Areas</b>	Areas or points (if too small to render as polygons at map scale).	0.1	Stripped Orange	1	0.12	0.6%

---

**Stream Station Photos**



PS1, Tributary 8 facing downstream



PS2, Tributary 8 facing upstream



PS3, Tributary 8 facing downstream



PS4, Tributary 8 facing upstream



PS5, Tributary 8 facing east



PS6, Tributary 8 facing upstream



PS7, Tributary 7 facing upstream



PS8, Tributary 7 facing downstream



PS9, Tributary 7 facing upstream



PS10, Tributary 7 facing downstream



PS11, Tributary 7 facing upstream



PS12, Tributary 7 facing downstream



PS13, Tributary 4 facing downstream



PS14, Tributary 4 facing upstream



PS15, Tributary 4 facing downstream



PS16, Tributary 4 facing upstream



PS17, Tributary 4 facing downstream



PS18, Tributary 4 facing upstream



PS19, Tributary 4 facing downstream



PS20, Tributary 4 facing upstream



PS21, Tributary 4 facing downstream



PS22, Tributary 4 facing upstream



PS23, Tributary 4 facing downstream



PS24, Tributary 4 facing upstream



PS25, Tributary 4 facing downstream



PS26, Tributary 3 facing downstream



PS27, Tributary 3 facing upstream



PS28, Tributary 3 facing downstream



PS29, Tributary 3 facing upstream



PS30, Tributary 3 facing downstream



PS31, Mainstem facing downstream



PS32, Mainstem facing upstream



PS33, Mainstem facing downstream



PS34, Mainstem facing upstream



PS35, Mainstem facing downstream



PS36, Mainstem facing upstream



PS37, Mainstem facing downstream



PS38, Tributary 3 facing upstream at confluence



PS39, Tributary 5 facing upstream



PS40, Tributary 5 facing downstream



PS41, Tributary 5 facing upstream



PS42, Tributary 5 facing downstream





PS43, Tributary 5 facing upstream at road crossing



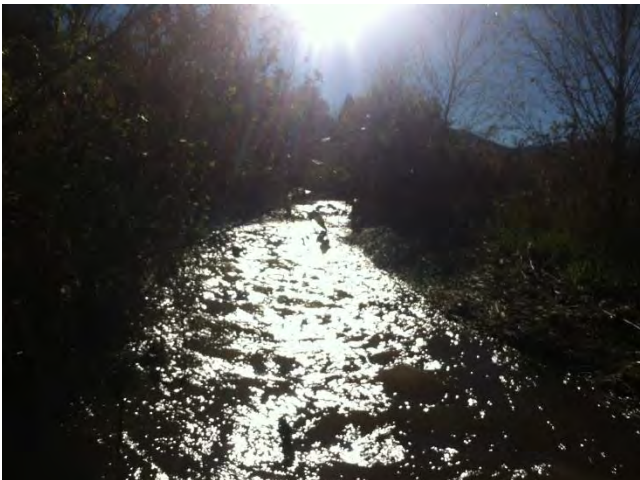
PS44, Tributary 4 facing upstream at confluence



PS45, Mainstem facing upstream



PS46, Mainstem facing downstream



PS47, Mainstem facing upstream



PS48, Mainstem facing downstream



PS49, Mainstem facing upstream



PS50, Mainstem facing downstream



PS51, Tributary 8 facing upstream



PS52, Mainstem facing upstream



PS53, Mainstem facing downstream



PS54, Mainstem facing upstream



PS55, Mainstem facing downstream



PS56, Tributary 6 facing upstream



PS57, Mainstem facing upstream



PS58, Mainstem facing downstream



PS59, Mainstem facing upstream



PS60, Mainstem facing downstream



PS61, Mainstem facing upstream



PS62, Mainstem facing downstream



PS63, Mainstem facing upstream



PS64, Mainstem facing downstream



PS65, Mainstem facing upstream



PS66, Tributary 6 facing downstream



PS67, Tributary 6 facing upstream



PS68, Tributary 6 facing downstream



PS69, Tributary 6 facing upstream



PS70, Tributary 6 facing downstream



PS71, Tributary 6 facing upstream



PS72, Tributary 6 facing downstream



PS73, Tributary 6 facing upstream



PS74, Tributary 6 facing downstream



PS75, Tributary 6 facing upstream

---

## Vegetation Plot Photos



VP1



VP2



VP3



VP4



VP5



VP6





VP7



VP8



VP9



VP10



VP11



VP12



VP13



VP14

---

**Appendix C: Vegetation Plot Data**

**Table 7: Vegetation Plot Success by Project Asset Type – CVS Generated Table**

Newfound Creek Stream Restoration				
DMS Project Number 92497				
Wetland/Stream Vegetation Totals				
(per acre)				
Plot #	Stream/ Wetland Stems <sup>2</sup>	Volunteers <sup>3</sup>	Total <sup>4</sup>	Success Criteria Met?
1	121	81	202	No
2	40	0	40	No
3	243	0	243	No
4	81	0	81	No
5	202	162	364	No
6	202	0	202	No
7	0	728	728	No
8	324	0	324	Yes
9	364	1093	1457	Yes
10	283	0	283	Yes
11	364	0	364	Yes
12	243	0	243	No
13	364	243	607	Yes
14	324	0	324	Yes
<b>Project Avg</b>	<b>214</b>	<b>165</b>	<b>390</b>	<b>No</b>

Riparian Buffer Vegetation Totals		
(per acre)		
Plot #	Riparian Buffer Stems <sup>1</sup>	Success Criteria Met?
1	81	No
2	0	No
3	243	No
4	81	No
5	202	No
6	202	No
7	0	No
8	202	No
9	243	No
10	202	No
11	364	Yes
12	243	No
13	364	Yes
14	283	No
<b>Project Avg</b>	<b>194</b>	<b>No</b>

<sup>1</sup> Buffer stems – Native planted hardwood trees. Does not include shrubs, pines or vines

<sup>2</sup> Stream/Wetland Stems – Native planted wood stems. Includes shrubs, does not include live stakes. No vines

<sup>3</sup> Volunteers – Native woody stems. Not planted. No vines

<sup>4</sup> Total – Planted + volunteer native woody stems. Includes livestakes. No vines

Table 8: CVS Stem Count Total and Planted with/without Livestakes by Plot and Species – CVS Generated Table

Scientific Name	Common Name	Species Type	Current Plot Data (MY4 2015)																										
			92497-01-0001			92497-01-0002			92497-01-0003			92497-01-0004			92497-01-0005			92497-01-0006			92497-01-0007			92497-01-0008			92497-01-0009		
			Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T	Pno LS	P-all	T
Acer floridanum	Florida Maple	Tree							1	1	1																		
Acer negundo	boxelder	Tree							2	2	2				2	2	2												
Acer rubrum	red maple	Tree			2																								
Acer saccharinum	silver maple	Tree	1	1	1									1	1	1													
Alnus serrulata	hazel alder	Shrub																			15								
Betula nigra	river birch	Tree																				1	1	1	1	1	1		
Carpinus caroliniana	American hornbeam	Tree															1	1	1										
Carya cordiformis	bitternut hickory	Tree																											
Carya ovata	shagbark hickory	Tree																											
Celtis laevigata	sugarberry	Tree										1	1	1											1	1	1		
Cornus florida	flowering dogwood	Tree																											
Corylus cornuta	beaked hazelnut	Shrub																							1	1	1		
Diospyros virginiana	common persimmon	Tree																											
Euonymus americanus																						1	1	1					
Fraxinus pennsylvanica	green ash	Tree																											
Hamamelis virginiana	American witchhazel	Tree							1	1	1														2	2	2		
Ilex opaca	American holly	Tree																											
Juglans nigra	black walnut	Tree												2	2	6													
Lindera benzoin	northern spicebush	Shrub	1	1	1																				1	1	1		
Liriodendron tulipifera	tuliptree	Tree																									14		
Platanus occidentalis	American sycamore	Tree	1	1	1				1	1	1										3	1	1	1	2	2	15		
Quercus michauxii	swamp chestnut oak	Tree							1	1	1	1	1	1			3	3	3					1	1	1			
Quercus pagoda	cherrybark oak	Tree															1	1	1					1	1	1			
Rhododendron maximum	great laurel	Shrub																						1	1	1			
Robinia pseudoacacia	black locust	Tree																					1	1	1				
Salix nigra	black willow	Tree																					2	2	2				
Sambucus canadensis	Common Elderberry	Shrub				1	1	1																					
Ulmus americana	American elm	Tree																											
Unknown		Shrub																											
Viburnum dentatum	southern arrowwood	Shrub																											
<b>Stem count</b>			3	3	5	1	1	1	6	6	6	2	2	2	5	5	9	5	5	5	0	0	18	8	8	8	9	9	36
<b>size (ares)</b>			1			1			1			1			1			1			1			1			1		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
<b>Species count</b>			3	3	4	1	1	1	5	5	5	2	2	2	3	3	3	3	3	3	0	0	2	6	7	7	7	7	8
<b>Stems per ACRE</b>			121.4	121.4	202.3	40.47	40.47	40.47	242.8	242.8	242.8	80.94	80.94	80.94	202.3	202.3	364.2	202.3	202.3	202.3	0	0	728.4	323.7	323.7	323.7	364.2	364.2	1457

Color for Density

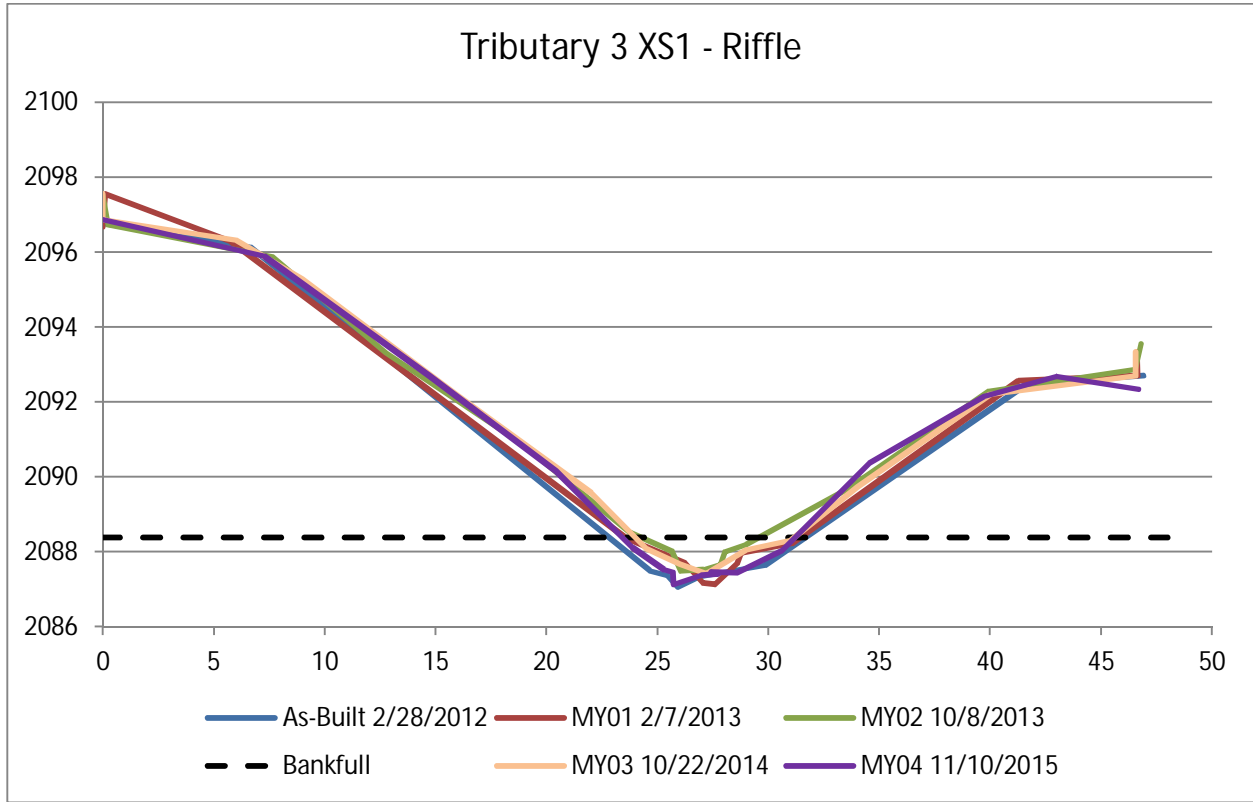
Exceeds requirements by 10%	Fails to meet requirements, by less than 10%
Exceeds requirements, but by less than 10%	Fails to meet requirements by more than 10%

Scientific Name	Common Name	Species Type	Current Plot Data (MY4 2015)															Annual Means													
			92497-01-0010			92497-01-0011			92497-01-0012			92497-01-0013			92497-01-0014			MY4 (2015)			MY3 (2014)			MY2 (2013)			MY1 (2013)				
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T		
Acer floridanum	Florida Maple	Tree																1	1	1				2	2	2	7	7	7		
Acer negundo	boxelder	Tree																4	4	4	4	4	4	3	3	3	7	7	7		
Acer rubrum	red maple	Tree																		2			2								
Acer saccharinum	silver maple	Tree																2	2	2	2	2	2	3	3	3					
Alnus serrulata	hazel alder	Shrub																		15			3	3	18	3	3	22	4	4	4
Betula nigra	river birch	Tree				2	2	2	2	2	2	1	1	1	5	5	5	12	12	12	13	13	13	12	12	12	9	9	9		
Carpinus caroliniana	American hornbeam	Tree																1	1	1	2	2	2	3	3	3	10	10	10		
Carya cordiformis	bitternut hickory	Tree																					1	1	1						
Carya ovata	shagbark hickory	Tree																								2	2	2			
Celtis laevigata	sugarberry	Tree									1	1	1				3	3	3	5	5	5	10	10	10	17	17	17			
Cornus florida	flowering dogwood	Tree									2	2	2				2	2	2	2	2	2	6	6	6						
Corylus cornuta	beaked hazelnut	Shrub															1	1	1	4	4	4	3	3	5	4	4	4			
Diospyros virginiana	common persimmon	Tree				2	2	2									2	2	2	3	3	3				3	3	3			
Euonymus americanus																	1	1	1	2	2	2	2	2	2	3	3	3			
Fraxinus pennsylvanica	green ash	Tree	3	3	3	2	2	2				4	4	4			9	9	9	9	9	9	8	8	8	4	4	4			
Hamamelis virginiana	American witchhazel	Tree															3	3	3	3	3	3	6	6	6	6	6	6			
Ilex opaca	American holly	Tree																								3	3	3			
Juglans nigra	black walnut	Tree															2	2	6	3	3	7	5	5	5	2	2	2			
Lindera benzoin	northern spicebush	Shrub	1	1	1										1	1	1	4	4	4	3	3	3	10	10	10					
Liriodendron tulipifera	tuliptree	Tree																		14			14			3					
Platanus occidentalis	American sycamore	Tree												6			5	5	27	10	10	32	5	5	18	16	16	16			
Quercus michauxii	swamp chestnut oak	Tree				1	1	1				1	1	1			8	8	8	10	10	10	3	3	3	6	6	6			
Quercus pagoda	cherrybark oak	Tree	2	2	2	1	1	1	3	3	3						8	8	8	10	10	10	13	13	13	18	18	18			
Rhododendron maximum	great laurel	Shrub															1	1	1				1	1	1	3	3	3			
Robinia pseudoacacia	black locust	Tree															1	1	1	1	1	1	1	1	1						
Salix nigra	black willow	Tree															2	2	2	3	6	6	3	6	6	3	6	6			
Sambucus canadensis	Common Elderberry	Shrub															1	1	1	1	1	1	1	1	1	1	2	2			
Ulmus americana	American elm	Tree				1	1	1	1	1	1				2	2	2	4	4	4	5	5	5	4	4	4	12	12	12		
Unknown		Shrub																								1	1	1			
Viburnum dentatum	southern arrowwood	Shrub	1	1	1												1	1	1	2	2	2	2	2	2	4	4	4			
<b>Stem count</b>			7	7	7	9	9	9	6	6	6	9	9	15	8	8	8	78	78	135	100	103	160	110	113	150	145	149	149		
<b>size (ares)</b>			1			1			1			1			1			14			14			14			14				
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02			0.02			0.35			0.35			0.35			0.35				
<b>Species count</b>			4	4	4	6	6	6	3	3	3	5	5	6	3	3	3	23	23	26	22	22	24	24	24	25	23	23	23		
<b>Stems per ACRE</b>			283.3	283.3	283.3	364.2	364.2	364.2	242.8	242.8	242.8	364.2	364.2	607	323.7	323.7	323.7	225.5	225.5	390.2	289.1	297.7	462.5	318	326.6	433.6	419.1	430.7	430.7		

---

**Appendix D: Stream Survey Data**

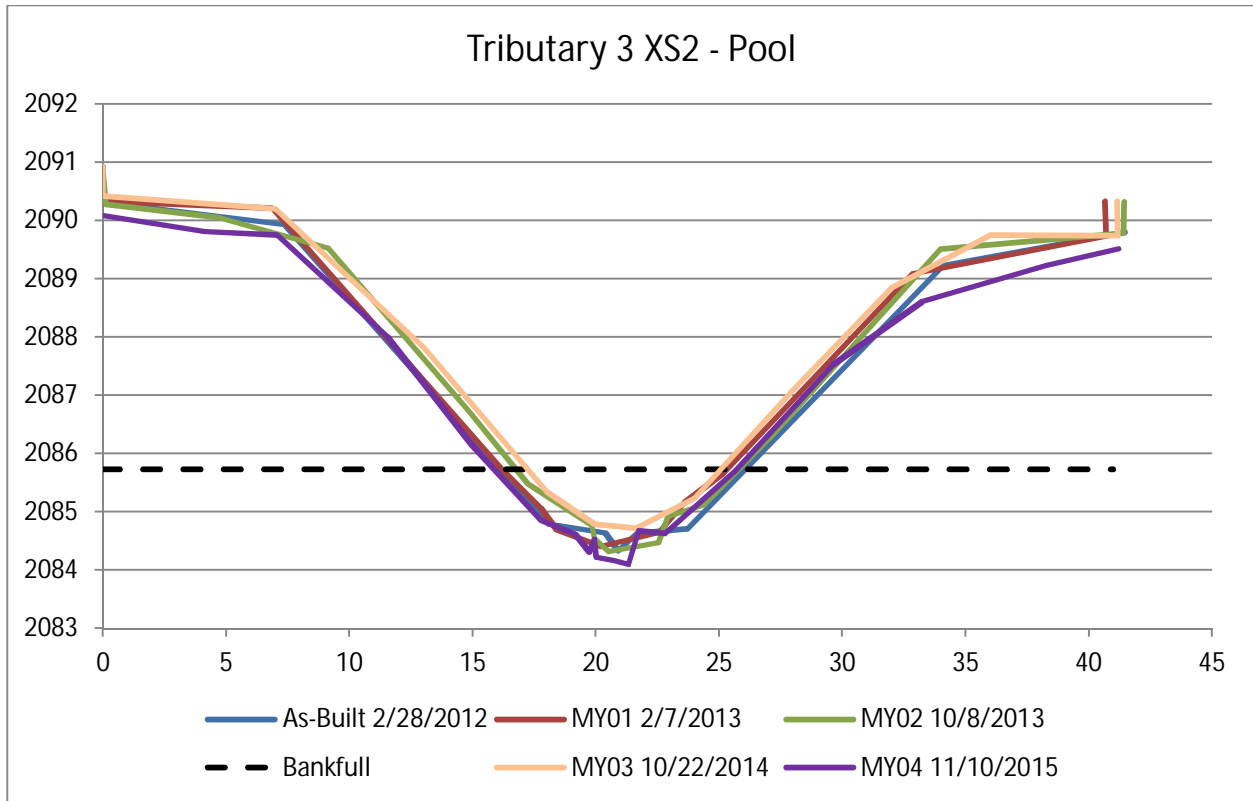
**Figure 5: Tributary 3 Cross Sections with Annual Overlays**



Tributary 3 XS1

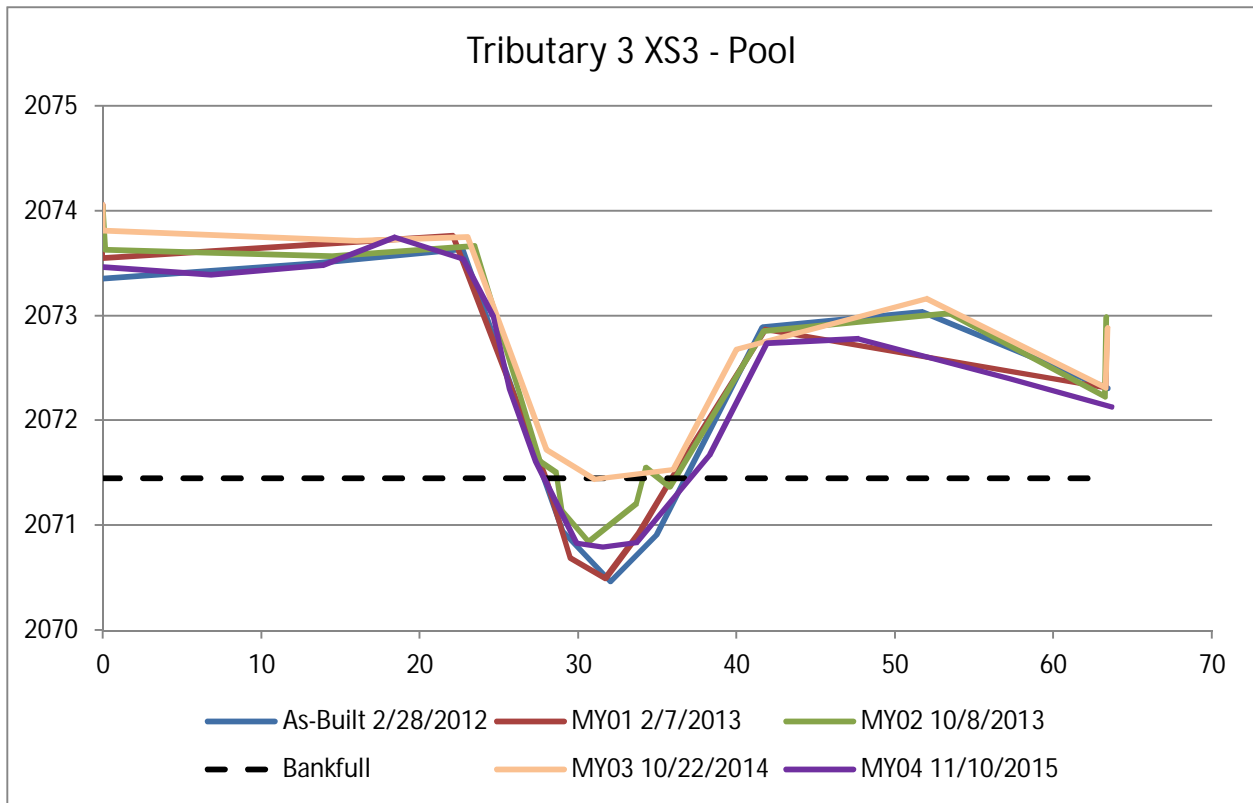
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		URS	
0.00	2096.76	0.00	2096.68	0.00	2097.51	0.00	2097.55	0.00	2096.87
6.64	2096.13	0.11	2097.55	0.21	2096.74	0.00	2096.87	7.27	2095.89
24.65	2087.48	5.76	2096.29	7.63	2095.88	6.00	2096.32	14.70	2092.71
25.44	2087.37	23.58	2088.37	12.74	2093.32	9.00	2095.28	20.43	2090.16
25.92	2087.06	26.21	2087.71	18.86	2090.91	16.00	2092.16	23.84	2088.12
26.87	2087.34	27.05	2087.16	23.71	2088.53	22.00	2089.57	25.31	2087.52
29.82	2087.64	27.58	2087.13	25.65	2088.02	24.50	2088.08	25.70	2087.46
41.63	2092.48	28.59	2087.70	26.04	2087.49	26.00	2087.67	25.73	2087.13
46.91	2092.70	28.77	2087.97	27.10	2087.52	27.20	2087.41	26.95	2087.37
		31.06	2088.22	27.84	2087.66	29.00	2088.05	27.71	2087.41
		41.25	2092.56	28.03	2088.00	31.00	2088.30	27.41	2087.46
		46.65	2092.71	28.96	2088.20	34.00	2089.72	28.57	2087.43
		46.63	2093.34	33.55	2089.68	40.00	2092.20	30.60	2088.04
				39.95	2092.30	46.58	2092.71	34.58	2090.38
				46.55	2092.87	46.56	2093.34	39.73	2092.16
				46.80	2093.56			42.98	2092.68
								46.69	2092.35





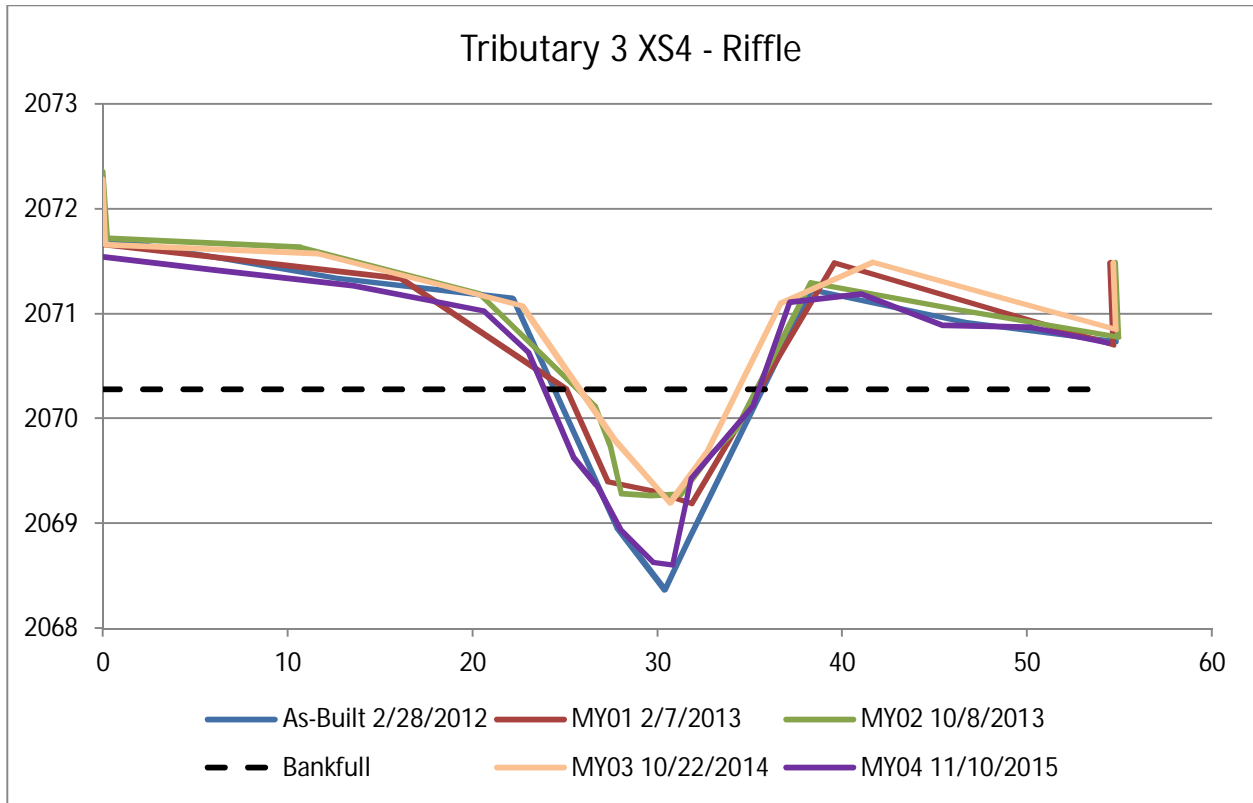
Tributary 3 XS2

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		URS	
0.00	2090.32	0.00	2090.92	0.00	2090.90	0.00	2090.92	0.00	2090.09
7.35	2089.94	-0.17	2090.33	0.11	2090.28	0.00	2090.41	4.11	2089.82
18.07	2084.80	6.89	2090.21	4.77	2090.04	7.00	2090.19	7.09	2089.75
20.37	2084.64	16.20	2085.73	9.15	2089.53	13.00	2087.82	11.53	2088.02
20.90	2084.34	17.75	2085.07	14.85	2086.72	18.00	2085.35	14.96	2086.16
21.65	2084.63	18.42	2084.70	17.27	2085.47	20.00	2084.78	17.76	2084.86
23.70	2084.71	20.20	2084.41	19.83	2084.77	21.60	2084.71	19.15	2084.61
34.09	2089.23	22.57	2084.65	19.95	2084.54	24.00	2085.23	19.74	2084.31
41.48	2089.80	23.57	2085.15	20.50	2084.32	28.00	2087.08	19.93	2084.53
		25.19	2085.67	22.54	2084.47	32.00	2088.84	20.01	2084.23
		32.85	2089.09	22.92	2084.92	36.00	2089.74	20.72	2084.17
		40.72	2089.74	24.37	2085.12	41.19	2089.74	21.30	2084.11
		40.66	2090.33	27.23	2086.35	41.15	2090.33	21.72	2084.67
				33.97	2089.50			22.79	2084.63
				41.42	2089.78			25.65	2085.70
				41.44	2090.31			29.63	2087.53
								33.27	2088.62
								38.27	2089.23
								41.21	2089.52



Tributary 3 XS3

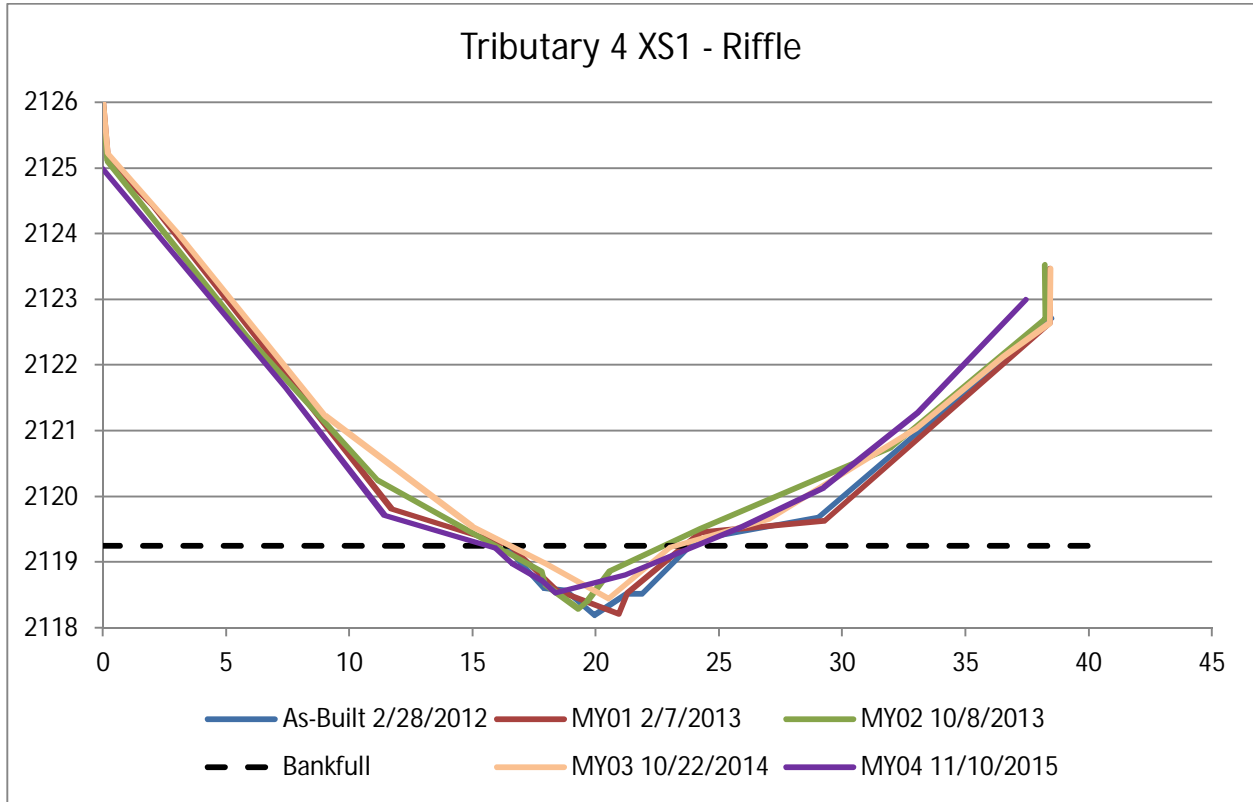
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		URS	
0.00	2073.35	0.00	2074.05	0.00	2074.04	0.00	2074.05	0.00	2073.46
12.95	2073.49	-0.04	2073.55	0.15	2073.63	0.00	2073.81	6.84	2073.39
22.70	2073.63	22.10	2073.76	14.45	2073.57	16.00	2073.71	13.86	2073.48
28.99	2070.94	27.96	2071.45	23.45	2073.66	23.00	2073.75	18.42	2073.75
32.02	2070.47	29.48	2070.69	27.56	2071.61	28.00	2071.72	22.74	2073.54
34.92	2070.91	31.69	2070.49	28.60	2071.51	31.00	2071.44	24.65	2072.99
41.59	2072.89	33.82	2070.92	28.95	2071.14	36.00	2071.53	25.63	2072.30
51.74	2073.03	35.83	2071.44	30.64	2070.84	40.00	2072.68	27.29	2071.61
63.40	2072.31	41.79	2072.87	33.64	2071.20	52.00	2073.16	29.89	2070.83
		63.28	2072.32	34.26	2071.55	63.30	2072.32	31.55	2070.80
		63.38	2072.88	35.79	2071.37	63.40	2072.88	33.67	2070.84
				41.66	2072.85			35.65	2071.20
				53.44	2073.02			38.30	2071.67
				63.26	2072.23			41.89	2072.74
				63.32	2072.99			47.68	2072.78
								57.24	2072.40
								63.64	2072.13



Tributary 3 XS4

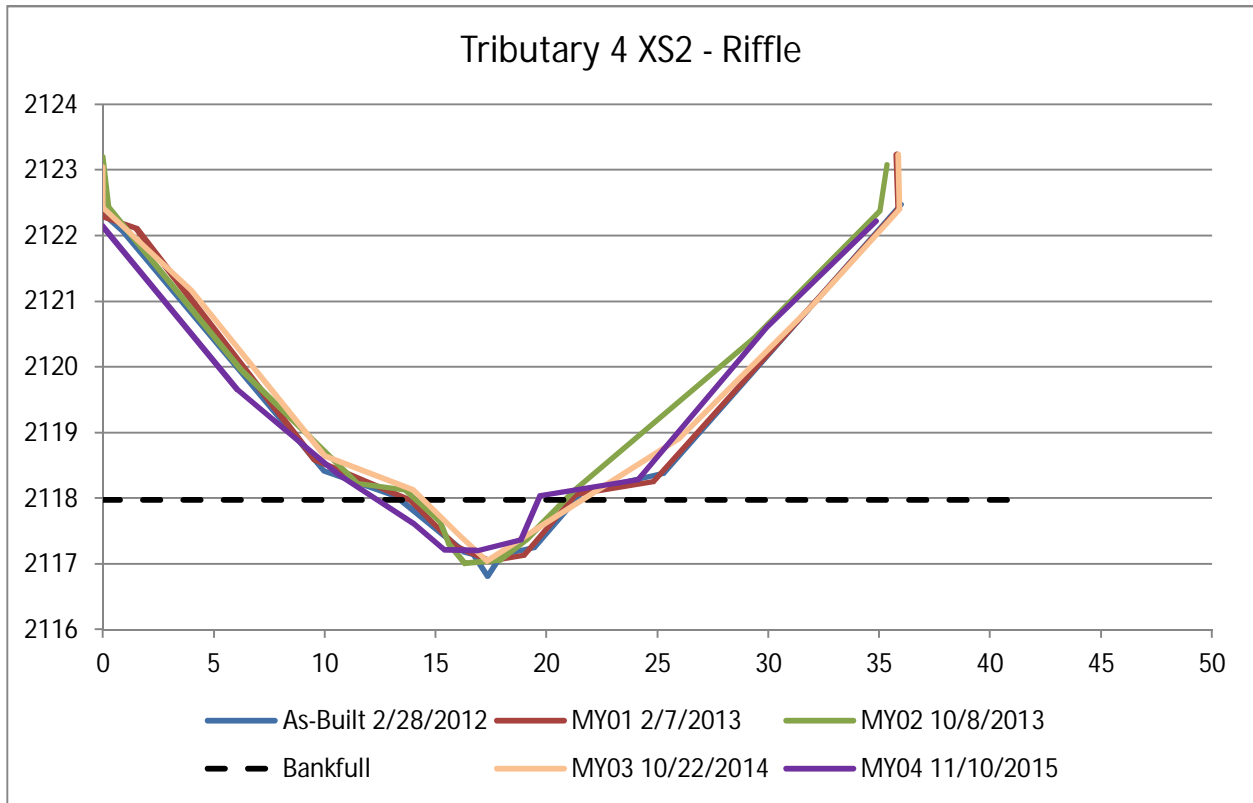
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		URS	
0.00	2071.72	0.00	2071.66	0.00	2072.35	0.00	2072.28	0.00	2071.54
12.68	2071.34	0.15	2071.66	0.23	2071.72	0.14	2071.66	6.15	2071.41
22.19	2071.14	16.16	2071.33	10.74	2071.63	11.66	2071.57	13.53	2071.26
27.81	2068.96	25.05	2070.28	20.36	2071.19	22.66	2071.07	20.59	2071.03
30.39	2068.37	27.31	2069.40	26.62	2070.12	27.66	2069.80	23.02	2070.63
31.65	2068.83	29.84	2069.31	27.46	2069.74	30.66	2069.19	25.46	2069.64
38.33	2071.23	31.85	2069.19	28.05	2069.28	32.66	2069.67	26.71	2069.36
46.66	2070.92	33.84	2069.79	29.58	2069.27	36.66	2071.10	28.00	2068.94
54.82	2070.74	39.57	2071.49	31.23	2069.28	41.66	2071.49	29.77	2068.63
		54.67	2070.71	32.79	2069.64	54.81	2070.85	30.81	2068.61
		54.50	2071.48	34.23	2069.89	54.66	2071.48	31.80	2069.43
				38.30	2071.30			35.16	2070.12
				46.43	2071.04			37.15	2071.11
				54.93	2070.78			41.04	2071.19
				54.79	2071.49			45.46	2070.89
								50.24	2070.87
								54.36	2070.73

**Figure 6: Tributary 4 Cross Sections with Annual Overlays**



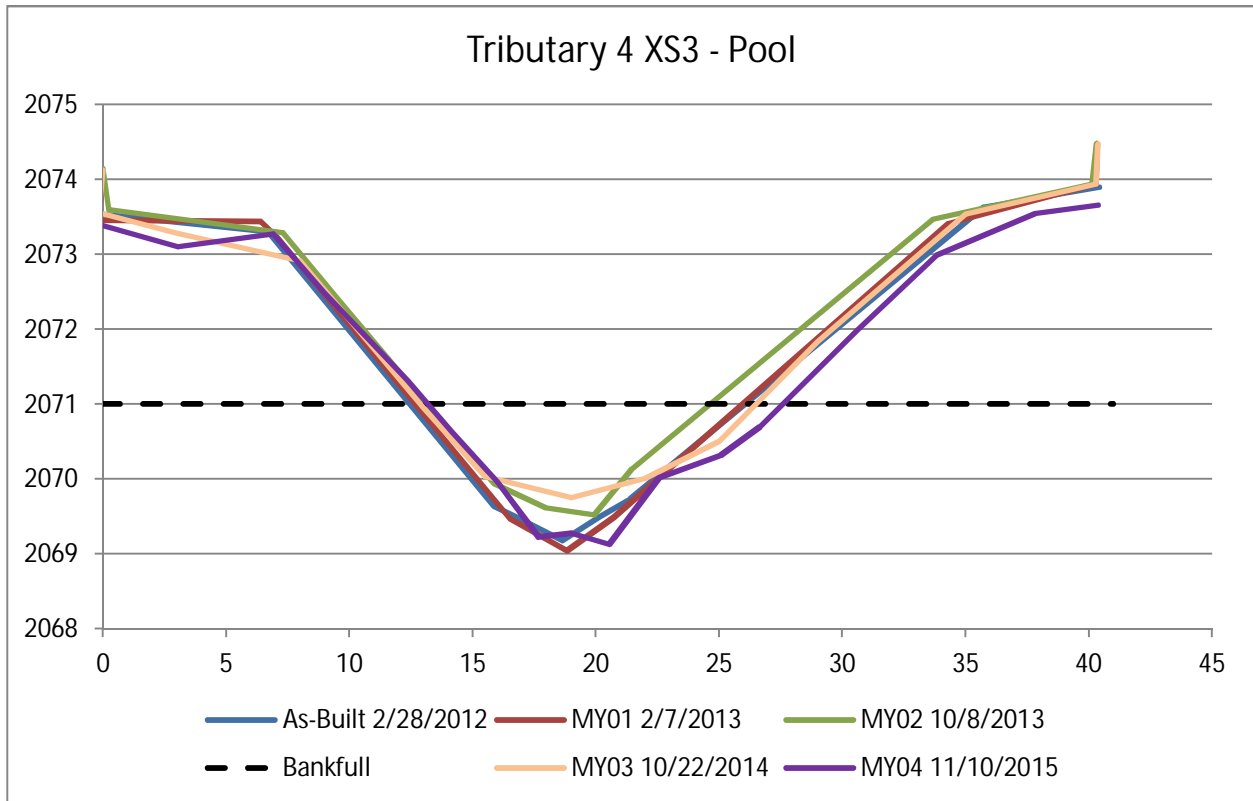
Tributary 4 XS1

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		AECOM	
0	2125.088	0.00	2126.104	0.00	2126.067	0.00	2126.10	0.00	2124.987
	2119.772	0.22	2125.097	0.17	2125.114	0.21	2125.22	7.39	2121.668
16.3437	2119.241	2.00	2124.443	5.84	2122.44	3.00	2124.02	11.42	2119.712
17.8751	2118.608	11.71	2119.815	11.12	2120.255	9.00	2121.23	15.91	2119.217
18.7881	2118.567	16.55	2119.25	17.82	2118.858	15.00	2119.54	16.58	2118.985
19.9274	2118.19	18.41	2118.573	17.93	2118.659	18.00	2118.97	17.82	2118.719
21.2336	2118.513	20.93	2118.21	19.28	2118.292	20.50	2118.44	18.35	2118.532
21.8528	2118.52	21.26	2118.529	19.63	2118.395	23.00	2119.22	21.19	2118.811
24.0685	2119.342	24.24	2119.454	20.55	2118.865	27.00	2119.65	25.92	2119.539
29.0385	2119.684	29.25	2119.631	24.23	2119.512	33.00	2121.04	29.25	2120.133
38.4749	2122.718	38.42	2122.645	31.96	2120.75	36.50	2122.12	33.05	2121.276
		38.43	2123.47	38.24	2122.718	38.44	2122.65	37.44	2122.999
				38.23	2123.523	38.45	2123.47		



Tributary 4 XS2

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		AECOM	
0	2122.342	0.00	2123.046	0.00	2123.196	0.00	2123.05	0.00	2122.15
0.8774	2122.071	-0.02	2122.294	0.25	2122.443	0.00	2122.43	6.09	2119.65
9.9427	2118.425	1.50	2122.114	6.21	2119.966	4.00	2121.17	10.61	2118.36
13.1583	2118.039	9.54	2118.588	11.46	2118.23	10.00	2118.65	14.03	2117.61
16.2575	2117.185	13.84	2117.968	13.60	2118.124	14.00	2118.13	15.40	2117.21
16.7109	2117.141	15.94	2117.257	15.21	2117.64	16.00	2117.46	16.87	2117.20
17.3258	2116.808	17.44	2117.048	15.56	2117.314	17.30	2117.05	18.85	2117.37
17.9615	2117.142	18.98	2117.136	16.32	2117.008	20.00	2117.63	19.69	2118.04
19.4388	2117.249	21.31	2118.055	17.87	2117.058	26.00	2118.92	24.11	2118.28
21.6126	2118.095	24.80	2118.256	19.12	2117.385	32.00	2120.95	29.90	2120.60
25.264	2118.382	35.85	2122.41	21.22	2118.114	35.93	2122.41	34.85	2122.23
35.9667	2122.48	35.76	2123.237	29.37	2120.449	35.86	2123.24		
				35.01	2122.381				
				35.33	2123.082				



Tributary 4 XS3

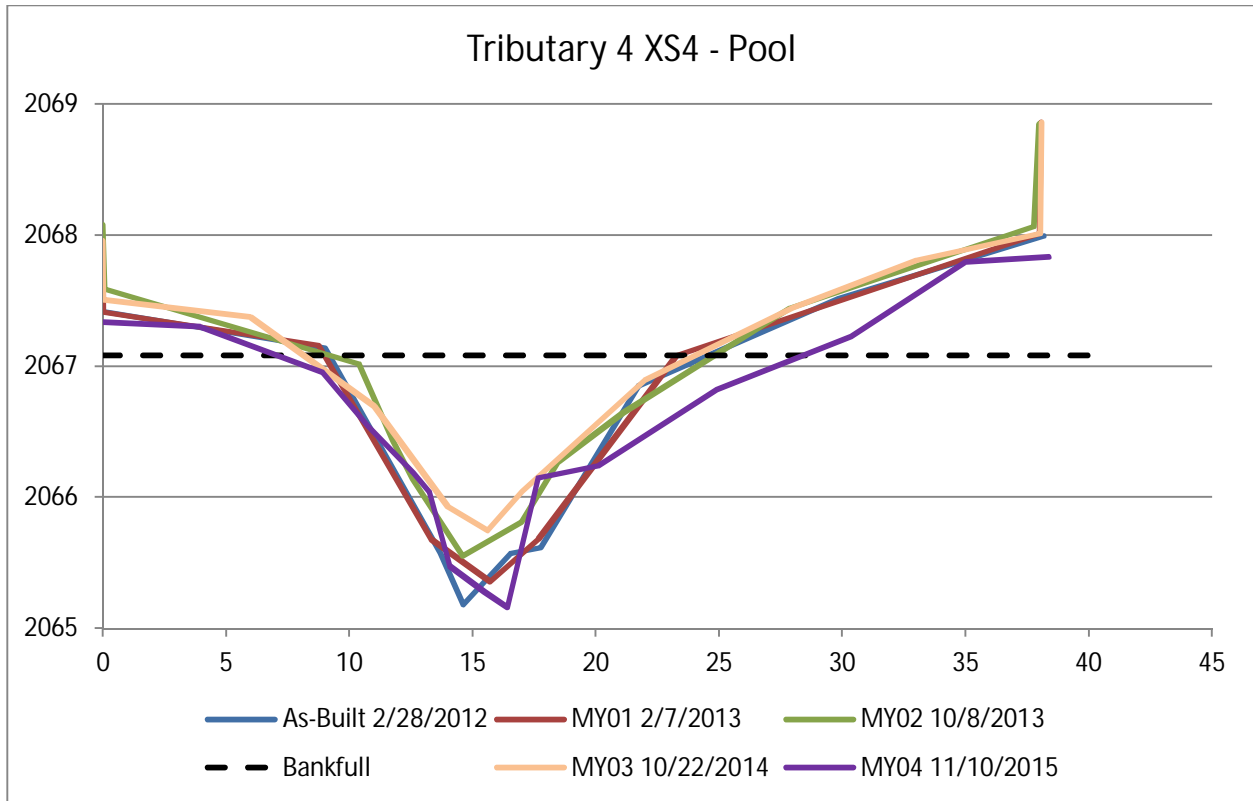
As-Built 2/28/2012		KEE
0	2073.531	
6.713	2073.303	
15.875	2069.633	
16.7022	2069.501	
18.642	2069.181	
20.1439	2069.5	
21.3602	2069.723	
35.7631	2073.628	
40.42	2073.901	

MY01 2/7/2013		URS
0.00	2074.116	
-0.17	2073.456	
6.41	2073.432	
7.09	2073.225	
16.51	2069.473	
18.82	2069.044	
20.72	2069.488	
34.27	2073.413	
40.29	2073.942	
40.36	2074.466	

MY02 10/8/2013		URS
0.00	2074.143	
0.22	2073.594	
7.29	2073.292	
9.57	2072.383	
15.13	2070.216	
15.87	2069.943	
17.97	2069.613	
19.94	2069.519	
21.46	2070.136	
33.69	2073.467	
40.14	2073.941	
40.31	2074.477	

MY03 10/22/2014		URS
0.00	2074.12	
-0.17	2073.56	
3.00	2073.29	
8.00	2072.92	
13.00	2070.95	
15.50	2070.04	
19.00	2069.76	
22.00	2070.01	
25.00	2070.51	
29.00	2071.84	
35.00	2073.54	
40.29	2073.94	
40.36	2074.47	

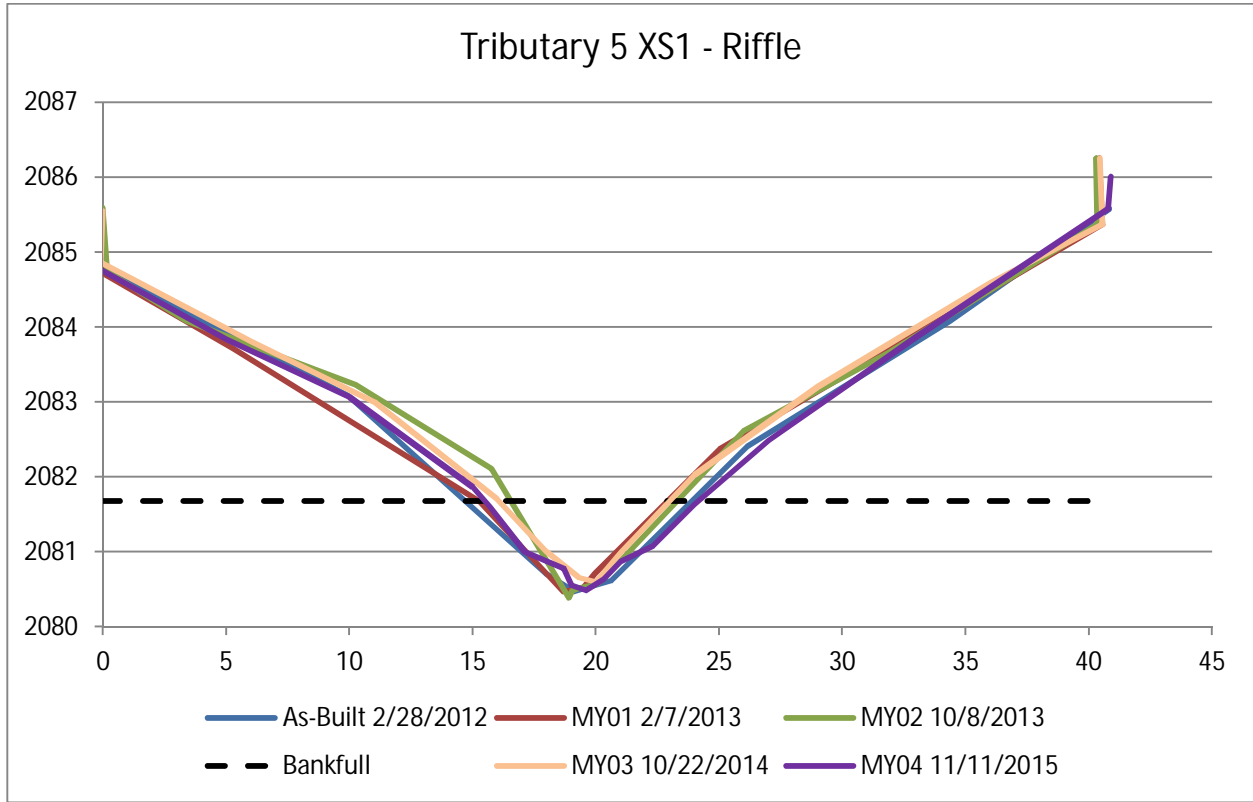
MY04 11/10/2015		URS
0.00	2073.384	
3.03	2073.1	
6.89	2073.271	
8.98	2072.487	
12.39	2071.312	
14.15	2070.631	
16.00	2069.966	
17.67	2069.221	
19.04	2069.271	
20.53	2069.13	
22.56	2070.017	
25.05	2070.313	
26.65	2070.701	
30.60	2071.986	
33.82	2072.988	
37.82	2073.551	
40.38	2073.661	



Tributary 4 XS4

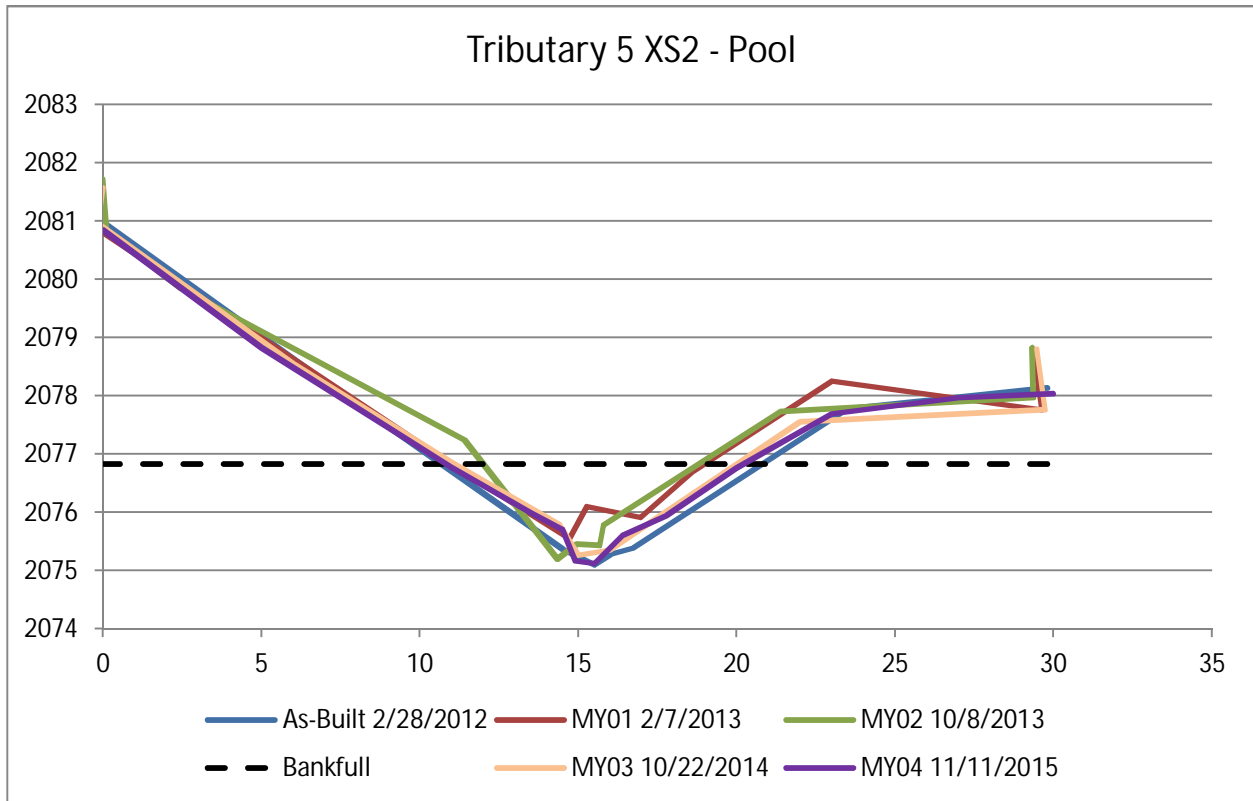
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/10/2015	
KEE		URS		URS		URS		URS	
0	2067.418	0.00	2067.956	0.00	2068.078	0.00	2067.96	0.00	2067.334
9.0065	2067.141	0.02	2067.414	0.06	2067.588	0.02	2067.51	3.95	2067.302
13.6894	2065.575	8.76	2067.159	10.38	2067.017	6.00	2067.38	8.91	2066.955
14.6259	2065.182	13.31	2065.679	11.75	2066.432	11.00	2066.70	10.74	2066.544
16.5262	2065.571	15.71	2065.359	12.56	2066.14	14.00	2065.93	12.58	2066.189
17.753	2065.614	17.65	2065.677	14.60	2065.551	15.60	2065.75	13.24	2066.041
21.7288	2066.85	23.25	2067.079	16.99	2065.813	17.00	2066.05	14.08	2065.475
29.8366	2067.517	38.02	2068.011	18.45	2066.27	22.00	2066.90	15.48	2065.28
38.1695	2067.994	38.06	2068.857	21.12	2066.645	28.00	2067.45	16.40	2065.162
				27.86	2067.444	33.00	2067.81	17.66	2066.147
				37.79	2068.068	38.04	2068.01	20.11	2066.241
				38.00	2068.85	38.08	2068.86	24.91	2066.823
								30.34	2067.228
								34.97	2067.793
								38.38	2067.833

**Figure 7: Tributary 5 Cross Sections with Annual Overlays**



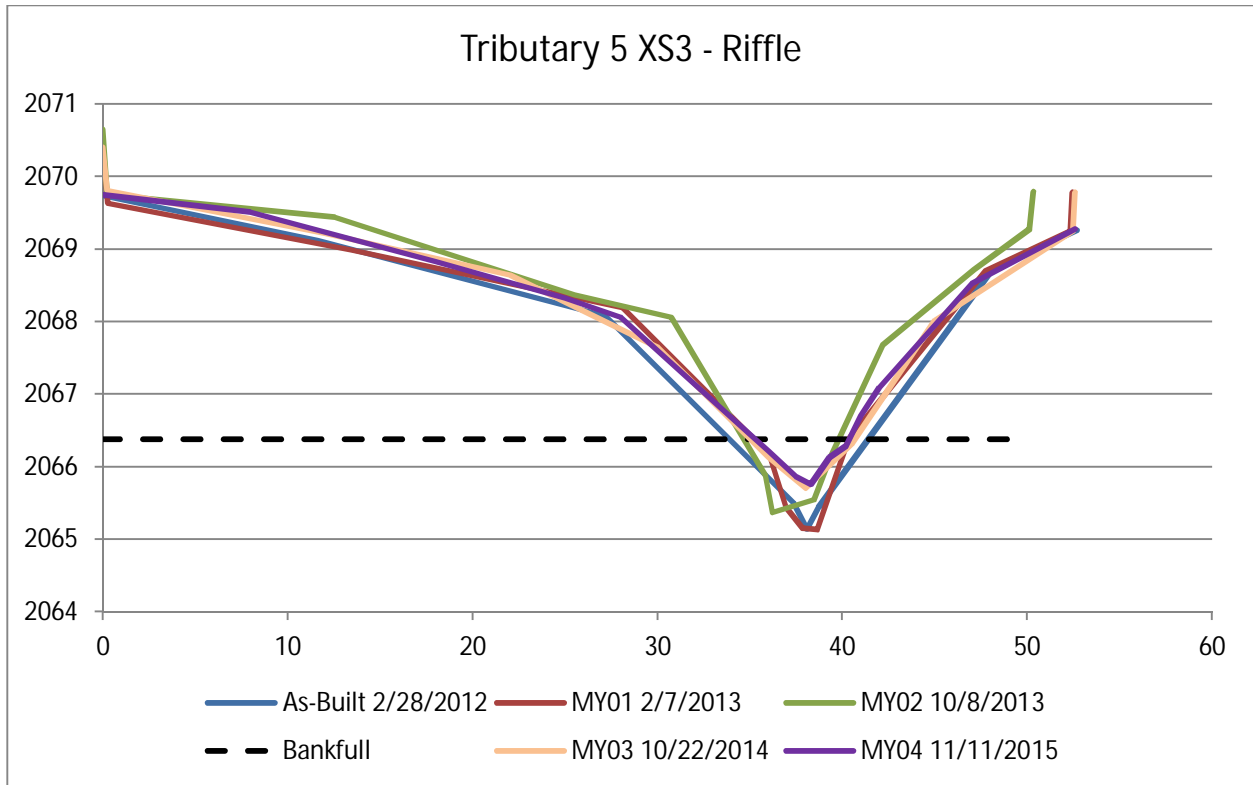
Tributary 5 XS1		MY01		MY02		MY03		MY04	
As-Built		2/7/2013	URS	10/8/2013	URS	10/22/2014	URS	11/11/2015	
2/28/2012	KEE								
0	2084.768	0.00	2085.543	0.00	2085.588	0.00	2085.54	0	2084.75
9.9361	2083.083	-0.09	2084.734	0.19	2084.745	-0.09	2084.86	5	2083.84
17.9744	2080.71	5.25	2083.716	3.38	2084.084	6.00	2083.81	10	2083.07
19.1036	2080.467	15.27	2081.677	10.26	2083.23	11.00	2083.00	15	2081.86
20.6072	2080.618	18.66	2080.471	15.76	2082.114	16.00	2081.70	15.7	2081.6
26.1441	2082.408	19.53	2080.529	18.91	2080.383	18.00	2081.00	17.1	2081
34.3842	2084.085	19.97	2080.713	19.03	2080.48	19.30	2080.66	18.7	2080.78
40.8249	2085.581	25.04	2082.373	19.29	2080.51	20.00	2080.60	19	2080.56
		40.56	2085.38	20.02	2080.572	21.00	2080.99	19.6	2080.49
		40.43	2086.259	20.32	2080.647	24.00	2082.02	20.3	2080.63
				25.99	2082.617	29.00	2083.20	21	2080.87
				31.86	2083.658	36.00	2084.59	22.3	2081.08
				40.35	2085.38	40.57	2085.38	24	2081.63
				40.30	2086.259	40.44	2086.26	27	2082.49
								33	2083.87
								40.8	2085.58
								40.9	2086.01





Tributary 5 XS2

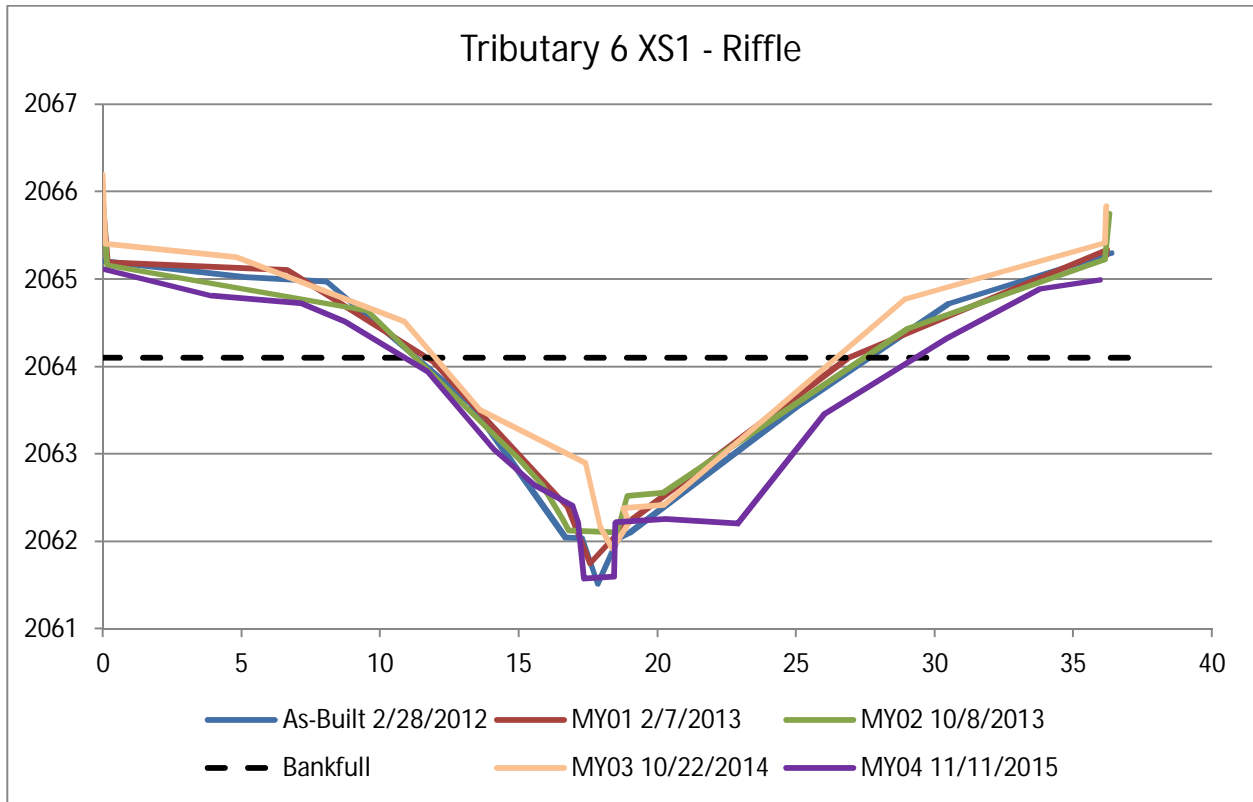
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0	2080.978	0.00	2081.575	0.00	2081.717	0.00	2081.58	0	2080.85
8.1352	2077.799	-0.17	2080.873	0.11	2080.826	-0.17	2080.96	5	2078.82
14.512	2075.366	11.01	2076.821	2.46	2079.846	6.00	2078.56	11	2076.77
15.5091	2075.095	14.73	2075.547	11.41	2077.238	11.00	2076.86	13.5	2075.99
16.0631	2075.285	15.27	2076.101	13.71	2075.641	14.40	2075.80	14.5	2075.70
16.7233	2075.389	16.97	2075.918	14.34	2075.198	15.00	2075.27	14.9	2075.17
23.4744	2077.77	18.63	2076.703	14.95	2075.456	16.00	2075.36	15.5	2075.12
29.8109	2078.129	23.00	2078.257	15.66	2075.428	17.00	2075.73	16	2075.38
		29.63	2077.754	15.79	2075.776	22.00	2077.55	16.4	2075.61
		29.35	2078.799	21.37	2077.724	29.73	2077.75	17.8	2075.95
				29.36	2077.97	29.47	2078.80	20	2076.76
				29.33	2078.829			23	2077.69
								27	2077.97
								30	2078.03



Tributary 5 XS3

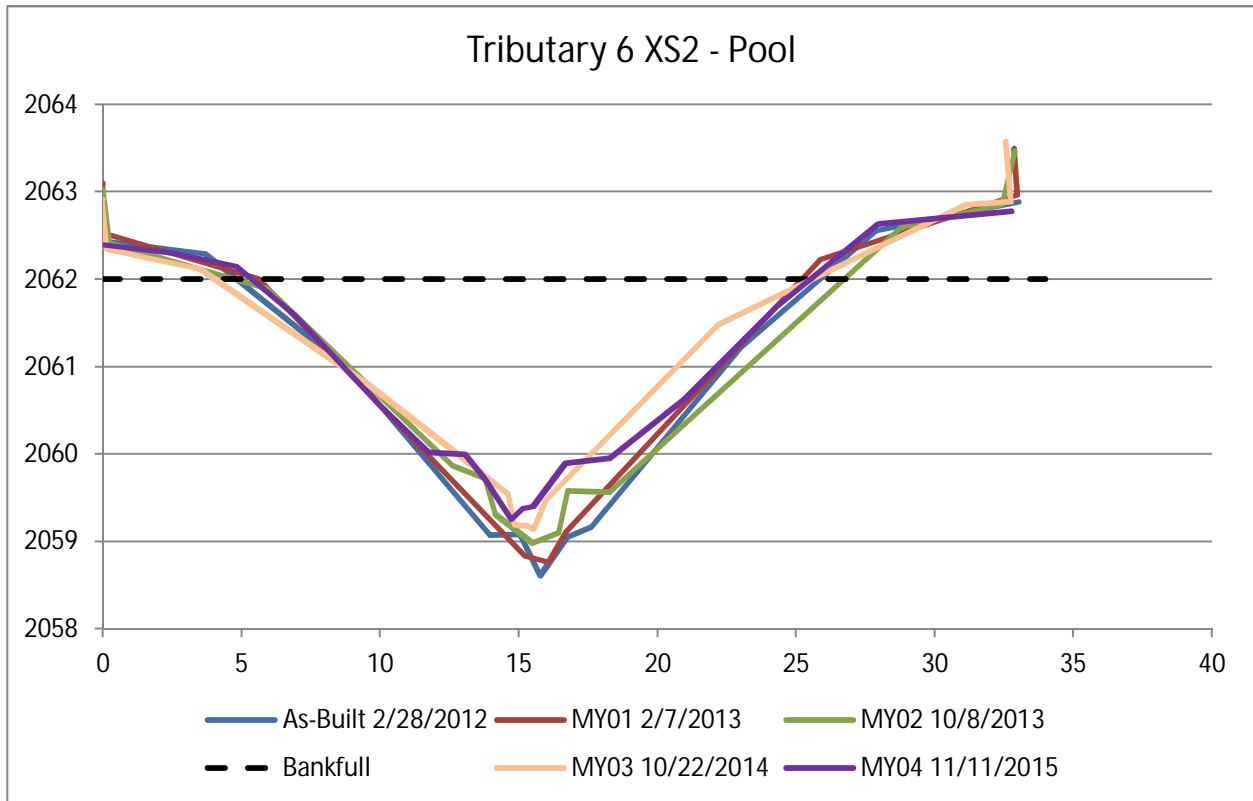
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0	2069.74	0.00	2070.401	0.00	2070.648	0.00	2070.40	0	2069.75
11.6367	2069.116	0.26	2069.636	0.25	2069.75	0.23	2069.81	8	2069.51
27.1749	2068.078	13.47	2068.989	12.57	2069.434	12.00	2069.22	18	2068.83
37.3558	2065.506	28.11	2068.191	25.52	2068.374	22.00	2068.64	25	2068.33
38.0937	2065.141	36.02	2066.172	30.75	2068.06	30.00	2067.65	28	2068.06
38.713	2065.439	36.92	2065.45	35.81	2065.881	36.00	2066.13	35	2066.45
48.0923	2068.717	37.87	2065.146	36.23	2065.374	38.00	2065.70	36	2066.22
52.6765	2069.258	38.63	2065.136	38.46	2065.549	40.50	2066.31	37.5	2065.86
		40.33	2066.38	39.31	2066.122	45.00	2068.02	38.3	2065.76
		47.77	2068.708	42.16	2067.669	52.47	2069.26	39.3	2066.13
		52.34	2069.255	47.11	2068.711	52.58	2069.78	40.2	2066.29
		52.46	2069.78	50.12	2069.281			41	2066.70
				50.33	2069.794			42	2067.09
								47	2068.53
								52.6	2069.28

**Figure 8: Tributary 6 Cross Sections with Annual Overlays**



Tributary 6 XS1

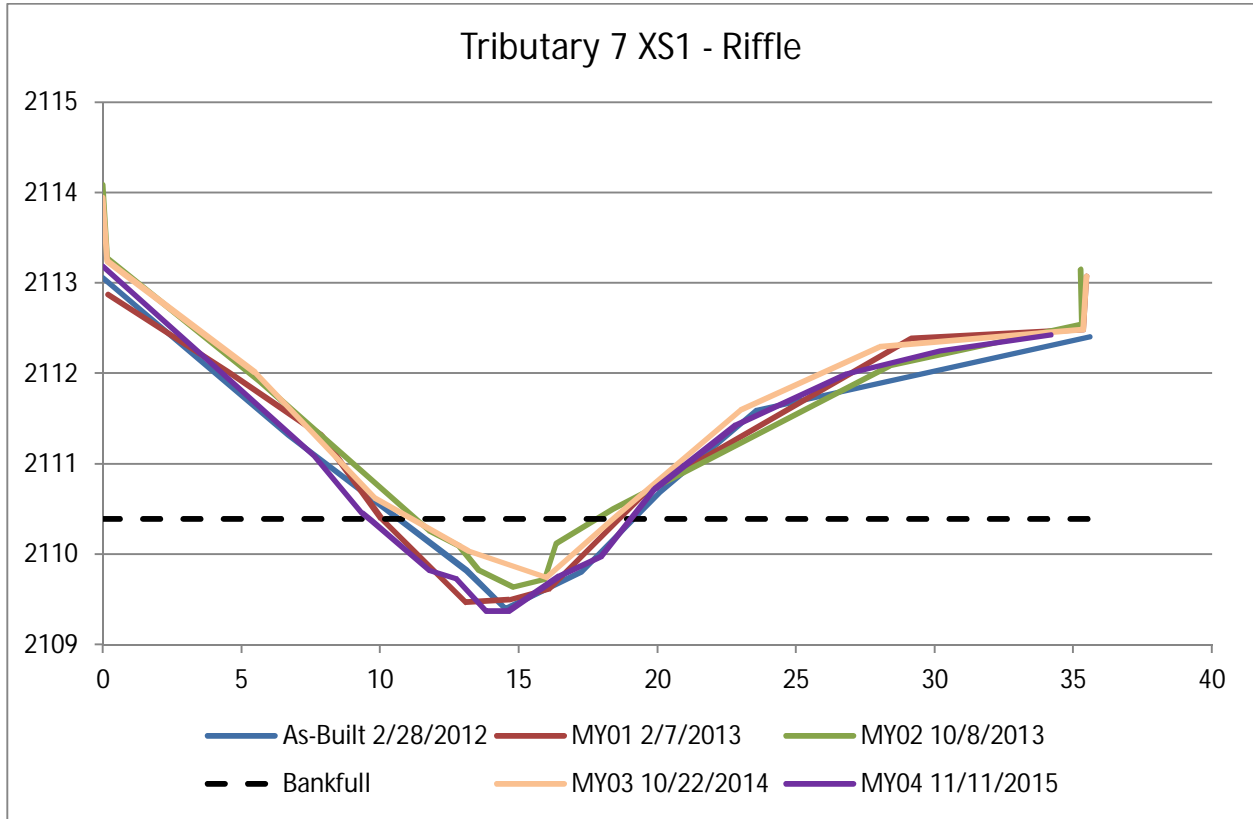
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0	2065.207	0.00	2065.902	0.00	2065.902	0.00	2066.19	0.00	2065.12
5.1102	2065.021	0.17	2065.194	0.16	2065.164	0.08	2065.41	3.92	2064.81
8.0812	2064.969	6.66	2065.102	9.53	2064.644	4.84	2065.25	7.17	2064.722
13.2725	2063.57	11.89	2064.059	14.97	2062.946	10.86	2064.52	8.72	2064.518
16.6861	2062.04	16.76	2062.392	15.83	2062.652	13.58	2063.51	11.70	2063.944
17.2919	2062.031	17.57	2061.746	16.60	2062.243	17.40	2062.90	14.09	2063.053
17.8299	2061.514	18.89	2062.204	16.80	2062.123	17.93	2062.16	15.58	2062.644
18.5677	2062.035	26.87	2064.102	18.53	2062.102	18.36	2061.92	16.94	2062.407
19.0027	2062.096	36.21	2065.336	18.89	2062.518	18.96	2062.22	17.14	2062.209
25.013	2063.542	36.18	2065.282	20.20	2062.556	18.77	2062.38	17.35	2061.575
30.5069	2064.721			29.02	2064.433	20.21	2062.42	18.44	2061.593
36.3639	2065.302			36.13	2065.227	28.93	2064.77	18.49	2062.219
				36.31	2065.744	36.13	2065.41	20.28	2062.255
						36.19	2065.83	22.90	2062.201
								26.03	2063.461
								30.43	2064.329
								33.80	2064.888
								35.95	2064.99



Tributary 6 XS2

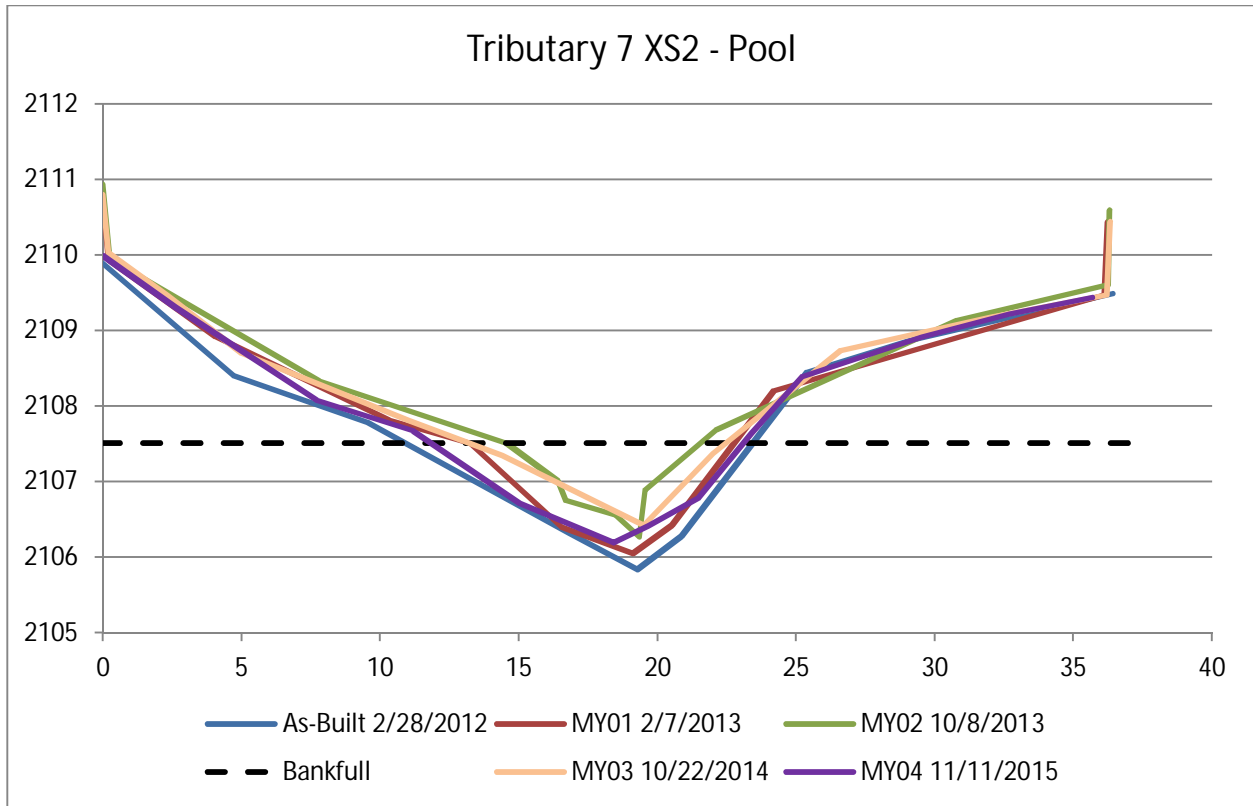
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0	2062.443	0.00	2063.1	0.00	2063.027	0.00	2062.92	0.00	2062.39
3.6619	2062.296	-0.06	2062.538	0.22	2062.414	-0.03	2062.89	2.67	2062.29
8.9382	2060.953	5.60	2062.007	5.94	2061.888	0.13	2062.34	4.83	2062.15
13.9563	2059.068	15.21	2058.837	12.61	2059.872	3.51	2062.12	6.94	2061.58
15.038	2059.075	16.06	2058.761	13.77	2059.719	9.64	2060.77	9.94	2060.57
15.7537	2058.611	16.71	2059.114	14.15	2059.313	12.24	2060.14	11.78	2060.02
16.7229	2059.046	25.87	2062.229	15.48	2058.979	14.60	2059.54	13.09	2059.99
17.6075	2059.169	32.99	2062.97	16.44	2059.097	14.83	2059.19	13.81	2059.71
23.0162	2061.227	32.87	2063.495	16.75	2059.572	15.32	2059.18	14.71	2059.25
27.891	2062.558			18.25	2059.564	15.53	2059.15	15.15	2059.38
33.0173	2062.884			28.79	2062.597	15.96	2059.48	15.50	2059.40
				32.44	2062.86	22.19	2061.48	16.66	2059.89
				32.89	2063.466	31.08	2062.85	18.28	2059.95
						32.75	2062.89	20.95	2060.62
						32.57	2063.58	24.25	2061.68
								27.94	2062.63
								32.77	2062.78

**Figure 9: Tributary 7 Cross Sections with Annual Overlays**



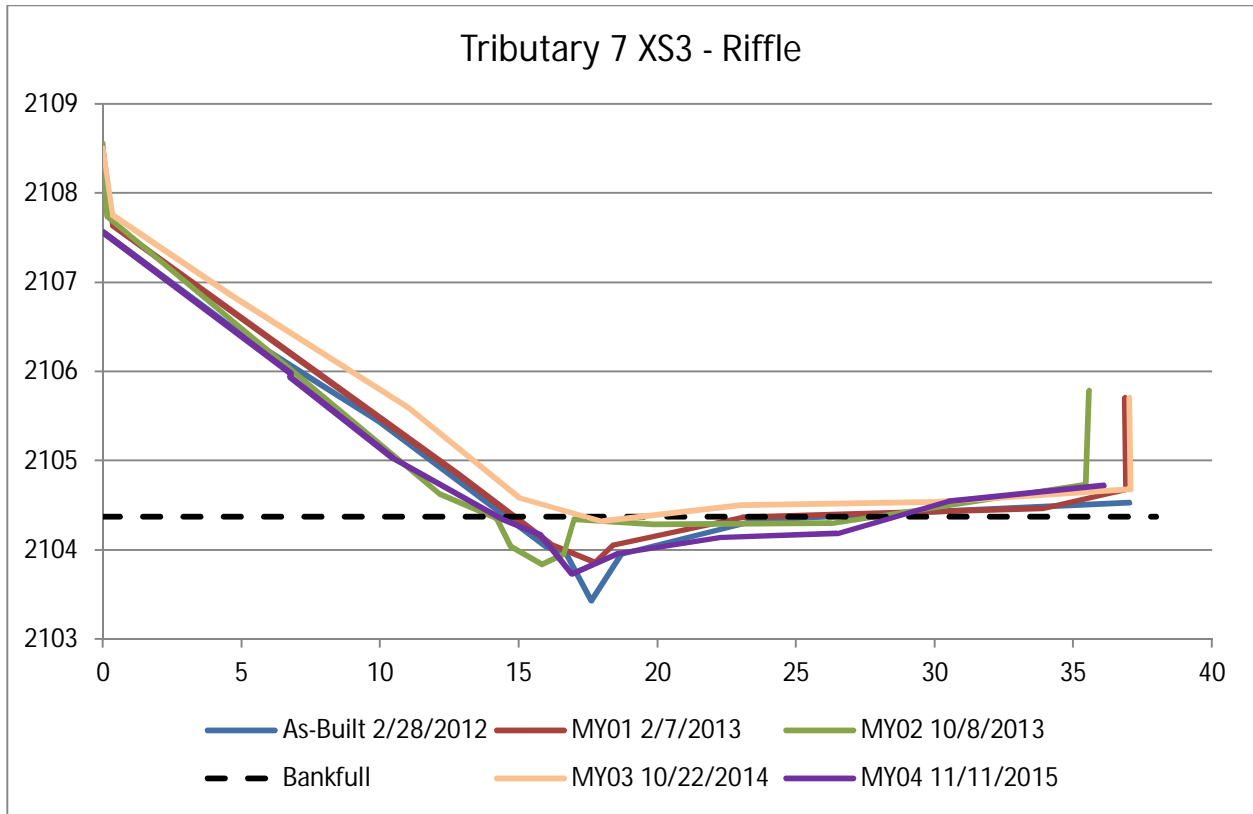
Tributary 7 XS1

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2113.06	0.00	2113.94	0.00	2114.09	0.00	2113.94	0.00	2113.19
6.69	2111.31	0.17	2112.87	0.16	2113.27	0.17	2113.24	3.73	2112.16
13.10	2109.82	4.51	2112.02	5.66	2111.91	5.50	2112.01	7.62	2111.09
14.52	2109.39	7.86	2111.32	11.76	2110.26	9.80	2110.62	9.31	2110.46
17.25	2109.81	10.03	2110.39	12.85	2110.09	13.20	2110.03	9.68	2110.36
20.08	2110.68	13.09	2109.47	13.58	2109.82	16.00	2109.74	11.76	2109.82
23.56	2111.59	14.64	2109.50	14.79	2109.64	18.50	2110.42	12.73	2109.73
35.60	2112.40	16.08	2109.62	15.92	2109.72	23.00	2111.60	13.83	2109.37
		19.64	2110.71	16.34	2110.12	28.00	2112.29	14.61	2109.37
		29.13	2112.39	18.40	2110.51	35.35	2112.49	15.20	2109.50
		35.35	2112.49	28.39	2112.09	35.47	2113.07	16.45	2109.76
		35.47	2113.07	35.31	2112.55			17.98	2109.98
				35.26	2113.15			19.89	2110.72
								22.82	2111.43
								26.82	2112.00
								30.18	2112.25
								34.18	2112.43



Tributary 7 XS2

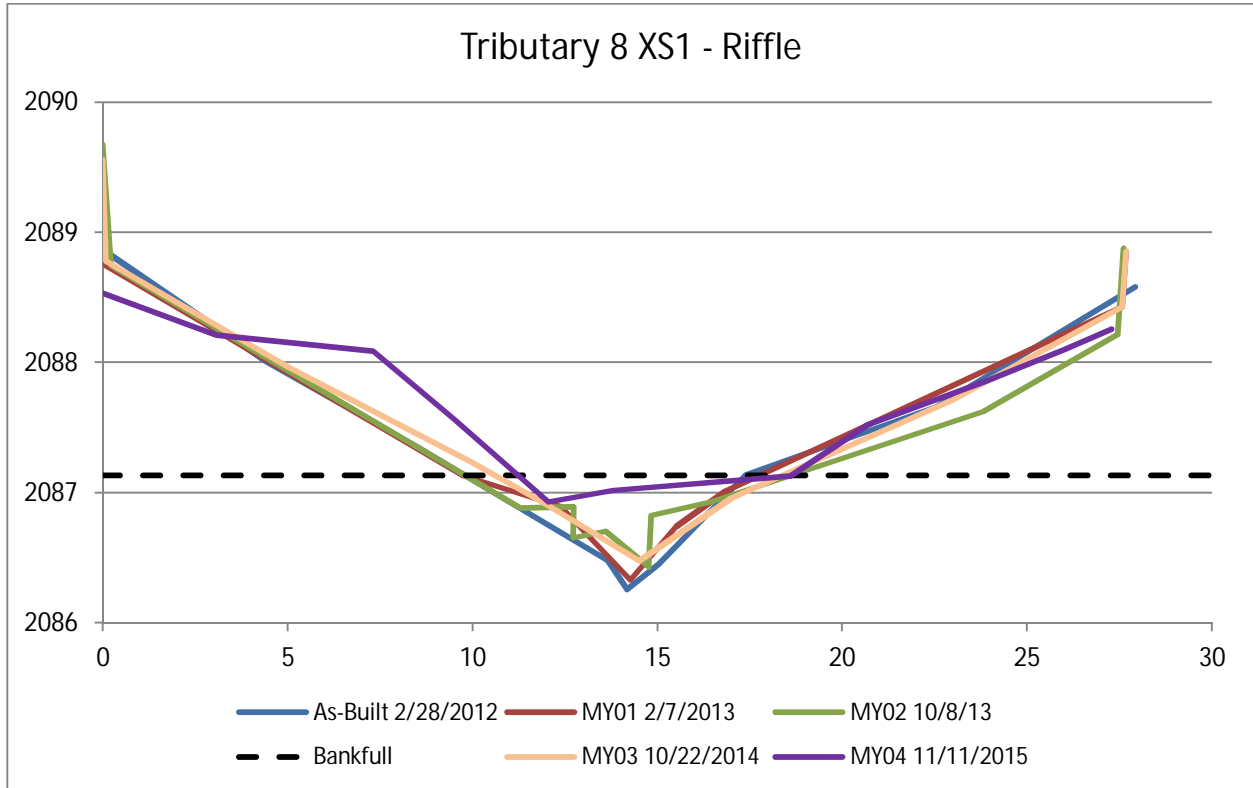
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2109.89	0.00	2110.80	0.00	2110.94	0.00	2110.80	0.00	2109.99
4.70	2108.41	0.21	2109.94	0.25	2109.95	0.21	2110.03	2.63	2109.31
9.52	2107.78	4.06	2108.93	7.81	2108.33	2.30	2109.47	7.72	2108.07
16.80	2106.33	10.34	2107.82	14.55	2107.51	5.00	2108.71	11.16	2107.68
19.27	2105.84	13.23	2107.51	16.40	2107.01	11.00	2107.82	15.04	2106.72
20.87	2106.28	16.55	2106.40	16.68	2106.76	14.40	2107.35	18.42	2106.20
25.38	2108.45	19.11	2106.05	18.49	2106.56	18.00	2106.70	19.65	2106.42
29.03	2108.87	20.52	2106.43	19.34	2106.28	19.50	2106.43	21.48	2106.79
36.41	2109.49	24.19	2108.20	19.55	2106.89	22.00	2107.38	23.41	2107.65
		36.13	2109.48	22.12	2107.69	26.60	2108.74	25.20	2108.39
		36.24	2110.44	30.78	2109.14	32.00	2109.18	29.52	2108.92
				36.26	2109.61	36.21	2109.48	32.68	2109.23
				36.30	2110.60	36.32	2110.44	35.69	2109.44



Tributary 7 XS3

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2107.56	0.00	2108.51	0.00	2108.56	0.00	2108.51	0.00	2107.56
4.90	2106.44	0.35	2107.64	0.16	2107.74	0.34	2107.76	6.78	2105.98
9.93	2105.44	12.83	2104.85	6.92	2105.98	4.60	2106.86	6.73	2105.94
16.03	2104.03	16.16	2104.06	12.15	2104.63	11.00	2105.60	10.45	2105.03
16.70	2103.97	17.74	2103.86	14.20	2104.36	15.00	2104.59	14.41	2104.34
17.62	2103.43	18.39	2104.06	14.70	2104.04	18.00	2104.32	15.77	2104.17
18.70	2103.96	23.04	2104.37	15.84	2103.84	23.00	2104.50	16.91	2103.73
23.59	2104.34	33.88	2104.47	16.62	2103.96	30.00	2104.54	18.59	2103.96
37.03	2104.53	36.91	2104.68	16.99	2104.34	37.06	2104.68	22.26	2104.14
		36.86	2105.71	19.85	2104.29	37.03	2105.71	26.49	2104.18
				26.28	2104.30			30.47	2104.54
				35.46	2104.74			36.09	2104.72
				35.57	2105.79				

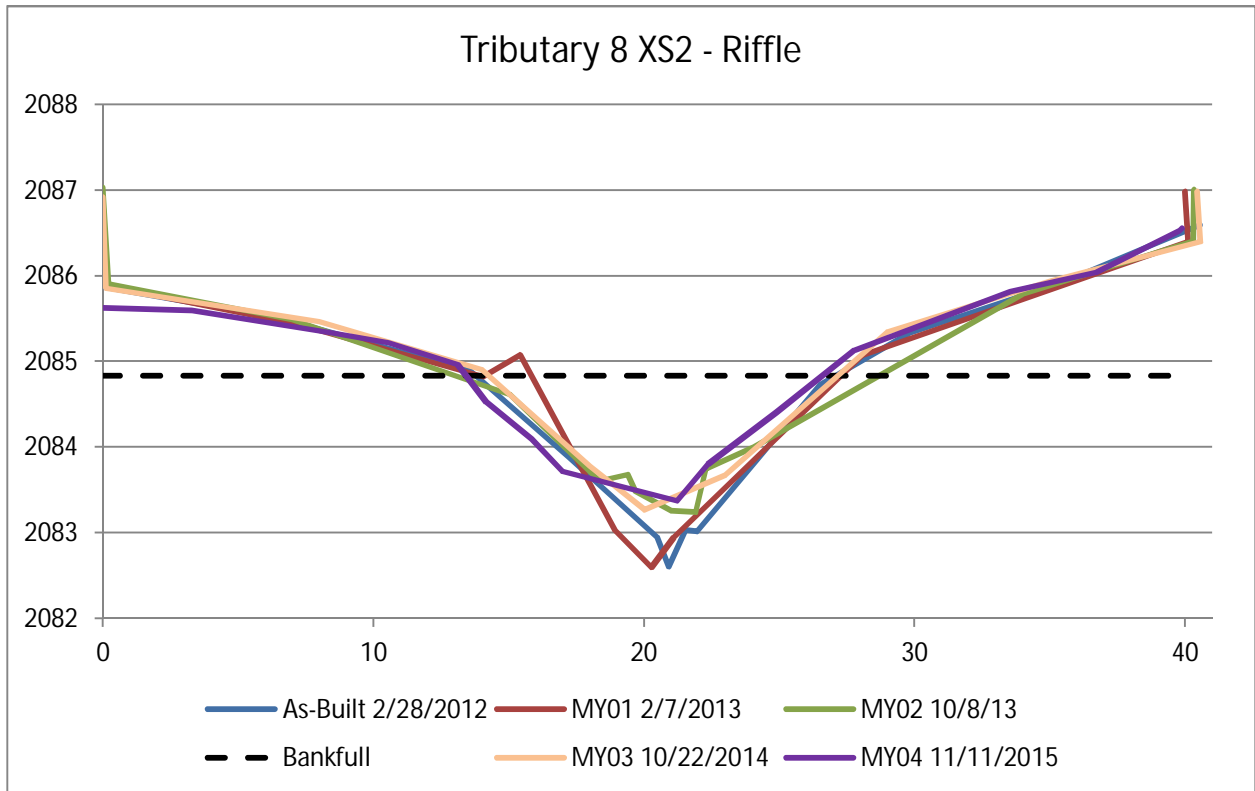
**Figure 10: Tributary 8 Cross Sections with Annual Overlays**



Tributary 8 XS1

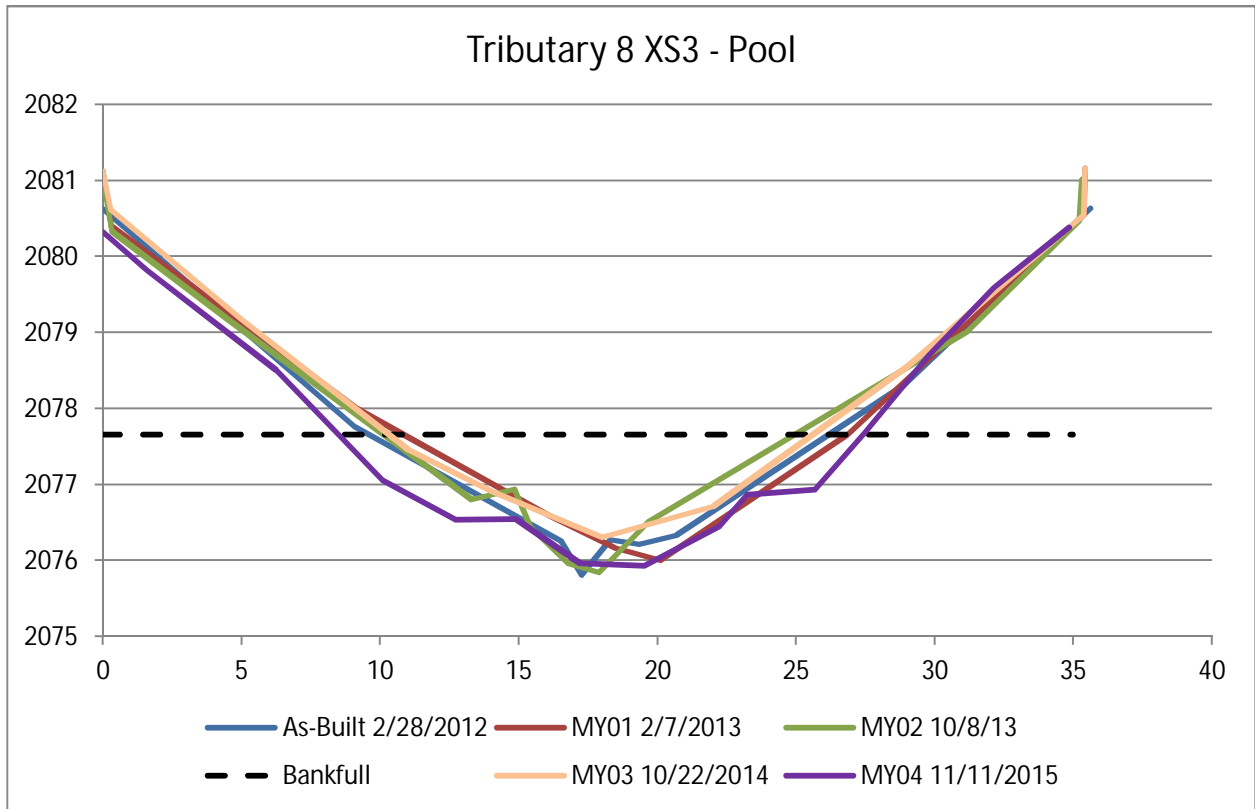
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/13		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2088.87	0.00	2089.56	0.00	2089.67	0.00	2089.56	0.00	2088.54
4.37	2088.01	0.09	2088.75	0.23	2088.75	0.09	2088.78	3.10	2088.21
8.58	2087.34	9.74	2087.13	3.14	2088.25	5.00	2087.97	7.32	2088.09
13.65	2086.48	12.38	2086.90	11.30	2086.88	10.00	2087.23	9.50	2087.57
14.18	2086.26	14.27	2086.33	12.73	2086.89	12.00	2086.91	12.05	2086.93
15.03	2086.45	15.50	2086.74	12.72	2086.66	14.50	2086.48	13.80	2087.02
17.38	2087.14	16.84	2087.01	13.59	2086.70	17.00	2086.96	18.59	2087.13
22.52	2087.66	27.57	2088.43	14.76	2086.43	23.00	2087.72	20.70	2087.53
27.93	2088.58	27.67	2088.86	14.84	2086.83	27.57	2088.43	23.86	2087.86
				16.44	2086.93	27.68	2088.86	26.00	2088.10
				23.80	2087.62			27.29	2088.26
				27.46	2088.22				
				27.62	2088.88				





Tributary 8 XS2

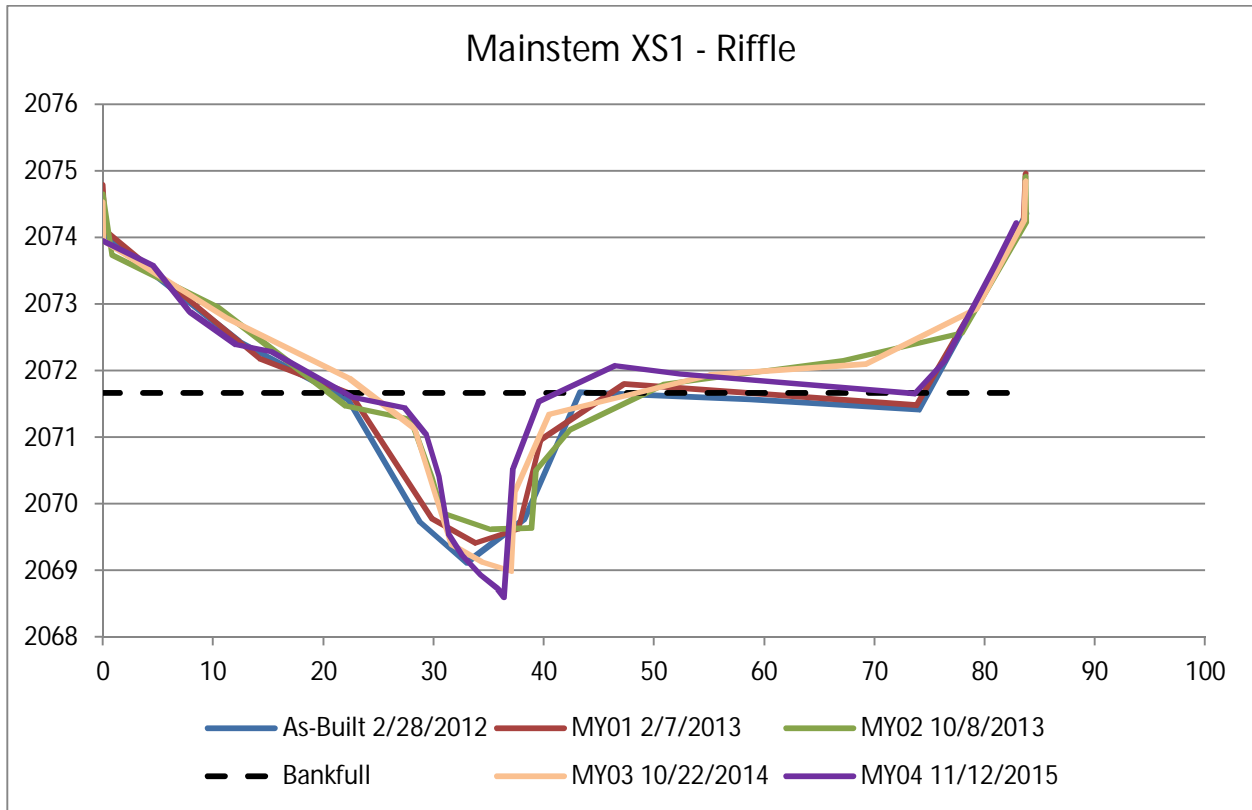
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/13		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2085.87	0.00	2086.92	0.00	2087.03	0.00	2086.92	0.00	2085.62
6.58	2085.50	0.13	2085.89	0.20	2085.91	0.12	2085.86	3.29	2085.60
13.59	2084.89	7.16	2085.44	7.01	2085.49	8.00	2085.47	8.50	2085.33
17.21	2083.88	14.05	2084.83	15.05	2084.62	14.00	2084.91	10.54	2085.22
20.48	2082.95	15.41	2085.08	18.36	2083.60	18.00	2083.78	13.10	2084.97
20.91	2082.60	18.93	2083.03	19.40	2083.68	20.00	2083.27	14.16	2084.53
21.52	2083.03	20.27	2082.60	19.69	2083.49	23.00	2083.68	15.84	2084.09
21.94	2083.01	21.09	2082.95	21.03	2083.26	29.00	2085.35	16.98	2083.72
26.51	2084.72	28.05	2085.07	21.91	2083.24	35.00	2085.94	19.46	2083.52
29.81	2085.33	40.13	2086.40	22.28	2083.75	40.58	2086.40	21.21	2083.37
35.43	2085.92	40.01	2086.98	24.05	2084.00	40.46	2086.98	22.36	2083.80
40.56	2086.60			33.99	2085.78			24.88	2084.41
				40.32	2086.41			27.78	2085.13
				40.33	2087.00			33.55	2085.82
								36.71	2086.04
								39.78	2086.53
								39.89	2086.56



Tributary 8 XS3

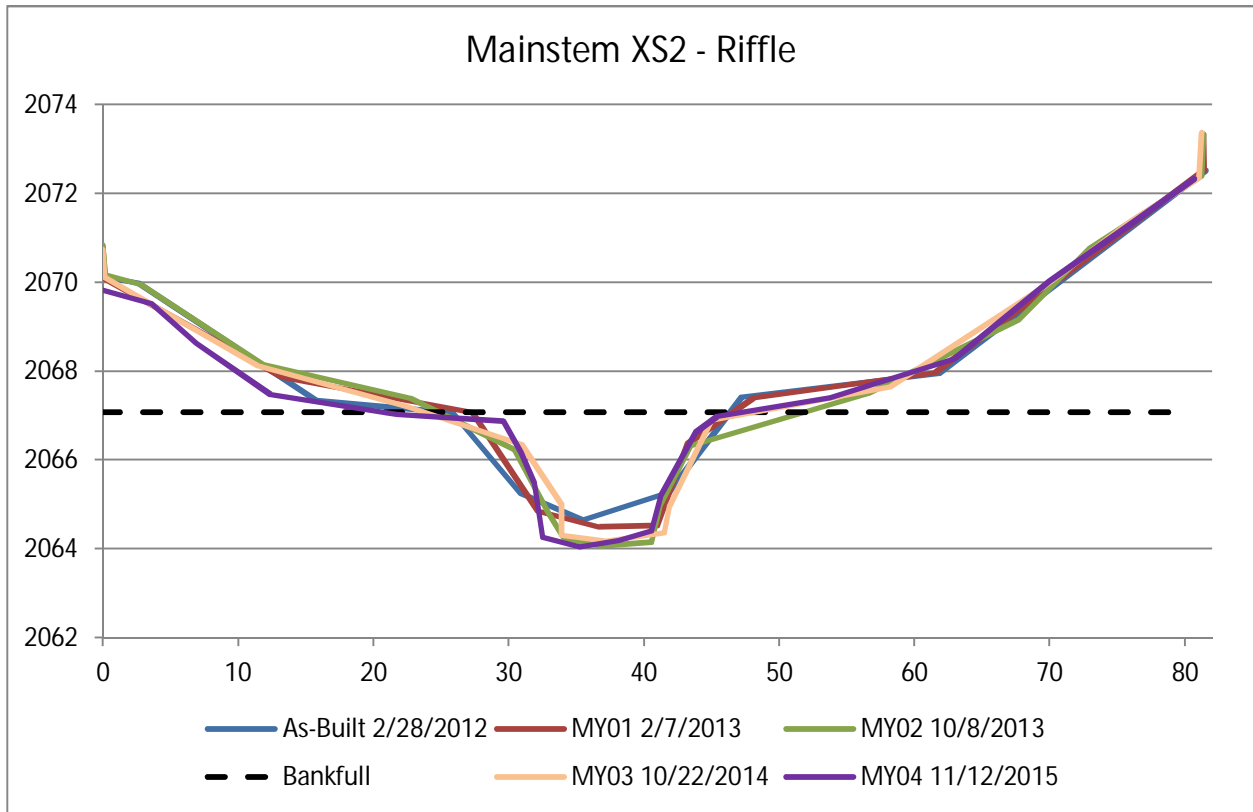
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/13		MY03 10/22/2014		MY04 11/11/2015	
KEE		URS		URS		URS		URS	
0.00	2080.63	0.00	2081.13	0.00	2081.02	0.00	2081.13	0.00	2080.32
9.06	2077.77	0.28	2080.40	0.31	2080.33	0.28	2080.62	1.58	2079.82
16.52	2076.26	9.10	2078.01	4.53	2079.17	5.00	2079.17	6.25	2078.50
17.26	2075.81	16.13	2076.58	13.30	2076.80	11.00	2077.46	10.07	2077.06
18.31	2076.27	18.48	2076.16	14.83	2076.93	14.00	2076.92	12.73	2076.53
19.33	2076.22	20.09	2076.00	15.42	2076.44	18.00	2076.31	14.91	2076.54
20.67	2076.33	26.83	2077.65	16.78	2075.96	22.00	2076.71	17.22	2075.96
28.90	2078.31	35.38	2080.55	17.88	2075.84	29.00	2078.56	19.51	2075.92
35.62	2080.64	35.43	2081.16	19.66	2076.51	35.38	2080.55	22.22	2076.45
				31.15	2079.01			23.21	2076.86
				35.23	2080.47			25.66	2076.93
				35.32	2081.01			27.47	2077.68
								29.78	2078.696
								32.13	2079.589
								34.85	2080.382

**Figure 11: Mainstem – Upstream of Browntown Road Cross Sections with Annual Overlays**



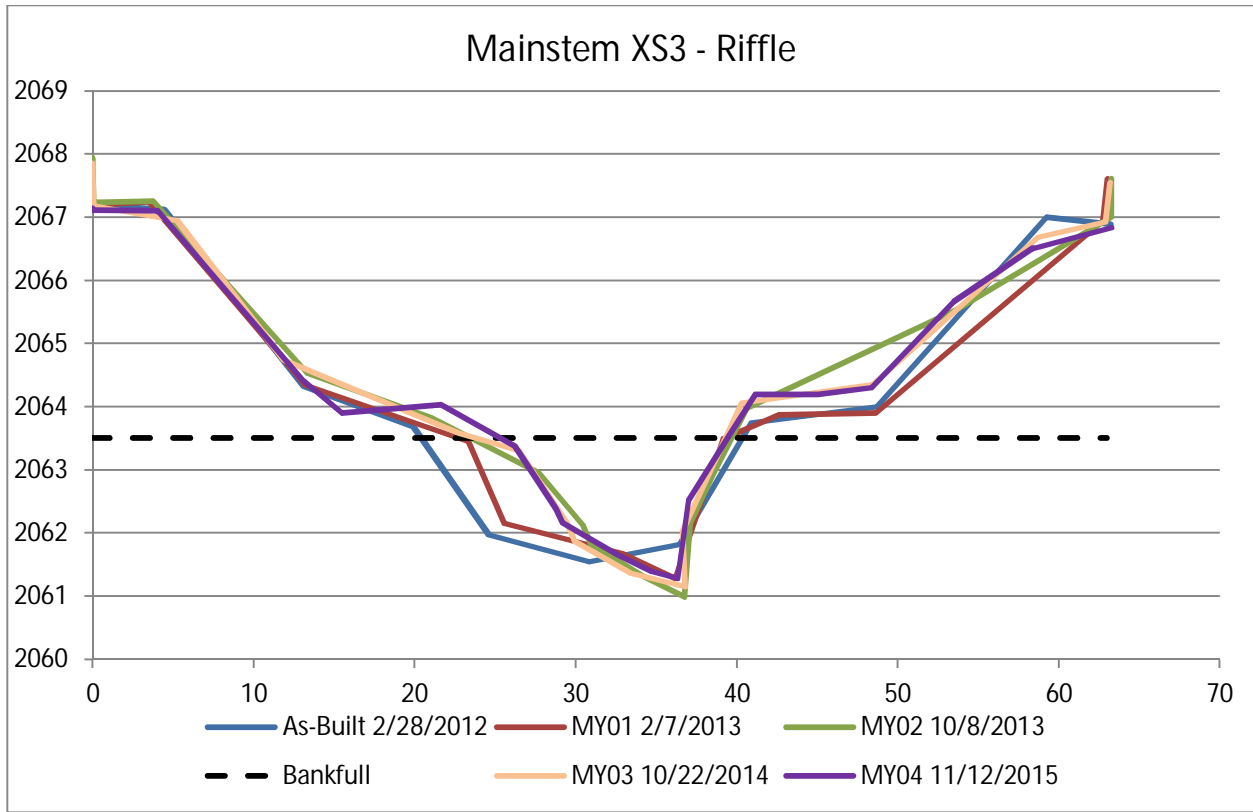
Mainstem Upstream of Browntown Road XS1

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE	URS	URS	URS	URS	URS	URS	URS	URS	URS
0	2074.062	0.00	2074.785	0.00	2074.65	0.00	2074.53	0.00	2073.95
12.4161	2072.436	0.19	2074.106	0.82	2073.744	0.06	2073.96	4.55	2073.58
22.2392	2071.571	14.18	2072.185	10.31	2072.962	11.23	2072.79	7.89	2072.88
28.7208	2069.726	22.43	2071.657	22.03	2071.473	22.33	2071.88	12.07	2072.40
32.9903	2069.114	29.84	2069.777	27.92	2071.27	28.25	2071.14	15.27	2072.28
38.2432	2069.779	33.76	2069.414	29.83	2070.393	30.20	2070.12	22.57	2071.60
43.2398	2071.676	37.67	2069.624	30.76	2069.868	31.57	2069.40	27.40	2071.45
58.6085	2071.571	39.72	2070.966	35.17	2069.611	34.44	2069.12	29.28	2071.05
74.0392	2071.416	47.25	2071.795	38.89	2069.632	37.02	2068.99	30.47	2070.41
83.8001	2074.363	73.79	2071.482	39.30	2070.513	37.41	2070.19	31.35	2069.55
		83.57	2074.263	42.36	2071.116	40.48	2071.35	32.53	2069.23
		83.69	2074.963	50.89	2071.797	54.95	2071.94	34.26	2068.93
				67.18	2072.156	69.13	2072.09	35.79	2068.72
				77.90	2072.571	79.26	2072.94	36.39	2068.60
				83.79	2074.238	83.57	2074.27	37.20	2070.54
				83.69	2074.916	83.69	2074.85	39.51	2071.54
								46.44	2072.08
								52.38	2071.95
								73.63	2071.66
								76.32	2072.14
								80.87	2073.57
								82.85	2074.22



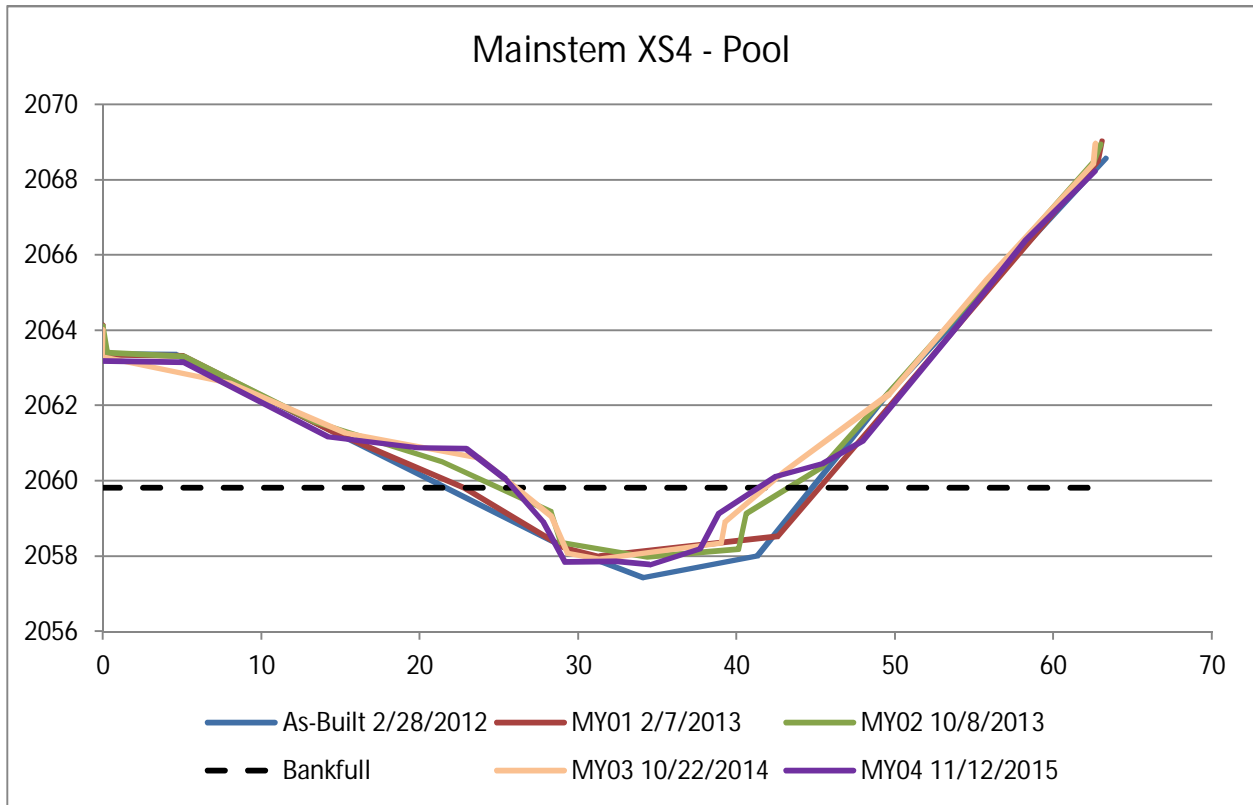
Mainstem Upstream of Browntown Road XS2

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2070.132	0.00	2070.824	0.00	2070.836	0.00	2070.73	0.00	2069.82
2.6192	2069.988	0.16	2070.062	0.16	2070.169	0.11	2070.11	3.59	2069.52
15.8434	2067.338	13.22	2067.865	2.79	2069.954	11.43	2068.12	6.92	2068.62
25.86	2067.062	27.31	2067.067	11.83	2068.147	22.53	2067.20	12.38	2067.48
30.8474	2065.253	32.10	2064.854	22.74	2067.389	30.95	2066.36	21.73	2067.03
35.4955	2064.659	36.65	2064.494	30.39	2066.236	33.90	2064.98	29.63	2066.87
41.829	2065.279	40.96	2064.526	32.91	2064.816	33.94	2064.31	30.91	2066.17
47.2124	2067.417	43.20	2066.361	34.05	2064.256	37.23	2064.18	31.89	2065.49
61.8097	2067.952	48.14	2067.409	36.82	2064.056	41.47	2064.37	32.50	2064.27
81.5124	2072.516	61.49	2067.97	40.56	2064.147	41.85	2064.95	35.26	2064.04
		81.42	2072.532	41.22	2065	44.98	2066.90	38.14	2064.19
		81.37	2073.318	43.42	2066.317	58.18	2067.65	40.52	2064.40
				56.60	2067.512	69.29	2069.86	41.25	2065.21
				67.70	2069.159	75.98	2071.37	43.80	2066.63
				72.94	2070.763	81.04	2072.36	45.41	2066.98
				81.25	2072.402	81.26	2073.36	53.76	2067.41
				81.39	2073.32			63.00	2068.29
								69.97	2070.03
								76.20	2071.37
								80.66	2072.33



Mainstem Upstream of Browntown Road XS3

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2067.19	0.00	2067.909	0.00	2067.947	0.00	2067.86	0.00	2067.14
4.4327	2067.123	-0.08	2067.195	0.09	2067.232	0.09	2067.19	0.01	2067.11
13.0977	2064.323	3.50	2067.247	3.77	2067.251	5.24	2066.95	4.06	2067.10
19.916	2063.687	13.19	2064.349	13.30	2064.534	11.88	2064.74	13.04	2064.42
24.5923	2061.976	23.31	2063.452	21.04	2063.833	22.72	2063.59	15.50	2063.90
30.8506	2061.55	25.55	2062.158	27.68	2062.961	26.44	2063.31	21.66	2064.03
36.445	2061.819	32.85	2061.676	30.46	2062.121	29.49	2062.14	26.17	2063.39
40.9076	2063.75	36.15	2061.285	30.90	2061.827	29.91	2061.87	28.77	2062.38
48.6652	2064	39.15	2063.495	34.12	2061.323	33.43	2061.37	29.17	2062.16
59.2229	2067	42.58	2063.867	36.76	2060.991	36.82	2061.15	32.56	2061.66
63.2372	2066.886	48.62	2063.903	37.11	2062.161	36.65	2062.04	34.69	2061.40
		62.74	2066.95	38.46	2062.903	40.30	2064.06	36.33	2061.28
		63.02	2067.611	40.60	2063.983	48.43	2064.35	37.01	2062.52
				53.66	2065.537	58.68	2066.69	39.57	2063.57
				63.25	2067.01	62.89	2066.93	41.14	2064.19
				63.25	2067.61	63.17	2067.55	45.04	2064.19
								48.38	2064.31
								53.47	2065.66
								58.39	2066.52
								58.35	2066.50
								63.27	2066.84



Mainstem Upstream of Browntown Road XS4

As-Built 2/28/2012		KEE
0	2063.374	
4.6347	2063.354	
16.0365	2061.006	
29.2988	2058.193	
34.0709	2057.426	
41.3221	2058.018	
49.4528	2062.263	
63.2853	2068.569	

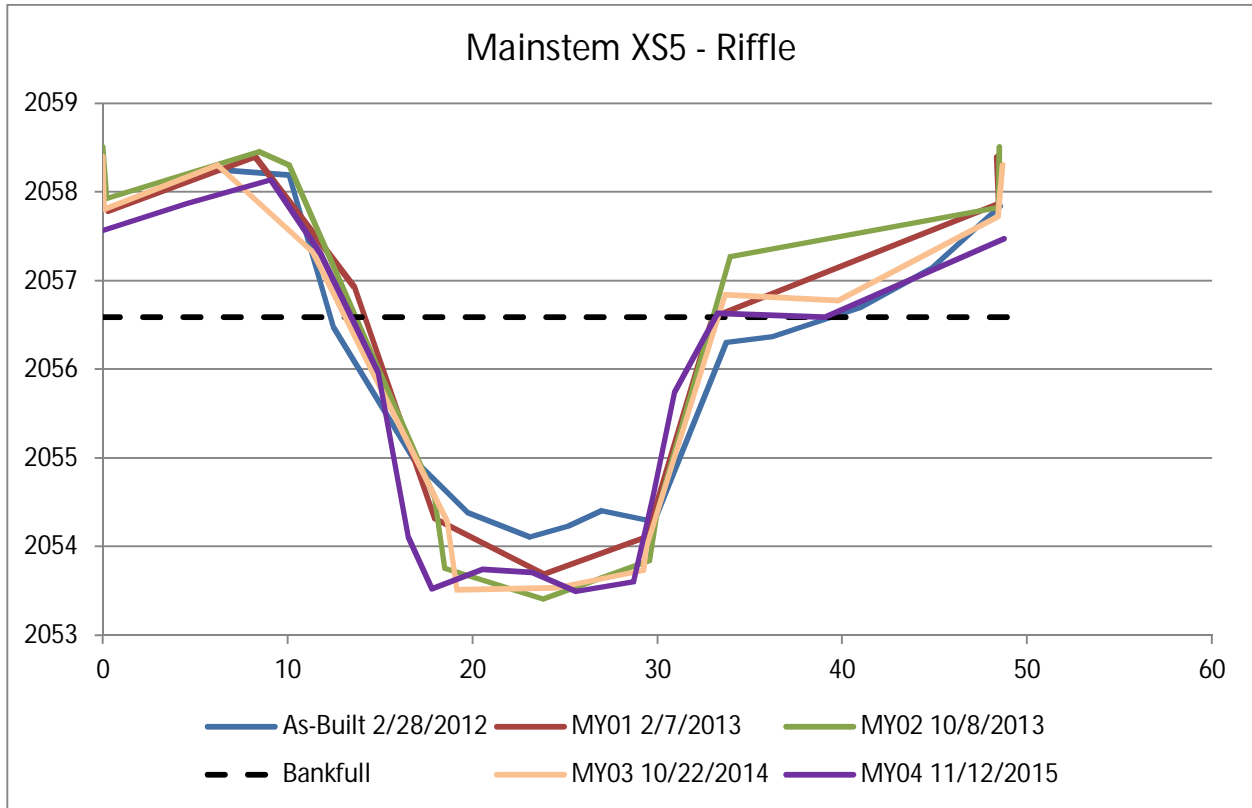
MY01 2/7/2013		URS
0.00	2064.138	
-0.12	2063.357	
5.07	2063.31	
14.48	2061.309	
22.82	2059.81	
29.06	2058.238	
31.31	2057.991	
42.57	2058.514	
49.60	2061.979	
62.80	2068.506	
63.06	2069.027	

MY02 10/8/2013		URS
0.00	2064.109	
0.26	2063.407	
5.18	2063.304	
13.39	2061.562	
21.41	2060.512	
28.27	2059.183	
28.86	2058.361	
34.39	2057.984	
40.10	2058.176	
40.58	2059.128	
45.40	2060.379	
54.01	2064.446	
62.54	2068.487	
62.98	2068.947	

MY03 10/22/2014		URS
0.00	2064.01	
-0.06	2063.29	
7.99	2062.60	
15.30	2061.28	
23.69	2060.61	
28.30	2059.05	
29.32	2058.08	
31.32	2057.93	
39.00	2058.36	
39.28	2058.92	
43.06	2060.28	
49.64	2062.31	
55.75	2065.35	
62.51	2068.43	
62.64	2068.95	

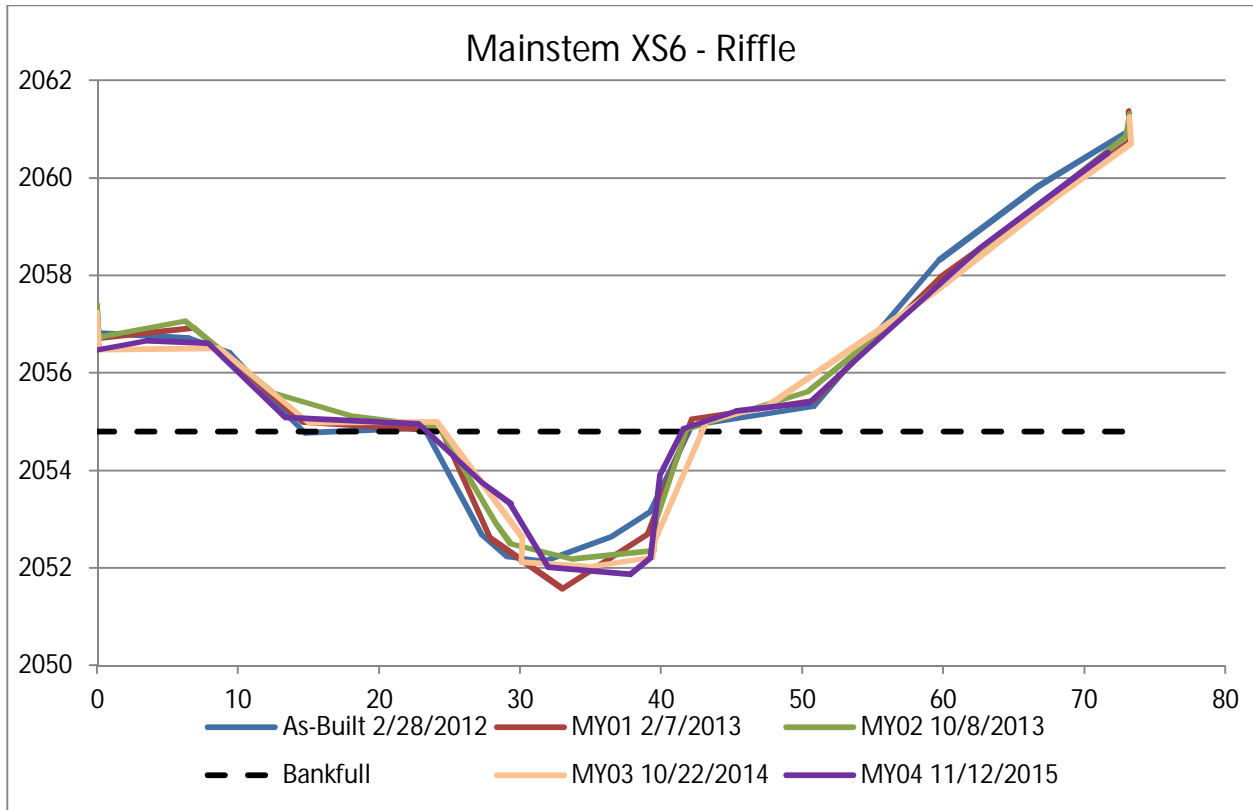
MY04 11/12/2015		URS
0.00	2063.18	
5.10	2063.15	
14.21	2061.17	
19.81	2060.88	
22.94	2060.85	
25.41	2060.06	
27.78	2058.91	
29.15	2057.83	
32.38	2057.85	
34.52	2057.77	
37.67	2058.20	
38.86	2059.13	
42.46	2060.12	
45.38	2060.46	
47.97	2061.06	
53.84	2064.06	
58.25	2066.39	
62.61	2068.23	

**Figure 12: Mainstem – Downstream of Browntown Road Cross Sections with Annual Overlays**



Mainstem Downstream of Browntown Road XS5

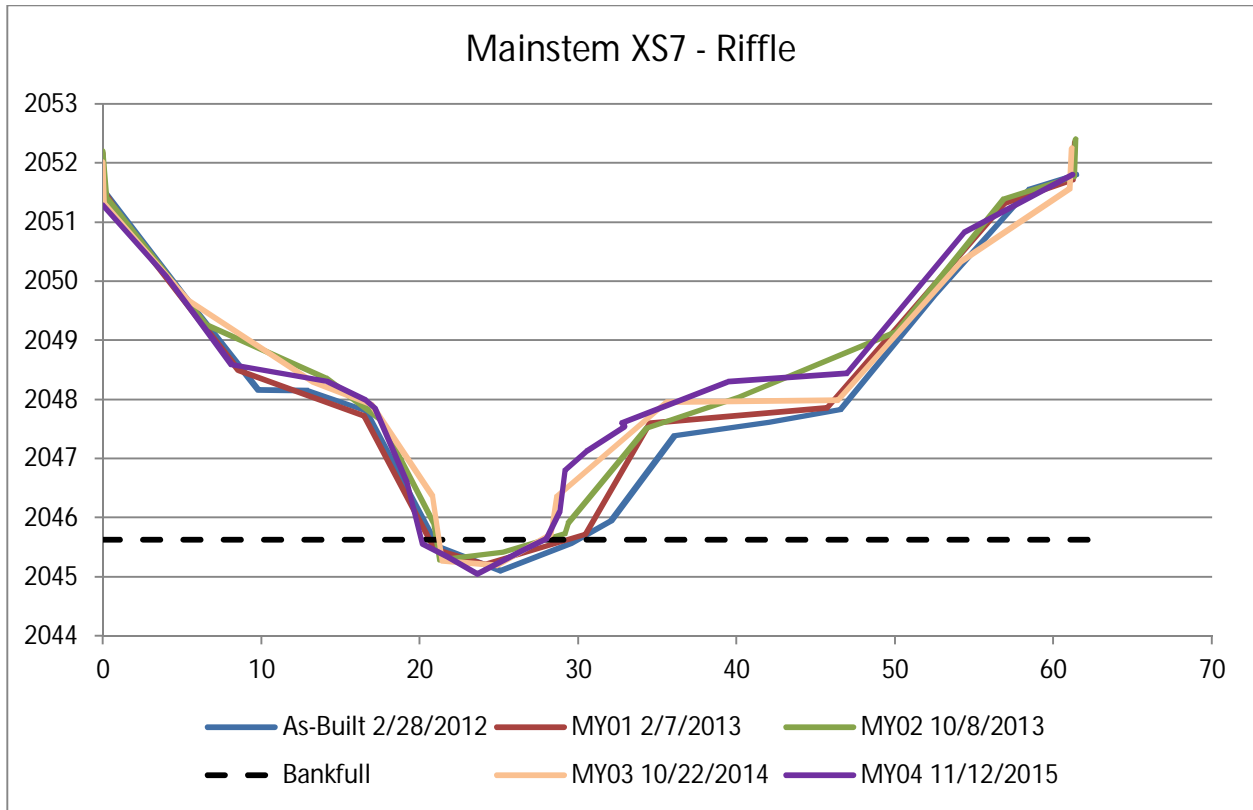
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2057.925	0.00	2058.401	0.00	2058.507	0.00	2058.40	0.00	2057.57
5.9297	2058.253	0.25	2057.789	0.19	2057.934	0.06	2057.81	4.53	2057.87
10.0609	2058.19	8.24	2058.402	8.45	2058.457	6.20	2058.31	9.08	2058.14
12.4738	2056.482	13.60	2056.927	10.08	2058.304	11.34	2057.33	11.77	2057.31
16.821	2054.986	17.94	2054.32	17.93	2054.557	18.60	2054.28	14.88	2055.97
19.7434	2054.383	23.86	2053.693	18.47	2053.759	19.14	2053.52	16.50	2054.11
23.0883	2054.108	29.38	2054.11	23.80	2053.413	24.42	2053.54	17.79	2053.53
25.1727	2054.237	32.95	2056.588	29.58	2053.844	29.25	2053.74	20.49	2053.74
26.9522	2054.404	48.48	2057.877	29.99	2054.395	29.40	2053.99	23.28	2053.71
29.8047	2054.287	48.36	2058.401	33.91	2057.276	33.64	2056.84	25.57	2053.50
33.7347	2056.304			48.46	2057.827	39.74	2056.78	28.69	2053.61
36.2155	2056.369			48.52	2058.508	48.44	2057.73	29.78	2054.59
40.9048	2056.694					48.67	2058.31	30.92	2055.75
44.8342	2057.144							33.23	2056.63
48.5411	2057.842							39.03	2056.59
								48.75	2057.48



Mainstem Downstream of Browntown Road XS6

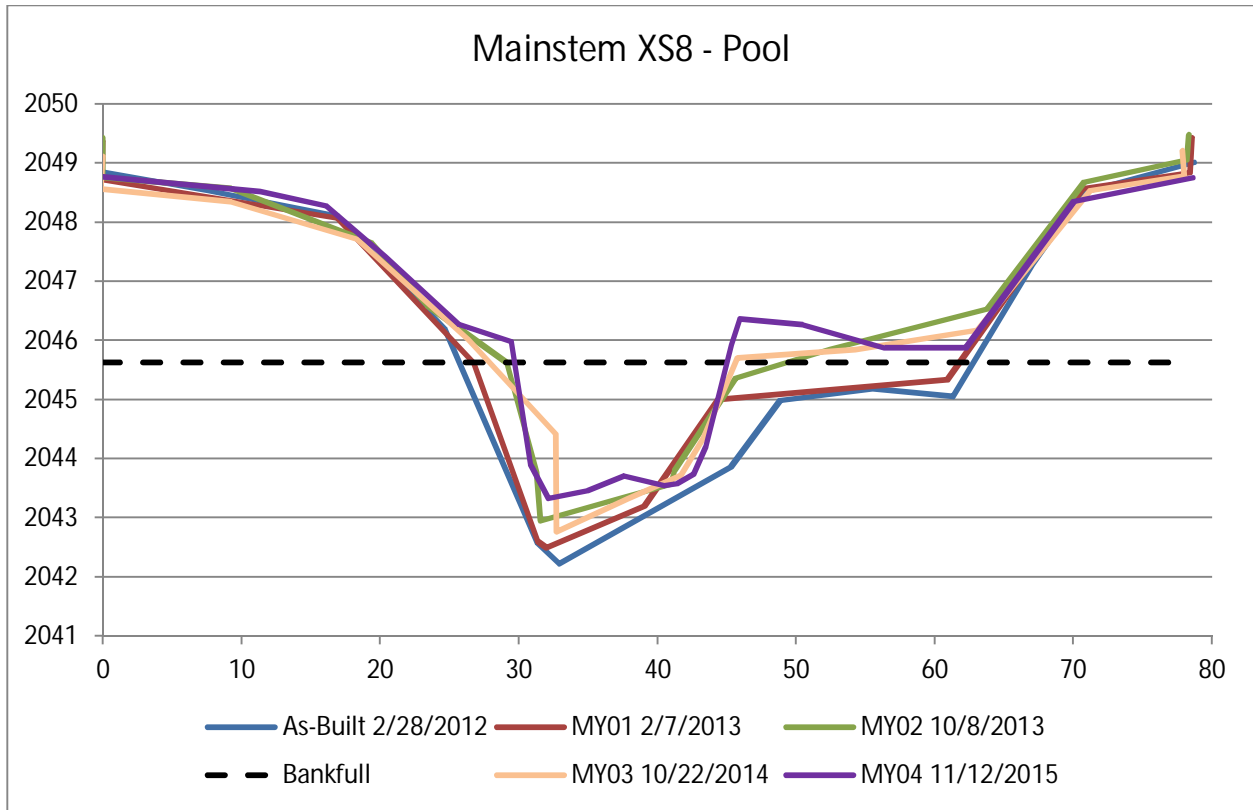
As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2056.814	0.00	2057.39	0.00	2057.395	0.00	2057.23	0.00	2056.48
6.562	2056.708	0.11	2056.706	0.13	2056.74	0.19	2056.48	3.43	2056.66
9.399	2056.419	6.91	2056.926	6.21	2057.065	8.70	2056.50	7.89	2056.60
13.4204	2055.146	14.57	2054.986	12.43	2055.597	15.02	2054.98	13.36	2055.09
14.7415	2054.769	24.48	2054.802	18.03	2055.117	24.11	2054.99	22.85	2054.96
23.2017	2054.869	27.87	2052.611	24.22	2054.898	30.18	2052.62	27.27	2053.75
27.2717	2052.676	32.99	2051.573	28.26	2052.922	30.09	2052.12	29.36	2053.31
29.04	2052.228	39.04	2052.692	29.32	2052.497	34.83	2052.02	29.32	2053.29
31.7226	2052.141	42.16	2055.055	33.74	2052.179	39.40	2052.23	32.00	2052.00
36.4605	2052.636	50.81	2055.443	39.47	2052.352	39.56	2052.59	35.16	2051.93
39.2248	2053.157	59.76	2057.96	39.66	2052.992	43.19	2055.01	37.79	2051.87
40.361	2053.832	73.24	2060.761	41.80	2054.851	47.56	2055.34	39.27	2052.21
42.1732	2054.926	73.13	2061.374	50.40	2055.617	59.41	2057.67	39.93	2053.93
50.8334	2055.319			62.52	2058.461	68.10	2059.64	41.55	2054.86
59.6708	2058.317			72.92	2060.855	73.34	2060.71	45.24	2055.22
66.6759	2059.827			73.19	2061.318	73.19	2061.26	50.48	2055.38
73.2022	2060.98							54.02	2056.33
								62.61	2058.58
								71.64	2060.53





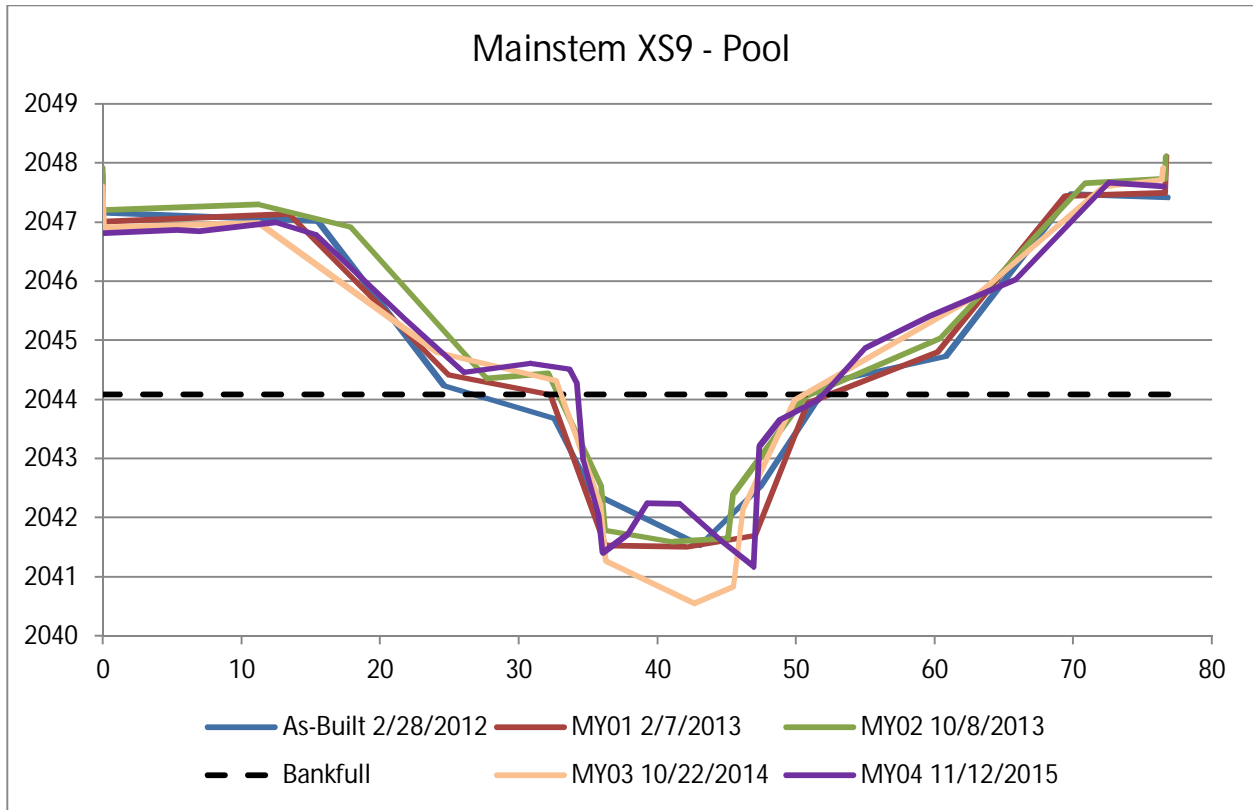
Mainstem Downstream of Browntown Road XS7

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2051.554	0.00	2052.17	0.00	2052.197	0.00	2052.01	0.00	2051.29
5.1556	2049.744	0.12	2051.503	0.24	2051.412	0.08	2051.32	3.98	2050.08
9.8014	2048.158	1.51	2050.912	6.46	2049.276	5.39	2049.67	8.11	2048.59
12.9772	2048.153	8.54	2048.494	14.04	2048.363	13.24	2048.30	14.12	2048.31
16.5994	2047.808	16.47	2047.72	17.42	2047.684	16.91	2047.92	16.55	2047.99
21.1335	2045.515	20.94	2045.474	20.88	2045.91	20.81	2046.37	17.14	2047.86
25.0671	2045.109	24.10	2045.217	21.24	2045.286	21.38	2045.27	19.20	2046.60
29.5685	2045.574	30.45	2045.717	25.23	2045.423	24.82	2045.19	20.17	2045.56
32.0625	2045.948	34.47	2047.599	29.15	2045.728	28.28	2045.72	21.74	2045.35
36.0525	2047.394	45.67	2047.851	29.37	2045.909	28.62	2046.36	23.64	2045.05
42.0455	2047.612	56.89	2051.324	34.33	2047.523	35.55	2047.96	26.56	2045.46
46.57	2047.834	61.23	2051.717	40.11	2048.034	46.37	2047.98	28.00	2045.65
52.5161	2049.769	61.36	2052.365	50.12	2049.151	54.15	2050.34	28.84	2046.11
58.4578	2051.562			56.86	2051.394	61.03	2051.57	29.14	2046.81
61.4321	2051.812			61.32	2051.772	61.17	2052.26	30.55	2047.13
				61.41	2052.405			32.93	2047.55
								32.76	2047.61
								39.41	2048.30
								46.93	2048.44
								54.36	2050.83
								61.18	2051.81



Mainstem Downstream of Browntown Road XS8

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2048.851	0.00	2049.361	0.00	2049.424	0.00	2049.11	0.00	2048.77
7.5733	2048.535	-0.05	2048.724	0.00	2048.753	-0.14	2048.55	11.33	2048.52
16.9398	2048.108	16.90	2048.074	9.26	2048.57	9.25	2048.34	16.12	2048.28
24.6471	2046.195	26.70	2045.624	19.40	2047.649	18.30	2047.71	20.35	2047.42
31.3548	2042.574	31.35	2042.598	23.36	2046.601	26.34	2046.01	25.65	2046.27
32.9069	2042.22	31.98	2042.495	29.14	2045.62	32.68	2044.41	29.44	2045.98
45.272	2043.858	39.03	2043.196	31.31	2043.76	32.72	2042.77	30.82	2043.90
48.8273	2044.981	44.37	2044.998	31.59	2042.946	37.79	2043.31	32.10	2043.33
55.4931	2045.185	60.88	2045.334	37.42	2043.343	41.69	2043.72	34.95	2043.46
61.299	2045.054	70.69	2048.572	40.94	2043.57	43.28	2044.34	37.57	2043.71
67.0118	2047.282	78.42	2048.846	41.23	2043.794	45.74	2045.70	40.46	2043.54
70.679	2048.508	78.56	2049.427	45.66	2045.36	54.28	2045.84	41.39	2043.58
78.7178	2049.012			52.44	2045.855	63.09	2046.17	42.59	2043.74
				63.80	2046.536	71.21	2048.54	43.47	2044.20
				70.75	2048.683	78.00	2048.79	45.31	2045.92
				78.18	2049.059	77.88	2049.21	45.94	2046.36
				78.33	2049.475			50.51	2046.26
								56.37	2045.87
								62.21	2045.87
								70.00	2048.36
								78.63	2048.75



Mainstem Downstream of Browntown Road XS9

As-Built 2/28/2012		MY01 2/7/2013		MY02 10/8/2013		MY03 10/22/2014		MY04 11/12/2015	
KEE		URS		URS		URS		URS	
0	2047.164	0.00	2047.797	0.00	2047.919	0.00	2047.60	0	2046.815
15.4834	2047.018	0.01	2047.009	0.00	2047.2	0.10	2046.91	5.28	2046.87
24.6158	2044.23	13.40	2047.136	11.27	2047.3	11.24	2046.98	6.94	2046.85
32.5523	2043.681	24.92	2044.42	17.84	2046.917	24.13	2044.80	12.49	2047.00
35.2546	2042.431	32.26	2044.081	27.70	2044.352	32.68	2044.33	15.37	2046.79
43.075	2041.533	36.23	2041.526	32.13	2044.439	35.91	2042.19	21.79	2045.36
47.45	2042.533	42.10	2041.506	35.96	2042.522	36.29	2041.27	26.01	2044.46
52.3752	2044.295	47.05	2041.701	36.22	2041.787	42.67	2040.56	30.82	2044.61
60.7911	2044.733	50.80	2043.939	41.10	2041.594	45.47	2040.83	33.64	2044.51
69.811	2047.474	60.26	2044.807	45.12	2041.641	46.14	2042.15	34.20	2044.26
76.7954	2047.415	69.37	2047.438	45.45	2042.402	49.88	2043.99	34.65	2042.96
		76.64	2047.492	50.65	2044.049	62.86	2045.74	35.79	2042.03
		76.72	2048.107	60.36	2045.041	72.14	2047.60	36.06	2041.40
				70.83	2047.662	76.39	2047.72	37.86	2041.72
				76.64	2047.734	76.47	2047.92	39.24	2042.24
				76.68	2048.116			41.63	2042.23
								44.62	2041.60
								46.95	2041.17
								47.34	2043.22
								48.82	2043.66
								51.61	2044.00
								54.99	2044.87
								59.65	2045.42
								65.84	2046.03
								72.51	2047.66
								76.55	2047.60

---

This page left intentionally blank

Figure 13: Tributary 3 Longitudinal Profile with Annual Overlays

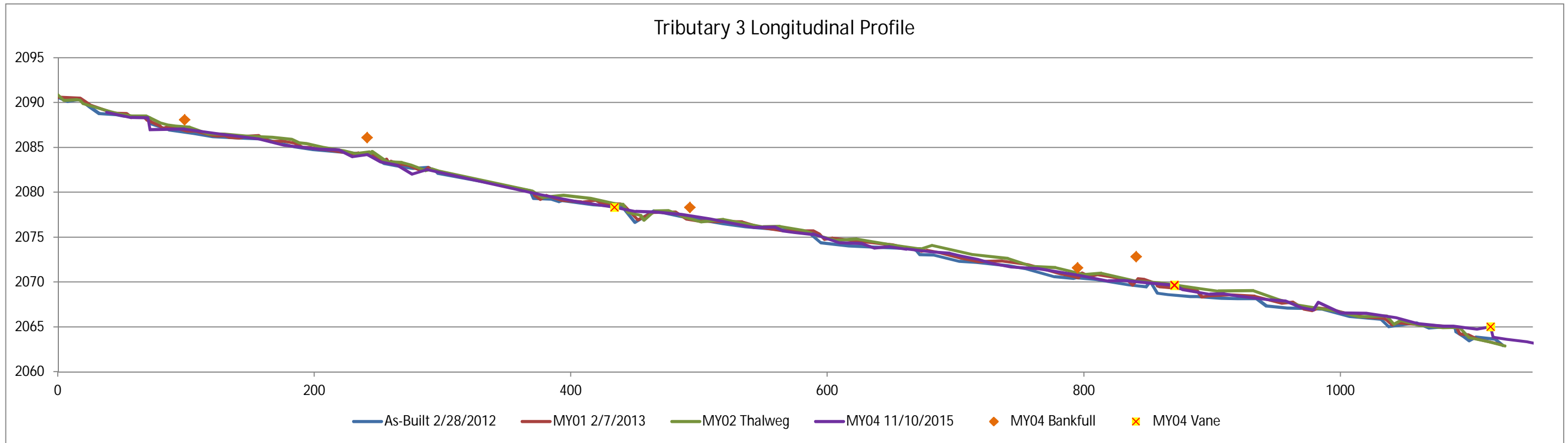


Figure 14: Tributary 4 Longitudinal Profile with Annual Overlays

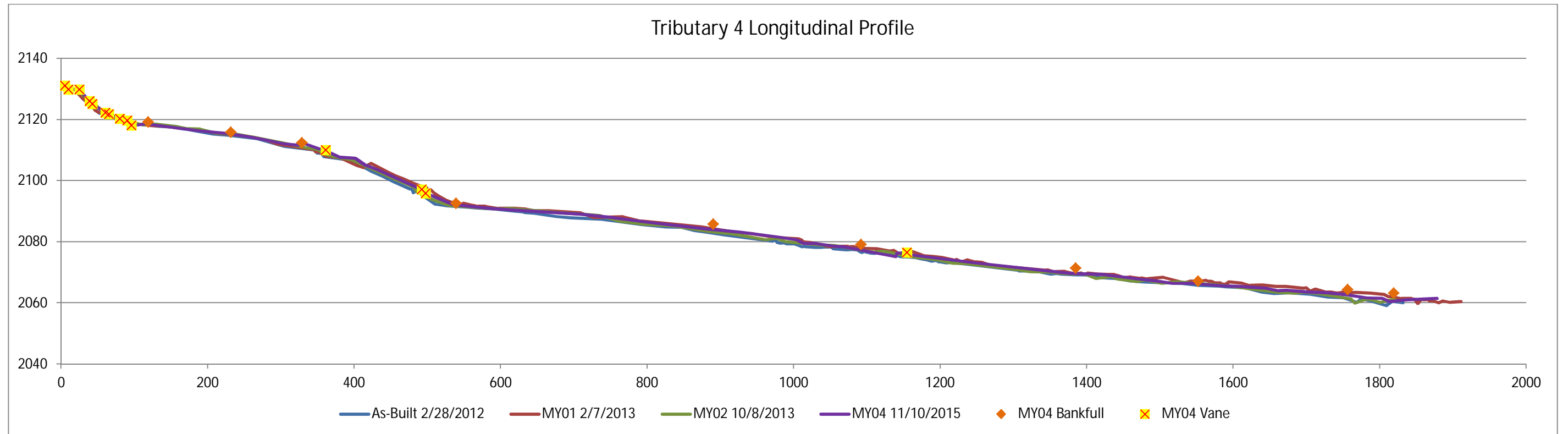


Figure 15: Tributary 5 Longitudinal Profile with Annual Overlays

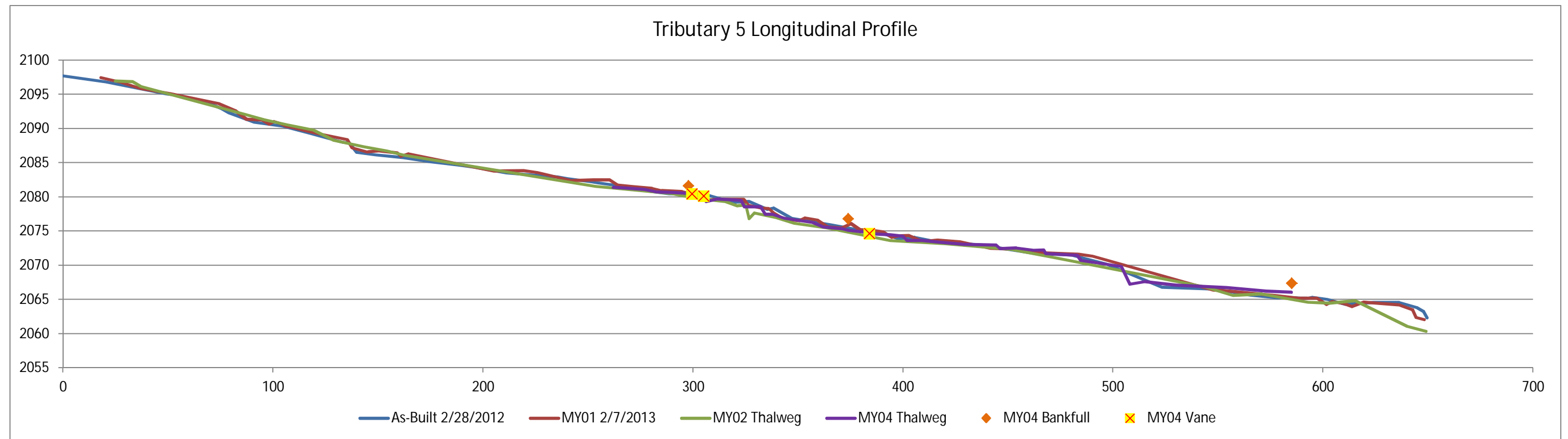


Figure 16: Tributary 6 Longitudinal Profile with Annual Overlays

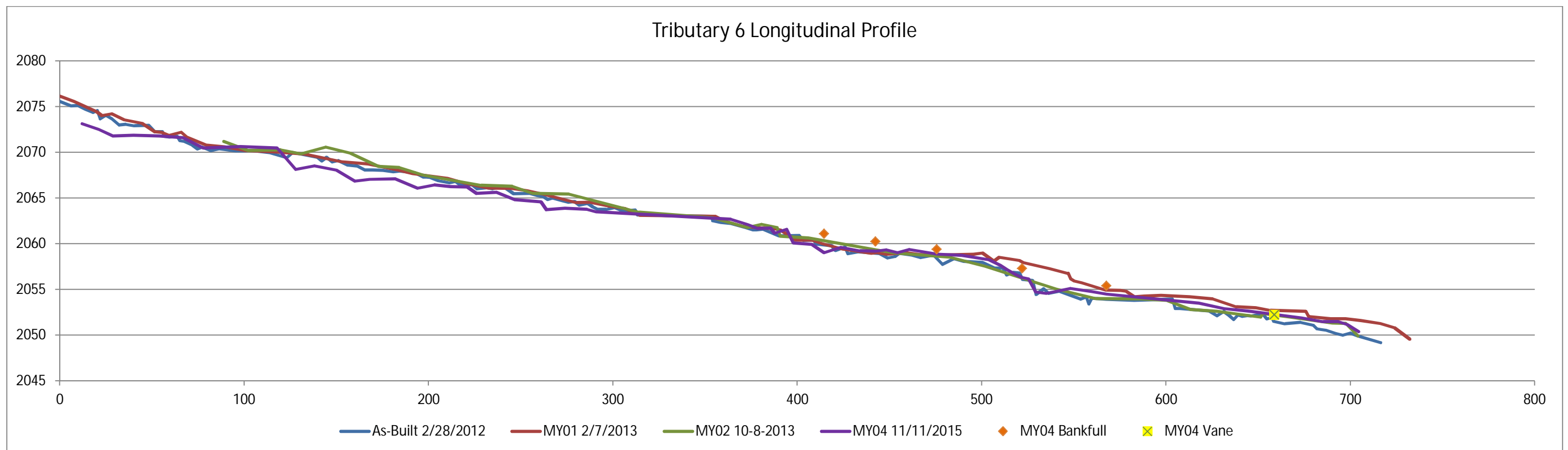


Figure 17: Tributary 7 Longitudinal Profile with Annual Overlays

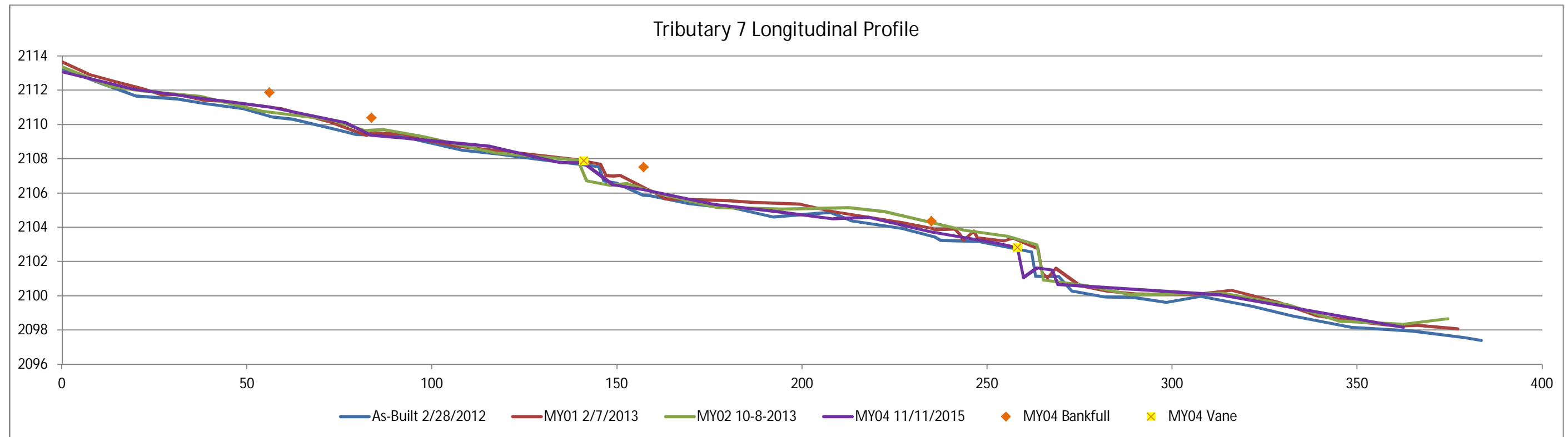
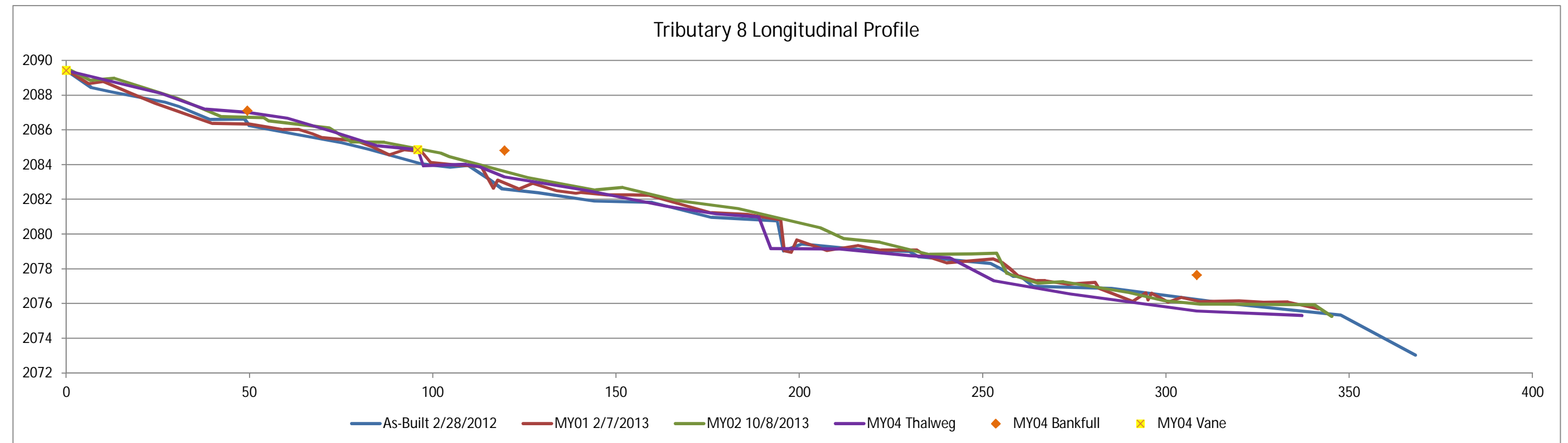
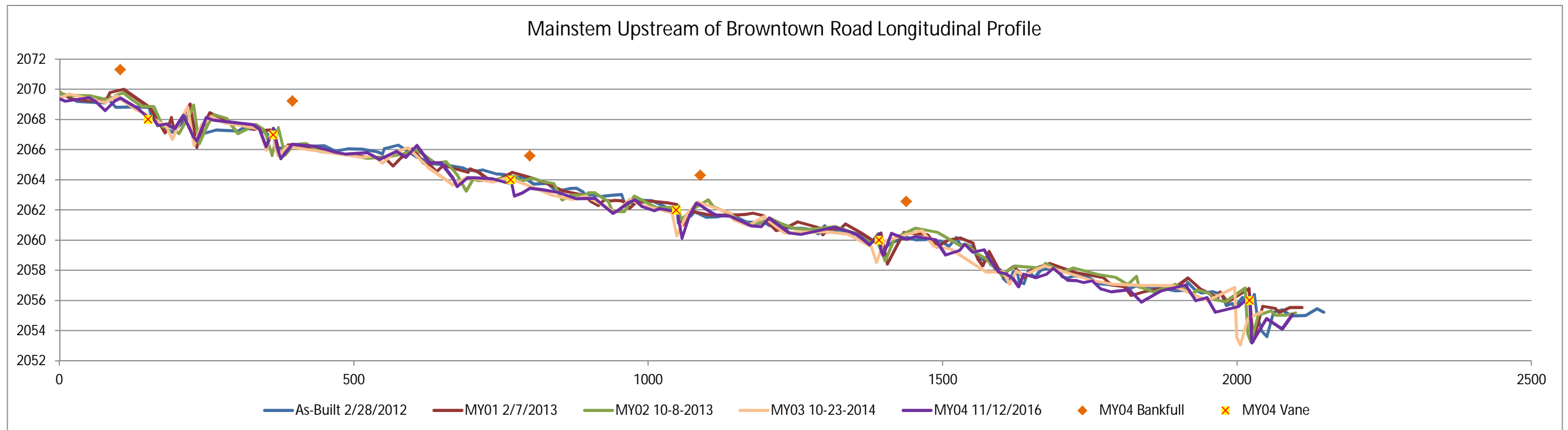


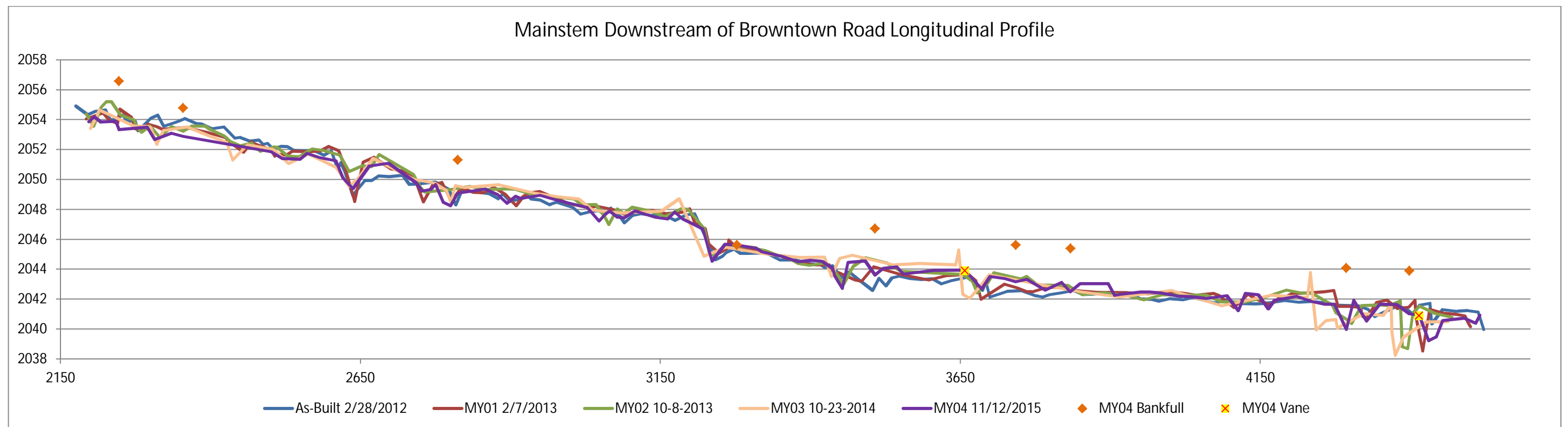
Figure 18: Tributary 8 Longitudinal Profile with Annual Overlays



**Figure 19: Mainstem – Upstream of Browntown Road Longitudinal Profile with Annual Overlays**

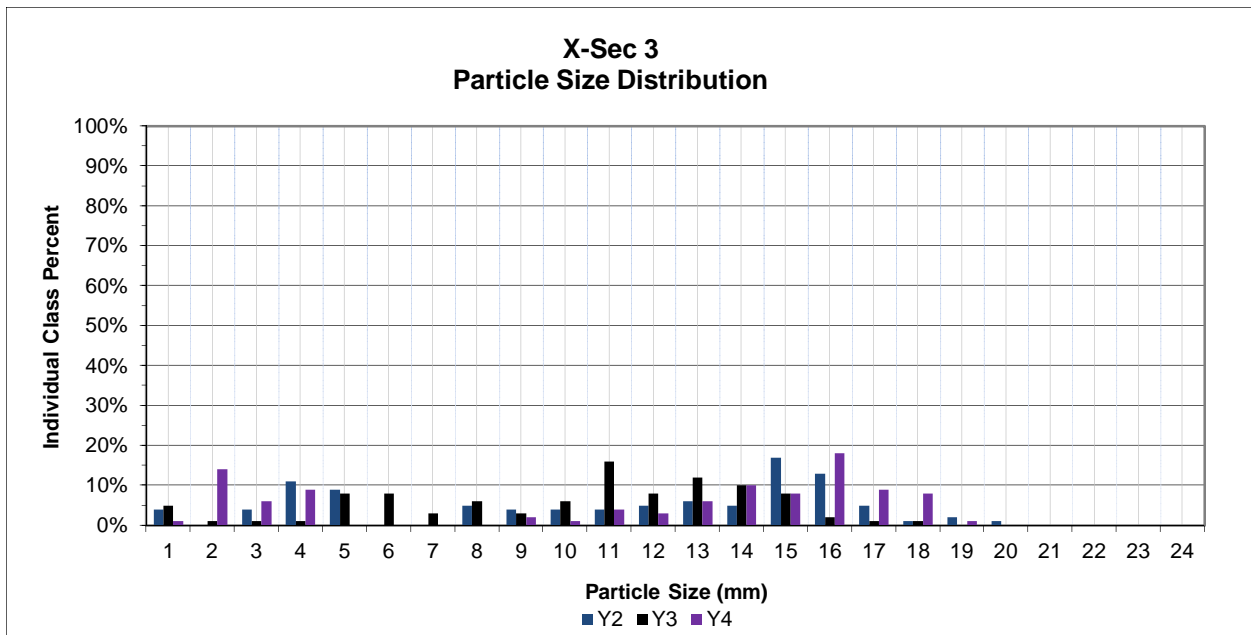
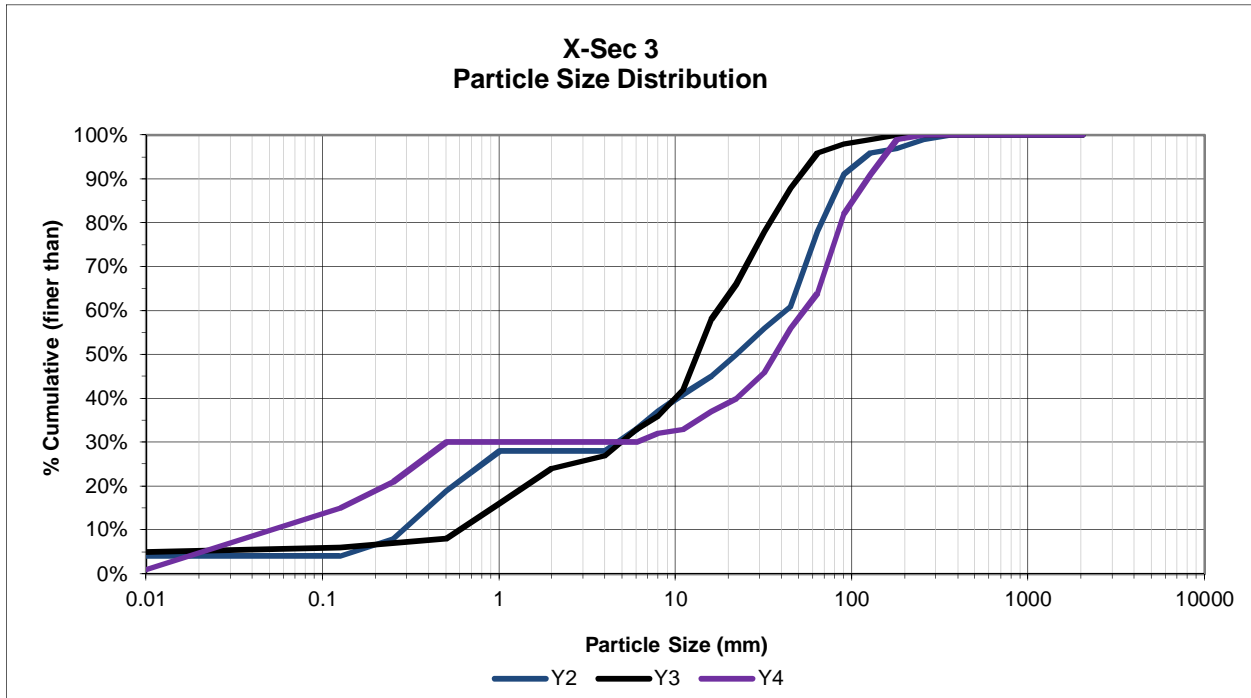


**Figure 20: Mainstem – Downstream of Browntown Road Longitudinal Profile with Annual Overlays**



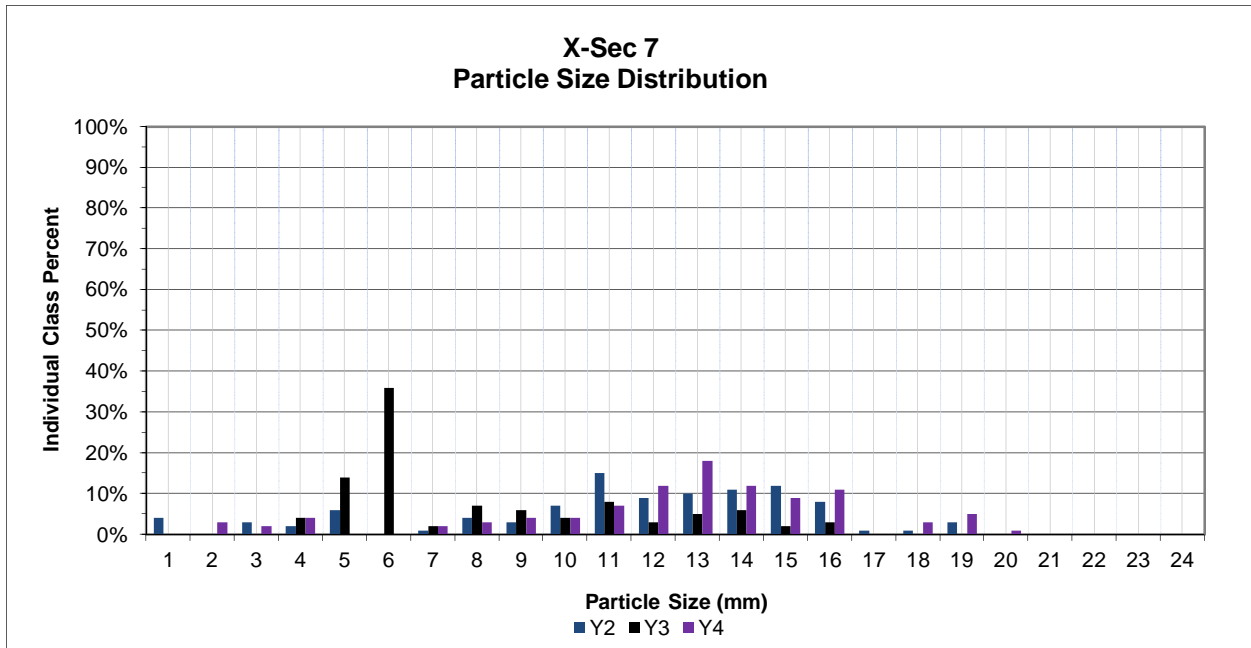
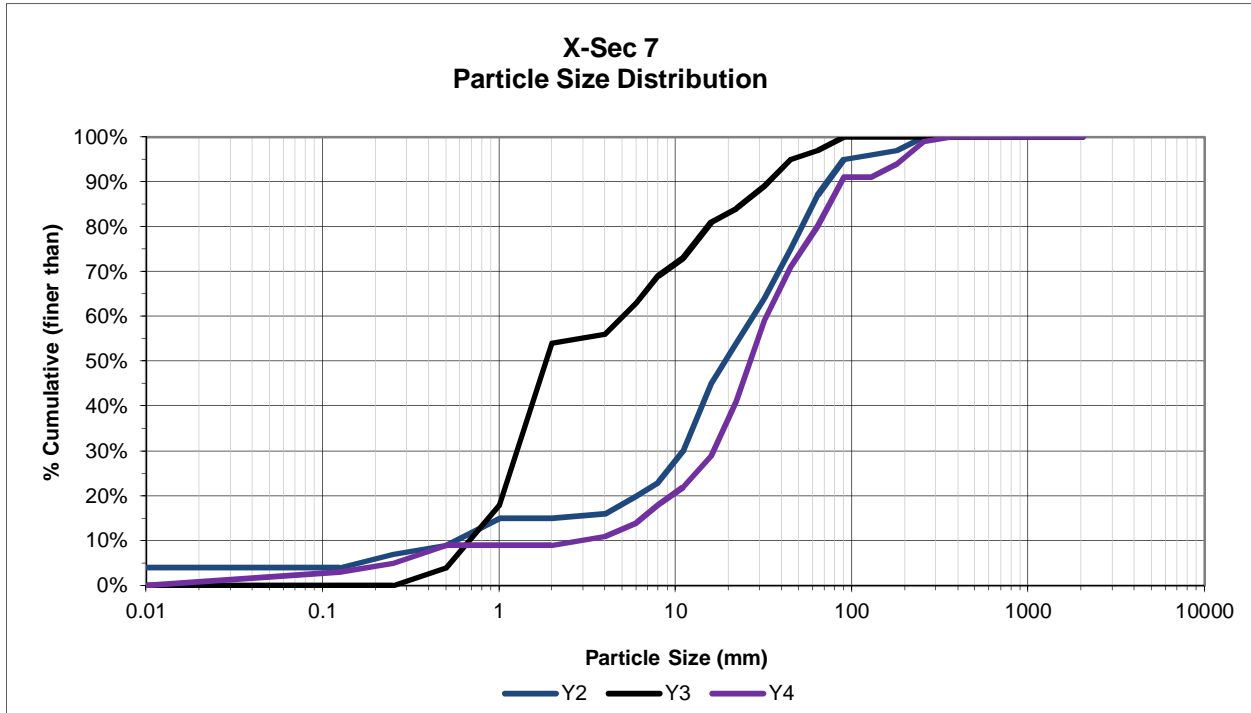


**Figure 21: Pebble Count Plot – Mainstem Upstream of Browntown Road (Riffle Cross Section 3)**



Summary Data	
D50	13.7
D84	98
D95	154

**Figure 20: Pebble Count Plot – Mainstem Downstream of Browntown Road (Riffle Cross-Section 7)**



Summary Data	
D50	27.3
D84	73
D95	195

**Table 9a: Baseline Stream Data Summary – Tributary 3**

Newfound Creek Stream Restoration																									
DMS Project Number 92497																									
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 3 (1060 feet)																									
Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
Bankfull Width (ft)				8.4	6.9	10.5	11.4	15.9	3.6	5	7.3	8.2	8.2	9.1	--	2		8.4							
Floodprone Width (ft)					10	29.7	35.0	60	23.5	5	17.5	21.4	21.4	25.3	--	2		18							
Bankfull Mean Depth (ft)				0.6	0.7	0.9	0.9	1.1	0.1	5	0.8	0.95	1.0	1.1	--	2		0.8							
<sup>1</sup> Bankfull Max Depth (ft)					1.1	1.5	1.7	2.3	0.5	5	1.3	1.55	1.6	1.8	--	2		1.7							
Bankfull Cross Sectional Area (ft <sup>2</sup> )				4.8	6.8	9.5	10.9	15	3.6	5	6.1	8.3	8.3	10.5	--	2		8.3							
Width/Depth Ratio					6.9	11.7	11.8	16.7	4.1	5	8.3	8.7	8.7	9.1	--	2		10							
Entrenchment Ratio					1.4	2.6	3.1	4.7	1.5	5	2.1	2.6	2.6	3.1	--	2		2.1							
<sup>1</sup> Bank Height Ratio					1	2.9	4.0	6.9	2.4	5	0.8	1.0	1.0	1.2	--	2		1							
<b>Profile</b>																									
Riffle Length (ft)																									
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2		0.048							
Pool Length (ft)																									
Pool Max depth (ft)					1.1	1.1	1.1	1.2	--	2	2.9	2.94	2.9	2.9	--			1.7							
Pool Spacing (ft)					175	385	387.5	600	--	3	100	150	150.0	200	--	2	10.6	89.5	168.4						
<b>Pattern</b>																									
Channel Beltwidth (ft)					20	31.7	30.0	40		3	20	32.5	45	70			25	32.5	40						
Radius of Curvature (ft)					180	180	180.0	180		1	51	102	153	255			22	43.5	65						
Rc:Bankfull width (ft/ft)					17.1	17.1	17.1	17.1		1	6.2	12.4	19	31.1			2.6	5.2	7.7						
Meander Wavelength (ft)					20	146.7	145.0	270		3	100	135	170	240			40	120	200						
Meander Width Ratio					1.9	3.0	2.9	3.8		3	2.4	3.925	5	8.5			3	3.9	4.8						
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/ft <sup>2</sup>					1.3												1.3								
Max part size (mm) mobilized at bankfull																									

Stream Power (transport capacity) W/m <sup>2</sup>				53.4		27.8	
<b>Additional Reach Parameters</b>							
Rosgen Classification				G5/F5		E4b	B5
Bankfull Velocity (fps)			3.9	3.7			2.3
Bankfull Discharge (cfs)			18.8	36			
Valley length (ft)				1140		121	
Channel Thalweg length (ft)				1060		130	1197
Sinuosity (ft)				1.01		1.07	1.05
Water Surface Slope (Channel) (ft/ft)				0.024		0.0625	0.023
BF slope (ft/ft)				<b>0.024</b>		<b>0.0625</b>	<b>0.023</b>
<sup>3</sup> Bankfull Floodplain Area (acres)							
<sup>4</sup> % of Reach with Eroding Banks				100		0	
Channel Stability or Habitat Metric				Moderate BEHI		Low-Very Low BEHI	
Biological or Other							

**Table 9b: Baseline Stream Data Summary – Tributary 4**

Newfound Creek Stream Restoration																										
DMS Project Number 92497																										
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (1590 feet)																										
Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline						
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n	
Bankfull Width (ft)				8.4	4	6.9	7.5	11	--	3	7.3	8.2	8.2	9.1	--	2		6								
Floodprone Width (ft)					6	9.8	10.7	15.4	--	3	17.5	21.4	21.4	25.3	--	2		14								
Bankfull Mean Depth (ft)				0.6	0.8	0.9	0.9	1	--	3	0.8	0.95	1.0	1.1	--	2		0.7								
<sup>1</sup> Bankfull Max Depth (ft)					1.1	1.2	1.3	1.4	--	3	1.3	1.55	1.6	1.8	--	2		1.1								
Bankfull Cross Sectional Area (ft <sup>2</sup> )				4.8	3.1	5.7	5.8	8.5	--	3	6.1	8.3	8.3	10.5	--	2		4								
Width/Depth Ratio					5.2	8.4	9.7	14.2	--	3	8.3	8.7	8.7	9.1	--	2		8.5								
Entrenchment Ratio					1.4	1.4	1.5	1.5	--	3	2.1	2.6	2.6	3.1	--	2		2.3								
<sup>1</sup> Bank Height Ratio					1.9	2.5	2.5	3.1	--	3	<b>0.8</b>	1.0	<b>1.0</b>	<b>1.2</b>	--	2		<b>1</b>								
<b>Profile</b>																										
Riffle Length (ft)																										
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2		0.074								
Pool Length (ft)																										
Pool Max depth (ft)											2.9	2.94	2.9	2.9	--			1.4								
Pool Spacing (ft)											100	150	150.0	200	--	2	7.6	63.8	120							
<b>Pattern</b>																										
Channel Beltwidth (ft)					25	32.5	32.5	40	--	2	20	32.5	45	70			25	32.5	40							
Radius of Curvature (ft)					109	144.5	144.5	180	--	2	51	102	153	255			25	32.5	40							
Rc:Bankfull width (ft/ft)					15.8	21.0	21.0	26.1	--	2	6.2	12.4	19	31.1			4.2	5.5	6.7							
Meander Wavelength (ft)					800	1025.0	1025.0	1250	--	2	100	135	170	240			40	145	250							
Meander Width Ratio					3.6	4.7	4.7	5.8	--	2	2.4	3.925	5	8.5			4.2	5.45	6.7							
<b>Transport parameters</b>																										
Reach Shear Stress (competency) lb/ft <sup>2</sup>					1.6												1.4									
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m <sup>2</sup>					55.1												59.3									

Additional Reach Parameters						
Rosgen Classification				A5/G5/B5/E5	E4b	E5
Bankfull Velocity (fps)			3.9	4.1		6.4
Bankfull Discharge (cfs)			18.8	24		
Valley length (ft)				2080	121	
Channel Thalweg length (ft)				2093	130	2107
Sinuosity (ft)				1.01	1.07	1.01
Water Surface Slope (Channel) (ft/ft)				0.0376	0.0625	0.0371
BF slope (ft/ft)				0.0376	0.0625	0.0371
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				100	0	
Channel Stability or Habitat Metric				10% Very High BEHI 90% Moderate BEHI	Low-Very Low BEHI	
Biological or Other						

**Table 9c: Baseline Stream Data Summary – Tributary 5**

**Newfound Creek Stream Restoration**

**DMS Project Number 92497**

**Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 5 (675 feet)**

Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
Bankfull Width (ft)				7.1	6.5	9.4	10.8	15.0	3.0	6	7.3	8.2	8.2	9.1	--	2		8.2							
Floodprone Width (ft)					18.0	40.3	59.0	100.0	40.0	4	17.5	21.4	21.4	25.3	--	2		21.1							
Bankfull Mean Depth (ft)				0.5	0.8	1.0	1.1	1.3	0.2	6	0.8	0.95	1.0	1.1	--	2		1.0							
<sup>1</sup> Bankfull Max Depth (ft)					1.3	2.2	3.6	5.8	1.8	6	1.3	1.55	1.6	1.8	--	2		1.6							
Bankfull Cross Sectional Area (ft <sup>2</sup> )				3.5	6.1	9.7	10.1	14.0	2.7	6	6.1	8.3	8.3	10.5	--	2		8.3							
Width/Depth Ratio					4.8	9.4	10.3	15.7	3.6	6	8.3	8.7	8.7	9.1	--	2		8.6							
Entrenchment Ratio					1.7	4.3	8.5	15.3	5.4	6	2.1	2.6	2.6	3.1	--	2		2.6							
<sup>1</sup> Bank Height Ratio					1.0	1.3	1.6	2.1	0.5	6	<b>0.8</b>	1.0	<b>1.0</b>	<b>1.2</b>	--	<b>2</b>		<b>1.0</b>							
<b>Profile</b>																									
Riffle Length (ft)																									
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2		0.095							
Pool Length (ft)																									
Pool Max depth (ft)											2.9	2.94	2.9	2.9	--			2.9							
Pool Spacing (ft)											100	150	150.0	200	--	2	100	132	164						
<b>Pattern</b>																									
Channel Beltwidth (ft)					10.0	32.0	40.0	70.0	23.1	5	20	32.5	45	70			25	52.5	80						
Radius of Curvature (ft)					51.0	128.0	153.0	255.0	110.8	3	51	102	153	255			10	32.5	55						
Rc:Bankfull width (ft/ft)					5.4	15.4	16.3	27.2	11.0	3	6.2	12.4	19	31.1			1.2	4.0	6.7						
Meander Wavelength (ft)					100.0	156.7	170.0	240.0	73.7	3	100	135	170	240			50	140	230						
Meander Width Ratio					1.1	4.3	4.3	7.5	4.5	2	2.4	3.925	5	8.5			3	6.4	9.8						
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/f <sup>2</sup>																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m <sup>2</sup>																									

Additional Reach Parameters						
Rosgen Classification				E4b/G4/B4/E4	E4b	E4b
Bankfull Velocity (fps)			3.8	6.2		6.3
Bankfull Discharge (cfs)			13.3	59		
Valley length (ft)				630	121	
Channel Thalweg length (ft)				674.9	130	670
Sinuosity (ft)				1.07	1.07	1
Water Surface Slope (Channel) (ft/ft)				0.0625	0.0625	0.0630
BF slope (ft/ft)				0.0625	0.0625	0.0630
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				50	0	
Channel Stability or Habitat Metric				Very Low to Moderate BEHI	Low-Very Low BEHI	
Biological or Other						



**Table 9d: Baseline Stream Data Summary – Tributary 6**

Newfound Creek Stream Restoration																									
DMS Project Number 92497																									
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 6 (600 feet)																									
Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
Bankfull Width (ft)				7.5	7.4	9.5	10.2	12.9	3.0	3	7.3	8.2	8.2	9.1	--	2		9.0							
Floodprone Width (ft)					13.7	15.2	16.0	18.2	2.6	3	17.5	21.4	21.4	25.3	--	2		23.2							
Bankfull Mean Depth (ft)				0.5	0.9	1.0	1.0	1.1	0.1	3	0.8	0.95	1.0	1.1	--	2		1.0							
<sup>1</sup> Bankfull Max Depth (ft)					1.5	1.7	1.7	1.8	0.2	3	1.3	1.55	1.6	1.8	--	2		1.7							
Bankfull Cross Sectional Area (ft <sup>2</sup> )				3.9	7.5	9.5	9.8	12.1	2.4	3	6.1	8.3	8.3	10.5	--	2		8.5							
Width/Depth Ratio					7.4	9.5	10.6	13.8	3.7	3	8.3	8.7	8.7	9.1	--	2		8.6							
Entrenchment Ratio					1.4	1.6	1.6	1.8	0.2	3	2.1	2.6	2.6	3.1	--	2		2.6							
<sup>1</sup> Bank Height Ratio					2.0	2.1	2.1	2.2	0.1	3	<b>0.8</b>	1.0	<b>1.0</b>	<b>1.2</b>	--	<b>2</b>		<b>1.0</b>							
<b>Profile</b>																									
Riffle Length (ft)																									
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2		0.055							
Pool Length (ft)																									
Pool Max depth (ft)											2.9	2.94	2.9	2.9	--			3.2							
Pool Spacing (ft)											100	150	150.0	200	--	2	110	145	180						
<b>Pattern</b>																									
Channel Beltwidth (ft)					20.0	25.0	25.0	30.0	7.1	2	20	32.5	45	70			30	35	40						
Radius of Curvature (ft)					110.0	146.0	146.0	182.0	50.9	2	51	102	153	255			60	60	60						
Rc:Bankfull width (ft/ft)					11.6	15.4	15.4	19.1	5.3	2	6.2	12.4	19	31.1			6.7	6.7	6.7						
Meander Wavelength (ft)					100.0	156.7	150.0	200.0	51.3	3	100	135	170	240			40	120	200						
Meander Width Ratio					2.1	2.7	2.7	3.2	0.8	2	2.4	3.925	5	8.5			3.3	4.15	5						
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/f <sup>2</sup>					2.2												2.15								
Max part size (mm) mobilized at bankfull					177.3												173.1								
Stream Power (transport capacity) W/m <sup>2</sup>					11.6												102.9								

Additional Reach Parameters						
Rosgen Classification				B4/E5	E4b	E4b
Bankfull Velocity (fps)			3.8	5.1		5.3
Bankfull Discharge (cfs)			14.8	48		
Valley length (ft)				650	121	
Channel Thalweg length (ft)				663	130	700
Sinuosity (ft)				1.02	1.07	1.08
Water Surface Slope (Channel) (ft/ft)				0.0387	0.0625	0.0366
BF slope (ft/ft)				0.0387	0.0625	0.0366
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				50	0	
Channel Stability or Habitat Metric				Low to Moderate BEHI	Low-Very Low BEHI	
Biological or Other						

**Table 9e: Baseline Stream Data Summary – Tributary 7**

**Newfound Creek Stream Restoration**

**DMS Project Number 92497**

**Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 7 (400 feet)**

Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
Bankfull Width (ft)				8.4	5.5	5.8	5.9	6.2		3	7.3	8.2	8.2	9.1	--	2		5.8							
Floodprone Width (ft)					10.4	13.8	13.3	16.1		3	17.5	21.4	21.4	25.3	--	2		13.8							
Bankfull Mean Depth (ft)				0.6	0.5	0.6	0.6	0.7		3	0.8	0.95	1.0	1.1	--	2		0.6							
<sup>1</sup> Bankfull Max Depth (ft)					1.0	1.1	1.1	1.2		3	1.3	1.55	1.6	1.8	--	2		1.1							
Bankfull Cross Sectional Area (ft <sup>2</sup> )				4.8	3.0	3.4	3.5	3.9		3	6.1	8.3	8.3	10.5	--	2		5.8							
Width/Depth Ratio					8.5	10.1	10.6	12.6		3	8.3	8.7	8.7	9.1	--	2		9.7							
Entrenchment Ratio					1.7	2.4	2.3	2.9		3	2.1	2.6	2.6	3.1	--	2		2.4							
<sup>1</sup> Bank Height Ratio					1.0	1.6	1.9	2.8		3	<b>0.8</b>	1.0	<b>1.0</b>	<b>1.2</b>	--	<b>2</b>		<b>1.0</b>							
<b>Profile</b>																									
Riffle Length (ft)																									
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2									
Pool Length (ft)																									
Pool Max depth (ft)											2.9	2.94	2.9	2.9	--			1.2							
Pool Spacing (ft)											100	150	150.0	200	--	2	36.7	76.7	116.7						
<b>Pattern</b>																									
Channel Beltwidth (ft)					20.0	20.0	20.0	20.0		1	20	32.5	45	70			20	30	40						
Radius of Curvature (ft)					175.0	175.0	175.0	175.0		1	51	102	153	255			30	30	30						
Rc:Bankfull width (ft/ft)					30.0	30.0	30.0	30.0		1	6.2	12.4	19	31.1			5.1	5.1	5.1						
Meander Wavelength (ft)					130.0	152.5	152.5	175.0		2	100	135	170	240			150	162.5	175						
Meander Width Ratio					3.4	3.4	3.4	3.4		1	2.4	3.925	5	8.5			3.4	4.25	5.1						
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/f <sup>2</sup>					1.3												1.52								
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m <sup>2</sup>					30.7												53.8								

Additional Reach Parameters						
Rosgen Classification				E5	E4b	E5
Bankfull Velocity (fps)			3.9	3.5		3.6
Bankfull Discharge (cfs)			18.8	12		
Valley length (ft)				740	121	
Channel Thalweg length (ft)				793	130	796.5
Sinuosity (ft)				1.07	1.07	1.08
Water Surface Slope (Channel) (ft/ft)				0.0446	0.0625	0.0414
BF slope (ft/ft)				0.0446	0.0625	0.0414
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				50%	0	
Channel Stability or Habitat Metric				Upper: Very Low BEHI, Lower: High BEHI	Low-Very Low BEHI	
Biological or Other						

**Table 9f: Baseline Stream Data Summary – Tributary 8**

Newfound Creek Stream Restoration																										
DMS Project Number 92497																										
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 8 (680 feet)																										
Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline						
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n	
Bankfull Width (ft)				5.8	5.2	7.4	7.7	10.2	2.3	4	7.3	8.2	8.2	9.1	--	2		5.8								
Floodprone Width (ft)					9.4	49.2	54.9	100.3	45.7	4	17.5	21.4	21.4	25.3	--	2		100.0								
Bankfull Mean Depth (ft)				0.4	0.5	0.6	0.7	0.8	0.2	4	0.8	0.95	1.0	1.1	--	2		0.4								
<sup>1</sup> Bankfull Max Depth (ft)					0.8	1.1	1.2	1.5	0.3	4	1.3	1.55	1.6	1.8	--	2		0.5								
Bankfull Cross Sectional Area (ft <sup>2</sup> )				2.4	2.4	4.5	5.2	7.9	2.4	4	6.1	8.3	8.3	10.5	--	2		2.4								
Width/Depth Ratio					11.1	12.9	13.7	16.2	2.4	4	8.3	8.7	8.7	9.1	--	2		16.0								
Entrenchment Ratio					1.8	5.8	6.0	10.1	4.5	4	2.1	2.6	2.6	3.1	--	2		17.2								
<sup>1</sup> Bank Height Ratio					1.4	2.4	2.7	3.9	1.1	4	<b>0.8</b>	1.0	<b>1.0</b>	<b>1.2</b>	--	2		<b>1.0</b>								
<b>Profile</b>																										
Riffle Length (ft)																										
Riffle Slope (ft/ft)											0.009	0.005	0.005	0.001	--	2		0.0553								
Pool Length (ft)																										
Pool Max depth (ft)											2.9	2.94	2.9	2.9	--			0.7								
Pool Spacing (ft)											100	150	150.0	200	--	2	36.5	76.25	116							
<b>Pattern</b>																										
Channel Beltwidth (ft)					20.0	20.0	20.0	20.0		1	20	32.5	45	70			20	35	50							
Radius of Curvature (ft)											51	102	153	255			15	15	15							
Rc:Bankfull width (ft/ft)											6.2	12.4	19	31.1			2.6	2.6	2.6							
Meander Wavelength (ft)					100.0	100.0	100.0	100.0		1	100	135	170	240			40	85	130							
Meander Width Ratio					2.7	2.7	2.7	2.7		1	2.4	3.925	5	8.5			3.4	6	8.6							
<b>Transport parameters</b>																										
Reach Shear Stress (competency) lb/ft <sup>2</sup>					1.6							1.4														
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m <sup>2</sup>					67.6							25.2														

Additional Reach Parameters						
Rosgen Classification				G5/E5	E4b	E5
Bankfull Velocity (fps)			3.6	4.8		3.0
Bankfull Discharge (cfs)			8.7	22		
Valley length (ft)				277	121	
Channel Thalweg length (ft)				277	130	575
Sinuosity (ft)				1	1.07	1.05
Water Surface Slope (Channel) (ft/ft)				0.0499	0.0625	0.0553
BF slope (ft/ft)				0.0499	0.0625	0.0553
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				85%	0	
Channel Stability or Habitat Metric				Low to High BEHI	Low-Very Low BEHI	
Biological or Other						

**Table 9g: Baseline Stream Data Summary – Mainstem Upstream of Browntown Road**

Newfound Creek Stream Restoration																										
DMS Project Number 92497																										
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above Browntown Road (2000 feet)																										
Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline						
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n	
Bankfull Width (ft)				44.6	27.2	33.8	38.5	49.7	9.4	5			39.6			1		32.0								
Floodprone Width (ft)					165.0	182.5	182.5	200.0	14.4	4	164	164	164.0	164		2		182.5								
Bankfull Mean Depth (ft)				2.3	1.6	2.3	2.1	2.6	0.5	4			1.9			1		1.7								
<sup>1</sup> Bankfull Max Depth (ft)					3.9	4.3	4.3	4.6	0.3	5			4.7			1		3.4								
Bankfull Cross Sectional Area (ft <sup>2</sup> )				103.4	62.8	69.7	68.4	74.0	4.4	5			74.9			1		80.0								
Width/Depth Ratio					10.4	19.1	24.9	39.4	11.7	5			21.0			1		19.0								
Entrenchment Ratio					3.8	5.3	5.2	6.6	1.4	5			4.1			1		5.7								
<sup>1</sup> Bank Height Ratio					1.0	1.3	1.3	1.5	0.2	5	<b>0.9</b>	1.0	1.0	<b>1.1</b>		<b>2</b>		<b>1.0</b>								
<b>Profile</b>																										
Riffle Length (ft)											25.5	29	29.25	33		3										
Riffle Slope (ft/ft)											0.019	0.0235	0.0235	0.028		2		0.0228								
Pool Length (ft)											34.0	35.3	35.5	37.0		3										
Pool Max depth (ft)					3.8	5.0	4.9	5.9	0.8	5	3.0	3.0	3.05	3.1		2		4.2								
Pool Spacing (ft)					50.0	268.3	317.5	585.0	175.2	6	50	152	140	230		3	40.4	113.2	185.9							
<b>Pattern</b>																										
Channel Beltwidth (ft)					60.0	87.5	105.0	150.0	41.9	4	120	185	185	250		2	80	115	150							
Radius of Curvature (ft)					25.0	74.8	77.5	130.0	40.2	5	138	174.5	175	211		2	32	86	140							
Rc:Bankfull width (ft/ft)					0.7	2.2	2.3	3.8	1.2	5	3.5	4.4	4	5.3		2	1	2.7	4.4							
Meander Wavelength (ft)					250.0	420.0	450.0	650.0	153.6	6	200	310	310	420		2	90	220	350							
Meander Width Ratio					1.8	2.6	3.1	4.4	1.2	4	3	4.65	5	6.3		2	2.5	3.6	4.7							
<b>Transport parameters</b>																										
Reach Shear Stress (competency) lb/f <sup>2</sup>					1												1.4									
Max part size (mm) mobilized at bankfull					78.0												110.7									
Stream Power (transport capacity) W/m <sup>2</sup>					275.4												266.7									

Additional Reach Parameters						
Rosgen Classification				C4/1	C4	C4/1
Bankfull Velocity (fps)			5.6	8.3		7.2
Bankfull Discharge (cfs)			579	579		
Valley length (ft)				1950	279	
Channel Thalweg length (ft)				2000	287	2065
Sinuosity (ft)				1.03	1.03	1.06
Water Surface Slope (Channel) (ft/ft)				0.0076	0.0054	0.0074
BF slope (ft/ft)				0.0076	0.0054	0.0074
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				90%	0	
Channel Stability or Habitat Metric				Moderate BEHI	Low BEHI	
Biological or Other						



**Table 9h: Baseline Stream Data Summary – Mainstem Downstream of Browntown Road**

**Newfound Creek Stream Restoration**

**DMS Project Number 92497**

**Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below Browntown Road (2400 feet)**

Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline						
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n	
Bankfull Width (ft)				45.2	58.2	86.6	86.6	114.9		2	25.3	32.65	32.7	40		2		35.0								
Floodprone Width (ft)					150.0	175.0	175.0	200.0		2	200	200.0	200.0	200		1		175.0								
Bankfull Mean Depth (ft)				2.3	1.1	1.2	1.3	1.4	0.2	4	2.5	2.6	2.6	2.7		2		2.3								
<sup>1</sup> Bankfull Max Depth (ft)					3.2	4.0	4.0	4.7		2	4.3	4.4	4.4	4.5		2		4.0								
Bankfull Cross Sectional Area (ft <sup>2</sup> )				105.8	78.6	114.3	114.3	150.0		2	68.8	84.1	84.1	99.3		2		90.0								
Width/Depth Ratio					46.9	69.8	69.8	92.7		2	9.3	12.7	12.7	16.1		2		15.0								
Entrenchment Ratio					1.7	2.0	2.0	2.3		2	5	6.5	6.5	7.9		2		5.0								
<sup>1</sup> Bank Height Ratio					0.7	0.8	0.8	0.8		2	0.9	1.0	1.0	1.1		2		1.0								
<b>Profile</b>																										
Riffle Length (ft)											53.5	56.1	56.1	58.7		2										
Riffle Slope (ft/ft)											0.009	0.010	0.010	0.011		2		0.0182								
Pool Length (ft)											30.0	30.0	30.0	30.0		1										
Pool Max depth (ft)					0.8	2.3	2.3	3.7		2	2.9	3.8	3.8	4.6		2		5.8								
Pool Spacing (ft)					205.0	513.3	552.5	900.0	296.6	6	205	552.5	552.5	900		2	44.2	123.8	203.3							
<b>Pattern</b>																										
Channel Beltwidth (ft)					50.0	125.0	125.0	200.0	106.1	2	500	435.0	435.0	370		2	30	80	130							
Radius of Curvature (ft)					91.0	120.5	120.5	150.0	41.7	2	15.3	149.2	149.2	283		1	35	87.5	140							
Rc:Bankfull width (ft/ft)					1.1	1.4	1.4	1.7	0.4	2	3.5	6.1	6.1	8.7		1	1	2.7	4.4							
Meander Wavelength (ft)					1100.0	1350.0	1350.0	1600.0	353.6	2	200.0	925.0	925.0	1650.0		2	100	200	300							
Meander Width Ratio					0.6	1.5	1.5	2.3	1.2	2	3.0	26.8	26.8	50.6		2	0.9	2.3	3.7							
<b>Transport parameters</b>																										
Reach Shear Stress (competency) lb/f <sup>2</sup>								0.5										1								
Max part size (mm) mobilized at bankfull								37.9										78.0								
Stream Power (transport capacity) W/m <sup>2</sup>								201.2										218.6								

Additional Reach Parameters						
Rosgen Classification				B4/1	C4	C4/1
Bankfull Velocity (fps)			5.6	8.3		6.6
Bankfull Discharge (cfs)			594.2	579		
Valley length (ft)				2110	205	
Channel Thalweg length (ft)				2406	234	2215
Sinuosity (ft)				1.14	1.14	1.05
Water Surface Slope (Channel) (ft/ft)				0.0054	0.0063	0.0059
BF slope (ft/ft)				0.0054	0.0063	0.0059
<sup>3</sup> Bankfull Floodplain Area (acres)						
<sup>4</sup> % of Reach with Eroding Banks				90%	0	
Channel Stability or Habitat Metric				Moderate to High BEHI	Low to Moderate BEHI	
Biological or Other						

**Table 10a: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 3**

Newfound Creek Stream Restoration																						
DMS Project Number 92497																						
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 3 (1060 feet)																						
Parameter	Pre-Existing Condition						Reference Reach(es) Data						Design				As-built/Baseline					
<sup>1</sup> Ri% / Ru% / P% / G% / S%	93	1	5	1	0		6	5	30	5	0			65	5	25	5		65	5	25	5
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	3	79	13	5	0		9	15	41	16	19											
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)	0.3	0.4	0.5	2.8	64		0.6	4.9	13	300	650	boulder	boulder									
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	25	25	25	20					100										100			
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	12.5	12.5	25	50					100												100	

**Table 10b: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 4**

Newfound Creek Stream Restoration																							
DMS Project Number 92497																							
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (1590 feet)																							
Parameter	Pre-Existing Condition						Reference Reach(es) Data						Design				As-built/Baseline						
<sup>1</sup> Ri% / Ru% / P% / G% / S%	90	2	8	2	0		6	5	30	5	0			40	5	20	5	30		55	5	25	5
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%							9	15	41	16	19												
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)							0.6	4.9	13	300	650	boulder	boulder										
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	33	33	33						100											100			
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0		33	33	33					100												100		

**Table 10c: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 5**

Newfound Creek Stream Restoration																							
DMS Project Number 92497																							
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 5 (675 feet)																							
Parameter	Pre-Existing Condition						Reference Reach(es) Data						Design				As-built/Baseline						
<sup>1</sup> Ri% / Ru% / P% / G% / S%	70	5	10	5	10		6	5	30	5	0			45	5	25	5	20		45	5	25	5
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	9	15	41	16	19		9	15	41	16	19												
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)	0.6	4.9	13	300	650	boulder	0.6	4.9	13	300	650	boulder	boulder										
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10		30	60		10				100												100		
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0			30	70					100													100	

**Table 10d: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 6**

Newfound Creek Stream Restoration																																		
DMS Project Number 92497																																		
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 6 (600 feet)																																		
Parameter	Pre-Existing Condition					Reference Reach(es) Data							Design					As-built/Baseline																
<sup>1</sup> Ri% / Ru% / P% / G% / S%						6	5	30	5	0							60	5	30	5							60	5	30	5	0			
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%						9	15	41	16	19																								
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>P</sup> / di <sup>SP</sup> (mm)						0.6	4.9	13	300	650	boulder	boulder																						
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	50	50							100																									
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0		50	50							100																								

**Table 10e: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 7**

Newfound Creek Stream Restoration																																	
DMS Project Number 92497																																	
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 7 (400 feet)																																	
Parameter	Pre-Existing Condition					Reference Reach(es) Data							Design					As-built/Baseline															
<sup>1</sup> Ri% / Ru% / P% / G% / S%	86	2	10	2	0	6	5	30	5	0						80	5	10	5							70	5	20	5	0			
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%		100				9	15	41	16	19																							
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>P</sup> / di <sup>SP</sup> (mm)						0.6	4.9	13	300	650	boulder	boulder																					
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10		60	40						100																								
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0			60	40						100																							

**Table 10f: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 8**

Newfound Creek Stream Restoration																																	
DMS Project Number 92497																																	
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 8 (680 feet)																																	
Parameter	Pre-Existing Condition					Reference Reach(es) Data							Design					As-built/Baseline															
<sup>1</sup> Ri% / Ru% / P% / G% / S%			90	10		6	5	30	5	0						73	5	17	5							50	5	30	5	10			
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	100					9	15	41	16	19																							
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>P</sup> / di <sup>SP</sup> (mm)						0.6	4.9	13	300	650	boulder	boulder																					
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10									100																								
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0										100																							

**Table 10g: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Upstream of Browntown Road**

Newfound Creek Stream Restoration																			
-----------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

DMS Project Number 92497																												
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above Browntown Road (2000 feet)																												
Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design				As-built/Baseline									
<sup>1</sup> Ri% / Ru% / P% / G% / S%	80	2.5	15	2.5				6	5	30	5	0			70	5	30	5				60	5	30	5	0		
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	1	14	68	15	0	2		1	14	68	15	0	2															
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)	2.5	17	28	63	97	98	75	2.5	17	28	63	97	98	75														
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10										100																100		
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0											100															100		

**Table 10h: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Downstream of Browntown Road**

Newfound Creek Stream Restoration																												
DMS Project Number 92497																												
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below Browntown Road (2400 feet)																												
Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design				As-built/Baseline									
<sup>1</sup> Ri% / Ru% / P% / G% / S%	80	2.5	15	2.5				60	5	30	5	0			70	5	30	5				60	5	30	5	0		
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	0	13	58	23	0	6		0	13	58	23	0	6															
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)	6.7	20	30	84	120	80	75	6.7	20	30	84	120	80	75														
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10		50	50								100															100		
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0			50	50							100															100		

**Table 10a: Monitoring Data – Dimensional Morphology Summary – Tributary 3**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 3 (1060 feet)																												
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Pool)							Cross Section 4 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3*	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2088.37	2088.37	2088.37	2088.37			--	2085.73	2085.73	2085.73	2085.73			--	2071.45	2071.45	2071.45	2071.45			--	2070.28	2070.28	2070.28	2070.28		
Bankfull Width (ft)	--	7.8	5.2	7.1	7.7				9.1	9	7.8	9.8				7.9	6.4	0.6	9.2				10.5	9.7	8.6	11.6		
Floodprone Width (ft)	--	13.5	10	10.8	11.9				45	45	45	45.0				14	14	--	13.6				100.0	100	100	100		
Bankfull Mean Depth (ft)	--	0.5	0.5	0.5	0.7				0.8	0.8	0.7	0.9				0.6	0.3	0	0.4				0.7	0.6	0.6	0.9		
Bankfull Max Depth (ft)	--	1.2	0.9	1	1.2				1.3	1.4	1	1.6				1.0	0.6	0	0.7				1.1	1	1.1	1.7		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	4.0	2.4	3.3	5.5				7.4	7.1	5.1	8.7				4.6	2.2	0	4.1				7.4	6.3	5	10.3		
Bankfull Width/Depth Ratio	--	15.2	11.4	15.2	10.9				11.3	11.5	12	11.2				13.6	18.9	132.5	20.9				14.7	15	14.7	13.1		
Bankfull Entrenchment Ratio	--	1.7	1.9	1.5	1.5				4.9	5.0	5.8	4.7				1.8	2.2	--	1.5				9.5	10.3	11.6	8.6		
Bankfull Bank Height Ratio	--	1.0	0.8	2.4	0.9				1.0	0.6	0.4	0.3				1.0	0.9	--	0.9				1.0	0.8	0.6	1.2		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	81.7	77.9	75.8	66.7				100.9	79.1	72.4	72.1				14.0	10.3	7.9	12.1				12.9	12.1	11	15.9		
d50 (mm)	--	Si	--	--	--				Si	--	--	--				Si	--	--	--				Si	--	--	--		

\* Aggradation in channel in the form of sediment and herbaceous vegetation has raised the bed surface above bankfull.

**Table 11b: Monitoring Data – Dimensional Morphology Summary – Tributary 4**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 4 (1590 feet)																												
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)							Cross Section 4 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2119.25	2119.25	2119.25	2119.25			--	2117.97	2117.97	2117.97	2117.97			--	2073.23*	2071.00*	2071.00	2071			--	2067.08	2067.08	2067.08	2067.08		
Bankfull Width (ft)	--	7.0	6.8	6.7	8.4				7.3	6.7	7.1	7.2				26.5	11.5	13.6	14.4				14.3	15.5	15.8	21.2		
Floodprone Width (ft)	--	20.5	17.2	15.6	17.4				17.6	14.7	16.5	16.0				--	--	25.5				100.0	100.0	100.0	100.0			
Bankfull Mean Depth (ft)	--	0.6	0.4	0.4	0.4				0.6	0.6	0.5	0.5				2.2	0.9	0.8	1.0				1.0	0.7	0.6	0.7		
Bankfull Max Depth (ft)	--	1.0	1.0	0.8	0.7				0.9	1.0	0.9	0.8				4.2	1.5	1.2	1.9				1.7	1.5	1.3	1.9		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	3.7	2.8	2.6	3.2				4.2	3.8	3.3	3.8				58.4	10.0	11.1	14.8				13.7	11.0	9.7	14.9		
Bankfull Width/Depth Ratio	--	12.6	16.7	17.3	22.2				12.5	11.6	15.3	13.8				12.0	13.2	16.7	14.0				14.8	22.0	25.8	30.2		
Bankfull Entrenchment Ratio	--	2.9	2.5	2.3	2.1				2.4	2.2	2.3	2.2				--	--	1.8				7.0	6.4	6.3	4.7			
Bankfull Bank Height Ratio	--	1.0	1.3	1.0	1.0				1.0	1.2	1.2	1.1				1.0	1.9	2.5	0.5				1.0	1.0	1.0	1.0	1.0	
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	82.8	79.1	76.0	90.6				109.8	101.4	105.8	100.0				64.8	61.8	67.0	67.4				20.6	22.4	18.5	21.2		
d50 (mm)	--	Si/Sa	--	--	--				Si/Sa	--	--	--				Si/Sa	--	--	--				Si/Sa	--	--	--		

\* It appears the bankfull elevation for Cross Section 3 identified in MY01 was erroneous. The fixed baseline bankfull elevation was adjusted in MY02.

**Table 11c: Monitoring Data – Dimensional Morphology Summary – Tributary 5**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 5 (675 feet)																					
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2081.68	2081.68	2081.68	2081.68			--	2076.82	2076.82	2076.82	2076.82			--	2066.38	2066.38	2066.38	2066.38		
Bankfull Width (ft)	--	7.6	6.7	6.9	8.4				7.9	6.8	8.9	9.4				5.1	5.1	5.7	5.2		
Floodprone Width (ft)	--	18.3	16.5	15.2	16.9				24.0	24.0	24.0	24.0				14.0	9.3	10.1	9.2		
Bankfull Mean Depth (ft)	--	0.6	0.7	0.6	0.6				0.6	0.8	0.8	0.8				0.7	0.5	0.4	0.3		
Bankfull Max Depth (ft)	--	1.2	1.3	1.1	1.1				1.3	1.6	1.6	1.7				1.2	1.0	0.7	0.6		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	5.0	4.7	4.1	5.2				5.2	5.5	6.9	7.4				3.6	2.8	2.0	1.6		
Bankfull Width/Depth Ratio	--	11.8	9.7	11.9	13.3				12.3	8.3	11.5	11.9				7.2	9.3	16.1	16.8		
Bankfull Entrenchment Ratio	--	2.4	2.4	2.2	2.0					3.5	2.7	2.6				2.7	1.8	1.8	1.8		
Bankfull Bank Height Ratio	--	1.0	1.3	1.0	1.0				1.0	1.3	1.0	1.1				1.0	2.3	1.0	1.0		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	71.6	106.9	70.6	72.4				15.0	17.6	18.4	23.7				56.8	48.0	55.1	53.8		
d50 (mm)	--	Si/Sa	--	--	--				Si/Sa	--	--	--				Si/Sa	--	--	--		

**Table 11d: Monitoring Data – Dimensional Morphology Summary – Tributary 6**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 6 (600 feet)														
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2064.1	2064.1	2064.1	2064.1			--	2062.01	2062.01	2062.01	2062.01		
Bankfull Width (ft)	--	14.8	16.2	14.5	18.4				19.6	22	21.6	20.2		
Floodprone Width (ft)	--	38.0	36+	38	100.0				100.0	100	100	100.0		
Bankfull Mean Depth (ft)	--	1.1	1	1	1.2				1.6	1.5	1.2	1.4		
Bankfull Max Depth (ft)	--	2.3	2	2.2	2.5				3.2	3	2.9	2.8		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	15.7	16.6	14.2	22.4				32.2	32.5	26.9	28.7		
Bankfull Width/Depth Ratio	--	14.0	15.7	14.7	15.1				11.9	14.9	17.4	14.2		
Bankfull Entrenchment Ratio	--	2.6	2.3	2.6	5.4				5.1	4.5	4.6	4.9		
Bankfull Bank Height Ratio	--	1.0	1	1	0.9				1.0	1	1	1.1		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	40.7	41.5	42.5	44.1				44.9	56	34.9	37.3		
d50 (mm)	--	Si/Sa	--	--	--				Si/Sa	--	--	--		

**Table 11e: Monitoring Data – Dimensional Morphology Summary – Tributary 7**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 7 (400 feet)																					
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2*	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2110.39	2110.39	2110.39	2110.39			--	2107.51	2107.51	2107.51	2107.51			--	2104.37	2104.37	2104.37	2104.37		
Bankfull Width (ft)	--	8.6	6.5	7.3	9.5				9.5	7	9.2	11.6				8.2	2.9	1.9	14.3		
Floodprone Width (ft)	--	15.2	14	12.4	16.3					--	--	28.0				24.2	24.3	3.8	30.0		
Bankfull Mean Depth (ft)	--	0.6	0.4	0.4	0.6				0.9	0.6	0.5	0.8				0.2	0.4	0	0.3		
Bankfull Max Depth (ft)	--	0.9	0.8	0.6	1.0				1.5	1.2	1.1	1.3				0.5	0.5	0	0.6		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	5.0	2.6	2.6	5.5				8.1	3.9	4.8	8.9				1.8	1	0	3.7		
Bankfull Width/Depth Ratio	--	14.7	16.4	20.6	16.3				11.2	12.5	17.7	15.3				36.6	8.2	77.8	54.6		
Bankfull Entrenchment Ratio	--	1.8	2.1	1.7	1.7					--	--	2.4				3.0	8.5	2	2.1		
Bankfull Bank Height Ratio	--	1.0	0.8	1.4	1.1				1.0	1	1	1.1				1.0	0.8	28.4	0.6		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	41.1	40.8	35.2	41.0				49.6	46.7	44.5	49.8				7.7	8.7	3.4	10.2		
d50 (mm)	--	Si	--	--	--				Si	--	--	--				Si	--	--	--		

\* The dimensional morphology data for MY2 may not be accurate. The cross-section pins do not line up in the overlay plots, indicating a possible survey error.

**Table 11f: Monitoring Data – Dimensional Morphology Summary – Tributary 8**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 8 (680 feet)																					
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2087.13	2087.13	2087.13	2087.13			--	2084.83	2084.83	2084.83	2084.83			--	2077.65	2077.65	2077.65	2077.65		
Bankfull Width (ft)	--	8.0	8.8	7.8	7.4				11.4	15.5	12.8	13.1				16.0	14.8	15.3	18.9		
Floodprone Width (ft)	--	18.9	19.5	17.2	9.3				40.4+	40.2+	40.4	50.0				60.0	60	60	60.0		
Bankfull Mean Depth (ft)	--	0.3	0.3	0.3	0.1				1.1	0.7	0.9	0.8				0.9	0.9	0.8	1.0		
Bankfull Max Depth (ft)	--	0.8	0.7	0.7	0.2				2.3	1.6	1.6	1.5				1.6	1.8	1.3	1.7		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	2.4	2.3	2.4	0.7				12.9	11.6	11	11.0				13.9	12.6	11.9	19.7		
Bankfull Width/Depth Ratio	--	26.3	34.2	25.1	83.0				10.1	20.8	15	15.6				18.3	17.3	19.6	18.1		
Bankfull Entrenchment Ratio	--	2.4	2.2	2.2	1.3				3.5	2.6	3.1	3.8				3.8	4.1	3.9	3.2		
Bankfull Bank Height Ratio	--	1.0	1	1	1.0				1.0	1	1	1.1				1.0	0.5	0.9	0.4		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	24.2	20.8	24.4	16.4				37.3	37.7	32.8	26.5				83.9	80.4	87.7	89.9		
d50 (mm)	--	Si/Sa	--	--	--				Si/Sa	--	--	--				Si/Sa	--	--	--		



**Table 11g: Monitoring Data – Dimensional Morphology Summary – Mainstem**

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: Main (4400 feet) Cross Sections 1 - 4 are upstream of Browntown Road, Cross Sections 5-9 are downstream of Browntown Road																												
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Riffle)							Cross Section 4 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2*	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2071.66	2071.66	2071.66	2071.66			--	2067.07	2067.07	2067.07	2067.07			--	2063.50	2063.50	2063.50	2063.50			--	2059.81	2059.81	2059.81	2059.81		
Bankfull Width (ft)	--	39.0	28.6	24	19.0				19.2	26.8	24.1	26.1				16.3	16.1	15.3	14.0				22.4	18.2	15.7	15.4		
Floodprone Width (ft)	--	80.6	80.6	83.6	90.0				66.1	69.4	68.8	70.0				48.3	48.6	46.4	45.0				35.9	35.0	35	38.4		
Bankfull Mean Depth (ft)	--	0.8	0.9	1	1.1				1.7	1.3	1.4	1.2				1.4	1.2	1.2	1.2				1.2	1.2	1.3	1.4		
Bankfull Max Depth (ft)	--	2.2	2.0	2.7	3.1				2.6	3.0	2.9	3.0				2.2	2.5	2.3	2.2				1.8	1.8	1.9	2.0		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	29.7	25.9	24	20.5				32.0	36.1	32.6	32.4				23.0	19.2	19	17.5				28.0	22.0	20	21.4		
Bankfull Width/Depth Ratio	--	51.2	31.5	24	17.6				11.5	19.9	17.8	21.0				11.6	13.5	12.4	11.2				17.9	15.0	12.3	11.1		
Bankfull Entrenchment Ratio	--	2.1	2.8	3.5	4.7				3.4	2.6	2.9	2.7				3.0	3.0	3	3.2				1.6	1.9	2.2	2.5		
Bankfull Bank Height Ratio	--	1.0	0.8	0.8	1.2				1.0	0.7	0.8	0.9				1.0	1.2	1.4	1.0				1.0	1.3	1.2	1.2		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	198.1	195.0	166	170.4				186.3	198.3	181.2	179.0				171.2	169.3	153.1	147.9				153.4	143.4	132.8	133.2		
d50 (mm)	--	--	--	--	--				24	--	--	--				--	22	13	37				--	--	--	--		
	Cross Section 5 (Riffle)							Cross Section 6 (Riffle)							Cross Section 7 (Riffle)							Cross Section 8 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2056.59	2056.59	2056.59	2056.59			--	2054.80	2054.80	2054.80	2054.80			--	2047.72	2047.72	2047.72	2047.72			--	2045.62	2045.62	2045.62	2045.62		
Bankfull Width (ft)	--	18.8	19.3	20.2	19.7			--	17.3	17.3	18.3	18.0				23.4	19.3	17.1	16.5				35.1	20.1	17.7	15.3		
Floodprone Width (ft)	--	175.0	48.5+	48.5	20			--	175.0	145.0	145	145.0				49.8	46.9	46.9	50.0				75.6	57.2	67.4	50.7		
Bankfull Mean Depth (ft)	--	2.1	2.2	2.2	2.2			--	2.1	1.9	1.9	1.8				1.3	1.4	1.4	1.5				1.3	1.5	1.6	1.8		
Bankfull Max Depth (ft)	--	2.9	3.2	3.1	3.1			--	3.2	2.6	2.8	2.9				2.5	2.4	2.5	2.7				3.1	2.7	2.8	2.3		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	38.8	43.1	43.7	44.1			--	36.7	33.5	35.1	32.9				31.4	27.4	24.4	25.2				44.4	30.3	28.2	27.8		
Bankfull Width/Depth Ratio	--	9.1	8.7	9.3	8.8			--	8.2	9.0	9.5	9.9				17.4	13.6	12	10.8				27.7	13.3	11.1	8.4		
Bankfull Entrenchment Ratio	--	9.3	2.5	2.4	10.2			--	16.1	8.9	7.9	8.0				2.1	2.4	2.7	3.0				2.2	2.8	3.8	3.3		
Bankfull Bank Height Ratio	--	1.0	1.2	1.1	1			--	1.0	1.0	1.2	1.1				1.0	0.9	1.1	0.7				1.0	0.9	1.1	1.2		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	72.0	73.4	78.5	71.9			--	109.5	104.5	85.2	95.1				203.2	183.3	181.6	175.3				191.8	169.1	160.2	164.2		
d50 (mm)	--	--	--	--	--			--		--	--	--				23	19	1.9	27.3				--	--	--	--		

\* Cross section 1 left bank pin was not located during MY1 survey; Station 0 was approximated and then the corrected by aligning the right bank pins in the spreadsheet.

**Table 11g: Monitoring Data – Dimensional Morphology Summary – Mainstem (continued)**

	Cross Section 9 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2044.08	2044.08	2044.08	2044.08		
Bankfull Width (ft)	--	20.1	18.1	17.5	17.7		
Floodprone Width (ft)	--	51.2	47.3	75	69		
Bankfull Mean Depth (ft)	--	1.9	1.6	2.2	1.7		
Bankfull Max Depth (ft)	--	2.6	2.5	3.5	2.9		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	--	37.2	29.6	38.8	29.7		
Bankfull Width/Depth Ratio	--	10.8	11.1	7.9	10.5		
Bankfull Entrenchment Ratio	--	2.5	2.6	4.3	3.9		
Bankfull Bank Height Ratio	--	1.0	1	1.5	1.1		
Cross Sectional Area between end pins (ft <sup>2</sup> )	--	159.2	150.9	150.9	132.6		
d50 (mm)	--	--	--	--	--		

**Table 12a: Monitoring Data – Stream Reach Data Summary – Tributary 3**

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 3 (1060 feet)																																			
Parameter	Baseline					MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
						Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension</b>																																			
Bankfull Width (ft)						7.8	9.2	9.2	10.5		2	5.2	7.4	--	9.7	--	2	7.1	7.8	--	8.6	--	2	7.7	9.7	--	11.6	--	2						
Floodprone Width (ft)						13.5	36.8	36.8	60		2	10.0	23.3	--	36.6	--	2	10.8	23.7	--	36.6	--	2	11.9	56.0	--	100	--	2						
Bankfull Mean Depth (ft)						0.5	0.6	0.6	0.7		2	0.5	0.6	--	0.6	--	2	0.5	0.5	--	0.6	--	2	0.7	0.8	--	0.9	--	2						
<sup>1</sup> Bankfull Max Depth (ft)						1.1	1.2	1.2	1.2		2	0.9	0.9	--	1.0	--	2	1.0	1.0	--	1.1	--	2	1.2	1.5	--	1.7	--	2						
Bankfull Cross Sectional Area(ft <sup>2</sup> )						4	5.7	5.7	7.4		2	2.4	4.3	--	6.3	--	2	3.3	4.2	--	5.0	--	2	5.5	7.9	--	10.3	--	2						
Width/Depth Ratio						14.7	15.0	15.0	15.2		2	11.4	12.8	--	15.0	--	2	14.7	14.8	--	15.2	--	2	10.9	12.0	--	13.1	--	2						
Entrenchment Ratio						1.7	3.7	3.7	5.7		2	1.9	2.9	--	3.8	--	2	1.4	3.0	--	4.7	--	2	1.5	5.1	--	8.6	--	2						
<sup>1</sup> Bank Height Ratio						<b>1.0</b>	1.0	1.0	<b>1.0</b>		2	0.7	0.8	--	0.9	--	2	0.6	1.4	--	2.3	--	2	0.9	1.1	--	1.2	--	2						
<b>Profile</b>																																			
Riffle Length (ft)						6.8	37.7	57.5	108.1		19	1.9	19.2	--	153.9	--	19							9.7	28	48.9	88	--	20						
Riffle Slope (ft/ft)						0.000	0.021	0.048	0.095		19	1.2	3.7	--	8.8	--	19							0.014	0.038	0.05	0.078	--	20						
Pool Length (ft)						2.8	11.2	23.5	44.2		19	2.1	15.5	--	49.6	--	19							13.2	24.7	24.9	36.6	--	9						
Pool Max depth (ft)						1.1	1.2	1.2	1.2		2			--		--	2							1	1.1	1.15	1.3	--	9						
Pool Spacing (ft)						22.4	62.7	87.3	152.2		19	12.5	60.5	--	153.9	--	19							20.6	110	159	297	--	9						
<b>Pattern</b>																																			
Channel Beltwidth (ft)																																			
Radius of Curvature (ft)																																			
Rc:Bankfull width (ft/ft)																																			
Meander Wavelength (ft)																																			
Meander Width Ratio																																			
<b>Additional Reach Parameters</b>																																			
Rosgen Classification						B5 (above Browntown)/C5 (below)					B5 (above Browntown)/C5 (below)					B5 (above Browntown)/C5 (below)																			
Channel Thalweg length (ft)						1204					1128					1128																			
Sinuosity (ft)						1.06					1.04					1.06																			
Water Surface Slope (Channel)(ft/ft)						0.023					0.025					0.023																			
BF slope (ft/ft)						0.023					0.023					0.023																			
<sup>3</sup> Ri% / Ru% / P% / G% / S%						60	5	30	5	0																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																			
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																			
<sup>2</sup> % of Reach with Eroding Banks						0					0					0					0														
Channel Stability or Habitat Metric																																			
Biological or Other																																			

\* Profile data were not collected in MY3

Table 12b: Monitoring Data – Stream Reach Data Summary – Tributary 4

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (1590 feet)																																				
Parameter	Baseline						MY1						MY2						MY3*						MY4						MY5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension</b>																																				
Bankfull Width (ft)							7	7.2	7.2	7.3		2	6.7	6.7	--	6.8	--	2	6.7	9.9	--	15.8	--	2	7.2	7.8	--	8.4	--	2						
Floodprone Width (ft)							17.6	19.1	19.1	20.5		2	14.7	16.0	--	17.2	--	2	15.6	23.3	--	38.0	--	2	16	16.7	--	17.4	--	2						
Bankfull Mean Depth (ft)							0.6	0.6	0.6	0.6		2	0.4	0.5	--	0.6	--	2	0.4	0.5	--	0.6	--	2	0.4	0.5	--	0.5	--	2						
<sup>1</sup> Bankfull Max Depth (ft)							0.9	1.0	1.0	1		2	1.0	1.0	--	1.0	--	2	0.8	1.0	--	1.3	--	2	0.7	0.8	--	0.8	--	2						
Bankfull Cross Sectional Area (ft <sup>2</sup> )							3.7	4.0	4.0	4.2		2	2.8	3.3	--	3.8	--	2	2.6	5.2	--	9.7	--	2	3.2	3.5	--	3.8	--	2						
Width/Depth Ratio							12.5	12.6	12.6	12.6		2	11.6	13.7	--	16.7	--	2	15.3	18.8	--	25.8	--	2	13.8	18.0	--	22.2	--	2						
Entrenchment Ratio							2.4	2.7	2.7	2.9		2	2.2	2.4	--	2.6	--	2	1.6	2.4	--	3.8	--	2	2.1	2.2	--	2.2	--	2						
<sup>1</sup> Bank Height Ratio							1.0	1.0	1.0	1.0		2	1.2	1.2	--	1.3	--	2	1.1	1.6	--	2.5	--	2	1.0	1.1	--	1.1	--	2						
<b>Profile</b>																																				
Riffle Length (ft)							4.8	78.0	214.0	423.1		17	3.8	13.5	--	35.1	--	14							19	67	95	171	--	15						
Riffle Slope (ft/ft)							0.000	0.027	0.049	0.097		17	--	--	--	--	--	14							0.014	0.051	0.07	0.126	--	15						
Pool Length (ft)							4	14.3	35.05	66.1		22	5.3	17.0	--	34.8	--	6							19	30	34	49	--	9						
Pool Max depth (ft)							4.2	4.2	23.1	42		1	1.5	1.5	--	1.5	--	2							1.5	2.2	2.85	4.2	--	9						
Pool Spacing (ft)							13.4	81.1	229.9	446.3		22	87	351	--	477	--	6							57	207	259	461	--	9						
<b>Pattern</b>																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
<b>Additional Reach Parameters</b>																																				
Rosgen Classification							C5						C5						C5																	
Channel Thalweg length (ft)							1911						1826.6						1826.00																	
Sinuosity (ft)							1.27						1.21						1.21																	
Water Surface Slope (Channel) (ft/ft)							0.037						0.039						0.037																	
BF slope (ft/ft)							0.037						0.039						0.037																	
<sup>3</sup> Ri% / Ru% / P% / G% / S%							55	5	25	5	10																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																				
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																				
<sup>2</sup> % of Reach with Eroding Banks							0						0						0						0											
Channel Stability or Habitat Metric																																				
Biological or Other																																				

\* Profile data were not collected in MY3

Table 12c: Monitoring Data – Stream Reach Data Summary – Tributary 5

		Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 5 (675 feet)																																		
Parameter	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension</b>																																				
Bankfull Width (ft)							5.1	6.4	6.4	7.6		2	5.1	5.9	--	6.7	--	2	5.7	6.3	--	6.9	--	2	5.2	6.8	--	8.4	--	2						
Floodprone Width (ft)							14	16.2	16.2	18.3		2	9.3	28.6	--	60.0	--	2	10.1	28.4	--	60.0	--	2	9.2	13.1	--	16.9	--	2						
Bankfull Mean Depth (ft)							0.6	0.7	0.7	0.7		2	0.5	0.6	--	0.7	--	2	0.4	0.5	--	0.6	--	2	0.3	0.5	--	0.6	--	2						
<sup>1</sup> Bankfull Max Depth (ft)							1.2	1.2	1.2	1.2		2	1.0	1.2	--	1.3	--	2	0.7	0.9	--	1.1	--	2	0.6	0.9	--	1.1	--	2						
Bankfull Cross Sectional Area (ft <sup>2</sup> )							3.6	4.3	4.3	5.0		2	2.8	3.7	--	4.7	--	2	2.0	3.0	--	4.1	--	2	1.6	3.4	--	5.2	--	2						
Width/Depth Ratio							7.2	9.5	9.5	11.8		2	9.3	9.4	--	9.7	--	2	11.9	13.1	--	16.1	--	2	13.3	15.1	--	16.8	--	2						
Entrenchment Ratio							2.4	2.6	2.6	2.7		2	1.8	2.1	--	2.4	--	2	1.6	4.5	--	9.5	--	2	1.8	1.9	--	2	--	2						
<sup>1</sup> Bank Height Ratio							1.0	1.0	1.0	1.0		2	0.9	1.2	--	1.5	--	2	0.8	1.0	--	1.3	--	2	1.0	1.0	--	1.0	--	2						
<b>Profile</b>																																				
Riffle Length (ft)							10.8	108.4	149.2	287.6		5	3.8	12.2	--	24.7	--	5							11.1	22.9	25.3	39.5	--	11						
Riffle Slope (ft/ft)							0.026	0.079	0.093	0.160		5	--	--	--	--	--	5							0.019	0.034	0.05	0.075	--	11						
Pool Length (ft)							2.7	7.7	9.7	16.7		7	4.0	15.5	--	27.0	--	2							5.5	7.7	7.75	10	--	5						
Pool Max depth (ft)							1.3	1.3	1.3	1.3		1	1.6	1.6	--	1.6	--	1							1.3	1.4	1.45	1.6	--	5						
Pool Spacing (ft)							18.8	56.1	112.8	206.8		7	218.8	218.8	--	218.8	--	2							5.9	26.3	25.3	44.6	--	5						
<b>Pattern</b>																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
<b>Additional Reach Parameters</b>																																				
Rosgen Classification							E4b						E4b						E4b																	
Channel Thalweg length (ft)							800.6						624.0						675																	
Sinuosity (ft)							1.36						1.05						1.05																	
Water Surface Slope (Channel) (ft/ft)							0.044						0.059						0.059																	
BF slope (ft/ft)							0.044						0.059						0.059																	
<sup>3</sup> Ri% / Ru% / P% / G% / S%							45	5	25	5	20																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																				
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																				
<sup>2</sup> % of Reach with Eroding Banks							0						0						0																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

\* Profile data were not collected in MY3

Table 12d: Monitoring Data – Stream Reach Data Summary – Tributary 6

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 6 (600 feet)																																				
Parameter	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension</b>																																				
Bankfull Width (ft)							14.8	14.8	14.8	14.8		1	16.2	16.2	--	16.2	--	1	--	14.5	--	--	--	1	--	18.4	--	--	--	1						
Floodprone Width (ft)							38	38.0	38.0	38		1	49.0	49.0	--	49.0	--	1	38.0	49.0	--	60.0	--	1	--	100.0	--	--	--	1						
Bankfull Mean Depth (ft)							1.1	1.1	1.1	1.1		1	1.0	1.0	--	1.0	--	1	--	1.0	--	--	--	1	--	1.2	--	--	--	1						
<sup>1</sup> Bankfull Max Depth (ft)							2.3	2.3	2.3	2.3		1	2.0	2.0	--	2.0	--	1	--	2.2	--	--	--	1	--	2.5	--	--	--	1						
Bankfull Cross Sectional Area (ft <sup>2</sup> )							15.7	15.7	15.7	15.7		1	16.6	16.6	--	16.6	--	1	--	14.2	--	--	--	1	--	22.4	--	--	--	1						
Width/Depth Ratio							14	14.0	14.0	14		1	15.7	15.7	--	15.7	--	1	--	14.7	--	--	--	1	--	15.1	--	--	--	1						
Entrenchment Ratio							2.6	2.6	2.6	2.6		1	2.3	2.3	--	2.3	--	1	2.6	3.4	--	4.2	--	1	--	5.4	--	--	--	1						
<sup>1</sup> Bank Height Ratio							1.0	1.0	1.0	1.0		1	1.0	1.0	--	1.0	--	1	--	1.0	--	--	--	1	--	0.9	--	--	--	1						
<b>Profile</b>																																				
Riffle Length (ft)							12.3	80.6	156.9	301.5		8	6.6	11.9	--	18.8	--	6							9.1	21.5	39.1	69	--	12						
Riffle Slope (ft/ft)							0.018	0.040	0.1	0.086		8	--	--	--	--	--	6							0.002	0.042	0.05	0.099	--	12						
Pool Length (ft)							8.3	13.5	14.1	19.9		5	11.1	19.4	--	30.2	--	3							8.9	14.5	16.3	23.7	--	10						
Pool Max depth (ft)							3.2	3.2	3.2	3.2		1	3.0	3.0	--	3.0	--	1							2.3	2.8	2.7	3.1	--	10						
Pool Spacing (ft)							21.7	131.5	196.3	370.9		5	64	166	--	269	--	3							11.6	34	40.8	70	--	10						
<b>Pattern</b>																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
<b>Additional Reach Parameters</b>																																				
Rosgen Classification							C4b						C4b						C4b																	
Channel Thalweg length (ft)							732						615.2												615											
Sinuosity (ft)							1.09						1.06												1.06											
Water Surface Slope (Channel) (ft/ft)							0.036						0.035												0.035											
BF slope (ft/ft)							0.036						0.035												0.035											
<sup>3</sup> Ri% / Ru% / P% / G% / S%							60	5	30	5	0																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																				
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																				
<sup>2</sup> % of Reach with Eroding Banks							0						0						0						0											
Channel Stability or Habitat Metric																																				
Biological or Other																																				

\* Profile data were not collected in MY3

**Table 12e: Monitoring Data – Stream Reach Data Summary – Tributary 7**

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 7 (400 feet)																																				
Parameter	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension</b>																																				
Bankfull Width (ft)							8.2	8.4	8.4	8.6		2	2.9	4.7	--	6.5	--	2	1.9	4.6	--	7.3	--	2	9.5	11.9	--	14.3	--	2						
Floodprone Width (ft)							15.2	19.7	19.7	24.2		2	14.0	32.8	--	60.0	--	2	3.8	24.0	--	60.0	--	2	16.3	23.2	--	30	--	2						
Bankfull Mean Depth (ft)							0.2	0.4	0.4	0.6		2	0.4	0.4	--	0.4	--	2	0.0	0.3	--	0.4	--	2	0.3	0.5	--	0.6	--	2						
<sup>1</sup> Bankfull Max Depth (ft)							0.5	0.7	0.7	0.9		2	0.5	0.6	--	0.8	--	2	0.0	0.3	--	0.6	--	2	0.6	0.8	--	1	--	2						
Bankfull Cross Sectional Area (ft <sup>2</sup> )							1.8	3.4	3.4	5		2	1.0	1.8	--	2.6	--	2	0.0	1.3	--	2.6	--	2	3.7	4.6	--	5.5	--	2						
Width/Depth Ratio							14.7	25.7	25.7	36.6		2	8.2	12.2	--	16.4	--	2	20.6	16.1	--	77.8	--	2	16.3	35.5	--	54.6	--	2						
Entrenchment Ratio							1.8	2.4	2.4	3		2	3.0	7.0	--	12.8	--	2	0.8	5.2	--	13.1	--	2	1.7	1.9	--	2.1	--	2						
<sup>1</sup> Bank Height Ratio							1.0	1.0	1.0	1.0		2	0.7	0.8	--	1.0	--	2	2.5	3.2	--	4.0	--	2	0.6	0.9	--	1.1	--	2						
<b>Profile</b>																																				
Riffle Length (ft)							5.3	37.1	97.15	189		6	7.8	18.8	--	31.2	--	2							7.1	65	64.1	121	--	5						
Riffle Slope (ft/ft)							0	0.033	0.047	0.093		6	0.038	0.050	--	0.070	--	2							0.016	0.062	0.091	0.167	--	5						
Pool Length (ft)							3.6	21.5	39.25	74.9		5	6.5	9.2	--	11.8	--	2							3.6	21.5	39.3	74.9	--	5						
Pool Max depth (ft)							1.5	1.5	1.5	1.5		1	1.2	1.2	--	1.2	--	1							2.8	2.8	--	2.8	--	1						
Pool Spacing (ft)							23.4	98.7	111.9	200.3		5	123	123	--	123	--	2							--	--	--	--	--	--						
<b>Pattern</b>																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
<b>Additional Reach Parameters</b>																																				
Rosgen Classification							C5						C5												C5											
Channel Thalweg length (ft)							579.5						374.5												381											
Sinuosity (ft)							1.59						1.1												1.02											
Water Surface Slope (Channel) (ft/ft)							0.026						0.039												0.039											
BF slope (ft/ft)							0.026						0.039												0.039											
<sup>3</sup> Ri% / Ru% / P% / G% / S%							70	5	20	5	0																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																				
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																				
<sup>2</sup> % of Reach with Eroding Banks							0						0						0						0											
Channel Stability or Habitat Metric																																				
Biological or Other																																				

\* Profile data were not collected in MY3

Table 12f: Monitoring Data – Stream Reach Data Summary – Tributary 8

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 8 (680 feet)																																					
Parameter	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5						
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	
<b>Dimension</b>																																					
Bankfull Width (ft)						8	9.7	9.7	11.4		2	8.81	12.2	--	15.5	--	2	7.8	10.3	--	12.8	--	2	9.5	11.9	--	2.0	--	2								
Floodprone Width (ft)						18.9	29.7	29.7	40.4		2	19.5	39.9	--	60	--	2	17.2	39.2	--	60.0	--	2	16.3	23.2	--	2.0	--	2								
Bankfull Mean Depth (ft)						0.3	0.7	0.7	1.1		2	0.26	0.6	--	0.75	--	2	0.3	0.7	--	0.9	--	2	0.3	0.5	--	2.0	--	2								
<sup>1</sup> Bankfull Max Depth (ft)						0.8	1.6	1.6	2.3		2	0.71	1.8	--	1.59	--	2	0.7	1.1	--	1.6	--	2	0.6	0.8	--	2.0	--	2								
Bankfull Cross Sectional Area (ft <sup>2</sup> )						2.4	7.7	7.7	12.9		2	2.27	6.9	--	11.6	--	2	2.4	6.7	--	11.0	--	2	3.7	4.6	--	2.0	--	2								
Width/Depth Ratio						10.1	18.2	18.2	26.3		2	20.8	21.4	--	34.2	--	2	15.0	15.9	--	25.1	--	2	16.3	35.5	--	2.0	--	2								
Entrenchment Ratio						2.4	3.0	3.0	3.5		2	1.61	3.3	--	4.93	--	2	1.7	3.8	--	5.8	--	2	1.7	1.9	--	2.0	--	2								
<sup>1</sup> Bank Height Ratio						1.0	1.0	1.0	1.0		2	0.6	1.0	--	1.4	--	2	0.6	1.0	--	1.4	--	2	0.6	0.9	--	2.0	--	2								
<b>Profile</b>																																					
Riffle Length (ft)						4	21.2	20.45	36.9			6.4	18.4	--	29.2	--	5							--	--	--	--	--	-								
Riffle Slope (ft/ft)						0.000	0.032	0.044	0.087			3.9	6.5	--	10	--	5							0.022	0.051	0.07	0.108	--	8								
Pool Length (ft)						3	8.8	9.45	15.9			8.6	10.9	--	13.2	--	2							3	3.5	3.5	4	--	2								
Pool Max depth (ft)						1.6	1.6	1.6	1.6		1	1.81	1.8	--	1.81	--	1							1.68	2.24	2.24	2.8	--	2								
Pool Spacing (ft)						22.8	47.5	43.4	64			291.1	291.1	--	291.1	--	2							94	94	94	94	--	1								
<b>Pattern</b>																																					
Channel Beltwidth (ft)																																					
Radius of Curvature (ft)																																					
Rc:Bankfull width (ft/ft)																																					
Meander Wavelength (ft)																																					
Meander Width Ratio																																					
<b>Additional Reach Parameters</b>																																					
Rosgen Classification																																					
Channel Thalweg length (ft)																																					
Sinuosity (ft)																																					
Water Surface Slope (Channel) (ft/ft)																																					
BF slope (ft/ft)																																					
<sup>3</sup> Ri% / Ru% / P% / G% / S%						70	5	20	5	0																											
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%																																					
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /																																					
<sup>2</sup> % of Reach with Eroding Banks																																					
Channel Stability or Habitat Metric																																					
Biological or Other																																					

\* Profile data were not collected in MY3



Table 12g: Monitoring Data – Stream Reach Data Summary – Mainstem Upstream of Browntown Road

		Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above Browntown Road (2000 feet)																																							
Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5										
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n					
<b>Dimension</b>																																									
Bankfull Width (ft)							16.3	24.8	19.2	39		3	16.0	23.8	--	28.6	--	3	15.3	21.1	--	24.1	--	3	21.1	13.6	--	24.1	--	3											
Floodprone Width (ft)							48.3	65.0	66.1	80.6		3	48.5	66.2	--	80.6	--	3	46.4	66.2	--	83.6	--	3	66.2	43.3	--	83.6	--	3											
Bankfull Mean Depth (ft)							0.8	1.3	1.4	1.7		3	0.91	1.1	--	1.34	--	3	1.0	1.2	--	1.4	--	3	1.2	2.2	--	3.0	--	3											
<sup>1</sup> Bankfull Max Depth (ft)							2.2	2.3	2.2	2.6		3	2.0	2.5	--	3.0	--	3	2.3	2.6	--	2.9	--	3	2.6	3.0	--	3.0	--	3											
Bankfull Cross Sectional Area (ft <sup>2</sup> )							23	28.2	29.7	32		3	19.1	27.0	--	36.1	--	3	19.0	25.2	--	32.6	--	3	25.2	17.8	--	32.6	--	3											
Width/Depth Ratio							11.5	24.8	11.6	51.2		3	13.5	21.0	--	31.5	--	3	12.4	17.7	--	24.0	--	3	17.7	13.5	--	24.0	--	3											
Entrenchment Ratio							2.1	2.8	3.0	3.4		3	2.0	2.8	--	3.4	--	3	2.2	3.1	--	4.0	--	3	3.1	3.5	--	4.0	--	3											
<sup>1</sup> Bank Height Ratio							1	1.0	1.0	1		3	0.66	0.90	--	1.19	--	3	0.3	0.8	--	1.2	--	3	0.8	2.1	--	3.0	--	3											
<b>Profile</b>																																									
Riffle Length (ft)							2.6	79.3	226.5	450.3		16	12.1	41.1	--	106	--	18	18.5	46.8	--	77.0	--	17	12	98.1	109	206	--	16											
Riffle Slope (ft/ft)							0.000	0.003	0.028	0.056		16	0.96	2.5	--	0.06	--	18	0.02	1.4	--	2.8	--	17	0.007	0.016	0.026	0.044	--	16											
Pool Length (ft)							11.1	52.2	100.7	190.3		14	14.4	24.6	--	40.6	--	13	16.3	27.3	--	57.5	--	10	24.4	55.8	56.1	87.7	--	9											
Pool Max depth (ft)							1.8	1.8	1.8	1.8		1	1.83	1.82	--	1.83	--	1	1.9	1.9	--	1.9	--	1	2.87	4.01	4.03	5.18	--	9											
Pool Spacing (ft)							54	172.3	252.2	450.3		14	31.6	170.1	--	370	--	13	20.3	223	--	550	--	10	26.3	172	184	341	--	9											
<b>Pattern</b>																																									
Channel Beltwidth (ft)																																									
Radius of Curvature (ft)																																									
Rc:Bankfull width (ft/ft)																																									
Meander Wavelength (ft)																																									
Meander Width Ratio																																									
<b>Additional Reach Parameters</b>																																									
Rosgen Classification							C4/1						C4/1						C4/1						C4/1																
Channel Thalweg length (ft)							2586.5						2327						2398.4						2100																
Sinuosity (ft)							1.36						1.2						1.3						1.2																
Water Surface Slope (Channel) (ft/ft)							0.0059						0.0069						.0064						0.0069																
BF slope (ft/ft)							0.0059						0.0069						.0058						0.0069																
<sup>3</sup> Ri% / Ru% / P% / G% / S%							60	5	30	5	0																														
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%													4%	24%	50%	21%	1%		5%	19%	72%	4%	0%																		
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /													0.41	6.9	22	75	120		1	7.3	13	39	61		0.15	13.6	37	98	154												
<sup>2</sup> % of Reach with Eroding Banks																			10%						11%																
Channel Stability or Habitat Metric																																									
Biological or Other																																									

Table 12h: Monitoring Data – Stream Reach Data Summary – Mainstem Downstream of Browntown Road

Parameter	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below Browntown Road (2400 feet)																																		
	Baseline						MY-1					MY-2					MY-3					MY-4					MY-5								
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>
<b>Dimension</b>																																			
Bankfull Width (ft)						17.3	19.8	18.8	23.4		3	17.3	18.7	--	19.3	--	3	17.1	18.5	--	20.2	--	3	17	18.1	--	19.7	--	3						
Floodprone Width (ft)						49.8	133.3	175.0	175		3	46.9	51.2	--	58.1	--	3	46.9	51.2	--	58.1	--	3	20	71.7	--	145.0	--	3						
Bankfull Mean Depth (ft)						1.3	1.8	2.1	2.1		3	1.4	1.9	--	2.2	--	3	1.4	1.86	--	2.2	--	3	2	1.8	--	2.2	--	3						
<sup>1</sup> Bankfull Max Depth (ft)						2.5	2.9	2.9	3.2		3	2.4	2.7	--	3.2	--	3	2.5	2.8	--	3.1	--	3	3	2.9	--	3.1	--	3						
Bankfull Cross Sectional Area (ft <sup>2</sup> )						31.4	35.6	36.7	38.8		3	27.4	34.7	--	43.1	--	3	24.4	34.4	--	43.7	--	3	25	34.1	--	44.1	--	3						
Width/Depth Ratio						8.2	11.6	9.1	17.4		3	8.7	10.0	--	13.6	--	3	9.3	10.0	--	12.0	--	3	9	9.8	--	10.8	--	3						
Entrenchment Ratio						2.1	9.2	9.3	16.1		3	2.5	2.7	--	3.1	--	3	2.5	2.8	--	3.1	--	3	3	7.1	--	10.2	--	3						
<sup>1</sup> Bank Height Ratio						1	1.0	1.0	1		3	0.8	1.1	--	1.4	--	3	1.0	1.1	--	1.2	--	3	1	0.9	--	1.1	--	3						
<b>Profile</b>																																			
Riffle Length (ft)						3.2	73.4	128.5	253.7		18	9.2	29.8	--	71.1	--	21	38.5	49.6	--	67.8	--	6	32.0	85.9	88.4	144.7	--	10						
Riffle Slope (ft/ft)						0.000	0.015	0.039	0.077		18	0.006	0.024	--	0.050	--	21	0.98	2.8	--	9.7	--	6	0.005	0.009	0.021	0.037	--	10						
Pool Length (ft)						16.2	47.0	97.7	179.2		18	16.0	34.2	--	53.8	--	14	16.0	43.6	--	202.2	--	11	26.8	46.1	53.7	80.6	--	14						
Pool Max depth (ft)						2.6	2.9	2.9	3.1		2	2.5	2.6	--	2.7	--	2	2.8	3.2	--	3.5	--	2	2.9	3.8	3.9	4.9	--	14						
Pool Spacing (ft)						19.4	145.7	242.8	466.1		18	36	162	--	564	--	14	79.6	230	--	654.8	--	11	41.6	152.5	186.6	331.6	--	14						
<b>Pattern</b>																																			
Channel Beltwidth (ft)																																			
Radius of Curvature (ft)																																			
Rc:Bankfull width (ft/ft)																																			
Meander Wavelength (ft)																																			
Meander Width Ratio																																			
<b>Additional Reach Parameters</b>																																			
Rosgen Classification						C4/1					C4/1					C4/1					C4/1														
Channel Thalweg length (ft)						2515.5					2244					2407.2					2400														
Sinuosity (ft)						1.28					1.18					1.2					1.2														
Water Surface Slope (Channel) (ft/ft)						0.0056					0.0064					0.0057					0.0056														
BF slope (ft/ft)						0.0056					0.0064					0.0067					0.0056														
<sup>3</sup> Ri% / Ru% / P% / G% / S%						60	5	30	5	0																									
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%												4%	11%	72%	13%	0%		0%	54%	43%	3%	0%													
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /												4	12	19	59	90		0.91	1.4	1.9	22	45		6.8	19	27.3	73	195							
<sup>2</sup> % of Reach with Eroding Banks						93										11%					15%														
Channel Stability or Habitat																																			
Biological or Other																																			

---

## **Appendix E: Hydrology Data**

**Table 13: Verification of Bankfull Events**

Newfound Creek Stream Restoration DMS Project Number 92497			
Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
10/9/13 – 5/20/14	Unknown	On-Site Crest Gauges	26, 64
10/21/14 - 10/23/14	Unknown	Site photographs (wrack lines)	77, 190, 256
10/21/14 - 10/23/14	Unknown	On-Site Crest Gauges	241, 239
10/17/14	Approx. December 15, 2013	Proximal USGS gauge resource – Pigeon River	Figure 23
10/17/14	Approx. December 15, 2013	Proximal USGS gauge resource – Ivy River	Figure 24
5/13/2015	Unknown	On-site crest gauges Visual (Wrack lines)	

Two crest gauges were installed along the mainstem of the site on February 7, 2013. One is located upstream of Browntown Road (Crest Gauge 1), and one is located downstream of Browntown Road (Crest Gauge 2). Both crest gauges were located during MY3 and MY4. Both gauges read above-bankfull storm events and collected debris well above bankfull. In MY3 cork from Crest Gauge 1 was present 13.5 inches above bankfull. Cork from Crest Gauge 2 was present 26 inches above bankfull. In MY4 during the May field visit Crest Gauge #1 measured an event 10 inches above bankfull and Crest Gauge #2 measured an event 21 inches above bankfull. Visual evidence was also noted in the form of wrack lines and debris.

Potential bankfull occurrences for the past year (October 16, 2013 to October 16, 2014) were extrapolated based on USGS stream gauge discharge data for the Pigeon River near Hepco, NC (03459500) and the Ivy River near Marshall, NC (03453000). The USGS gauge plots are shown below (Figures 23 & 24). The Pigeon River gauge is located in Haywood County and has a drainage area of 350 square miles. The Ivy River gauge is located in Madison County and has a drainage area of 158 square miles.

An estimate of the number of bankfull events between October 16, 2014 and November 15, 2015 was made by comparing the stream discharges from the USGS data in cubic feet per second (cfs) against the bankfull discharge estimated from the drainage area on the Mountain Regional Curve. According to the regional curve, a bankfull event occurs on a stream with a 350 square mile drainage area when the discharge is about 10,000 cfs. A discharge of 9570 cfs was recorded on April 20, 2015 at the Pigeon River location. A bankfull event occurs on a stream with a 158 square mile drainage area when the discharge is about 4,000 cfs. This discharge was not reached or exceeded during the past year at the Ivy River location. Data are consistent between gauges.

Rainfall data are presented in Figure 25. Rainfall data were derived from two NC Climate Retrieval and Observations Network of the Southeast (CRONOS) stations in the Leicester area. Both stations were used to ensure that the most accurate data were used, rainfall totals from the station with the most recorded observations were used for each month. Rainfall data show that

---

rainfall amounts near the site were low to average for the majority of the past 12 months, with high rainfall amounts of 3.07 inches in April of 2015 and 3.02 inches in October of 2015.



Photo 77. Wrack lines on upstream of mainstem



Photo 190. Wrack lines on downstream of mainstem



Photo 256. Wrack lines near bottom of mainstem



Photo 26. Crest Gauge 1, May 2014



Photo 64. Crest Gauge 2, May 2014



Photo 241. Crest gauge 1, November 2014



Photo 239. Crest gauge 2, November 2014



Crest gauge 1, May 2015



Crest gauge 2, May 2015



Wrack lines along mainstem, May 2015



Figure 21: USGS Proximal Gauge Pigeon River near Hepco, NC

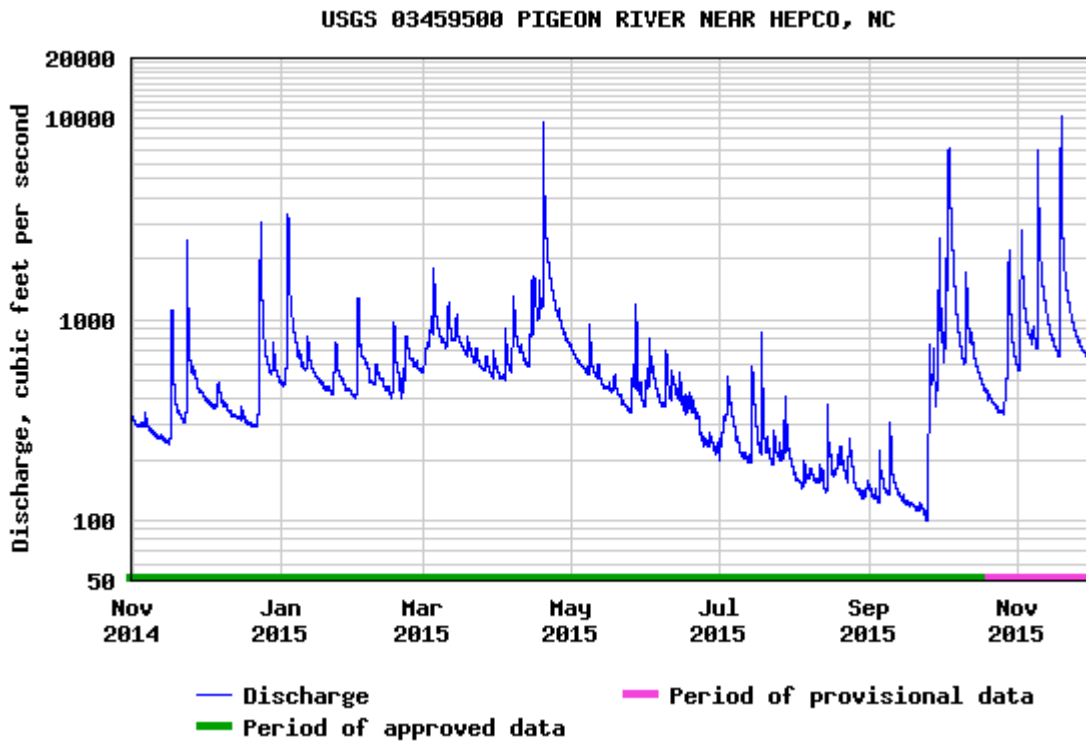
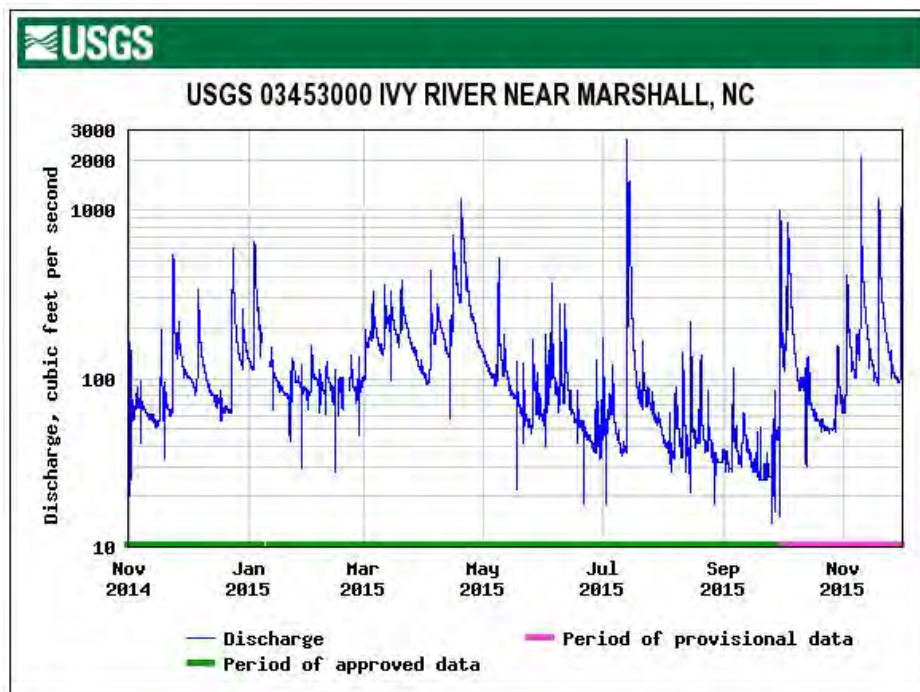


Figure 22: USGS Proximal Gauge Ivy River near Marshall, NC



**Figure 23: Newfound Creek 30-70 Percentile Graph for Rainfall in Past Year, Leicester, NC**

