Newfound Creek Stream Restoration
2016 Monitoring Report
Monitoring Year Five

NC Division of Mitigation Services Project Number 92497

Submitted to:

North Carolina Division of Mitigation Services
1652 Mail Service Center
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Project Designed by:

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Newfound Creek Stream Restoration
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NC Division of Mitigation Services Project Number 92497

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January 5, 2017

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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 provided grade control, enhanced stability, promoted efficient sediment transport, and produced/enhanced in-stream habitat. A buffer was planted along the stream banks to help stabilize the banks. The buffer was 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 included:

- 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.
- Improving overall water quality.

The objectives of the project included:

- Stabilizing eroding stream banks and headcuts.
- Restoring the stream channels to a proper dimension, pattern, and profile.
- Providing the stream channels with adequate flood prone area.
- Establishing a more diverse bed morphology with riffle-pool sequences supported by in-stream structures, and by providing a source for woody debris and leaf litter by planting a native riparian buffer.
- Creating riparian corridors.
- Reducing direct inputs of nutrients and fecal coliform by excluding livestock from the stream channels and providing livestock with alternative sources of drinking water.
- Reducing nutrient and sediment inputs to the stream from the agricultural fields by providing a native riparian buffer.

As an important part of this project, the North Carolina Division of Mitigation Services (DMS) [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 (USDA) 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) are 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.

2016 Monitoring Year (MY) 5 monitoring indicates that the planted woody vegetation meets the success criteria. The site-wide average planted stem count is 263 stems/acre. When volunteer woody species are added in plant density increases to 587 stem/acre. Six of the 14 planted plots (43%) are not meeting the success criteria of 260 planted stems/acre at MY5 (plots 1, 4, 5, 6, 8, and 12). If volunteer stems are considered than there are only three plots not meeting the success criteria (plots 4, 6, and 12). The MY5 densities are higher than MY4 as an extra effort was made to located planted stems in the monitoring plots. Herbaceous vegetation in all plots is quite dense which makes locating planted stems difficult. Even with the extra effort there is a likelihood that some planted vegetation was overlooked because of the dense vegetation. Low survival in several plots is due to the dense herbaceous vegetation growing in the plots which has over topped the planted stems. Replanting of the buffers is unlikely to significantly increase stem densities as it is likely that there would be a low survival rate of planted stems due to the dense herbaceous vegetation.

Streamside livestake survival is successful throughout all reaches and tributaries, but is not captured within the plot data as most vegetation plots include few livestake stems. Herbaceous vegetation, including goldenrod, joe pye weed, and tearthumb are thriving along the banks of the tributaries and mainstem. In most areas, the herbaceous cover is quite thick. The banks and channels of some of the smaller tributaries have filled in with dense mats of vegetation. This is the case within Tributary 4, upstream of Browntown Road, Tributary 7, and Tributary 8.

A few isolated bushes of Chinese privet (*Ligustrum sinense*) were noted along the upper portion of the mainstem. Scattered stems of privet were also observed in the easements on Tributary 4 (above Browntown Road), Tributary 7, and Tributary 5. Treatment of privet on Tributary 4 has occurred in previous years, but stems are starting to regenerate and there may be some new stems occurring. Scattered stems of multiflora rose (*Rosa multiflora*) were also noted along Tributaries 4, 5, and 7. In general the invasives are scattered with no dense populations observed.

Kudzu (*Pueraria lobata*) was initially observed at the top of the mainstem and on Tributary 4, at the crossing with Browntown Road, during MY2. The population along Tributary 4 near Browntown Road was destroyed in conjunction with Chinese privet treatments in that area. While the kudzu is gone there are still a few live stems of privet present in the area as of MY5 [Vegetation Area of Concern (VAC) 10]. The kudzu population at the top of the mainstem, while not observed in MY4 appears to have returned in MY5 (VAC 22). Oriental bittersweet (*Celastrus orbiculatus*) was also noted in the canopy along Tributaries 3, 4, and 7 during MY5. It should be noted that the site is still undergoing invasive population treatments via a separate DMS contract.

In MY5, the stream morphology components of the Newfound Creek Stream Restoration project are functioning reasonably well. However, beavers have moved onto the site and six beaver dams were noted on both the upstream and downstream reaches of the mainstem. Beaver activity (stem chews) were noted throughout the reach below Browntown Road.

The majority of the bed features on the mainstem appear stable. The channel is dominated by riffles and runs, with most of the well-developed pools associated with structures or natural bedrock features. Two of the cross-vanes upstream of Browntown Road (Sta 0+80 and 15+80) have failed with the sill and portion of the vane arm displaced. These “failures” have not created any instability or bank failures in the stream channel in the vicinity of the structures. A root wad installed at Sta. 28+00 (AC 13) has also “failed” and the bank has eroded away behind the structure.

There are several areas of bank erosion, some of them severe, which have been present for several years. Some of the banks have stabilized with vegetation but several banks remain erosional, although significant changes have not been noted from MY4.

The fields adjacent to the project downstream of Browntown Road have been converted from tomato fields to pasture and the equipment crossing/stream ford is becoming overgown and appears not to have been used for some time.

The six tributaries were all functioning well and appear stable. Small headcuts were noted in Tributaries 4, 5, and 6. The headcuts on Tributaries 4 and 5 appear stable. The Tributary 6 headcut may still be active but any change from the previous year has been relatively minor. As noted above, streamside livestakes are thriving, and along most tributaries are over 20 feet tall.

Tributaries 7 and 8 are both relatively "low flow" headwater streams. While there is typically flow in the streams there is not sufficient velocities to flush silts/fines from the system. Both of these streams have a buildup of fine silt in the riffles and pools, particularly in the downstream reaches.

Deposition of silts has also occurred in Tributary 4 from Sta 6+00 to 9+50 and on the downstream end of Tributary 3 (Sta 7+50 to 11+00) where the gradient flattens out. This is reflected in the pool cross-section (XS-3). From MY1 to MY3 there was a consistent deposition of silt in the pool, filling the pool to bankfull. In MY4 a large storm event shortly before the monitoring event appeared to have flushed the fines from the system. However, the silt had built back up in the pool for MY5 (See XS on page 74).

Overall, the site is doing well. The fences that were constructed to exclude cattle are all in good condition. The fencing along Tributary 8 that had been damaged during MY4 has been repaired restricting the cattle. The vegetation along Tributary 8 has recovered and there is little evidence that the cattle were ever in the easement.

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

2.0 METHODOLOGY

All monitoring methodologies follow the June 2012 *Procedural Guidance and Content Requirements for EEP Monitoring Reports* provided by EEP (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 R10 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 MY5. The longitudinal profile for Tributary 5 began about 60 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. URS 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 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

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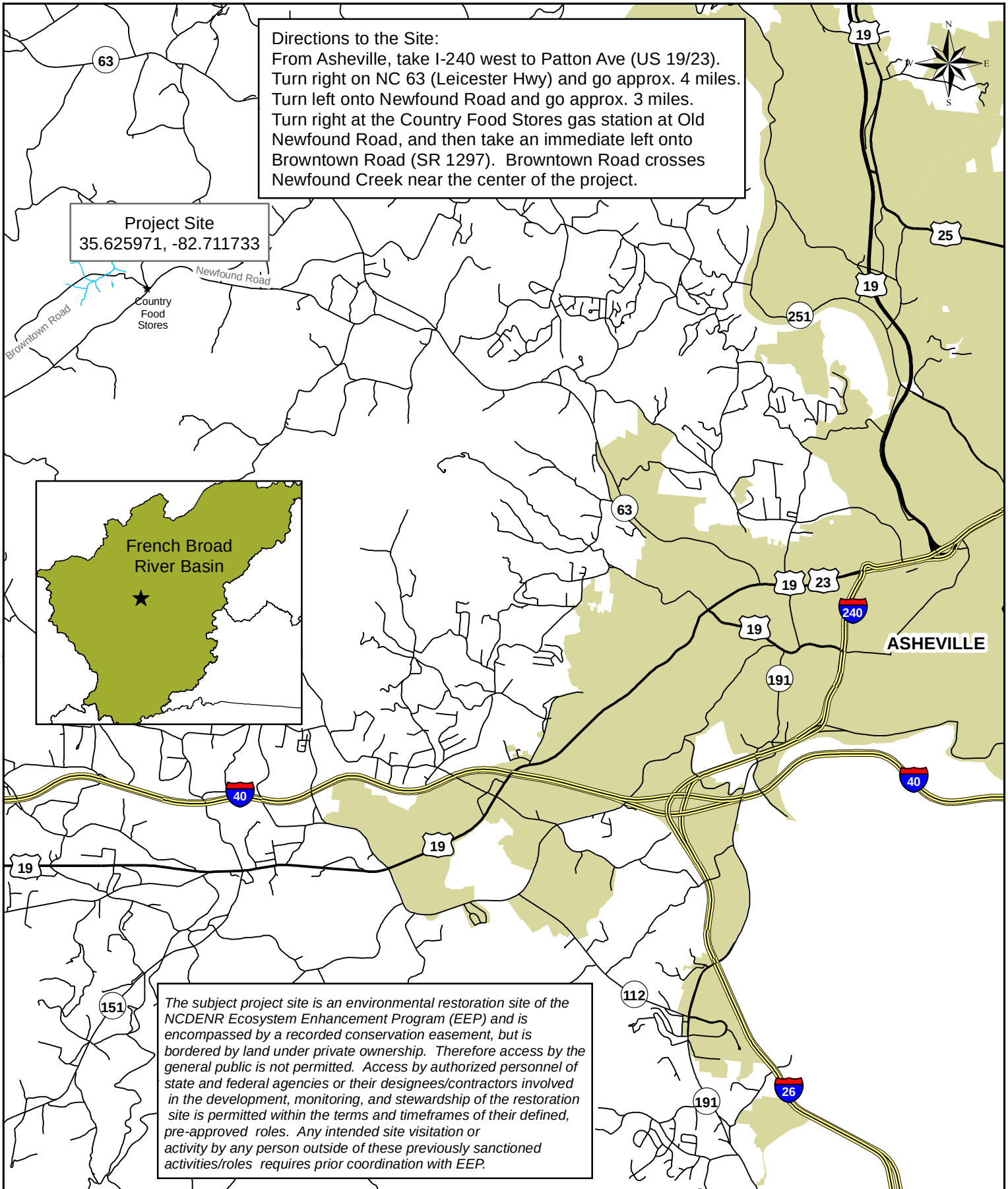
Appendices for Project Background, Condition, and Performance Data

Appendix A: Project Vicinity Map and Background Tables



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Division of Mitigation Services

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

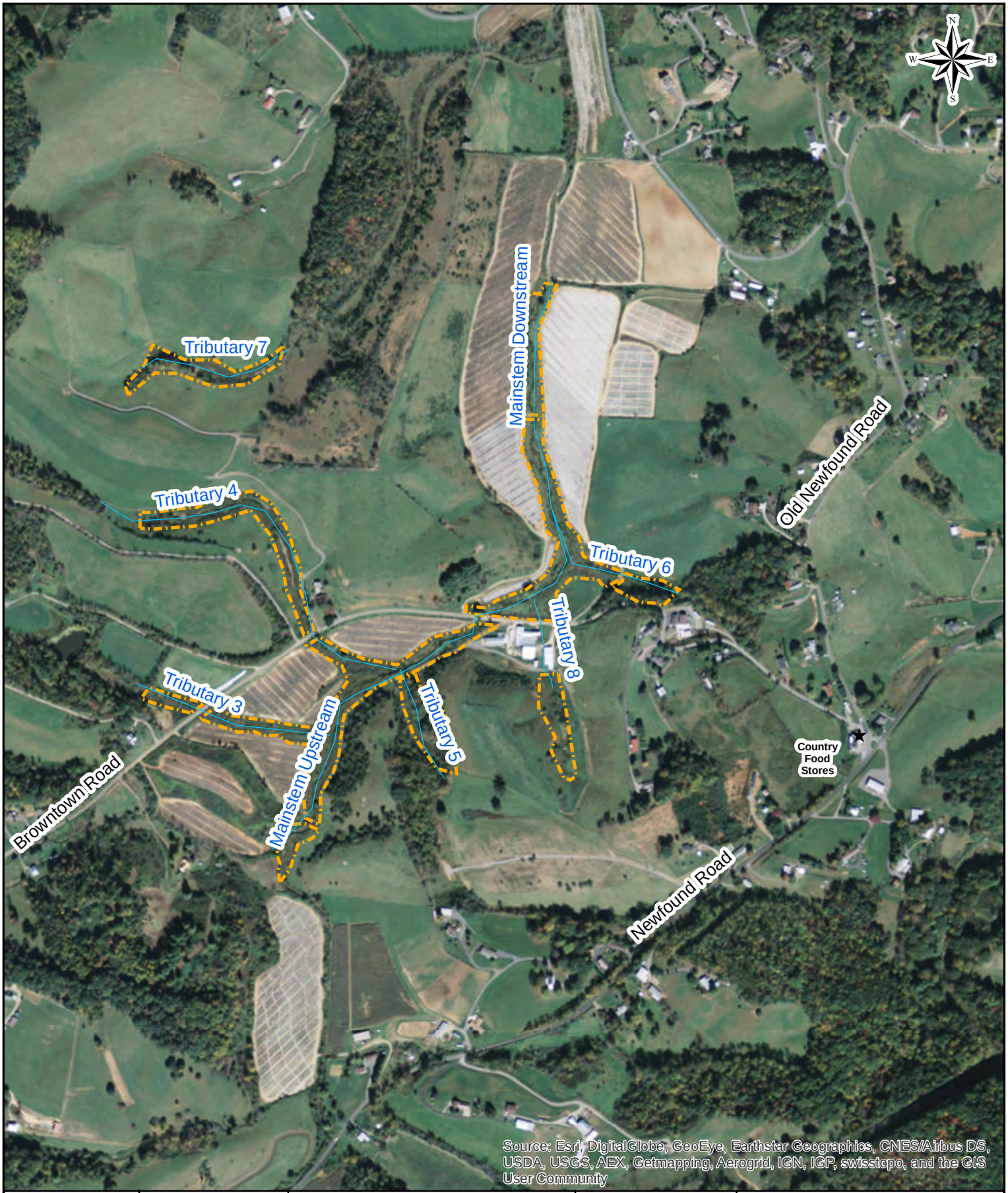
Project Number: 92497

Date: November 2016

Legend
- Project Reach
- Interstate
- US Highway
- NC Highway
- Local Road
- Municipal Boundary

Figure 1
Project Vicinity

0 1 2 Miles



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NORTH CAROLINA

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

Project Number: 92497

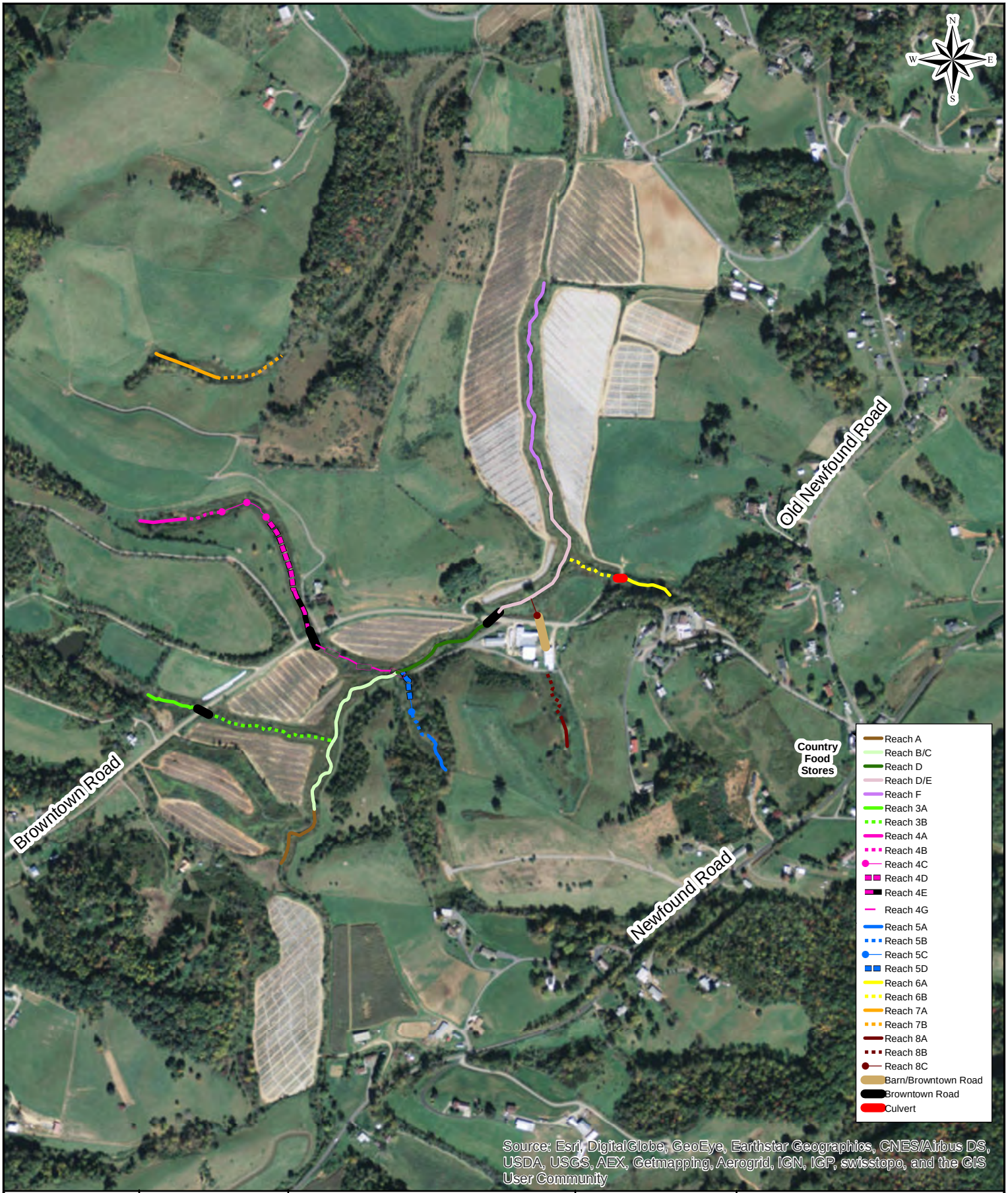
Date: November 2016

Legend
- Project Reach
- Conservation Easement

Figure 2
Project Site

0 250 500 1,000 Feet

North Carolina 2010 Ortho Imagery



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CU 06010105

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Figure 3
Restoration Reaches
0 250 500 1,000 Feet
North Carolina 2012 Ortho Imagery

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 Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	**7,998**			**0.35**					

Project Components

Project Component -or- Reach ID	Stationing/Location	Existing Footage or Acreage	Approach (Restoration, Enhancement, etc.)	Level (P1, P2, P3, EI, EII etc)	Restoration Footage or Acreage	Mitigation Ratio
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 (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (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						
Totals	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

Newfound Creek Stream Restoration Project DMS Project Number 92497		
Elapsed Time Since Grading Complete: **5 yrs 0 months** **Elapsed Time Since Planting Complete:** **4 yrs 9 months** **Number of Reporting Years:** **5**		
Activity or Deliverable	**Data Collection Complete**	**Completion or Delivery**
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 O (baseline) Monitoring	N/A	N/A
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	November 2016	January 2017

Table 3: Project Contacts Table

Newfound Creek Stream Restoration DMS Project Number 92497	
Designer	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Primary project design POC	Kathleen McKeithan 919-461-1597
Construction Contractor	Eagle Wood, Inc. PO Box 1046 Denver, NC 28037
Construction contractor POC	Bill Anderson 704-483-5853
Survey Contractor	Kee Mapping and Surveying PO Box 2566 Asheville, NC 28802
Survey contractor POC	Brad Kee 828-645-8275
Planting Contractor	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273
Planting contractor POC	Gregg Antemann 704-527-1177
Seeding Contractor	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273
Contractor point of contact	Gregg Antemann 704-527-1177
Seed Mix Sources	Green Resource, Colfax NC 336-855-6363
Nursery Stock Suppliers	Cumberland Mountain Nursery 357 Middle Ridge Road Beersheba Springs, TN 37305 931-692-2164
Monitoring Performers – MY1	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
Monitoring Performers – MY2, MY3, MY4, MY5	URS Corporation - North Carolina 701 Corporate Center Drive, Suite 475 Raleigh, NC 27609
Stream Monitoring POC	Ron Johnson 919-654-6210
Vegetation Monitoring POC	Ron Johnson 919-654-6210
Wetland Monitoring POC	NA

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

Wetland Summary Information

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	
Regulatory Considerations			
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

Appendix B: Visual Assessment Data

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 XS3 Left	35.62457057730	-82.71456587310
Tributary 3 XS3 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

Sheet 12
Tributary 7
Sheet 7
Sheet 6
Mainstem
Sheet 9
Sheet 10
Tributary 4
Sheet 5
Tributary 6
Sheet 4
Sheet 11
Browntown Road
Sheet 3
Sheet 13
Sheet 8
Sheet 2
Tributary 5
Tributary 8
Tributary 3
Sheet 1
Mainstem
Browntown Road

0 250 500 1,000 1,500 Feet

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Stream Restoration
Buncombe County, NC
CU 06010105

Monitoring Year:
5 (2016)

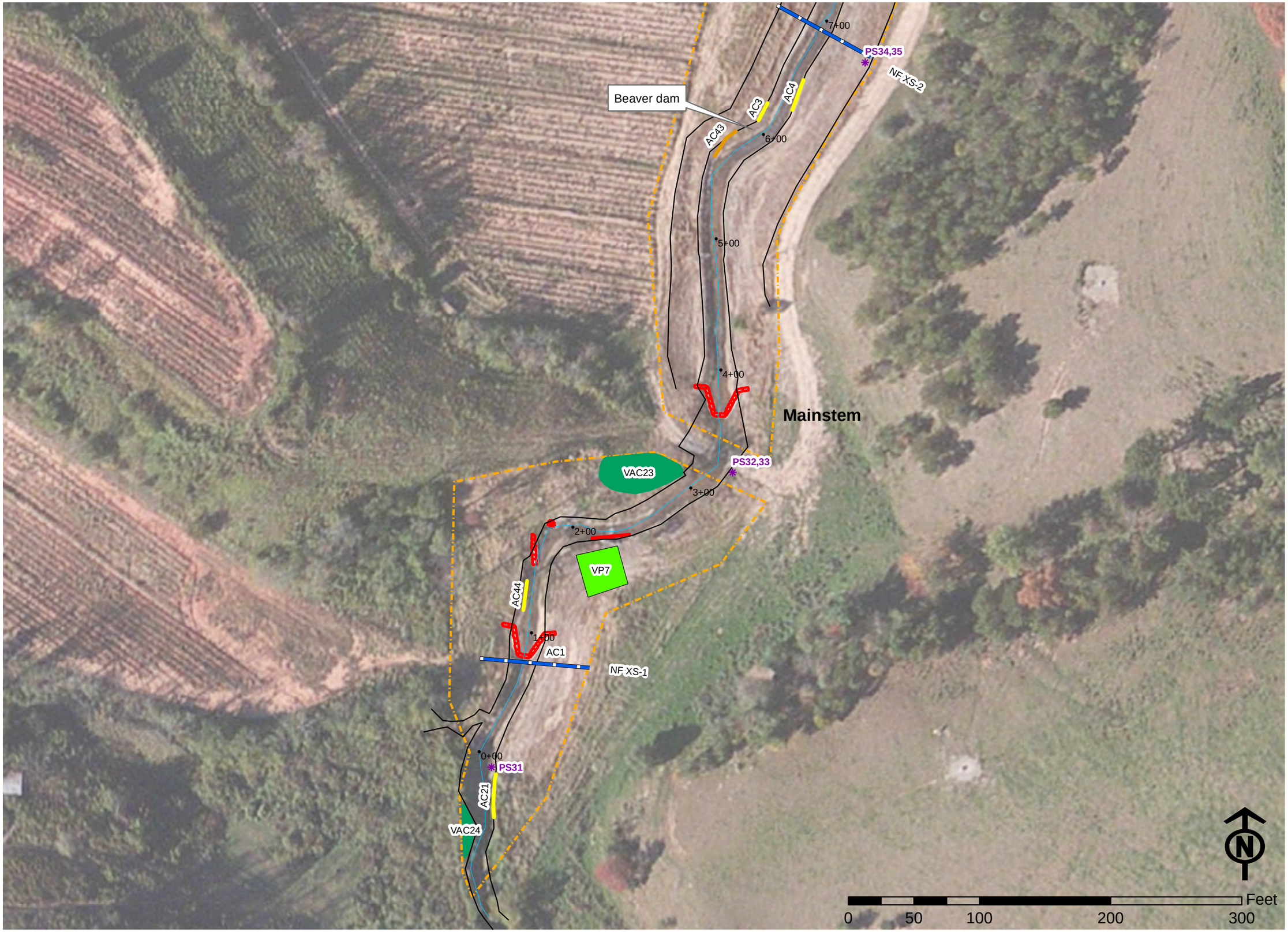
Project Number:
92497

Date:
November 2016

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

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition Plan View Overview



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Stream Restoration
Buncombe County, NC
CU 06010105

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5 (2016)

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Date:
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Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

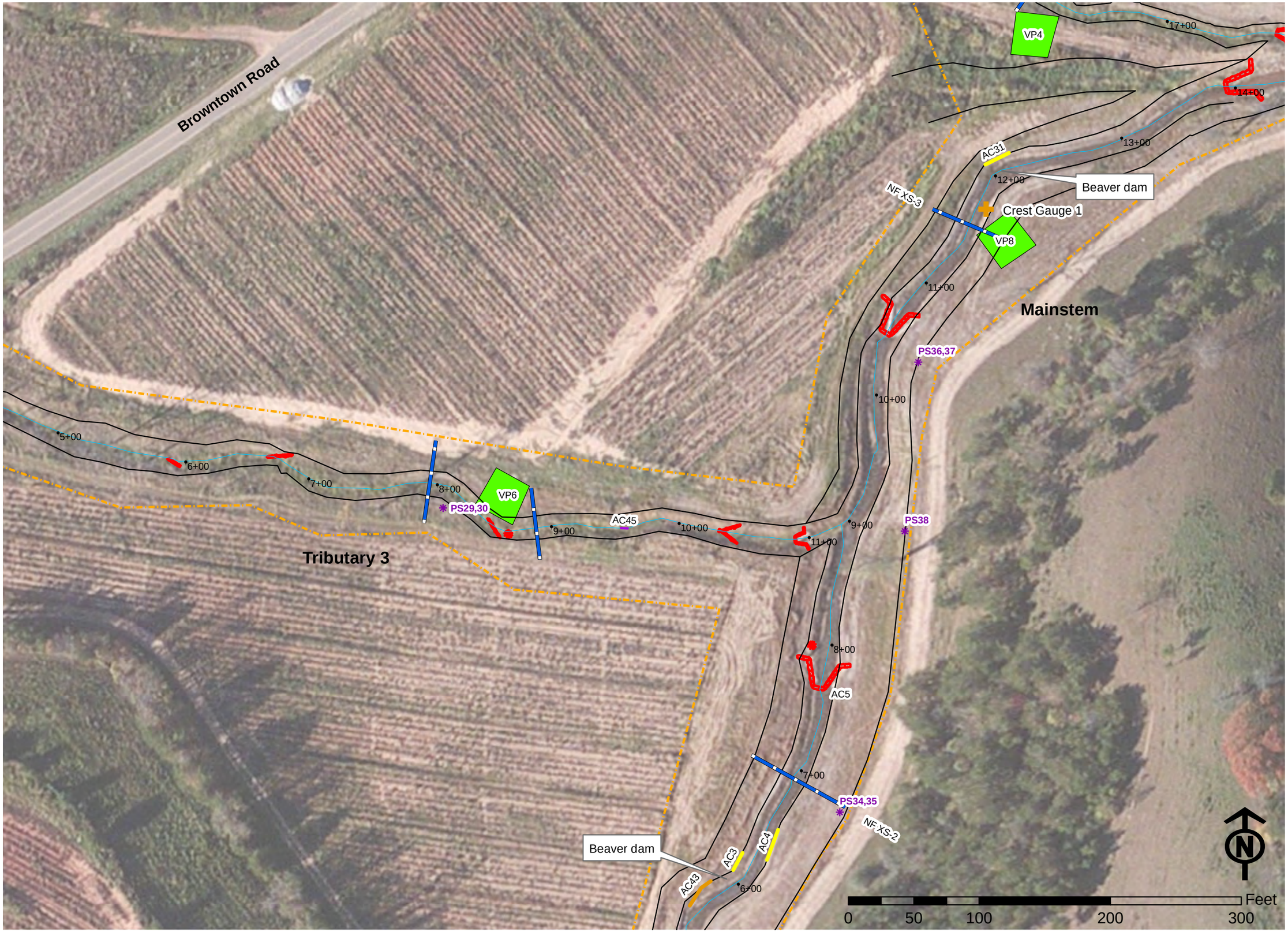
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 1



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5 (2016)

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Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

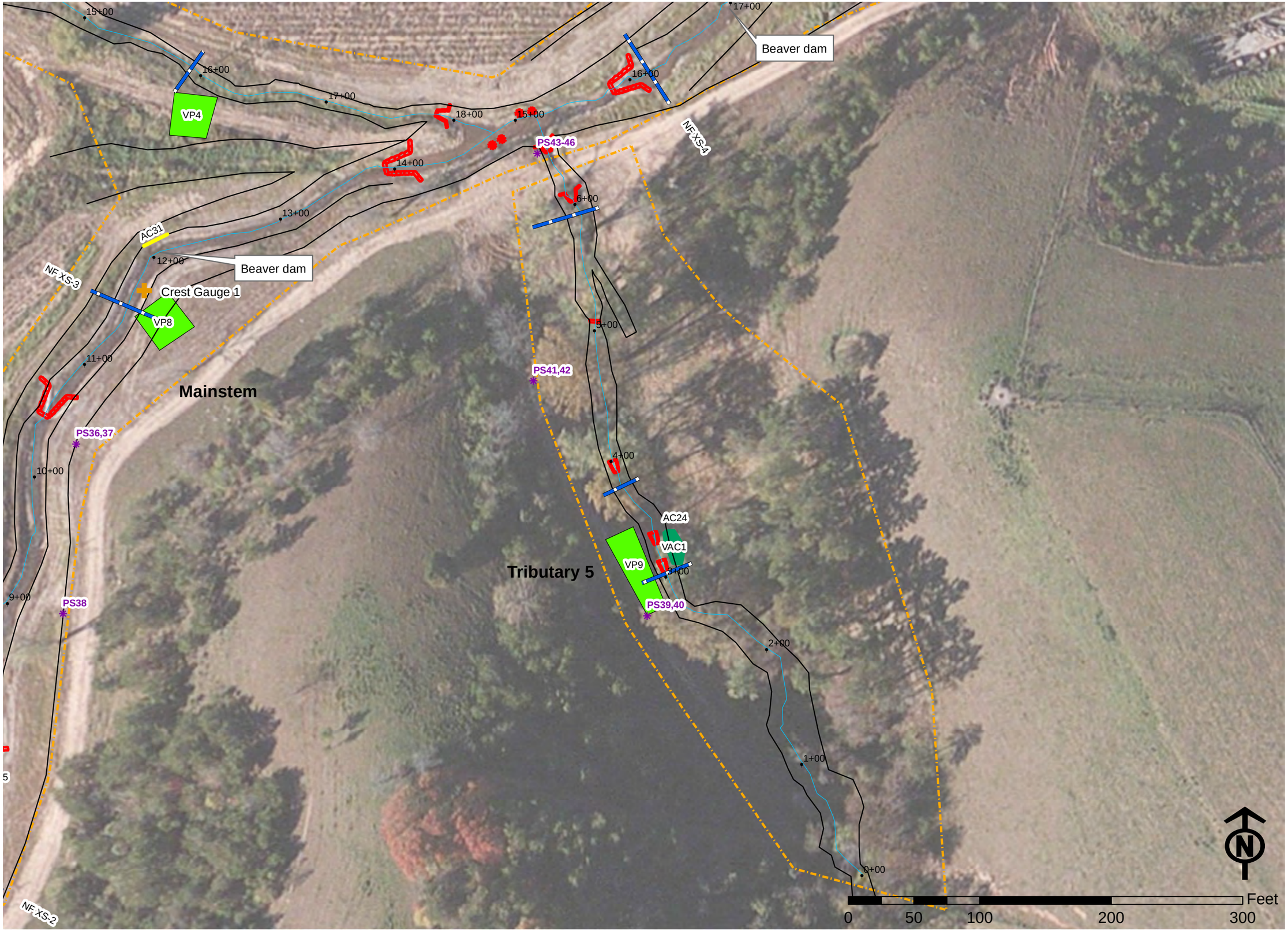
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 2



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Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

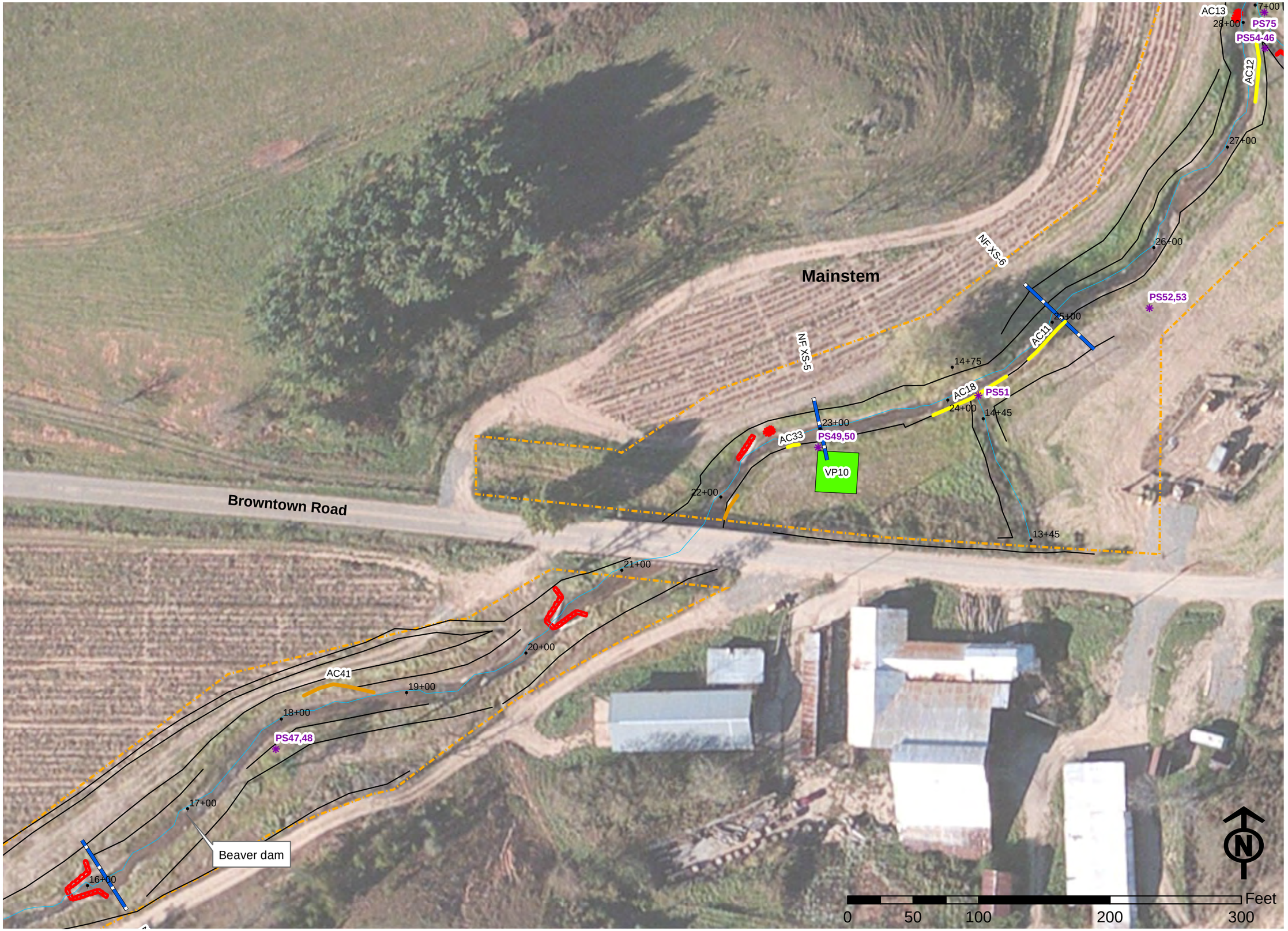
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 3



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92497

Date:

November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

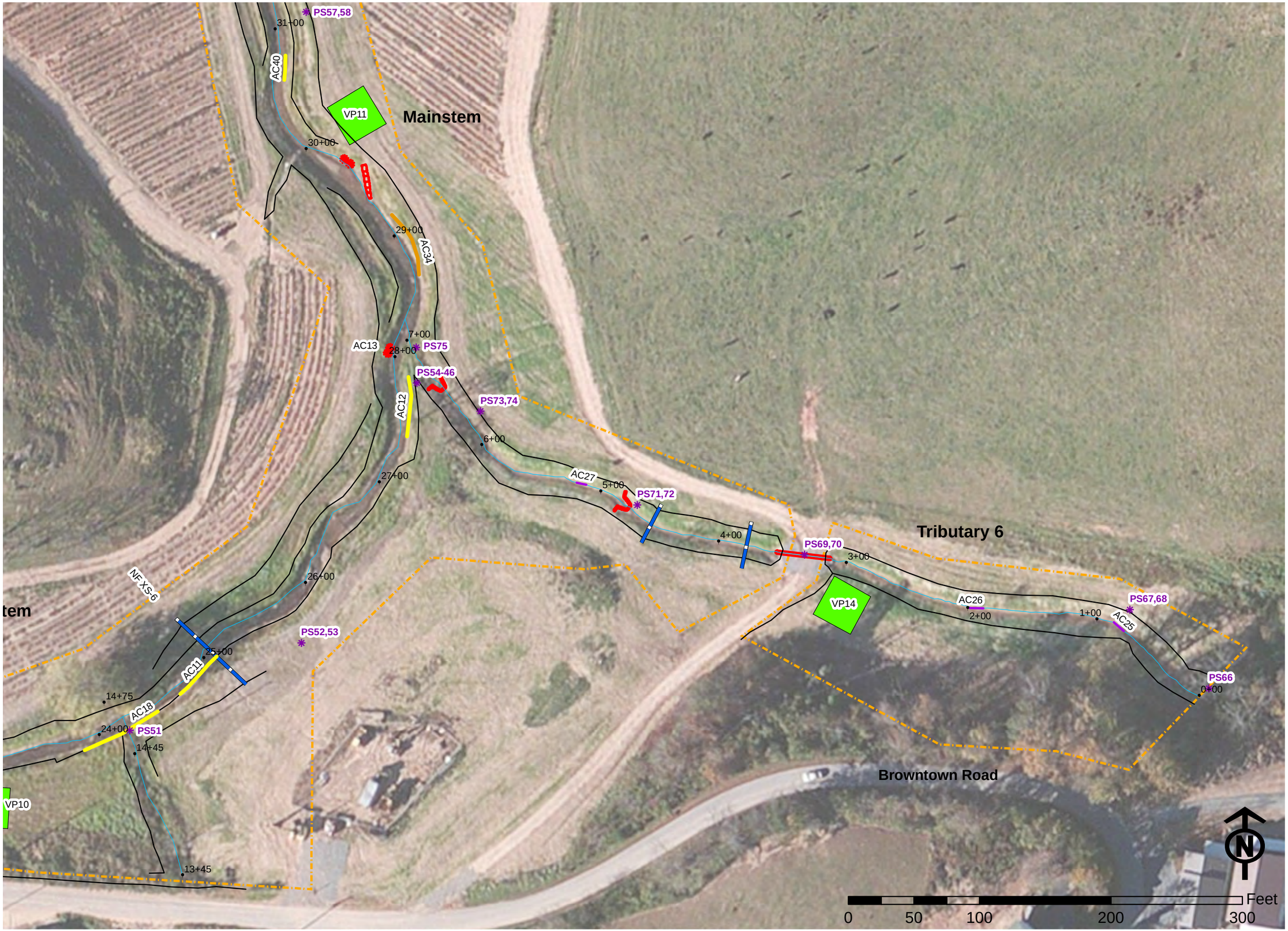
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 4



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5 (2016)

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92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 5

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Monitoring Year:
5 (2016)

Project Number:
92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

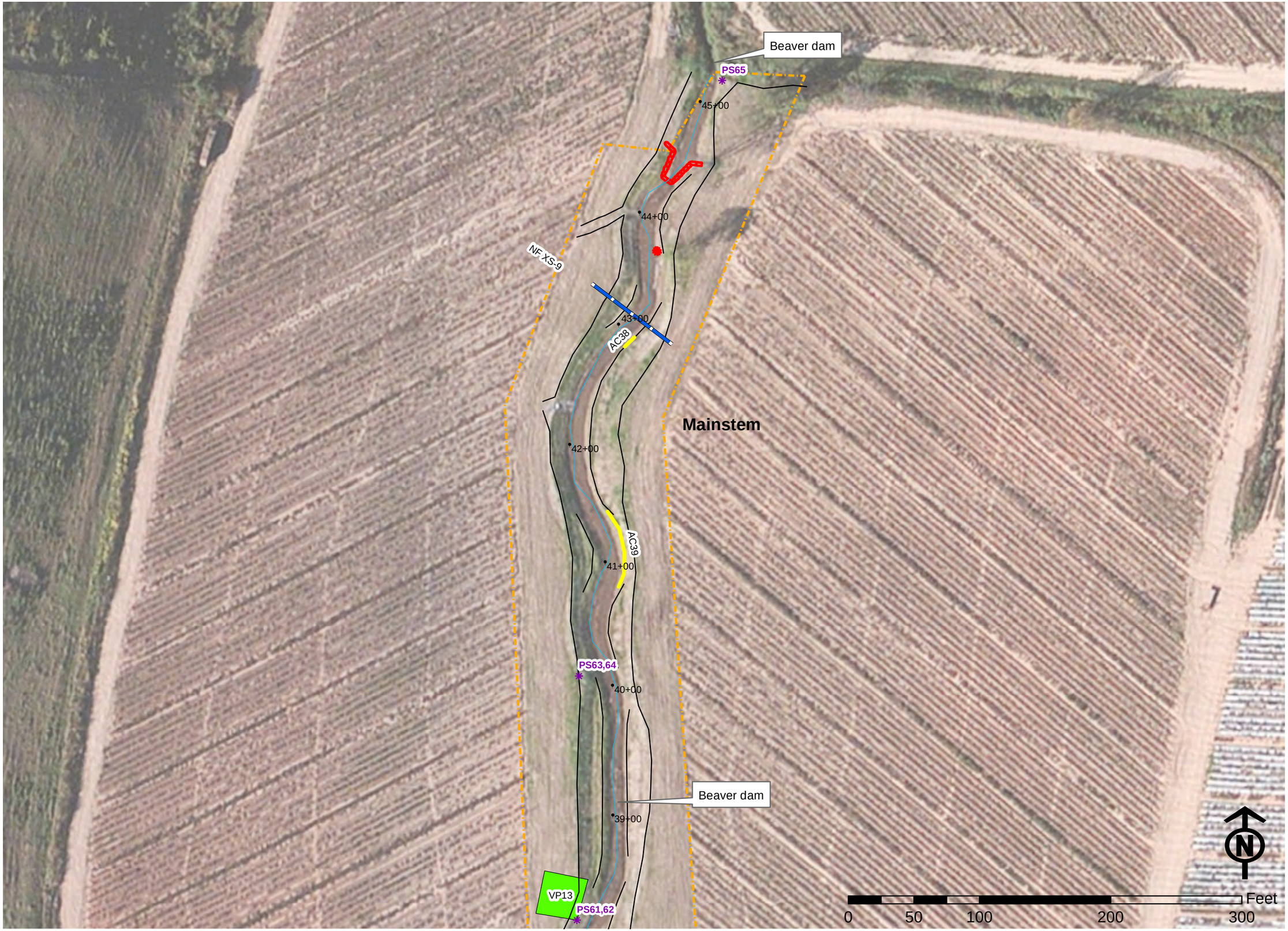
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 6



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Monitoring Year:
5 (2016)

Project Number:
92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

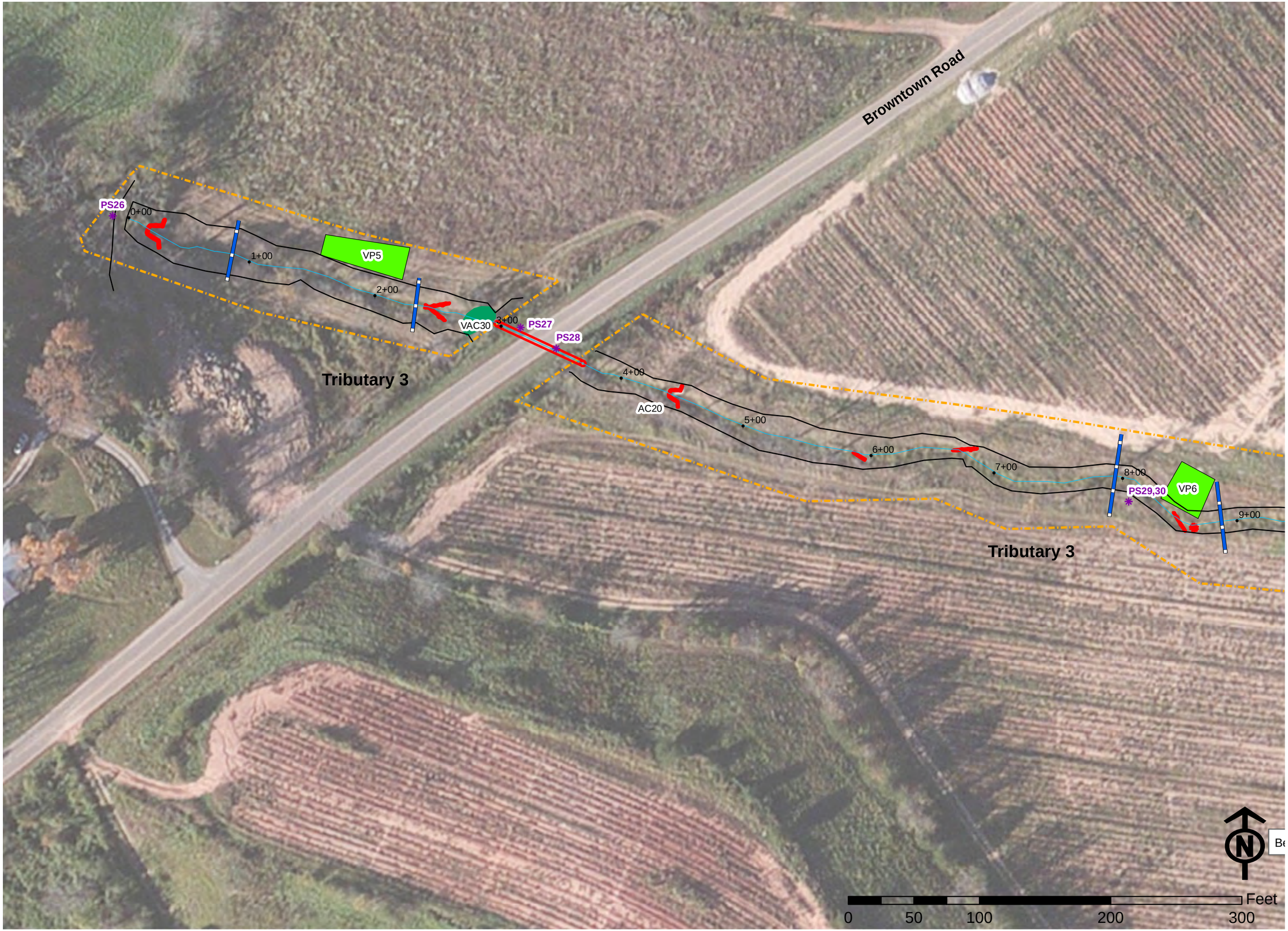
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 7



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Buncombe County, NC
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5 (2016)

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Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

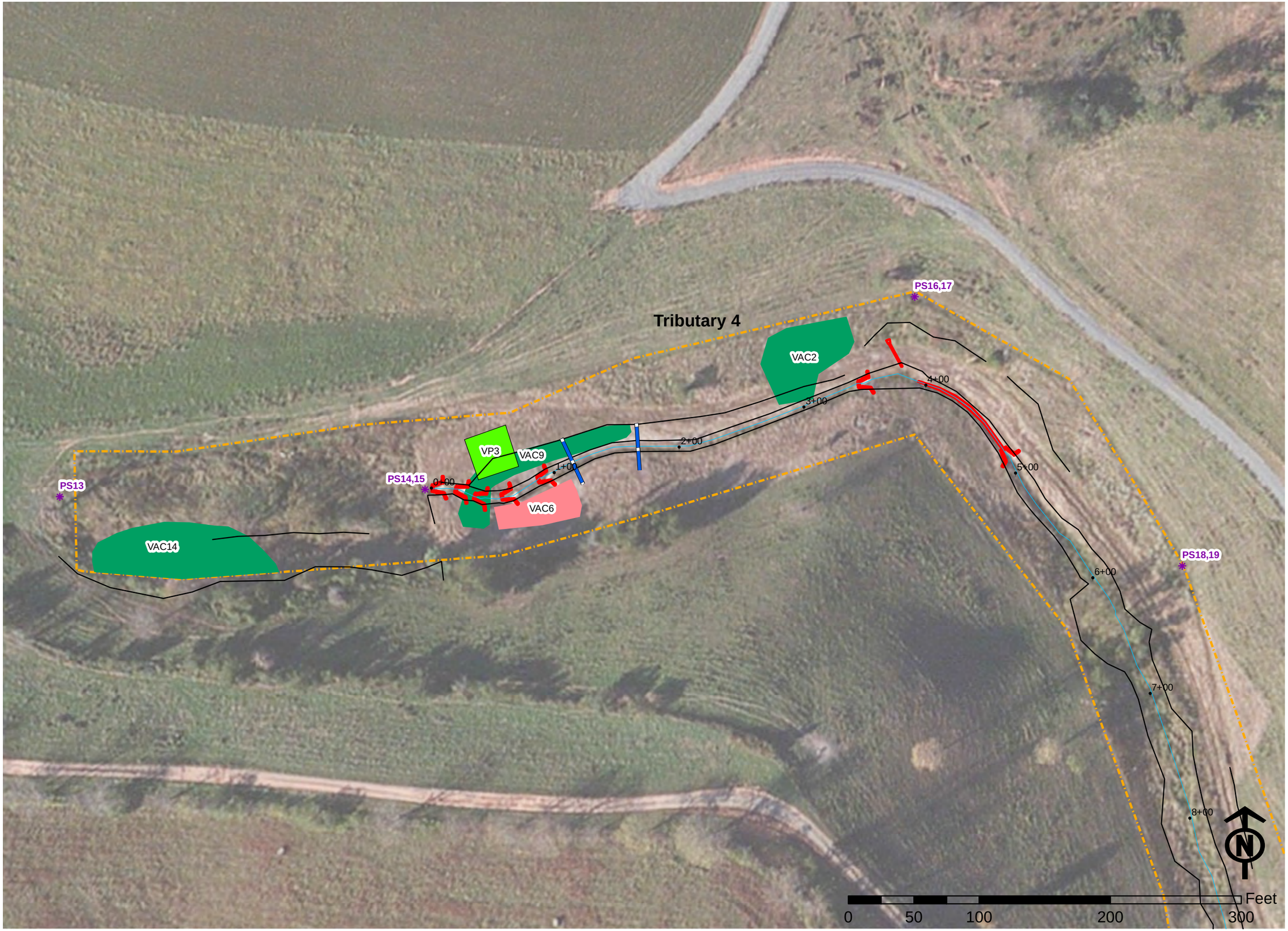
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 8



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Nothing Compares NORTH CAROLINA

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Stream Restoration
Buncombe County, NC
CU 06010105

Monitoring Year:
5 (2016)

Project Number:
92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

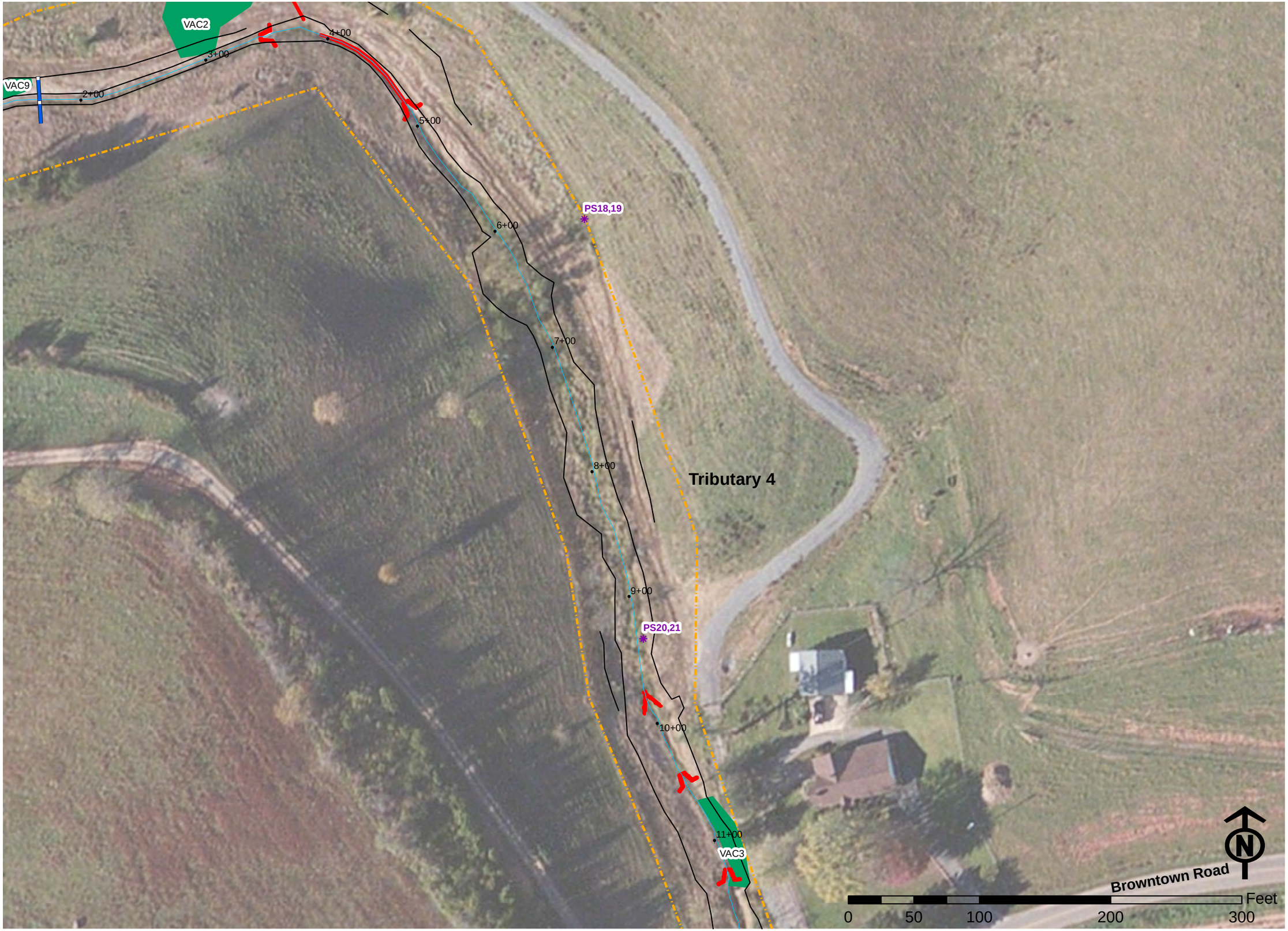
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 9



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Buncombe County, NC
CU 06010105

Monitoring Year:

5 (2016)

Project Number:

92497

Date:

November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

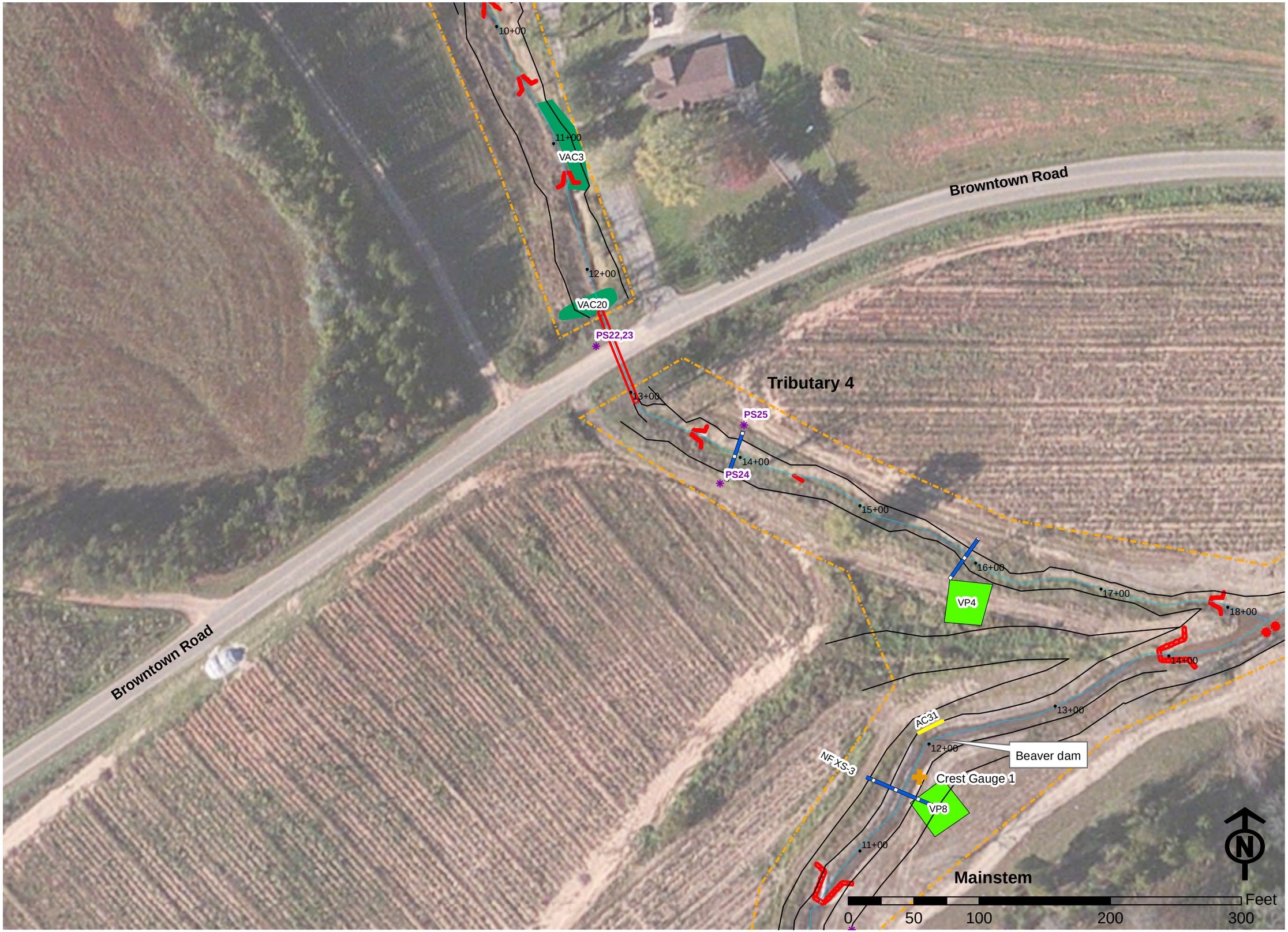
- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 10



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5 (2016)

Project Number:
92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 11

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Buncombe County, NC
CU 06010105

Monitoring Year:

5 (2016)

Project Number:

92497

Date:

November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 12

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CU 06010105

Monitoring Year:
5 (2016)

Project Number:
92497

Date:
November 2016

Legend

- Stream Stations
- Photo Stations

Bed/Bank Condition

- Degradation/Headcut
- Scoured/Eroding Bank
- Undercut Bank
- Cross Section
- Top of Bank
- Thalweg
- Vegetation Plot

Display

- Yes

Vegetation Problem Areas

- Invasive Population
- Low Stem Count
- Conservation Easement

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Current Condition
Plan View
Sheet 13

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			1	5	99.9%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	19	19			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	15	15			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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 NOT include undercuts that are			0	0	100%	0	0	100%

		modest, appear sustainable and are providing habitat.								
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio <u>≥</u> 1.6 Rootwads/logs providing some cover at base-flow.	2	8			25%			

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			1	4’	99.8%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	14	24			58%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	4	12			33%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	4	12			33%			
	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 NOT include undercuts that are			0	0	100%	0	0	100%

		modest, appear sustainable and are providing habitat.								
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	13	13			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			1	4	99%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	7	7			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	2	3			67%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are			0	0	100%	0	0	100%

		modest, appear sustainable and are providing habitat.								
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio <u>≥</u> 1.6 Rootwads/logs providing some cover at base-flow.	3	5			60%			

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			1	15’	98%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	4	5			80%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	3	3			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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 NOT include undercuts that are modest, appear sustainable and			0	0	100%	0	0	100%

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

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			3	170	55%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	1	3			33%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	1	2			50%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	1	2			50%			
	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 NOT include undercuts that are modest, appear sustainable and			0	0	100%	0	0	100%

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

Table 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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			5	170	55%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	2	9			22%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	1	3			33%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	1	3			33%			
	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 NOT include undercuts that are			0	0	100%	0	0	100%

		modest, appear sustainable and are providing habitat.								
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	3	5			60%			

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
1. Bed	**1. Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	30	99%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	18	19			95%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	13	13			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	13	13			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	19	19			100%			
		2. Thalweg centering at downstream of meander (Glide)	10	10			100%			
2. Bank	**1. Scoured /Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			5	125	97%	0	0	97%

	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.		2	65	99%	0	0	99%
	3. Mass Wasting	Bank slumping, calving, or collapse		0	0	100%	0	0	100%
			Totals	7	190	96%	0	0	96%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	10	12		83%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	7		71%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	8		75%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	12	12		100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	8		75%			

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	25	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	17	17			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	16	16			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	16	16			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	16	16			100%			
		2. Thalweg centering at downstream of meander (Glide)	16	16			100%			
2. Bank	**1. Scoured/ Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			6	260	94%	0	0	94%

	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.		1	105	98%	0	0	98%
	3. Mass Wasting	Bank slumping, calving, or collapse		0	0	100%	0	0	100%
			Totals	7	365	92%	0	0	92%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	6 7			89%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4 4			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5 5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	6 7			88%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	2 7			40%			

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**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	N/A	0	0.0	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Solid coral	4	0.04	0.2%
			Total	4	0.04	0.2%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	N/A	0	0.00	0.0%
			Cumulative Total	4	0.04	0.2%
Easement Acreage	**25.3**					
Vegetation Category	**Definitions**	**Mapping Threshold**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Presence of Chinese privet, multiflora rose, oriental bittersweet, and kudzu.	1000 SF	Solid green	11	0.47	1.9%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	0.0	Stripped Orange	0	0.0	0.0%

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

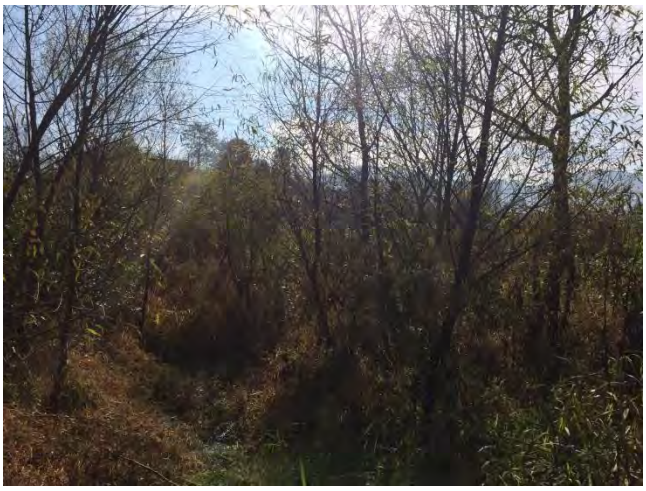
PS70, Tributary 6 facing downstream

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

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Table 7: CVS Stem Count Total and Planted with/without Livestakes by Plot and Species – CVS Generated Table

			Current Plot Data (MY5 2016)																												
Scientific Name	Common Name	Species Type	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			92497-01-0010		
			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	PnoLS	P-all	T
Acer floridanum	Southern sugar maple	Tree			1				1	1	1																	1			
Acer negundo	boxelder	Tree							2	2	2				2	2	3														
Acer rubrum	red maple	Tree																													
Acer saccharinum	silver maple	Tree	1	1	1										1	1	1														
Alnus serrulata	hazel alder	Shrub																			2	2	27				1	1	1		
Betula nigra	river birch	Tree																						1	1	1	1	1	1		
Carpinus caroliniana	American hornbeam	Tree																1	1	1				1	1	2	1	1	1		
Carya cordiformis	bitternut hickory	Tree																													
Carya ovata	shagbark hickory	Tree																													
Celtis laevigata	sugarberry	Tree										1	1	1													2	2	2		
Cornus amomum	silky dogwood	Shrub																								1					
Cornus florida	flowering dogwood	Tree																													
Corylus cornuta	beaked hazelnut	Shrub																			3	3	3				1	1	1		
Diospyros virginiana	common persimmon	Tree				1	1	2																							
Euonymus americanus	Strawberry bush	Shrub																			1	1	1	1	1	1					
Fraxinus pennsylvanica	green ash	Tree																												3	3	3
Hamamelis virginiana	American witchhazel	Tree							1	1	1																2	2	2		
Ilex opaca	American holly	Tree																													
Juglans nigra	black walnut	Tree			2										2	2	6									1					
Juniperus virginiana	eastern redcedar	Tree																											4		
Lindera benzoin	northern spicebush	Shrub																									1	1	1	1	1	1
Liriodendron tulipifera	tuliptree	Tree																											20		
Pinus virginiana	Virginia pine	Tree																								6					
Platanus occidentalis	American sycamore	Tree	1	1	1	2	2	2	2	2	2						1							1	1	1	4	4	24		
Pyrus calleryana	Callery pear	Exotic																								1					
Quercus michauxii	swamp chestnut oak	Tree							1	1	1							3	3	3				1	1	1					
Quercus pagoda	cherrybark oak	Tree																2	2	2	1	1	1							2	2	2
Rhododendron maximum	great laurel	Shrub																													
Rhus sp.	sumac	shrub			3						4															1					
Robinia pseudoacacia	black locust	Tree																						1	1	2			2		
Salix nigra	black willow	Tree				3	3	3														1	1		2	2					
Sambucus canadensis	Common elderberry	Shrub				1	1	1																							
Ulmus americana	American elm	Tree																								1					
Unknown		Tree																													
Viburnum dentatum	southern arrowwood	Shrub																			1	1	1							1	1	1
	Stem count		2	2	8	7	7	8	7	7	11	1	1	1	5	5	11	6	6	6	8	9	34	6	8	21	13	13	60	7	7	7
	size (ares)		1			1			1			1			1			1			1			1			1			1		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
	Species count		2	2	5	4	4	4	5	5	6	1	1	1	3	3	4	3	3	3	5	6	6	6	7	13	8	8	12	4	4	4
	Stems per ACRE		80.94	80.94	323.7	283.3	283.3	323.7	283.3	283.3	445.2	40.47	40.47	40.47	202.3	202.3	445.2	242.8	242.8	242.8	323.7	364.2	1376	242.8	323.7	849.8	526.1	526.1	2428	283.3	283.3	283.3

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%

Pnols – Planted excluding livestakes

P-all – All planted stems including livestakes

Total - - all planted and natural recruit stems including livestakes

		Current Plot Data (MY5 2016)												Annual Means											
Scientific Name	Common Name	Species Type	92497-01-0011			92497-01-0012			92497-01-0013			92497-01-0014			MY5 (2016)			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	Southern sugar maple	Tree													1	1	3	1	1	1				2	2	2	7	7	7
Acer negundo	boxelder	Tree													4	4	5	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	2	2	2	3	3	3			
Alnus serrulata	hazel alder	Shrub									1				3	3	29			15	3	3	18	3	3	22	4	4	4
Betula nigra	river birch	Tree	2	2	2				1	1	1	5	5	5	10	10	10	12	12	12	13	13	13	12	12	12	9	9	9
Carpinus caroliniana	American hornbeam	Tree													3	3	4	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				4	4	4	3	3	3	5	5	5	10	10	10	17	17	17
Cornus amomum	silky dogwood	Shrub															1												
Cornus florida	flowering dogwood	Tree							2	2	2				2	2	2	2	2	2	2	2	2	6	6	6			
Corylus cornuta	beaked hazelnut	Shrub													4	4	4	1	1	1	4	4	4	3	3	5	4	4	4
Diospyros virginiana	common persimmon	Tree	2	2	2			1							3	3	5	2	2	2	3	3	3				3	3	3
Euonymus americanus	Strawberry bush	Shrub													2	2	2	1	1	1	2	2	2	2	2	2	3	3	3
Fraxinus pennsylvanica	green ash	Tree	2	2	3				4	4	4				9	9	10	9	9	9	9	9	9	8	8	8	4	4	4
Hamamelis virginiana	American witchhazel	Tree						1							3	3	4	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	9	2	2	6	3	3	7	5	5	5	2	2	2
Juniperus virginiana	eastern redcedar	Tree															4												
Lindera benzoin	northern spicebush	Shrub													2	2	2	4	4	4	3	3	3	10	10	10			
Liriodendron tulipifera	tuliptree	Tree															20			14			14			3			
Pinus virginiana	Virginia pine	Tree															6												
Platanus occidentalis	American sycamore	Tree									1				10	10	32	5	5	27	10	10	32	5	5	18	16	16	16
Pyrus calleryana	Callery pear	Exotic						1									2												
Quercus michauxii	swamp chestnut oak	Tree	1	1	2				1	1	1				7	7	8	8	8	8	10	10	10	3	3	3	6	6	6
Quercus pagoda	cherrybark oak	Tree	1	1	1	2	2	2							8	8	8	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
Rhus sp.	sumac	shrub															8												
Robinia pseudoacacia	black locust	Tree													1	1	4	1	1	1	1	1	1	1	1	1			
Salix nigra	black willow	Tree													3	6	6		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	1	1	1	2	2
Ulmus americana	American elm	Tree	1	1	1	1	1	1				3	3	3	5	5	6	4	4	4	5	5	5	4	4	4	12	12	12
Unknown		Tree																									1	1	1
Viburnum dentatum	southern arrowwood	Shrub													2	2	2	1	1	1	2	2	2	2	2	2	4	4	4
	Stem count		9	9	11	3	3	6	9	9	11	8	8	8	91	94	203	76	78	135	100	103	160	110	113	150	145	149	149
	size (ares)		1			1			1			1			14			14			14			14			14		
	size (ACRES)		0.02			0.02			0.02			0.02			0.35			0.35			0.35			0.35			0.35		
	Species count		6	6	6	2	2	5	5	5	7	2	2	2	23	23	29	22	23	26	22	22	24	24	24	25	23	23	23
	Stems per ACRE		364.2	364.2	445.2	121.4	121.4	242.8	364.2	364.2	445.2	323.7	323.7	323.7	263	271.7	586.8	219.7	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

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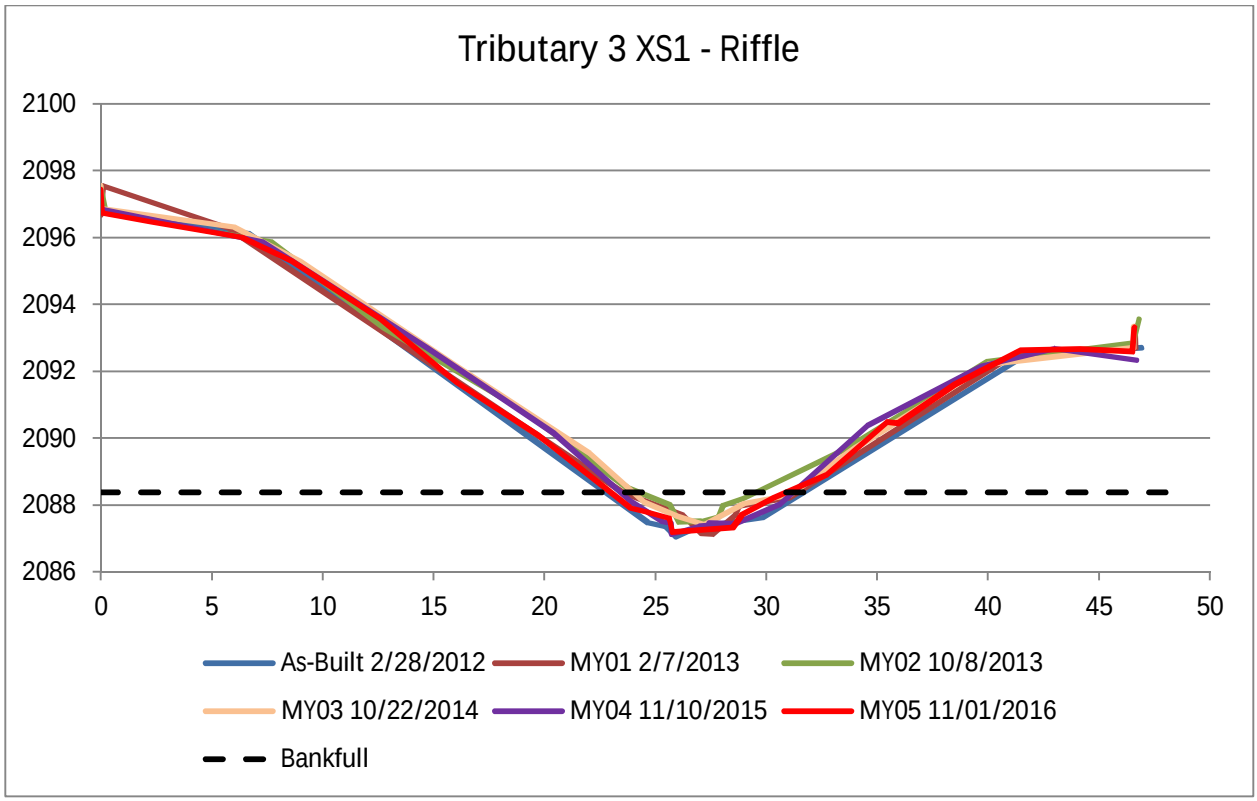
Figure 5: Tributary 3 Cross Sections with Annual Overlays



Tributary 3 XS1

As-Built 2/28/2012	KEE
0.00	2096.76
6.64	2096.13
24.65	2087.48
25.44	2087.37
25.92	2087.06
26.87	2087.34
29.82	2087.64
41.63	2092.48
46.91	2092.70

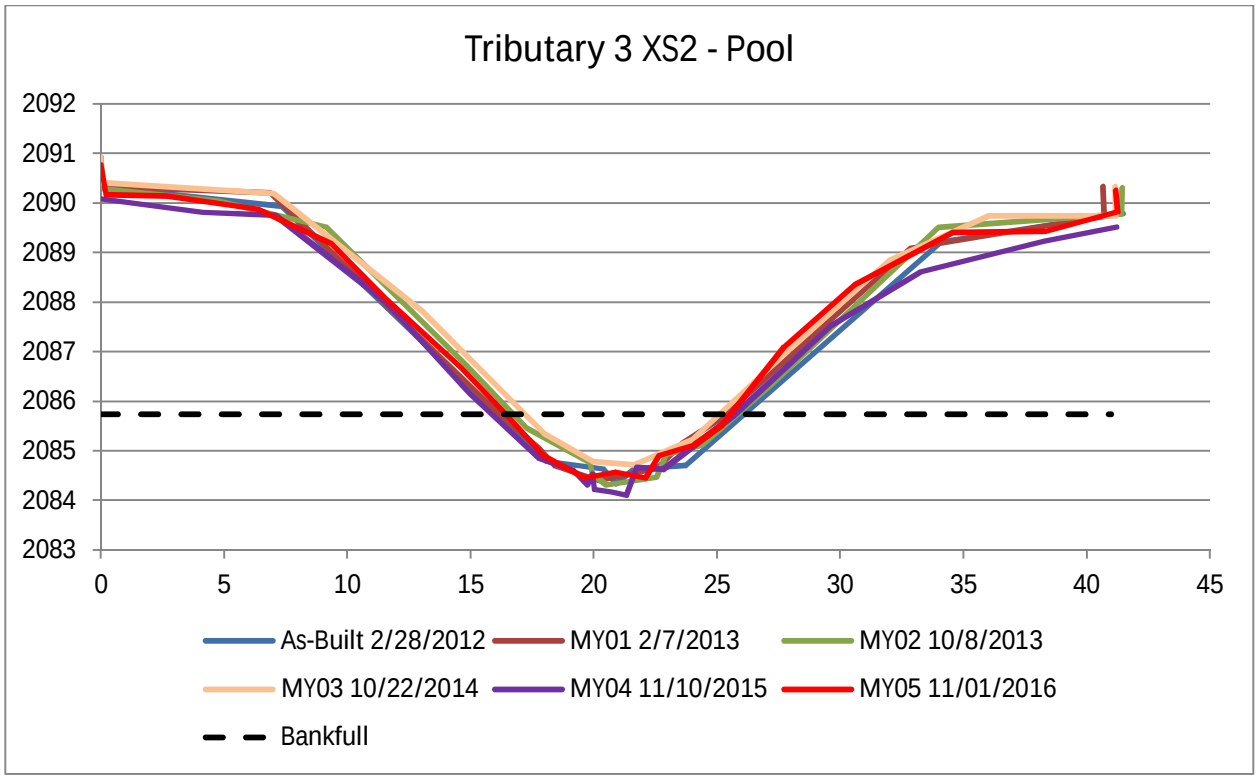
MY01 2/7/2013	URS
0.00	2096.68
0.11	2097.55
5.76	2096.29
23.58	2088.37
26.21	2087.71
27.05	2087.16
27.58	2087.13
28.59	2087.70
28.77	2087.97
31.06	2088.22
41.25	2092.56
46.65	2092.71
46.63	2093.34

MY02 10/8/2013	URS
0.00	2097.51
0.21	2096.74
7.63	2095.88
12.74	2093.32
18.86	2090.91
23.71	2088.53
25.65	2088.02
26.04	2087.49
27.10	2087.52
27.84	2087.66
28.03	2088.00
28.96	2088.20
33.55	2089.68
39.95	2092.30
46.55	2092.87
46.80	2093.56

MY03 10/22/2014	URS
0.00	2097.55
0.00	2096.87
6.00	2096.32
9.00	2095.28
16.00	2092.16
22.00	2089.57
24.50	2088.08
26.00	2087.67
27.20	2087.41
29.00	2088.05
31.00	2088.30
34.00	2089.72
40.00	2092.20
46.58	2092.71
46.56	2093.34

MY04 11/10/2015	
0.00	2096.87
7.27	2095.89
14.70	2092.71
20.43	2090.16
23.84	2088.12
25.31	2087.52
25.70	2087.46
25.73	2087.13
26.95	2087.37
27.71	2087.41
27.41	2087.46
28.57	2087.43
30.60	2088.04
34.58	2090.38
39.73	2092.16
42.98	2092.68
46.69	2092.35

MY05 11/01/2016	
0.00	2097.43
0.06	2096.74
2.26	2096.48
6.33	2096.03
8.60	2095.31
12.56	2093.59
16.05	2091.67
19.71	2090.10
23.85	2087.92
24.57	2087.80
25.62	2087.61
25.76	2087.19
28.46	2087.33
28.92	2087.74
30.33	2088.22
32.72	2088.92
35.44	2090.48
35.91	2090.44
38.48	2091.62
41.44	2092.62
44.15	2092.68
46.52	2092.59
46.58	2093.33



Tributary 3 XS2

As-Built 2/28/2012	KEE
0.00	2090.32
7.35	2089.94
18.07	2084.80
20.37	2084.64
20.90	2084.34
21.65	2084.63
23.70	2084.71
34.09	2089.23
41.48	2089.80

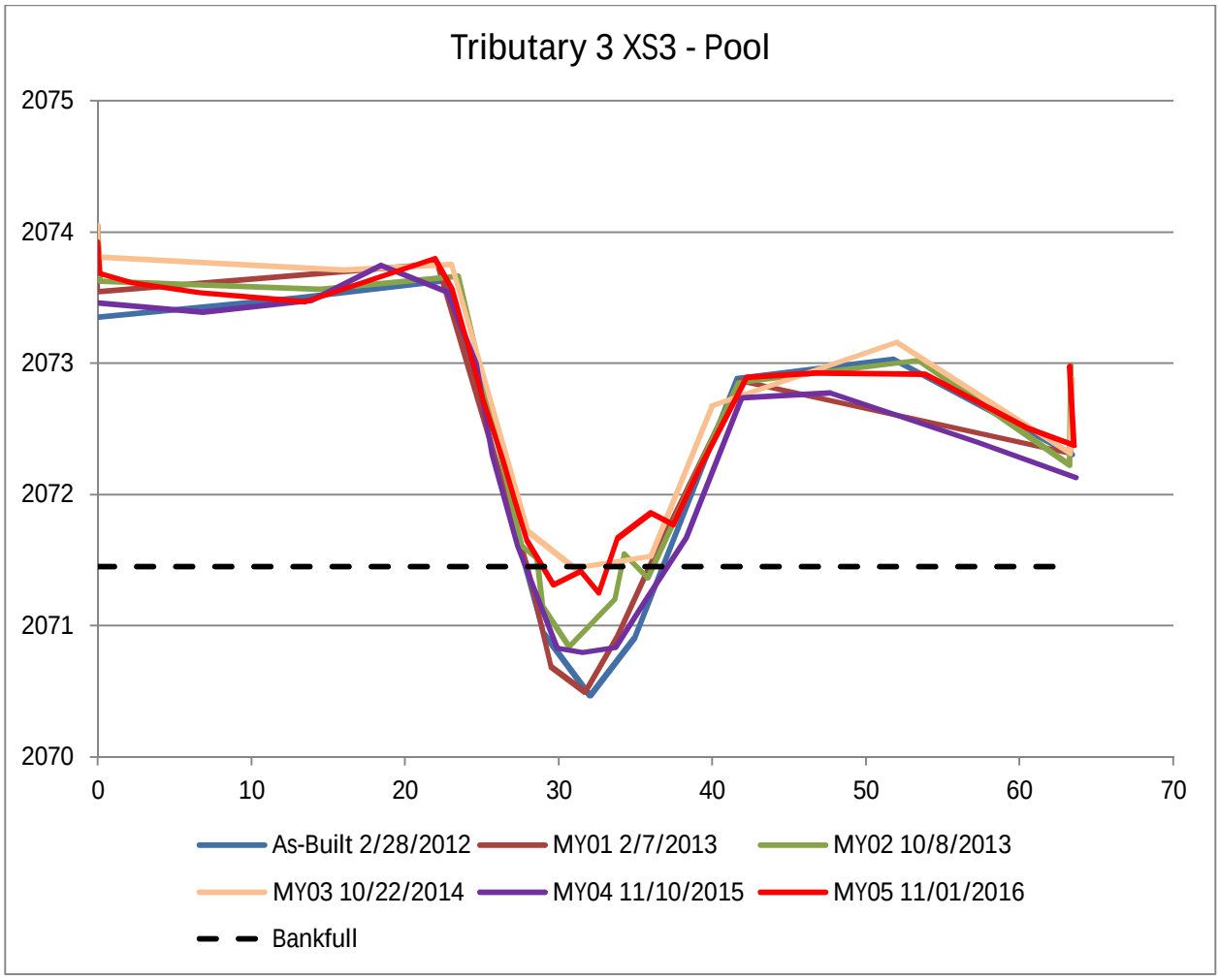
MY01 2/7/2013	URS
0.00	2090.92
-0.17	2090.33
6.89	2090.21
16.20	2085.73
17.75	2085.07
18.42	2084.70
20.20	2084.41
22.57	2084.65
23.57	2085.15
25.19	2085.67
32.85	2089.09
40.72	2089.74
40.66	2090.33

MY02 10/8/2013	URS
0.00	2090.90
0.11	2090.28
4.77	2090.04
9.15	2089.53
14.85	2086.72
17.27	2085.47
19.83	2084.77
19.95	2084.54
20.50	2084.32
22.54	2084.47
22.92	2084.92
24.37	2085.12
27.23	2086.35
33.97	2089.50
41.42	2089.78
41.44	2090.31

MY03 10/22/2014	URS
0.00	2090.92
0.00	2090.41
7.00	2090.19
13.00	2087.82
18.00	2085.35
20.00	2084.78
21.60	2084.71
24.00	2085.23
28.00	2087.08
32.00	2088.84
36.00	2089.74
41.19	2089.74
41.15	2090.33

MY04 11/10/2015	
0.00	2090.09
4.11	2089.82
7.09	2089.75
11.53	2088.02
14.96	2086.16
17.76	2084.86
19.15	2084.61
19.74	2084.31
19.93	2084.53
20.01	2084.23
20.72	2084.17
21.30	2084.11
21.72	2084.67
22.79	2084.63
25.65	2085.70
29.63	2087.53
33.27	2088.62
38.27	2089.23
41.21	2089.52

MY05 11/01/2016	
0.00	2090.78
0.20	2090.17
2.66	2090.14
6.35	2089.89
9.33	2089.18
11.53	2088.09
14.62	2086.68
16.53	2085.69
17.94	2084.91
19.62	2084.46
20.87	2084.57
22.10	2084.45
22.65	2084.91
24.03	2085.12
25.21	2085.53
27.72	2087.10
30.59	2088.36
34.53	2089.40
38.30	2089.44
41.26	2089.83
41.18	2090.26



Tributary 3 XS3

As-Built 2/28/2012	KEE
0.00	2073.35
12.95	2073.49
22.70	2073.63
28.99	2070.94
32.02	2070.47
34.92	2070.91
41.59	2072.89
51.74	2073.03
63.40	2072.31

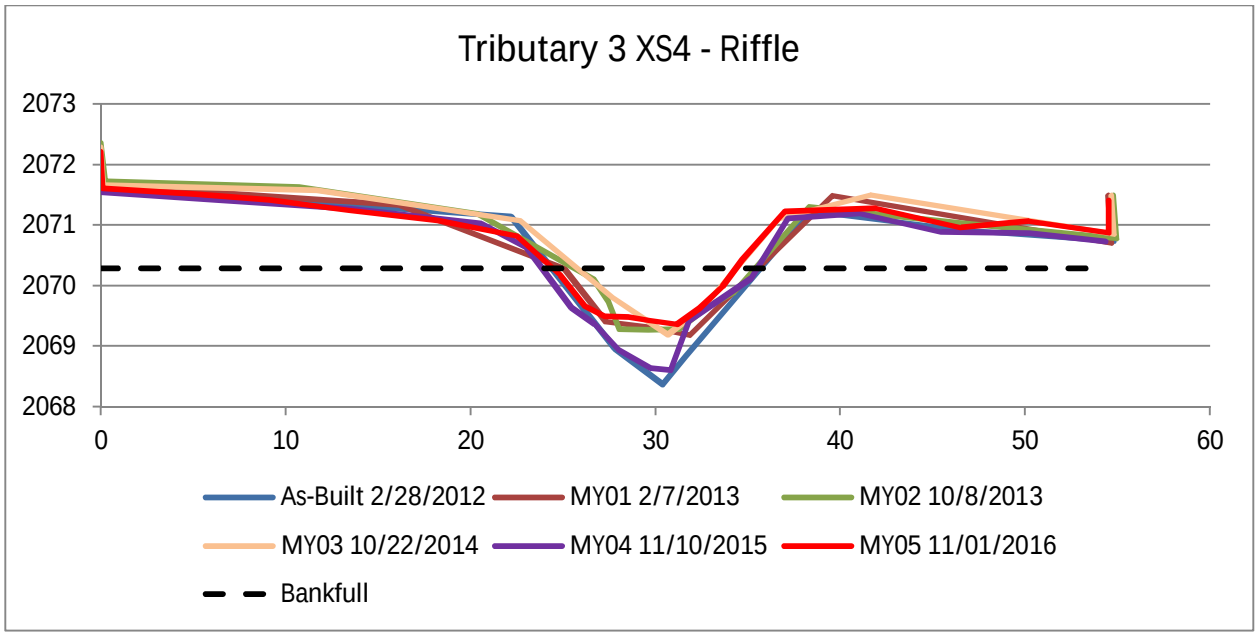
MY01 2/7/2013	URS
0.00	2074.05
-0.04	2073.55
22.10	2073.76
27.96	2071.45
29.48	2070.69
31.69	2070.49
33.82	2070.92
35.83	2071.44
41.79	2072.87
63.28	2072.32
63.38	2072.88

MY02 10/8/2013	URS
0.00	2074.04
0.15	2073.63
14.45	2073.57
23.45	2073.66
27.56	2071.61
28.60	2071.51
28.95	2071.14
30.64	2070.84
33.64	2071.20
34.26	2071.55
35.79	2071.37
41.66	2072.85
53.44	2073.02
63.26	2072.23
63.32	2072.99

MY03 10/22/2014	URS
0.00	2074.05
0.00	2073.81
16.00	2073.71
23.00	2073.75
28.00	2071.72
31.00	2071.44
36.00	2071.53
40.00	2072.68
52.00	2073.16
63.30	2072.32
63.40	2072.88

MY04 11/10/2015	
0.00	2073.46
6.84	2073.39
13.86	2073.48
18.42	2073.75
22.74	2073.54
24.65	2072.99
25.63	2072.30
27.29	2071.61
29.89	2070.83
31.55	2070.80
33.67	2070.84
35.65	2071.20
38.30	2071.67
41.89	2072.74
47.68	2072.78
57.24	2072.40
63.64	2072.13

MY05 11/01/2016	
0.00	2073.92
0.12	2073.68
2.23	2073.62
6.60	2073.54
13.45	2073.47
21.94	2073.80
23.06	2073.56
24.99	2072.74
26.33	2072.27
27.08	2071.97
27.92	2071.66
29.64	2071.31
31.40	2071.42
32.58	2071.25
33.81	2071.67
35.97	2071.86
37.43	2071.77
39.06	2072.18
42.20	2072.89
46.74	2072.92
53.88	2072.92
60.45	2072.51
63.55	2072.38
63.24	2072.98



Tributary 3 XS4

As-Built 2/28/2012	KEE
0.00	2071.72
12.68	2071.34
22.19	2071.14
27.81	2068.96
30.39	2068.37
31.65	2068.83
38.33	2071.23
46.66	2070.92
54.82	2070.74

MY01 2/7/2013	URS
0.00	2071.66
0.15	2071.66
16.16	2071.33
25.05	2070.28
27.31	2069.40
29.84	2069.31
31.85	2069.19
33.84	2069.79
39.57	2071.49
54.67	2070.71
54.50	2071.48

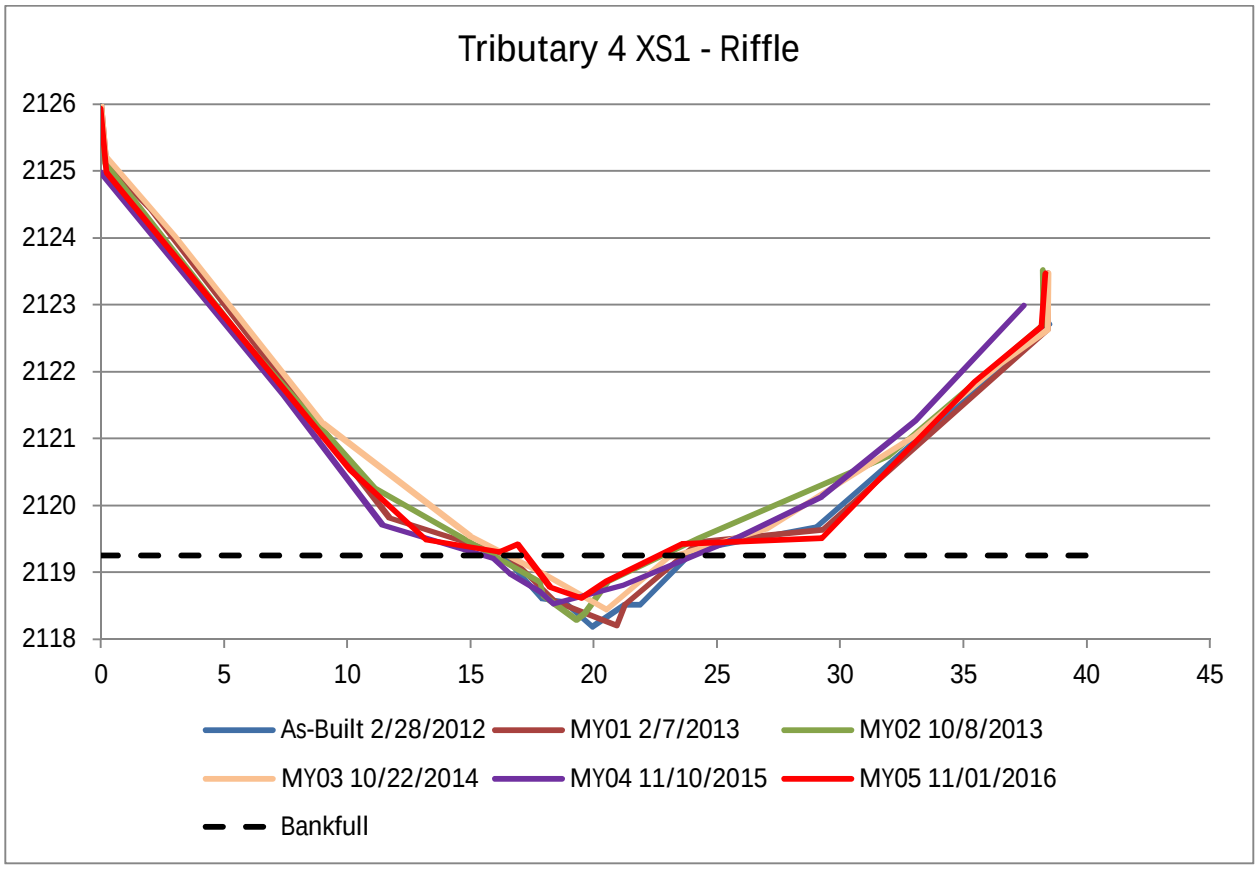
MY02 10/8/2013	URS
0.00	2072.35
0.23	2071.72
10.74	2071.63
20.36	2071.19
26.62	2070.12
27.46	2069.74
28.05	2069.28
29.58	2069.27
31.23	2069.28
32.79	2069.64
34.23	2069.89
38.30	2071.30
46.43	2071.04
54.93	2070.78
54.79	2071.49

MY03 10/22/2014	URS
0.00	2072.28
0.14	2071.66
11.66	2071.57
22.66	2071.07
27.66	2069.80
30.66	2069.19
32.66	2069.67
36.66	2071.10
41.66	2071.49
54.81	2070.85
54.66	2071.48

MY04 11/10/2015	
0.00	2071.54
6.15	2071.41
13.53	2071.26
20.59	2071.03
23.02	2070.63
25.46	2069.64
26.71	2069.36
28.00	2068.94
29.77	2068.63
30.81	2068.61
31.80	2069.43
35.16	2070.12
37.15	2071.11
41.04	2071.19
45.46	2070.89
50.24	2070.87
54.36	2070.73

MY05 11/01/2016	
0.00	2072.21
0.11	2071.60
5.13	2071.51
9.11	2071.42
13.43	2071.25
18.21	2071.07
22.50	2070.83
24.87	2070.17
26.21	2069.66
27.26	2069.49
28.51	2069.47
29.66	2069.43
31.15	2069.36
32.36	2069.63
33.60	2069.99
34.70	2070.43
36.98	2071.22
41.92	2071.28
46.49	2070.96
50.20	2071.07
54.52	2070.87
54.52	2071.40

Figure 6: Tributary 4 Cross Sections with Annual Overlays



Tributary 4 XS1

As-Built 2/28/2012	KEE
0	2125.088
	2119.772
16.3437	2119.241
17.8751	2118.608
18.7881	2118.567
19.9274	2118.19
21.2336	2118.513
21.8528	2118.52
24.0685	2119.342
29.0385	2119.684
38.4749	2122.718

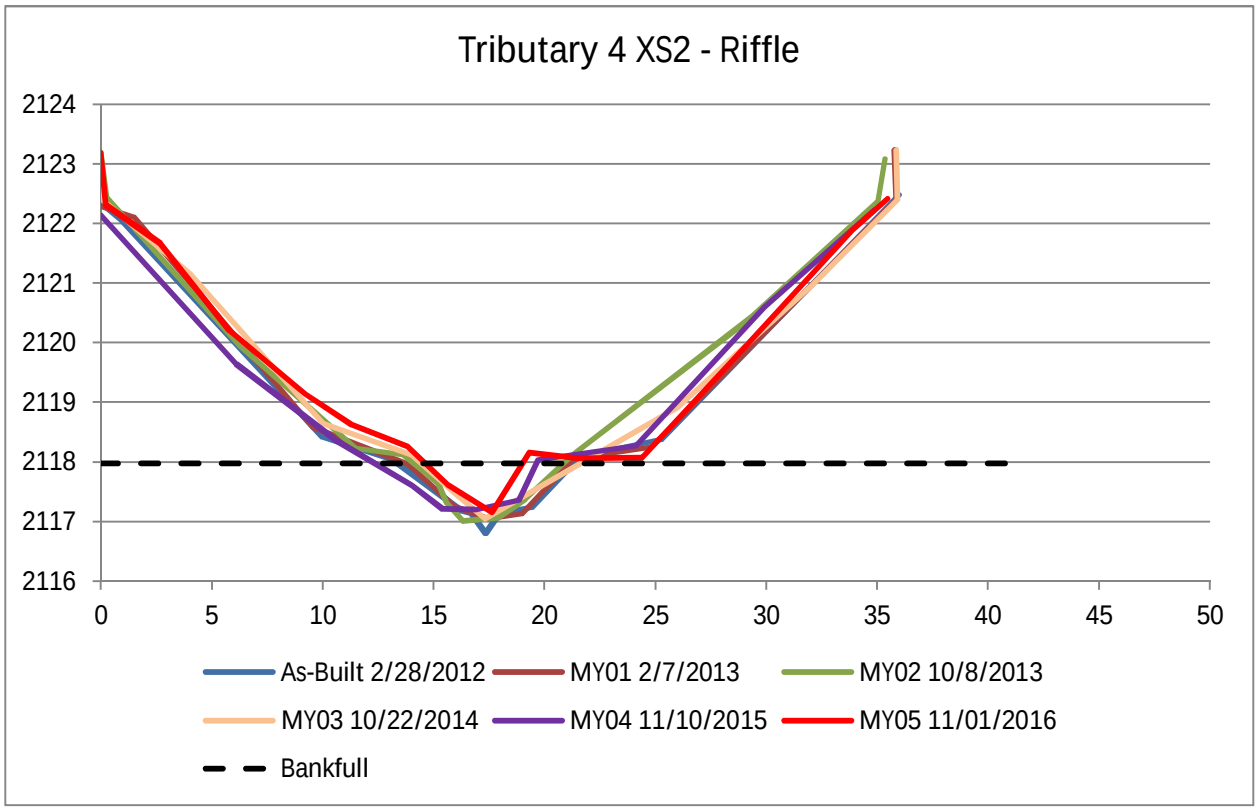
MY01 2/7/2013	URS
0.00	2126.104
0.22	2125.097
2.00	2124.443
11.71	2119.815
16.55	2119.25
18.41	2118.573
20.93	2118.21
21.26	2118.529
24.24	2119.454
29.25	2119.631
38.42	2122.645
38.43	2123.47

MY02 10/8/2013	URS
0.00	2126.067
0.17	2125.114
5.84	2122.44
11.12	2120.255
17.82	2118.858
17.93	2118.659
19.28	2118.292
19.63	2118.395
20.55	2118.865
24.23	2119.512
31.96	2120.75
38.24	2122.718
38.23	2123.523

MY03 10/22/2014	URS
0.00	2126.10
0.21	2125.22
3.00	2124.02
9.00	2121.23
15.00	2119.54
18.00	2118.97
20.50	2118.44
23.00	2119.22
27.00	2119.65
33.00	2121.04
36.50	2122.12
38.44	2122.65
38.45	2123.47

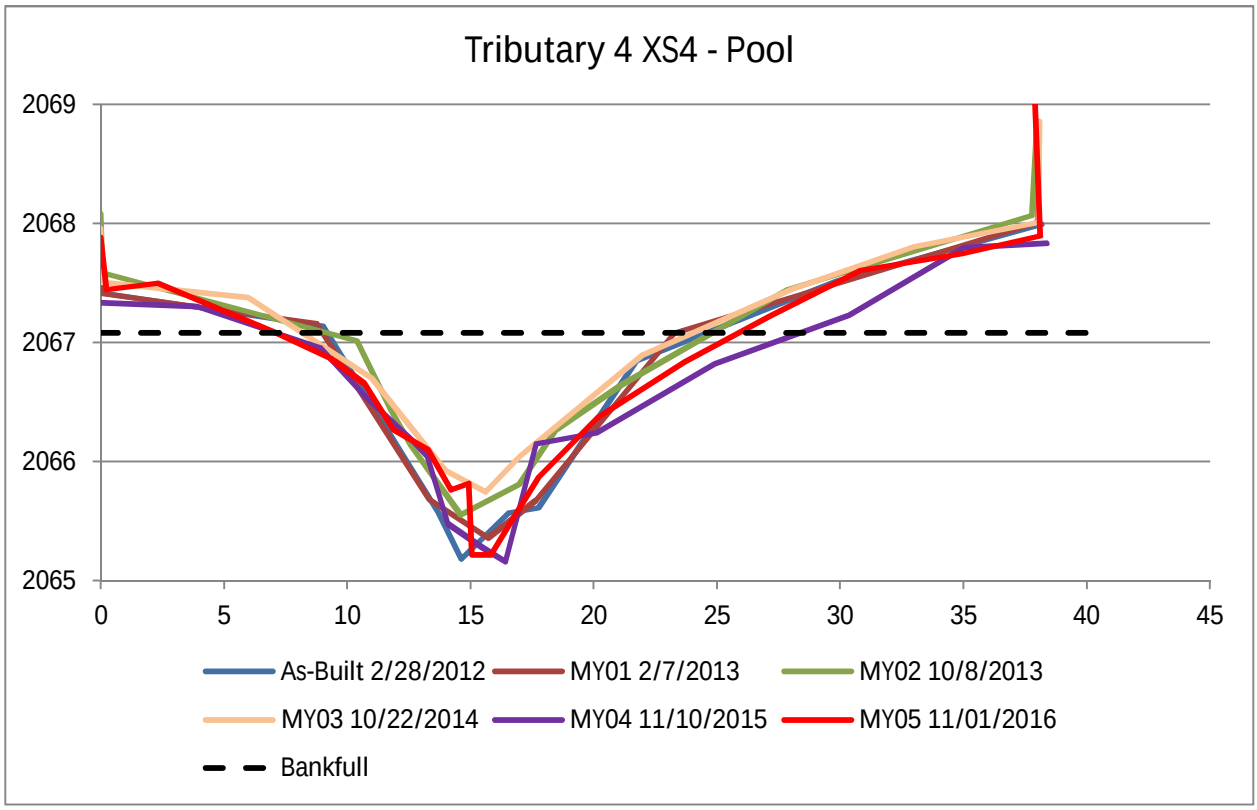
MY04 11/10/2015	AECOM
0.00	2124.987
7.39	2121.668
11.42	2119.712
15.91	2119.217
16.58	2118.985
17.82	2118.719
18.35	2118.532
21.19	2118.811
25.92	2119.539
29.25	2120.133
33.05	2121.276
37.44	2122.999

MY05 11/01/2016	AECOM
0.00	2125.93
0.23	2124.983
10.12	2120.536
13.18	2119.492
16.17	2119.309
16.90	2119.425
18.22	2118.787
19.50	2118.622
20.51	2118.867
23.55	2119.427
29.23	2119.51
32.68	2120.821
35.45	2121.85
38.16	2122.678
38.33	2123.47



Tributary 4 XS2

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS	MY03 10/22/2014	URS	MY04 11/10/2015	AECOM	MY05 11/01/2016	AECOM
0	2122.342	0.00	2123.046	0.00	2123.196	0.00	2123.05	0.00	2122.15	0.00	2123.19
0.8774	2122.071	-0.02	2122.294	0.25	2122.443	0.00	2122.43	6.09	2119.65	0.22	2122.31
9.9427	2118.425	1.50	2122.114	6.21	2119.966	4.00	2121.17	10.61	2118.36	2.67	2121.67
13.1583	2118.039	9.54	2118.588	11.46	2118.23	10.00	2118.65	14.03	2117.61	5.80	2120.21
16.2575	2117.185	13.84	2117.968	13.60	2118.124	14.00	2118.13	15.40	2117.21	9.19	2119.14
16.7109	2117.141	15.94	2117.257	15.21	2117.64	16.00	2117.46	16.87	2117.20	11.30	2118.63
17.3258	2116.808	17.44	2117.048	15.56	2117.314	17.30	2117.05	18.85	2117.37	13.81	2118.27
17.9615	2117.142	18.98	2117.136	16.32	2117.008	20.00	2117.63	19.69	2118.04	15.62	2117.62
19.4388	2117.249	21.31	2118.055	17.87	2117.058	26.00	2118.92	24.11	2118.28	17.62	2117.16
21.6126	2118.095	24.80	2118.256	19.12	2117.385	32.00	2120.95	29.90	2120.60	19.30	2118.16
25.264	2118.382	35.85	2122.41	21.22	2118.114	35.93	2122.41	34.85	2122.23	21.53	2118.06
35.9667	2122.48	35.76	2123.237	29.37	2120.449	35.86	2123.24			24.37	2118.07
				35.01	2122.381					28.95	2119.91
				35.33	2123.082					33.87	2121.90
										35.47	2122.42



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

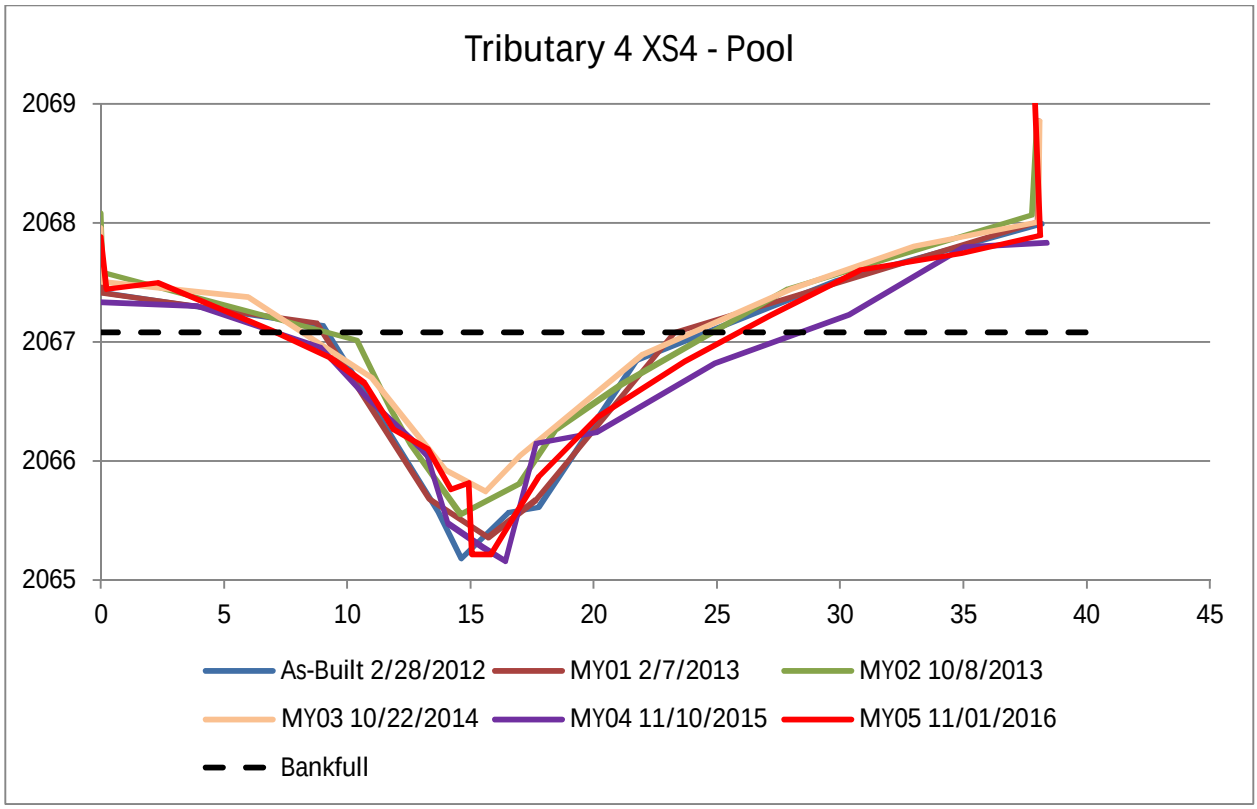
MY01 2/7/2013	URS
0.00	2074.116
-0.17	2073.456
6.41	2073.432
7.09	2073.225
16.51	2069.473
18.82	2069.044
20.72	2069.488
34.27	2073.413
40.29	2073.942
40.36	2074.466

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	
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

MY05 11/01/2016	
0.00	2074.196
0.16	2073.516
3.16	2073.307
5.98	2073.237
7.46	2072.935
9.49	2072.2
11.61	2071.478
13.50	2070.491
15.34	2069.986
17.61	2070.138
19.61	2069.778
21.69	2070.011
24.44	2070.65
29.22	2072.235
33.17	2072.976
36.90	2073.828
40.29	2074.037
40.22	2074.547



Tributary 4 XS4

As-Built 2/28/2012	KEE
0	2067.418
9.0065	2067.141
13.6894	2065.575
14.6259	2065.182
16.5262	2065.571
17.753	2065.614
21.7288	2066.85
29.8366	2067.517
38.1695	2067.994

MY01 2/7/2013	URS
0.00	2067.956
0.02	2067.414
8.76	2067.159
13.31	2065.679
15.71	2065.359
17.65	2065.677
23.25	2067.079
38.02	2068.011
38.06	2068.857

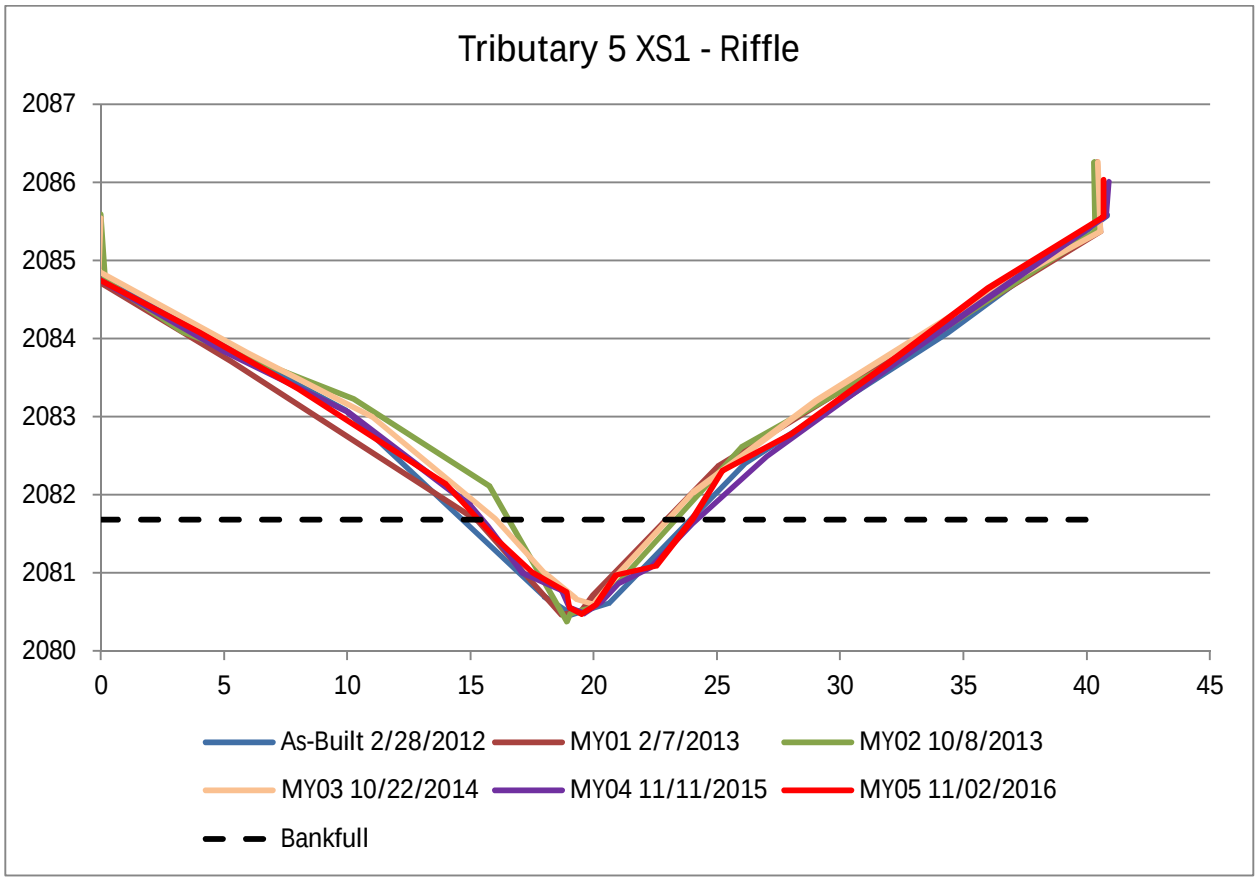
MY02 10/8/2013	URS
0.00	2068.078
0.06	2067.588
10.38	2067.017
11.75	2066.432
12.56	2066.14
14.60	2065.551
16.99	2065.813
18.45	2066.27
21.12	2066.645
27.86	2067.444
37.79	2068.068
38.00	2068.85

MY03 10/22/2014	URS
0.00	2067.96
0.02	2067.51
6.00	2067.38
11.00	2066.70
14.00	2065.93
15.60	2065.75
17.00	2066.05
22.00	2066.90
28.00	2067.45
33.00	2067.81
38.04	2068.01
38.08	2068.86

MY04 11/10/2015	
0.00	2067.334
3.95	2067.302
8.91	2066.955
10.74	2066.544
12.58	2066.189
13.24	2066.041
14.08	2065.475
15.48	2065.28
16.40	2065.162
17.66	2066.147
20.11	2066.241
24.91	2066.823
30.34	2067.228
34.97	2067.793
38.38	2067.833

MY05 11/01/2016	
0.00	2067.881
0.22	2067.447
2.30	2067.499
7.01	2067.091
9.28	2066.869
10.70	2066.653
11.87	2066.266
13.26	2066.1
14.20	2065.764
14.92	2065.814
15.06	2065.212
15.81	2065.216
16.89	2065.585
17.75	2065.87
20.14	2066.368
23.69	2066.837
27.15	2067.225
30.83	2067.609
34.92	2067.746
38.13	2067.897
37.91	2069.005

Figure 7: Tributary 5 Cross Sections with Annual Overlays



Tributary 5 XS1

As-Built 2/28/2012	KEE
0	2084.768
9.9361	2083.083
17.9744	2080.71
19.1036	2080.467
20.6072	2080.618
26.1441	2082.408
34.3842	2084.085
40.8249	2085.581

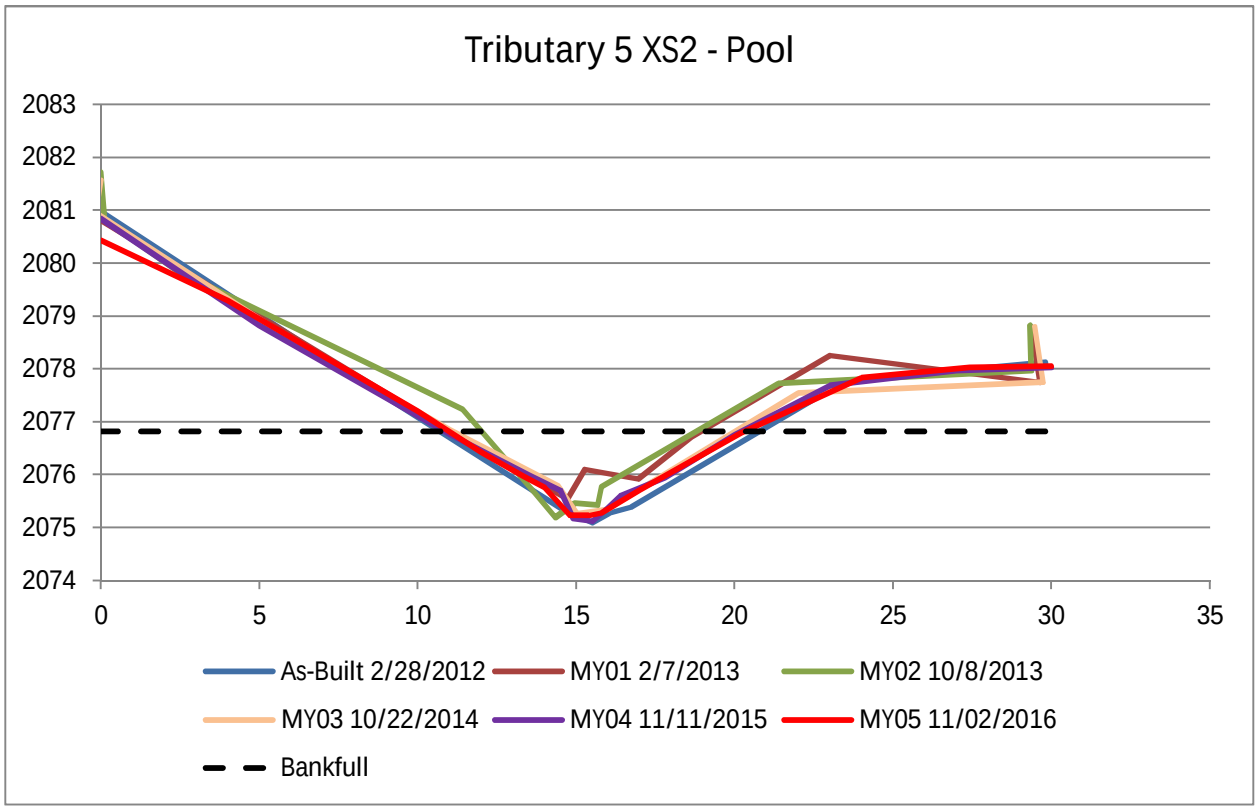
MY01 2/7/2013	URS
0.00	2085.543
-0.09	2084.734
5.25	2083.716
15.27	2081.677
18.66	2080.471
19.53	2080.529
19.97	2080.713
25.04	2082.373
40.56	2085.38
40.43	2086.259

MY02 10/8/2013	URS
0.00	2085.588
0.19	2084.745
3.38	2084.084
10.26	2083.23
15.76	2082.114
18.91	2080.383
19.03	2080.48
19.29	2080.51
20.02	2080.572
20.32	2080.647
25.99	2082.617
31.86	2083.658
40.35	2085.38
40.30	2086.259

MY03 10/22/2014	URS
0.00	2085.54
-0.09	2084.86
6.00	2083.81
11.00	2083.00
16.00	2081.70
18.00	2081.00
19.30	2080.66
20.00	2080.60
21.00	2080.99
24.00	2082.02
29.00	2083.20
36.00	2084.59
40.57	2085.38
40.44	2086.26

MY04 11/11/2015	
0	2084.75
5	2083.84
10	2083.07
15	2081.86
15.7	2081.6
17.1	2081
18.7	2080.78
19	2080.56
19.6	2080.49
20.3	2080.63
21	2080.87
22.3	2081.08
24	2081.63
27	2082.49
33	2083.87
40.8	2085.58
40.9	2086.01

MY05 11/02/2016	
0	2084.75
4	2084.08
8	2083.36
14	2082.14
16	2081.45
17.5	2081.01
18.9	2080.76
19	2080.56
19.5	2080.48
20.1	2080.6
20.9	2080.98
22.5	2081.09
24	2081.69
25.2	2082.31
28	2082.78
32	2083.7
36	2084.65
40.7	2085.57
40.7	2086.03



Tributary 5 XS2

As-Built 2/28/2012	KEE
0	2080.978
8.1352	2077.799
14.512	2075.366
15.5091	2075.095
16.0631	2075.285
16.7233	2075.389
23.4744	2077.77
29.8109	2078.129

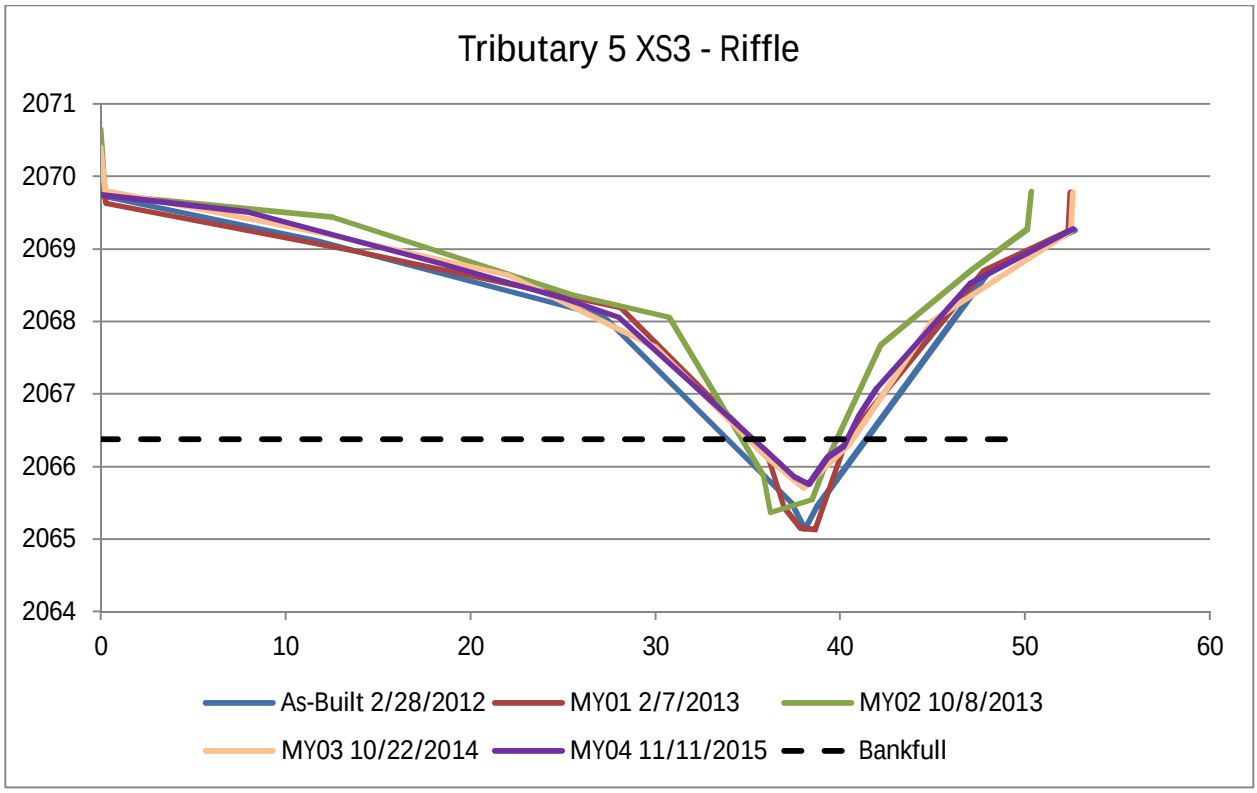
MY01 2/7/2013	URS
0.00	2081.575
-0.17	2080.873
11.01	2076.821
14.73	2075.547
15.27	2076.101
16.97	2075.918
18.63	2076.703
23.00	2078.257
29.63	2077.754
29.35	2078.799

MY02 10/8/2013	URS
0.00	2081.717
0.11	2080.826
2.46	2079.846
11.41	2077.238
13.71	2075.641
14.34	2075.198
14.95	2075.456
15.66	2075.428
15.79	2075.776
21.37	2077.724
29.36	2077.97
29.33	2078.829

MY03 10/22/2014	URS
0.00	2081.58
-0.17	2080.96
6.00	2078.56
11.00	2076.86
14.40	2075.80
15.00	2075.27
16.00	2075.36
17.00	2075.73
22.00	2077.55
29.73	2077.75
29.47	2078.80

MY04 11/11/2015	
0	2080.85
5	2078.82
11	2076.77
13.5	2075.99
14.5	2075.70
14.9	2075.17
15.5	2075.12
16	2075.38
16.4	2075.61
17.8	2075.95
20	2076.76
23	2077.69
27	2077.97
30	2078.03

MY05 11/02/2016	
0	2080.43
4	2079.30
10	2077.20
12	2076.43
13.3	2075.98
14	2075.76
14.8	2075.23
15.4	2075.23
15.8	2075.28
17	2075.72
20.2	2076.79
24	2077.83
27.4	2078.03
30	2078.05



Tributary 5 XS3

As-Built 2/28/2012	KEE
0	2069.74
11.6367	2069.116
27.1749	2068.078
37.3558	2065.506
38.0937	2065.141
38.713	2065.439
48.0923	2068.717
52.6765	2069.258

MY01 2/7/2013	URS
0.00	2070.401
0.26	2069.636
13.47	2068.989
28.11	2068.191
36.02	2066.172
36.92	2065.45
37.87	2065.146
38.63	2065.136
40.33	2066.38
47.77	2068.708
52.34	2069.255
52.46	2069.78

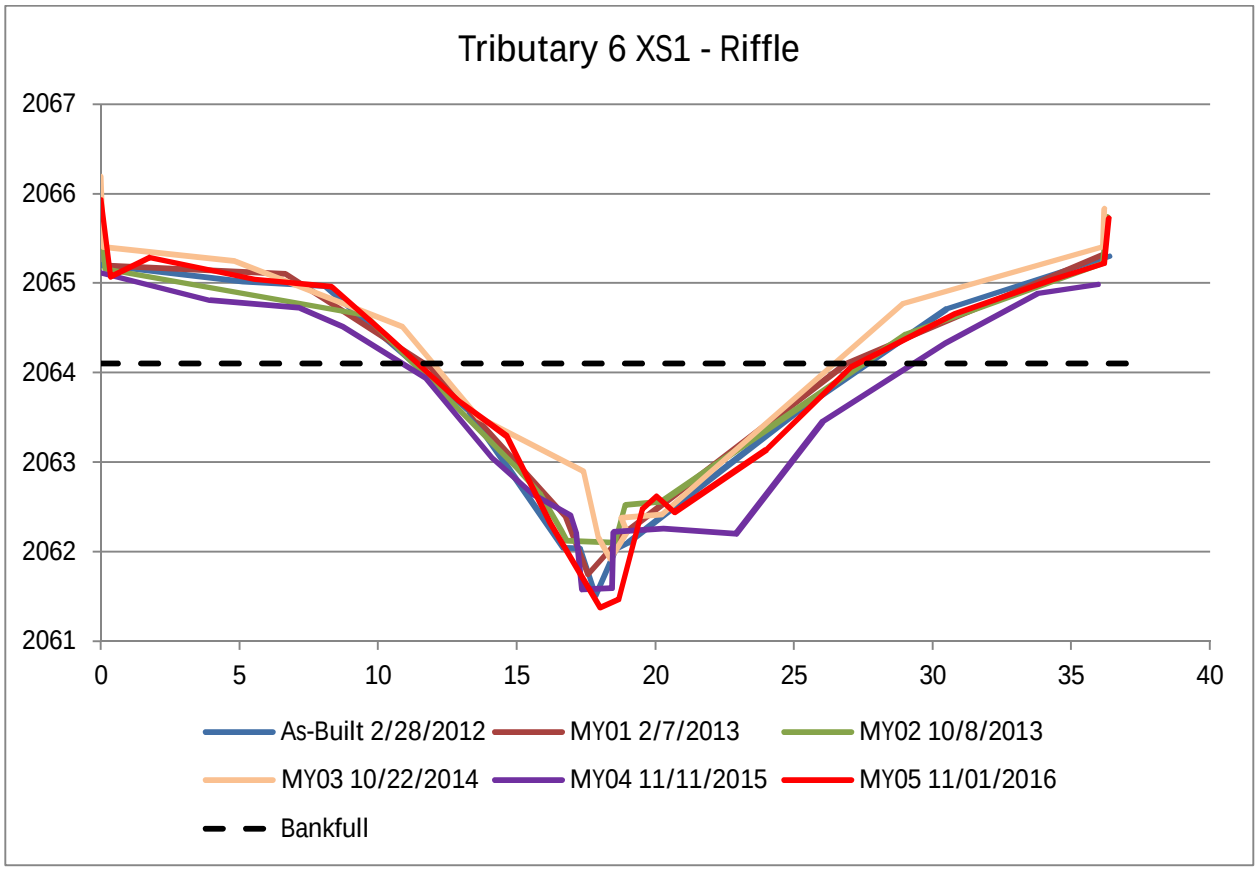
MY02 10/8/2013	URS
0.00	2070.648
0.25	2069.75
12.57	2069.434
25.52	2068.374
30.75	2068.06
35.81	2065.881
36.23	2065.374
38.46	2065.549
39.31	2066.122
42.16	2067.669
47.11	2068.711
50.12	2069.281
50.33	2069.794

MY03 10/22/2014	URS
0.00	2070.40
0.23	2069.81
12.00	2069.22
22.00	2068.64
30.00	2067.65
36.00	2066.13
38.00	2065.70
40.50	2066.31
45.00	2068.02
52.47	2069.26
52.58	2069.78

MY04 11/11/2015	
0	2069.75
8	2069.51
18	2068.83
25	2068.33
28	2068.06
35	2066.45
36	2066.22
37.5	2065.86
38.3	2065.76
39.3	2066.13
40.2	2066.29
41	2066.70
42	2067.09
47	2068.53
52.6	2069.28

MY05 11/02/2016
No data
Tree fell on cross-section

Figure 8: Tributary 6 Cross Sections with Annual Overlays



Tributary 6 XS1

As-Built 2/28/2012	KEE
0	2065.207
5.1102	2065.021
8.0812	2064.969
13.2725	2063.57
16.6861	2062.04
17.2919	2062.031
17.8299	2061.514
18.5677	2062.035
19.0027	2062.096
25.013	2063.542
30.5069	2064.721
36.3639	2065.302

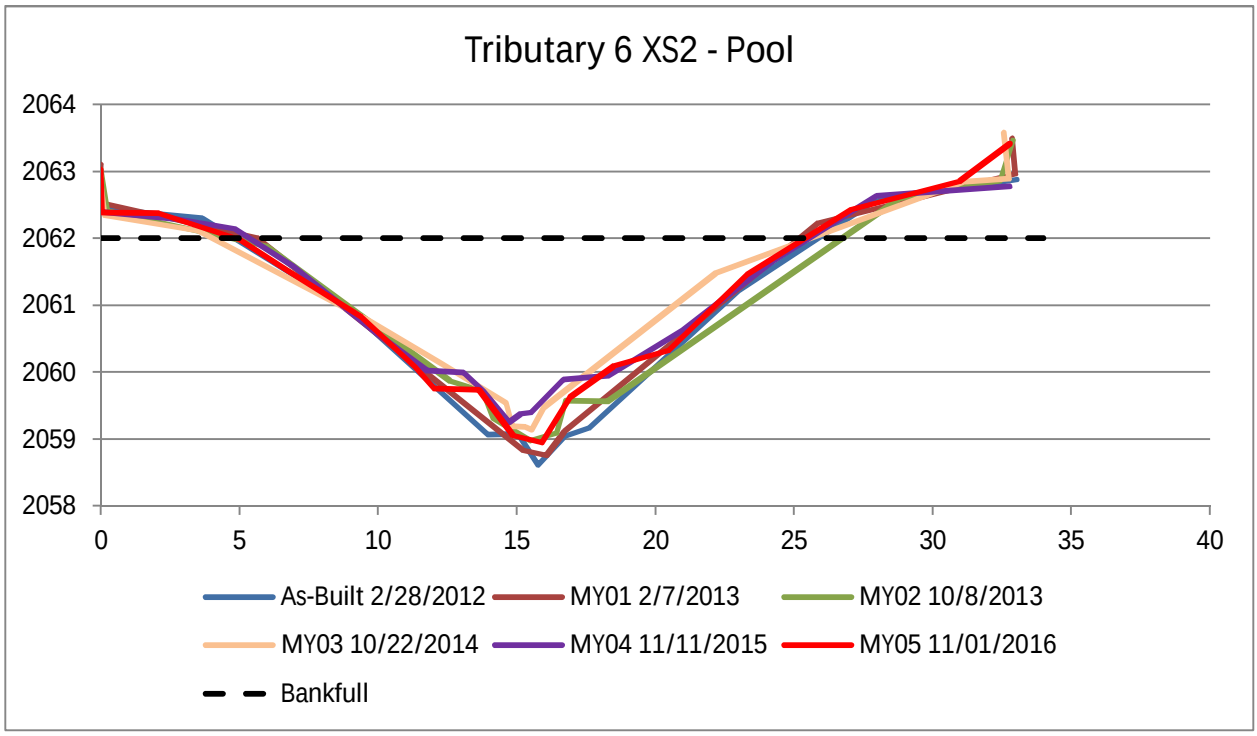
MY01 2/7/2013	URS
0.00	2065.902
0.17	2065.194
6.66	2065.102
11.89	2064.059
16.76	2062.392
17.57	2061.746
18.89	2062.204
26.87	2064.102
36.21	2065.336
36.18	2065.282

MY02 10/8/2013	URS
0.00	2065.902
0.16	2065.164
9.53	2064.644
14.97	2062.946
15.83	2062.652
16.60	2062.243
16.80	2062.123
18.53	2062.102
18.89	2062.518
20.20	2062.556
29.02	2064.433
36.13	2065.227
36.31	2065.744

MY03 10/22/2014	URS
0.00	2066.19
0.08	2065.41
4.84	2065.25
10.86	2064.52
13.58	2063.51
17.40	2062.90
17.93	2062.16
18.36	2061.92
18.96	2062.22
18.77	2062.38
20.21	2062.42
28.93	2064.77
36.13	2065.41
36.19	2065.83

MY04 11/11/2015	
0.00	2065.12
3.92	2064.81
7.17	2064.722
8.72	2064.518
11.70	2063.944
14.09	2063.053
15.58	2062.644
16.94	2062.407
17.14	2062.209
17.35	2061.575
18.44	2061.593
18.49	2062.219
20.28	2062.255
22.90	2062.201
26.03	2063.461
30.43	2064.329
33.80	2064.888
35.95	2064.99

MY05 11/01/2016	
0.00	2065.935
0.34	2065.074
1.74	2065.29
5.54	2065.043
8.32	2064.958
10.28	2064.422
12.91	2063.687
14.63	2063.29
16.20	2062.323
17.99	2061.373
18.68	2061.466
19.53	2062.481
20.03	2062.621
20.67	2062.439
24.00	2063.146
27.05	2064.064
30.80	2064.663
34.37	2065.048
36.18	2065.225
36.36	2065.728



Tributary 6 XS2

As-Built 2/28/2012	KEE
0	2062.443
3.6619	2062.296
8.9382	2060.953
13.9563	2059.068
15.038	2059.075
15.7537	2058.611
16.7229	2059.046
17.6075	2059.169
23.0162	2061.227
27.891	2062.558
33.0173	2062.884

MY01 2/7/2013	URS
0.00	2063.1
-0.06	2062.538
5.60	2062.007
15.21	2058.837
16.06	2058.761
16.71	2059.114
25.87	2062.229
32.99	2062.97
32.87	2063.495

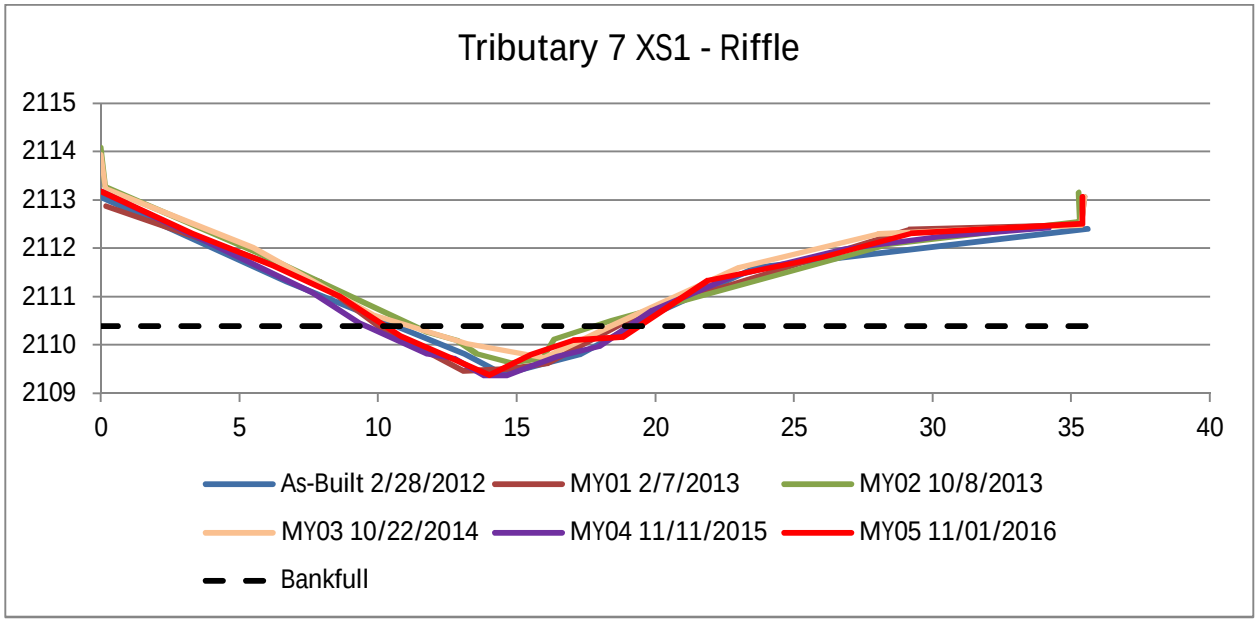
MY02 10/8/2013	URS
0.00	2063.027
0.22	2062.414
5.94	2061.888
12.61	2059.872
13.77	2059.719
14.15	2059.313
15.48	2058.979
16.44	2059.097
16.75	2059.572
18.25	2059.564
28.79	2062.597
32.44	2062.86
32.89	2063.466

MY03 10/22/2014	URS
0.00	2062.92
-0.03	2062.89
0.13	2062.34
3.51	2062.12
9.64	2060.77
12.24	2060.14
14.60	2059.54
14.83	2059.19
15.32	2059.18
15.53	2059.15
15.96	2059.48
22.19	2061.48
31.08	2062.85
32.75	2062.89
32.57	2063.58

MY04 11/11/2015	
0.00	2062.39
2.67	2062.29
4.83	2062.15
6.94	2061.58
9.94	2060.57
11.78	2060.02
13.09	2059.99
13.81	2059.71
14.71	2059.25
15.15	2059.38
15.50	2059.40
16.66	2059.89
18.28	2059.95
20.95	2060.62
24.25	2061.68
27.94	2062.63
32.77	2062.78

MY05 11/01/2016	
0.00	2063.02
0.05	2062.39
2.10	2062.37
5.01	2061.99
6.71	2061.52
9.36	2060.84
11.32	2060.08
12.02	2059.75
13.63	2059.73
14.85	2059.06
15.89	2058.95
16.91	2059.63
18.51	2060.09
20.48	2060.33
23.32	2061.46
27.04	2062.43
30.95	2062.86
32.77	2063.42

Figure 9: Tributary 7 Cross Sections with Annual Overlays



Tributary 7 XS1

As-Built 2/28/2012	KEE
0.00	2113.06
6.69	2111.31
13.10	2109.82
14.52	2109.39
17.25	2109.81
20.08	2110.68
23.56	2111.59
35.60	2112.40

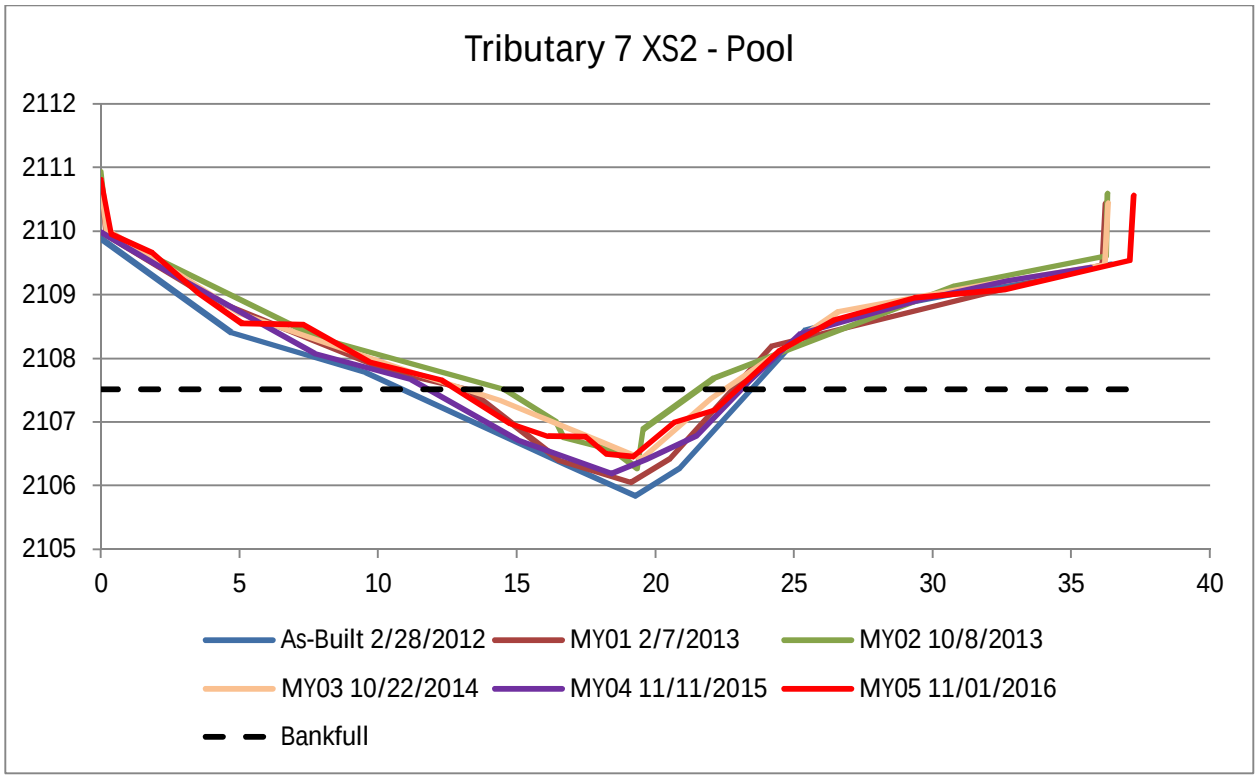
MY01 2/7/2013	URS
0.00	2113.94
0.17	2112.87
4.51	2112.02
7.86	2111.32
10.03	2110.39
13.09	2109.47
14.64	2109.50
16.08	2109.62
19.64	2110.71
29.13	2112.39
35.35	2112.49
35.47	2113.07

MY02 10/8/2013	URS
0.00	2114.09
0.16	2113.27
5.66	2111.91
11.76	2110.26
12.85	2110.09
13.58	2109.82
14.79	2109.64
15.92	2109.72
16.34	2110.12
18.40	2110.51
28.39	2112.09
35.31	2112.55
35.26	2113.15

MY03 10/22/2014	URS
0.00	2113.94
0.17	2113.24
5.50	2112.01
9.80	2110.62
13.20	2110.03
16.00	2109.74
18.50	2110.42
23.00	2111.60
28.00	2112.29
35.35	2112.49
35.47	2113.07

MY04 11/11/2015	
0.00	2113.19
3.73	2112.16
7.62	2111.09
9.31	2110.46
9.68	2110.36
11.76	2109.82
12.73	2109.73
13.83	2109.37
14.61	2109.37
15.20	2109.50
16.45	2109.76
17.98	2109.98
19.89	2110.72
22.82	2111.43
26.82	2112.00
30.18	2112.25
34.18	2112.43

MY05 11/01/2016	
0.00	2113.19
3.30	2112.31
6.20	2111.65
8.60	2111.01
10.80	2110.19
12.60	2109.74
14.00	2109.38
15.50	2109.81
17.00	2110.10
18.80	2110.17
21.90	2111.34
26.00	2111.82
29.20	2112.31
32.50	2112.42
35.40	2112.51
35.40	2113.06



Tributary 7 XS2

As-Built 2/28/2012	KEE
0.00	2109.89
4.70	2108.41
9.52	2107.78
16.80	2106.33
19.27	2105.84
20.87	2106.28
25.38	2108.45
29.03	2108.87
36.41	2109.49

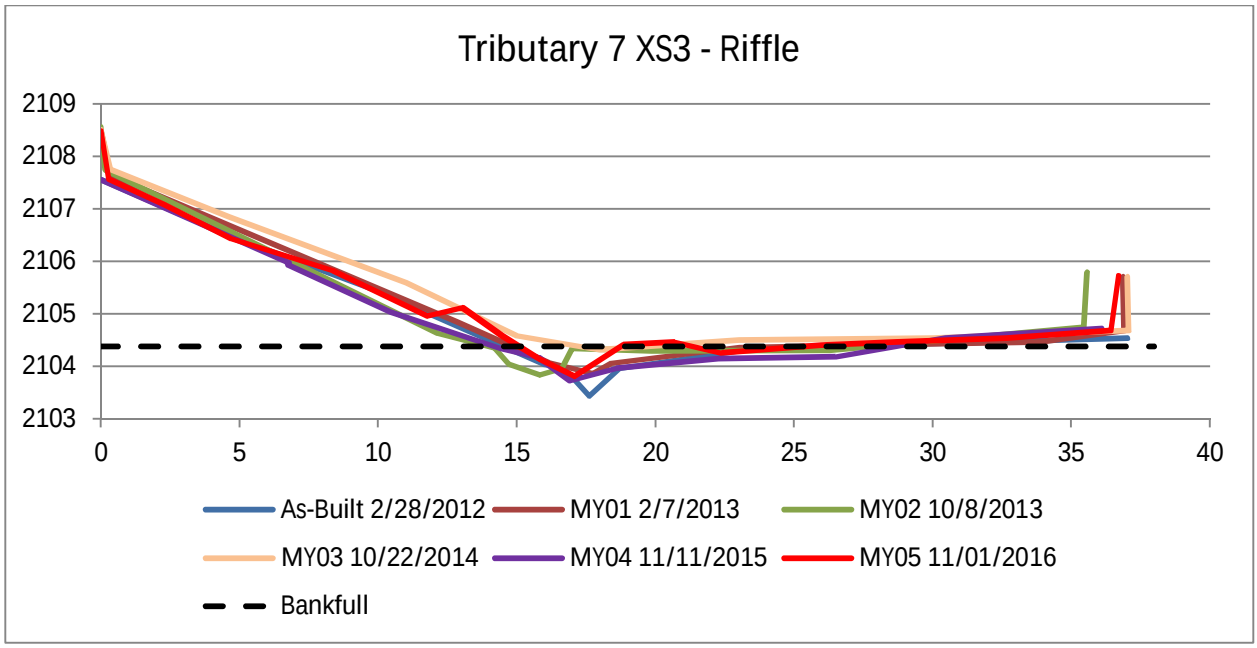
MY01 2/7/2013	URS
0.00	2110.80
0.21	2109.94
4.06	2108.93
10.34	2107.82
13.23	2107.51
16.55	2106.40
19.11	2106.05
20.52	2106.43
24.19	2108.20
36.13	2109.48
36.24	2110.44

MY02 10/8/2013	URS
0.00	2110.94
0.25	2109.95
7.81	2108.33
14.55	2107.51
16.40	2107.01
16.68	2106.76
18.49	2106.56
19.34	2106.28
19.55	2106.89
22.12	2107.69
30.78	2109.14
36.26	2109.61
36.30	2110.60

MY03 10/22/2014	URS
0.00	2110.80
0.21	2110.03
2.30	2109.47
5.00	2108.71
11.00	2107.82
14.40	2107.35
18.00	2106.70
19.50	2106.43
22.00	2107.38
26.60	2108.74
32.00	2109.18
36.21	2109.48
36.32	2110.44

MY04 11/11/2015	
0.00	2109.99
2.63	2109.31
7.72	2108.07
11.16	2107.68
15.04	2106.72
18.42	2106.20
19.65	2106.42
21.48	2106.79
23.41	2107.65
25.20	2108.39
29.52	2108.92
32.68	2109.23
35.69	2109.44

MY05 11/01/2016	
0.00	2110.81
0.36	2109.95
1.85	2109.67
3.52	2109.02
5.10	2108.55
7.32	2108.53
9.70	2107.95
12.27	2107.66
14.74	2106.98
16.10	2106.78
17.50	2106.77
18.22	2106.50
19.17	2106.46
20.68	2107.00
22.13	2107.20
24.43	2108.12
26.44	2108.61
29.32	2108.95
32.61	2109.08
37.11	2109.54
37.25	2110.56



Tributary 7 XS3

As-Built 2/28/2012	KEE
0.00	2107.56
4.90	2106.44
9.93	2105.44
16.03	2104.03
16.70	2103.97
17.62	2103.43
18.70	2103.96
23.59	2104.34
37.03	2104.53

MY01 2/7/2013	URS
0.00	2108.51
0.35	2107.64
12.83	2104.85
16.16	2104.06
17.74	2103.86
18.39	2104.06
23.04	2104.37
33.88	2104.47
36.91	2104.68
36.86	2105.71

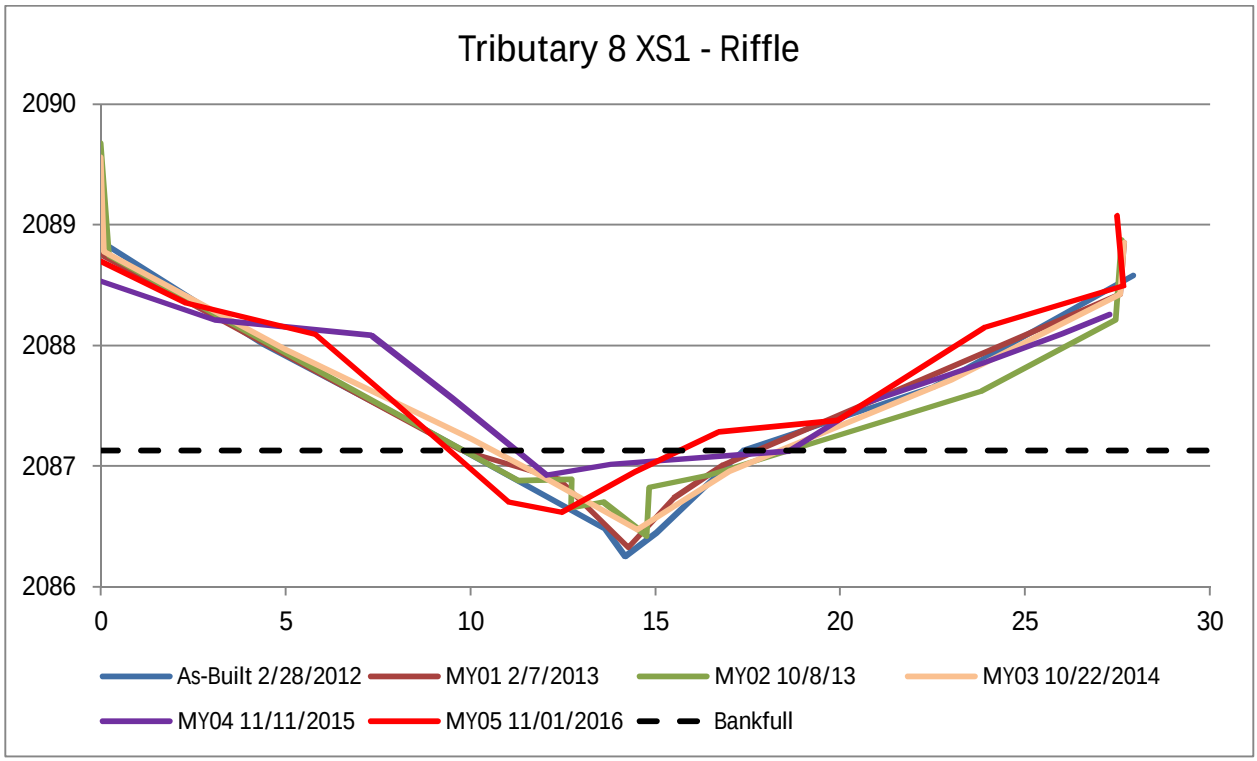
MY02 10/8/2013	URS
0.00	2108.56
0.16	2107.74
6.92	2105.98
12.15	2104.63
14.20	2104.36
14.70	2104.04
15.84	2103.84
16.62	2103.96
16.99	2104.34
19.85	2104.29
26.28	2104.30
35.46	2104.74
35.57	2105.79

MY03 10/22/2014	URS
0.00	2108.51
0.34	2107.76
4.60	2106.86
11.00	2105.60
15.00	2104.59
18.00	2104.32
23.00	2104.50
30.00	2104.54
37.06	2104.68
37.03	2105.71

MY04 11/11/2015	
0.00	2107.56
6.78	2105.98
6.73	2105.94
10.45	2105.03
14.41	2104.34
15.77	2104.17
16.91	2103.73
18.59	2103.96
22.26	2104.14
26.49	2104.18
30.47	2104.54
36.09	2104.72

MY05 11/01/2016	
0.00	2108.49
0.28	2107.57
2.28	2107.08
4.69	2106.44
8.36	2105.82
11.77	2104.96
13.03	2105.12
14.46	2104.58
15.81	2104.14
17.07	2103.82
18.84	2104.41
20.68	2104.47
22.37	2104.25
25.97	2104.40
28.66	2104.46
32.63	2104.53
36.42	2104.68
36.70	2105.73

Figure 10: Tributary 8 Cross Sections with Annual Overlays



Tributary 8 XS1

As-Built 2/28/2012	KEE
0.00	2088.87
4.37	2088.01
8.58	2087.34
13.65	2086.48
14.18	2086.26
15.03	2086.45
17.38	2087.14
22.52	2087.66
27.93	2088.58

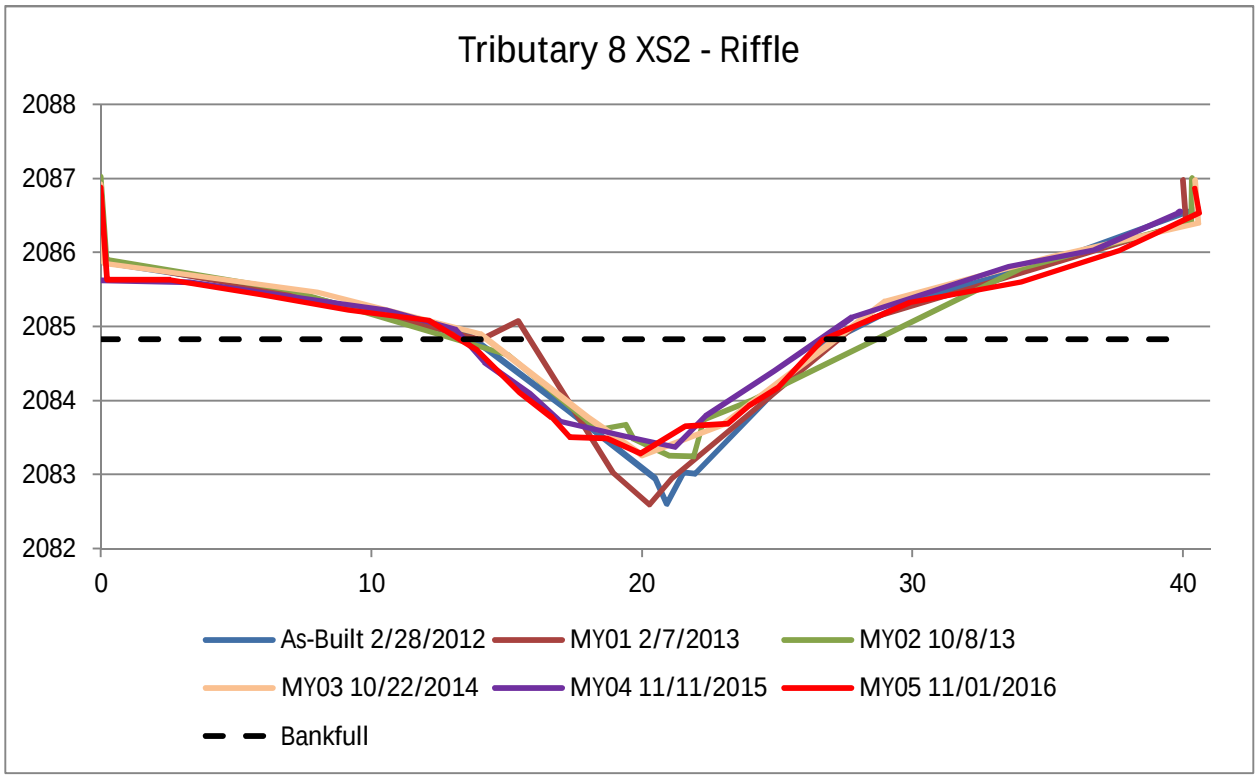
MY01 2/7/2013	URS
0.00	2089.56
0.09	2088.75
9.74	2087.13
12.38	2086.90
14.27	2086.33
15.50	2086.74
16.84	2087.01
27.57	2088.43
27.67	2088.86

MY02 10/8/13	URS
0.00	2089.67
0.23	2088.75
3.14	2088.25
11.30	2086.88
12.73	2086.89
12.72	2086.66
13.59	2086.70
14.76	2086.43
14.84	2086.83
16.44	2086.93
23.80	2087.62
27.46	2088.22
27.62	2088.88

MY03 10/22/2014	URS
0.00	2089.56
0.09	2088.78
5.00	2087.97
10.00	2087.23
12.00	2086.91
14.50	2086.48
17.00	2086.96
23.00	2087.72
27.57	2088.43
27.68	2088.86

MY04 11/11/2015	
0.00	2088.54
3.10	2088.21
7.32	2088.09
9.50	2087.57
12.05	2086.93
13.80	2087.02
18.59	2087.13
20.70	2087.53
23.86	2087.86
26.00	2088.10
27.29	2088.26

MY05 11/01/2016	
0.00	2088.70
2.30	2088.36
5.79	2088.10
8.02	2087.51
11.03	2086.71
12.46	2086.62
14.43	2086.96
16.69	2087.28
19.90	2087.38
23.91	2088.15
27.67	2088.50
27.49	2089.08



Tributary 8 XS2

As-Built 2/28/2012	KEE
0.00	2085.87
6.58	2085.50
13.59	2084.89
17.21	2083.88
20.48	2082.95
20.91	2082.60
21.52	2083.03
21.94	2083.01
26.51	2084.72
29.81	2085.33
35.43	2085.92
40.56	2086.60

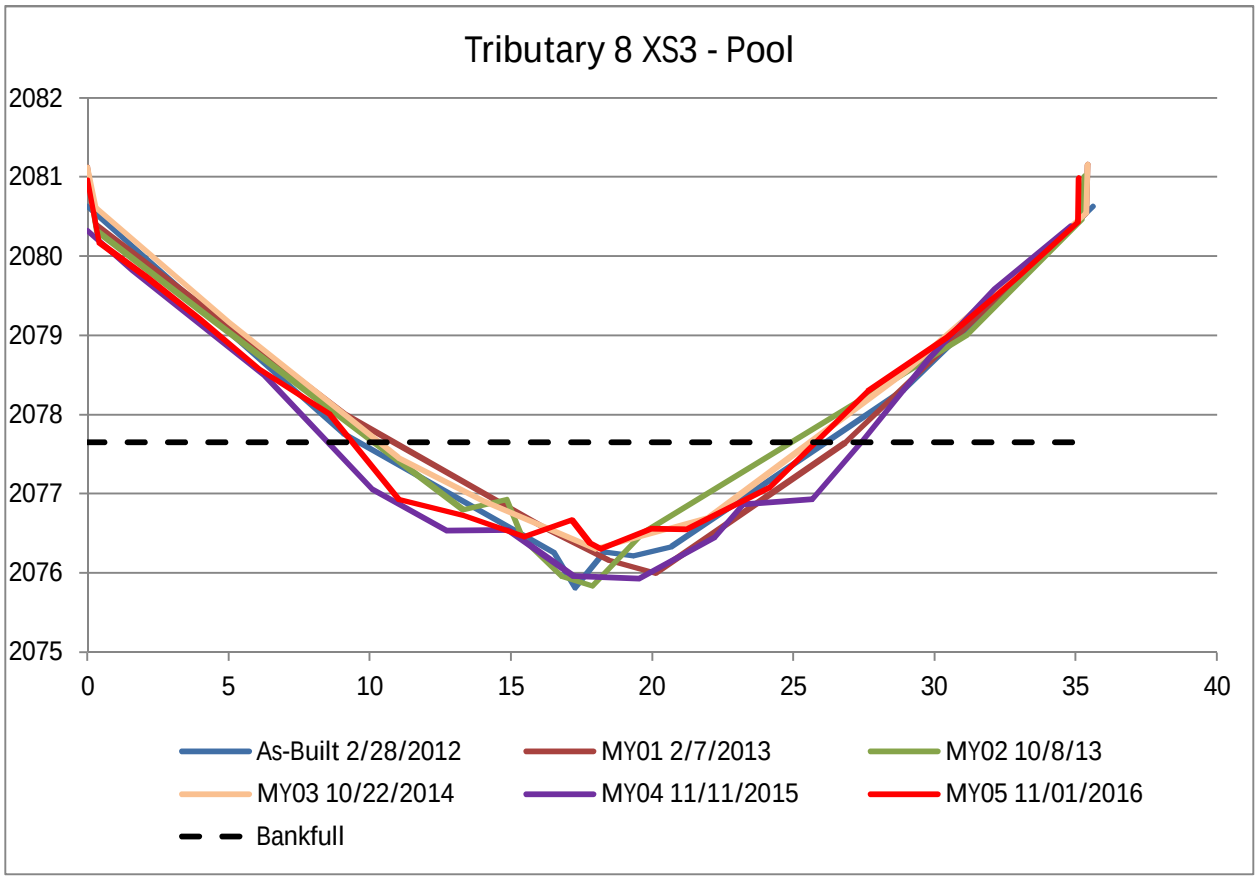
MY01 2/7/2013	URS
0.00	2086.92
0.13	2085.89
7.16	2085.44
14.05	2084.83
15.41	2085.08
18.93	2083.03
20.27	2082.60
21.09	2082.95
28.05	2085.07
40.13	2086.40
40.01	2086.98

MY02 10/8/13	URS
0.00	2087.03
0.20	2085.91
7.01	2085.49
15.05	2084.62
18.36	2083.60
19.40	2083.68
19.69	2083.49
21.03	2083.26
21.91	2083.24
22.28	2083.75
24.05	2084.00
33.99	2085.78
40.32	2086.41
40.33	2087.00

MY03 10/22/2014	URS
0.00	2086.92
0.12	2085.86
8.00	2085.47
14.00	2084.91
18.00	2083.78
20.00	2083.27
23.00	2083.68
29.00	2085.35
35.00	2085.94
40.58	2086.40
40.46	2086.98

MY04 11/11/2015	
0.00	2085.62
3.29	2085.60
8.50	2085.33
10.54	2085.22
13.10	2084.97
14.16	2084.53
15.84	2084.09
16.98	2083.72
19.46	2083.52
21.21	2083.37
22.36	2083.80
24.88	2084.41
27.78	2085.13
33.55	2085.82
36.71	2086.04
39.78	2086.53
39.89	2086.56

MY05 11/01/2016	
0.00	2086.87
0.22	2085.63
2.58	2085.63
5.94	2085.43
9.16	2085.22
12.12	2085.09
13.89	2084.69
15.48	2084.11
16.67	2083.78
17.34	2083.51
18.73	2083.49
19.95	2083.29
21.57	2083.65
23.17	2083.69
23.97	2083.94
25.03	2084.18
26.66	2084.82
29.90	2085.33
34.03	2085.61
37.64	2086.03
40.60	2086.54
40.44	2086.87



Tributary 8 XS3

As-Built 2/28/2012	KEE
0.00	2080.63
9.06	2077.77
16.52	2076.26
17.26	2075.81
18.31	2076.27
19.33	2076.22
20.67	2076.33
28.90	2078.31
35.62	2080.64

MY01 2/7/2013	URS
0.00	2081.13
0.28	2080.40
9.10	2078.01
16.13	2076.58
18.48	2076.16
20.09	2076.00
26.83	2077.65
35.38	2080.55
35.43	2081.16

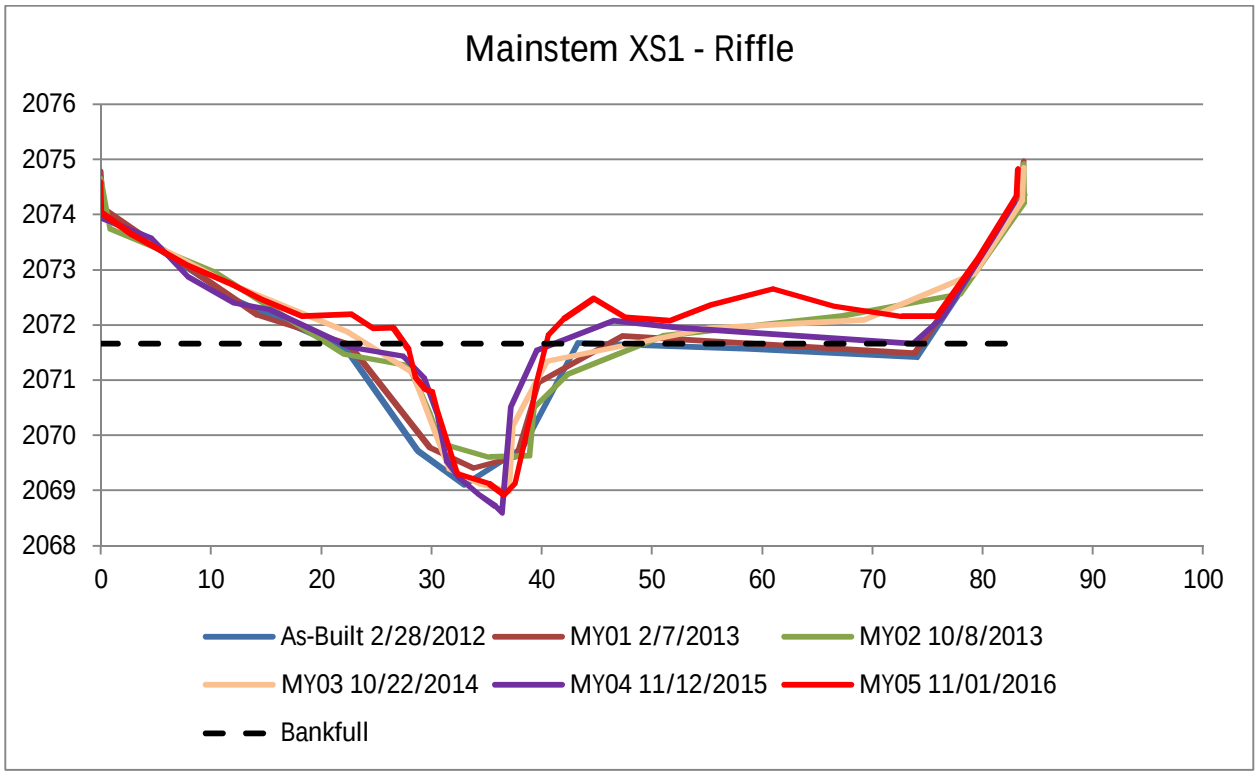
MY02 10/8/13	URS
0.00	2081.02
0.31	2080.33
4.53	2079.17
13.30	2076.80
14.83	2076.93
15.42	2076.44
16.78	2075.96
17.88	2075.84
19.66	2076.51
31.15	2079.01
35.23	2080.47
35.32	2081.01

MY03 10/22/2014	URS
0.00	2081.13
0.28	2080.62
5.00	2079.17
11.00	2077.46
14.00	2076.92
18.00	2076.31
22.00	2076.71
29.00	2078.56
35.38	2080.55
35.43	2081.16

MY04 11/11/2015	
0.00	2080.32
1.58	2079.82
6.25	2078.50
10.07	2077.06
12.73	2076.53
14.91	2076.54
17.22	2075.96
19.51	2075.92
22.22	2076.45
23.21	2076.86
25.66	2076.93
27.47	2077.68
29.78	2078.696
32.13	2079.589
34.85	2080.382

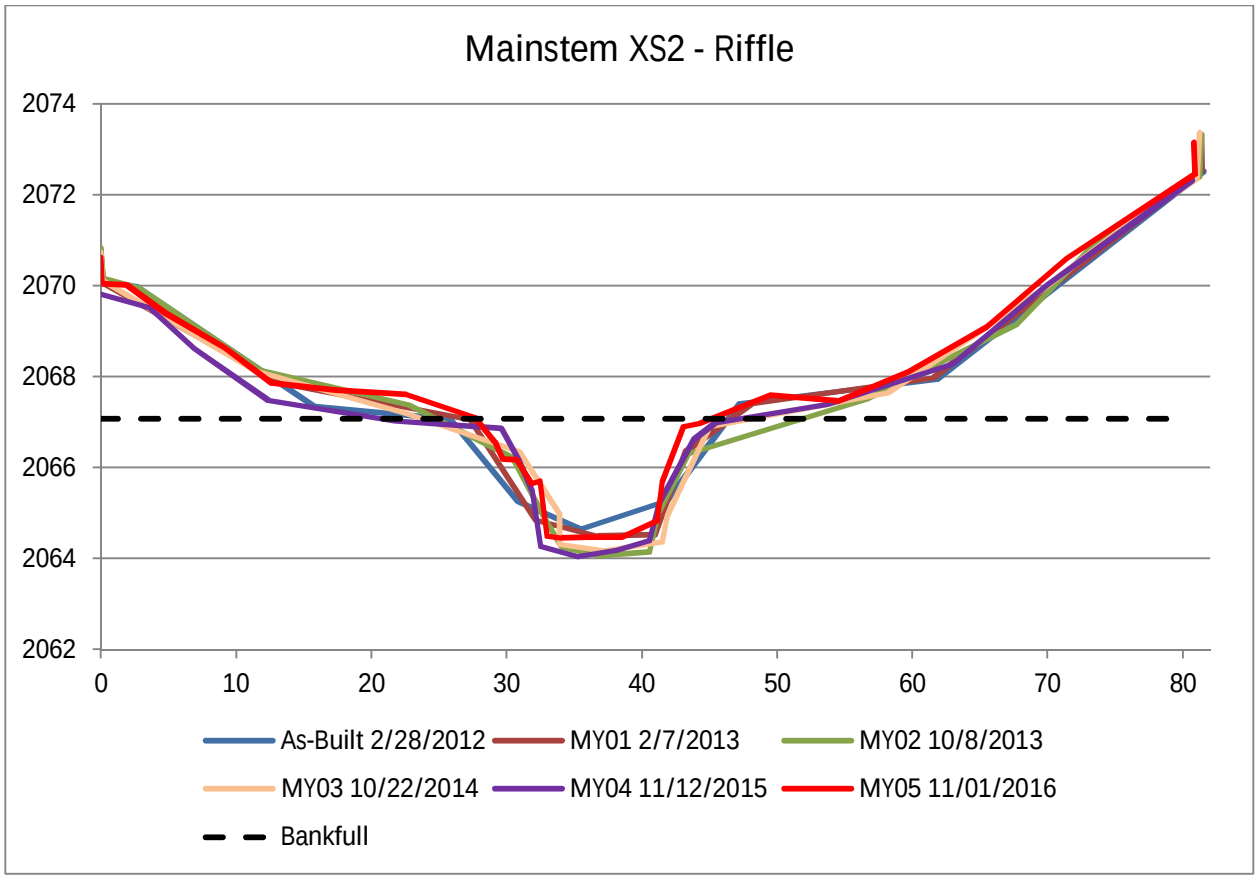
MY05 11/01/2016	
0.00	2080.96
0.40	2080.18
2.11	2079.74
3.97	2079.20
6.07	2078.58
8.59	2078.00
11.04	2076.93
13.32	2076.73
15.48	2076.46
17.16	2076.67
17.80	2076.38
18.18	2076.31
19.94	2076.555
21.18	2076.549
24.16	2077.081
27.63	2078.294
30.43	2078.972
32.94	2079.733
35.09	2080.437
35.12	2080.989

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		MY05 11/01/2016	
	KEE		URS		URS		URS				
0	2074.062	0.00	2074.785	0.00	2074.65	0.00	2074.53	0.00	2073.95	0.00	2074.59
12.4161	2072.436	0.19	2074.106	0.82	2073.744	0.06	2073.96	4.55	2073.58	0.02	2074.04
22.2392	2071.571	14.18	2072.185	10.31	2072.962	11.23	2072.79	7.89	2072.88	2.70	2073.66
28.7208	2069.726	22.43	2071.657	22.03	2071.473	22.33	2071.88	12.07	2072.40	7.81	2073.09
32.9903	2069.114	29.84	2069.777	27.92	2071.27	28.25	2071.14	15.27	2072.28	11.75	2072.76
38.2432	2069.779	33.76	2069.414	29.83	2070.393	30.20	2070.12	22.57	2071.60	14.48	2072.47
43.2398	2071.676	37.67	2069.624	30.76	2069.868	31.57	2069.40	27.40	2071.45	18.29	2072.16
58.6085	2071.571	39.72	2070.966	35.17	2069.611	34.44	2069.12	29.28	2071.05	22.72	2072.20
74.0392	2071.416	47.25	2071.795	38.89	2069.632	37.02	2068.99	30.47	2070.41	24.75	2071.94
83.8001	2074.363	73.79	2071.482	39.30	2070.513	37.41	2070.19	31.35	2069.55	26.52	2071.95
		83.57	2074.263	42.36	2071.116	40.48	2071.35	32.53	2069.23	27.93	2071.55
		83.69	2074.963	50.89	2071.797	54.95	2071.94	34.26	2068.93	28.52	2071.08
				67.18	2072.156	69.13	2072.09	35.79	2068.72	29.43	2070.84
				77.90	2072.571	79.26	2072.94	36.39	2068.60	30.05	2070.79
				83.79	2074.238	83.57	2074.27	37.20	2070.54	30.45	2070.48
				83.69	2074.916	83.69	2074.85	39.51	2071.54	32.35	2069.30
								46.44	2072.08	33.47	2069.23
								52.38	2071.95	35.16	2069.13
								73.63	2071.66	36.57	2068.93
								76.32	2072.14	37.56	2069.13
								80.87	2073.57	39.05	2070.45
								82.85	2074.22	39.47	2070.94
										40.57	2071.83
										41.99	2072.12
										44.70	2072.49
										47.61	2072.13
										51.52	2072.08
										55.31	2072.37
										60.95	2072.66
										66.46	2072.35
										72.54	2072.16
										75.84	2072.16
										79.58	2073.21
										83.08	2074.35
										83.18	2074.83



Mainstem Upstream of Browntown Road XS2

As-Built 2/28/2012	KEE
0	2070.132
2.6192	2069.988
15.8434	2067.338
25.86	2067.062
30.8474	2065.253
35.4955	2064.659
41.829	2065.279
47.2124	2067.417
61.8097	2067.952
81.5124	2072.516

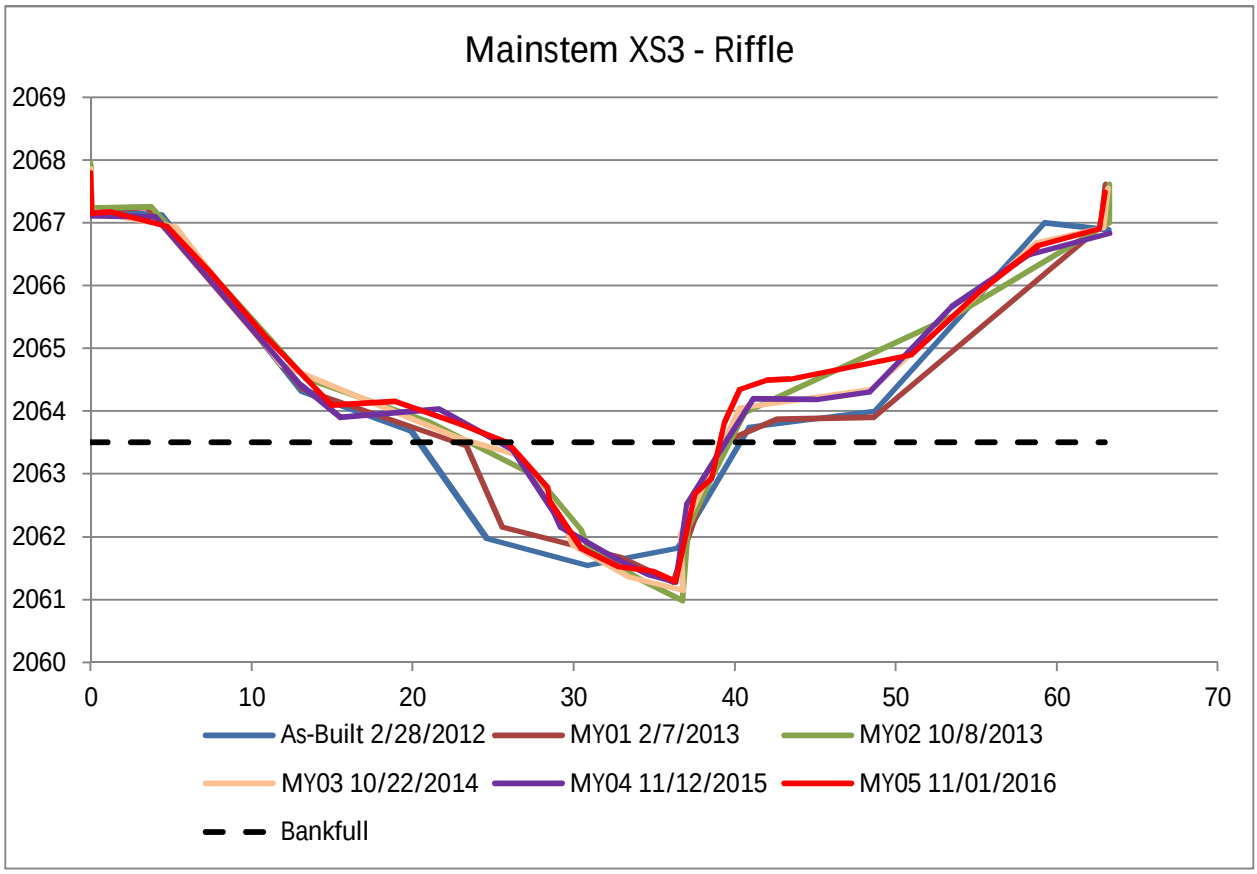
MY01 2/7/2013	URS
0.00	2070.824
0.16	2070.062
13.22	2067.865
27.31	2067.067
32.10	2064.854
36.65	2064.494
40.96	2064.526
43.20	2066.361
48.14	2067.409
61.49	2067.97
81.42	2072.532
81.37	2073.318

MY02 10/8/2013	URS
0.00	2070.836
0.16	2070.169
2.79	2069.954
11.83	2068.147
22.74	2067.389
30.39	2066.236
32.91	2064.816
34.05	2064.256
36.82	2064.056
40.56	2064.147
41.22	2065
43.42	2066.317
56.60	2067.512
67.70	2069.159
72.94	2070.763
81.25	2072.402
81.39	2073.32

MY03 10/22/2014	URS
0.00	2070.73
0.11	2070.11
11.43	2068.12
22.53	2067.20
30.95	2066.36
33.90	2064.98
33.94	2064.31
37.23	2064.18
41.47	2064.37
41.85	2064.95
44.98	2066.90
58.18	2067.65
69.29	2069.86
75.98	2071.37
81.04	2072.36
81.26	2073.36

MY04 11/12/2015	
0.00	2069.82
3.59	2069.52
6.92	2068.62
12.38	2067.48
21.73	2067.03
29.63	2066.87
30.91	2066.17
31.89	2065.49
32.50	2064.27
35.26	2064.04
38.14	2064.19
40.52	2064.40
41.25	2065.21
43.80	2066.63
45.41	2066.98
53.76	2067.41
63.00	2068.29
69.97	2070.03
76.20	2071.37
80.66	2072.33

MY05 11/01/2016	
0.00	2070.62
0.09	2070.05
1.92	2070.01
4.70	2069.41
9.17	2068.63
12.61	2067.86
17.26	2067.71
22.59	2067.61
27.69	2067.10
29.12	2066.57
29.70	2066.19
30.73	2066.17
31.85	2065.65
32.43	2065.71
32.96	2064.51
33.99	2064.46
35.96	2064.47
38.46	2064.48
41.10	2064.84
41.51	2065.69
43.03	2066.91
44.23	2066.97
49.42	2067.59
54.52	2067.47
59.71	2068.11
65.48	2069.10
71.38	2070.60
80.91	2072.47
80.82	2073.15



Mainstem Upstream of Browntown Road XS3

As-Built 2/28/2012	KEE
0	2067.19
4.4327	2067.123
13.0977	2064.323
19.916	2063.687
24.5923	2061.976
30.8506	2061.55
36.445	2061.819
40.9076	2063.75
48.6652	2064
59.2229	2067
63.2372	2066.886

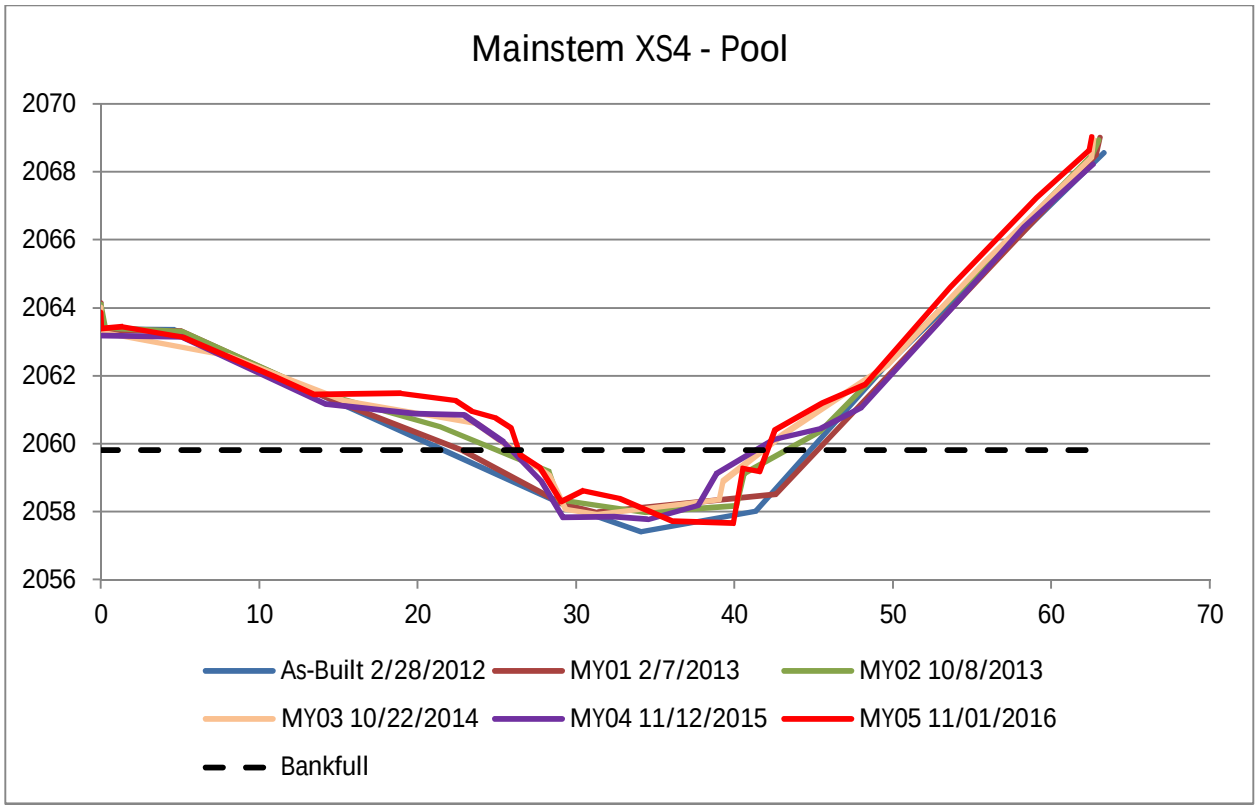
MY01 2/7/2013	URS
0.00	2067.909
-0.08	2067.195
3.50	2067.247
13.19	2064.349
23.31	2063.452
25.55	2062.158
32.85	2061.676
36.15	2061.285
39.15	2063.495
42.58	2063.867
48.62	2063.903
62.74	2066.95
63.02	2067.611

MY02 10/8/2013	URS
0.00	2067.947
0.09	2067.232
3.77	2067.251
13.30	2064.534
21.04	2063.833
27.68	2062.961
30.46	2062.121
30.90	2061.827
34.12	2061.323
36.76	2060.991
37.11	2062.161
38.46	2062.903
40.60	2063.983
53.66	2065.537
63.25	2067.01
63.25	2067.61

MY03 10/22/2014	URS
0.00	2067.86
0.09	2067.19
5.24	2066.95
11.88	2064.74
22.72	2063.59
26.44	2063.31
29.49	2062.14
29.91	2061.87
33.43	2061.37
36.82	2061.15
36.65	2062.04
40.30	2064.06
48.43	2064.35
58.68	2066.69
62.89	2066.93
63.17	2067.55

MY04 11/12/2015	
0.00	2067.14
0.01	2067.11
4.06	2067.10
13.04	2064.42
15.50	2063.90
21.66	2064.03
26.17	2063.39
28.77	2062.38
29.17	2062.16
32.56	2061.66
34.69	2061.40
36.33	2061.28
37.01	2062.52
39.57	2063.57
41.14	2064.19
45.04	2064.19
48.38	2064.31
53.47	2065.66
58.39	2066.52
58.35	2066.50
63.27	2066.84

MY05 11/01/2016	
0.00	2067.79
0.07	2067.15
1.31	2067.17
4.72	2066.95
7.40	2066.23
10.77	2065.21
14.97	2064.09
18.96	2064.16
22.85	2063.81
25.88	2063.50
26.51	2063.34
28.39	2062.79
28.49	2062.57
30.42	2061.82
32.79	2061.53
34.90	2061.45
36.33	2061.29
37.50	2062.69
38.54	2062.93
39.33	2063.82
40.30	2064.35
41.94	2064.49
43.45	2064.51
50.94	2064.90
55.20	2065.91
58.86	2066.65
62.62	2066.91
62.99	2067.49



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

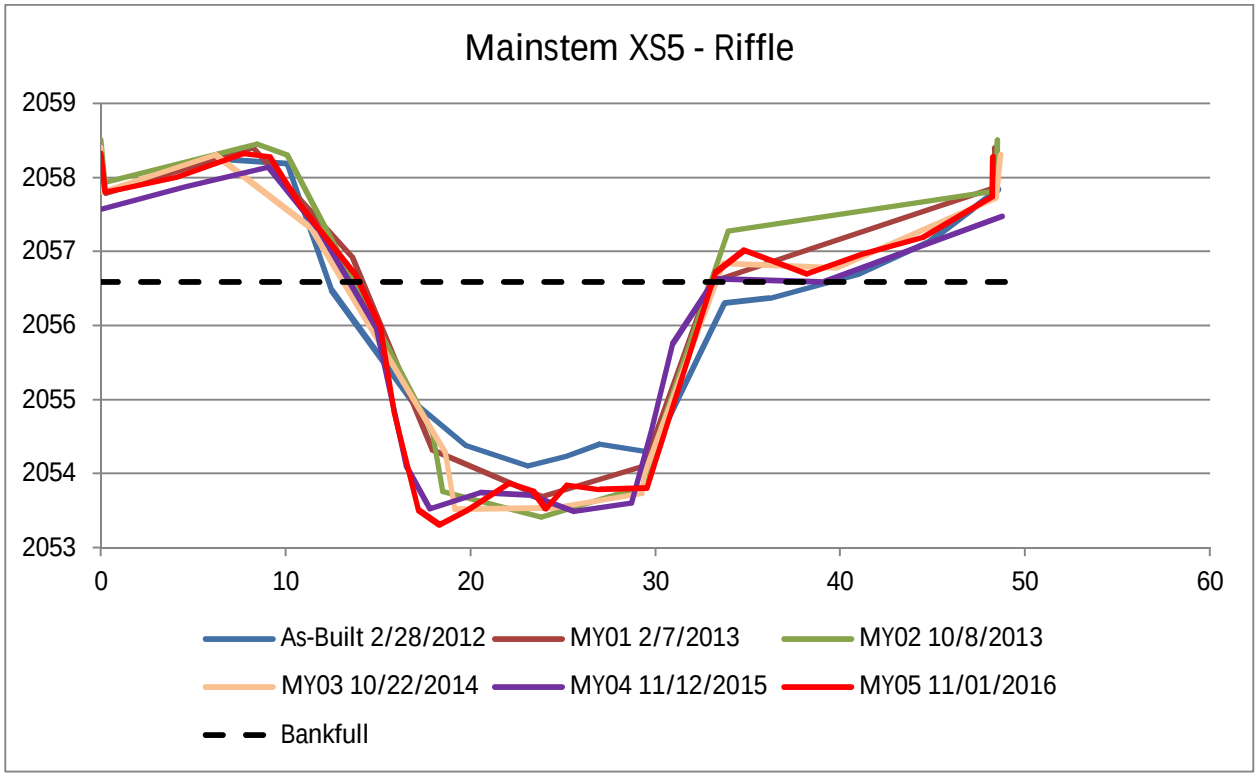
MY02 10/8/2013	URS
0.00	2064.109
0.26	2063.407
5.18	2063.304
13.39	2061.562
21.41	2060.512
28.27	2059.183
28.86	2058.361
34.39	2057.984
40.10	2058.176
40.58	2059.128
45.40	2060.379
54.01	2064.446
62.54	2068.487
62.98	2068.947

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	
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

MY05 11/01/2016	
0.00	2063.87
0.02	2063.39
1.35	2063.45
5.18	2063.15
8.08	2062.57
10.98	2061.97
13.50	2061.44
18.93	2061.48
22.38	2061.28
23.43	2060.96
24.88	2060.78
25.90	2060.46
26.45	2059.67
27.71	2059.30
29.05	2058.30
30.39	2058.62
32.70	2058.39
36.12	2057.72
39.91	2057.66
40.49	2059.28
41.55	2059.18
42.53	2060.40
45.50	2061.21
48.24	2061.75
53.61	2064.60
59.05	2067.25
62.36	2068.65
62.51	2069.04

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



Mainstem Downstream of Browntown Road XS5

As-Built 2/28/2012	KEE
0	2057.925
5.9297	2058.253
10.0609	2058.19
12.4738	2056.482
16.821	2054.986
19.7434	2054.383
23.0883	2054.108
25.1727	2054.237
26.9522	2054.404
29.8047	2054.287
33.7347	2056.304
36.2155	2056.369
40.9048	2056.694
44.8342	2057.144
48.5411	2057.842

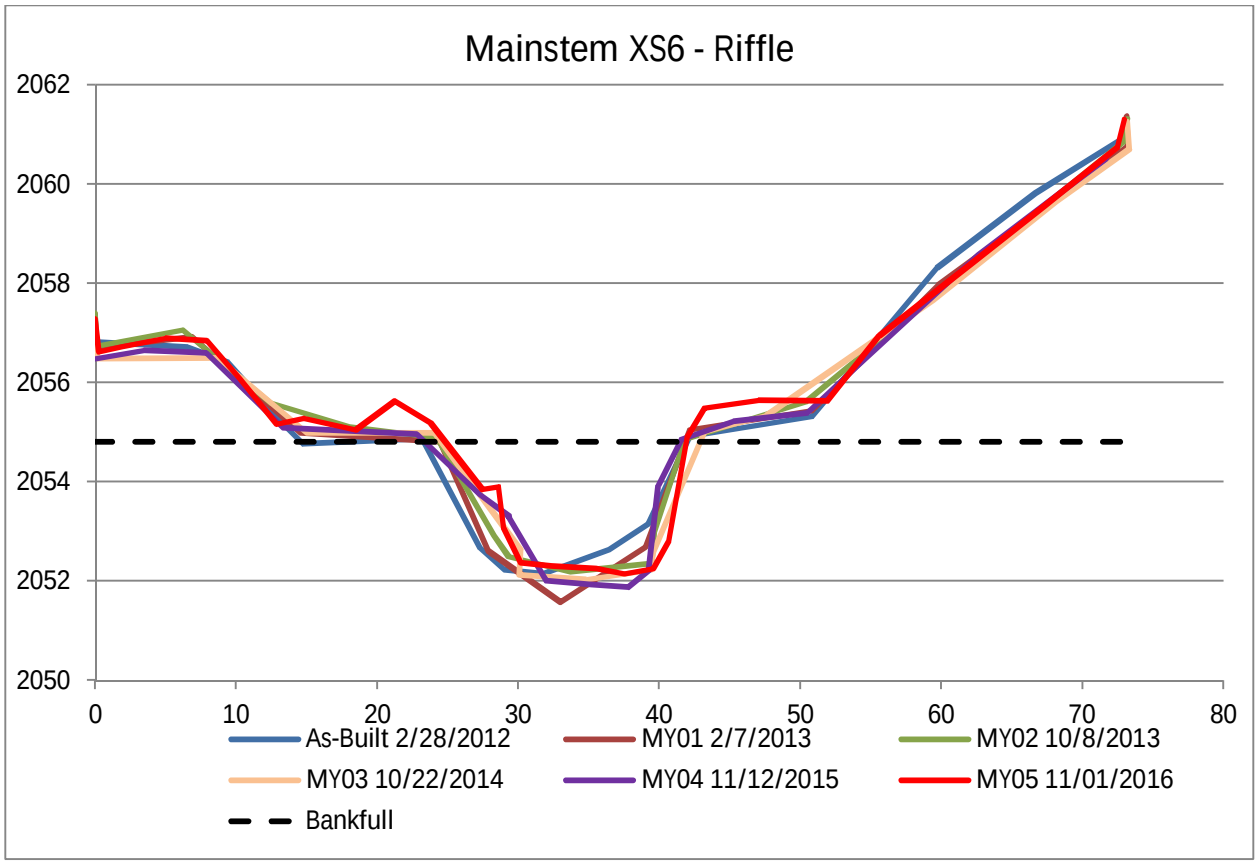
MY01 2/7/2013	URS
0.00	2058.401
0.25	2057.789
8.24	2058.402
13.60	2056.927
17.94	2054.32
23.86	2053.693
29.38	2054.11
32.95	2056.588
48.48	2057.877
48.36	2058.401

MY02 10/8/2013	URS
0.00	2058.507
0.19	2057.934
8.45	2058.457
10.08	2058.304
17.93	2054.557
18.47	2053.759
23.80	2053.413
29.58	2053.844
29.99	2054.395
33.91	2057.276
48.46	2057.827
48.52	2058.508

MY03 10/22/2014	URS
0.00	2058.40
0.06	2057.81
6.20	2058.31
11.34	2057.33
18.60	2054.28
19.14	2053.52
24.42	2053.54
29.25	2053.74
29.40	2053.99
33.64	2056.84
39.74	2056.78
48.44	2057.73
48.67	2058.31

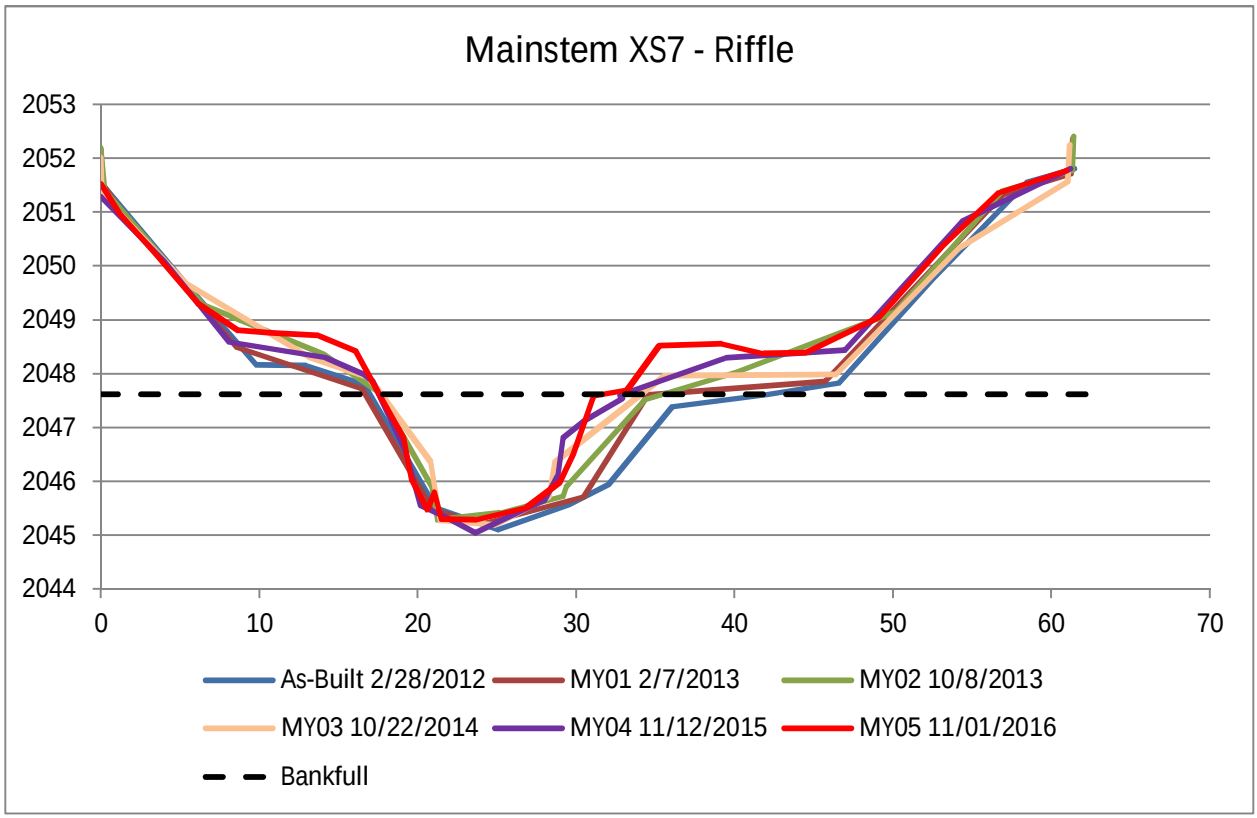
MY04 11/12/2015	
0.00	2057.57
4.53	2057.87
9.08	2058.14
11.77	2057.31
14.88	2055.97
16.50	2054.11
17.79	2053.53
20.49	2053.74
23.28	2053.71
25.57	2053.50
28.69	2053.61
29.78	2054.59
30.92	2055.75
33.23	2056.63
39.03	2056.59
48.75	2057.48

MY05 11/01/2016	
0.00	2058.32
0.22	2057.81
1.12	2057.85
4.07	2058.01
7.71	2058.33
9.14	2058.28
10.75	2057.63
13.73	2056.70
15.11	2055.97
15.86	2054.83
17.17	2053.51
18.31	2053.31
19.82	2053.51
22.09	2053.87
23.36	2053.77
24.04	2053.53
25.20	2053.85
26.92	2053.79
29.52	2053.80
33.25	2056.72
34.80	2057.02
38.20	2056.70
41.21	2056.97
44.46	2057.19
48.22	2057.75
48.27	2058.28



Mainstem Downstream of Browntown Road XS6

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS	MY03 10/22/2014	URS	MY04 11/12/2015		MY05 11/01/2016	
0	2056.814	0.00	2057.39	0.00	2057.395	0.00	2057.23	0.00	2056.48	0.00	2057.28
6.562	2056.708	0.11	2056.706	0.13	2056.74	0.19	2056.48	3.43	2056.66	0.28	2056.62
9.399	2056.419	6.91	2056.926	6.21	2057.065	8.70	2056.50	7.89	2056.60	1.91	2056.73
13.4204	2055.146	14.57	2054.986	12.43	2055.597	15.02	2054.98	13.36	2055.09	5.01	2056.89
14.7415	2054.769	24.48	2054.802	18.03	2055.117	24.11	2054.99	22.85	2054.96	7.92	2056.84
23.2017	2054.869	27.87	2052.611	24.22	2054.898	30.18	2052.62	27.27	2053.75	10.26	2056.09
27.2717	2052.676	32.99	2051.573	28.26	2052.922	30.09	2052.12	29.36	2053.31	12.87	2055.16
29.04	2052.228	39.04	2052.692	29.32	2052.497	34.83	2052.02	29.32	2053.29	14.78	2055.28
31.7226	2052.141	42.16	2055.055	33.74	2052.179	39.40	2052.23	32.00	2052.00	18.48	2055.05
36.4605	2052.636	50.81	2055.443	39.47	2052.352	39.56	2052.59	35.16	2051.93	21.23	2055.64
39.2248	2053.157	59.76	2057.96	39.66	2052.992	43.19	2055.01	37.79	2051.87	23.77	2055.20
40.361	2053.832	73.24	2060.761	41.80	2054.851	47.56	2055.34	39.27	2052.21	27.47	2053.85
42.1732	2054.926	73.13	2061.374	50.40	2055.617	59.41	2057.67	39.93	2053.93	28.60	2053.90
50.8334	2055.319			62.52	2058.461	68.10	2059.64	41.55	2054.86	28.96	2053.07
59.6708	2058.317			72.92	2060.855	73.34	2060.71	45.24	2055.22	30.16	2052.36
66.6759	2059.827			73.19	2061.318	73.19	2061.26	50.48	2055.38	32.36	2052.30
73.2022	2060.98							54.02	2056.33	35.54	2052.25
								62.61	2058.58	37.52	2052.15
								71.64	2060.53	39.58	2052.25
										40.64	2052.80
										41.98	2054.90
										43.18	2055.49
										47.00	2055.64
										51.93	2055.63
										55.61	2056.95
										62.12	2058.40
										67.30	2059.56
										72.46	2060.74
										72.96	2061.31



Mainstem Downstream of Browntown Road XS7

As-Built 2/28/2012	KEE
0	2051.554
5.1556	2049.744
9.8014	2048.158
12.9772	2048.153
16.5994	2047.808
21.1335	2045.515
25.0671	2045.109
29.5685	2045.574
32.0625	2045.948
36.0525	2047.394
42.0455	2047.612
46.57	2047.834
52.5161	2049.769
58.4578	2051.562
61.4321	2051.812

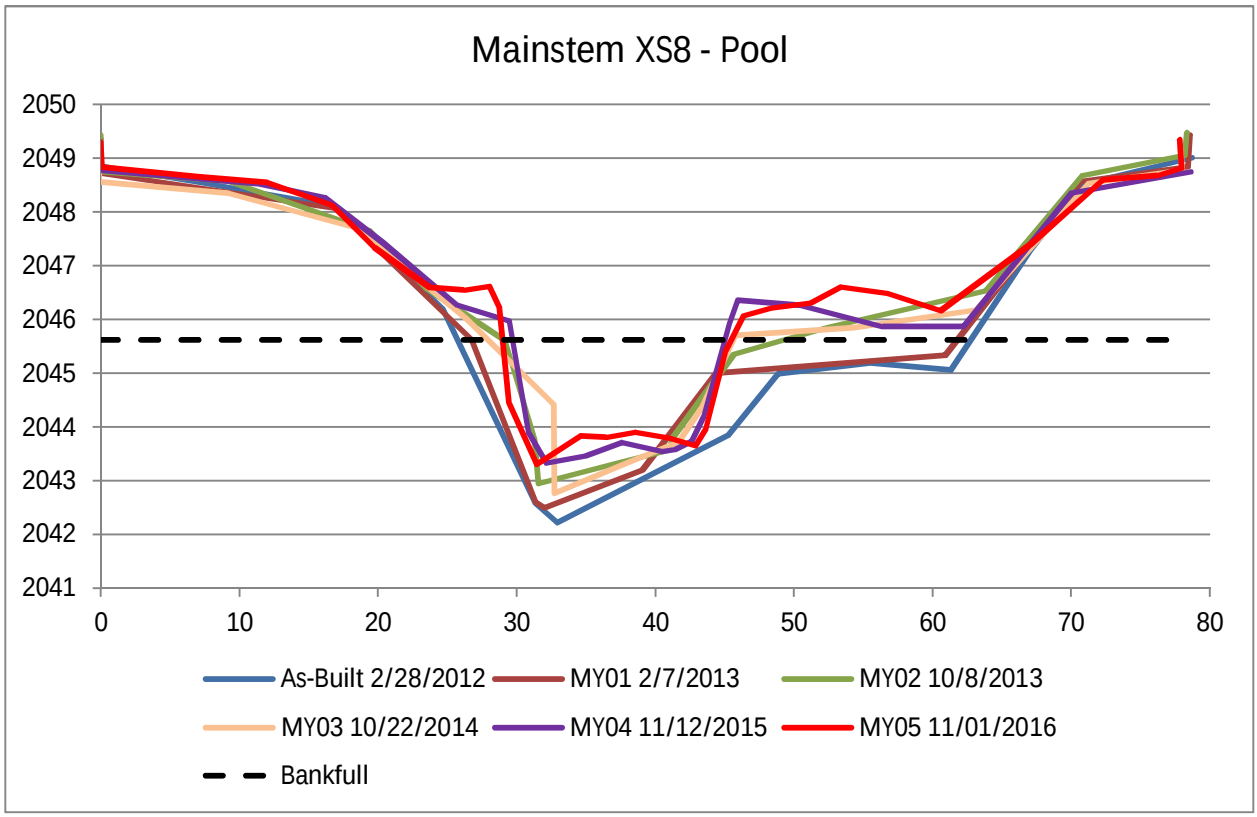
MY01 2/7/2013	URS
0.00	2052.17
0.12	2051.503
1.51	2050.912
8.54	2048.494
16.47	2047.72
20.94	2045.474
24.10	2045.217
30.45	2045.717
34.47	2047.599
45.67	2047.851
56.89	2051.324
61.23	2051.717
61.36	2052.365

MY02 10/8/2013	URS
0.00	2052.197
0.24	2051.412
6.46	2049.276
14.04	2048.363
17.42	2047.684
20.88	2045.91
21.24	2045.286
25.23	2045.423
29.15	2045.728
29.37	2045.909
34.33	2047.523
40.11	2048.034
50.12	2049.151
56.86	2051.394
61.32	2051.772
61.41	2052.405

MY03 10/22/2014	URS
0.00	2052.01
0.08	2051.32
5.39	2049.67
13.24	2048.30
16.91	2047.92
20.81	2046.37
21.38	2045.27
24.82	2045.19
28.28	2045.72
28.62	2046.36
35.55	2047.96
46.37	2047.98
54.15	2050.34
61.03	2051.57
61.17	2052.26

MY04 11/12/2015	
0.00	2051.29
3.98	2050.08
8.11	2048.59
14.12	2048.31
16.55	2047.99
17.14	2047.86
19.20	2046.60
20.17	2045.56
21.74	2045.35
23.64	2045.05
26.56	2045.46
28.00	2045.65
28.84	2046.11
29.14	2046.81
30.55	2047.13
32.93	2047.55
32.76	2047.61
39.41	2048.30
46.93	2048.44
54.36	2050.83
61.18	2051.81

MY05 11/01/2016	
0.00	2051.53
1.16	2050.99
3.45	2050.22
6.10	2049.32
8.69	2048.81
10.69	2048.76
13.71	2048.71
16.08	2048.43
17.81	2047.49
19.10	2046.81
19.59	2046.05
20.61	2045.48
21.02	2045.80
21.49	2045.30
23.63	2045.29
26.81	2045.51
28.95	2045.99
29.79	2046.51
31.09	2047.59
33.18	2047.71
35.20	2048.53
39.17	2048.56
41.76	2048.37
44.44	2048.39
49.13	2049.06
53.15	2050.38
56.62	2051.36
60.94	2051.78



Mainstem Downstream of Browntown Road XS8

As-Built 2/28/2012	KEE
0	2048.851
7.5733	2048.535
16.9398	2048.108
24.6471	2046.195
31.3548	2042.574
32.9069	2042.22
45.272	2043.858
48.8273	2044.981
55.4931	2045.185
61.299	2045.054
67.0118	2047.282
70.679	2048.508
78.7178	2049.012

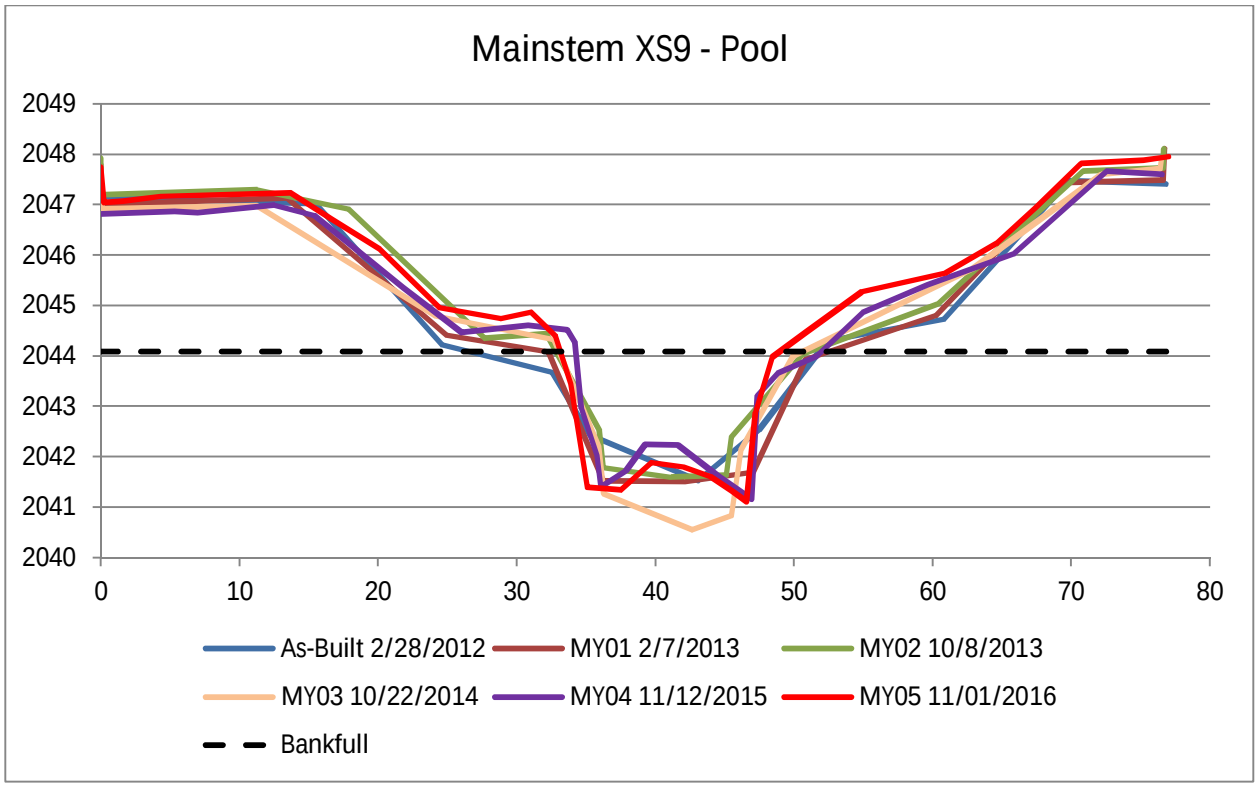
MY01 2/7/2013	URS
0.00	2049.361
-0.05	2048.724
16.90	2048.074
26.70	2045.624
31.35	2042.598
31.98	2042.495
39.03	2043.196
44.37	2044.998
60.88	2045.334
70.69	2048.572
78.42	2048.846
78.56	2049.427

MY02 10/8/2013	URS
0.00	2049.424
0.00	2048.753
9.26	2048.57
19.40	2047.649
23.36	2046.601
29.14	2045.62
31.31	2043.76
31.59	2042.946
37.42	2043.343
40.94	2043.57
41.23	2043.794
45.66	2045.36
52.44	2045.855
63.80	2046.536
70.75	2048.683
78.18	2049.059
78.33	2049.475

MY03 10/22/2014	URS
0.00	2049.11
-0.14	2048.55
9.25	2048.34
18.30	2047.71
26.34	2046.01
32.68	2044.41
32.72	2042.77
37.79	2043.31
41.69	2043.72
43.28	2044.34
45.74	2045.70
54.28	2045.84
63.09	2046.17
71.21	2048.54
78.00	2048.79
77.88	2049.21

MY04 11/12/2015	
0.00	2048.77
11.33	2048.52
16.12	2048.28
20.35	2047.42
25.65	2046.27
29.44	2045.98
30.82	2043.90
32.10	2043.33
34.95	2043.46
37.57	2043.71
40.46	2043.54
41.39	2043.58
42.59	2043.74
43.47	2044.20
45.31	2045.92
45.94	2046.36
50.51	2046.26
56.37	2045.87
62.21	2045.87
70.00	2048.36
78.63	2048.75

MY05 11/01/2016	
0.00	2049.29
0.06	2048.83
7.00	2048.66
12.03	2048.55
16.66	2048.13
19.71	2047.35
23.70	2046.59
26.20	2046.55
28.00	2046.62
28.73	2046.22
29.46	2044.43
31.41	2043.30
34.55	2043.83
36.46	2043.80
38.56	2043.90
40.98	2043.79
42.89	2043.65
43.61	2043.96
45.03	2045.41
46.33	2046.07
48.32	2046.21
51.17	2046.31
53.36	2046.61
56.74	2046.48
60.57	2046.17
67.10	2047.42
72.24	2048.60
76.19	2048.67
77.98	2048.82
77.81	2049.34



Mainstem Downstream of Browntown Road XS9

As-Built 2/28/2012	KEE
0	2047.164
15.4834	2047.018
24.6158	2044.23
32.5523	2043.681
35.2546	2042.431
43.075	2041.533
47.45	2042.533
52.3752	2044.295
60.7911	2044.733
69.811	2047.474
76.7954	2047.415

MY01 2/7/2013	URS
0.00	2047.797
0.01	2047.009
13.40	2047.136
24.92	2044.42
32.26	2044.081
36.23	2041.526
42.10	2041.506
47.05	2041.701
50.80	2043.939
60.26	2044.807
69.37	2047.438
76.64	2047.492
76.72	2048.107

MY02 10/8/2013	URS
0.00	2047.919
0.00	2047.2
11.27	2047.3
17.84	2046.917
27.70	2044.352
32.13	2044.439
35.96	2042.522
36.22	2041.787
41.10	2041.594
45.12	2041.641
45.45	2042.402
50.65	2044.049
60.36	2045.041
70.83	2047.662
76.64	2047.734
76.68	2048.116

MY03 10/22/2014	URS
0.00	2047.60
0.10	2046.91
11.24	2046.98
24.13	2044.80
32.68	2044.33
35.91	2042.19
36.29	2041.27
42.67	2040.56
45.47	2040.83
46.14	2042.15
49.88	2043.99
62.86	2045.74
72.14	2047.60
76.39	2047.72
76.47	2047.92

MY04 11/12/2015	
0	2046.815
5.28	2046.87
6.94	2046.85
12.49	2047.00
15.37	2046.79
21.79	2045.36
26.01	2044.46
30.82	2044.61
33.64	2044.51
34.20	2044.26
34.65	2042.96
35.79	2042.03
36.06	2041.40
37.86	2041.72
39.24	2042.24
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

MY05 11/01/2016	
0	2047.744
0.20	2047.05
1.54	2047.07
4.32	2047.17
13.72	2047.23
16.66	2046.72
20.06	2046.13
24.43	2044.96
28.85	2044.74
31.01	2044.87
32.79	2044.40
33.88	2043.45
35.07	2041.39
37.47	2041.34
39.71	2041.89
42.05	2041.80
43.97	2041.61
45.51	2041.33
46.59	2041.12
47.24	2042.90
48.40	2043.98
50.86	2044.48
54.86	2045.27
60.90	2045.65
64.62	2046.24
67.40	2046.94
70.66	2047.81
75.21	2047.88
76.99	2047.96

Figure 13: Tributary 3 Longitudinal Profile with Annual Overlays

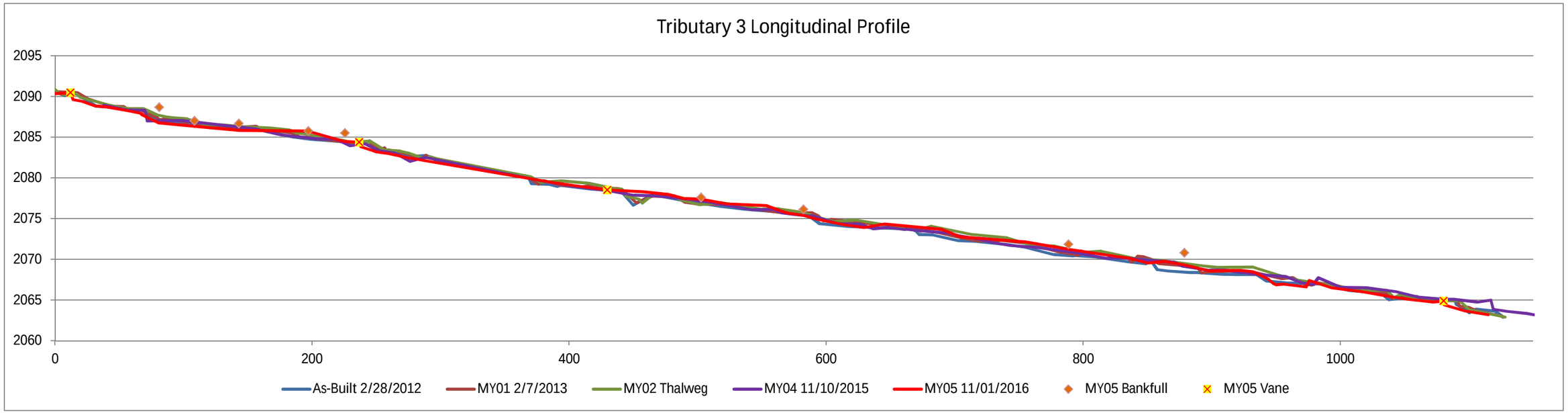


Figure 14: Tributary 4 Longitudinal Profile with Annual Overlays

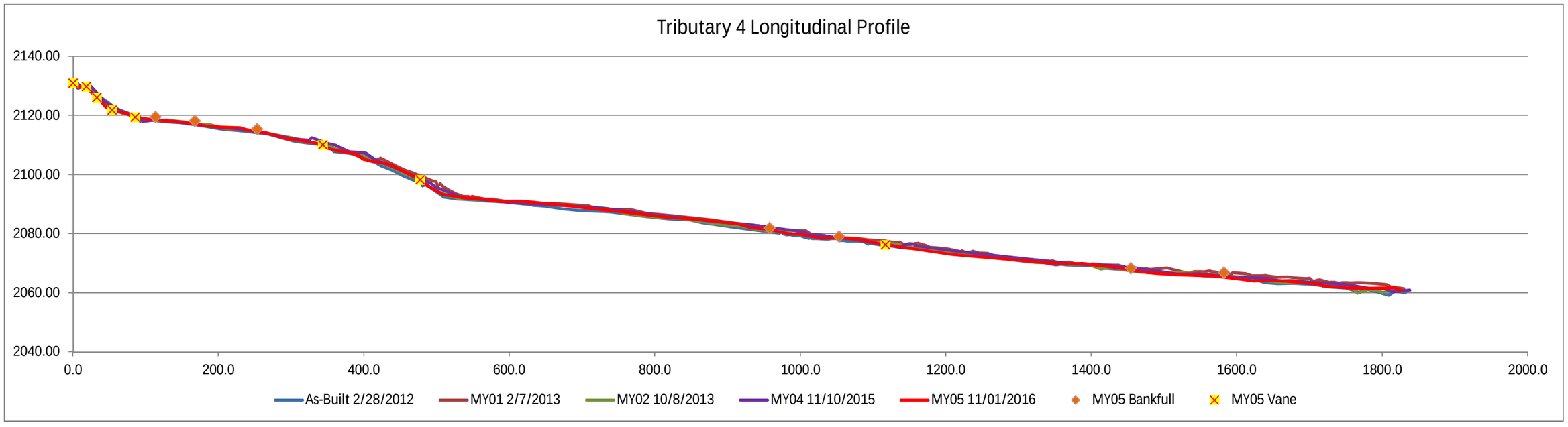


Figure 15: Tributary 5 Longitudinal Profile with Annual Overlays

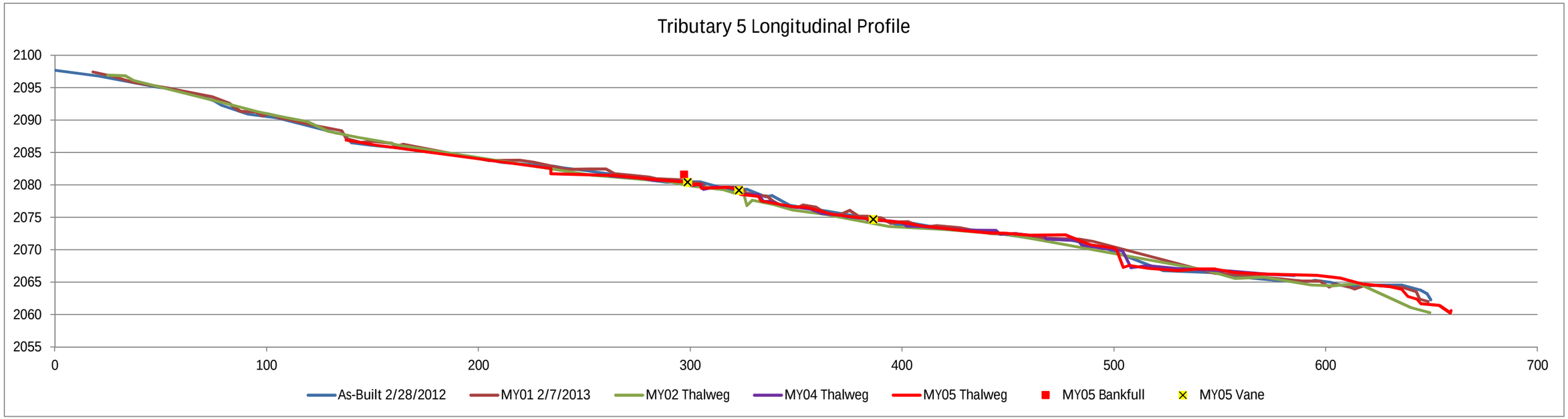


Figure 16: Tributary 6 Longitudinal Profile with Annual Overlays

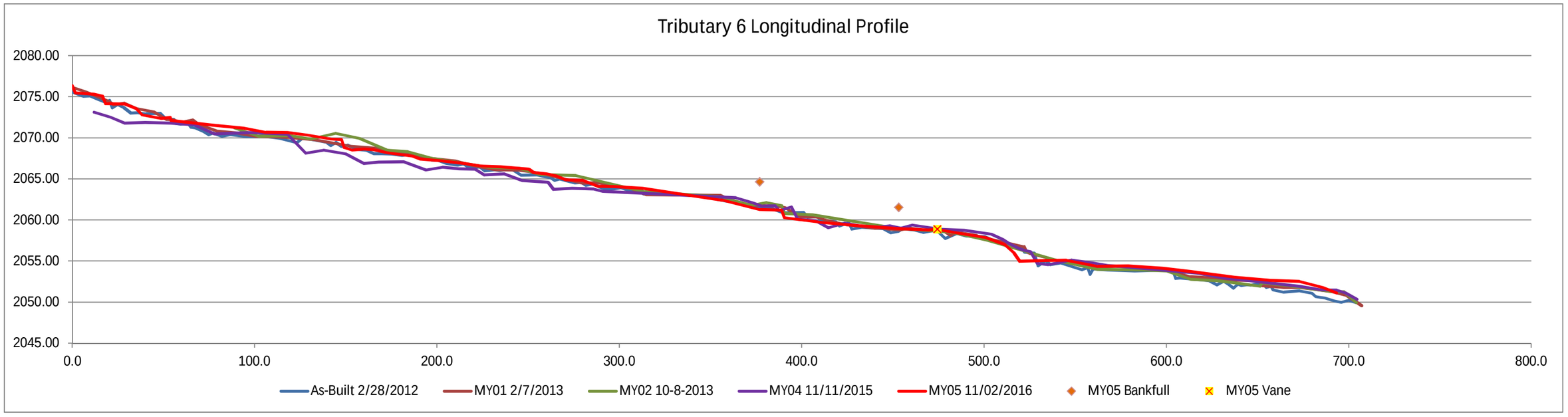


Figure 17: Tributary 7 Longitudinal Profile with Annual Overlays

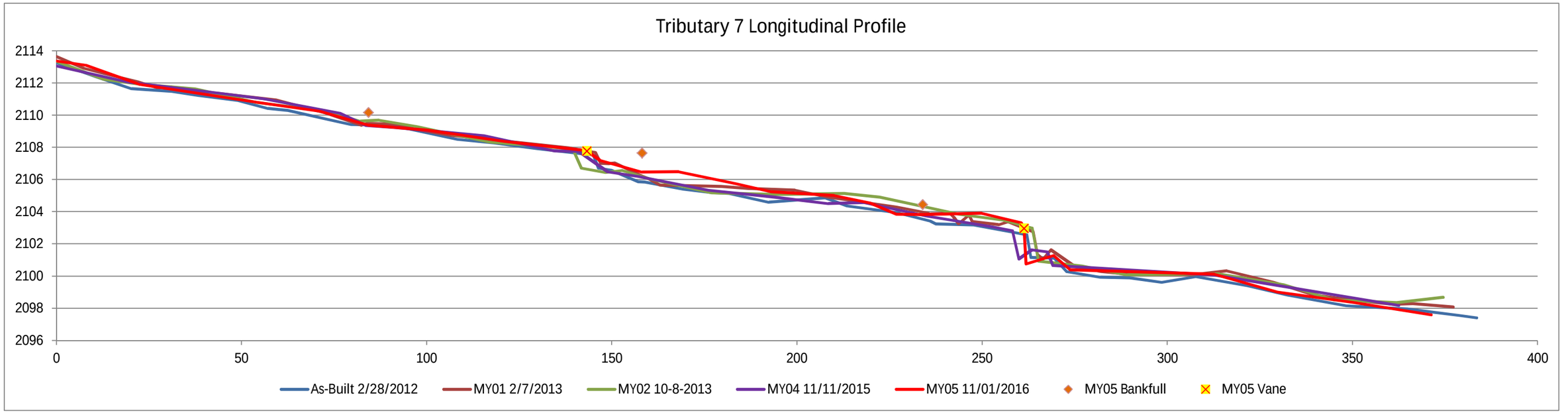


Figure 18: Tributary 8 Longitudinal Profile with Annual Overlays

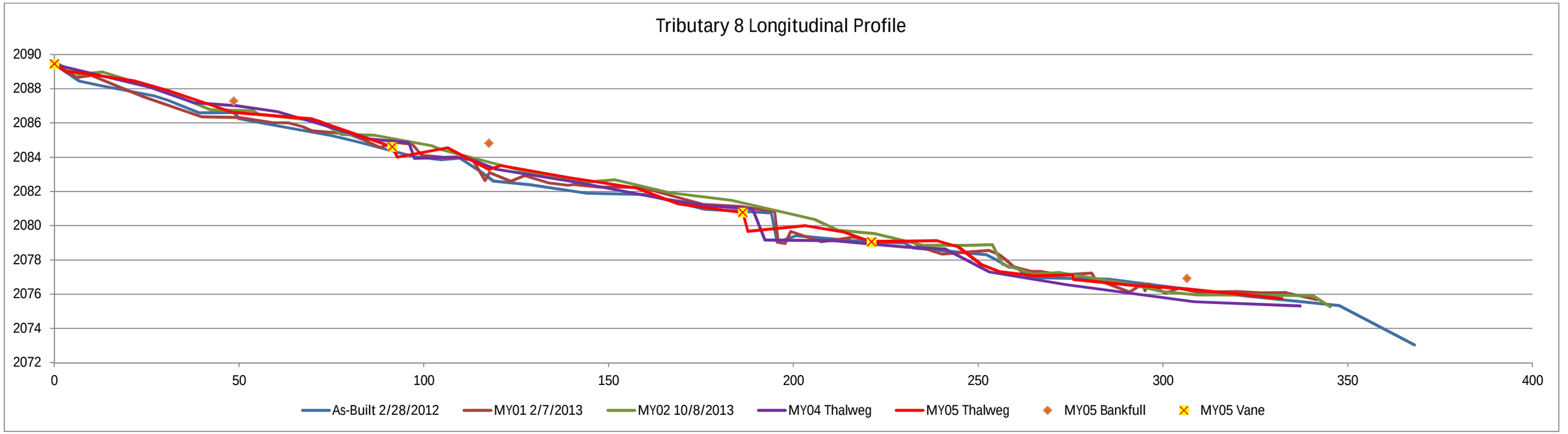


Figure 19: Mainstem – Upstream of Browntown Road Longitudinal Profile with Annual Overlays

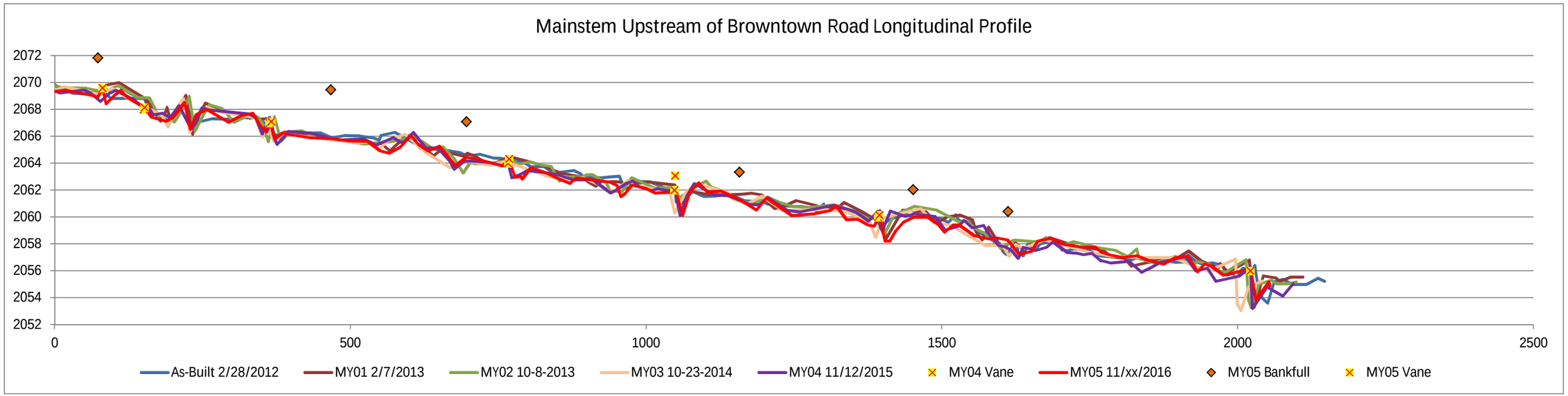


Figure 20: Mainstem – Downstream of Browntown Road Longitudinal Profile with Annual Overlays

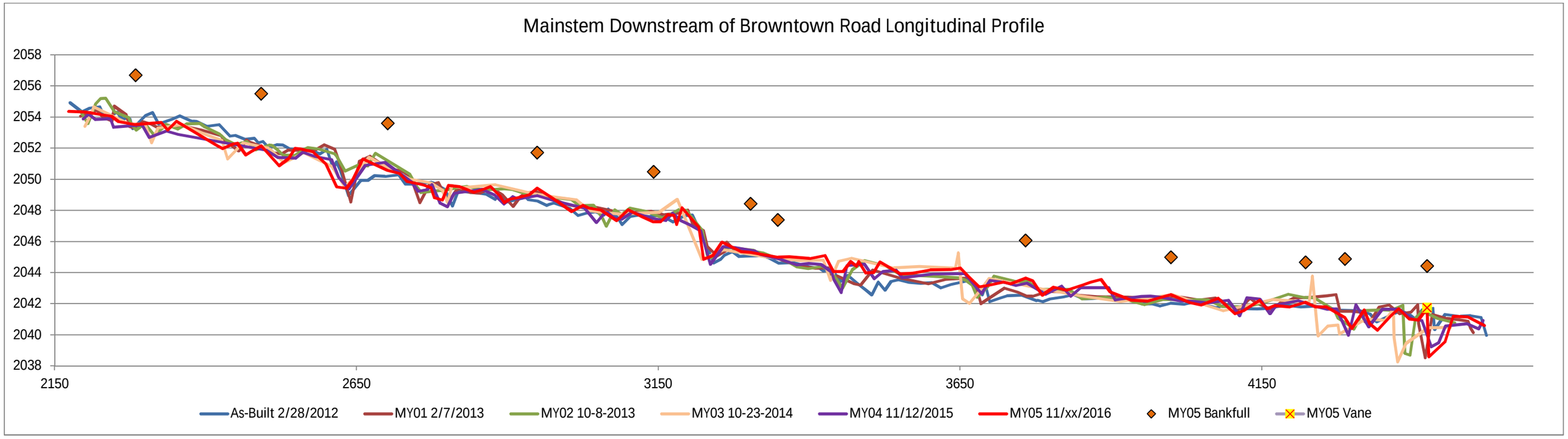
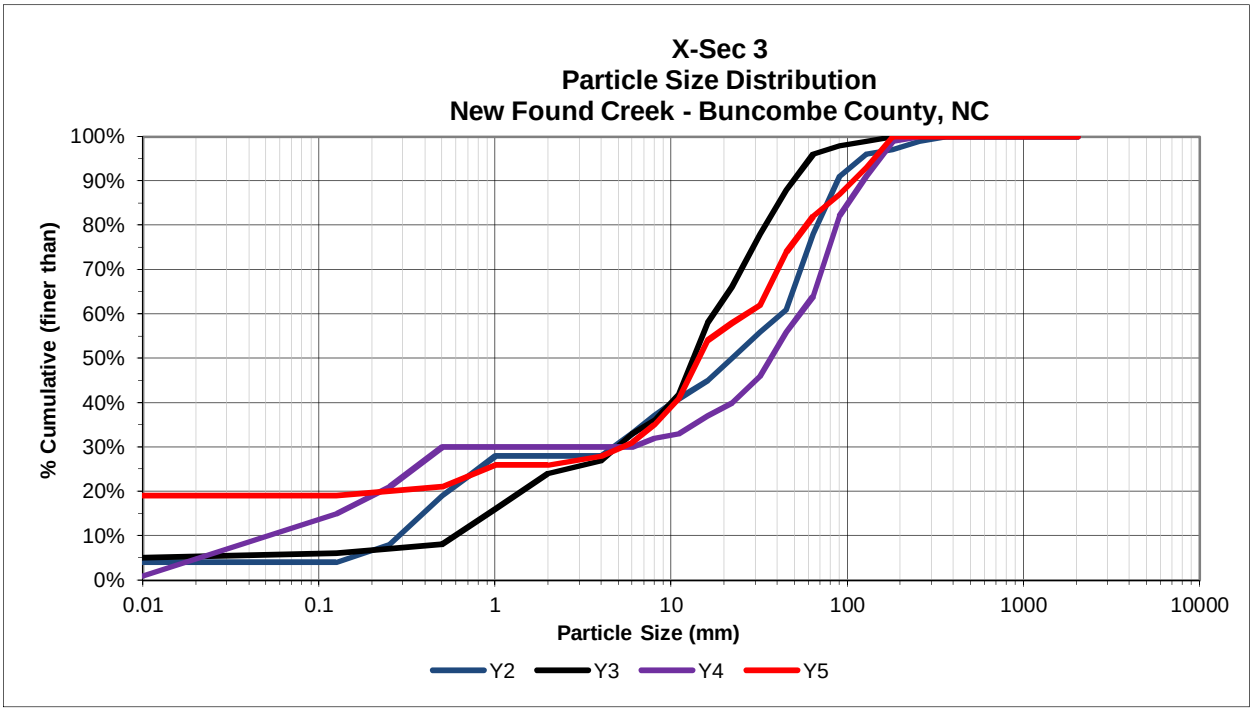
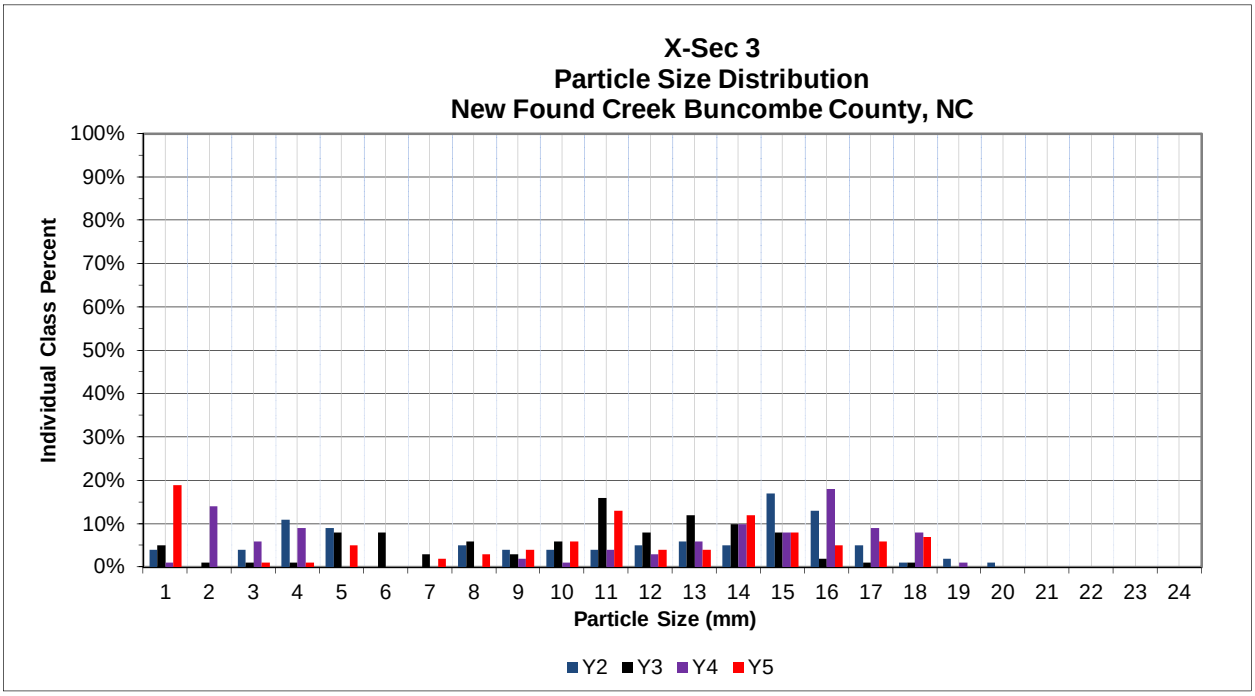


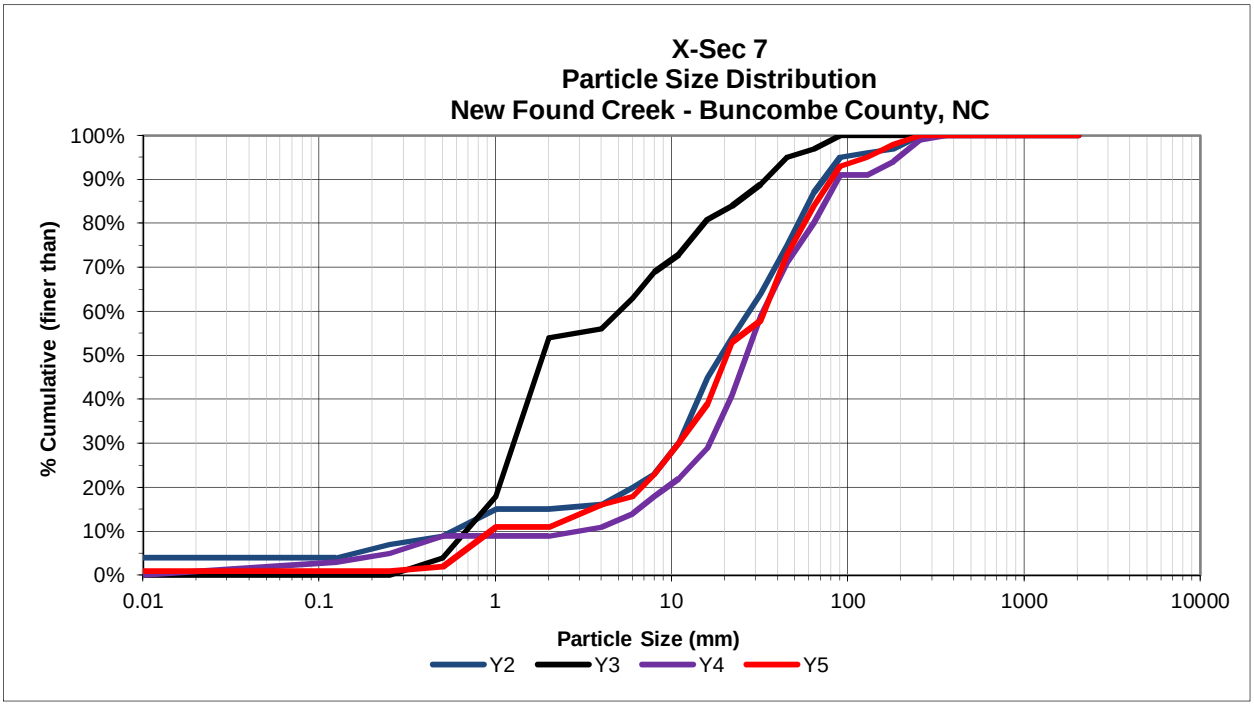
Figure 21: Pebble Count Plot – Mainstem Upstream of Browntown Road (Riffle Cross Section 3)

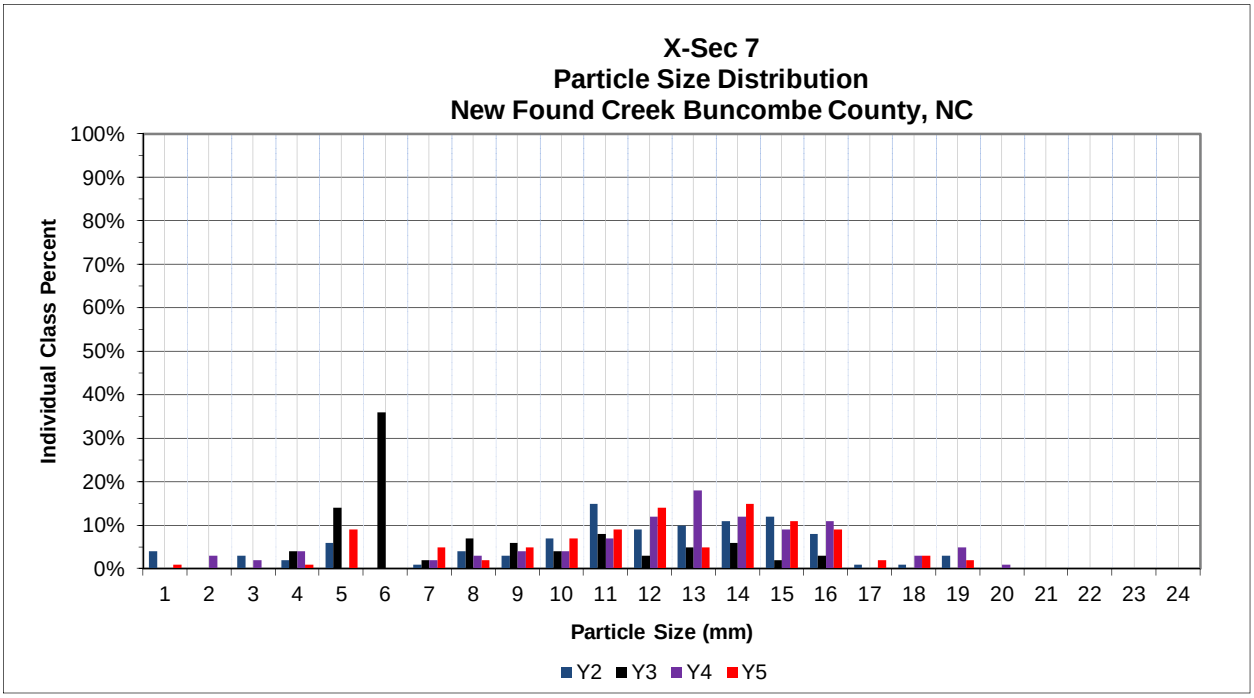




Summary Data	
D50	14.5
D84	74
D95	143

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





Summary Data	
D50	21.2
D84	64
D95	128

Table 8a: Baseline Stream Data Summary – Tributary 3

Newfound Creek Stream Restoration DMS Project Number 92497 Tributary 3 (1060 feet)																									
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1	2.9	4.0	6.9	2.4	**5**	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1**							
Profile																									
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						
Pattern																									
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						
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2					1.3												1.3								
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2					53.4												27.8								
Additional Reach Parameters																									
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)					**0.024**	**0.0625**	**0.023**	
[3]Bankfull Floodplain Area (acres)								
[4]% of Reach with Eroding Banks					100	0		
Channel Stability or Habitat Metric					Moderate BEHI	Low-Very Low BEHI		
Biological or Other								

Table 8b: Baseline Stream Data Summary – Tributary 4

Newfound Creek Stream Restoration/ DMS Project Number 92497(1590 feet)																									
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1.9	2.5	2.5	3.1	--	**3**	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1**							
Profile																									
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						
Pattern																									
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						
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					1.6												1.4								
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)						
[4]% 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 8c: Baseline Stream Data Summary – Tributary 5

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 5 (675 feet)																										
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1.0	1.3	1.6	2.1	0.5	6	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1.0**							
Profile																										
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						
Pattern																										
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						
Transport parameters																										
Reach Shear Stress (competency) lb/f^2					3.4												3.5								
Max part size (mm) mobilized at bankfull					287.6												279.1								
Stream Power (transport capacity) W/m^2					232												206								
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	
[3]Bankfull Floodplain Area (acres)						
[4]% 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 8d: Baseline Stream Data Summary – Tributary 6

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 6 (600 feet)																									
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					2.0	2.1	2.1	2.2	0.1	3	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1.0**							
Profile																									
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						
Pattern																									
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						
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					2.2												2.15								
Max part size (mm) mobilized at bankfull					177.3												173.1								
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)								
[4]% of Reach with Eroding Banks					50	0		
Channel Stability or Habitat Metric					Low to Moderate BEHI	Low-Very Low BEHI		
Biological or Other								

Table 8e: Baseline Stream Data Summary – Tributary 7

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 7 (400 feet)																										
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1.0	1.6	1.9	2.8		3	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1.0**							
Profile																										
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							
Pattern																										
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							
Transport parameters																										
Reach Shear Stress (competency) lb/f^2					1.3												1.52									
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)						
[4]% 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 8f: Baseline Stream Data Summary – Tributary 8

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 8 (680 feet)																										
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1.4	2.4	2.7	3.9	1.1	4	**0.8**	1.0	**1.0**	**1.2**	--	**2**		**1.0**							
Profile																										
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						
Pattern																										
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						
Transport parameters																										
Reach Shear Stress (competency) lb/f^2					1.6												1.4								
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)						
[4]% of Reach with Eroding Banks			85%	0		
Channel Stability or Habitat Metric			Low to High BEHI	Low-Very Low BEHI		
Biological or Other						

Table 8g: Baseline Stream Data Summary – Mainstem Upstream of Browntown Road

Newfound Creek Stream Restoration / DMS Project Number 92497 Mainstem Upstream of Browntown Road (2000 feet)																									
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					1.0	1.3	1.3	1.5	0.2	5	**0.9**	1.0	1.0	**1.1**		**2**		**1.0**							
Profile																									
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						
Pattern																									
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						
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					1												1.4								
Max part size (mm) mobilized at bankfull					78.0												110.7								
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)						
[4]% of Reach with Eroding Banks			90%	0		
Channel Stability or Habitat Metric			Moderate BEHI	Low BEHI		
Biological or Other						

Table 8h: Baseline Stream Data Summary – Mainstem Downstream of Browntown Road

Newfound Creek Stream Restoration / DMS Project Number 92497 Mainstem Downstream of Browntown Road (2400 feet)																									
Parameter	**Gauge[2]**	**Regional Curve**			**Pre-Existing Condition**						**Reference Reach(es) Data**						**Design**			**Monitoring Baseline**					
Dimension		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	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							
[1]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^2)				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							
[1]Bank Height Ratio					0.7	0.8	0.8	0.8		2	0.9	1.0	1.0	1.1		2		1.0							
Profile																									
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						
Pattern																									
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						
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					0.5												1								
Max part size (mm) mobilized at bankfull					37.9												78.0								
Stream Power (transport capacity) W/m^2					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	
[3]Bankfull Floodplain Area (acres)						
[4]% of Reach with Eroding Banks			90%	0		
Channel Stability or Habitat Metric			Moderate to High BEHI	Low to Moderate BEHI		
Biological or Other						

Table 9a: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 3

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

Table 9b: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 4

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

Table 9c: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 5

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

Table 9d: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 6

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

Table 9e: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 7

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

Table 9f: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 8

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

Table 9g: 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 Mainstem above Browntown Road (2000 feet)																												
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[1]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		
[1]SC% / Sa% / G% / C% / B% / Be%	1	14	68	15	0	2		1	14	68	15	0	2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	2.5	17	28	63	97	98	75	2.5	17	28	63	97	98	75														
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10										100															100		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0											100														100		

Table 9h: 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 Mainstem below Browntown Road (2400 feet)																												
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[1]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		
[1]SC% / Sa% / G% / C% / B% / Be%	0	13	58	23	0	6		0	13	58	23	0	6															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	6.7	20	30	84	120	80	75	6.7	20	30	84	120	80	75														
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10		50	50								100														100		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0			50	50							100														100		

Table 7a: Monitoring Data – Dimensional Morphology Summary – Tributary 3

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	2088.37			2085.73	2085.73	2085.73	2085.73	2085.73			2071.45	2071.45	2071.45	2071.45	2071.45			2070.28	2070.28	2070.28	2070.28	2070.28	
Bankfull Width (ft)		7.8	5.2	7.1	7.7	7.8			9.1	9	7.8	9.8	9.1			7.9	6.4	0.6	9.2	4.2			10.5	9.7	8.6	11.6	9.8	
Floodprone Width (ft)		13.5	10	10.8	11.9	13.1			14.6	14.9	14.9	14.0	13.6			14	14	--	13.6	13.6			37.9	36.6	34.2	100	31.1	
Bankfull Mean Depth (ft)		0.5	0.5	0.5	0.7	0.7			0.8	0.8	0.7	0.9	0.8			0.6	0.3	0	0.4	0.1			0.7	0.6	0.6	0.9	0.6	
Bankfull Max Depth (ft)		1.2	0.9	1	1.2	1.2			1.3	1.4	1	1.6	1.3			1.0	0.6	0	0.7	0.2			1.1	1	1.1	1.7	0.9	
Bankfull Cross Sectional Area (ft^2)		4.0	2.4	3.3	5.5	5.4			7.4	7.1	5.1	8.7	7.4			4.6	2.2	0	4.1	0.4			7.4	6.3	5	10.3	6.2	
Bankfull Width/Depth Ratio		15.2	11.4	15.2	10.9	11.5			11.3	11.5	12	11.2	11.1			13.6	18.9	132.5	20.9	45.9			14.7	15	14.7	13.1	15.7	
Bankfull Entrenchment Ratio		1.7	1.9	1.5	1.5	1.7			1.6	1.7	1.9	1.4	1.5			1.8	2.2	--	1.5	3.2			3.6	3.8	4.0	8.6	3.2	
Bankfull Bank Height Ratio		1.0	0.8	2.4	0.9	1.0			1.0	0.6	0.4	0.3	0.4			1.0	0.9	--	0.9	0.5			1.0	0.8	0.6	1.2	2.1	
Cross Sectional Area between end pins (ft^2)		81.7	77.9	75.8	66.7	78.5			100.9	79.1	72.4	72.1	68.0			14.0	10.3	7.9	12.1	17.5			12.9	12.1	11	15.9	28.2	
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 10b: Monitoring Data – Dimensional Morphology Summary – Tributary 4

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	2119.25			2117.97	2117.97	2117.97	2117.97	2117.97			2073.23*	2071.00*	2071.00	2071.00	2017.00			2067.08	2067.08	2067.08	2067.08	2067.08	
Bankfull Width (ft)		7.0	6.8	6.7	8.4	5.3			7.3	6.7	7.1	7.2	4.3			26.5	11.5	13.6	14.4	13.0			14.3	15.5	15.8	21.2	18.7	
Floodprone Width (ft)		20.5	17.2	15.6	17.4	18.2			17.6	14.7	16.5	16.0	15.5				--	--	25.5	19.8			100.0	100.0	100.0	100.0	100.0	
Bankfull Mean Depth (ft)		0.6	0.4	0.4	0.4	0.3			0.6	0.6	0.5	0.5	0.4			2.2	0.9	0.8	1.0	0.8			1.0	0.7	0.6	0.7	0.7	
Bankfull Max Depth (ft)		1.0	1.0	0.8	0.7	0.6			0.9	1.0	0.9	0.8	0.8			4.2	1.5	1.2	1.9	1.2			1.7	1.5	1.3	1.9	1.9	
Bankfull Cross Sectional Area (ft^2)		3.7	2.8	2.6	3.2	1.8			4.2	3.8	3.3	3.8	1.9			58.4	10.0	11.1	14.8	10.2			13.7	11.0	9.7	14.9	13.5	
Bankfull Width/Depth Ratio		12.6	16.7	17.3	22.2	15.5			12.5	11.6	15.3	13.8	10.0			12.0	13.2	16.7	14.0	16.5			14.8	22.0	25.8	30.2	26.0	
Bankfull Entrenchment Ratio		2.9	2.5	2.3	2.1	3.4			2.4	2.2	2.3	2.2	3.6				--	--	1.8	1.5			7.0	6.4	6.3	4.7	5.3	
Bankfull Bank Height Ratio		1.0	1.3	1.0	1.0	1.4			1.0	1.2	1.2	1.1	1.2			1.0	1.9	2.5	0.5	1.0			1.0	1.0	1.0	1.0	1.0	
Cross Sectional Area between end pins (ft^2)		82.8	79.1	76.0	90.6	82.4			109.8	101.4	105.8	100.0	99.9			64.8	61.8	67.0	67.4	62.8			20.6	22.4	18.5	21.2	23.0	
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 10c: Monitoring Data – Dimensional Morphology Summary – Tributary 5

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	2081.68			2076.82	2076.82	2076.82	2076.82	2076.82			2066.38	2066.38	2066.38	2066.38	NA	
Bankfull Width (ft)	--	7.6	6.7	6.9	8.4	8.7			7.9	6.8	8.9	9.4	9.3			5.1	5.1	5.7	5.2	NA	
Floodprone Width (ft)	--	18.3	16.5	15.2	16.9	18.3			24.0	24.0	24.0	24.0	35.0			14.0	9.3	10.1	9.2	NA	
Bankfull Mean Depth (ft)	--	0.6	0.7	0.6	0.6	0.6			0.6	0.8	0.8	0.8	0.8			0.7	0.5	0.4	0.3	NA	
Bankfull Max Depth (ft)	--	1.2	1.3	1.1	1.1	1.2			1.3	1.6	1.6	1.7	1.6			1.2	1.0	0.7	0.6	NA	
Bankfull Cross Sectional Area (ft^2)	--	5.0	4.7	4.1	5.2	5.5			5.2	5.5	6.9	7.4	7.7			3.6	2.8	2.0	1.6	NA	
Bankfull Width/Depth Ratio	--	11.8	9.7	11.9	13.3	13.8			12.3	8.3	11.5	11.9	11.2			7.2	9.3	16.1	16.8	NA	
Bankfull Entrenchment Ratio	--	2.4	2.4	2.2	2.0	2.1				3.5	2.7	2.6	2.4			2.7	1.8	1.8	1.8	NA	
Bankfull Bank Height Ratio	--	1.0	1.3	1.0	1.0	1.0			1.0	1.3	1.0	1.1	1.0			1.0	2.3	1.0	1.0	NA	
Cross Sectional Area between end pins (ft^2)	--	71.6	106.9	70.6	72.4	70.7			15.0	17.6	18.4	23.7	24.3			56.8	48.0	55.1	53.8	NA	
d50 (mm)	--	Si/Sa	--	--	--	--			Si/Sa	--	--	--	--			Si/Sa	--	--	--	--	

Table 10d: Monitoring Data – Dimensional Morphology Summary – Tributary 6

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	--	2064.10	2064.10	2064.10	2064.10	2064.10			2062.01	2062.01	2062.01	2062.01	2062.01	
Bankfull Width (ft)	--	14.8	16.2	14.5	18.4	15.8			19.6	22	21.6	20.2	20.6	
Floodprone Width (ft)	--	38.0	36+	38	100.0	100.0			100.0	100	100	100.0	100.0	
Bankfull Mean Depth (ft)	--	1.1	1	1	1.2	1.2			1.6	1.5	1.2	1.4	1.5	
Bankfull Max Depth (ft)	--	2.3	2	2.2	2.5	2.7			3.2	3	2.9	2.8	3.1	
Bankfull Cross Sectional Area (ft^2)	--	15.7	16.6	14.2	22.4	18.7			32.2	32.5	26.9	28.7	30.6	
Bankfull Width/Depth Ratio	--	14.0	15.7	14.7	15.1	13.4			11.9	14.9	17.4	14.2	13.9	
Bankfull Entrenchment Ratio	--	2.6	2.3	2.6	5.4	6.3			5.1	4.5	4.6	4.9	4.9	
Bankfull Bank Height Ratio	--	1.0	1	1	0.9	1.0			1.0	1	1	1.1	1.1	
Cross Sectional Area between end pins (ft^2)	--	40.7	41.5	42.5	44.1	46.6			44.9	56	34.9	37.3	37.1	
d50 (mm)	--	Si/Sa	--	--	--	--			Si/Sa	--	--	--	--	

Table 10e: Monitoring Data – Dimensional Morphology Summary – Tributary 7

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	2110.39			2107.51	2107.51	2107.51	2107.51	2107.51			2104.37	2104.37	2104.37	2104.37	2104.37	
Bankfull Width (ft)	--	8.6	6.5	7.3	9.5	9.1			9.5	7	9.2	11.6	10.0			8.2	2.9	1.9	14.3	7.4	
Floodprone Width (ft)	--	15.2	14	12.4	16.3	15.3				--	--	28.0	21.0			24.2	24.3	3.8	30.0	35.0	
Bankfull Mean Depth (ft)	--	0.6	0.4	0.4	0.6	0.5			0.9	0.6	0.5	0.8	0.6			0.2	0.4	0	0.3	0.2	
Bankfull Max Depth (ft)	--	0.9	0.8	0.6	1.0	1.0			1.5	1.2	1.1	1.3	1.1			0.5	0.5	0	0.6	0.6	
Bankfull Cross Sectional Area (ft^2)	--	5.0	2.6	2.6	5.5	4.4			8.1	3.9	4.8	8.9	5.8			1.8	1	0	3.7	1.2	
Bankfull Width/Depth Ratio	--	14.7	16.4	20.6	16.3	19.1			11.2	12.5	17.7	15.3	17.1			36.6	8.2	77.8	54.6	44.0	
Bankfull Entrenchment Ratio	--	1.8	2.1	1.7	1.7	1.7				--	--	2.4	2.1			3.0	8.5	2	2.1	4.7	
Bankfull Bank Height Ratio	--	1.0	0.8	1.4	1.1	0.7			1.0	1	1	1.1	1.1			1.0	0.8	28.4	0.6	1.1	
Cross Sectional Area between end pins (ft^2)	--	41.1	40.8	35.2	41.0	40.8			49.6	46.7	44.5	49.8	46.8			7.7	8.7	3.4	10.2	6.3	
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 10f: Monitoring Data – Dimensional Morphology Summary – Tributary 8

Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 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	2087.13			2084.83	2084.83	2084.83	2084.83	2084.83			2077.65	2077.65	2077.65	2077.65	2077.65	
Bankfull Width (ft)	--	8.0	8.8	7.8	7.4	6.2			11.4	15.5	12.8	13.1	13.4			16.0	14.8	15.3	18.9	16.4	
Floodprone Width (ft)	--	18.9	19.5	17.2	9.3	13.8			40.4+	40.2+	40.4	50.0	50.0			27.3	29	24.8	28.4	25.8	
Bankfull Mean Depth (ft)	--	0.3	0.3	0.3	0.1	0.3			1.1	0.7	0.9	0.8	0.9			0.9	0.9	0.8	1.0	0.9	
Bankfull Max Depth (ft)	--	0.8	0.7	0.7	0.2	0.5			2.3	1.6	1.6	1.5	1.5			1.6	1.8	1.3	1.7	1.3	
Bankfull Cross Sectional Area (ft^2)	--	2.4	2.3	2.4	0.7	1.8			12.9	11.6	11	11.0	13.4			13.9	12.6	11.9	19.7	14.2	
Bankfull Width/Depth Ratio	--	26.3	34.2	25.1	83.0	21.5			10.1	20.8	15	15.6	14.5			18.3	17.3	19.6	18.1	18.9	
Bankfull Entrenchment Ratio	--	2.4	2.2	2.2	1.3	2.2			3.5	2.6	3.1	3.8	3.7			1.7	2.0	1.6	1.5	1.6	
Bankfull Bank Height Ratio	--	1.0	1	1	1.0	1.3			1.0	1	1	1.1	1.2			1.0	0.5	0.9	0.4	1.3	
Cross Sectional Area between end pins (ft^2)	--	24.2	20.8	24.4	16.4	23.2			37.3	37.7	32.8	26.5	28.1			83.9	80.4	87.7	89.9	77.6	
d50 (mm)	--	Si/Sa	--	--	--	--			Si/Sa	--	--	--	--			Si/Sa	--	--	--	--	

Table 10g: Monitoring Data – Dimensional Morphology Summary – Mainstem

Newfound Creek Stream Restoration / DMS Project Number 92497 Mainstem (4400 feet) CX #1 - 4 are above Browntown Road																					
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation[1]	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	2071.66			2067.07	2067.07	2067.07	2067.07	2067.07			2063.50	2063.50	2063.50	2063.50	2063.50	
Bankfull Width (ft)		39.0	28.6	24	19.0	12.8			19.2	26.8	24.1	26.1	17.3			16.3	16.1	15.3	14.0	13.1	
Floodprone Width (ft)		80.6	80.6	83.6	90.0	90.0			66.1	69.4	68.8	70.0	64.3			48.3	48.6	46.4	45.0	45.1	
Bankfull Mean Depth (ft)		0.8	0.9	1	1.1	1.7			1.7	1.3	1.4	1.2	1.6			1.4	1.2	1.2	1.2	1.2	
Bankfull Max Depth (ft)		2.2	2.0	2.7	3.1	2.7			2.6	3.0	2.9	3.0	2.6			2.2	2.5	2.3	2.2	2.2	
Bankfull Cross Sectional Area (ft^2)		29.7	25.9	24	20.5	21.8			32.0	36.1	32.6	32.4	27.5			23.0	19.2	19	17.5	17.6	
Bankfull Width/Depth Ratio		51.2	31.5	24	17.6	7.5			11.5	19.9	17.8	21.0	10.8			11.6	13.5	12.4	11.2	9.8	
Bankfull Entrenchment Ratio		2.1	2.8	3.5	4.7	7.0			3.4	2.6	2.9	2.7	4.1			3.0	3.0	3	3.2	3.4	
Bankfull Bank Height Ratio		1.0	0.8	0.8	1.2	1.2			1.0	0.7	0.8	0.9	1.0			1.0	1.2	1.4	1.0	1.0	
Cross Sectional Area between end pins (ft^2)		198.1	195.0	166	170.4	157.2			186.3	198.3	181.2	179.0	174.7			171.2	169.3	153.1	147.9	145.9	
d50 (mm)		--	--	--	--	--			24	--	--	--	--			--	22	13	37	14.5	
	Cross Section 4 (Pool)							Cross Section 5 (Riffle)							Cross Section 6 (Riffle)						
Based on fixed baseline bankfull elevation[1]	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		2059.81	2059.81	2059.81	2059.81	2059.81			2056.59	2056.59	2056.59	2056.59	2056.59			2045.62	2045.62	2045.62	2045.62	2045.62	
Bankfull Width (ft)		22.4	18.2	15.7	15.4	15.7			18.8	19.3	20.2	19.7	19.2			35.1	20.1	17.7	15.3	16.5	
Floodprone Width (ft)		35.9	35.0	35	38.4	37.6			175.0	200+	200+	200+	200+			75.6	57.2	67.4	50.7	51.9	
Bankfull Mean Depth (ft)		1.2	1.2	1.3	1.4	1.4			2.1	2.2	2.2	2.2	2.4			1.3	1.5	1.6	1.8	1.7	
Bankfull Max Depth (ft)		1.8	1.8	1.9	2.0	2.2			2.9	3.2	3.1	3.1	3.3			3.1	2.7	2.8	2.3	2.3	
Bankfull Cross Sectional Area (ft^2)		28.0	22.0	20	21.4	22.2			38.8	43.1	43.7	44.1	45.3			44.4	30.3	28.2	27.8	27.9	
Bankfull Width/Depth Ratio		17.9	15.0	12.3	11.1	11.1			9.1	8.7	9.3	8.8	8.1			27.7	13.3	11.1	8.4	9.7	
Bankfull Entrenchment Ratio		1.6	1.9	2.2	2.5	2.4			9.3	10.3	9.9	10.2	10.4			2.2	2.8	3.8	3.3	3.1	
Bankfull Bank Height Ratio		1.0	1.3	1.2	1.2	1.3			1.0	1.2	1.1	1	1			1.0	0.9	1.1	1.2	1.2	
Cross Sectional Area between end pins (ft^2)		153.4	143.4	132.8	133.2	128.2			72.0	73.4	78.5	71.9	78.2			191.8	169.1	160.2	164.2	161.6	
d50 (mm)		--	--	--	--	--			--	--	--	--	--			--	--	--	--	--	

* 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 10g: Monitoring Data – Dimensional Morphology Summary – Mainstem (continued)

	Cross Section 7 (Riffle)							Cross Section 8 (Pool)							Cross Section 9 (Pool)						
Based on fixed baseline bankfull elevation[1]	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		2047.72	2047.72	2047.72	2047.72	2047.72			2045.62	2045.62	2045.62	2045.62	2045.62			2044.08	2044.08	2044.08	2044.08	2044.80	
Bankfull Width (ft)		23.4	19.3	17.1	16.5	15.8			35.1	20.1	17.7	15.3	16.5			20.1	18.1	17.5	17.7	15.7	
Floodprone Width (ft)		49.8	46.9	46.9	50.0	48.8			75.6	57.2	67.4	50.7	51.9			51.2	47.3	75	69	53	
Bankfull Mean Depth (ft)		1.3	1.4	1.4	1.5	1.5			1.3	1.5	1.6	1.8	1.7			1.9	1.6	2.2	1.7	2.1	
Bankfull Max Depth (ft)		2.5	2.4	2.5	2.7	2.4			3.1	2.7	2.8	2.3	2.3			2.6	2.5	3.5	2.9	3	
Bankfull Cross Sectional Area (ft^2)		31.4	27.4	24.4	25.2	24.3			44.4	30.3	28.2	27.8	27.9			37.2	29.6	38.8	29.7	33.3	
Bankfull Width/Depth Ratio		17.4	13.6	12	10.8	10.3			27.7	13.3	11.1	8.4	9.7			10.8	11.1	7.9	10.5	7.4	
Bankfull Entrenchment Ratio		2.1	2.4	2.7	3.0	3.1			2.2	2.8	3.8	3.3	3.1			2.5	2.6	4.3	3.9	3.3	
Bankfull Bank Height Ratio		1.0	0.9	1.1	0.7	1.0			1.0	0.9	1.1	1.2	1.2			1.0	1	1.5	1.1	1.1	
Cross Sectional Area between end pins (ft^2)		203.2	183.3	181.6	175.3	179.0			191.8	169.1	160.2	164.2	161.6			159.2	150.9	150.9	132.6	135	
d50 (mm)		23	19	1.9	27.3	21.2			--	--	--	--	--			--	--	--	--	--	

Table 11a: Monitoring Data – Stream Reach Data Summary – Tributary 3

Parameter	Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 3 (1060 feet)																																	
	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
							Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension																																		
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	7.8	8.8	--	9.8	--	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	13.1	22.1	--	31.1	--	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	0.6	0.7	--	0.7	--	2
[1]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	0.9	1.1	--	1.2	--	2
Bankfull Cross Sectional Area(ft^2)							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	5.4	5.8	--	6.2	--	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	11.5	13.6	--	15.7	--	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	1.7	2.4	--	3.2	--	2
[1]Bank Height Ratio							1.0	1.0	1.0	1.0	--	2	0.7	0.8	--	0.9	--	2	0.6	1.4	--	2.3	--	2	0.9	1.1	--	1.2	--	2	1.0	1.6	--	2.1	--	2
Profile																																		
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	13	29.2	--	111	--	9
Riffle Slope (ft/ft)							0.000	0.021	0.048	0.095	--	19	--	--	--	--	--	--	--	--	--	--	--	-	0.014	0.038	0.05	0.078	--	20	0.0 01	0.022	--	0.03 5	--	9
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	16. 7	25.8	--	32.5	--	5
Pool Max depth (ft)							1.1	1.2	1.2	1.2	--	2	--	--	--	--	--	--	--	--	--	--	--	-	1	1.1	1.15	1.3	--	9	1	1.1	--	1.3	--	5
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	60	136	--	299	--	5
Pattern																																		
Channel Beltwidth (ft)																																		
Radius of Curvature (ft)																																		
Rc:Bankfull width (ft/ft)																																		
Meander Wavelength (ft)																																		
Meander Width Ratio																																		
Additional Reach Parameters																																		
Rosgen Classification							B5 (above Browntown)/C5 (below)						B5 (above Browntown)/C5 (below)												B5 (above Browntown)/C5 (below)						B5 (above Browntown)/C5 (below)					
Channel Thalweg length (ft)							1204						1128												1128						1128					
Sinuosity (ft)							1.06						1.04												1.06						1.06					
Water Surface Slope (Channel)(ft/ft)							0.023						0.025												0.023						0.023					
BF slope (ft/ft)							0.023						0.023												0.023						0.023					
[3]Ri% / Ru% / P% / G% / S%							60	5	30	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%																																		
[3]d16 / d35 / d50 / d84 / d95 /																																		
[2]% of Reach with Eroding Banks							0						0						0						0						0					
Channel Stability or Habitat Metric																																		
Biological or Other																																		

* Profile data were not collected in MY3

Table 11b: Monitoring Data – Stream Reach Data Summary – Tributary 4

Parameter	MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension - Riffle only																														
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	4.3	4.8	--	5.3	--	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	--	2	16	16.7	--	17.4	--	2	15.5	16.9	--	18.2	--	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	0.3	0.4	--	0.4	--	2
[1]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	0.6	0.7	--	0.8	--	2
Bankfull Cross Sectional Area (ft^2)	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	1.8	1.9	--	1.9	--	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	10	12.8	--	15.5	--	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	3.4	3.5	--	3.6	--	2
[1]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	1.2	1.3	--	1.4	--	2
Profile																														
Riffle Length (ft)	4.8	78	214	423.1		17	3.8	13.5	--	35.1	--	14							19	67	--	171	--	15	11	42	--	133	--	10
Riffle Slope (ft/ft)	0.000	0.027	0.049	0.097		17	--	--	--	--	--	14							0.014	0.051	--	0.126	--	15	0.015	0.060	--	0.180	--	10
Pool Length (ft)	4	14.3	35.05	66.1		22	5.3	17.0	--	34.8	--	6							19	30	--	49	--	9	17	40	--	50	--	6
Pool Max depth (ft)	4.2	4.2	4.2	4.2		1	1.5	1.5	--	1.5	--	2							1.5	2.2	--	4.2	--	9	1	1.4	--	1.9	--	6
Pool Spacing (ft)	13.4	81.1	229.9	446.3		22	87	351	--	477	--	6							57	207	--	461	--	9	20	62	--	455	--	6
Pattern																														
Channel Beltwidth (ft)																														
Radius of Curvature (ft)																														
Rc:Bankfull width (ft/ft)																														
Meander Wavelength (ft)																														
Meander Width Ratio																														
Additional Reach Parameters																														
Rosgen Classification	C5						C5												C5						C5					
Channel Thalweg length (ft)	1911.00						1826.0												1826.00						1826.00					
Sinuosity (ft)	1.27						1.21												1.21						1.21					
Water Surface Slope (Channel) (ft/ft)	0.037						0.039												0.037						0.037					
BF slope (ft/ft)	0.037						0.039												0.037						0.037					
[3]Ri% / Ru% / P% / G% / S%	55	5	25	5	10																									
[3]SC% / Sa% / G% / C% / B% / Be%																														
[3]d16 / d35 / d50 / d84 / d95 /																														
[2]% of Reach with Eroding Banks	0						0						0						< 1%						< 1%					
Channel Stability or Habitat Metric																														
Biological or Other																														

* Profile data were not collected in MY3

Table 11c: Monitoring Data – Stream Reach Data Summary – Tributary 5

	Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 5 (675 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3***						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																				
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	--	8.7	--	--	--	1
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	--	18.3	--	--	--	1
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	--	0.6	--	--	--	1
[1]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	--	1.2	--	--	--	1
Bankfull Cross Sectional Area (ft^2)							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	--	5.5	--	--	--	1
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	--	13.8	--	--	--	1
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	--	2.1	--	--	--	1
[1]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	--	1.0	--	--	--	1
Profile																																				
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	9	14	--	24	--	8
Riffle Slope (ft/ft)							0.026	0.079	0.093	0.160		5	--	--	--	--	--	5							0.019	0.034	0.05	0.075	--	11	0.026	0.056	--	0.088	--	8
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	5.2	9	--	12	--	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	1.2	1.4	--	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	11	68	--	166	--	5
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification							E4b						E4b												E4b						E4b					
Channel Thalweg length (ft)							800.6						624.0												675						675					
Sinuosity (ft)							1.36						1.05												1.05						1.05					
Water Surface Slope (Channel) (ft/ft)							0.044						0.059												0.059						0.059					
BF slope (ft/ft)							0.044						0.059												0.059						0.059					
[3]Ri% / Ru% / P% / G% / S%							45	5	25	5	20																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks							**0**						0						0						0						0					
Channel Stability or Habitat Metric																																				
Biological or Other																																				

* Profile data were not collected in MY3

Table 11d: Monitoring Data – Stream Reach Data Summary – Tributary 6

	Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 6 (600 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3***						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																		
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	--	15.8	--	--	--	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	--	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	--	1.2	--	--	--	1
[1]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	--	2.7	--	--	--	1
Bankfull Cross Sectional Area (ft^2)							15.7	15.7	15.7	15.7		1	16.6	16.6	--	16.6	--	1	--	14.2	--	--	--	1	--	22.4	--	--	--	1	--	18.7	--	--	--	1
Width/Depth Ratio							14	14.0	14.0	14		1	15.7	15.7	--	15.7	--	1	--	14.7	--	--	--	1	--	15.1	--	--	--	1	--	13.4	--	--	--	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	--	6.3	--	--	--	1
[1]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	--	1.0	--	--	--	1
Profile																																		
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	10	23.3	--	75	--	12
Riffle Slope (ft/ft)							0.018	0.040	0.1	0.086		8	--	--	--	--	--	6							0.002	0.042	0.05	0.099	--	12	0.002	0.039	--	0.086	--	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	7.8	14.4	--	24.5	--	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	2.2	2.8	--	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	12	36	--	69	--	10
Pattern																																		
Channel Beltwidth (ft)																																		
Radius of Curvature (ft)																																		
Rc:Bankfull width (ft/ft)																																		
Meander Wavelength (ft)																																		
Meander Width Ratio																																		
Additional Reach Parameters																																		
Rosgen Classification							C4b						C4b												C4b						C4b					
Channel Thalweg length (ft)							732						615.2												615						615					
Sinuosity (ft)							1.09						1.06												1.06						1.06					
Water Surface Slope (Channel) (ft/ft)							0.036						0.035												0.035						0.035					
BF slope (ft/ft)							0.036						0.035												0.035						0.035					
[3]Ri% / Ru% / P% / G% / S%							60	5	30	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%																																		
[3]d16 / d35 / d50 / d84 / d95 /																																		
[2]% of Reach with Eroding Banks							0						0						0						0						0					
Channel Stability or Habitat Metric																																		
Biological or Other																																		

* Profile data were not collected in MY3

Table 11e: Monitoring Data – Stream Reach Data Summary – Tributary 7

Parameter	Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 7 (400 feet)																																	
	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																				
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	7.4	8.3	--	9.1	--	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	15.3	25.2	--	35	--	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	0.2	0.4	--	0.5	--	2
[1]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	0.6	0.8	--	1	--	2
Bankfull Cross Sectional Area (ft^2)							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	1.2	2.8	--	4.4	--	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	19.1	31.6	--	44	--	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	1.7	3.2	--	4.7	--	2
[1]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	0.7	0.9	--	1.1	--	2
Profile																																				
Riffle Length (ft)							5.3	37.1	97.15	189		6	7.8	18.8	--	31.2	--	2							7.1	65	--	121	--	5	8	63	--	125	--	5
Riffle Slope (ft/ft)							0	0.033	0.047	0.093		6	0.038	0.050	--	0.070	--	2							0.016	0.062	--	0.167	--	5	0.015	0.058	--	0.176	--	5
Pool Length (ft)							3.6	21.5	39.25	74.9		5	6.5	9.2	--	11.8	--	2							3.6	39	--	74.9	--	2	3.5	37	--	72	--	2
Pool Max depth (ft)							1.5	1.5	1.5	1.5		1	1.2	1.2	--	1.2	--	1							1.3	1.3	--	1.3	--	1	1.1	1.1	--	1.1	--	1
Pool Spacing (ft)							23.4	98.7	111.9	200.3		5	123	123	--	123	--	2							--	--	--	--	--	--	--	--	--	--	--	--
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification							C5						C5												C5						C5					
Channel Thalweg length (ft)							579.5						374.5												381						381					
Sinuosity (ft)							1.59						1.1												1.02						1.02					
Water Surface Slope (Channel) (ft/ft)							0.026						0.039												0.039						0.039					
BF slope (ft/ft)							0.026						0.039												0.039						0.039					
[3]Ri% / Ru% / P% / G% / S%							70	5	20	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% 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 11f: Monitoring Data – Stream Reach Data Summary – Tributary 8

Parameter	Newfound Creek Stream Restoration / DMS Project Number 92497 Tributary 8 (680 feet)																																	
	Baseline						MY-1						MY-2						MY- 3*						MY- 4						MY- 5					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																				
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	6.2	9.8	--	13.4	--	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	13.8	31.9	--	50	--	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	0.3	0.6	--	0.9	--	2
[1]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	0.5	1.0	--	1.5	--	2
Bankfull Cross Sectional Area (ft^2)							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	1.8	7.6	--	13.4	--	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	14.5	18.0	--	21.5	--	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	2.2	3.0	--	3.7	--	2
[1]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	1.2	1.3	--	1.3	--	2
Profile																																				
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						
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification							C5						C5												C5						C5					
Channel Thalweg length (ft)							378.4						379.9												345						345					
Sinuosity (ft)							1.30						1.27												1.20						1.20					
Water Surface Slope (Channel) (ft/ft)							0.037						0.038												0.042						0.042					
BF slope (ft/ft)							0.037						0.038												0.042						0.042					
[3]Ri% / Ru% / P% / G% / S%							70	5	20	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks							0						0						0						0						0					
Channel Stability or Habitat Metric																																				
Biological or Other																																				

* Profile data were not collected in MY3

Table 11g: Monitoring Data – Stream Reach Data Summary – Mainstem Upstream of Browntown Road

	Newfound Creek Stream Restoration / DMS Project Number 92497 Mainstem Upstream of Browntown Road (2000 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																				
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	12.8	14.4	--	17.3	--	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	45.1	66.5	--	90	--	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	1.2	1.5	--	1.7	--	3
[1]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	2.2	2.5	--	2.7	--	3
Bankfull Cross Sectional Area (ft^2)							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	17.6	22.3	--	27.5	--	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	7.5	9.4	--	10.8	--	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	3.4	4.8	--	7	--	3
[1]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	1	1.1	--	1.2	--	3
Profile																																				
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	6	21	--	58	--	12*
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	0.009	0.033	--	0.069	--	12*
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	18	42	--	95	--	8*
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	2.8	3.6	--	4.4	--	14
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	39	123	--	296	--	14
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification							C4/1						C4/1						C4/1						C4/1						C4/1					
Channel Thalweg length (ft)							2586.5						2327						2398.4						2100						2100					
Sinuosity (ft)							1.36						1.2						1.3						1.2						1.2					
Water Surface Slope (Channel) (ft/ft)							0.0059						0.0069						.0064						0.0069						0.0069					
BF slope (ft/ft)							0.0059						0.0069						.0058						0.0069						0.0069					
[3]Ri% / Ru% / P% / G% / S%							60	5	30	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%													4%	24%	50%	21%	1%		5%	19%	72%	4%	0%													
[3]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		0.05	8	14.6	74	143	
[2]% of Reach with Eroding Banks																			10%						11%						4%					
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Table 11h: Monitoring Data – Stream Reach Data Summary – Mainstem Downstream of Browntown Road

	Newfound Creek Stream Restoration / DMS Project Number 92497 Mainstem Downstream of Browntown Road (2400 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Dimension																																				
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	15.8	17.4	--	19.2	--	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	48.8	96.9	--	145	--	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	1.5	1.9	--	2.4	--	3
[1]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	2.4	2.8	--	3.3	--	3
Bankfull Cross Sectional Area (ft^2)							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	24.3	34.2	--	45.3	--	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	8.1	9.1	--	10.3	--	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	3.1	7.3	--	10.4	--	3
[1]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	1	1.1	--	1.3	--	3
Profile																																				
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	34	67	--	117	--	6*
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	0.005	0.019	--	0.067	--	6*
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	24	28	--	56	--	9*
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	3.1	4.2	--	5.8	--	13*
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	40	138	--	320	--	13*
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification							C4/1						C4/1						C4/1						C4/1						C4/1					
Channel Thalweg length (ft)							2515.5						2244						2407.2						2400						2400					
Sinuosity (ft)							1.28						1.18						1.2						1.2						1.2					
Water Surface Slope (Channel) (ft/ft)							0.0056						0.0064						0.0057						0.0056						0.0056					
BF slope (ft/ft)							0.0056						0.0064						0.0067						0.0056						0.0056					
[3]Ri% / Ru% / P% / G% / S%							60	5	30	5	0																									
[3]SC% / Sa% / G% / C% / B% / Be%													4%	11%	72%	13%	0%		0%	54%	43%	3%	0%													
[3]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		4	13.9	21.1	64	128	
[2]% of Reach with Eroding Banks							93												11%						15%						8%					
Channel Stability or Habitat																																				
Biological or Other																																				

Appendix E: Hydrology Data

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Table 12: 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 MY3 report
10/17/14	Approx. December 15, 2013	Proximal USGS gauge resource – Ivy River	Figure 24 MY 3 report
5/13/2015	Unknown	On-site crest gauges Visual (Wrack lines)	
5/12/2016	Unknown	On-Site Crest Gauge	3002

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 MY3, MY4 and MY5 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 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.

The USGS gauge plots for MY5 (October 2015 to January 2017) are shown below (Figures 23 & 24). An estimate of the number of bankfull events between October 1, 2015 and November 1, 2016 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 (Pigeon River) when the discharge is about 10,000 cfs. A discharge of 14,200 cfs was recorded on December 24 and a discharge of 13,500 ws recorded on December 29 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. On December 2, 2015 the Ivy River peaked at 6,980 cfs.

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 were variable throughout the year with higher than normal rainfall in November and December 2015 and June and August of 2016, but lower than normal in March, September, and October, 2016.

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

Photo 3002 Crest gauge 1, May 2015

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

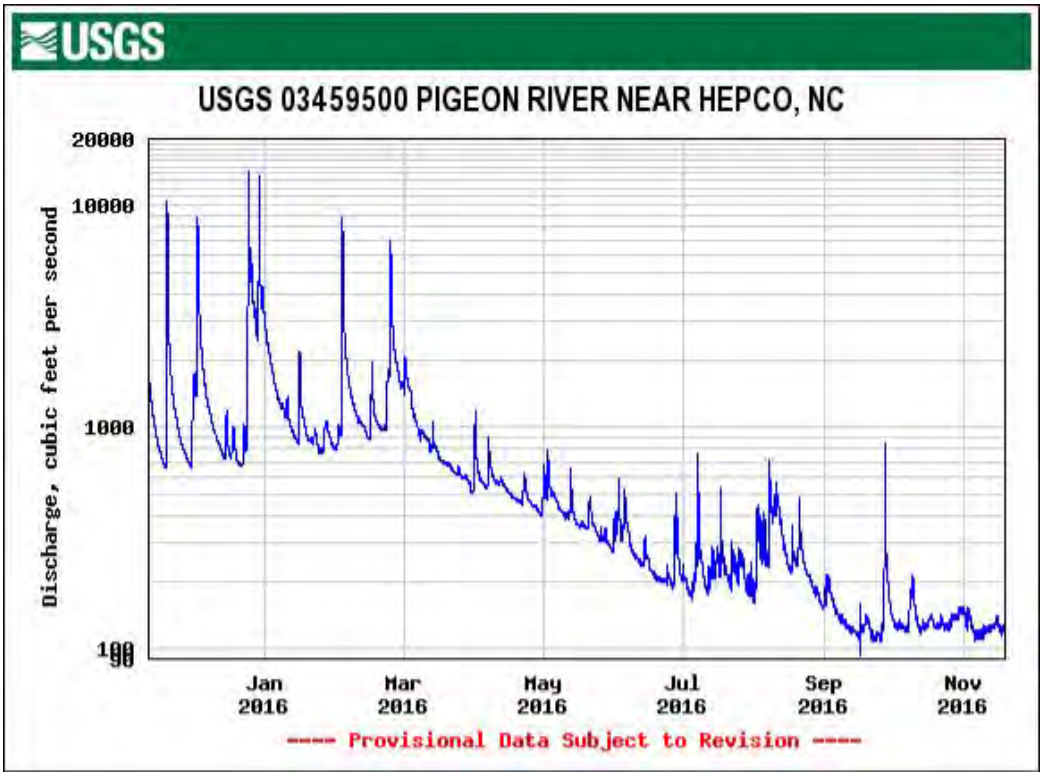

Figure 22: USGS Proximal Gauge Ivy River near Marshall, NC

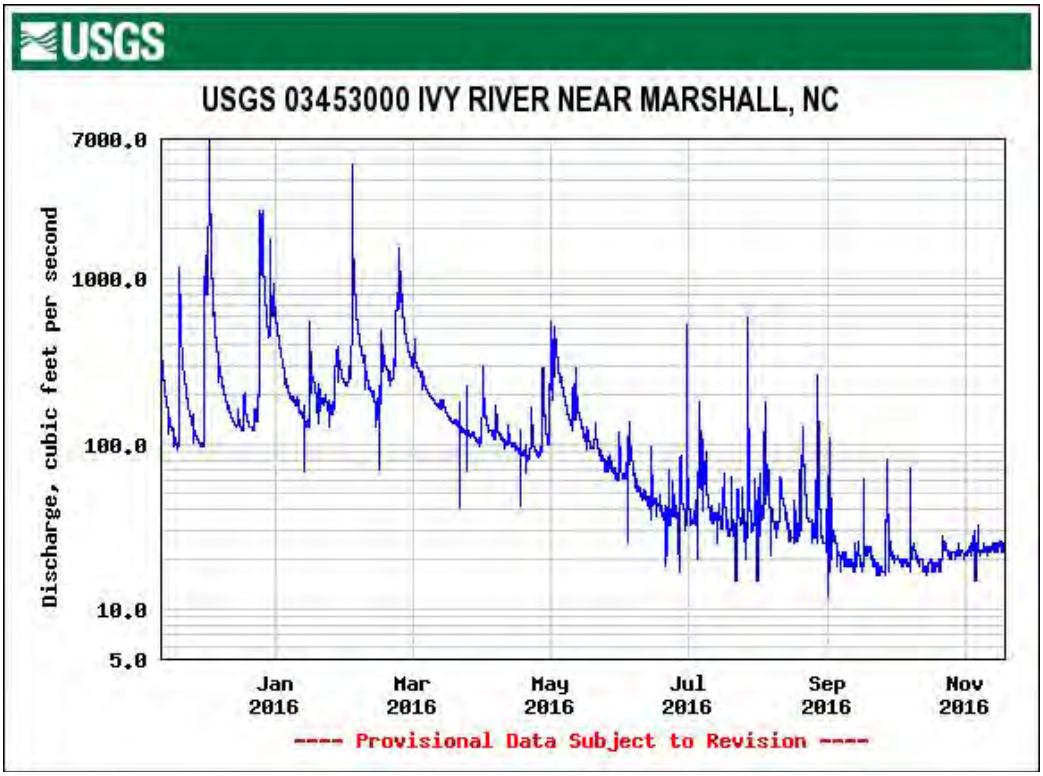

Figure 23: Newfound Creek 30-70 Percentile Graph for Rainfall in Past Year, Leicester, NC