Newfound Creek Stream Restoration
2013 Final Monitoring Report
Monitoring Year Two

Ecosystem Enhancement Program Project Number 92497

Submitted to:

NCDENR-Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Project Designed by:

URS Corporation – North Carolina
1600 Perimeter Park Drive, Suite 400
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Construction Complete: October 2011

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Ecosystem Enhancement PROGRAM

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Prepared by:

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December 2, 2013

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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 will provide grade control, enhance stability, promote efficient sediment transport, and produce/enhance in-stream habitat. A buffer was planted along the stream banks to help stabilize the banks. The buffer is also intended to enhance water quality through root filtration and shading, while also providing habitat for amphibians, reptiles, small mammals, and birds.

The goals of the project include:

- Reducing erosion from within the project study area.
- Restoring a channel that is able to properly transport watershed flows and sediment loads efficiently.
- Improving aquatic habitat.
- Enhancing wildlife habitat.
- Improving overall water quality.

The objectives of the proposed project include:

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

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

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

Tributaries 1 and 2 are 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.

2013 Monitoring Year (MY) 2 monitoring indicates that the planted woody vegetation is doing fair at the site. The site-wide average stem count is 434 stems/acre. Seven (50%) of the 14 planted plots are not meeting the success criteria of 320 stems/acre at MY3 (plots 1, 2, 4, 5, 6, 7, and 12). The streamside and floodplain zones remain in better health than upland areas. Tributaries with steep slopes continue to be the most problematic. Streamside survival (livestakes) appears to be the most successful. The banks and channels of some of the smaller tributaries have filled in with dense mats of vegetation, dominated by Juncus. This is the case within Tributary 4, upstream of Browntown Road, Tributary 7, and Tributary 8.

Chinese privet (*Ligustrum sinense*) was noted along Tributaries 4 and 5 during MY1. These populations are still present. Populations of multiflora rose (*Rosa multiflora*) were also noted during MY2 along Tributaries 4, 5, and 7. New occurrences of kudzu (*Pueraria lobata*) were noted at the top of the mainstem and on Tributary 4, at the crossing with Browntown Road, during MY2. These populations are small at this time, but should be monitored closely. The

presence and abundance of all invasive species will be monitored each year and any notable changes will be documented. The project easement is currently under contract for repeat invasives treatments extending through the Spring of 2015.

In MY2, the Newfound Creek Stream Restoration project is functioning reasonably well. The majority of the bed features on the mainstem appear stable; though there is some aggradation in the vicinity of the Browntown Road bridge. The channel is dominated by riffles and runs, with most of the well-developed pools associated with structures. A few of the structures upstream of Browntown Road have are now even with the channel bed are not maintaining pools. The structures are largely stable and do not appear to be causing erosion or scour. There are several areas of bank erosion, some of them severe, which have been noted for reassessment.

The six tributaries were all functioning well and appear very stable. The survey conditions in the tributaries varied greatly from MY1 (February 2013) to MY2 (October 2013) due to the active growing season in October. Many areas of the tributary channels were filled with vegetation, and defined riffle-pool sequences were absent or unclear. In some instances the thalweg location was not evident. These conditions persist after an exceptionally rainy year. While many bed features are missing as compared to the As-Built, the vegetation is a stabilizing factor and there is was no erosion or scour evident in the tributaries.

Overall, the site is doing well. The fences that were constructed to exclude cattle are all in good condition. One potential easement violation was observed, where an irrigation pipe was crossing the mainstem and had been staked in the center of the channel. The stake had collected a large amount of debris in the center of the channel which was deflecting flow into the banks.

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 NCEEP's website. All raw data supporting the tables and figures in the appendices are available from NCEEP 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). Photographs were taken at high resolution using a Nikkon Coolpix 8.0 megapixel digital camera. 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). URS' field morphology survey was conducted using a VRS Total Station and the data were

analyzed and displayed using the Reference Reach Spreadsheet, Version 4.2T (Mecklenburg 2006). The entirety of the Newfound Creek Stream Restoration site was surveyed during MY2. A total of 9,527 linear feet of survey was conducted across the eight reaches. Newfound Creek upstream of Browntown Road included 2,327 linear feet; Newfound Creek downstream of Browntown Road included 2,244 linear feet; Tributary 3 included 1,128 linear feet; Tributary 4 included 1,826 linear feet; Tributary 5 included 633 linear feet; Tributary 6 included 615 linear feet; Tributary 7 included 374 linear feet, and Tributary 8 included 380 linear feet. The longitudinal stationing was taken directly from the VRS Total Station data. 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. Bankfull curve relationships were derived from *Bankfull Hydraulic Geometry Relationships for North Carolina Stream* (Harmon *et al.* 1999).

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 US Department of Agriculture (USDA) Plants Database (USDA 2006). Stem height was measured with a folding one-meter rule. Diameter at breast height (when applicable) was measured with calipers.

3.0 REFERENCES

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

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

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

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

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

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

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

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

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

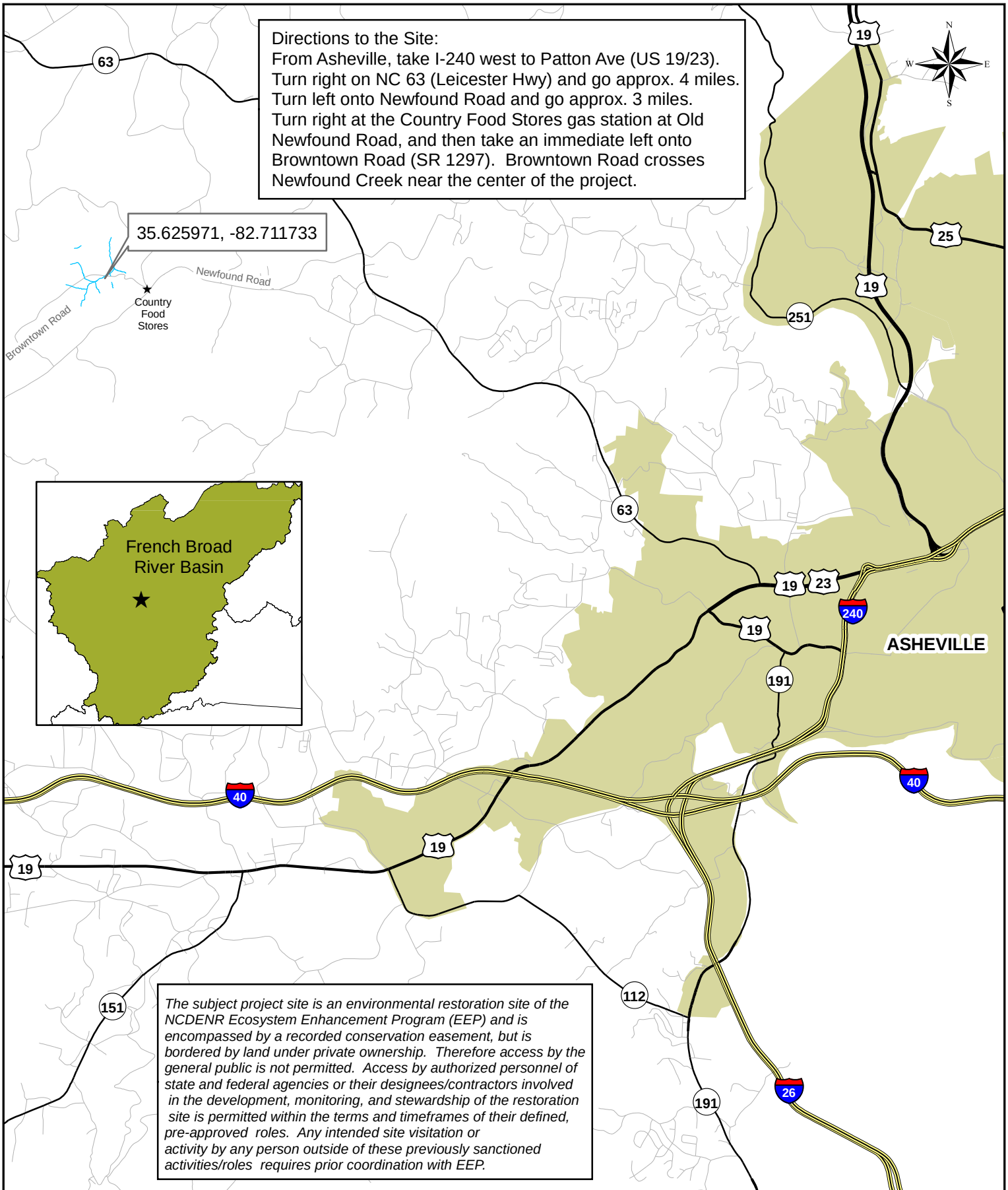
USGS. 2013a. Ivy River near Marshall, NC streamflow gage. USGS Real-Time Water Data. Gage 03453000. http://waterdata.usgs.gov.

USGS. 2013b. Pigeon River near Hepco, NC streamflow gage. USGS Real-Time Water Data. Gage 03459500. http://waterdata.usgs.gov.

NC CRONOS. 2013. NC Climate Retrieval and Observations Network of the Southeast. State Climate Office of North Carolina. Station NC-BC-14 – Leicester 2 SE. http://www.nc-climate.ncsu.edu/cronos.

Appendices for Project Background, Condition, and Performance Data

Appendix A: Project Vicinity Map and Background Tables



The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, monitoring, and stewardship of the restoration site is permitted within the terms and timeframes of their defined, pre-approved roles. Any intended site visitation or activity by any person outside of these previously sanctioned activities/roles requires prior coordination with EEP.

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NC Ecosystem Enhancement Program

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

Project Number: 92497

Date: December 2013

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

Figure 1
Project Vicinity

0 1 2 Miles

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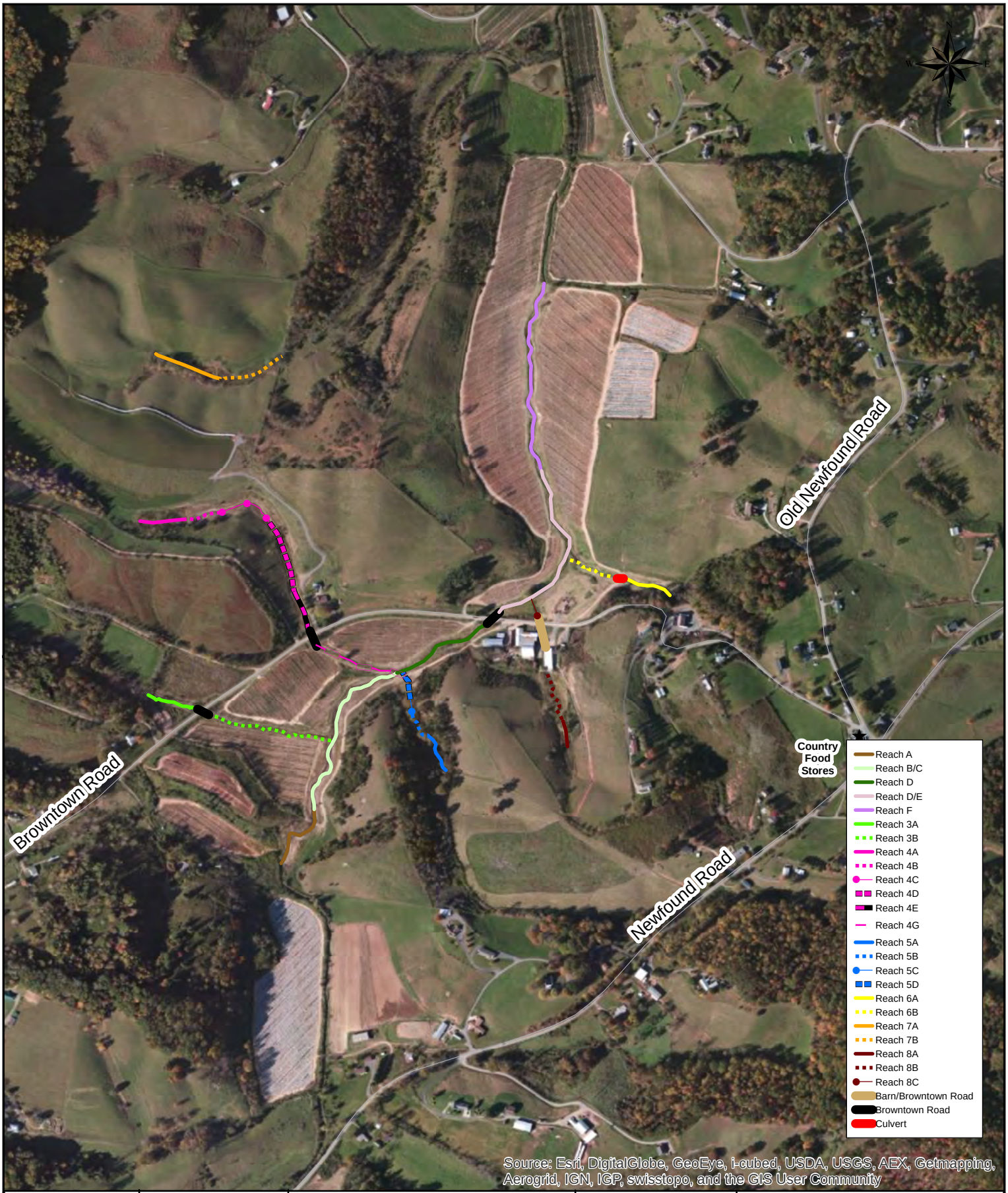
Legend
- Project Reach
- Conservation Easement
- Municipal Boundary

Figure 2
Project Site
0 250 500 1,000 Feet

North Carolina 2012 Ortho Imagery



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- Interstate
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- NC Hwy
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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									
EEP 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 EEP Project Number 92497		
Elapsed Time Since Grading Complete: **2 yrs 0 months** **Elapsed Time Since Planting Complete:** **1 yrs 9 months** **Number of Reporting Years:** **2**		
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		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3: Project Contacts Table

Newfound Creek Stream Restoration EEP Project Number 92497	
Designer Primary project design POC	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560 Kathleen McKeithan 919-461-1597
Construction Contractor Construction contractor POC	Eagle Wood, Inc. PO Box 1046 Denver, NC 28037 Bill Anderson 704-483-5853
Survey Contractor Survey contractor POC	Kee Mapping and Surveying PO Box 2566 Asheville, NC 28802 Brad Kee 828-645-8275
Planting Contractor Planting contractor POC	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273 Gregg Antemann 704-527-1177
Seeding Contractor Contractor point of contact	Carolina Wetlands Services 550 Westinghouse Blvd Charlotte, NC 28273 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	URS Corporation - North Carolina 1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Stream Monitoring POC	Melissa Bauguess 828-226-1790
Vegetation Monitoring POC	Susan Westberry 910-343-5994
Wetland Monitoring POC	Susan Westberry 910-343-5994

Table 4: Project Attribute Table

Newfound Creek Stream Restoration EEP 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/E 5	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

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Monitoring Year:
2 (2013)

Project Number:
92497

Date:
December 2013

2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Figure 4a
Current Condition
Plan View
Overview

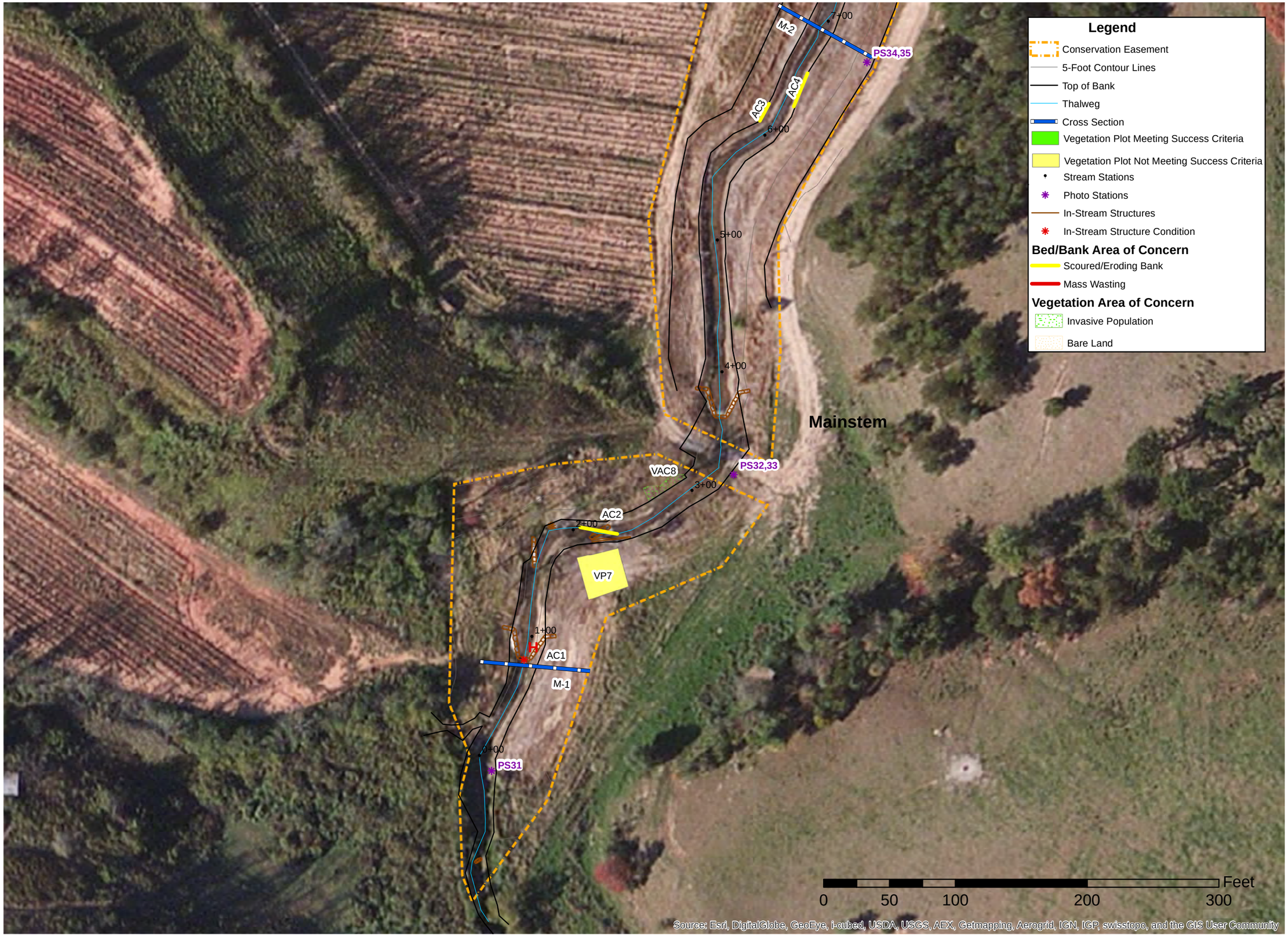

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Figure 4b
Current Condition
Plan View
Sheet 1

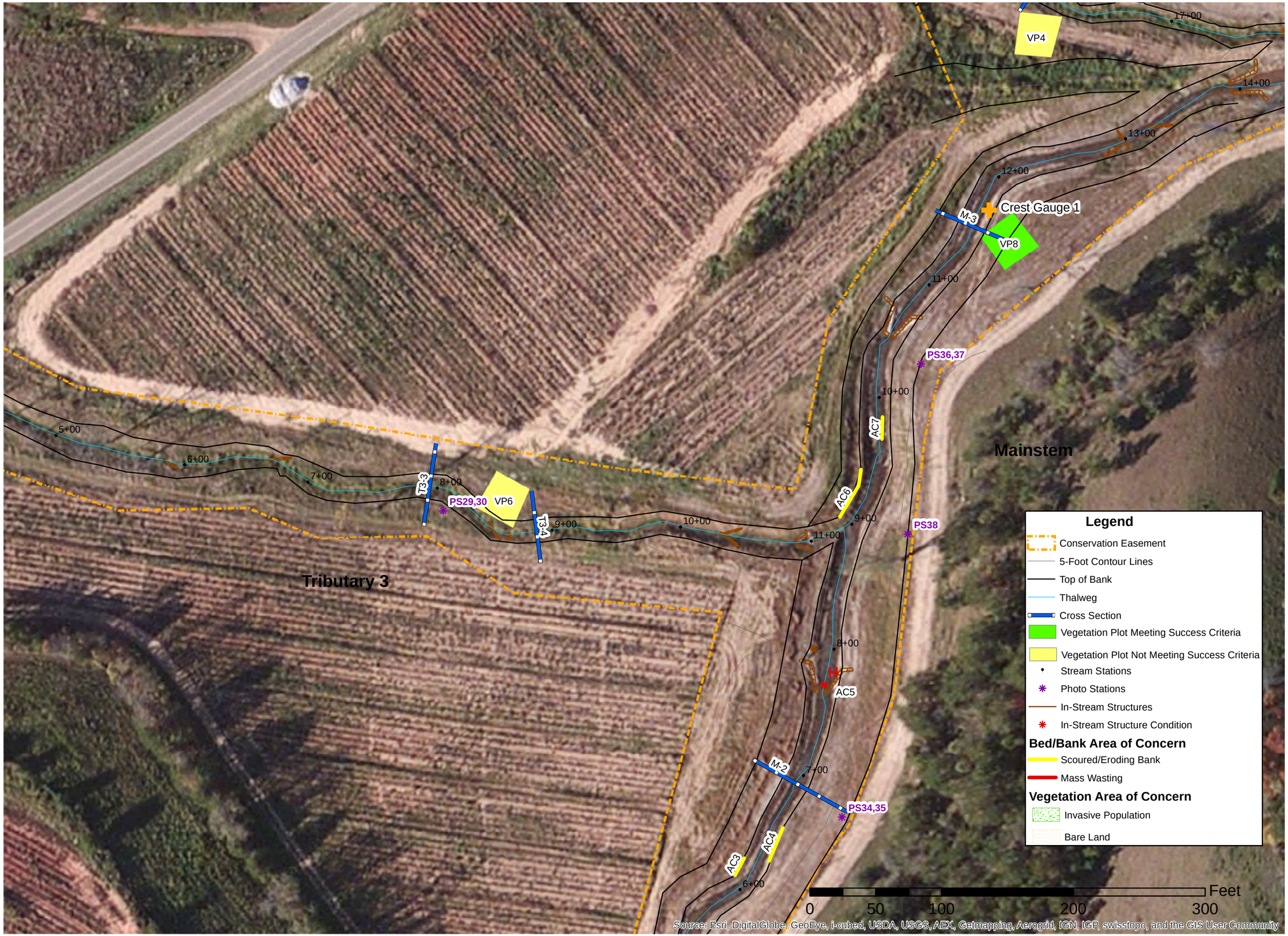

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Figure 4c
Current Condition
Plan View
Sheet 2

Legend

- Conservation Easement
- 5-Foot Contour Lines
- Top of Bank
- Thalweg
- Cross Section
- Vegetation Plot Meeting Success Criteria
- Vegetation Plot Not Meeting Success Criteria
- Stream Stations
- Photo Stations
- In-Stream Structures
- In-Stream Structure Condition

Bed/Bank Area of Concern

- Scoured/Eroding Bank
- Mass Wasting

Vegetation Area of Concern

- Invasive Population
- Bare Land

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Figure 4d
Current Condition
Plan View
Sheet 3

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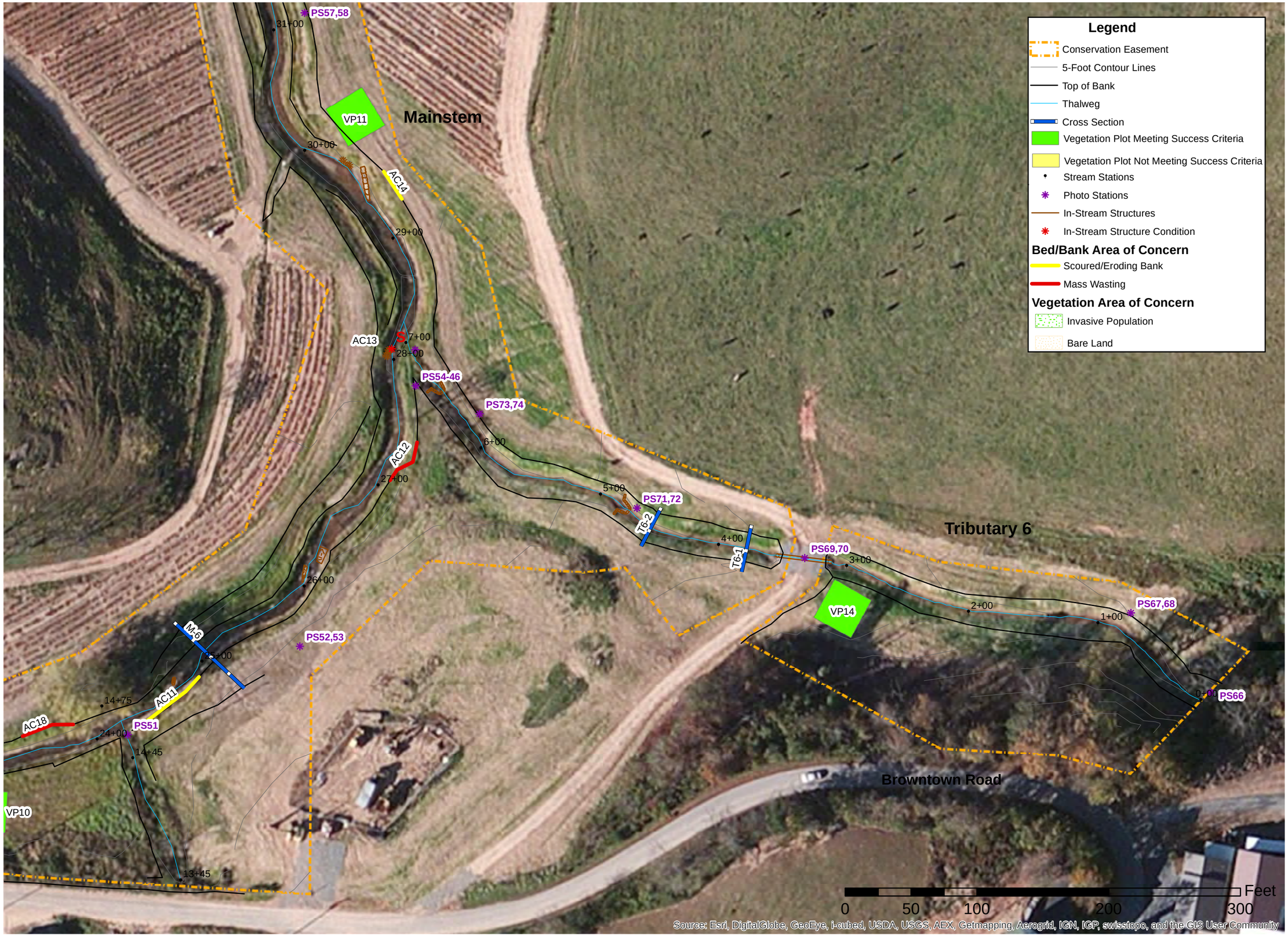
Figure 4e
Current Condition
Plan View
Sheet 4



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2012 Aerial
Orthophotography
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Figure 4f
Current Condition
Plan View
Sheet 5

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Figure 4g
Current Condition
Plan View
Sheet 6

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2012 Aerial
Orthophotography
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Figure 4h
Current Condition
Plan View
Sheet 7

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Orthophotography
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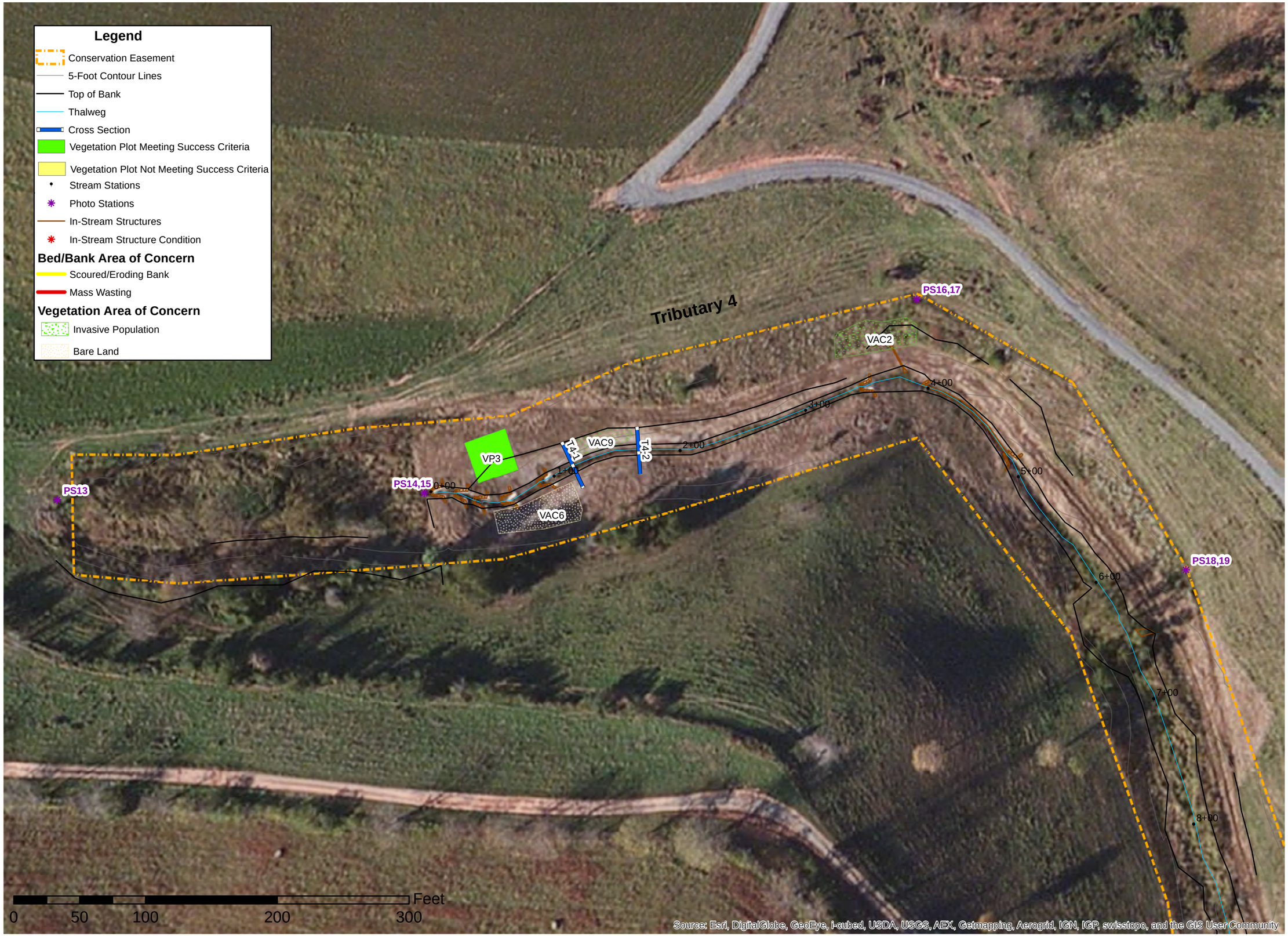
Figure 4i
Current Condition
Plan View
Sheet 8



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2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Figure 4j
Current Condition
Plan View
Sheet 9

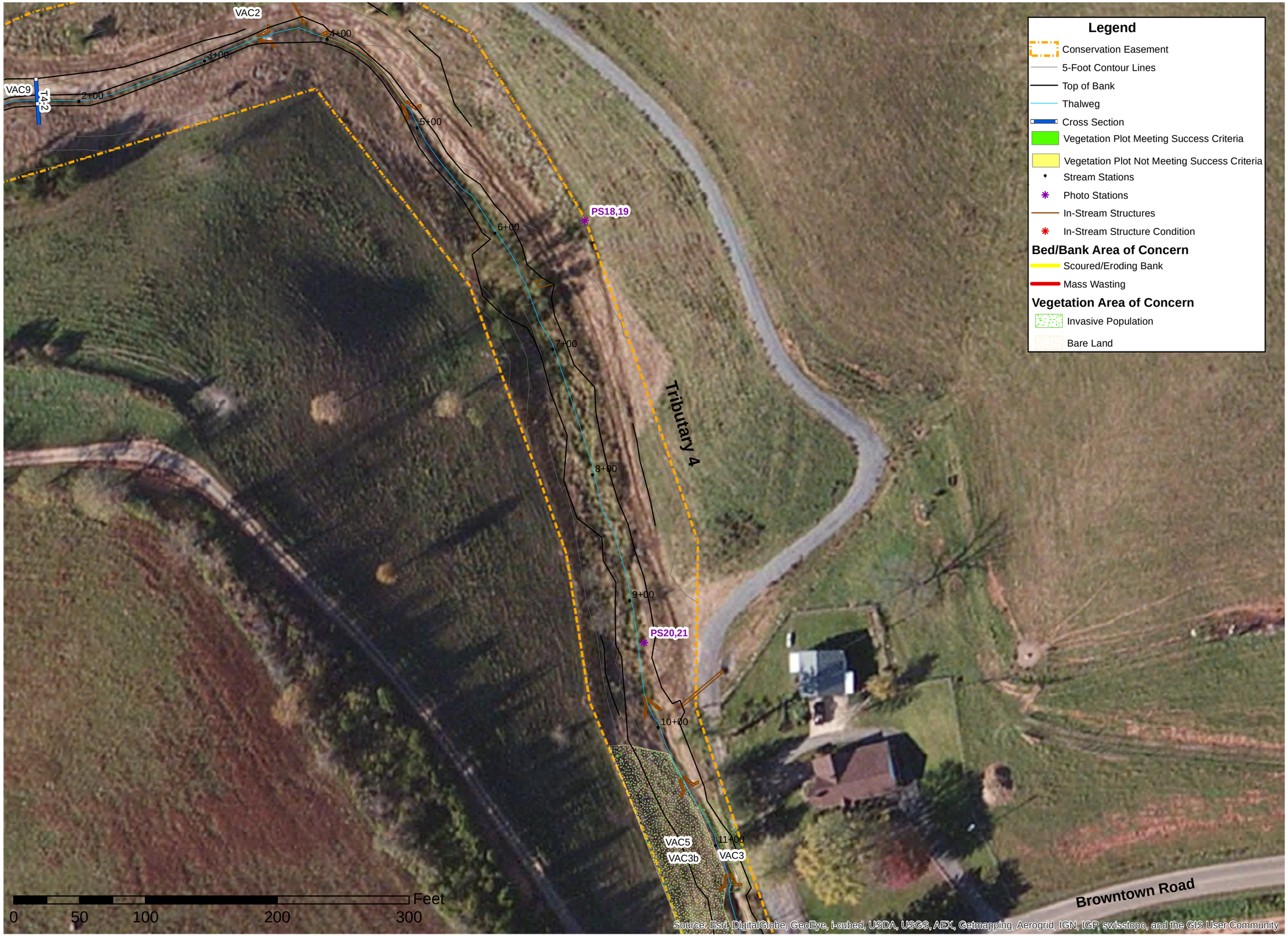

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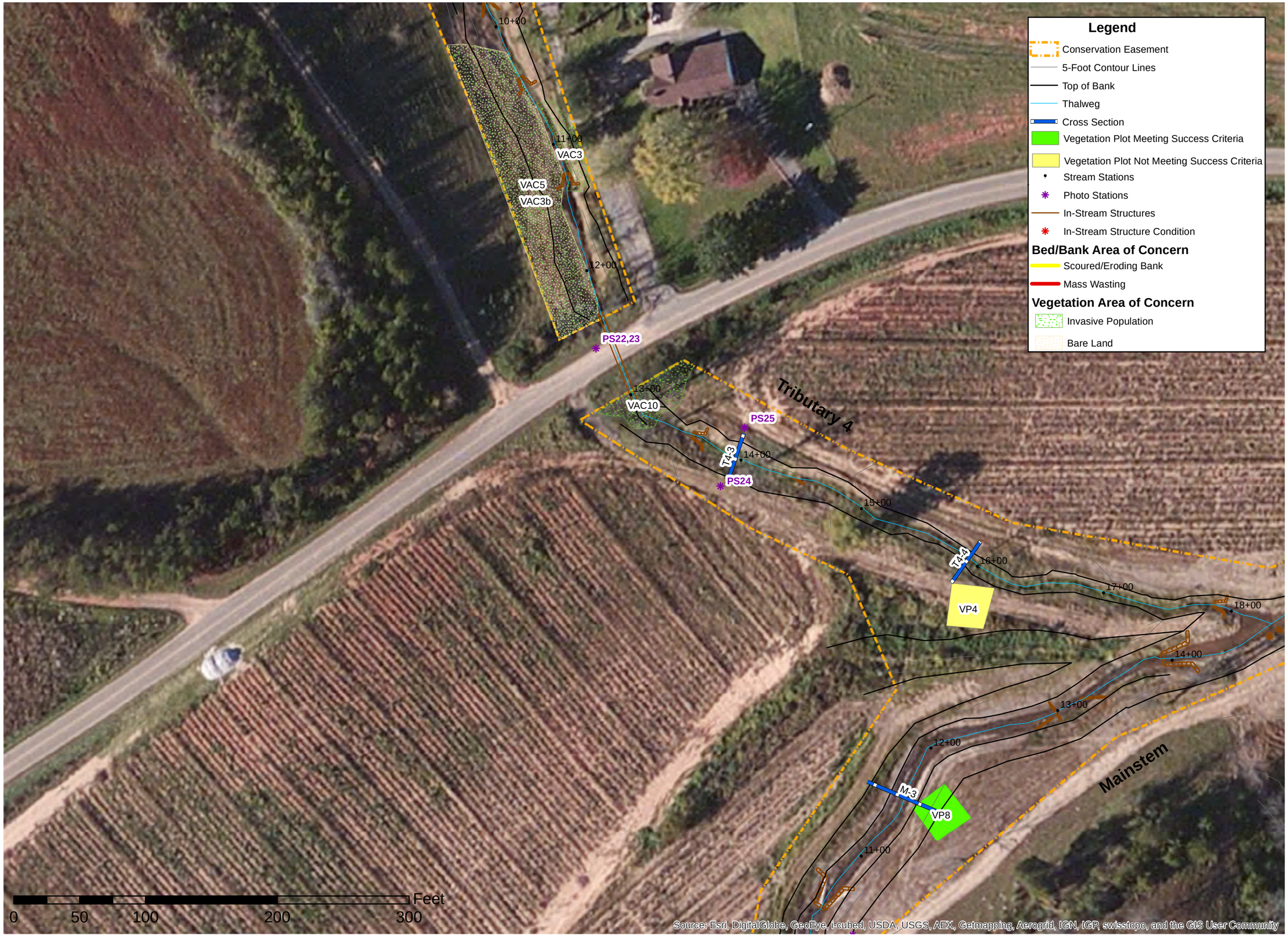
Figure 4k
Current Condition
Plan View
Sheet 10



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2012 Aerial
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Figure 4l
Current Condition
Plan View
Sheet 11

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2012 Aerial
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Figure 4m
Current Condition
Plan View
Sheet 12

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2012 Aerial
Orthophotography
(Source: ESRI Basemap)

Figure 4n
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			0	0	100%			
	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 not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	7	8			88%			

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

Reach ID - Reach 4 - Tributary 4

Assessed Length: 1826

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	14	24			58%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	6	12			50%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	6	12			50%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	12	12			100%			
		2. Thalweg centering at downstream of meander (Glide)	12	12			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does 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			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	5	7			71%			
	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.	6	6			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)	6	6			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	5			40%			

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			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	6	5			100%			
	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.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath 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)	3	3			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 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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	2	3			67%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	2	1			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	2	1			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	1	1			100%			
		2. Thalweg centering at downstream of meander (Glide)	1	1			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does 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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	5	9			55%			
	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 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.	2	5			40%			

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

Reach ID - Reach 1 - Mainstem, Upstream of Browntown Rd.

Assessed Length: 2326.8

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			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	10			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	13	10			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	19	10			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	170	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.		1	20	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse		1	30	99%	0	0	99%
			Totals	7	220	96%	0	0	96%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	17	18		94%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7		100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8		100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	18	18		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	21	20			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	14	14			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	14	14			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	14	14			100%			
		2. Thalweg centering at downstream of meander (Glide)	14	14			100%			
2. Bank	**1. Scoured/ Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			3	100	95%	0	0	98%

	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	120	95%	1	40	98%
	3. Mass Wasting	Bank slumping, calving, or collapse			3	110	95%	0	0	98%
				Totals	8	330	85%	1	40	94%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	21	21			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.	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)	20	21			95%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 6: Vegetation Condition Assessment Table

Newfound Creek Stream Restoration EEP 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	Beige dot pattern	4	0.51	2.5%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	N/A	0	0.00	0.0%
			Total	4	0.51	2.5%
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	0.51	2.5%
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, and privet.	1000 SF	Green dot pattern	8	0.34	1.3%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	1000 SF	Red dot pattern	1	0.04	0.2%

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 (photo from February 2013, new photo will be taken during site assessment in Spring of 2014)

PS67, Tributary 6 facing upstream

PS68, Tributary 6 facing downstream


PS69, Tributary 6 facing upstream

PS70, Tributary 6 facing downstream

PS71, Tributary 6 facing upstream

PS72, Tributary 6 facing downstream

PS73, Tributary 6 facing upstream

PS74, Tributary 6 facing downstream

PS75, Tributary 6 facing upstream

Vegetation Plot Photos

VP1

VP2

VP3

VP4

VP5

VP6

VP7

VP8

VP9

VP10

VP11

VP12


VP13


VP14

Appendix C: Vegetation Plot Data

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

Newfound Creek Stream Restoration

EEP Project Number 92497

Wetland/Stream Vegetation Totals

(per acre)

Plot #	Stream/ Wetland Stems[2]	Volunteers[3]	Total[4]	Success Criteria Met?
1	243	0	243	No
2	243	0	243	No
3	526	0	526	Yes
4	121	0	121	No
5	121	0	121	No
6	202	0	202	No
7	121	567	850	No
8	486	283	890	Yes
9	647	647	1335	Yes
10	364	0	364	Yes
11	324	0	324	Yes, barely
12	121	0	121	No
13	405	0	405	Yes
14	324	0	324	Yes, barely
Project Avg	**304**	**107**	**434**	**No, but close**

Riparian Buffer Vegetation Totals

(per acre)

Plot #	Riparian Buffer Stems[1]	Success Criteria Met?
1	202	No
2	202	No
3	486	Yes
4	121	No
5	121	No
6	202	No
7	40	No
8	405	Yes
9	486	Yes
10	243	No
11	243	No
12	121	No
13	405	Yes
14	283	No
Project Avg	**254**	**No**

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

			Current Plot Data (MY2 2013)																				
			92497-01-0001			92497-01-0002			92497-01-0003			92497-01-0004			92497-01-0005			92497-01-0006			92497-01-0007		
Scientific Name	**Common Name**	**Species Type**	**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, Florida Maple	Tree	1	1	1				1	1	1												
Acer negundo	boxelder	Tree							2	2	2				1	1	1						
Acer saccharinum	silver maple	Tree	2	2	2										1	1	1						
Alnus serrulata	hazel alder	Shrub																			2	2	14
Betula nigra	river birch	Tree																					
Carpinus caroliniana	American hornbeam	Tree							1	1	1												
Carya cordiformis	bitternut hickory	Tree																					
Carya ovata	shagbark hickory	Tree																					
Celtis laevigata	sugarberry	Tree										2	2	2									
Cornus florida	flowering dogwood	Tree				1	1	1	3	3	3												
Corylus cornuta	beaked hazelnut	Shrub Tree																			2	2	4
Diospyros virginiana	common persimmon	Tree																					
Euonymus americanus																					1	1	1
Fraxinus pennsylvanica	green ash	Tree																					
Hamamelis virginiana	American witchhazel	Tree							3	3	3												
Ilex opaca	American holly	Tree																					
Juglans nigra	black walnut	Tree	1	1	1										1	1	1						
Lindera benzoin	northern spicebush	Shrub	1	1	1																		
Liriodendron tulipifera	tuliptree	Tree																					
Platanus occidentalis	American sycamore	Tree	1	1	1	1	1	1	1	1	1												
Quercus michauxii	swamp chestnut oak	Tree																1	1	1			
Quercus pagoda	cherrybark oak	Tree										1	1	1				3	3	3	1	1	1
Rhododendron maximum	great laurel	Shrub																					
Robinia pseudoacacia	black locust	Tree																					
Salix nigra	black willow	Tree				3	3	3														1	1
Sambucus canadensis	Common Elderberry	Shrub				1	1	1															
Ulmus americana	American elm	Tree							1	1	1							1	1	1			
Unknown		Shrub or Tree																					
Viburnum dentatum	southern arrowwood	Shrub							1	1	1												
	Stem count		6	6	6	6	6	6	13	13	13	3	3	3	3	3	3	5	5	5	6	7	21
	size (ares)		1			1			1			1			1			1			1		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02		
	Species count		5	5	5	4	4	4	8	8	8	2	2	2	3	3	3	3	3	3	4	5	5
	Stems per ACRE		242.8	242.8	242.8	242.8	242.8	242.8	526.1	526.1	526.1	121.4	121.4	121.4	121.4	121.4	121.4	202.3	202.3	202.3	242.8	283.3	849.8

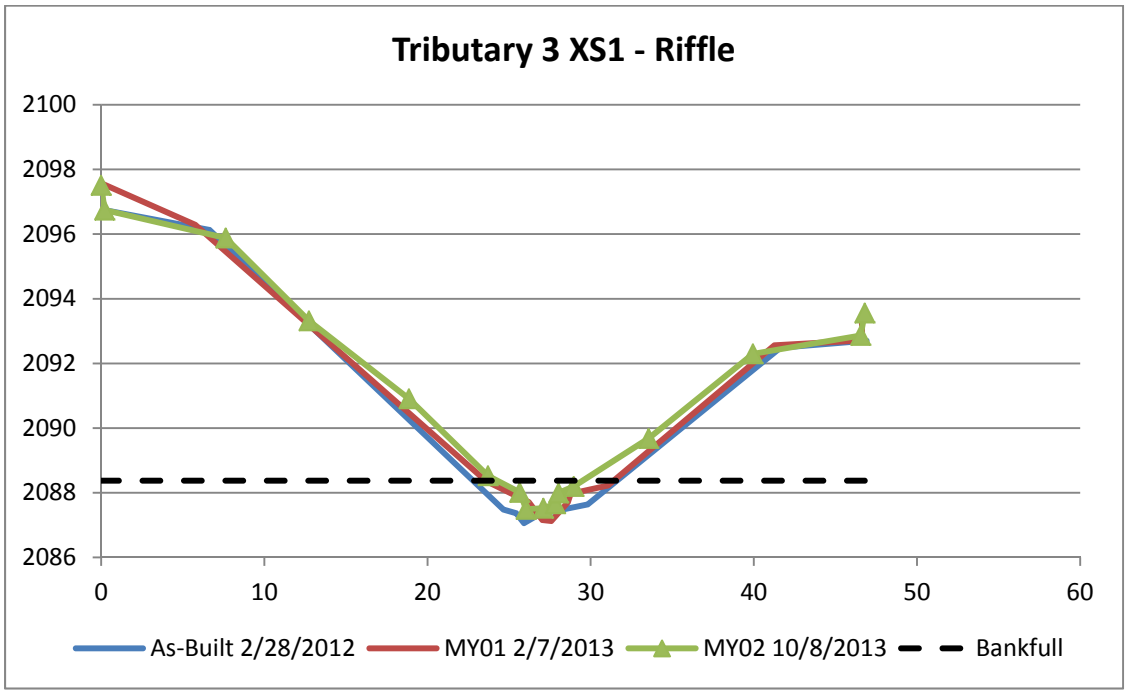
Color for Density

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%

			Current Plot Data (MY2 2013)																					Annual Means					
			92497-01-0008			92497-01-0009			92497-01-0010			92497-01-0011			92497-01-0012			92497-01-0013			92497-01-0014			MY2 (2013)			MY1 (2013)		
Scientific Name	Common Name	Species Type	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, Florida Maple	Tree																						2	2	2	7	7	7
Acer negundo	boxelder	Tree																						3	3	3	7	7	7
Acer saccharinum	silver maple	Tree																						3	3	3			
Alnus serrulata	hazel alder	Shrub			5	1	1	3																3	3	22	4	4	4
Betula nigra	river birch	Tree	2	2	2	1	1	1				2	2	2				1	1	1	6	6	6	12	12	12	9	9	9
Carpinus caroliniana	American hornbeam	Tree	2	2	2																			3	3	3	10	10	10
Carya cordiformis	bitternut hickory	Tree				1	1	1																1	1	1			
Carya ovata	shagbark hickory	Tree																									2	2	2
Celtis laevigata	sugarberry	Tree				4	4	4							1	1	1	3	3	3				10	10	10	17	17	17
Cornus florida	flowering dogwood	Tree																2	2	2				6	6	6			
Corylus cornuta	beaked hazelnut	Shrub Tree				1	1	1																3	3	5	4	4	4
Diospyros virginiana	common persimmon	Tree																									3	3	3
Euonymus americanus			1	1	1																			2	2	2	3	3	3
Fraxinus pennsylvanica	green ash	Tree							3	3	3	2	2	2				3	3	3				8	8	8	4	4	4
Hamamelis virginiana	American witchhazel	Tree				3	3	3																6	6	6	6	6	6
Ilex opaca	American holly	Tree																									3	3	3
Juglans nigra	black walnut	Tree	2	2	2	1	1	1																5	5	5	2	2	2
Lindera benzoin	northern spicebush	Shrub	2	2	2	2	2	2	2	2	2	2	2	2							1	1	1	10	10	10			
Liriodendron tulipifera	tuliptree	Tree						3																		3			
Platanus occidentalis	American sycamore	Tree			2	2	2	13																5	5	18	16	16	16
Quercus michauxii	swamp chestnut oak	Tree	1	1	1													1	1	1				3	3	3	6	6	6
Quercus pagoda	cherrybark oak	Tree	2	2	2				3	3	3	2	2	2	1	1	1							13	13	13	18	18	18
Rhododendron maximum	great laurel	Shrub				1	1	1																1	1	1	3	3	3
Robinia pseudoacacia	black locust	Tree	1	1	1																			1	1	1			
Salix nigra	black willow	Tree		2	2																			3	6	6	3	6	6
Sambucus canadensis	Common Elderberry	Shrub																						1	1	1	1	2	2
Ulmus americana	American elm	Tree													1	1	1				1	1	1	4	4	4	12	12	12
Unknown		Shrub or Tree																									1	1	1
Viburnum dentatum	southern arrowwood	Shrub							1	1	1													2	2	2	4	4	4
		Stem count	13	15	22	17	17	33	9	9	9	8	8	8	3	3	3	10	10	10	8	8	8	110	113	150	145	149	149
		size (ares)	1			1			1			1			1			1			1			14			14		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.35			0.35		
		Species count	8	9	11	10	10	11	4	4	4	4	4	4	3	3	3	5	5	5	3	3	3	24	24	25	23	23	23
		Stems per ACRE	526.1	607	890.3	688	688	1335	364.2	364.2	364.2	323.7	323.7	323.7	121.4	121.4	121.4	404.7	404.7	404.7	323.7	323.7	323.7	318	326.6	433.6	419.1	430.7	430.7

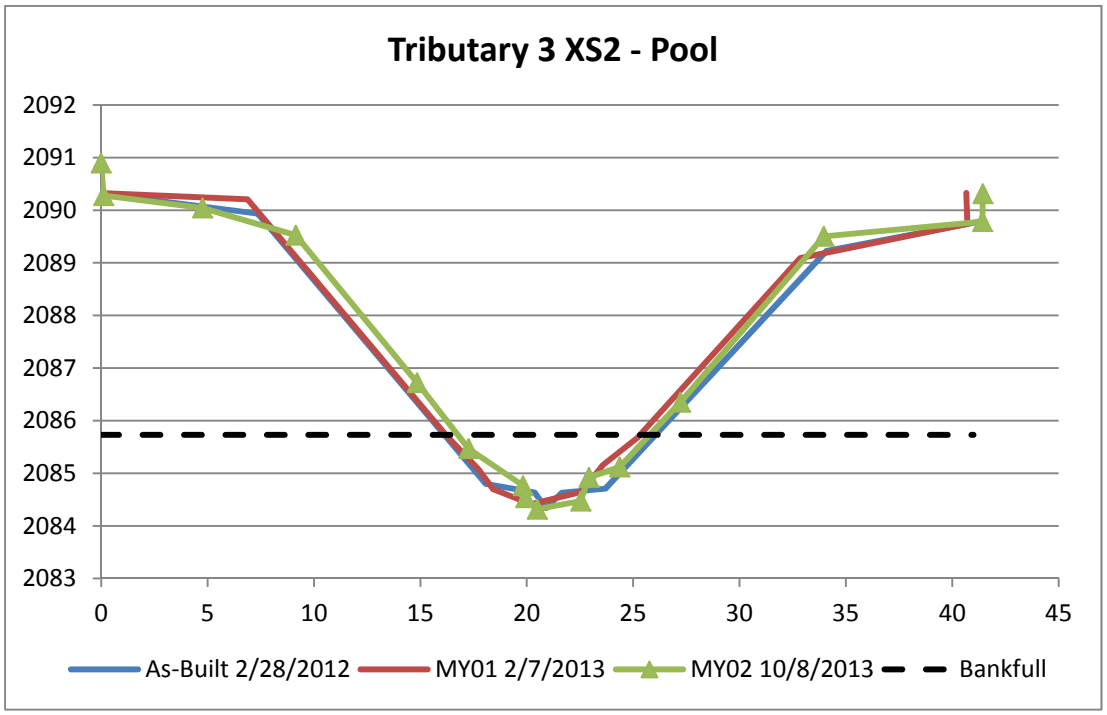
Appendix D: Stream Survey Data

Figure 5: Tributary 3 Cross Sections with Annual Overlays



Tributary 3 XS1

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0.00	2096.76	0.00	2096.68	0.00	2097.51
6.64	2096.13	0.11	2097.55	0.21	2096.74
24.65	2087.48	5.76	2096.29	7.63	2095.88
25.44	2087.37	23.58	2088.37	12.74	2093.32
25.92	2087.06	26.21	2087.71	18.86	2090.91
26.87	2087.34	27.05	2087.16	23.71	2088.53
29.82	2087.64	27.58	2087.13	25.65	2088.02
41.63	2092.48	28.59	2087.70	26.04	2087.49
46.91	2092.70	28.77	2087.97	27.10	2087.52
		31.06	2088.22	27.84	2087.66
		41.25	2092.56	28.03	2088.00
		46.65	2092.71	28.96	2088.20
		46.63	2093.34	33.55	2089.68
				39.95	2092.30
				46.55	2092.87
				46.80	2093.56

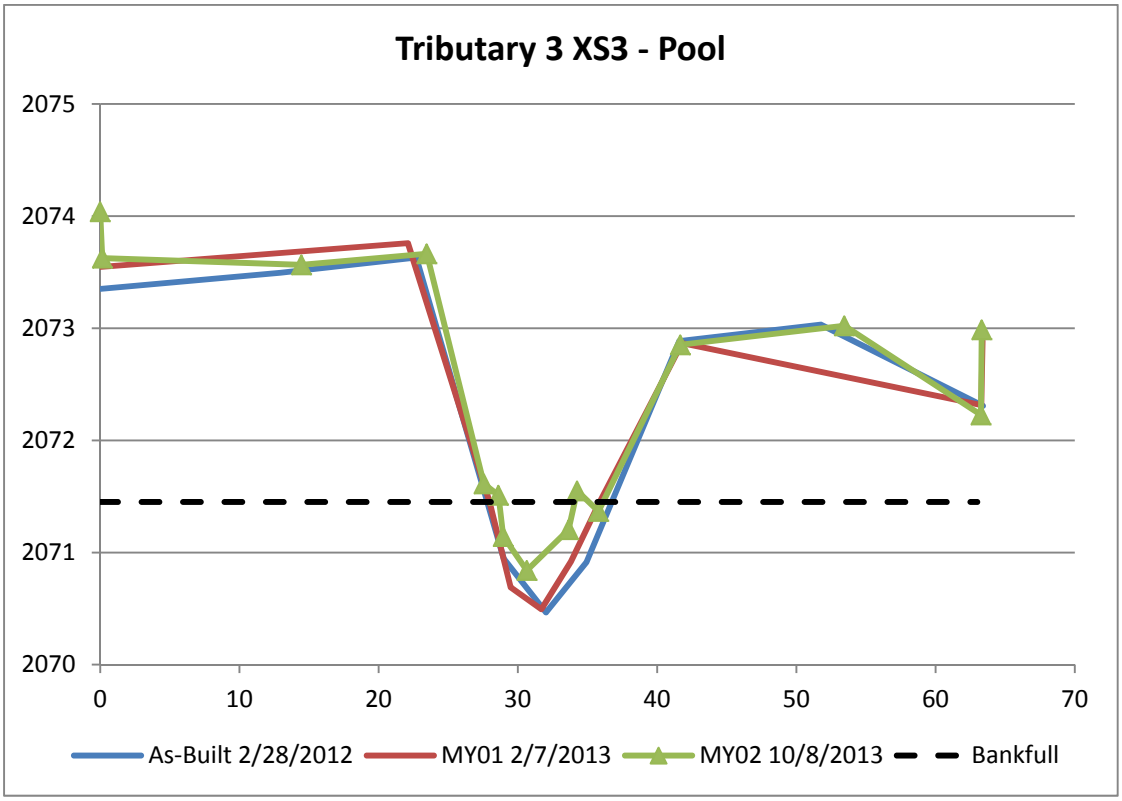


Tributary 3 XS2

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

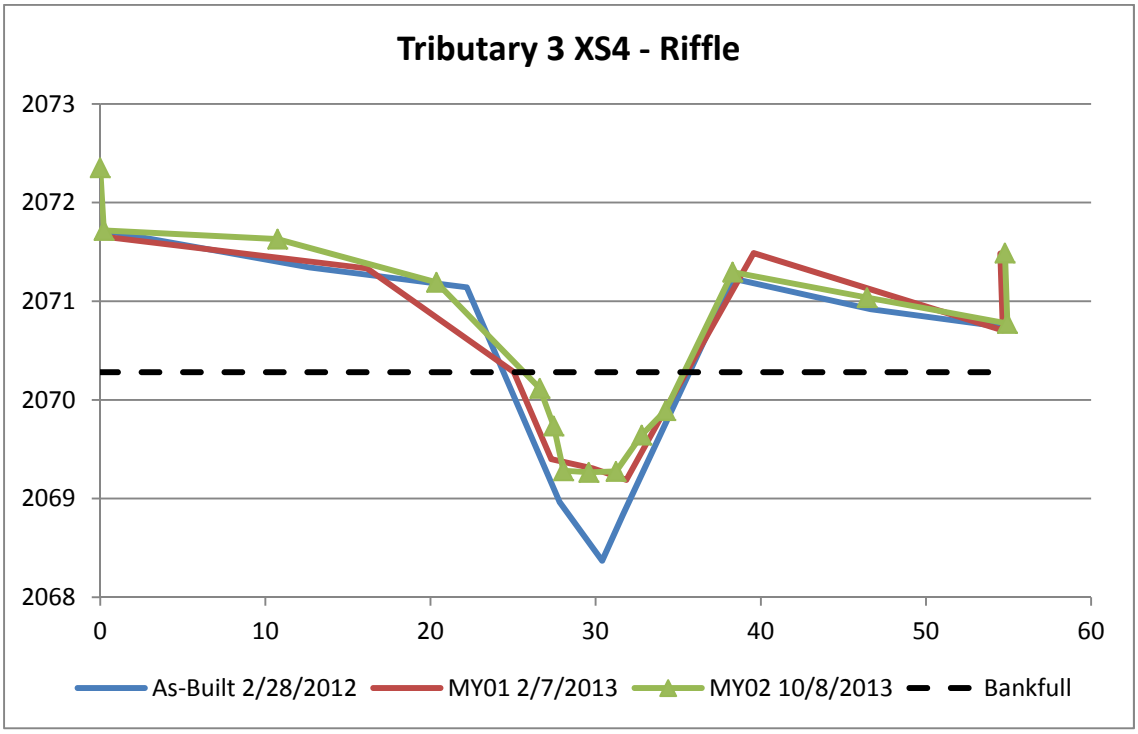
MY01 2/7/2013	URS
0.00	2090.92
-0.17	2090.33
6.89	2090.21
16.20	2085.73
17.75	2085.07
18.42	2084.70
20.20	2084.41
22.57	2084.65
23.57	2085.15
25.19	2085.67
32.85	2089.09
40.72	2089.74
40.66	2090.33

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



Tributary 3 XS2

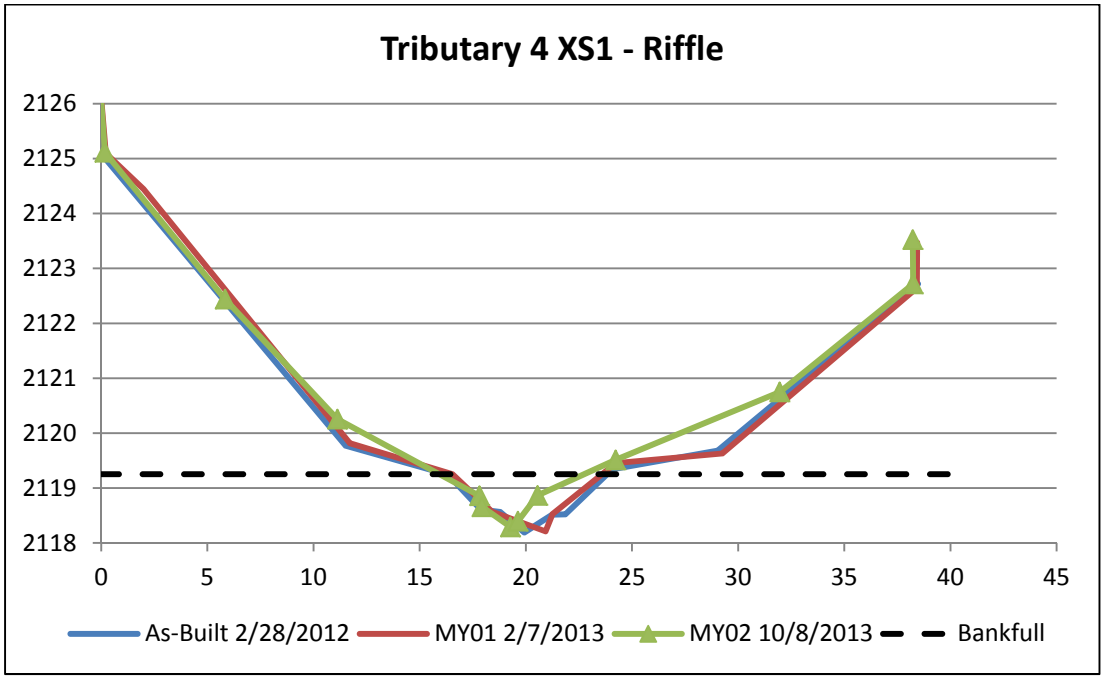
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0.00	2073.35	0.00	2074.05	0.00	2074.04
12.95	2073.49	-0.04	2073.55	0.15	2073.63
22.70	2073.63	22.10	2073.76	14.45	2073.57
28.99	2070.94	27.96	2071.45	23.45	2073.66
32.02	2070.47	29.48	2070.69	27.56	2071.61
34.92	2070.91	31.69	2070.49	28.60	2071.51
41.59	2072.89	33.82	2070.92	28.95	2071.14
51.74	2073.03	35.83	2071.44	30.64	2070.84
63.40	2072.31	41.79	2072.87	33.64	2071.20
		63.28	2072.32	34.26	2071.55
		63.38	2072.88	35.79	2071.37
				41.66	2072.85
				53.44	2073.02
				63.26	2072.23
				63.32	2072.99



Tributary 3 XS4

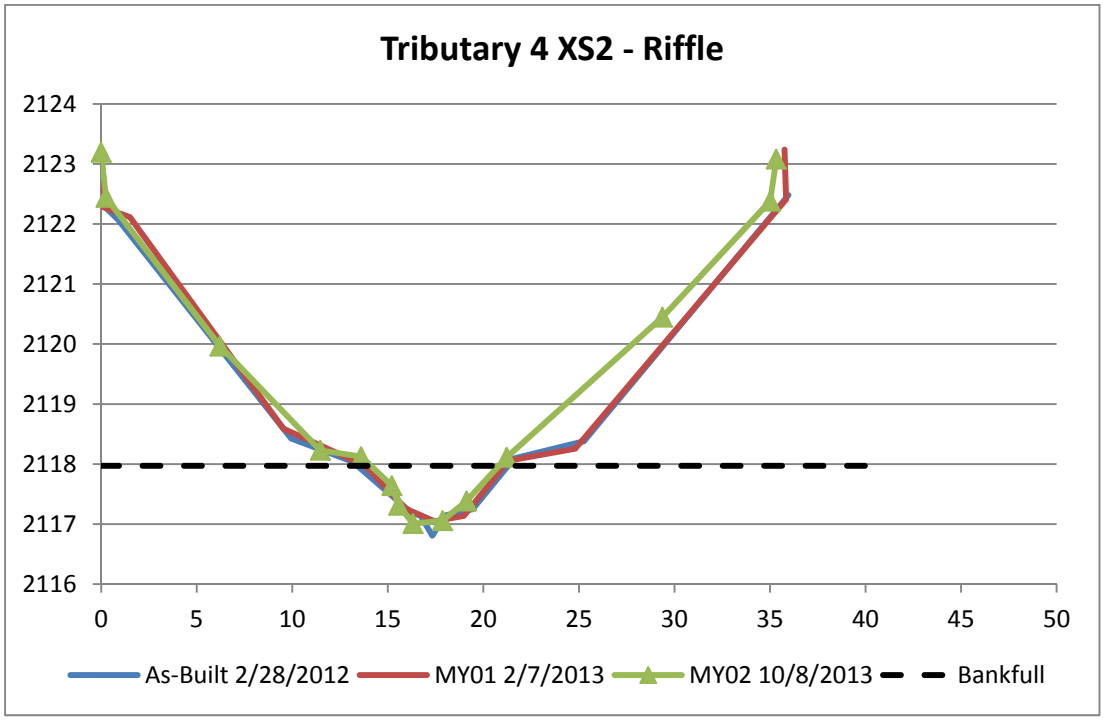
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0.00	2071.72	0.00	2071.66	0.00	2072.35
12.68	2071.34	0.15	2071.66	0.23	2071.72
22.19	2071.14	16.16	2071.33	10.74	2071.63
27.81	2068.96	25.05	2070.28	20.36	2071.19
30.39	2068.37	27.31	2069.40	26.62	2070.12
31.65	2068.83	29.84	2069.31	27.46	2069.74
38.33	2071.23	31.85	2069.19	28.05	2069.28
46.66	2070.92	33.84	2069.79	29.58	2069.27
54.82	2070.74	39.57	2071.49	31.23	2069.28
		54.67	2070.71	32.79	2069.64
		54.50	2071.48	34.23	2069.89
				38.30	2071.30
				46.43	2071.04
				54.93	2070.78
				54.79	2071.49

Figure 6: Tributary 4 Cross Sections with Annual Overlays



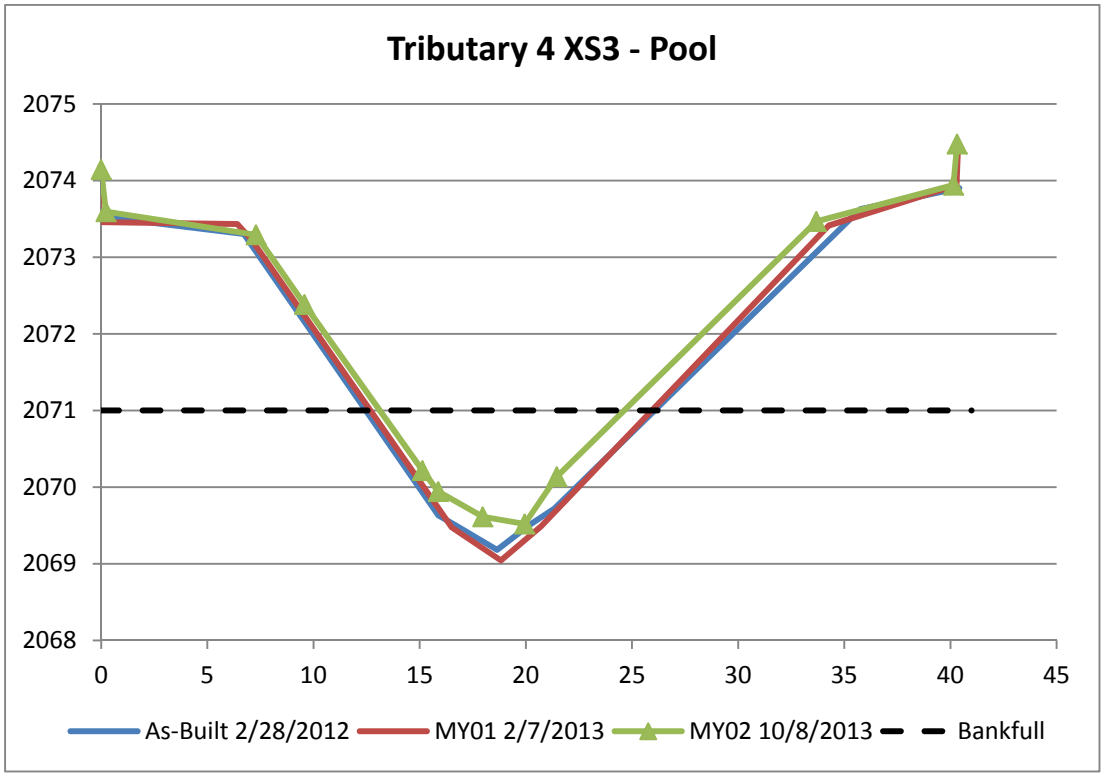
Tributary 4 XS1

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2125.088	0.00	2126.104	0.00	2126.067
11.5109	2119.772	0.22	2125.097	0.17	2125.114
16.3437	2119.241	2.00	2124.443	5.84	2122.44
17.8751	2118.608	11.71	2119.815	11.12	2120.255
18.7881	2118.567	16.55	2119.25	17.82	2118.858
19.9274	2118.19	18.41	2118.573	17.93	2118.659
21.2336	2118.513	20.93	2118.21	19.28	2118.292
21.8528	2118.52	21.26	2118.529	19.63	2118.395
24.0685	2119.342	24.24	2119.454	20.55	2118.865
29.0385	2119.684	29.25	2119.631	24.23	2119.512
38.4749	2122.718	38.42	2122.645	31.96	2120.75
		38.43	2123.47	38.24	2122.718
				38.23	2123.523



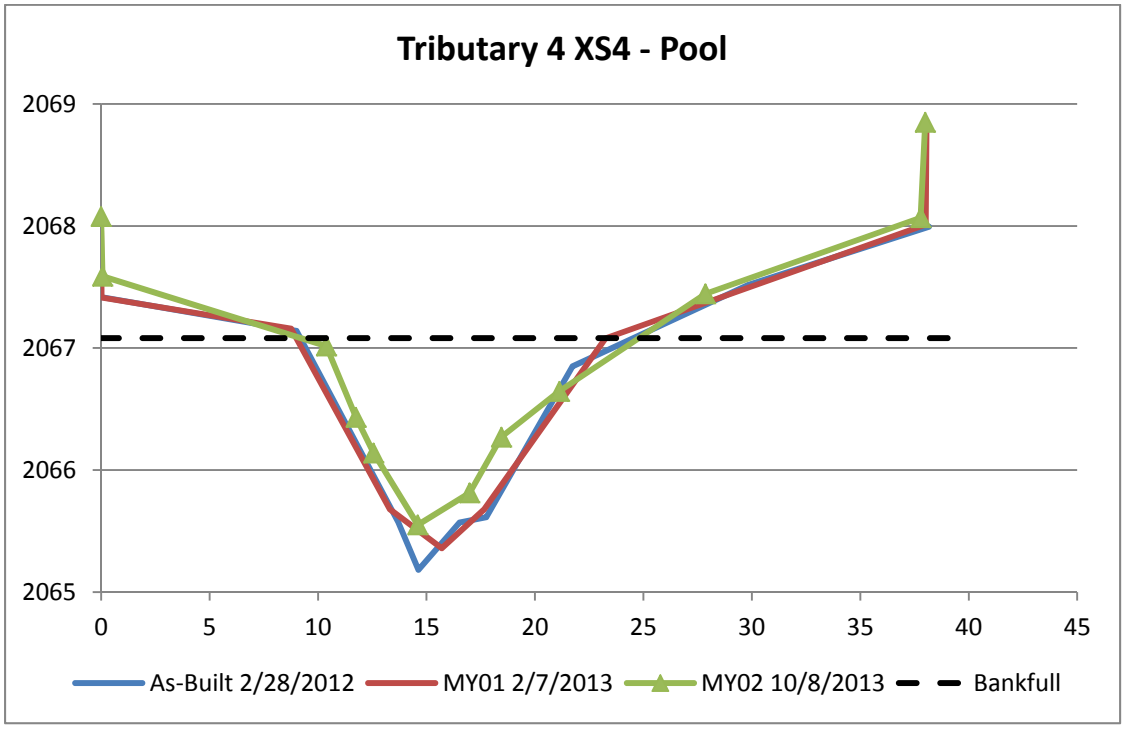
Tributary 4 XS2

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2122.342	0.00	2123.046	0.00	2123.196
0.8774	2122.071	-0.02	2122.294	0.25	2122.443
9.9427	2118.425	1.50	2122.114	6.21	2119.966
13.1583	2118.039	9.54	2118.588	11.46	2118.23
16.2575	2117.185	13.84	2117.968	13.60	2118.124
16.7109	2117.141	15.94	2117.257	15.21	2117.64
17.3258	2116.808	17.44	2117.048	15.56	2117.314
17.9615	2117.142	18.98	2117.136	16.32	2117.008
19.4388	2117.249	21.31	2118.055	17.87	2117.058
21.6126	2118.095	24.80	2118.256	19.12	2117.385
25.264	2118.382	35.85	2122.41	21.22	2118.114
35.9667	2122.48	35.76	2123.237	29.37	2120.449
				35.01	2122.381
				35.33	2123.082



Tributary 4 XS3

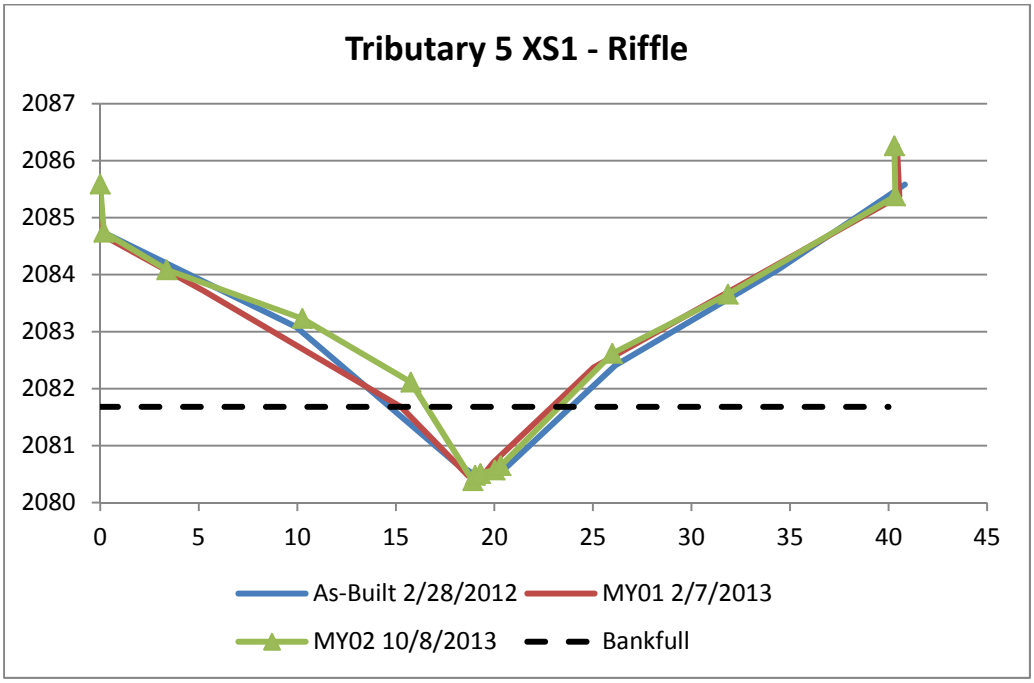
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2073.531	0.00	2074.116	0.00	2074.143
6.713	2073.303	-0.17	2073.456	0.22	2073.594
15.875	2069.633	6.41	2073.432	7.29	2073.292
16.7022	2069.501	7.09	2073.225	9.57	2072.383
18.642	2069.181	16.51	2069.473	15.13	2070.216
20.1439	2069.5	18.82	2069.044	15.87	2069.943
21.3602	2069.723	20.72	2069.488	17.97	2069.613
35.7631	2073.628	34.27	2073.413	19.94	2069.519
40.42	2073.901	40.29	2073.942	21.46	2070.136
		40.36	2074.466	33.69	2073.467
				40.14	2073.941
				40.31	2074.477



Tributary 4 XS4

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2067.418	0.00	2067.956	0.00	2068.078
9.0065	2067.141	0.02	2067.414	0.06	2067.588
13.6894	2065.575	8.76	2067.159	10.38	2067.017
14.6259	2065.182	13.31	2065.679	11.75	2066.432
16.5262	2065.571	15.71	2065.359	12.56	2066.14
17.753	2065.614	17.65	2065.677	14.60	2065.551
21.7288	2066.85	23.25	2067.079	16.99	2065.813
29.8366	2067.517	38.02	2068.011	18.45	2066.27
38.1695	2067.994	38.06	2068.857	21.12	2066.645
				27.86	2067.444
				37.79	2068.068
				38.00	2068.85

Figure 7: Tributary 5 Cross Sections with Annual Overlays

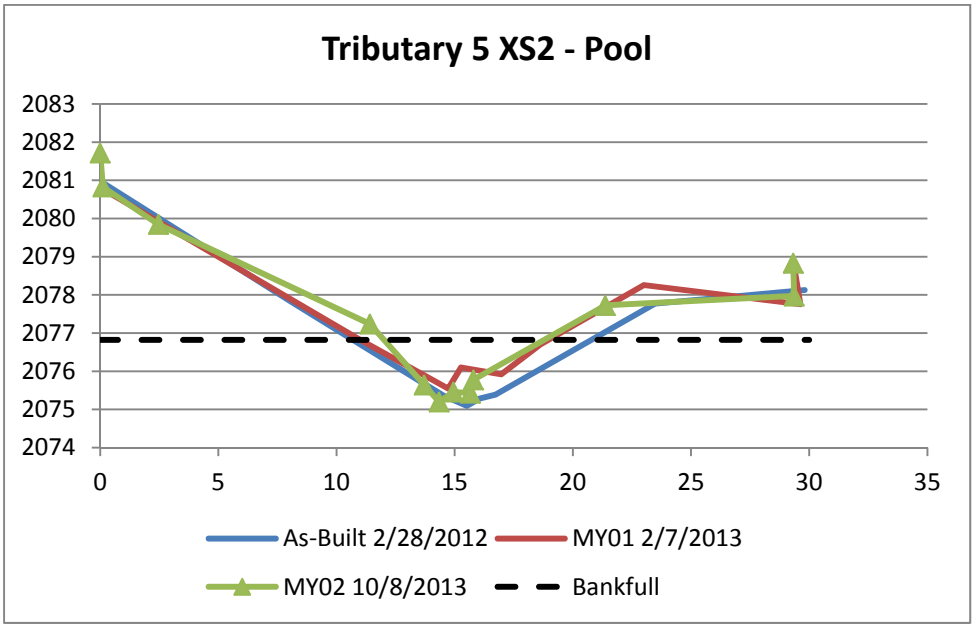


Tributary 5 XS1

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

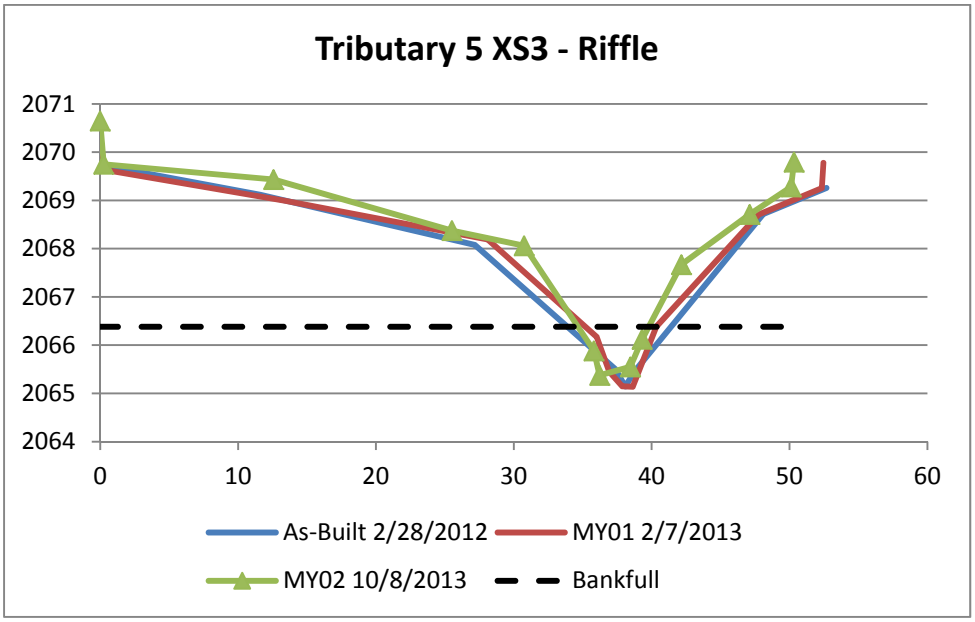
MY01 2/7/2013	URS
0.00	2085.543
-0.09	2084.734
5.25	2083.716
15.27	2081.677
18.66	2080.471
19.53	2080.529
19.97	2080.713
25.04	2082.373
40.56	2085.38
40.43	2086.259

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



Tributary 5 XS2

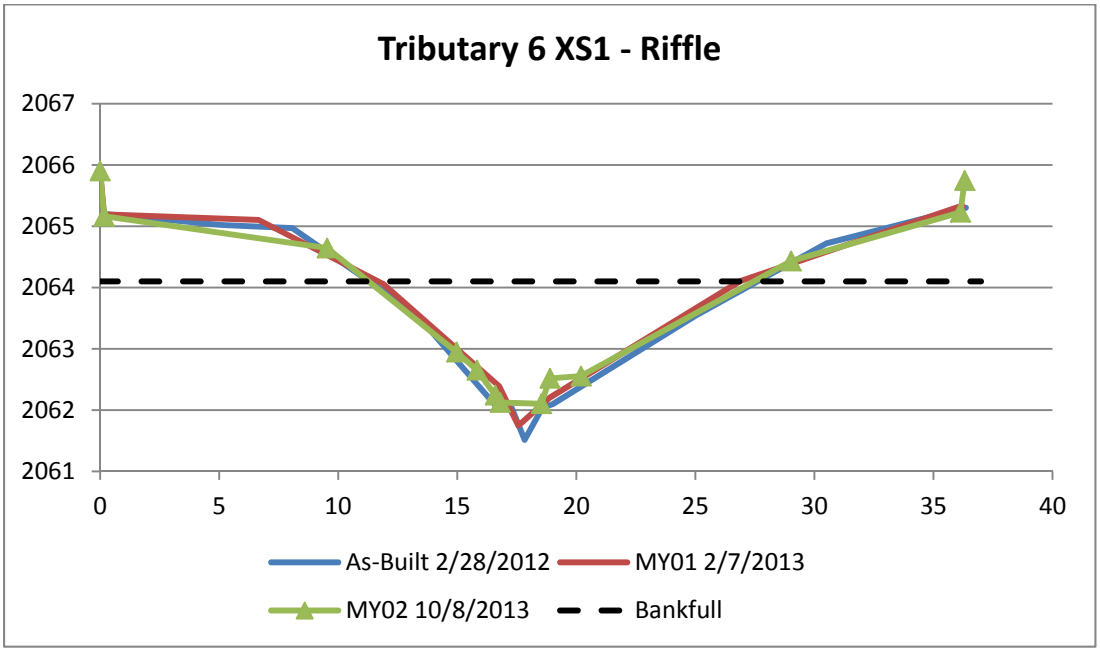
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2080.978	0.00	2081.575	0.00	2081.717
8.1352	2077.799	-0.17	2080.873	0.11	2080.826
14.512	2075.366	11.01	2076.821	2.46	2079.846
15.5091	2075.095	14.73	2075.547	11.41	2077.238
16.0631	2075.285	15.27	2076.101	13.71	2075.641
16.7233	2075.389	16.97	2075.918	14.34	2075.198
23.4744	2077.77	18.63	2076.703	14.95	2075.456
29.8109	2078.129	23.00	2078.257	15.66	2075.428
		29.63	2077.754	15.79	2075.776
		29.35	2078.799	21.37	2077.724
				29.36	2077.97
				29.33	2078.829



Tributary 5 XS3

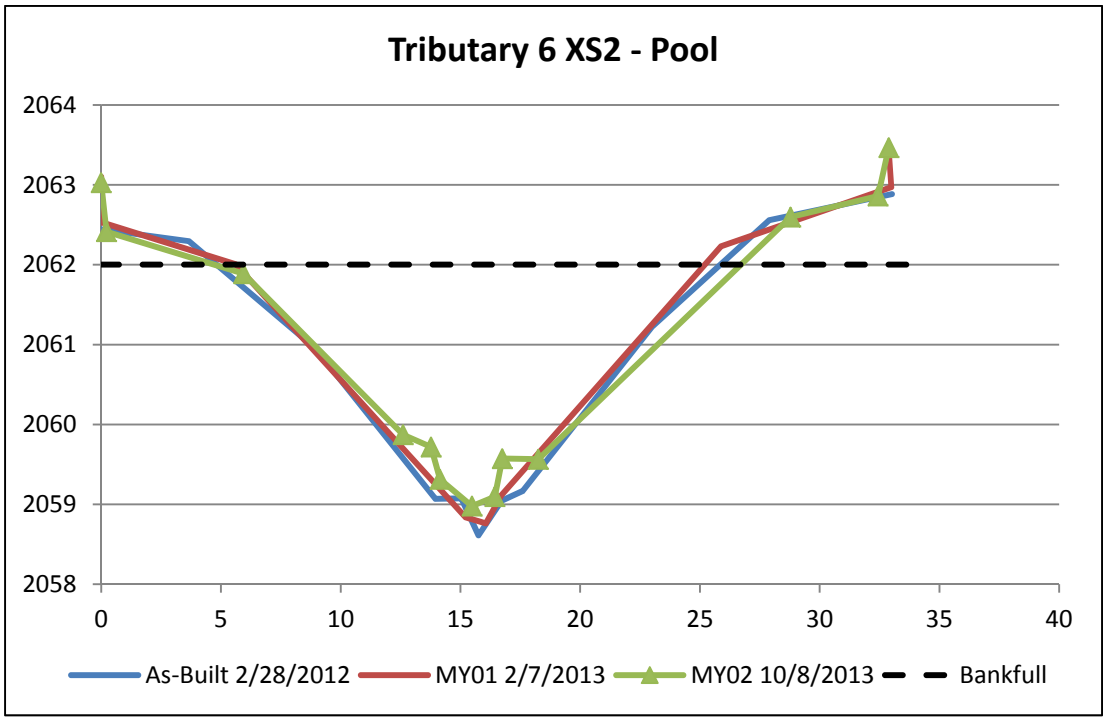
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2069.74	0.00	2070.401	0.00	2070.648
11.6367	2069.116	0.26	2069.636	0.25	2069.75
27.1749	2068.078	13.47	2068.989	12.57	2069.434
37.3558	2065.506	28.11	2068.191	25.52	2068.374
38.0937	2065.141	36.02	2066.172	30.75	2068.06
38.713	2065.439	36.92	2065.45	35.81	2065.881
48.0923	2068.717	37.87	2065.146	36.23	2065.374
52.6765	2069.258	38.63	2065.136	38.46	2065.549
		40.33	2066.38	39.31	2066.122
		47.77	2068.708	42.16	2067.669
		52.34	2069.255	47.11	2068.711
		52.46	2069.78	50.12	2069.281
				50.33	2069.794

Figure 8: Tributary 6 Cross Sections with Annual Overlays



Tributary 6 XS1

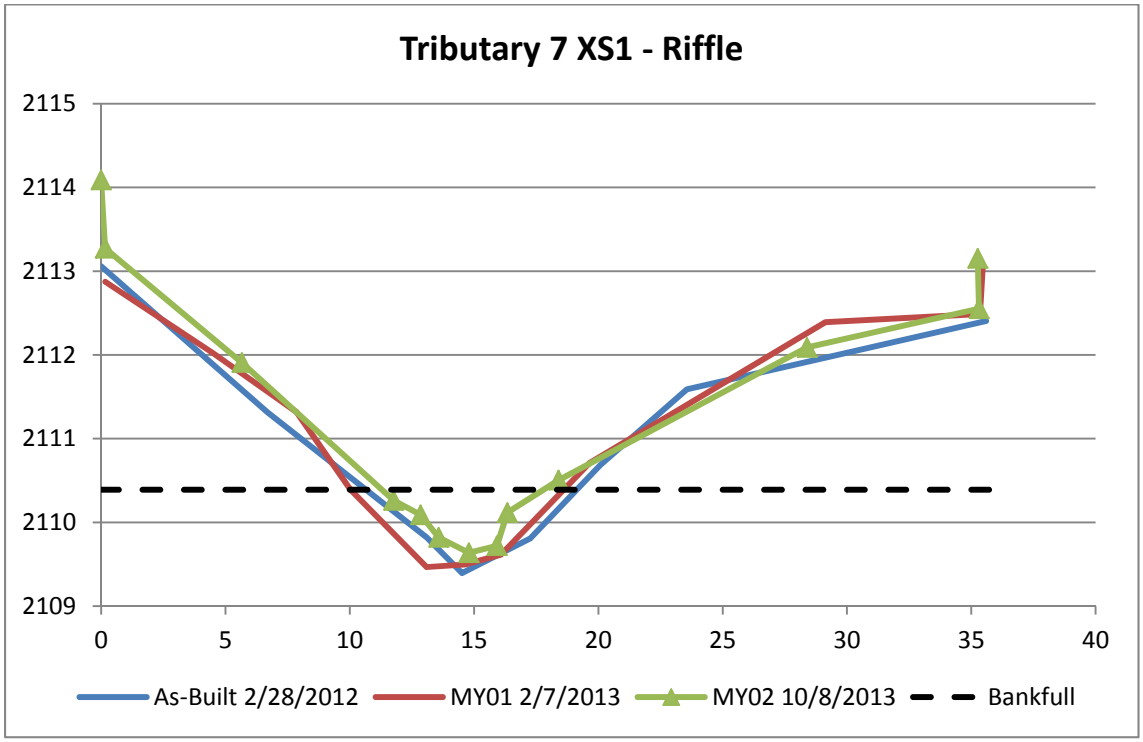
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2065.207	0.00	2065.902	0.00	2065.902
5.1102	2065.021	0.17	2065.194	0.16	2065.164
8.0812	2064.969	6.66	2065.102	9.53	2064.644
13.2725	2063.57	11.89	2064.059	14.97	2062.946
16.6861	2062.04	16.76	2062.392	15.83	2062.652
17.2919	2062.031	17.57	2061.746	16.60	2062.243
17.8299	2061.514	18.89	2062.204	16.80	2062.123
18.5677	2062.035	26.87	2064.102	18.53	2062.102
19.0027	2062.096	36.21	2065.336	18.89	2062.518
25.013	2063.542	36.18	2065.282	20.20	2062.556
30.5069	2064.721			29.02	2064.433
36.3639	2065.302			36.13	2065.227
				36.31	2065.744



Tributary 6 XS2

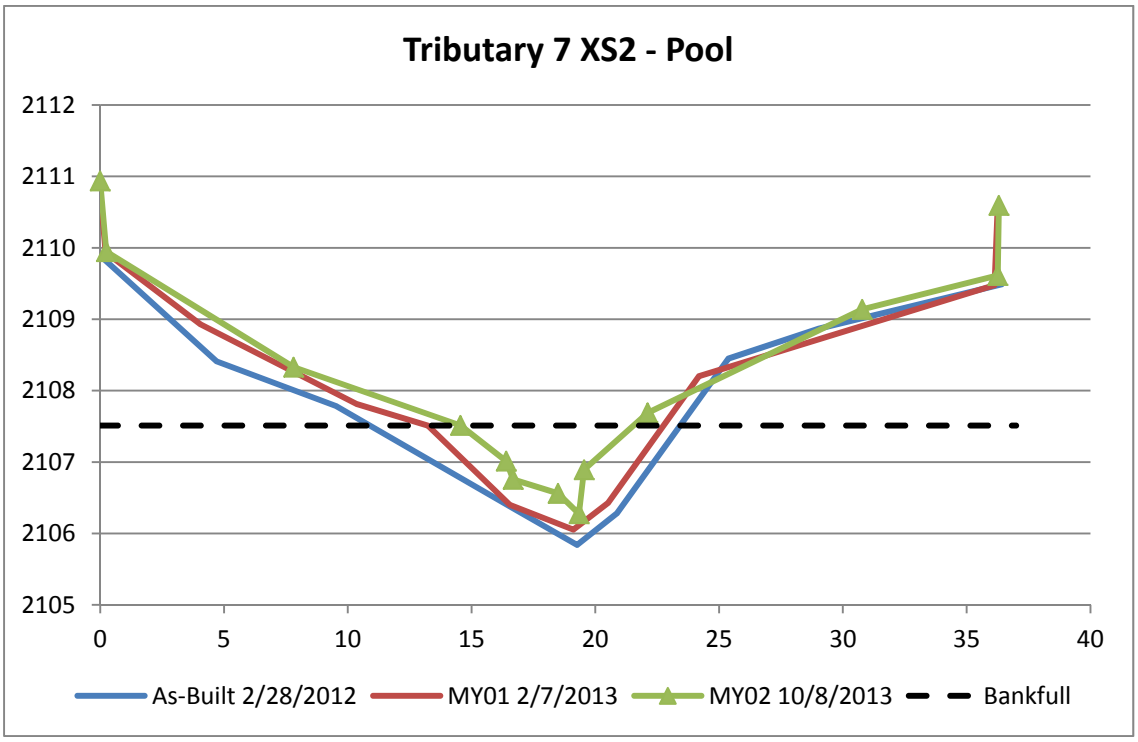
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2062.443	0.00	2063.1	0.00	2063.027
3.6619	2062.296	-0.06	2062.538	0.22	2062.414
8.9382	2060.953	5.60	2062.007	5.94	2061.888
13.9563	2059.068	15.21	2058.837	12.61	2059.872
15.038	2059.075	16.06	2058.761	13.77	2059.719
15.7537	2058.611	16.71	2059.114	14.15	2059.313
16.7229	2059.046	25.87	2062.229	15.48	2058.979
17.6075	2059.169	32.99	2062.97	16.44	2059.097
23.0162	2061.227	32.87	2063.495	16.75	2059.572
27.891	2062.558			18.25	2059.564
33.0173	2062.884			28.79	2062.597
				32.44	2062.86
				32.89	2063.466

Figure 9: Tributary 7 Cross Sections with Annual Overlays



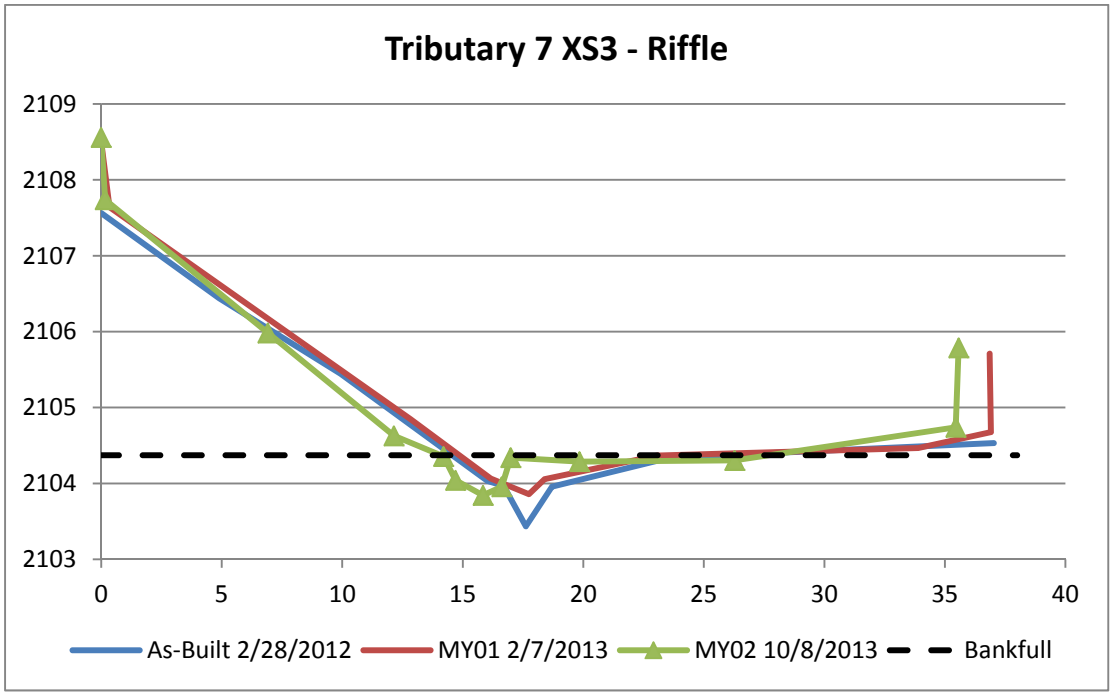
Tributary 7 XS1

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0.00	2113.06	0.00	2113.94	0.00	2114.09
6.69	2111.31	0.17	2112.87	0.16	2113.27
13.10	2109.82	4.51	2112.02	5.66	2111.91
14.52	2109.39	7.86	2111.32	11.76	2110.26
17.25	2109.81	10.03	2110.39	12.85	2110.09
20.08	2110.68	13.09	2109.47	13.58	2109.82
23.56	2111.59	14.64	2109.50	14.79	2109.64
35.60	2112.40	16.08	2109.62	15.92	2109.72
		19.64	2110.71	16.34	2110.12
		29.13	2112.39	18.40	2110.51
		35.35	2112.49	28.39	2112.09
		35.47	2113.07	35.31	2112.55
				35.26	2113.15



Tributary 7 XS2

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0.00	2109.89	0.00	2110.80	0.00	2110.94
4.70	2108.41	0.21	2109.94	0.25	2109.95
9.52	2107.78	4.06	2108.93	7.81	2108.33
16.80	2106.33	10.34	2107.82	14.55	2107.51
19.27	2105.84	13.23	2107.51	16.40	2107.01
20.87	2106.28	16.55	2106.40	16.68	2106.76
25.38	2108.45	19.11	2106.05	18.49	2106.56
29.03	2108.87	20.52	2106.43	19.34	2106.28
36.41	2109.49	24.19	2108.20	19.55	2106.89
		36.13	2109.48	22.12	2107.69
		36.24	2110.44	30.78	2109.14
				36.26	2109.61
				36.30	2110.60



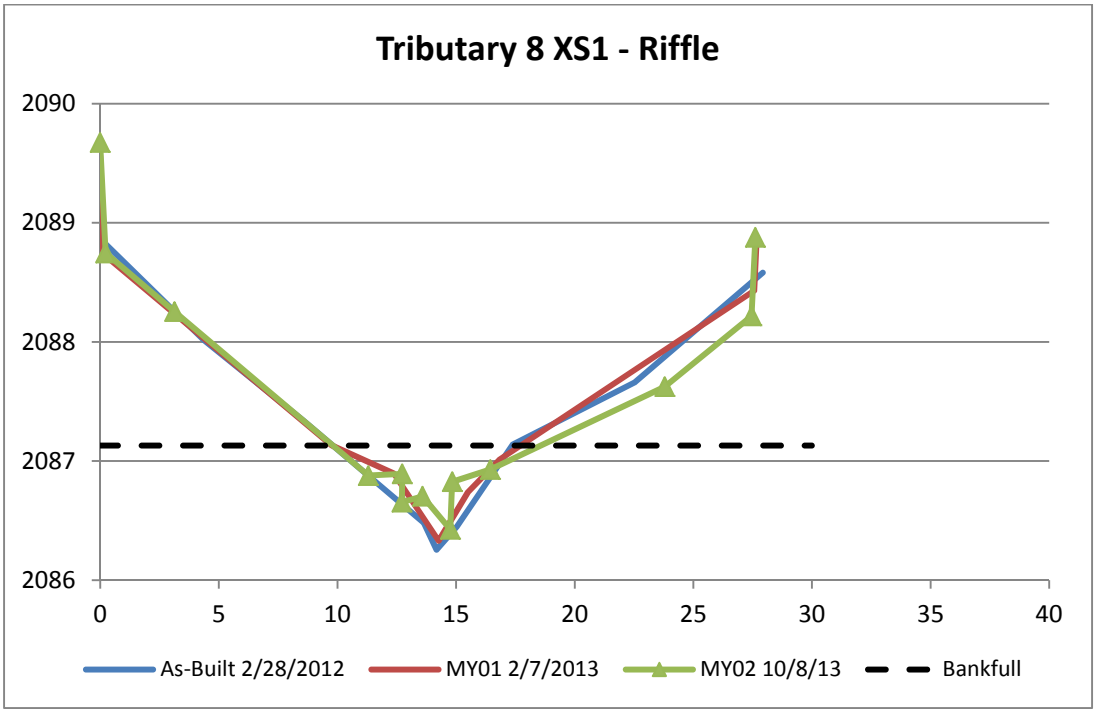
Tributary 7 XS3

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

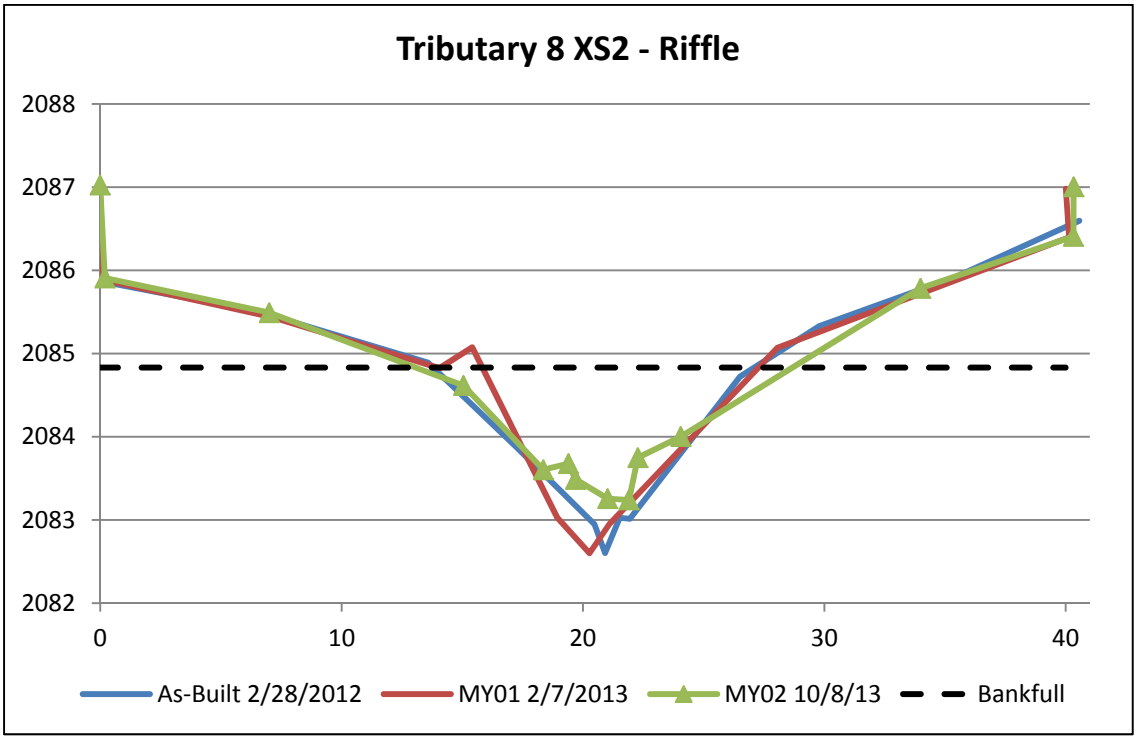
MY02 10/8/2013	URS
0.00	2108.56
0.16	2107.74
6.92	2105.98
12.15	2104.63
14.20	2104.36
14.70	2104.04
15.84	2103.84
16.62	2103.96
16.99	2104.34
19.85	2104.29
26.28	2104.30
35.46	2104.74
35.57	2105.79

Figure 10: Tributary 8 Cross Sections with Annual Overlays



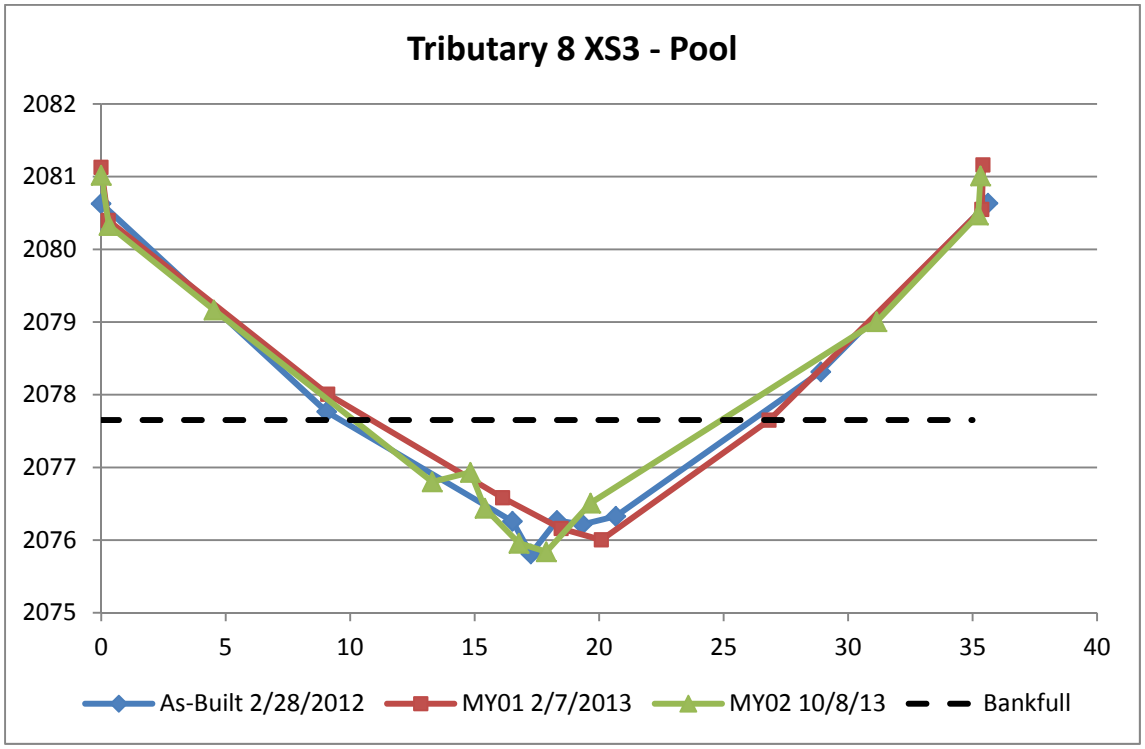
Tributary 8 XS1

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/13	URS
0.00	2088.87	0.00	2089.56	0.00	2089.67
4.37	2088.01	0.09	2088.75	0.23	2088.75
8.58	2087.34	9.74	2087.13	3.14	2088.25
13.65	2086.48	12.38	2086.90	11.30	2086.88
14.18	2086.26	14.27	2086.33	12.73	2086.89
15.03	2086.45	15.50	2086.74	12.72	2086.66
17.38	2087.14	16.84	2087.01	13.59	2086.70
22.52	2087.66	27.57	2088.43	14.76	2086.43
27.93	2088.58	27.67	2088.86	14.84	2086.83
				16.44	2086.93
				23.80	2087.62
				27.46	2088.22
				27.62	2088.88



Tributary 8 XS2

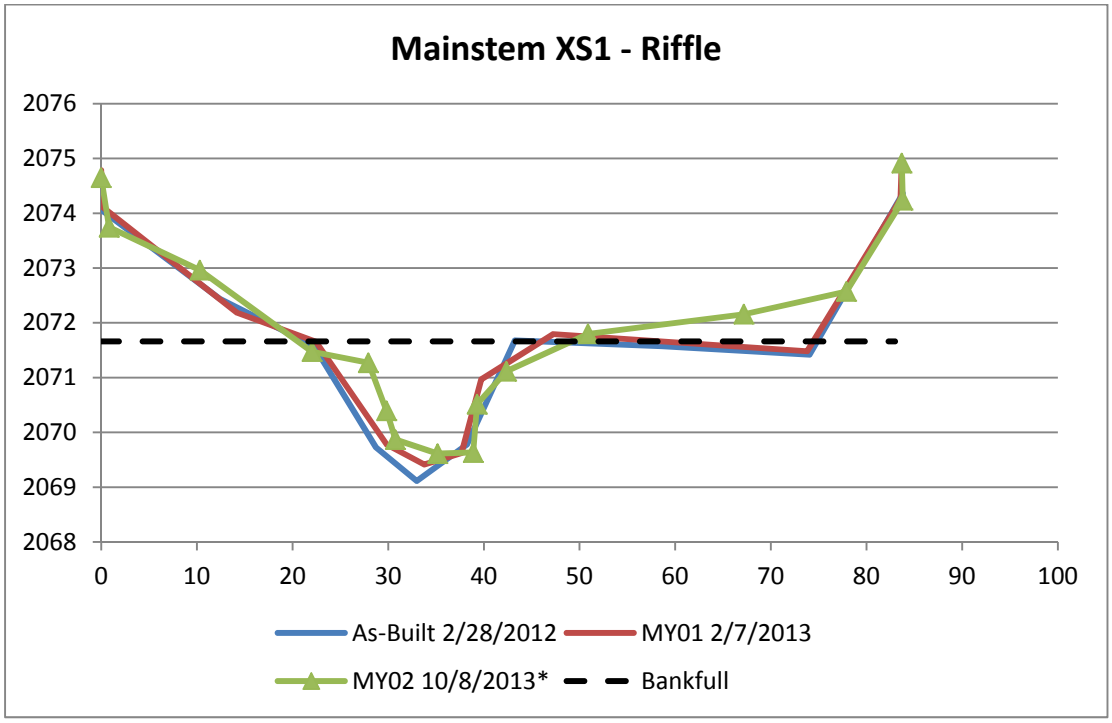
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/13	URS
0.00	2085.87	0.00	2086.92	0.00	2087.03
6.58	2085.50	0.13	2085.89	0.20	2085.91
13.59	2084.89	7.16	2085.44	7.01	2085.49
17.21	2083.88	14.05	2084.83	15.05	2084.62
20.48	2082.95	15.41	2085.08	18.36	2083.60
20.91	2082.60	18.93	2083.03	19.40	2083.68
21.52	2083.03	20.27	2082.60	19.69	2083.49
21.94	2083.01	21.09	2082.95	21.03	2083.26
26.51	2084.72	28.05	2085.07	21.91	2083.24
29.81	2085.33	40.13	2086.40	22.28	2083.75
35.43	2085.92	40.01	2086.98	24.05	2084.00
40.56	2086.60			33.99	2085.78
				40.32	2086.41
				40.33	2087.00



Tributary 8 XS3

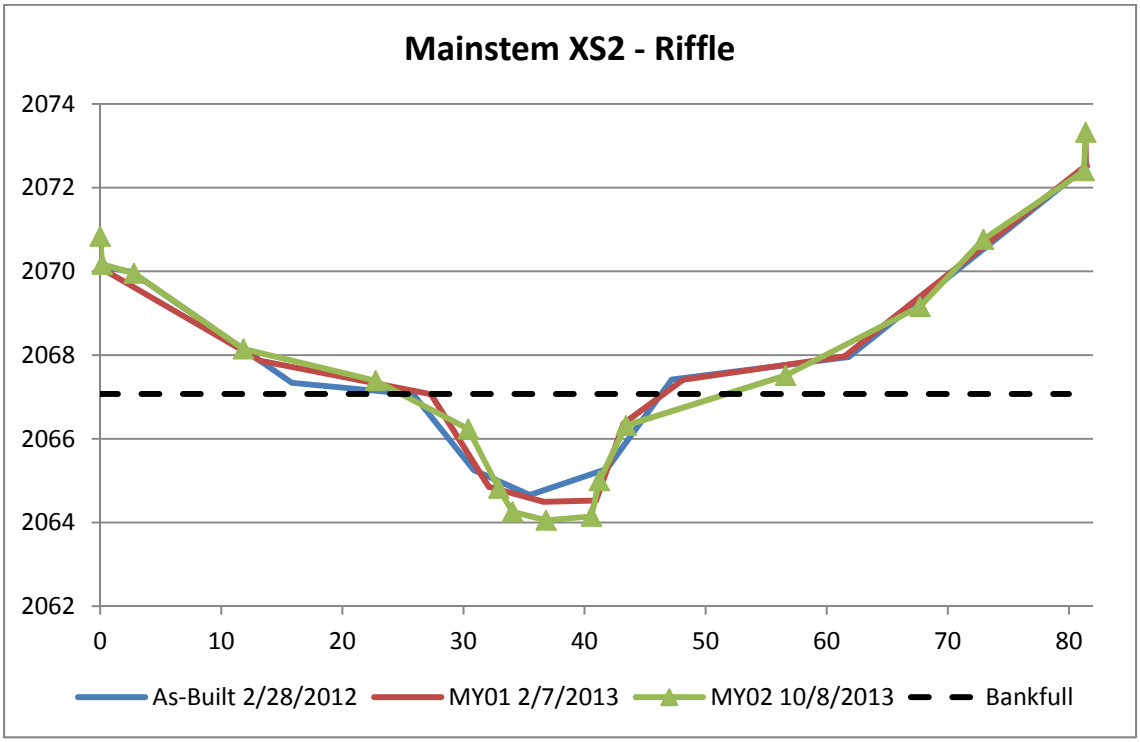
As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/13	URS
0.00	2080.63	0.00	2081.13	0.00	2081.02
9.06	2077.77	0.28	2080.40	0.31	2080.33
16.52	2076.26	9.10	2078.01	4.53	2079.17
17.26	2075.81	16.13	2076.58	13.30	2076.80
18.31	2076.27	18.48	2076.16	14.83	2076.93
19.33	2076.22	20.09	2076.00	15.42	2076.44
20.67	2076.33	26.83	2077.65	16.78	2075.96
28.90	2078.31	35.38	2080.55	17.88	2075.84
35.62	2080.64	35.43	2081.16	19.66	2076.51
				31.15	2079.01
				35.23	2080.47
				35.32	2081.01

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



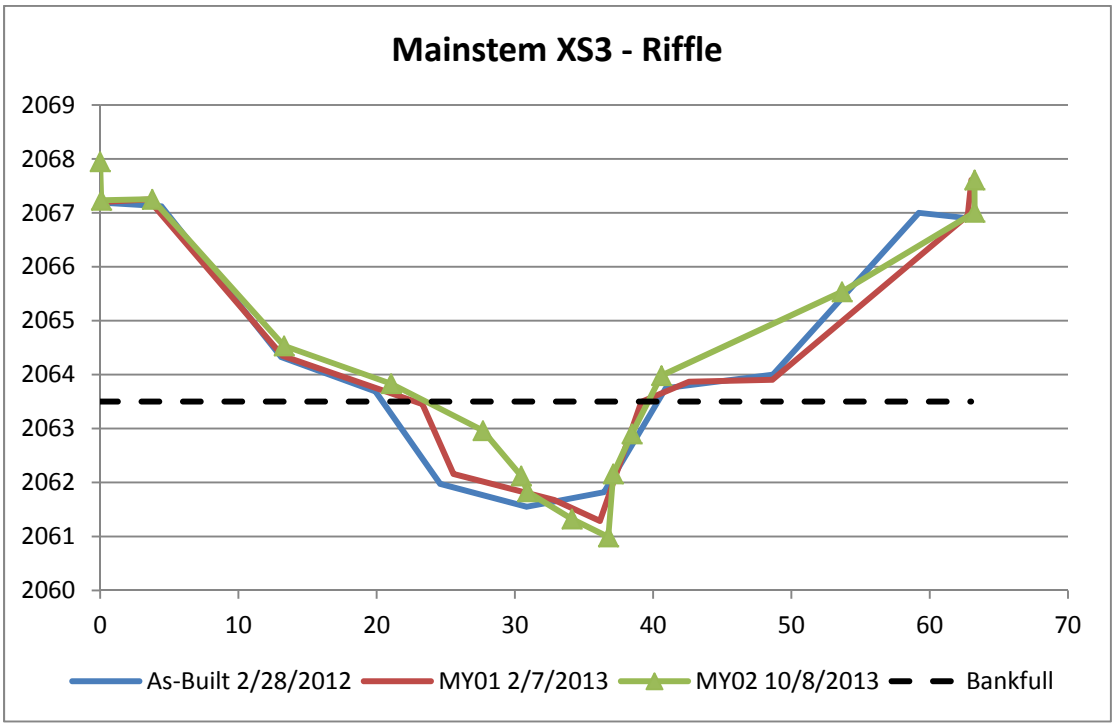
Mainstem Upstream of Browntown Road XS1

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013*	URS
0	2074.062	0.00	2074.785	0.00	2074.65
12.4161	2072.436	0.19	2074.106	0.82	2073.744
22.2392	2071.571	14.18	2072.185	10.31	2072.962
28.7208	2069.726	22.43	2071.657	22.03	2071.473
32.9903	2069.114	29.84	2069.777	27.92	2071.27
38.2432	2069.779	33.76	2069.414	29.83	2070.393
43.2398	2071.676	37.67	2069.624	30.76	2069.868
58.6085	2071.571	39.72	2070.966	35.17	2069.611
74.0392	2071.416	47.25	2071.795	38.89	2069.632
83.8001	2074.363	73.79	2071.482	39.30	2070.513
		83.57	2074.263	42.36	2071.116
		83.69	2074.963	50.89	2071.797
				67.18	2072.156
				77.90	2072.571
				83.79	2074.238
				83.69	2074.916



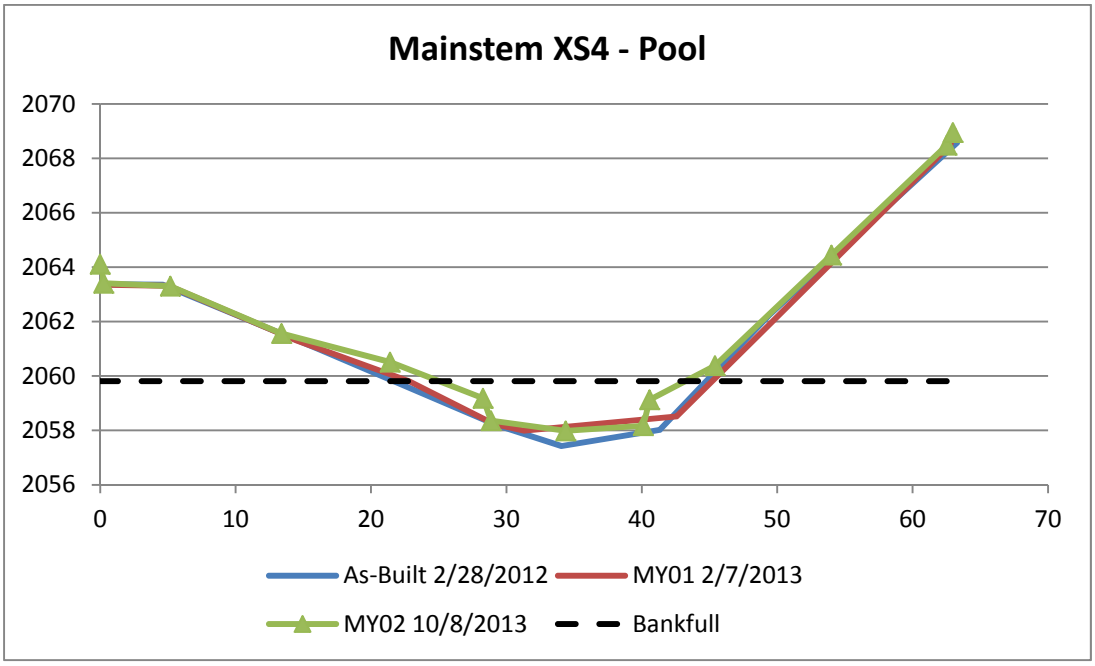
Mainstem Upstream of Browntown Road XS2

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2070.132	0.00	2070.824	0.00	2070.836
2.6192	2069.988	0.16	2070.062	0.16	2070.169
15.8434	2067.338	13.22	2067.865	2.79	2069.954
25.86	2067.062	27.31	2067.067	11.83	2068.147
30.8474	2065.253	32.10	2064.854	22.74	2067.389
35.4955	2064.659	36.65	2064.494	30.39	2066.236
41.829	2065.279	40.96	2064.526	32.91	2064.816
47.2124	2067.417	43.20	2066.361	34.05	2064.256
61.8097	2067.952	48.14	2067.409	36.82	2064.056
81.5124	2072.516	61.49	2067.97	40.56	2064.147
		81.42	2072.532	41.22	2065
		81.37	2073.318	43.42	2066.317
				56.60	2067.512
				67.70	2069.159
				72.94	2070.763
				81.25	2072.402
				81.39	2073.32



Mainstem Upstream of Browntown Road XS3

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2067.19	0.00	2067.909	0.00	2067.947
4.4327	2067.123	-0.08	2067.195	0.09	2067.232
13.0977	2064.323	3.50	2067.247	3.77	2067.251
19.916	2063.687	13.19	2064.349	13.30	2064.534
24.5923	2061.976	23.31	2063.452	21.04	2063.833
30.8506	2061.55	25.55	2062.158	27.68	2062.961
36.445	2061.819	32.85	2061.676	30.46	2062.121
40.9076	2063.75	36.15	2061.285	30.90	2061.827
48.6652	2064	39.15	2063.495	34.12	2061.323
59.2229	2067	42.58	2063.867	36.76	2060.991
63.2372	2066.886	48.62	2063.903	37.11	2062.161
		62.74	2066.95	38.46	2062.903
		63.02	2067.611	40.60	2063.983
				53.66	2065.537
				63.25	2067.01
				63.25	2067.61



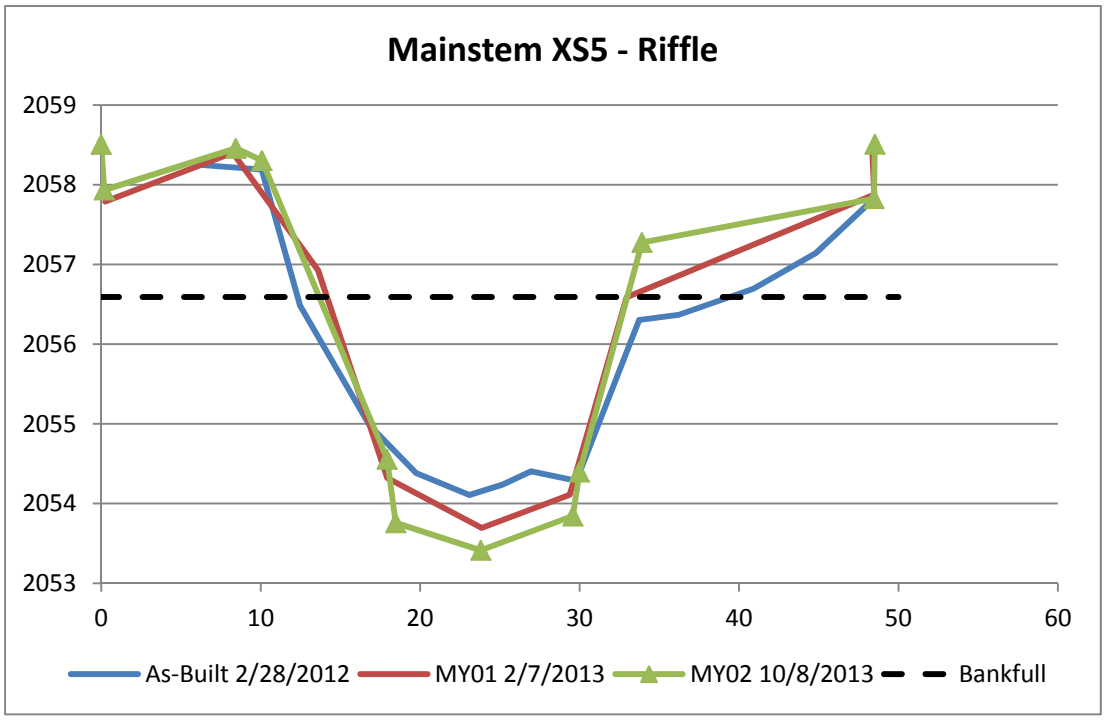
Mainstem Upstream of Browntown Road XS4

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

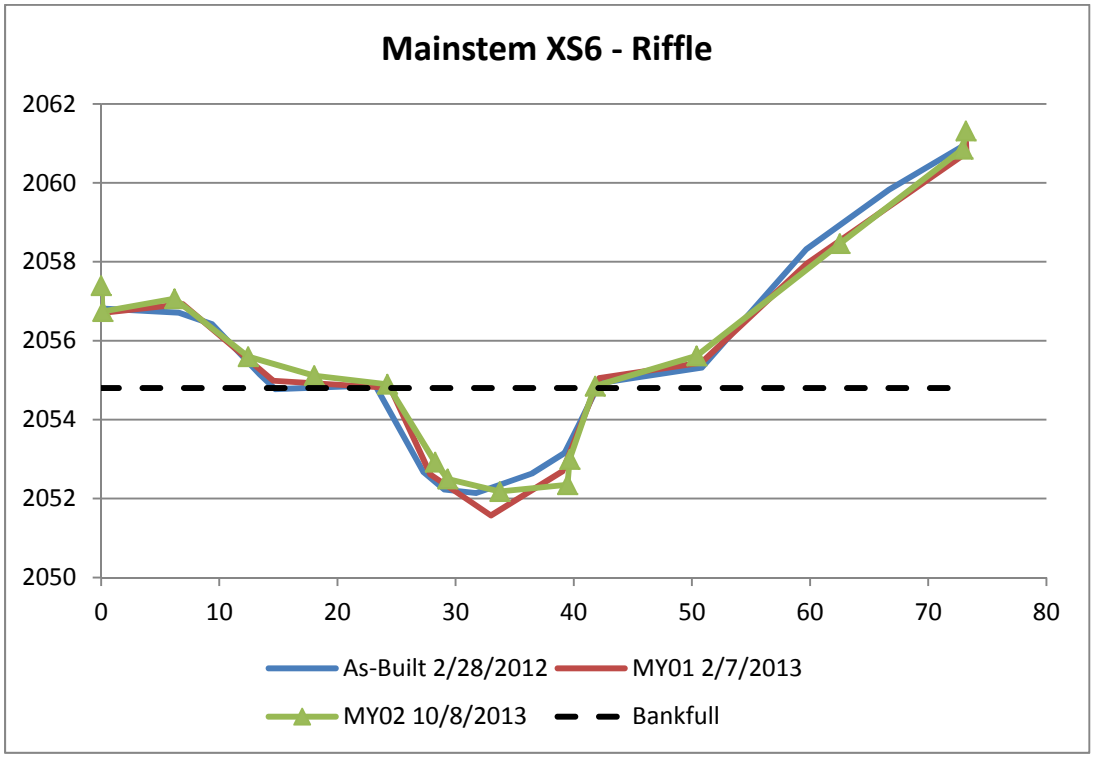
MY02 10/8/2013	URS
0.00	2064.109
0.26	2063.407
5.18	2063.304
13.39	2061.562
21.41	2060.512
28.27	2059.183
28.86	2058.361
34.39	2057.984
40.10	2058.176
40.58	2059.128
45.40	2060.379
54.01	2064.446
62.54	2068.487
62.98	2068.947

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



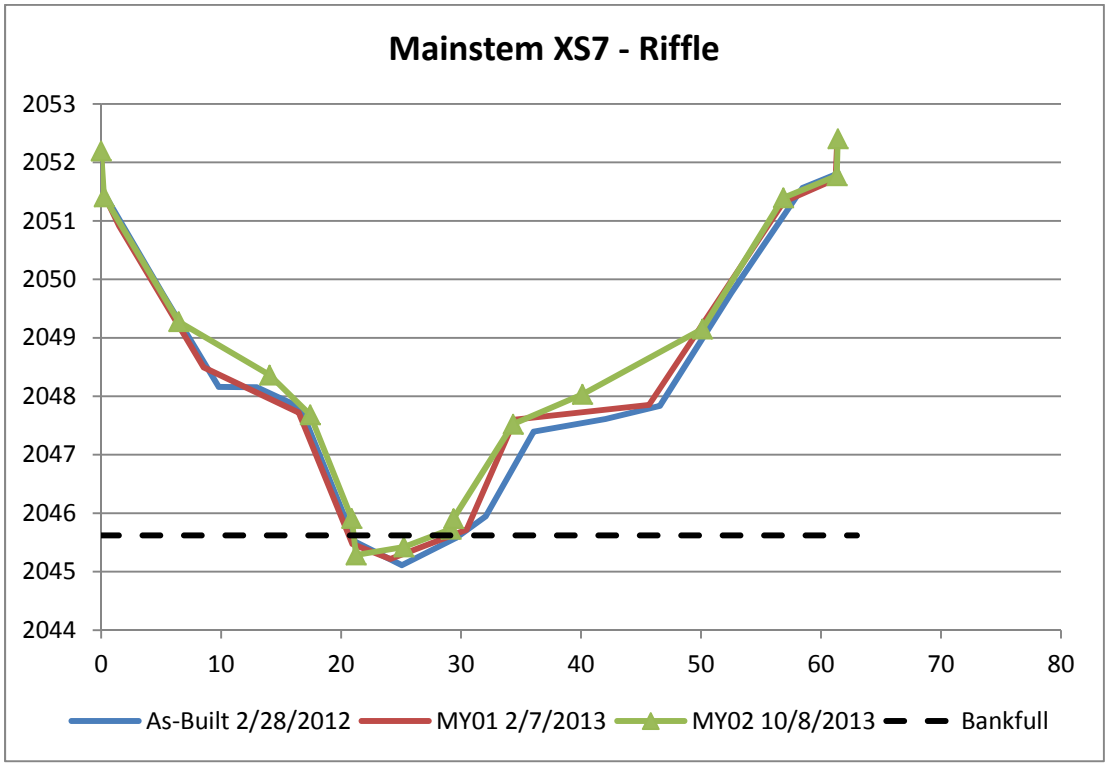
Mainstem Downstream of Browntown Road XS5

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2057.925	0.00	2058.401	0.00	2058.507
5.9297	2058.253	0.25	2057.789	0.19	2057.934
10.0609	2058.19	8.24	2058.402	8.45	2058.457
12.4738	2056.482	13.60	2056.927	10.08	2058.304
16.821	2054.986	17.94	2054.32	17.93	2054.557
19.7434	2054.383	23.86	2053.693	18.47	2053.759
23.0883	2054.108	29.38	2054.11	23.80	2053.413
25.1727	2054.237	32.95	2056.588	29.58	2053.844
26.9522	2054.404	48.48	2057.877	29.99	2054.395
29.8047	2054.287	48.36	2058.401	33.91	2057.276
33.7347	2056.304			48.46	2057.827
36.2155	2056.369			48.52	2058.508
40.9048	2056.694				
44.8342	2057.144				
48.5411	2057.842				



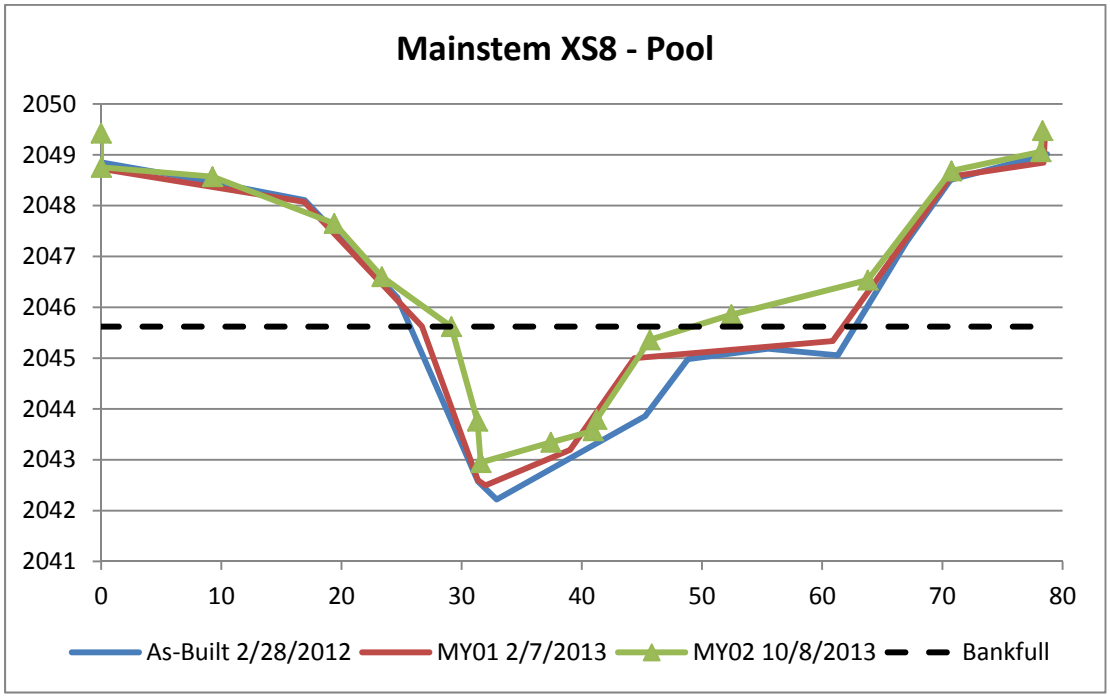
Mainstem Downstream of Browntown Road XS6

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2056.814	0.00	2057.39	0.00	2057.395
6.562	2056.708	0.11	2056.706	0.13	2056.74
9.399	2056.419	6.91	2056.926	6.21	2057.065
13.4204	2055.146	14.57	2054.986	12.43	2055.597
14.7415	2054.769	24.48	2054.802	18.03	2055.117
23.2017	2054.869	27.87	2052.611	24.22	2054.898
27.2717	2052.676	32.99	2051.573	28.26	2052.922
29.04	2052.228	39.04	2052.692	29.32	2052.497
31.7226	2052.141	42.16	2055.055	33.74	2052.179
36.4605	2052.636	50.81	2055.443	39.47	2052.352
39.2248	2053.157	59.76	2057.96	39.66	2052.992
40.361	2053.832	73.24	2060.761	41.80	2054.851
42.1732	2054.926	73.13	2061.374	50.40	2055.617
50.8334	2055.319			62.52	2058.461
59.6708	2058.317			72.92	2060.855
66.6759	2059.827			73.19	2061.318
73.2022	2060.98				



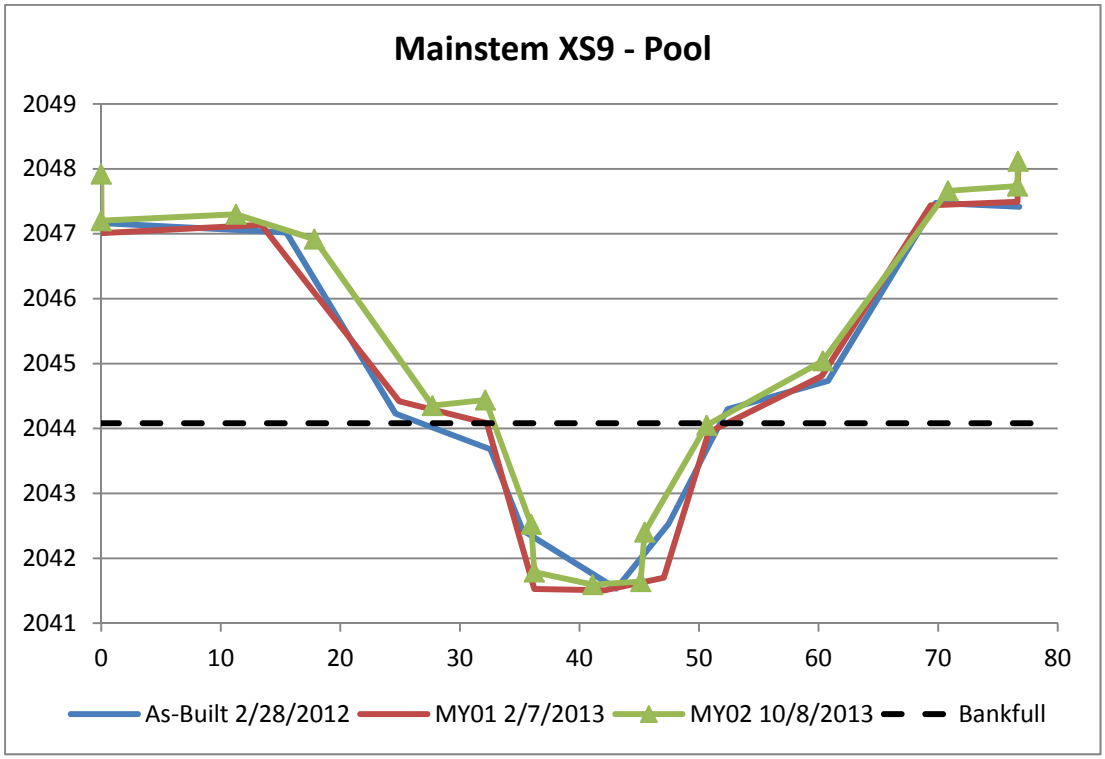
Mainstem Downstream of Browntown Road XS7

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2051.554	0.00	2052.17	0.00	2052.197
5.1556	2049.744	0.12	2051.503	0.24	2051.412
9.8014	2048.158	1.51	2050.912	6.46	2049.276
12.9772	2048.153	8.54	2048.494	14.04	2048.363
16.5994	2047.808	16.47	2047.72	17.42	2047.684
21.1335	2045.515	20.94	2045.474	20.88	2045.91
25.0671	2045.109	24.10	2045.217	21.24	2045.286
29.5685	2045.574	30.45	2045.717	25.23	2045.423
32.0625	2045.948	34.47	2047.599	29.15	2045.728
36.0525	2047.394	45.67	2047.851	29.37	2045.909
42.0455	2047.612	56.89	2051.324	34.33	2047.523
46.57	2047.834	61.23	2051.717	40.11	2048.034
52.5161	2049.769	61.36	2052.365	50.12	2049.151
58.4578	2051.562			56.86	2051.394
61.4321	2051.812			61.32	2051.772
				61.41	2052.405



Mainstem Downstream of Browntown Road XS8

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2048.851	0.00	2049.361	0.00	2049.424
7.5733	2048.535	-0.05	2048.724	0.00	2048.753
16.9398	2048.108	16.90	2048.074	9.26	2048.57
24.6471	2046.195	26.70	2045.624	19.40	2047.649
31.3548	2042.574	31.35	2042.598	23.36	2046.601
32.9069	2042.22	31.98	2042.495	29.14	2045.62
45.272	2043.858	39.03	2043.196	31.31	2043.76
48.8273	2044.981	44.37	2044.998	31.59	2042.946
55.4931	2045.185	60.88	2045.334	37.42	2043.343
61.299	2045.054	70.69	2048.572	40.94	2043.57
67.0118	2047.282	78.42	2048.846	41.23	2043.794
70.679	2048.508	78.56	2049.427	45.66	2045.36
78.7178	2049.012			52.44	2045.855
				63.80	2046.536
				70.75	2048.683
				78.18	2049.059
				78.33	2049.475



Mainstem Downstream of Browntown Road XS9

As-Built 2/28/2012	KEE	MY01 2/7/2013	URS	MY02 10/8/2013	URS
0	2047.164	0.00	2047.797	0.00	2047.919
15.4834	2047.018	0.01	2047.009	0.00	2047.2
24.6158	2044.23	13.40	2047.136	11.27	2047.3
32.5523	2043.681	24.92	2044.42	17.84	2046.917
35.2546	2042.431	32.26	2044.081	27.70	2044.352
43.075	2041.533	36.23	2041.526	32.13	2044.439
47.45	2042.533	42.10	2041.506	35.96	2042.522
52.3752	2044.295	47.05	2041.701	36.22	2041.787
60.7911	2044.733	50.80	2043.939	41.10	2041.594
69.811	2047.474	60.26	2044.807	45.12	2041.641
76.7954	2047.415	69.37	2047.438	45.45	2042.402
		76.64	2047.492	50.65	2044.049
		76.72	2048.107	60.36	2045.041
				70.83	2047.662
				76.64	2047.734
				76.68	2048.116

Figure 13: Tributary 3 Longitudinal Profile with Annual Overlays

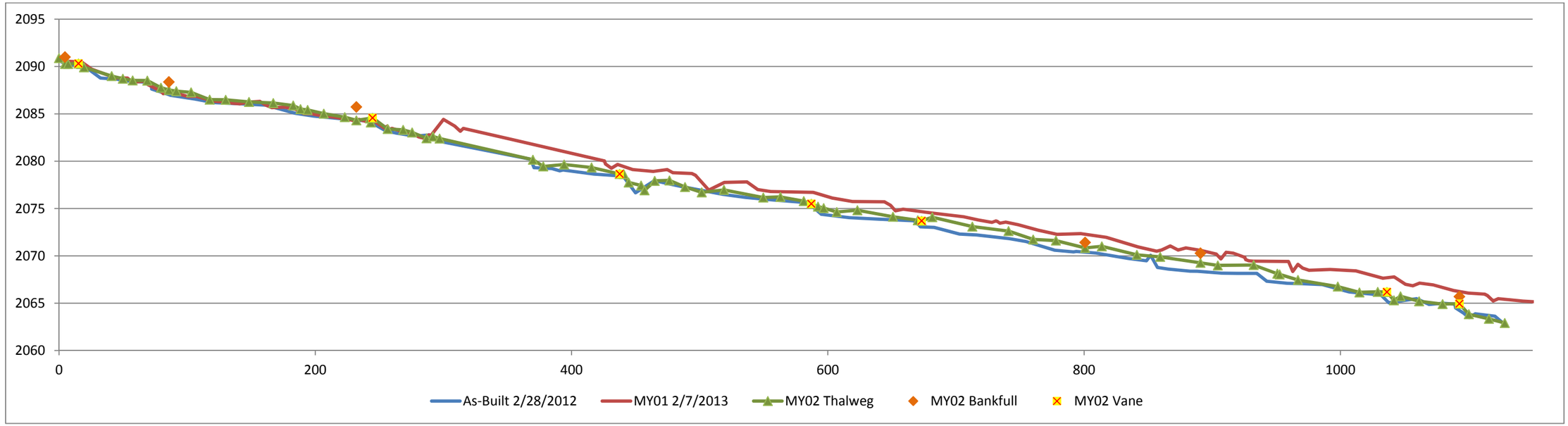


Figure 14: Tributary 4 Longitudinal Profile with Annual Overlays

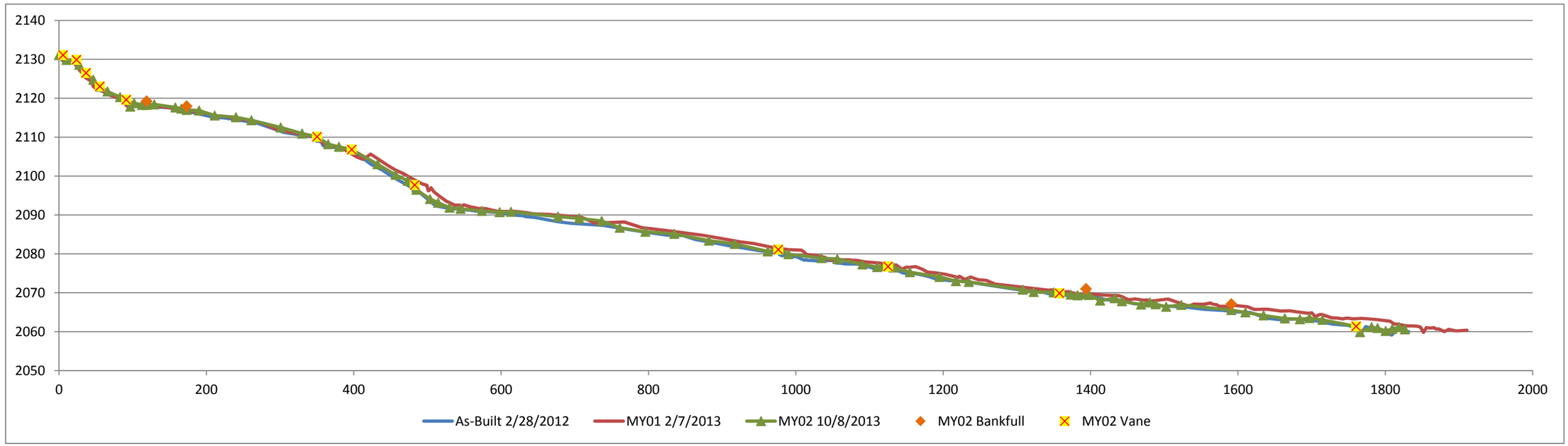


Figure 15: Tributary 5 Longitudinal Profile with Annual Overlays

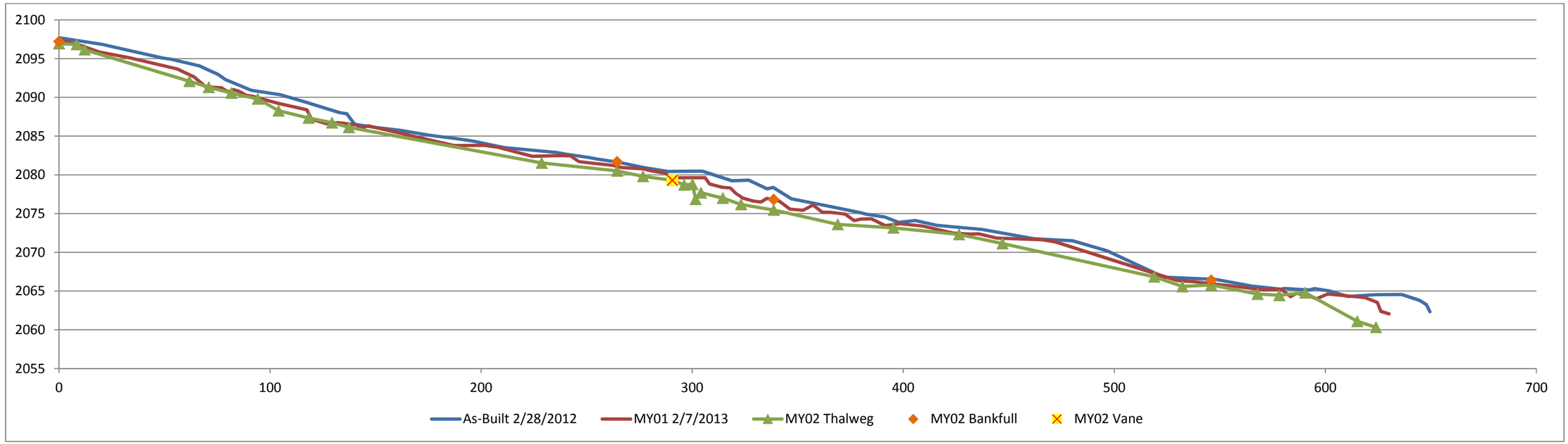


Figure 16: Tributary 6 Longitudinal Profile with Annual Overlays

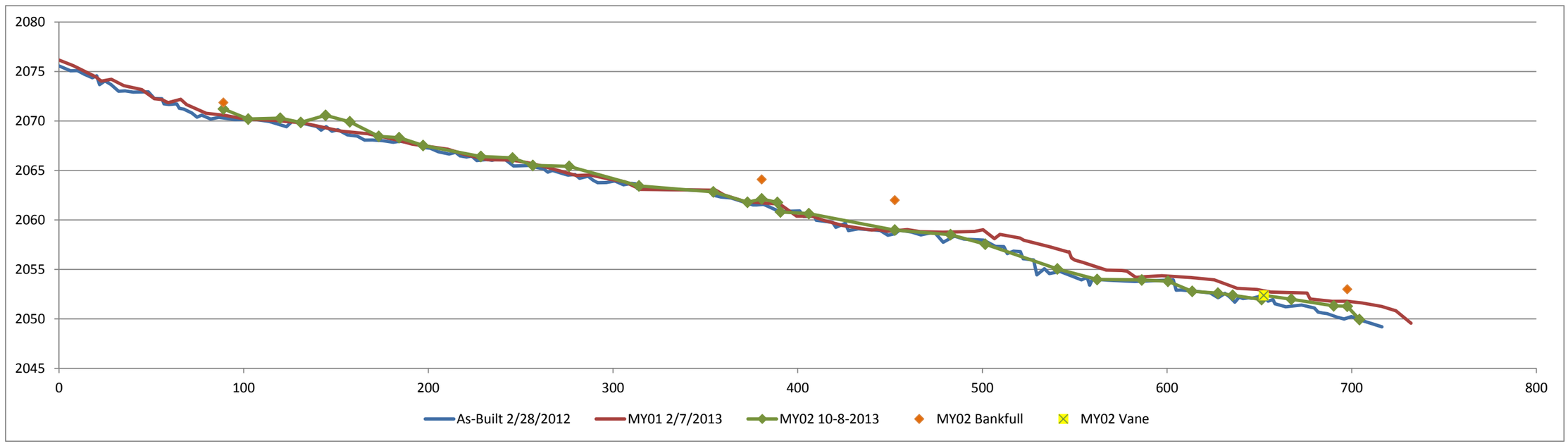


Figure 17: Tributary 7 Longitudinal Profile with Annual Overlays

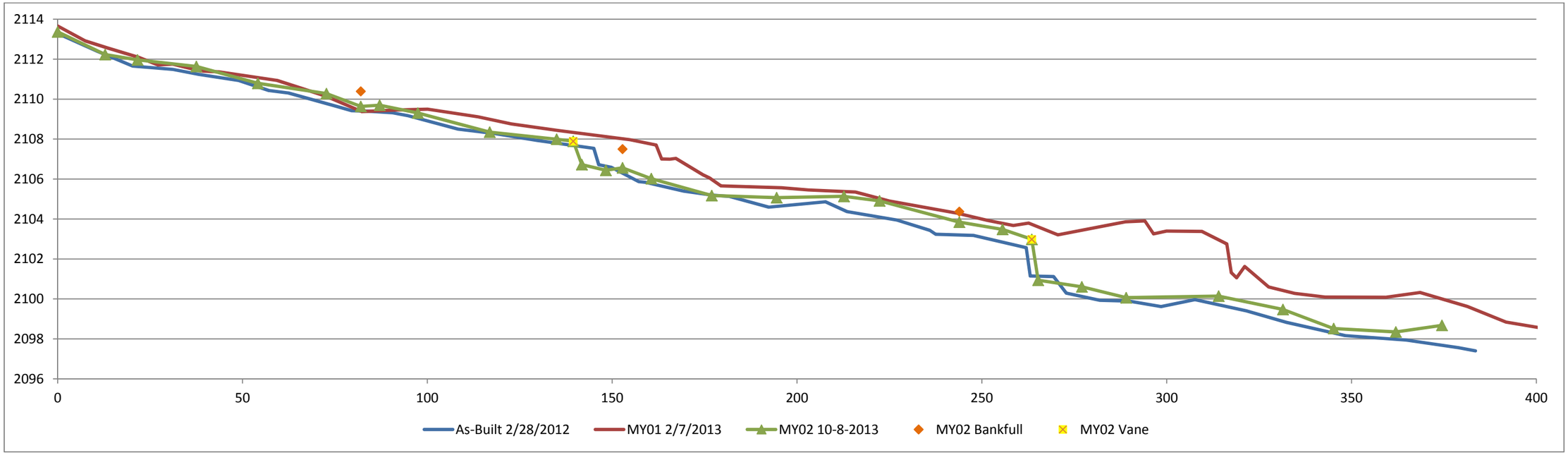


Figure 18: Tributary 8 Longitudinal Profile with Annual Overlays

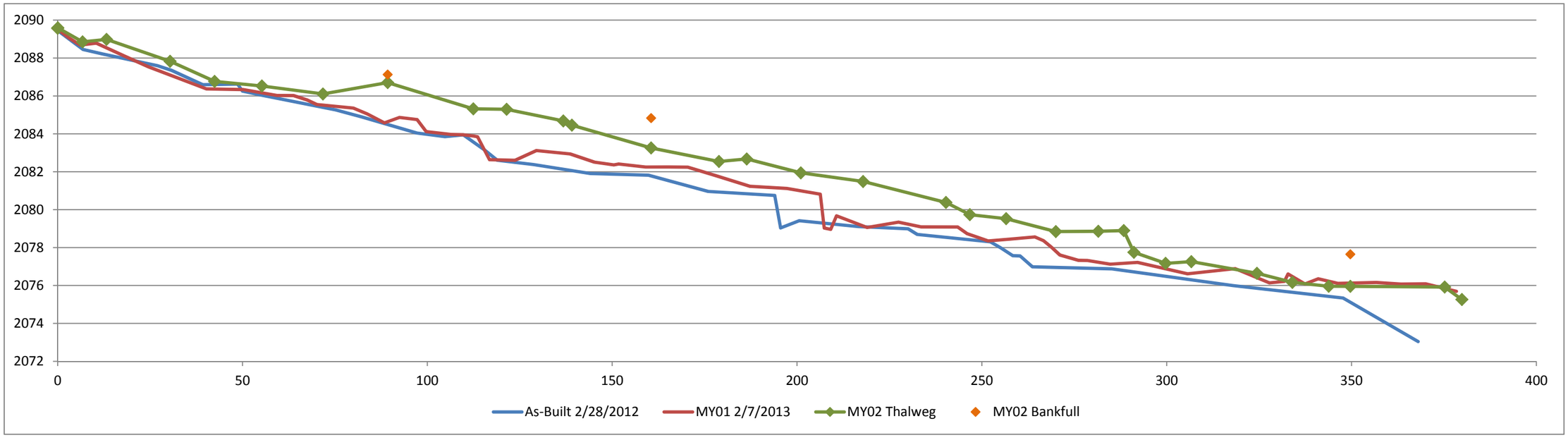


Figure 19: Mainstem – Upstream of Browntown Road Longitudinal Profile with Annual Overlays

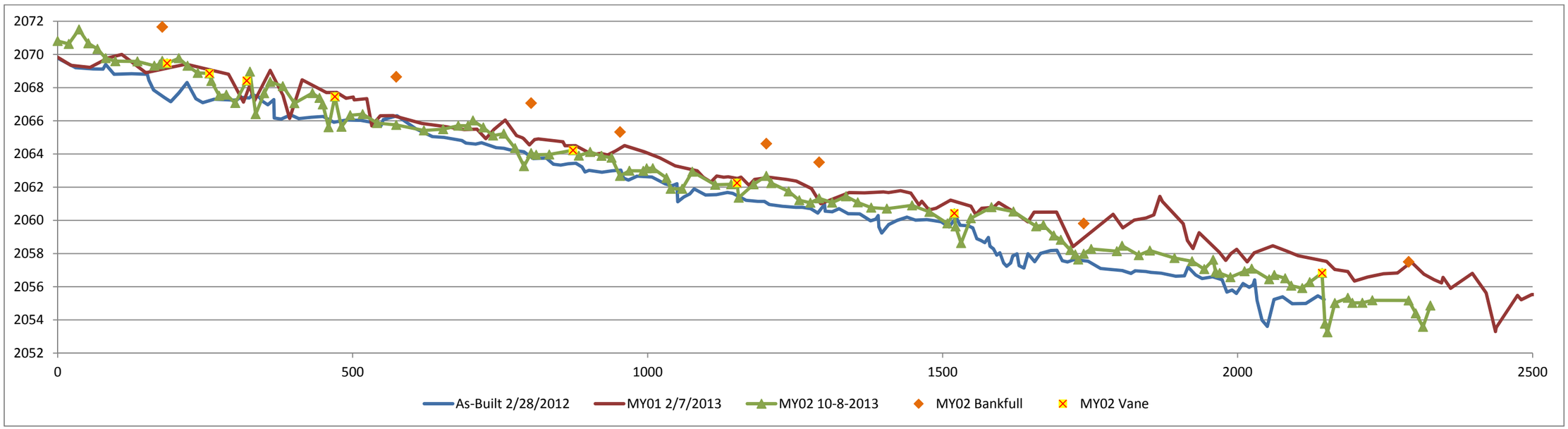


Figure 20: Mainstem – Downstream of Browntown Road Longitudinal Profile with Annual Overlays

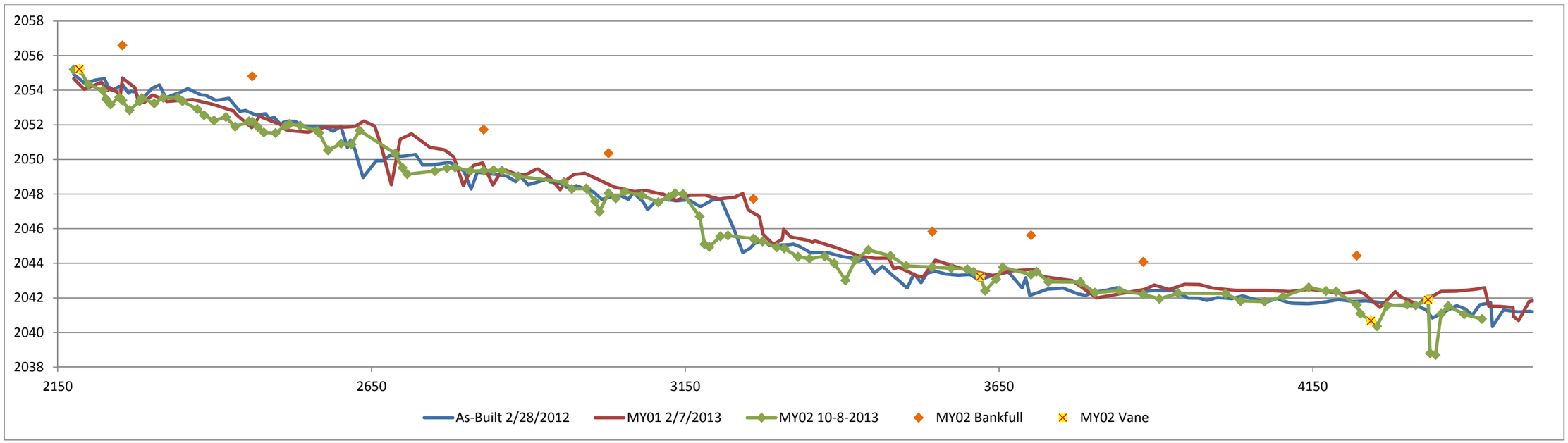
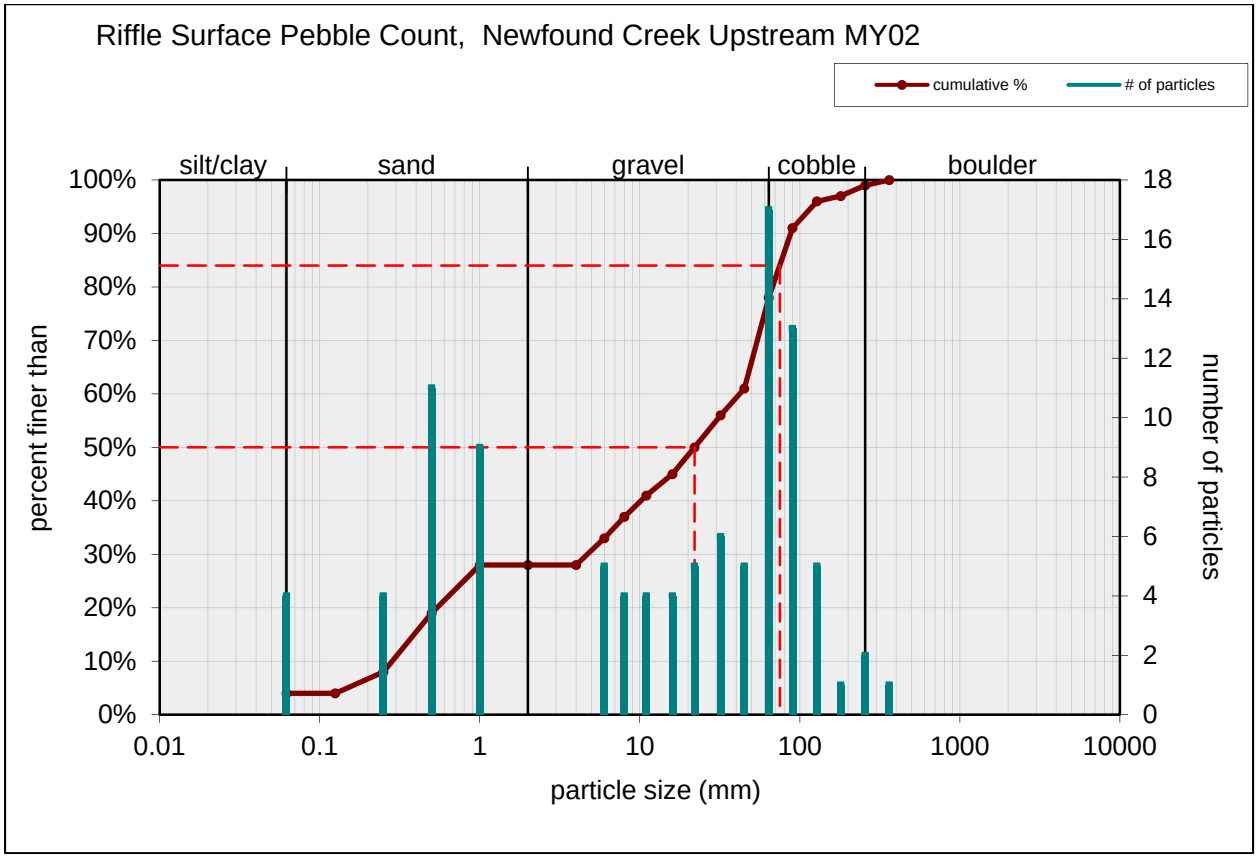
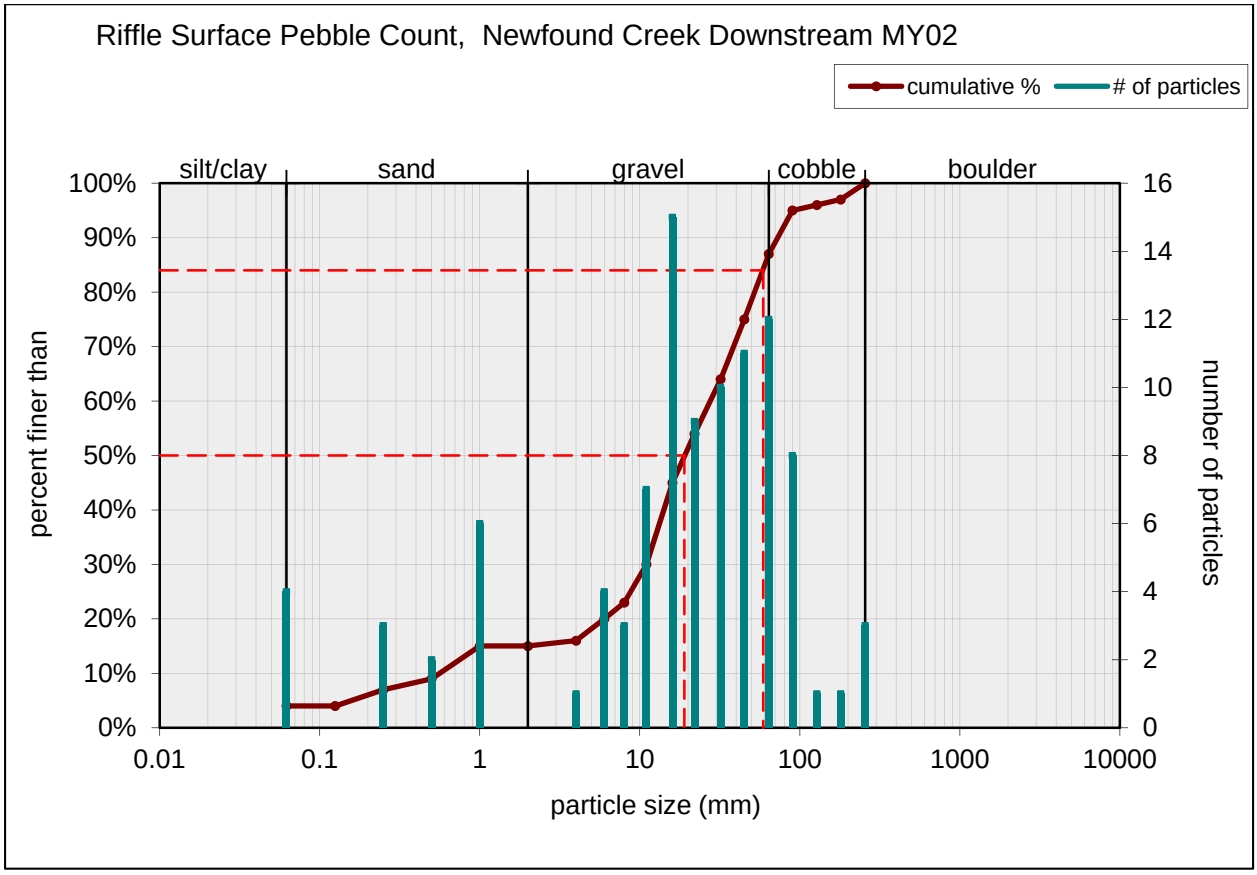


Figure 21: Pebble Count Plot – Mainstem Upstream of Browntown Road (Riffle Cross Section 3)



Size (mm)		Type	
D16	0.41	silt/clay	4%
D35	6.9	sand	24%
D50	22	gravel	50%
D65	49	cobble	21%
D84	75	boulder	1%
D95	120		

Figure 22: Pebble Count Plot – Mainstem Downstream of Browntown Road (Riffle Cross-Section 7)



Size (mm)		Type	
D16	4	silt/clay	4%
D35	12	sand	11%
D50	19	gravel	72%
D65	33	cobble	13%
D84	59	boulder	0%
D95	90		

Table 9a: Baseline Stream Data Summary – Tributary 3

Newfound Creek Stream Restoration EEP Project Number 92497																								
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 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/f^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 9b: Baseline Stream Data Summary – Tributary 4

Newfound Creek Stream Restoration EEP Project Number 92497																								
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (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 9c: Baseline Stream Data Summary – Tributary 5

Newfound Creek Stream Restoration

EEP Project Number 92497

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 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 9d: Baseline Stream Data Summary – Tributary 6

Newfound Creek Stream Restoration EEP Project Number 92497																									
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 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 9e: Baseline Stream Data Summary – Tributary 7

Newfound Creek Stream Restoration

EEP Project Number 92497

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 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 9f: Baseline Stream Data Summary – Tributary 8

Newfound Creek Stream Restoration EEP Project Number 92497																								
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 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 9g: Baseline Stream Data Summary – Mainstem Upstream of Browntown Road

Newfound Creek Stream Restoration

EEP Project Number 92497

Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above 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 9h: Baseline Stream Data Summary – Mainstem Downstream of Browntown Road

Newfound Creek Stream Restoration EEP Project Number 92497																									
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below 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 10a: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 3

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 3 (1060 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10b: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 4

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (1590 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10c: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 5

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 5 (675 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10d: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 6

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 6 (600 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10e: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 7

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 7 (400 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10f: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Tributary 8

Newfound Creek Stream Restoration EEP Project Number 92497 Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 8 (680 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10g: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Upstream of Browntown Road

Newfound Creek Stream Restoration EEP Project Number 92497																													
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above Browntown Road (2000 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10h: Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions) – Mainstem Downstream of Browntown Road

Newfound Creek Stream Restoration EEP Project Number 92497																													
Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below Browntown Road (2400 feet)																													
Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
[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 10a: Monitoring Data – Dimensional Morphology Summary – Tributary 3

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 3 (1060 feet)																											
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Pool)							Cross Section 4 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2088.37	2088.37					--	2085.73	2085.73					--	2071.45	2071.45					--	2070.28	2070.28				
Bankfull Width (ft)	--	7.8	5.2					--	9.1	9.0					--	7.9	6.4					--	10.5	9.7				
Floodprone Width (ft)	--	13.5	10.0					--	--	--					--	--	--					--	100.0	36.6				
Bankfull Mean Depth (ft)	--	0.5	0.5					--	0.8	0.8					--	0.6	0.3					--	0.7	0.6				
Bankfull Max Depth (ft)	--	1.2	0.9					--	1.3	1.4					--	1.0	0.6					--	1.1	1.0				
Bankfull Cross Sectional Area (ft^2)	--	4.0	2.4					--	7.4	7.1					--	4.6	2.2					--	7.4	6.3				
Bankfull Width/Depth Ratio	--	15.2	11.4					--	11.3	11.5					--	13.6	18.9					--	14.7	15.0				
Bankfull Entrenchment Ratio	--	1.7	1.9					--	--	--					--	--	--					--	5.7	3.8				
Bankfull Bank Height Ratio	--	1.0	0.8					--	1.0	0.6					--	1.0	0.9					--	1.0	0.8				
Cross Sectional Area between end pins (ft^2)	--	81.7	77.9					--	100.9	79.1					--	14.0	10.3					--	12.9	12.1				
d50 (mm)	--	Si	--					--	Si	--					--	Si	--					--	Si	--				

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 4 (1590 feet)																											
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)							Cross Section 4 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2119.25	2119.25					--	2117.97	2117.97					--	2073.23*	2071.00*					--	2067.08	2067.08				
Bankfull Width (ft)	--	7.0	6.8					--	7.3	6.7					--	26.5	11.5					--	14.3	15.5				
Floodprone Width (ft)	--	20.5	17.2					--	17.6	14.7					--	--	--					--	40.0+	40+				
Bankfull Mean Depth (ft)	--	0.6	0.4					--	0.6	0.6					--	2.2	0.9					--	1.0	0.7				
Bankfull Max Depth (ft)	--	1.0	1.0					--	0.9	1.0					--	4.2	1.5					--	1.7	1.5				
Bankfull Cross Sectional Area (ft^2)	--	3.7	2.8					--	4.2	3.8					--	58.4	10.0					--	13.7	11.0				
Bankfull Width/Depth Ratio	--	12.6	16.7					--	12.5	11.6					--	12.0	13.2					--	14.8	22.0				
Bankfull Entrenchment Ratio	--	2.9	2.5					--	2.4	2.2					--	--	--					--	4.2	2.4				
Bankfull Bank Height Ratio	--	1.0	1.3					--	1.0	1.2					--	1.0	1.9					--	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	--	82.8	79.1					--	109.8	101.4					--	64.8	61.8					--	20.6	22.4				
d50 (mm)	--	Si/Sa	--					--	Si/Sa	--					--	Si/Sa	--					--	Si/Sa	--				

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

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 5 (675 feet)																				
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2081.68	2081.68					--	2076.82	2076.82					--	2066.38	2066.38				
Bankfull Width (ft)	--	7.6	6.7					--	7.9	6.8					--	5.1	5.1				
Floodprone Width (ft)	--	18.3	16.5					--	--	--					--	14.0	9.3				
Bankfull Mean Depth (ft)	--	0.6	0.7					--	0.6	0.8					--	0.7	0.5				
Bankfull Max Depth (ft)	--	1.2	1.3					--	1.3	1.6					--	1.2	1.0				
Bankfull Cross Sectional Area (ft^2)	--	5.0	4.7					--	5.2	5.5					--	3.6	2.8				
Bankfull Width/Depth Ratio	--	11.8	9.7					--	12.3	8.3					--	7.2	9.3				
Bankfull Entrenchment Ratio	--	2.4	2.4					--	--	--					--	2.7	1.8				
Bankfull Bank Height Ratio	--	1.0	1.3					--	1.0	1.3					--	1.0	2.3				
Cross Sectional Area between end pins (ft^2)	--	71.6	106.9					--	15.0	17.6					--	56.8	48.0				
d50 (mm)	--	Si/Sa	--					--	Si/Sa	--					--	Si/Sa	--				

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 6 (600 feet)														
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2064.1	2064.1					--	2062.01	2062.01				
Bankfull Width (ft)	--	14.8	16.2					--	19.6	22.0				
Floodprone Width (ft)	--	38	36+					--	--					
Bankfull Mean Depth (ft)	--	1.1	1.0					--	1.6	1.5				
Bankfull Max Depth (ft)	--	2.3	2.0					--	3.2	3.0				
Bankfull Cross Sectional Area (ft^2)	--	15.7	16.6					--	32.2	32.5				
Bankfull Width/Depth Ratio	--	14.0	15.7					--	11.9	14.9				
Bankfull Entrenchment Ratio	--	2.6	2.3					--	--	--				
Bankfull Bank Height Ratio	--	1.0	1.0					--	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	--	40.7	41.5					--	44.9	56.0				
d50 (mm)	--	Si/Sa	--					--	Si/Sa	--				

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 7 (400 feet)																				
	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2*	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2110.39	2110.39					--	2107.51	2107.51					--	2104.37	2104.37				
Bankfull Width (ft)	--	8.6	6.5					--	9.5	7.0					--	8.2	2.9				
Floodprone Width (ft)	--	15.2	14.0					--	--	--					--	24.2	24.3				
Bankfull Mean Depth (ft)	--	0.6	0.4					--	0.9	0.6					--	0.2	0.4				
Bankfull Max Depth (ft)	--	0.9	0.8					--	1.5	1.2					--	0.5	0.5				
Bankfull Cross Sectional Area (ft^2)	--	5.0	2.6					--	8.1	3.9					--	1.8	1.0				
Bankfull Width/Depth Ratio	--	14.7	16.4					--	11.2	12.5					--	36.6	8.2				
Bankfull Entrenchment Ratio	--	1.8	2.1					--	--	--					--	3.0	8.5				
Bankfull Bank Height Ratio	--	1.0	0.8					--	1.0	1.0					--	1.0	0.8				
Cross Sectional Area between end pins (ft^2)	--	41.1	40.8					--	49.6	46.7					--	7.7	8.7				
d50 (mm)	--	Si	--					--	Si	--					--	Si	--				

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

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: 8 (680 feet)																				
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2087.13	2087.13					--	2084.83	2084.83					--	2077.65	2077.65				
Bankfull Width (ft)	--	8.0	8.8					--	11.4	15.5					--	16.0	14.8				
Floodprone Width (ft)	--	18.9	19.5					--	40.4+	40.2+					--	--	--				
Bankfull Mean Depth (ft)	--	0.3	0.3					--	1.1	0.7					--	0.9	0.9				
Bankfull Max Depth (ft)	--	0.8	0.7					--	2.3	1.6					--	1.6	1.8				
Bankfull Cross Sectional Area (ft^2)	--	2.4	2.3					--	12.9	11.6					--	13.9	12.6				
Bankfull Width/Depth Ratio	--	26.3	34.2					--	10.1	20.8					--	18.3	17.3				
Bankfull Entrenchment Ratio	--	2.4	2.2					--	3.5	2.6					--	--	--				
Bankfull Bank Height Ratio	--	1.0	1.0					--	1.0	1.0					--	1.0	0.5				
Cross Sectional Area between end pins (ft^2)	--	24.2	20.8					--	37.3	37.7					--	83.9	80.4				
d50 (mm)	--	Si/Sa	--					--	Si/Sa	--					--	Si/Sa	--				

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

Project Name/Number (Newfound Creek Stream Restoration/92497) Segment/Reach: Main (4400 feet) Cross Sections 1 - 4 are upstream of Browntown Road, Cross Sections 5-9 are downstream of Browntown Road																										
	Cross Section 1 (Riffle)							Cross Section 2 (Riffle)							Cross Section 3 (Riffle)							Cross Section 4 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2*	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2071.66	2071.66					--	2067.07	2067.07					--	2063.50	2063.50					--	2059.81	2059.81				
Bankfull Width (ft)	--	39.0	28.6					--	19.2	26.8					--	16.3	16.1					--	22.4	18.2				
Floodprone Width (ft)	--	80.6	80.6					--	66.1	69.4					--	48.3	48.6					--	--	--				
Bankfull Mean Depth (ft)	--	0.8	0.9					--	1.7	1.3					--	1.4	1.2					--	1.2	1.2				
Bankfull Max Depth (ft)	--	2.2	2.0					--	2.6	3.0					--	2.2	2.5					--	1.8	1.8				
Bankfull Cross Sectional Area (ft^2)	--	29.7	25.9					--	32.0	36.1					--	23.0	19.2					--	28.0	22.0				
Bankfull Width/Depth Ratio	--	51.2	31.5					--	11.5	19.9					--	11.6	13.5					--	17.9	15.0				
Bankfull Entrenchment Ratio	--	2.1	2.8					--	3.4	2.6					--	3.0	3.0					--	--	--				
Bankfull Bank Height Ratio	--	1.0	0.8					--	1.0	0.7					--	1.0	1.2					--	1.0	1.3				
Cross Sectional Area between end pins (ft^2)	--	198.1	195					--	186.3	198.3					--	171.2	169.3					--	153.4	143.4				
d50 (mm)	--	--	--					--	24	--					--	--	22					--	--	--				
	Cross Section 5 (Riffle)							**Cross Section 6 (Riffle)**							**Cross Section 7 (Riffle)**							**Cross Section 8 (Pool)**						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2056.59	2056.59					--	2054.80	2054.80					--	2047.72	2047.72					--	2045.62	2045.62				
Bankfull Width (ft)	--	18.8	19.3					--	17.3	17.3					--	23.4	19.3					--	35.1	20.1				
Floodprone Width (ft)	--	175.0	48.5+					--	175.0	58+					--	49.8	46.9					--	--	--				
Bankfull Mean Depth (ft)	--	2.1	2.2					--	2.1	1.9					--	1.3	1.4					--	1.3	1.5				
Bankfull Max Depth (ft)	--	2.9	3.2					--	3.2	2.6					--	2.5	2.4					--	3.1	2.7				
Bankfull Cross Sectional Area (ft^2)	--	38.8	43.1					--	36.7	33.5					--	31.4	27.4					--	44.4	30.3				
Bankfull Width/Depth Ratio	--	9.1	8.7					--	8.2	9.0					--	17.4	13.6					--	27.7	13.3				
Bankfull Entrenchment Ratio	--	9.3	2.5					--	16.1	3.4					--	2.1	2.4					--		--				
Bankfull Bank Height Ratio	--	1.0	1.2					--	1.0	1.0					--	1.0	0.9					--	1.0	0.9				
Cross Sectional Area between end pins (ft^2)	--	72.0	73.4					--	109.5	104.5					--	203.2	183.3					--	191.8	169.1				
d50 (mm)	--	--	--					--	--	--					--	23	19					--						

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

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

	Cross Section 9 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	--	2044.08	2044.08				
Bankfull Width (ft)	--	20.1	18.1				
Floodprone Width (ft)	--	--	--				
Bankfull Mean Depth (ft)	--	1.9	1.6				
Bankfull Max Depth (ft)	--	2.6	2.5				
Bankfull Cross Sectional Area (ft^2)	--	37.2	29.6				
Bankfull Width/Depth Ratio	--	10.8	11.1				
Bankfull Entrenchment Ratio	--	--	--				
Bankfull Bank Height Ratio	--	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	--	159.2	150.9				
d50 (mm)	--	--	--				

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 3 (1060 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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)							7.8	9.2	9.2	10.5		2	5.2	7.4	--	9.7	--	2																	
Floodprone Width (ft)							13.5	36.8	36.8	60		2	10.0	23.3	--	36.6	--	2																	
Bankfull Mean Depth (ft)							0.5	0.6	0.6	0.7		2	0.5	0.6	--	0.6	--	2																	
[1]Bankfull Max Depth (ft)							1.1	1.2	1.2	1.2		2	0.9	0.9	--	1.0	--	2																	
Bankfull Cross Sectional Area (ft^2)							4	5.7	5.7	7.4		2	2.4	4.3	--	6.3	--	2																	
Width/Depth Ratio							14.7	15.0	15.0	15.2		2	11.4	12.8	--	15.0	--	2																	
Entrenchment Ratio							1.7	3.7	3.7	5.7		2	1.9	2.9	--	3.8	--	2																	
[1]Bank Height Ratio							**1.0**	1.0	1.0	**1.0**		**2**	0.7	0.8	--	0.9	--	2																	
Profile																																		
Riffle Length (ft)							6.8	37.7	57.5	108.1		19	1.9	19.2	--	153.9	--	19																	
Riffle Slope (ft/ft)							0.000	0.021	0.048	0.095		19	1.2	3.7	--	8.8	--	19																	
Pool Length (ft)							2.8	11.2	23.5	44.2		19	2.1	15.5	--	49.6	--	19																	
Pool Max depth (ft)							1.1	1.2	1.2	1.2		2			--		--	2																	
Pool Spacing (ft)							22.4	62.7	87.3	152.2		19	12.5	60.5	--	153.9	--	19																	
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)																							
Channel Thalweg length (ft)							1204						1128																						
Sinuosity (ft)							1.06						1.04																						
Water Surface Slope (Channel) (ft/ft)							0.023						0.025																						
BF slope (ft/ft)							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																						
Channel Stability or Habitat Metric																																		
Biological or Other																																		

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 4 (1590 feet)																																	
Parameter	**Baseline**						**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)							7	7.2	7.2	7.3		2	6.7	6.7	--	6.8	--	2																		
Floodprone Width (ft)							17.6	19.1	19.1	20.5		2	14.7	16.0	--	17.2	--	2																		
Bankfull Mean Depth (ft)							0.6	0.6	0.6	0.6		2	0.4	0.5	--	0.6	--	2																		
[1]Bankfull Max Depth (ft)							0.9	1.0	1.0	1		2	1.0	1.0	--	1.0	--	2																		
Bankfull Cross Sectional Area (ft^2)							3.7	4.0	4.0	4.2		2	2.8	3.3	--	3.8	--	2																		
Width/Depth Ratio							12.5	12.6	12.6	12.6		2	11.6	13.7	--	16.7	--	2																		
Entrenchment Ratio							2.4	2.7	2.7	2.9		2	2.2	2.4	--	2.6	--	2																		
[1]Bank Height Ratio							1.0	1.0	1.0	1.0		2	1.2	1.2	--	1.3	--	2																		
Profile																																				
Riffle Length (ft)							4.8	78.0	214.0	423.1		17	3.8	13.5	--	35.1	--	14																		
Riffle Slope (ft/ft)							0.000	0.027	0.049	0.097		17	--	--	--	--	--	14																		
Pool Length (ft)							4	14.3	35.05	66.1		22	5.3	17.0	--	34.8	--	6																		
Pool Max depth (ft)							4.2	4.2	23.1	42		1	1.5	1.5	--	1.5	--	2																		
Pool Spacing (ft)							13.4	81.1	229.9	446.3		22	87	351	--	477	--	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																							
Channel Thalweg length (ft)							1911						1826.6																							
Sinuosity (ft)							1.27						1.21																							
Water Surface Slope (Channel) (ft/ft)							0.037						0.039																							
BF slope (ft/ft)							0.037						0.039																							
[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																							
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 5 (675 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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																	
Floodprone Width (ft)							14	16.2	16.2	18.3		2	9.3	28.6	--	60.0	--	2																	
Bankfull Mean Depth (ft)							0.6	0.7	0.7	0.7		2	0.5	0.6	--	0.7	--	2																	
[1]Bankfull Max Depth (ft)							1.2	1.2	1.2	1.2		2	1.0	1.2	--	1.3	--	2																	
Bankfull Cross Sectional Area (ft^2)							3.6	4.3	4.3	5.0		2	2.8	3.7	--	4.7	--	2																	
Width/Depth Ratio							7.2	9.5	9.5	11.8		2	9.3	9.4	--	9.7	--	2																	
Entrenchment Ratio							2.4	2.6	2.6	2.7		2	1.8	2.1	--	2.4	--	2																	
[1]Bank Height Ratio							1.0	1.0	1.0	1.0		2	0.9	1.2	--	1.5	--	2																	
Profile																																		
Riffle Length (ft)							10.8	108.4	149.2	287.6		5	3.8	12.2	--	24.7	--	5																	
Riffle Slope (ft/ft)							0.026	0.079	0.093	0.160		5	--	--	--	--	--	5																	
Pool Length (ft)							2.7	7.7	9.7	16.7		7	4.0	15.5	--	27.0	--	2																	
Pool Max depth (ft)							1.3	1.3	1.3	1.3		1	1.6	1.6	--	1.6	--	1																	
Pool Spacing (ft)							18.8	56.1	112.8	206.8		7	218.8	218.8	--	218.8	--	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							E4b						E4b																						
Channel Thalweg length (ft)							800.6						624.0																						
Sinuosity (ft)							1.36						1.05																						
Water Surface Slope (Channel) (ft/ft)							0.044						0.059																						
BF slope (ft/ft)							0.044						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																						
Channel Stability or Habitat Metric																																		
Biological or Other																																		

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 6 (600 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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																		
Floodprone Width (ft)							38	38.0	38.0	38		1	49.0	49.0	--	49.0	--	1																		
Bankfull Mean Depth (ft)							1.1	1.1	1.1	1.1		1	1.0	1.0	--	1.0	--	1																		
[1]Bankfull Max Depth (ft)							2.3	2.3	2.3	2.3		1	2.0	2.0	--	2.0	--	1																		
Bankfull Cross Sectional Area (ft^2)							15.7	15.7	15.7	15.7		1	16.6	16.6	--	16.6	--	1																		
Width/Depth Ratio							14	14.0	14.0	14		1	15.7	15.7	--	15.7	--	1																		
Entrenchment Ratio							2.6	2.6	2.6	2.6		1	2.3	2.3	--	2.3	--	1																		
[1]Bank Height Ratio							1.0	1.0	1.0	1.0		1	1.0	1.0	--	1.0	--	1																		
Riffle Length (ft)							12.3	80.6	156.9	301.5		8	6.6	11.9	--	18.8	--	6																		
Riffle Slope (ft/ft)							0.018	0.040	0.1	0.086		8	--	--	--	--	--	6																		
Pool Length (ft)							8.3	13.5	14.1	19.9		5	11.1	19.4	--	30.2	--	3																		
Pool Max depth (ft)							3.2	3.2	3.2	3.2		1	3.0	3.0	--	3.0	--	1																		
Pool Spacing (ft)							21.7	131.5	196.3	370.9		5	64	166	--	269	--	3																		
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																						
Channel Thalweg length (ft)							732						615.2																						
Sinuosity (ft)							1.09						1.06																						
Water Surface Slope (Channel) (ft/ft)							0.036						0.035																						
BF slope (ft/ft)							0.036						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																						
Channel Stability or Habitat Metric																																		
Biological or Other																																		

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 7 (400 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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																	
Floodprone Width (ft)							15.2	19.7	19.7	24.2		2	14.0	32.8	--	60.0	--	2																	
Bankfull Mean Depth (ft)							0.2	0.4	0.4	0.6		2	0.4	0.4	--	0.4	--	2																	
[1]Bankfull Max Depth (ft)							0.5	0.7	0.7	0.9		2	0.5	0.6	--	0.8	--	2																	
Bankfull Cross Sectional Area (ft^2)							1.8	3.4	3.4	5		2	1.0	1.8	--	2.6	--	2																	
Width/Depth Ratio							14.7	25.7	25.7	36.6		2	8.2	12.2	--	16.4	--	2																	
Entrenchment Ratio							1.8	2.4	2.4	3		2	3.0	7.0	--	12.8	--	2																	
[1]Bank Height Ratio							1.0	1.0	1.0	1.0		2	0.7	0.8	--	1.0	--	2																	
Riffle Length (ft)							5.3	37.1	97.15	189		6	7.8	18.8	--	31.2	--	2																	
Riffle Slope (ft/ft)							0	0.033	0.047	0.093		6	0.038	0.050	--	0.070	--	2																	
Pool Length (ft)							3.6	21.5	39.25	74.9		5	6.5	9.2	--	11.8	--	2																	
Pool Max depth (ft)							1.5	1.5	1.5	1.5		1	1.2	1.2	--	1.2	--	1																	
Pool Spacing (ft)							23.4	98.7	111.9	200.3		5	123	123	--	123	--	2																	
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																						
Channel Thalweg length (ft)							579.5						374.5																						
Sinuosity (ft)							1.59						1.1																						
Water Surface Slope (Channel) (ft/ft)							0.026						0.039																						
BF slope (ft/ft)							0.026						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																						
Channel Stability or Habitat Metric																																		
Biological or Other																																		

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: 8 (680 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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																		
Floodprone Width (ft)							18.9	29.7	29.7	40.4		2	19.5	39.9	--	60	--	2																		
Bankfull Mean Depth (ft)							0.3	0.7	0.7	1.1		2	0.26	0.6	--	0.75	--	2																		
[1]Bankfull Max Depth (ft)							0.8	1.6	1.6	2.3		2	0.71	1.8	--	1.59	--	2																		
Bankfull Cross Sectional Area (ft^2)							2.4	7.7	7.7	12.9		2	2.27	6.9	--	11.6	--	2																		
Width/Depth Ratio							10.1	18.2	18.2	26.3		2	20.8	21.4	--	34.2	--	2																		
Entrenchment Ratio							2.4	3.0	3.0	3.5		2	1.61	3.3	--	4.93	--	2																		
[1]Bank Height Ratio							1.0	1.0	1.0	1.0		2	0.6	1.0	--	1.4	--	2																		
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																		
Pool Length (ft)							3	8.8	9.45	15.9			8.6	10.9	--	13.2	--	2																		
Pool Max depth (ft)							1.6	1.6	1.6	1.6		1	1.81	1.8	--	1.81	--	1																		
Pool Spacing (ft)							22.8	47.5	43.4	64			291.1	291.1	--	291.1	--	2																		
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																							
Channel Thalweg length (ft)							378.4						379.9																							
Sinuosity (ft)							1.30						1.27																							
Water Surface Slope (Channel) (ft/ft)							0.037						0.038																							
BF slope (ft/ft)							0.037						0.038																							
[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																							
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main above Browntown Road (2000 feet)																																	
Parameter	**Baseline**						**MY-1**						**MY-2**						**MY- 3**						**MY- 4**						**MY- 5**					
	Min	Mean	Med	Max	SD[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																	
Floodprone Width (ft)							48.3	65.0	66.1	80.6		3	48.5	66.2	--	80.6	--	3																	
Bankfull Mean Depth (ft)							0.8	1.3	1.4	1.7		3	0.91	1.1	--	1.34	--	3																	
[1]Bankfull Max Depth (ft)							2.2	2.3	2.2	2.6		3	2.0	2.5	--	3.0	--	3																	
Bankfull Cross Sectional Area (ft^2)							23	28.2	29.7	32		3	19.1	27.0	--	36.1	--	3																	
Width/Depth Ratio							11.5	24.8	11.6	51.2		3	13.5	21.0	--	31.5	--	3																	
Entrenchment Ratio							2.1	2.8	3.0	3.4		3	2.0	2.8	--	3.4	--	3																	
[1]Bank Height Ratio							1	1.0	1.0	1		3	0.66	0.90	--	1.19	--	3																	
Profile																																		
Riffle Length (ft)							2.6	79.3	226.5	450.3		16	12.1	41.1	--	106	--	18																	
Riffle Slope (ft/ft)							0.000	0.003	0.028	0.056		16	0.96	2.5	--	0.06	--	18																	
Pool Length (ft)							11.1	52.2	100.7	190.3		14	14.4	24.6	--	40.6	--	13																	
Pool Max depth (ft)							1.8	1.8	1.8	1.8		1	1.83	1.82	--	1.83	--	1																	
Pool Spacing (ft)							54	172.3	252.2	450.3		14	31.6	170.1	--	370	--	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																						
Channel Thalweg length (ft)							2586.5						2327																						
Sinuosity (ft)							1.36						1.2																						
Water Surface Slope (Channel) (ft/ft)							0.0059						0.0069																						
BF slope (ft/ft)							0.0059						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%																	
[3]d16 / d35 / d50 / d84 / d95 /													0.41	6.9	22	75	120																	
[2]% of Reach with Eroding Banks																																		
Channel Stability or Habitat Metric																																		
Biological or Other																																		

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

	Project Name/Number (Newfound Creek Stream Restoration/92497) - Segment/Reach: Main below 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																	
Floodprone Width (ft)							49.8	133.3	175.0	175		3	46.9	51.2	--	58.1	--	3																	
Bankfull Mean Depth (ft)							1.3	1.8	2.1	2.1		3	1.4	1.9	--	2.2	--	3																	
[1]Bankfull Max Depth (ft)							2.5	2.9	2.9	3.2		3	2.4	2.7	--	3.2	--	3																	
Bankfull Cross Sectional Area (ft^2)							31.4	35.6	36.7	38.8		3	27.4	34.7	--	43.1	--	3																	
Width/Depth Ratio							8.2	11.6	9.1	17.4		3	8.7	10.0	--	13.6	--	3																	
Entrenchment Ratio							2.1	9.2	9.3	16.1		3	2.5	2.7	--	3.1	--	3																	
[1]Bank Height Ratio							1	1.0	1.0	1		3	0.8	1.1	--	1.4	--	3																	
Profile																																		
Riffle Length (ft)							3.2	73.4	128.5	253.7		18	9.2	29.8	--	71.1	--	21																	
Riffle Slope (ft/ft)							0.000	0.015	0.039	0.077		18	0.006	0.024	--	0.050	--	21																	
Pool Length (ft)							16.2	47.0	97.7	179.2		18	16.0	34.2	--	53.8	--	14																	
Pool Max depth (ft)							2.6	2.9	2.9	3.1		2	2.5	2.6	--	2.7	--	2																	
Pool Spacing (ft)							19.4	145.7	242.8	466.1		18	36	162	--	564	--	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																						
Channel Thalweg length (ft)							2515.5						2244																						
Sinuosity (ft)							1.28						1.18																						
Water Surface Slope (Channel) (ft/ft)							0.0056						0.0064																						
BF slope (ft/ft)							0.0056						0.0064																						
[3]Ri% / Ru% / P% / G% / S%							**60**	**5**	30	5	**0**																								
[3]SC% / Sa% / G% / C% / B% / Be%													4%	11%	72%	13%	0%																	
[3]d16 / d35 / d50 / d84 / d95 /													4	12	19	59	90																	
[2]% of Reach with Eroding Banks							93																											
Channel Stability or Habitat																																		
Biological or Other																																		

Appendix E: Hydrology Data

Table 13: Verification of Bankfull Events

Newfound Creek Stream Restoration EEP Project Number 92497			
Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
10/08/13 & 10/09/13	Unknown	Site photographs (wrack lines)	53, 214
10/08/13 & 10/09/13	Unknown	On-Site Crest Gauges	53, 214
10/21/13	Approx. January 15 and January 28, 2013	Proximal USGS gauge resource – Pigeon River	Figure 23
10/21/13	Approx. January 15 and January 28, 2013	Proximal USGS gauge resource – Ivy River	Figure 24

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 MY2. Crest Gauge 1 was found to have damage caused by a storm event. The gauge was no longer upright and was angled downstream. Debris was cleared from the gauge and its orientation was corrected. Debris was also cleared from Crest Gauge 2. Both gauges read above-bankfull storm events and collected debris well above bankfull. Cork from Crest Gauge 1 was present at the top of the measuring stick, and on top of the stick, verifying that the bankfull event contained flows at least 24 inches above bankfull. Cork from Crest Gauge 2 was present 38 inches above bankfull.

Potential bankfull occurrences for the past year (October 20, 2012 to Ocotber 20, 2013) were extrapolated based on USGS stream gauge discharge data for the Pigeon River near Hepco, NC (03459500) and the Ivy River near Marshall, NC (03453000). The USGS gauge plots are shown below (Figures 23 & 24). The Pigeon River gauge is located in Haywood County and has a drainage area of 350 square miles. The Ivy River gauge is located in Madison County and has a drainage area of 158 square miles.

An estimate of the number of bankfull events between Ocotber 20, 2012 and Ocotber 20, 2013 was made by comparing the stream discharges from the USGS data in cubic feet per second (cfs) against the bankfull discharge estimated from the drainage area on the Mountain Regional Curve. According to the regional curve, a bankfull event occurs on a stream with a 350 square mile drainage area when the discharge is about 10,000 cfs. This discharge was reached or exceeded four times during the past year at the Pigeon River location (late January, early February, early March, early July). A bankfull event occurs on a stream with a 158 square mile drainage area when the discharge is about 4,000 cfs. This discharge was reached or exceeded six times during the past year at the Ivy River location (late January, early February, early March, mid-April, early July, and mid-July). Data are consistent between gauges.

Rainfall data are presented in Figure 25. Rainfall data show that rainfall amounts near the site were at or above the 70th percentile for the majority of the past 12 months, with record rainfall amounts of 6.25 inches in May of 2013 and 11.42 inches in July of 2013.

Photo 53. Wrack lines on Crest Gauge 1. Gauge pushed towards downstream during storm event(s)

Photo 214. Wrack lines on Crest Gauge 2

Figure 23: USGS Proximal Gauge Pigeon River near Hepco, NC

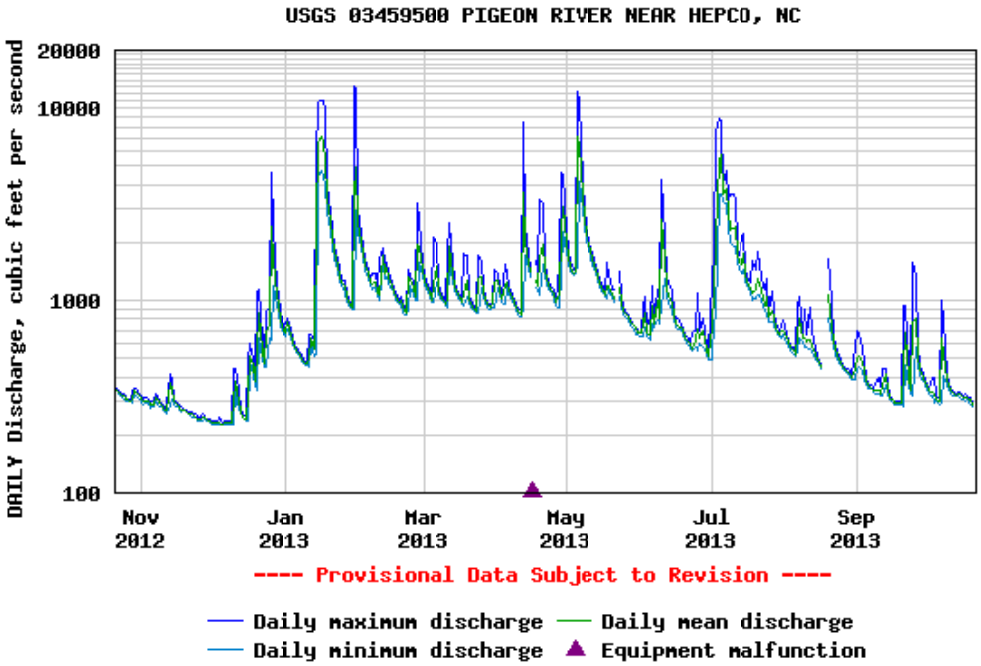


Figure 24: USGS Proximal Gauge Ivy River near Marshall, NC

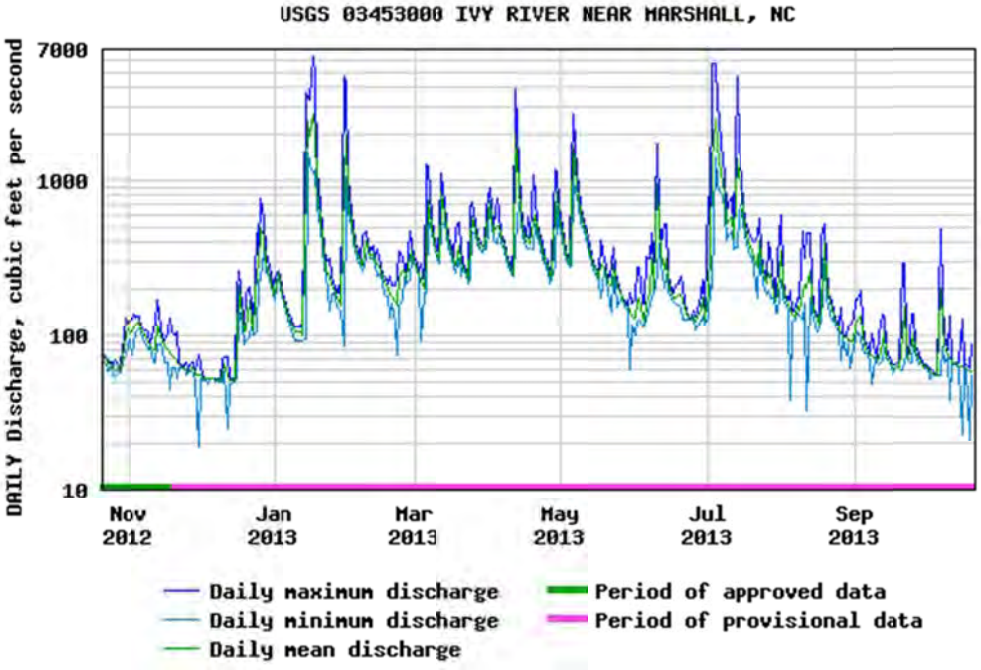


Figure 25: Newfound Creek 30-70 Percentile Graph for Rainfall in 2012, Leicester, NC