



EEP Project Closeout Summary

<u>Project ID & Status</u>	
<u>Project Name/Number:</u>	Open Springs
<u>EEP ID:</u>	
<u>EEP Contract ID:</u>	275
<u>County:</u>	Randolph
<u>Project Type:</u>	Stream
<u>Current Status:</u>	5 Years of Monitoring complete

<u>Project Setting</u>	
Basin:	Cape Fear
Physiographic Region:	Piedmont
Ecoregion:	
USGS Hydro Unit:	03030003020020
NCDWQ Subbasin:	
Thermal Regime:	Warm
Trout Water:	N/A
Provider:	EBX-Neuse 1, LLC
Designer:	WK Dickson and Co., Inc
Monitoring:	WK Dickson and Co., Inc.

<u>Project Timeline</u>	
<u>Milestone</u>	<u>Date</u>
Construction Completed	April 2005
Monitoring Year-1	November 2005
Monitoring Year-2	November 2006
Monitoring Year-3	November 2007
Monitoring Year-4	November 2008
Monitoring Year-5	November 2009

Project Restoration Components and Mitigation Assets

Wetland	Restoration Component	Asset Data				
		Level	Multip	Unit (ft or ac)	SMU	WMU
	Stream Restoration	R	1.00	3509.0	3509.0	
	Stream Enhancement II	E	0.40	2724.0	1089.6	

Asset Summary

Level	Multip	Feet/Acres	SMU	WMU
R	1.00	3509.0	3509.0	
E II	0.40	2724.0	1089.6	
		6233.0	4598.6	0.0

P1 = Priority I Restoration
 P2 = Priority II Restoration
 P3 = Priority III Restoration

R = Restoration
 E = Wetland Enhancement
 EI = Stream Enhancement I
 EII = Stream Enhancement II
 C = Wetland Creation
 P = Preservation

SMU =Stream Mitigation Units

The Open Springs Stream Mitigation Project site is located in Randolph County, North Carolina, northeast of Ramseur within hydrologic unit 03030003 in the Cape Fear River Basin. The NC Department of Transportation (NCDOT) contracted with EBX Neuse I, LLC (EBX) to perform mitigation work at the site under Full Delivery Project S-1. A total of 4,598 stream mitigation units (SMU) were generated from this project through restoration and enhancement of stream and riparian habitats.

The project has been monitored for five years to determine the success of the restoration and enhancement efforts. Baseline data on stream morphology and vegetation were collected immediately after construction and planting were complete. This information is documented in the As-Built Report dated July 25, 2005. Information on stream morphology and vegetation was collected each year and compared to the baseline data and data from previous monitoring years in order to determine whether the site is meeting success criteria.

Monitoring of the vegetation plots in 2009 recorded an average of 570 planted stems per acre at the site. All of the plots exceeded the five year success criteria of 260 stems per acre.

The stream morphology is stable with the site experiencing multiple bankfull events in 2009. Very little fluvial erosion was observed, and many of the riffle features are collecting small gravel, as expected. The longitudinal profile and all monitored cross-sections show very little adjustment of stream dimension.

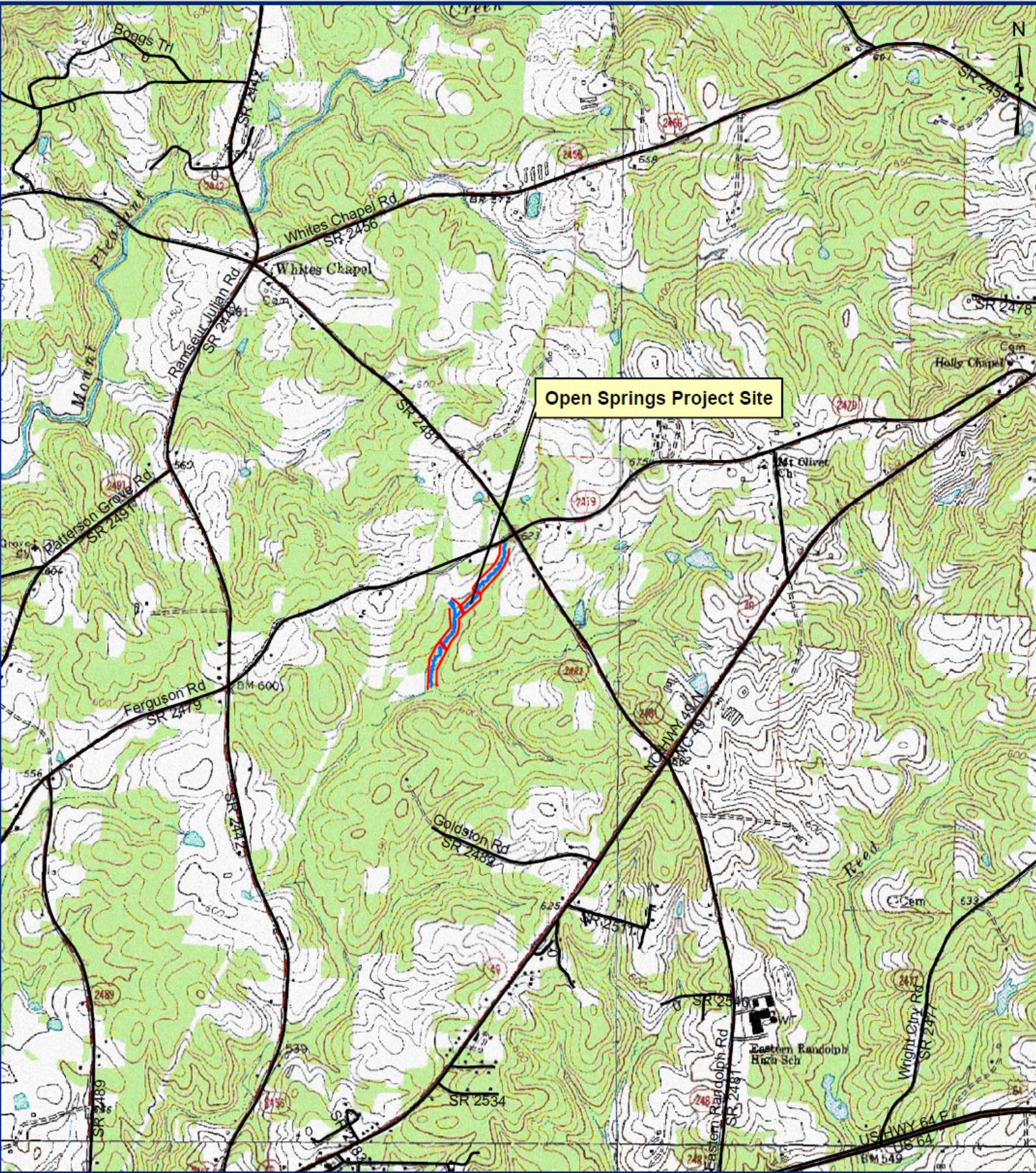
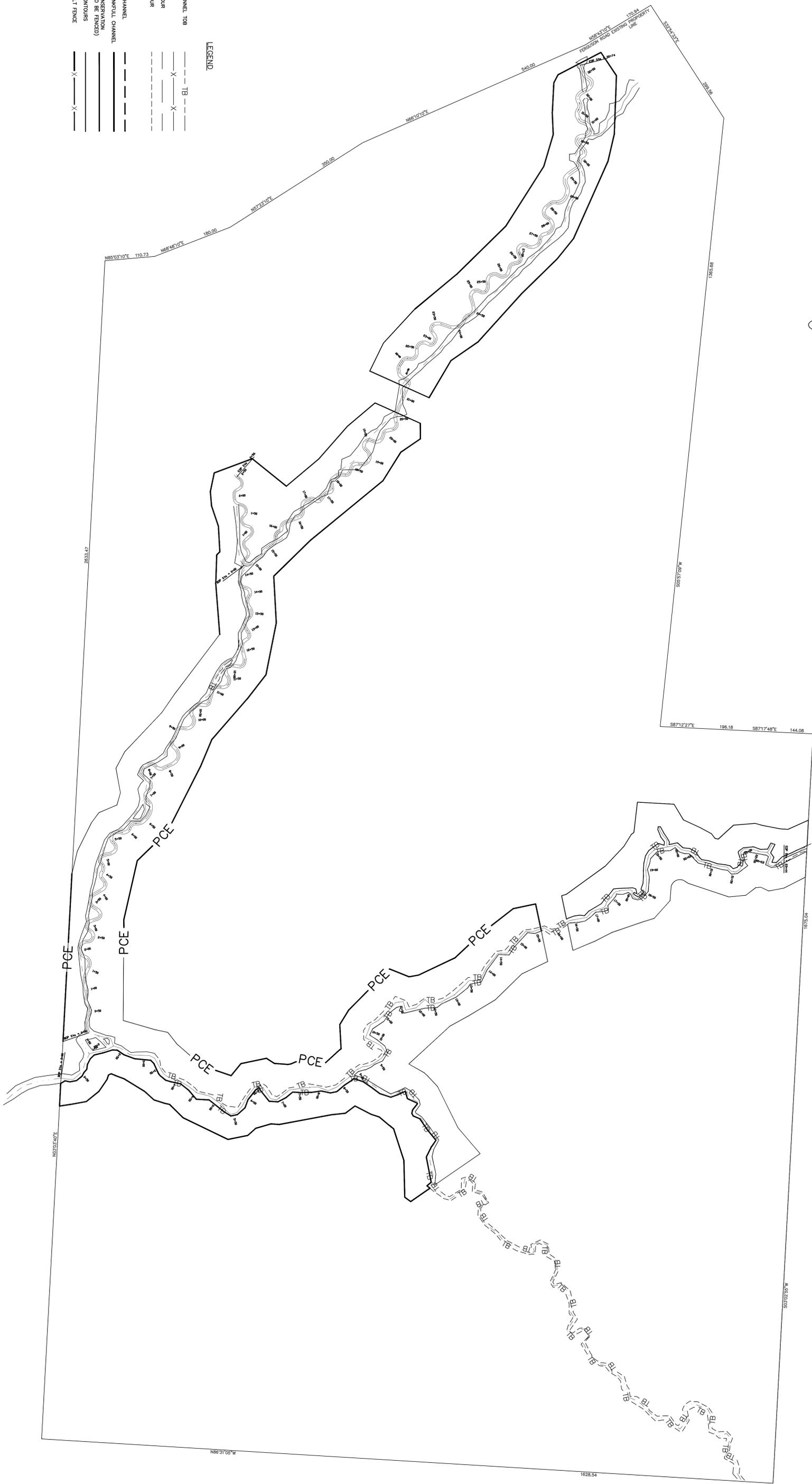


Figure 2.
 Open Springs Stream Mititgation Site
 USGS Topographic Map
 Randolph County, NC

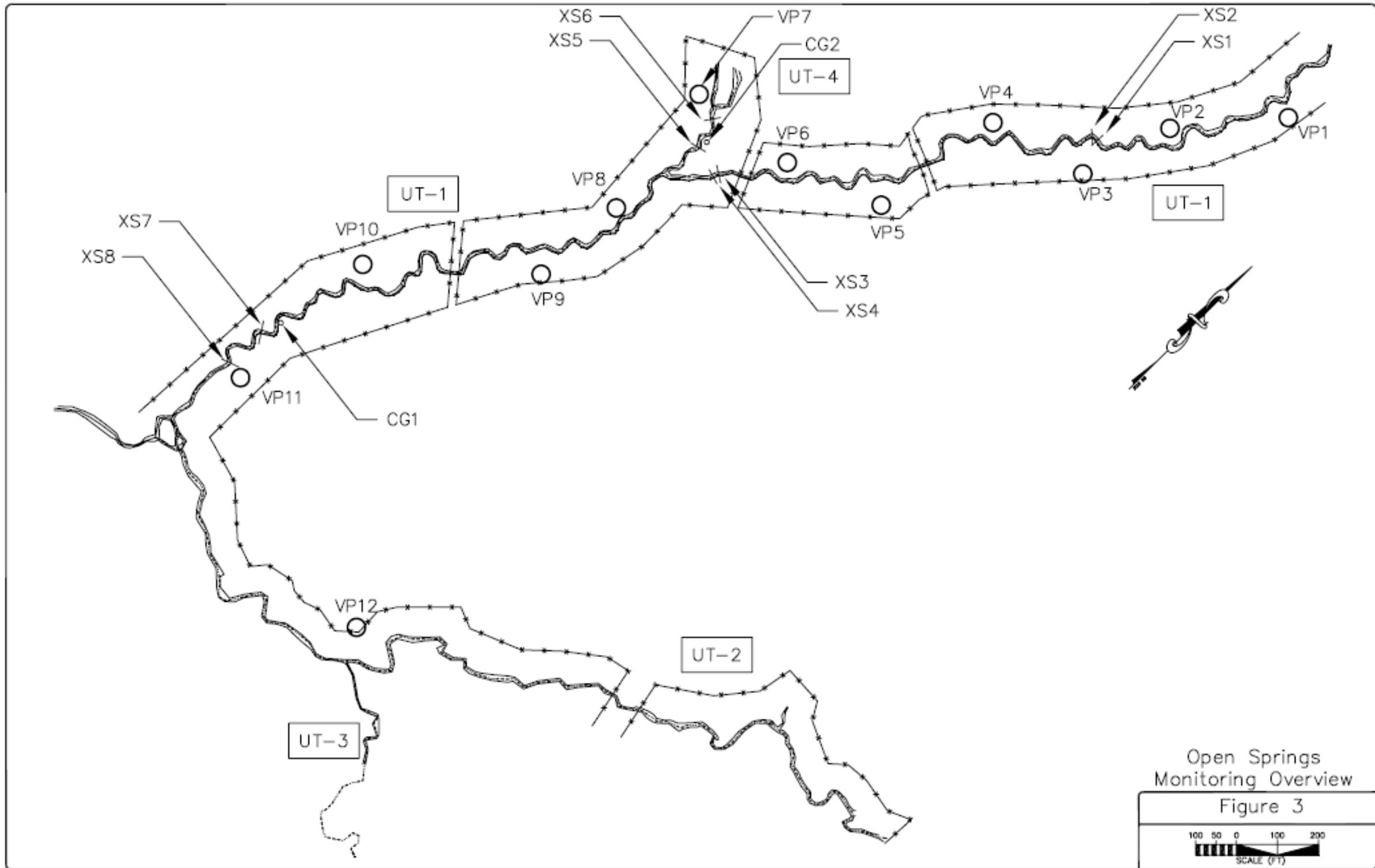
1 inch equals 2,000 feet





- LEGEND**
- EXISTING CHANNEL TOP
 - FENCE LINE
 - MAJOR CONTOUR
 - MINOR CONTOUR
 - PROPOSED
 - CENTER OF CHANNEL
 - LIMITS OF BANKFUL CHANNEL
 - LIMITS OF CONSERVATION EASEMENT (TO BE FENCED)
 - PROPOSED CONTOURS
 - PROPOSED SILT FENCE





Open Springs
Monitoring Overview

Figure 3

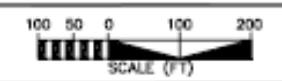


Table 4. Planted Tree Species

Common Name	Scientific Name	FAC Status
Shrubs		
Elderberry	<i>Sambucus canadensis</i>	FACW-
Paw Paw	<i>Asimina triloba</i>	FAC
Silky Dogwood	<i>Cornus amomum</i>	FACW+
Tag alder	<i>Alnus serrulata</i>	FACW+
Trees		
Black Gum	<i>Nyssa sylvatica</i>	FAC
Black Locust	<i>Robinia pseudocacia</i>	FACU-
Green ash	<i>Fraxinus pennsylvanica</i>	FACW
Ironwood	<i>Carpinus caroliniana</i>	FAC
Red Oak	<i>Quercus rubra</i>	FACU
River Birch	<i>Betula nigra</i>	FACW
Slippery Elm	<i>Ulmus rubra</i>	FAC
Sycamore	<i>Platanus occidentalis</i>	FACW-
Tulip Poplar	<i>Liriodendron tulipifera</i>	FAC
Black Gum	<i>Nyssa sylvatica</i>	FAC

Table 14. Summary of Vegetative Monitoring Data 2005-2009

Plot	Planted Stems Per Acre					
	Base	2005	2006	2007	2008	2009
1	729	729	486	607	567	526
2	688	688	486	526	445	486*
3	729	729	364	526	526	567*
4	810	810	648	810	810	810
5	688	688	607	607	607	607
6	850	850	729	729	688	688
7	769	769	324	607	688	688*
8	648	648	648	648	648	648
9	769	769	162	202	486	445
10	405	405	283	283	324	324
11	567	567	567	607	567	567
12	769	769	162	405	486	445
Average	702	702	455	547	570	567

* Resprouts observed in 2009.

Table 12. Summary of Stream Crest Gauge Data 2005-2009

	2005	2006	2007	2008	2009
Number of Bankfull Events	5	6	6	8	5 [†]
Maximum Height Above Bankfull (feet)	1.40	2.45	2.30	2.40	1.6

[†] January - August

Table 13a. Summary of Morphologic Monitoring Parameters 2005-2009 for UT1

Parameter	As-Built	Year 1	Year 2	Year 3	Year 4	Year 5
Bankfull Cross Section Area, Abkf (sq ft)	7.9	8.6	7.9	8.1	7.5	7.9
Avg. Bankfull Width, Wbkf (ft)	10.0	13.4	11.7	9.3	8.9	9.1
Bankfull W/D	13.6	25.6	20.1	11.9	12.2	12.0
Bankfull Mean Depth, Dbkf (ft)	0.8	0.7	0.7	0.8	0.8	0.8
Bankfull Max Depth, Dmax (ft)	1.4	1.5	1.4	1.4	1.5	1.4

Table 13b. Summary of Morphologic Monitoring Parameters 2005-2009 for UT4

Parameter	As-Built	Year 1	Year 2	Year 3	Year 4	Year 5
Bankfull Cross Section Area, Abkf (sq ft)	5.7	6.0	5.2	4.5	5.5	5.6
Avg. Bankfull Width, Wbkf (ft)	9.8	13.3	7.7	7.9	9.9	7.8
Bankfull W/D	17.2	31.6	11.4	14.0	17.7	11.1
Bankfull Mean Depth, Dbkf (ft)	0.6	0.5	0.7	0.5	0.6	0.7
Bankfull Max Depth, Dmax (ft)	1.1	1.1	1.1	1.1	1.3	1.2

