

# Rocky Branch Stream Restoration

Yadkin County, North Carolina

2011 Year 4 Monitoring Report - Final

EEP Project Number: 308

USGS HUC 03040102

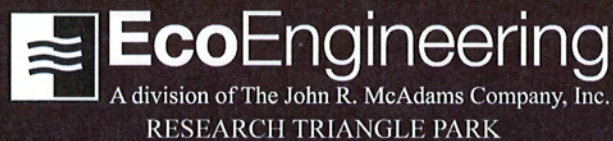
EcoEngineering Project Number: EEP-08020

Prepared for:

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- Morphology and Hydraulic Monitoring Summary [Exhibit Table IX] (Cross Section and Reach Parameters submitted electronically)
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- Stream Problem Area Inventory Table (submitted electronically)

## **Appendix E – Wetland Assessment**

Table 10. Wetland Criteria Attainment (omitted, not applicable)  
– Precipitation and Water Level Plots (omitted, not applicable)

## **1.0 Executive Summary/Project Abstract**

### ***1.1 Project Goals and Objectives***

The goals of this stream restoration project were to:

- To improve the overall water quality and aquatic habitat in and around the stream channels by reducing sediment and waste inputs into the stream caused by bank erosion, mass-wasting, and livestock influences.
- To improve the richness and diversity of the plant species within the conservation easement.
- To facilitate on-going livestock operations through farm management improvements.
- To provide perpetual protection for the restored stream channels and associated riparian and upland buffers.

These goals will be met through the following objectives:

- By using natural channel design to restore stable dimension, pattern, and profile for the project stream reaches.
- By establishing a native plant community to match the endemic plant species at the site.
- By reducing the quantities of exotic invasive species at the site through mechanical and chemical methods.
- By decommissioning a dairy waste storage pond to eliminate future risks to the Rocky Branch channel and the watershed.
- By installing watering facilities and a shadehouse to manage livestock previously using the restoration site.
- By establishing a conservation easement and permanent fencing to provide long-term protection for the site. (Mulkey, 2008)

### ***1.2 Vegetation Condition and Comparison***

Original baseline vegetation monitoring data was not provided prior to the 2008 Monitoring Year 1 and 2008 is considered a drought year. The 2009 Monitoring Year 2 is considered the baseline datum because after two years of monitoring it is assumed all planted stems within a vegetation monitoring plot have been surveyed and accounted for. Therefore, any additional species observed in proceeding monitoring years are considered volunteer species. The 2011 Monitoring Year 4 data was provided by Carolina Vegetation Survey and was not manipulated for presentation within Table 7 - Stem Count Total and Planted by Plot Species **Appendix C**.

Current stem counts were calculated using vegetation plot monitoring data. Interim density targets (stems/acre) are 320 at year 3 and 288 at year 4. Final stem count criteria are 260 trees per acre at the end of the five (5) year monitoring. As for monitored Year 4, the Rocky Branch Stream Restoration Site had 11 plots encompassing 0.27 acres, containing a total of 162 planted stems excluding live stakes. When examining total stems within all 11

vegetation plots, there were 408 planted stems including volunteer stems. In total, the 11 vegetation plots yielded a density of 596 planted trees per acre excluding live stakes. When examining the density total of all trees within all 11 vegetation plots, there was a density of 1,501 planted trees including volunteer trees. These density totals exceed the requirements by 10% for both planted trees per acre excluding live stakes and planted trees including volunteer trees. With regard to each individual vegetation plot, all of the vegetation plots exceeded the requirements by 10% when examining planted stems excluding live stakes and when examining planted stems including volunteer stems.

Exotic/invasive species were observed at the site. Exotic species observed at the site include Chinese privet (*Ligustrum sinense*), Chinese lespedeza (*Lespedeza cuneata*), multiflora rose (*Rosa multiflora*), and cattail (*Typha latifolia*). There are fourteen areas in which exotic/invasive species were observed totaling approximately 0.74 acres in size and are approximately 3.07% of the easement acreage. The extent of exotic/invasive species is depicted in the Consolidated Current Condition Plan View **Appendix A**.

During Monitoring Year 3 site investigations, encroachments into the conservation easement were observed in the form of cattle entering the easement. Visual evidence of cattle encroaching into the conservation easement was not observed during Monitoring Year 4 site investigations.

### ***1.3 Stream Stability/Condition and Comparison***

Overall, the stream system appears stable and is not migrating toward lateral or vertical instability. Based on the prior year comparison using longitudinal profile data, it appears that minor systemic aggradation has occurred throughout the reach, although this condition does not appear to pose an imminent threat to the overall stability of the system.

The largest problem observed within the stream channel is beaver activity. Since the 2008 Year 1 Monitoring to the current 2011 Monitoring Year 4, there have been a total of five (5) beaver dams constructed at the Rocky Branch Stream Restoration Site. In addition, one beaver den has been observed. Over the years, four of the beaver dams have been removed and the locations of these former beaver dams are depicted on the Consolidated Current Condition Plan View **Appendix A**. During the current 2011 Monitoring Year 4 field investigation, a newly constructed fifth beaver dam was observed at Station 21+90. This newly constructed beaver dam has the potential of influencing the project's flow regime, increase erosion, and compromise the "J" hook structure located at Station 22+00. In addition, during the current year's field investigation it was noted the beaver den located at Station 27+00 does not appear to be actively used and may be abandoned.

Overall, the channel morphology appeared stable during the 2011 Monitoring Year 4 field investigations. However, there are two "J" hook structures (Structures Number 14 and 28, Stations 11+90 and 28+50 respectively, Consolidated Current Conditions Plan View **Appendix A**) which have been compromised due to past beaver activities. The "J" hook structure located at Station 11+90 (Structure Number 14, Consolidated Current Conditions Plan View **Appendix A**) has been compromised since 2010 and could be contributing sediment loading downstream as evident in Cross Section 3. Cross Section 3 is of a pool

feature and sediment has filled in this feature approximately 1 foot or more in some locations of the feature.

Evidence of a bankfull event was observed this monitoring year.

#### ***1.4 Wetland Conditions and Performance***

No wetlands are being monitored for mitigation credits at this project site.

#### ***1.5 Narrative Background***

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on the EEP website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

### **2.0 Methodology**

All monitoring methodologies follow the most current templates and guidelines provided by EEP (EEP, 2006; EEP, 2009). Photographs were taken at high resolution using an Olympus FE-115 5.0 megapixel digital camera. GPS location information was collected using a Trimble Geo XT handheld mapping grade GPS unit. Stream and vegetation problem areas were noted in the field on As-Built Plan Sheets.

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).

Vegetation monitoring methods followed the 2008, Version 4.2 CVS-EEP Protocol for Recording Vegetation (Lee et. al., 2008). Vegetation plot photographs were collected for each vegetation plot. Vegetation monitoring plots were re-marked in the field by replacing all old flagging with new orange flagging. Monitoring taxonomy follows *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas* (Weakley 2007). Stem height was measured with a folding one-meter rule. Diameter at breast height and decimeter height were measured with calipers.

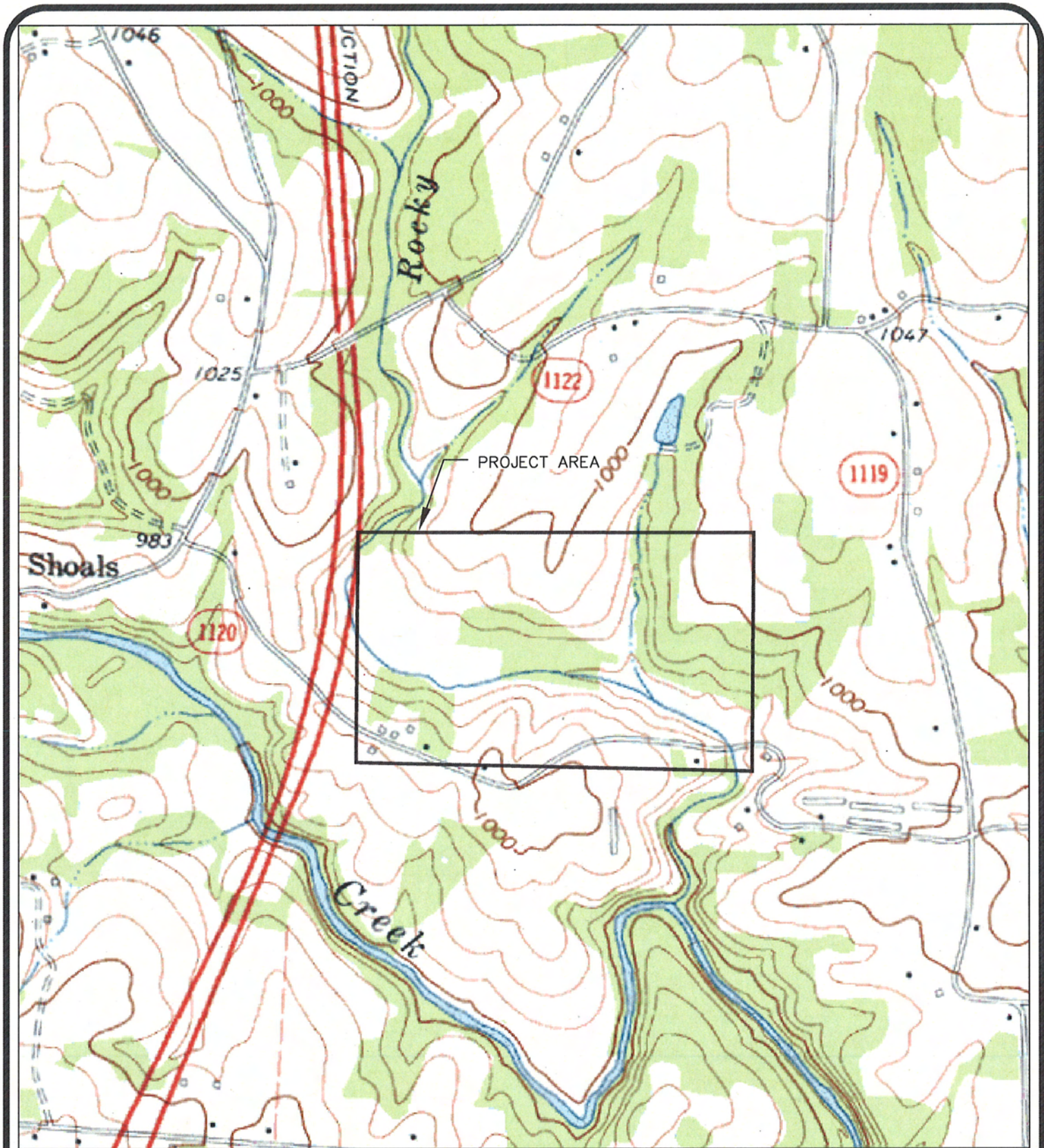
### **3.0 References**

- Ecosystem Enhancement Program (EEP), 2006. Monitoring Report Guidelines, November 16, 2006.
- Ecosystem Enhancement Program (EEP), 2009. Monitoring Report Guidelines, June 1, 2009.
- Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (<http://cvs.bio.unc.edu/methods.htm>)
- Mulkey Engineer and Consultants, 2008. As-Built Mitigation Plan Rocky Branch Stream Mitigation Report. Submitted to NCDENR-EEP, February 2008.
- Rosgen, D.L. 1996. Applied Morphology. Wildland Hydrology, Pagosa Springs, CO.
- US Army Corps of Engineers (USACE), 2003. April 2003 Stream Mitigation Guidelines.
- US Army Corps of Engineers (USACE), 2005. Information Regarding Stream Restoration In The Outer Coastal Plain of North Carolina. US Army Corps of Engineers, Wilmington District, Regulatory Division and North Carolina Department of Environment and Natural Resources, Division of Water Quality, December 1, 2005.
- Weakley, A. S., 2008. Flora of the Carolinas, Virginia, Georgia, northern Florida, and surrounding areas. University of North Carolina Herbarium (NCU), North Carolina Botanical Garden, University of North Carolina at Chapel Hill, working Draft as of April 7, 2008.

APPENDIX A

General Figures and Plan View





USGS, 7.5 MINUTE, TOPOGRAPHIC QUADRANGLE;  
 BROOKS CROSSROADS, N.C.; 1970; LAT: 36.0943785° N  
 LON: 80.8114769° W



McADAMS	PROJECT NO.	EEP-08020
	FILENAME:	EEP-08020
	SCALE:	1" = 1,000
	DATE:	04-29-11



# ROCKY BRANCH VICINITY MAP

YADKIN COUNTY, NORTH CAROLINA

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# ROCKY BRANCH

## CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING

YADKIN COUNTY, NORTH CAROLINA  
EEP PROJECT NUMBER: 308

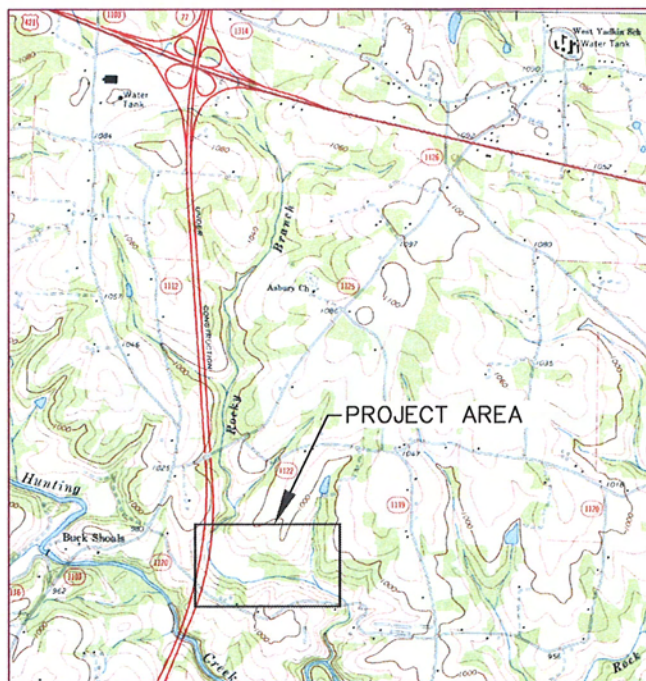
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NORTH CAROLINA  
ECOSYSTEM ENHANCEMENT PROGRAM  
NC-EEP CONTACT: HARRY TSOMIDES (828) 545-7057

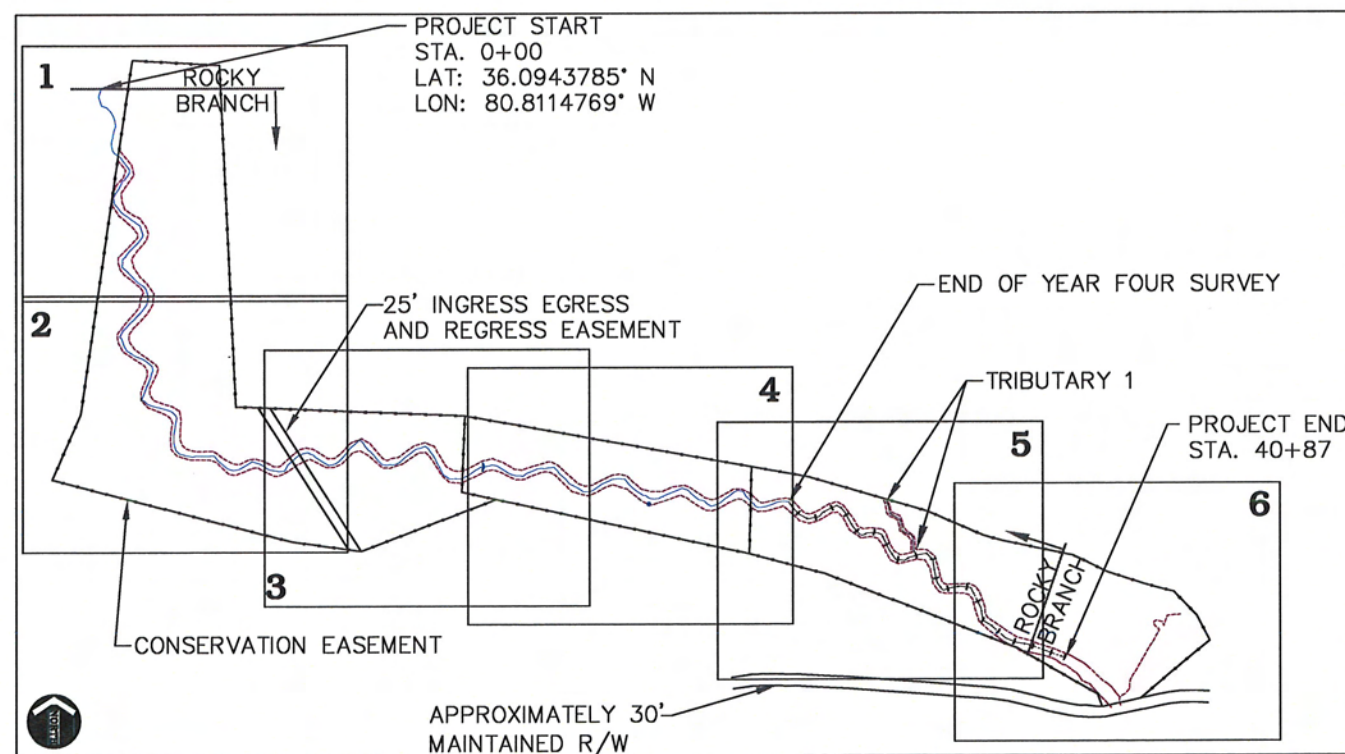
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2	857706.98	1464784.29	923.60	CONTROL
3	857497.74	1465232.84	921.75	CONTROL
4	857374.24	1465869.69	943.35	CONTROL
5	857383.41	1466105.73	924.76	CONTROL
6	857286.17	1466325.15	945.11	CONTROL
7	857204.24	1466508.09	947.75	CONTROL
8	857188.08	1466694.46	939.14	CONTROL
9	856985.38	1467244.76	928.06	CONTROL
10	856996.29	1466467.36	970.98	CONTROL
11	856897.33	1467392.45	917.61	CONTROL
100	857064.87	1467441.85	917.74	CONTROL
101	858419.60	1464837.57	930.60	CONTROL
102	858025.29	1465002.38	927.84	CONTROL
103	858597.92	1464848.09	933.32	CONTROL
104	858530.69	1465077.59	969.73	CONTROL
105	857360.69	1465445.98	923.35	CONTROL
106	858309.21	1464950.27	949.60	NL SET
107	858049.05	1465099.55	941.04	NL SET
108	857672.99	1465257.40	923.10	NL SET
109	857351.66	1465705.60	933.45	NL SET
110	857528.08	1466070.12	918.28	NL SET
111	857483.76	1466334.47	916.79	NL SET
9001	858530.66	1465077.56	969.66	TTPT104
9002	858583.24	1465085.65	964.54	EIP-IN-30MAPLE
9003	858597.24	1464859.07	934.86	R/W MON
9004	858162.53	1464795.63	928.21	BENCHMARK 1
9005	858025.27	1465002.36	927.84	TTPT102
9006	857685.27	1465116.57	924.65	BENCHMARK 3
9007	857560.18	1465779.26	921.38	BENCHMARK 4?
9008	857360.66	1465446.04	923.31	TTPT105
9009	857508.68	1466220.77	919.02	BENCHMARK 5
9010	857439.76	1466843.27	918.41	BENCHMARK 8
9011	857317.78	1466690.43	919.68	BENCHMARK 7

NOTE: SURVEY DATES OF THALWEG AND TOP-OF-BANK - 04/11/11 TO 04/14/11.

**SHEET INDEX**  
1-6 CONSOLIDATED CURRENT CONDITIONS  
PLAN VIEW



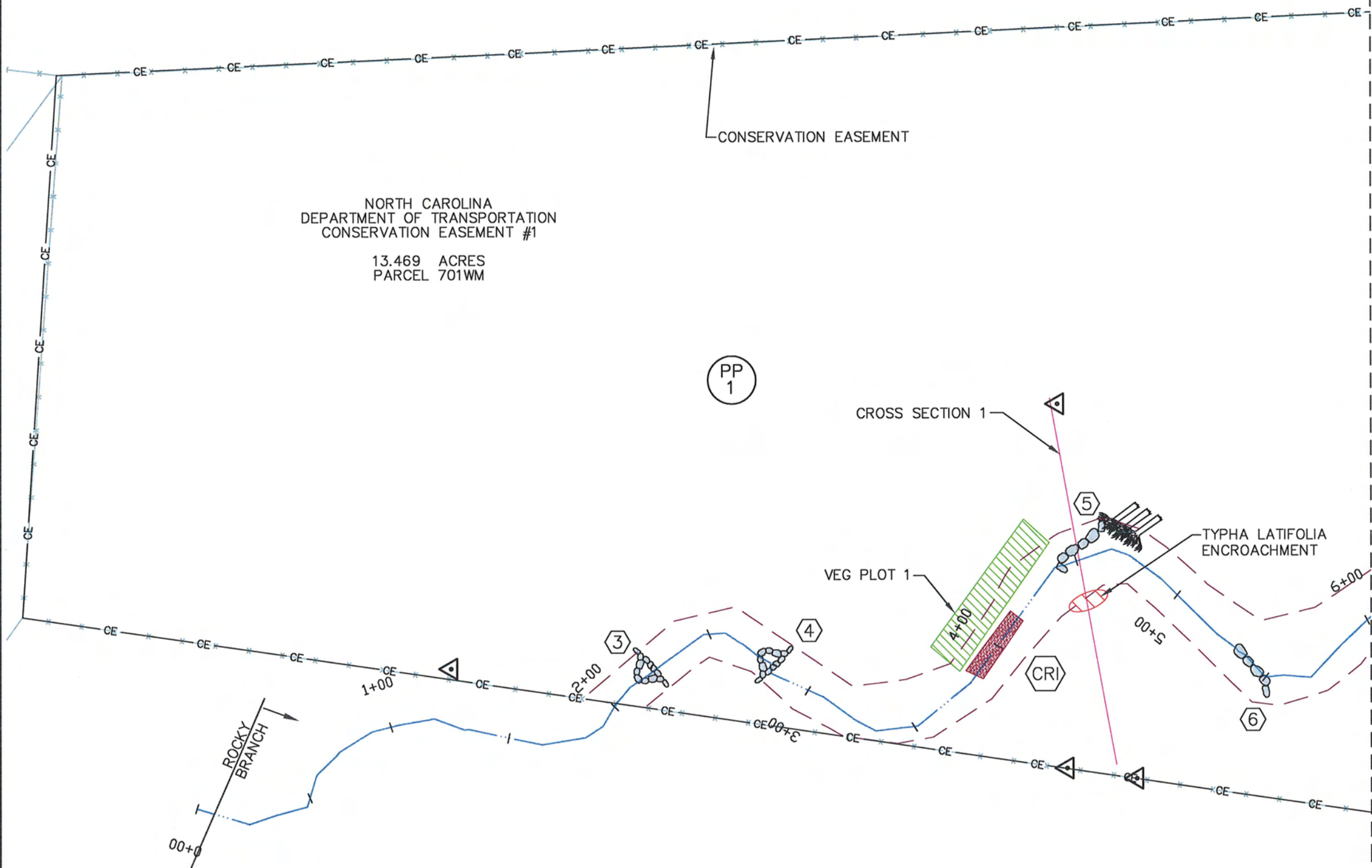
VICINITY MAP  
NTS



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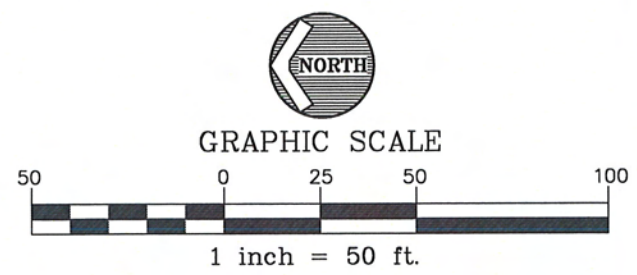


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PARCEL 701WM

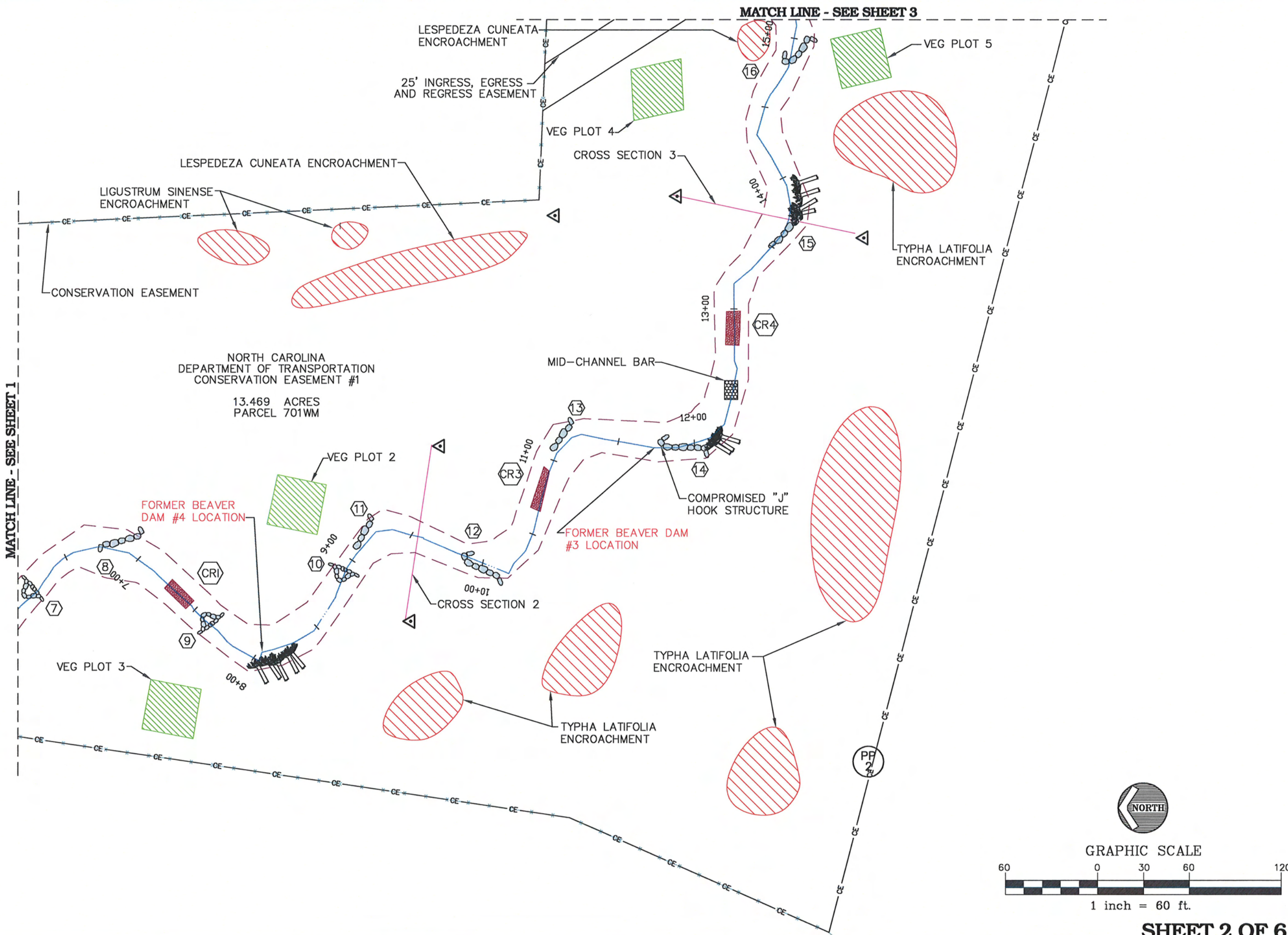
- LEGEND**
- EXISTING FENCE LINE
  - THALWEG OF CREEK
  - CONSERVATION EASEMENT
  - ROCK CROSS VANE
  - ROCK A-VANE
  - LOG VANE
  - ROOT WAD
  - ROCK VANE
  - STRUCTURE NUMBER
  - SURVEY CONTROL
  - INVASIVE / EXOTIC POPULATION
  - PHOTO POINT
  - CREST GAGE
  - RIFFLE
  - BEAVER DAM
  - MID-CHANNEL BAR

**NOTES:**  
CONSERVATION EASEMENT PROVIDED BY EEP FROM PLAT PREPARED BY MULKEY ENGINEERS & CONSULTANTS TITLED "PLAT SHOWING NORTH CAROLINA DEPARTMENT OF TRANSPORTATION CONSERVATION EASEMENTS PROPERTY OF: WILLIAM M. ALLEN, ET. UX., JOE L. ALLEN, ET. UX., TEXIE B. OWNES, ET. AL.", BOOK OF MAPS 9, PAGE 606.

SURVEY DATES OF THALWEG AND TOP-OF-BANK - 04/11/11 TO 04/14/11.



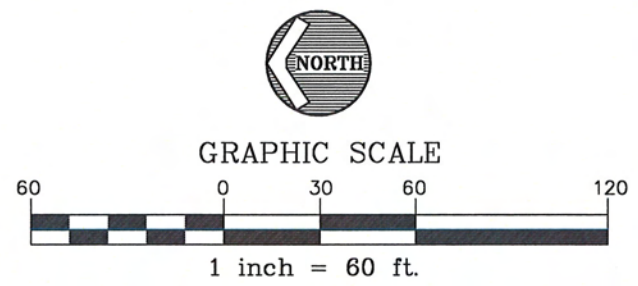
**SHEET 1 OF 6**



MATCH LINE - SEE SHEET 1

MATCH LINE - SEE SHEET 3

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
CONSERVATION EASEMENT #1  
13.469 ACRES  
PARCEL 701WM

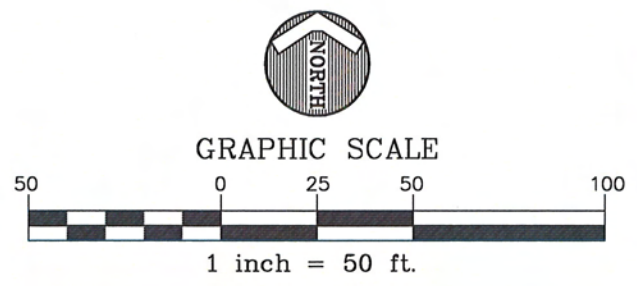
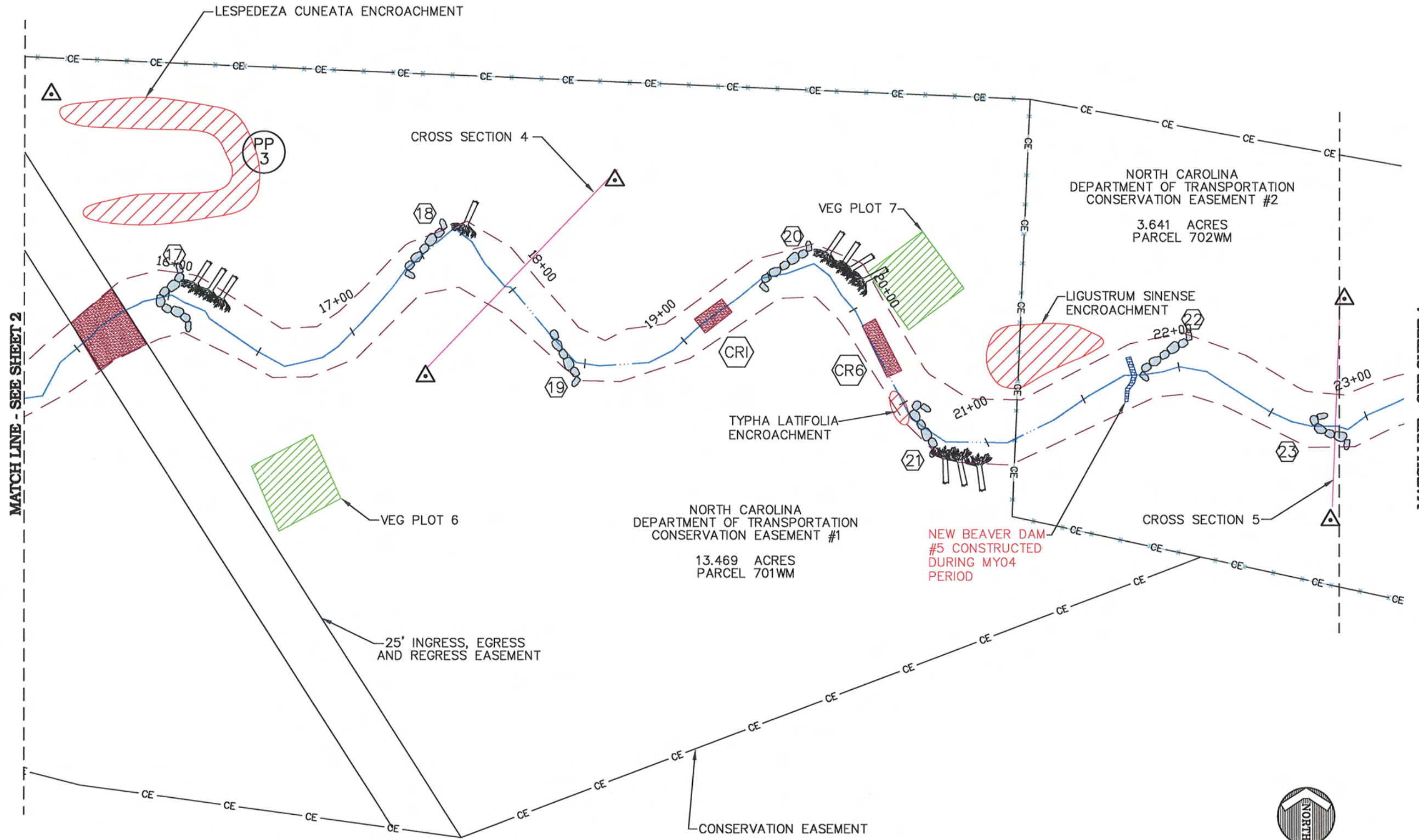


**SHEET 2 OF 6**



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CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING  
YADKIN COUNTY, NORTH CAROLINA

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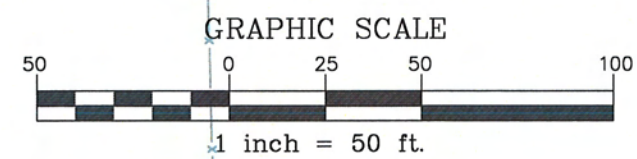
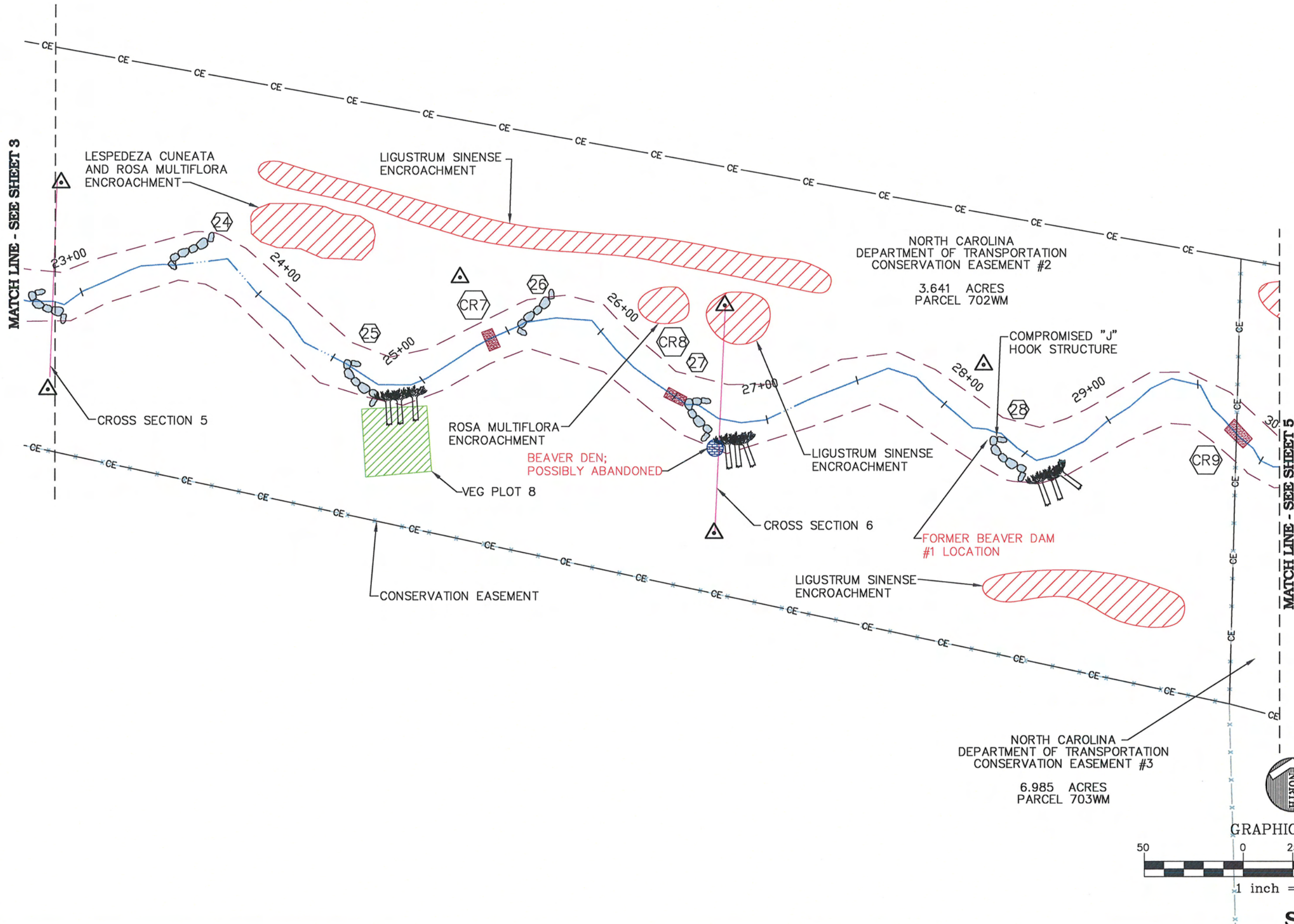


**SHEET 3 OF 6**



**ROCKY BRANCH**  
 CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING  
 YADKIN COUNTY, NORTH CAROLINA

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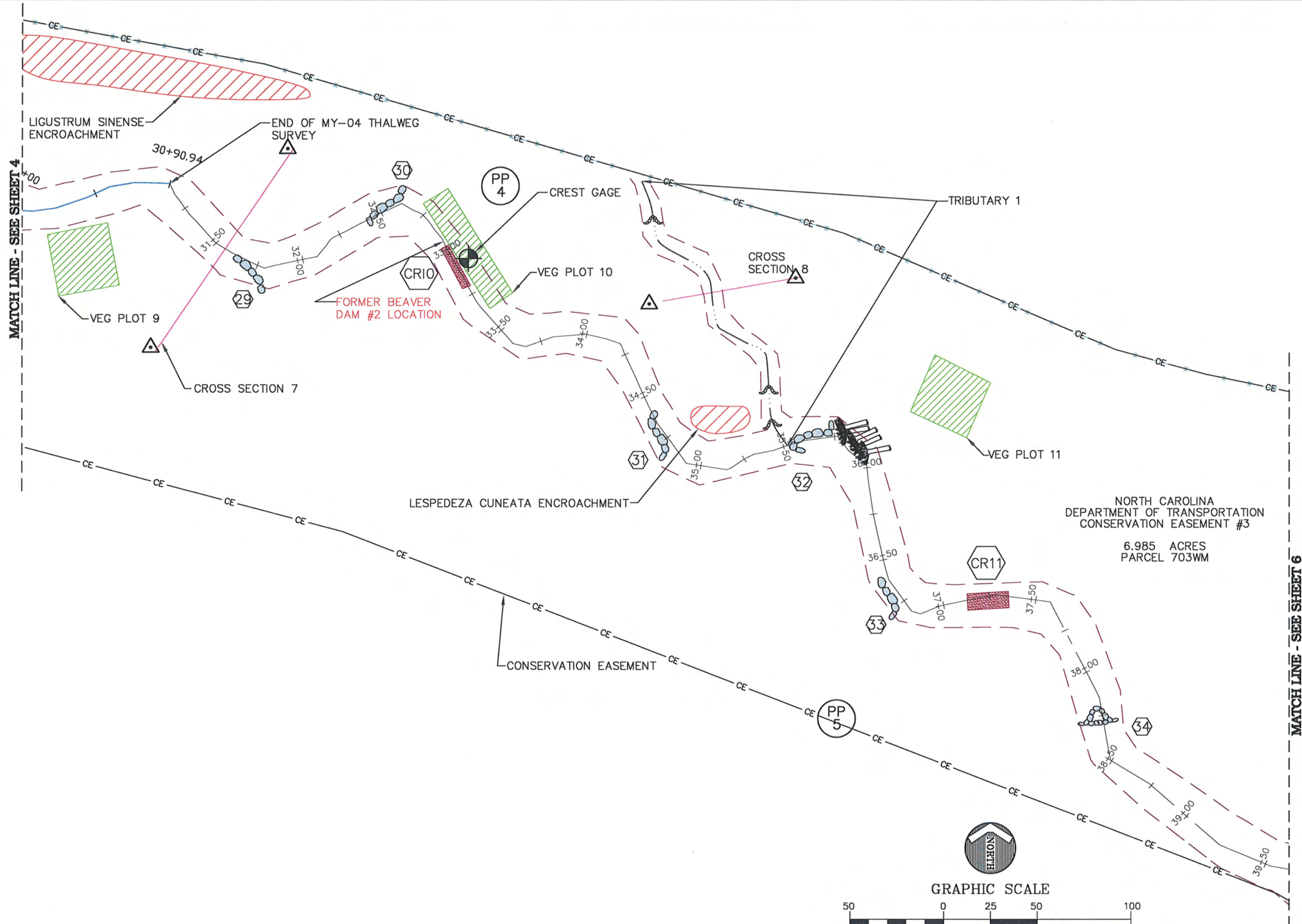


**SHEET 4 OF 6**



**ROCKY BRANCH**  
 CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING  
 YADKIN COUNTY, NORTH CAROLINA

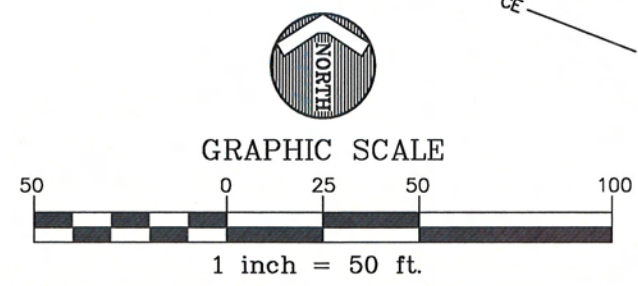
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MATCH LINE - SEE SHEET 4

MATCH LINE - SEE SHEET 6

NORTH CAROLINA  
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6.985 ACRES  
PARCEL 703WM



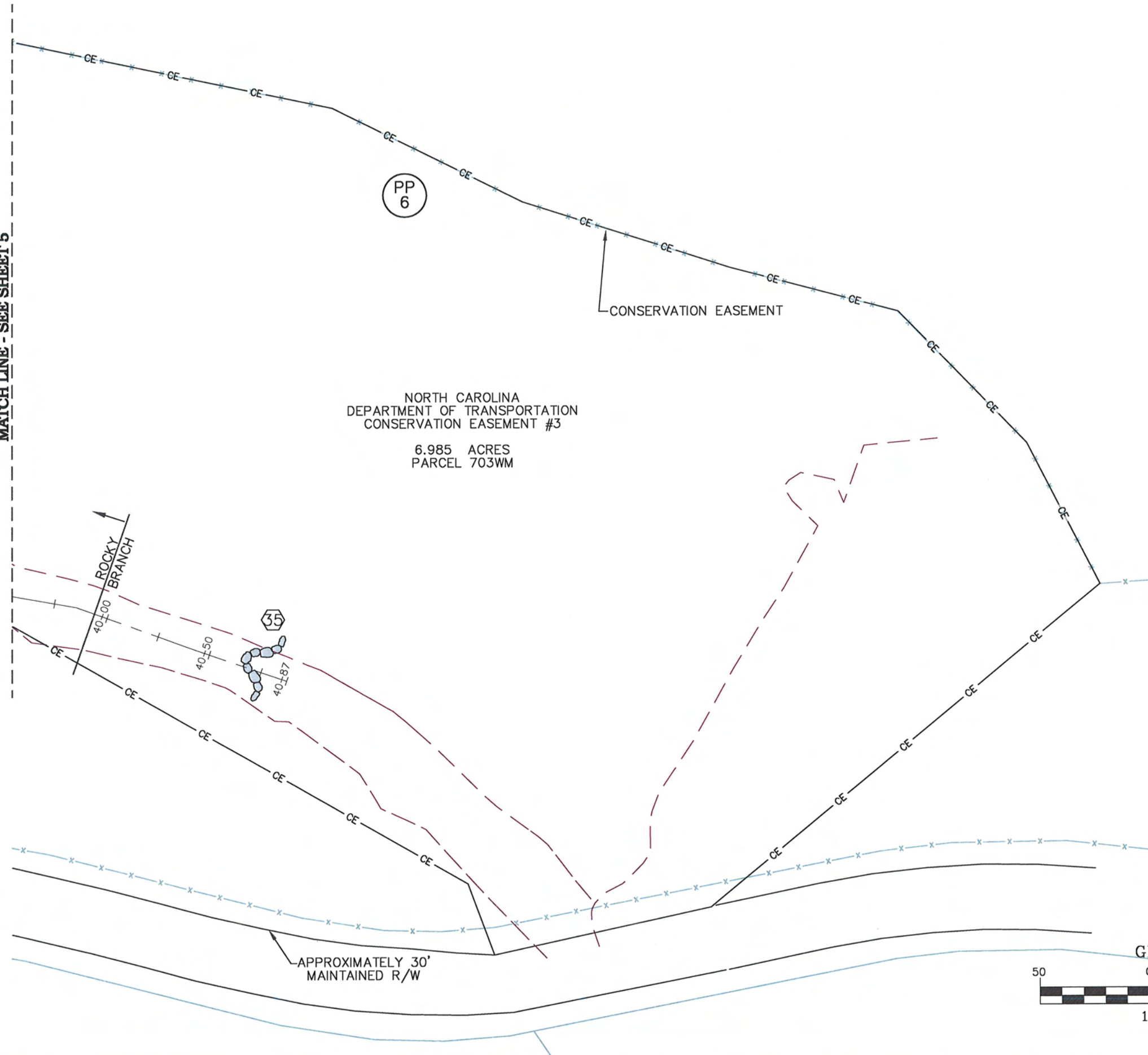
SHEET 5 OF 6



**ROCKY BRANCH**  
CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING  
YADKIN COUNTY, NORTH CAROLINA

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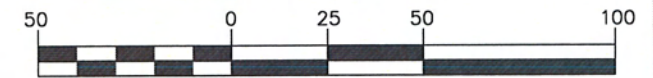
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GRAPHIC SCALE



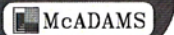
1 inch = 50 ft.

**SHEET 6 OF 6**

# ROCKY BRANCH

CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR FOUR MONITORING  
YADKIN COUNTY, NORTH CAROLINA

PROJECT NO. EEP-08020  
 FILENAME: EEP-08020X  
 SCALE: 1" = 50'  
 DATE: 04-29-11



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APPENDIX B

General Project Tables

**Table 1. Project Restoration Components  
Rocky Branch Stream Restoration Site/EEP Project Number: 308**

Project Segment or Reach ID	Existing Feet/Acres	Type	Approach	Footage or Acreage	Mitigation Ratio	Mitigation Units	Stationing	Comment
Rocky Branch	3,090	R	P1 & P2	3,614	1	3,614	0+00 - 30+90.94	
		EI	P4	206	0.66	137		
Tributary 1	593	R	P1	172	1	172	0+00 - 1+72	
Tributary 2	280	NA	NA	Pond	NA	NA	NA	NA = Not Applicable; Portion of original channel contained within proposed conservation easement
<b>Mitigation Unit Summations</b>								
Stream	Riparian Wetland	Nonriparian Wetland	Total Wetland	Buffer	Comment			
3,923	0	0	0	0				

R= Restoration

EI= Enhancement

EII= Enhancement II

S= Stabilization

P1= Priority I

P2= Priority II

P3= Priority III

SS=Stream Bank Stabilization

**Table 2. Project Activity and Reporting History  
Rocky Branch Stream Restoration Site/EEP Project Number: 308**

<b>Activity or Report</b>	<b>Data Collection Complete</b>	<b>Actual Completion or Delivery</b>
Restoration Plan	Winter 04	Mar-05
Final Design – 90%	Summer 05	Winter 05
Construction	May-06	Sep-06
Temporary S&E mix applied to entire project area	May-06	Sep-06
Permanent seed mix applied to reach/segments 1 & 2	Sep-06	Sep-06
Containerized and B&B plantings for reach/segments 1 & 2	Fall 06	Dec-06
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	Winter 07	Feb-08
Year 1 Monitoring	Sep-08	Nov-08
Year 2 Monitoring	Sep-09	Nov-09
Year 3 Monitoring	Aug-10	Oct-10
Year 4 Monitoring	Apr-11	Jun-11

Note: Timeframe estimated from information provided by EEP.

**Table 3. Project Contacts Table**  
**Rocky Branch Stream Restoration Site/EEP Project Number: 308**

<b>Designer</b>	Mulkey Engineers & Consultants 6750 Tryon Road, Cary, NC 27518
Primary project design POC	Wendee Smith, 919-858-1833
<b>Construction Contractor</b>	Fluvial Solutions, Inc. PO Box 28749, Raleigh, NC 27611-8749
Construction contractor POC	Peter Jelenevsky, 919-605-6134
<b>Planting Contractor</b>	Carolina Silvics 908 Indian Trail Road, Edenton, NC 27932
Planting contractor POC	Mary-Margaret McKinney 252-484-8491
<b>Seeding Contractor</b>	Contact: Fluvial Solutions, Inc. PO Box 28749, Raleigh, NC 27611-8749
Planting contractor POC	Peter Jelenevsky, 919-605-6134
Seed Mix Sources	Contact: Fluvial Solutions, Inc. Peter Jelenevsky, 919-605-6134
Nursery Stock Suppliers	ArboGen 843-851-4129
<b>Monitoring Performers</b>	EcoEngineering - A Division of The John R. McAdams Co. 2905 Meridian Parkway, Durham, NC 27713
Stream Monitoring POC Jim Halley	919-287-4262
Vegetation Monitoring POC Jim Halley	919-287-4262
Wetland Monitoring POC NA	NA

Note: Information obtained from EEP documents and bid tabulation results. Use contacts in table for additional information or to verify data.

**Table 4. Project Background Table  
Rocky Branch Stream Restoration Site/EEP Project Number: 308**

Project County	Yadkin County
Drainage Area	3.1 square miles
Drainage impervious cover estimate (%) For example	5%
Stream Order	1
Physiographic Region	Piedmont
Ecoregion	Northern Inner Piedmont
Rosgen Classification of As-built	C4
Cowardin Classification	R3UBH
Dominant soil types	Chewacla, Cecil, Appling, and Wilkes
Reference site ID	Spencer Creek
USGS HUC for Project and Reference	Project 03040102, Reference 03040104
NCDWQ Sub-basin for Project and Reference	Project 03-07-06, Reference 03-07-09
NCDWQ classification for Project and Reference	Project WS-III, Reference WS-IV
Any portion of any project segment 303d listed?	no
Any portion of any project segment upstream of a 303d listed segment?	no
Reasons for 303d listing or stressor	no
% of project easement fenced	100%

APPENDIX C

Vegetation Assessment Data

**Table 5. Vegetation Plot Mitigation Success Summary Table****Rocky Branch Stream Restoration Site/EEP Project ID: 308****Planted Excluding Live Stakes Summary**

<b>Tract</b>	<b>Vegetation Plot ID</b>	<b>Vegetation Survival Threshold Met?</b>	<b>Tract Mean</b>
Rocky Branch	VP1	Y	100%
	VP2	Y	
	VP3	Y	
	VP4	Y	
	VP5	Y	
	VP6	Y	
	VP7	Y	
	VP8	Y	
	VP9	Y	
	VP10	Y	
	VP11	Y	

**Total Planted and Volunteer Stem Summary**

<b>Tract</b>	<b>Vegetation Plot ID</b>	<b>Vegetation Survival Threshold Met?</b>	<b>Tract Mean</b>
Rocky Branch	VP1	Y	100%
	VP2	Y	
	VP3	Y	
	VP4	Y	
	VP5	Y	
	VP6	Y	
	VP7	Y	
	VP8	Y	
	VP9	Y	
	VP10	Y	
	VP11	Y	

**Table 6. Vegetation Metadata****Rocky Branch Stream Restoration Site/EEP Project ID: 308**

<b>Report Prepared By</b>	George Buchholz
<b>Date Prepared</b>	5/12/2011 10:41
<b>database name</b>	EcoEngineering-2010-B.mdb
<b>database location</b>	X:\Projects\EEP\EEP-08020 (Rocky Branch)\Storm\CVS Vegetation Data\2011 Vegetation Data
<b>computer name</b>	BUCHHOLES
<b>file size</b>	53751808
<b>DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT</b>	
<b>Metadata</b>	Description of database file, the report worksheets, and a summary of project(s) and project data.
<b>Proj, planted</b>	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
<b>Proj, total stems</b>	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
<b>Plots</b>	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
<b>Vigor</b>	Frequency distribution of vigor classes for stems for all plots.
<b>Vigor by Spp</b>	Frequency distribution of vigor classes listed by species.
<b>Damage</b>	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
<b>Damage by Spp</b>	Damage values tallied by type for each species.
<b>Damage by Plot</b>	Damage values tallied by type for each plot.
<b>Planted Stems by Plot and Spp</b>	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
<b>PROJECT SUMMARY</b>	
<b>Project Code</b>	308
<b>project Name</b>	Rocky Branch
<b>Description</b>	Rocky Branch Stream Restoration Project
<b>River Basin</b>	Yadkin-Pee Dee
<b>length(ft)</b>	3,993
<b>stream-to-edge width (ft)</b>	24
<b>area (sq m)</b>	0.04 sq mile (24.10 acres)
<b>Required Plots (calculated)</b>	11
<b>Sampled Plots</b>	11



**Table 6A. Vegetation Condition Assessment  
Rocky Branch Stream Restoration Site/EEP Project ID: 308**

**Planted Acreage 13.29**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
<b>1. Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.1 acres	----	0	0	0.0%
<b>2. Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	----	0	0	0.0%
<b>Total</b>						
<b>3. Areas of Poor Growth Rates or Vigor</b>	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	----	0	0	0.0%
<b>Cumaltive Total</b>						0.0%

**Easement Acreage 24.09**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
<b>4. Invasive Areas of Concern</b>	Areas or points (if too small to render as polygons at map scale).	1000 SF	diagonal, red	17	0.81	3.36%
<b>5. Easement Encroachment Areas</b>	Areas or points (if too small to render as polygons at map scale).	none	----	0	0	0.0%







VEGETATION PLOT 1 - STREAMBANKS (5m X 20m). VIEW FROM SOUTHEAST PLOT CORNER.



VEGETATION PLOT 2 - RIPARIAN BUFFER (10m x 10m). VIEW FROM SOUTHEAST PLOT CORNER.

PROJECT NO. EEP-08020

FILENAME: EEP08020-EX1

SCALE: NTS

DATE: 04-25-11



**ROCKY BRANCH**  
**MONITORING PHOTOS**  
**YADKIN COUNTY, NORTH CAROLINA**



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VEGETATION PLOT 3 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.



VEGETATION PLOT 4 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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FILENAME: EEP08020-EX1

SCALE: NTS

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VEGETATION PLOT 5 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.



VEGETATION PLOT 6 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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SCALE: NTS

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VEGETATION PLOT 7 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.



VEGETATION PLOT 8 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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 SCALE: NTS  
 DATE: 04-25-11



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VEGETATION PLOT 9 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.



VEGETATION PLOT 10 - RIPARIAN BUFFER (5m x 20m). VIEW FROM NORTHWEST PLOT CORNER.

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SCALE: NTS

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VEGETATION PLOT II - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.

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FILENAME: EEP08020-EX1

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DATE: 04-25-11



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**Table 8a. Visual Morphological Stability Assessment  
Rocky Branch Stream Restoration Site/EEP Project Number: 308  
Rocky Branch: 3,751 Linear Feet**

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffls	1. Present ?	28	28	NA	100	
	2. Armor stable (e.g. no displacement)?	28	28	NA	100	
	3. Facet grade appears stable?	23	28	NA	82	
	4. Minimal evidence of embedding/fining?	28	28	NA	100	
	5. Length appropriate?	NA	NA	NA	NA	96
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	25	27	NA	93	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?)	3.5 / 1.5 = 2.3	27	Max Pool / 1.5 > 1.6, 24 of 27	89	
	3. Length appropriate?	23	27	NA	85	89
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	37	39	NA	95	
	2. Downstream of meander (glide/inflection) centering?	37	39	NA	93	94
D. Meander	1. Outer bend in state of limited/controlled erosion?	43	43	NA	100	
	2. Of those eroding, # w/concomitant point bar formation	43	43	NA	100	
	3. Apparent Rc within spec?	42	43	NA	98	
	4. Sufficient floodplain access and relief?	43	43	NA	100	100
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	NA	100	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	100
F. Bank	1. Actively eroding, washing, or slumping bank	NA	NA	5/90	98	98
	1. Free of bank or arm scour?	34	36	30	94	
	2. Height appropriate?	34	36	30	94	
	3. Angle and geometry appear appropriate?	34	36	30	94	
G. Vanes	4. Free of piping or other structural failures?	34	36	30	94	94
	1. Free of scour?	40	40	NA	100	
H. Wads/ Boulders	2. Footing stable?	40	40	NA	100	100

**Table 8b. Visual Morphological Stability Assessment  
Rocky Branch Stream Restoration Site/EEP Project Number: 308  
Rocky Branch Tributary 1: 172 Linear Feet**

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present?	3	3	NA	100	
	2. Armor stable (e.g. no displacement)?	3	3	NA	100	
	3. Facet grade appears stable?	3	3	NA	100	
	4. Minimal evidence of embedding/fining?	3	3	NA	100	
	5. Length appropriate?	NA	NA	NA	NA	100
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	NA	NA	NA	NA	
	2. Sufficiently deep (Max Pool D:Mean Bk<math>>1.6</math>?)	NA	NA	NA	NA	
	3. Length appropriate?	NA	NA	NA	NA	NA
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	4	4	NA	100	
	2. Downstream of meander (glide/inflection) centering?	3	4	NA	100	100
D. Meander	1. Outer bend in state of limited/controlled erosion?	5	5	NA	100	
	2. Of those eroding, # w/concomitant point bar formation	0	0	NA	100	
	3. Apparent Rc within spec?	5	5	NA	100	
	4. Sufficient floodplain access and relief?	5	5	NA	100	100
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	NA	100	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	100
F. Bank	1. Actively eroding, wasting, or slumping bank	NA	NA	0/172	100	100
	1. Free of bank or arm scour?	3	3	NA	100	
	2. Height appropriate?	3	3	NA	100	
	3. Angle and geometry appear appropriate?	3	3	NA	100	
G. Vanes	4. Free of piping or other structural failures?	3	3	NA	100	100
	1. Free of scour?	NA	NA	NA	NA	NA
H. Wads/ Boulders	2. Footing stable?	NA	NA	NA	NA	NA

**Table 9. Verification of Bankfull Events  
Rocky Branch Stream Restoration Site/EEP Project Number: 308**

<b>Date of Data Collection</b>	<b>Date of Occurrence</b>	<b>Method</b>	<b>Photo # (if available)</b>
24-Sep-08	No occurrence	Observation	Not Available
2-Oct-09	Between 09/25/08 and 10/02/09	On-Site Crest Gage located at Station 33+08. Observed elevation on gage at elevation 918.99	Not Available
5-Aug-10	Between 10/02/09 and 08/05/10	On-Site Crest Gage located at Station 33+08. Observed elevation on gage at elevation 914.25	Not Available
14-Apr-11	Between 08/05/10 and 04/14/11	On-Site Crest Gage located at Station 33+08. Observed elevation on gage at elevation 914.63	Not Available



PHOTO POINT 1. VIEW LOOKING SOUTH TOWARD DAIRY FACILITY.



PHOTO POINT 2. VIEW LOOKING NORTH ACROSS NEW ROCKY BRANCH STREAM CHANNEL.

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PROJECT NO. EEP-08020  
 FILENAME: EEP08020-EX1  
 SCALE: NTS  
 DATE: 04-25-11



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PHOTO POINT 2. VIEW LOOKING NORTHEAST ACROSS NEW EXISTING ROCKY BRANCH STREAM CHANNEL.



PHOTO POINT 3. VIEW LOOKING WEST TOWARD THE I-77 ROADWAY CORRIDOR.

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PHOTO POINT 3. VIEW LOOKING SOUTH TOWARD HOMES LOCATED ALONG SR 1120.



PHOTO POINT 3. VIEW LOOKING EAST TOWARD WOODED AREA.

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FILENAME: EEP08020-EX1

SCALE: NTS

DATE: 04-25-11



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PHOTO POINT 4. VIEW LOOKING WEST THROUGH WOODED SECTION.



PHOTO POINT 4. VIEW LOOKING SOUTH TOWARD SR 1120.

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FILENAME: EEP08020-EX1

SCALE: NTS

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PHOTO POINT 4. VIEW LOOKING EAST TOWARD NEWLY CONSTRUCTED TRIBUTARY I AND MAIN CHANNEL.



PHOTO POINT 5. VIEW LOOKING NORTHEAST ACROSS NEW ROCKY BRANCH STREAM CHANNEL.

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 FILENAME: EEP08020-EX1  
 SCALE: NTS  
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PHOTO POINT 5. VIEW LOOKING NORTH TOWARD NEWLY CONSTRUCTED TRIBUTARY I.



PHOTO POINT 5. VIEW LOOKING NORTHEAST TOWARD NEW POND.

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PROJECT NO. EEP-08020  
 FILENAME: EEP08020-EX1  
 SCALE: NTS  
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PHOTO POINT 6. VIEW LOOKING WEST TOWARD SR 1120.



PHOTO POINT 6. VIEW LOOKING SOUTH TOWARD SR 1120 AND JOE ALLEN RESIDENCE.

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 FILENAME: EEP08020-EX1  
 SCALE: NTS  
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PHOTO POINT 6. VIEW LOOKING EAST TOWARD NEW POND.

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CROSS SECTION 1 - POOL. (ROCKY BRANCH, STA 4 + 25) VIEW LOOKING DOWNSTREAM.



CROSS SECTION 2 - RIFFLE. (ROCKY BRANCH, STA 9 + 22) VIEW LOOKING DOWNSTREAM.

McADAMS

PROJECT NO. EEP-08020

FILENAME: EEP08020-EX1

SCALE: NTS

DATE: 04-25-11



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CROSS SECTION 3 - POOL. (ROCKY BRANCH, STA 13 + 25) VIEW LOOKING DOWNSTREAM.



CROSS SECTION 4 - RIFFLE. (ROCKY BRANCH, STA 17 + 49) VIEW LOOKING DOWNSTREAM.

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PROJECT NO. EEP-08020  
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CROSS SECTION 5 - POOL. (ROCKY BRANCH, STA 22 + 32) VIEW LOOKING DOWNSTREAM.



CROSS SECTION 6 - RIFFLE. (ROCKY BRANCH, STA 26 + 22) VIEW LOOKING DOWNSTREAM.

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PROJECT NO. EEP-08020

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CROSS SECTION 7 - RIFFLE. (ROCKY BRANCH, STA 30 + 75) VIEW LOOKING DOWNSTREAM.




CROSS SECTION 8 - RIFFLE. (TRIBUTARY 1, STA 0 + 75) VIEW LOOKING DOWNSTREAM.

 PROJECT NO. EEP-08020  
 FILENAME: EEP08020-EX1  
 SCALE: NTS  
 DATE: 04-25-11



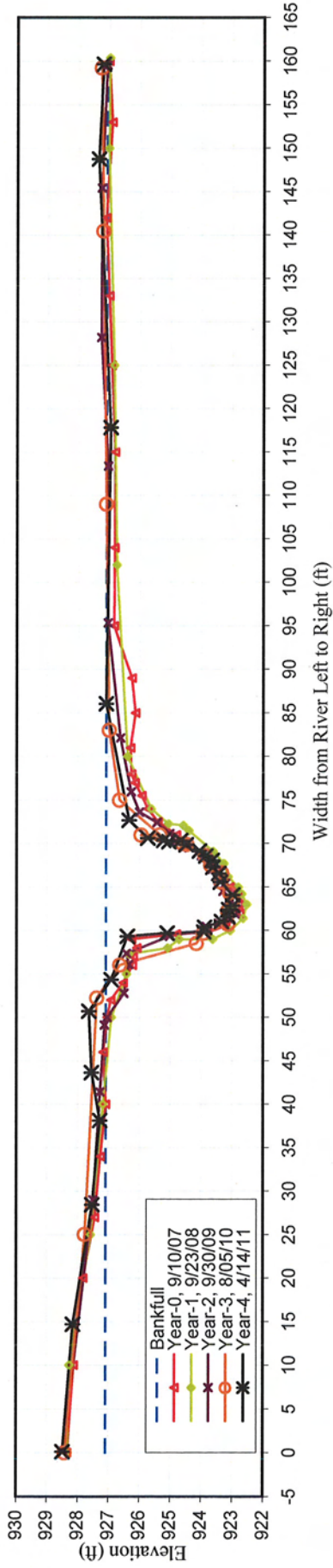
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<b>ROCKY BRANCH</b>		<b>EEP PROJECT # 308</b>										<b>CROSS-SECTION: 1</b>	
<b>Year-0</b>		<b>Year-1</b>		<b>Year-2</b>		<b>Year-3</b>		<b>Year-4</b>		<b>Year-5</b>		<b>Year-6</b>	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	928.33	0.00	928.33	-0.87	928.46	0.00	928.41	0.12	928.48				
10.00	928.12	10.00	928.26	28.76	927.50	25.04	927.76	14.67	928.15				
20.00	927.82	25.00	927.58	41.50	927.27	52.24	927.38	28.45	927.53				
27.00	927.44	40.00	927.18	49.38	927.13	56.04	926.62	38.11	927.28				
34.00	927.26	50.00	926.90	50.28	927.04	58.54	924.15	43.65	927.55				
40.00	927.08	55.00	926.41	53.16	926.49	59.69	923.93	50.71	927.64				
46.00	927.17	57.30	926.34	56.54	926.34	60.77	923.12	54.35	926.91				
50.00	927.05	58.00	925.08	57.83	926.41	62.26	923.13	59.31	926.38				
52.00	926.92	59.00	924.71	59.88	925.02	63.46	923.07	59.71	925.1				
54.00	926.52	59.00	923.62	60.60	923.92	64.36	923.07	59.83	923.91				
56.00	926.22	60.00	923.05	61.05	923.84	65.61	923.36	60.36	923.89				
57.00	926.19	61.40	922.64	61.39	923.44	66.63	923.33	61.01	923.34				
58.00	926.08	63.00	922.52	61.96	923.12	67.55	923.69	61.6	923.14				
59.00	926.25	64.20	922.68	62.54	922.90	68.67	923.88	62.4	923.1				
59.60	924.80	65.00	922.80	63.27	923.10	69.93	924.46	62.86	922.98				
59.80	923.79	66.20	923.12	64.16	923.07	70.00	924.60	64.08	922.98				
60.50	923.25	67.70	923.26	65.20	923.28	71.00	925.94	65.57	923.37				
61.00	923.19	69.10	923.61	66.11	923.20	71.03	925.34	66.56	923.43				
62.00	922.75	71.50	924.40	66.81	923.47	74.99	926.64	67.26	923.62				
63.00	922.78	72.10	924.58	67.78	923.63	83.04	926.98	68.06	923.64				
64.00	922.83	72.30	925.06	68.58	923.75	109.00	927.09	68.55	923.85				
65.00	923.07	74.00	925.62	69.35	923.99	140.48	927.20	69.14	924.06				
66.00	923.29	80.00	926.38	70.31	924.40	159.25	927.26	69.86	924.49				
67.00	923.49	102.00	926.74	71.07	924.82			70.2	925.04				
68.00	923.71	125.00	926.84	71.99	925.02			70.33	924.67				
69.00	924.04	150.00	927.02	73.27	925.43			70.35	925.21				
70.00	924.50	160.40	926.99	74.49	925.99			70.6	925.73				
71.00	924.80			76.91	926.26			72.67	926.33				
72.50	925.40			83.25	926.62			86.03	927.08				
74.00	925.73			96.79	927.03			117.81	926.95				
75.50	925.92			115.30	927.03			148.76	927.35				
77.00	926.15			130.50	927.26			159.64	927.2				
78.00	926.26			148.17	927.26								
81.00	926.29			162.68	927.08								
85.00	926.13												
89.00	926.25												
95.00	926.83												
104.00	926.81												
115.00	926.80												
125.00	926.92												
133.00	927.00												
142.00	927.11												
153.00	926.91												
160.00	927.02												

Rocky Branch Cross Section 1 - Pool



CROSS SECTION PLOT - LOOKING DOWNSTREAM

<b>YEAR-4, 2011 SURVEY DATA</b>	<b>CROSS-SECTION:</b>	1
<b>PROJECT</b>	ROCKY BRANCH	Pool
<b>TASK</b>	CROSS SECTION	
<b>REACH</b>	ROCKY BRANCH	
<b>DATE</b>	4/11/11 to 4/14/11	
<b>CREW</b>	BUCHHOLZ/PARRISH	

**Summary Data**

All dimensions in feet.

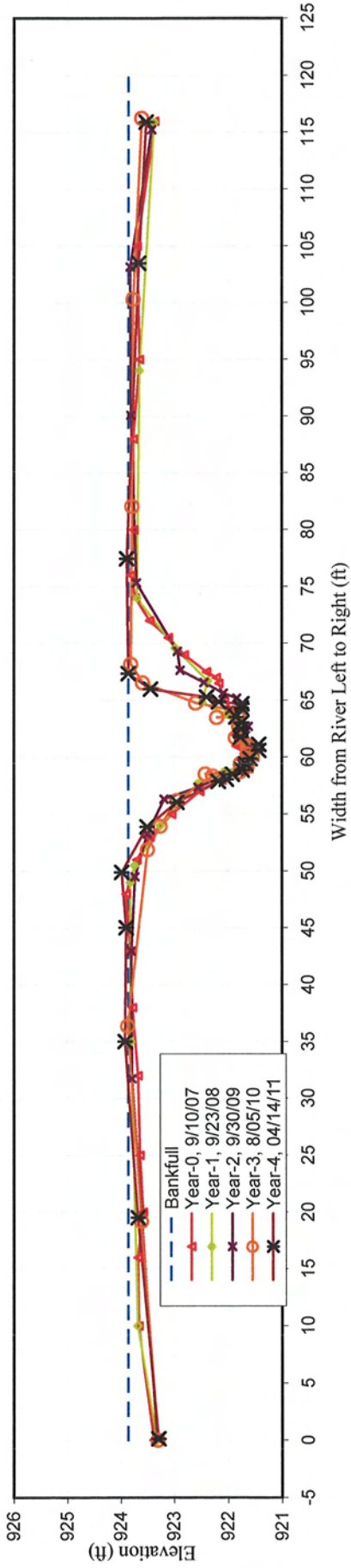
Bankfull X-sec area	48.2	sq. ft.
Bankfull Width	32.5	ft.
Bankfull Mean Depth	1.5	ft.
Bankfull Max Depth	4.1	ft.
Width/Depth Ratio	21.9	
Entrenchment Ratio	3.1	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	927.08	ft.



CROSS SECTION PHOTO - LOOKING DOWNSTREAM

<b>ROCKY BRANCH</b>		<b>CROSS-SECTION: 2</b>													
<b>EEP PROJECT # 308</b>		<b>Year-0</b>		<b>Year-1</b>		<b>Year-2</b>		<b>Year-3</b>		<b>Year-4</b>		<b>Year-5</b>		<b>Year-6</b>	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	923.38	0.00	923.32	0.15	923.32	0	923.3	0.12	923.3	0.12	923.29				
10.00	923.66	10.00	923.68	31.73	923.79	31.73	923.61	19.51	923.61	19.51	923.68				
16.00	923.68	35.00	923.81	42.99	923.80	36.4	923.87	35.03	923.87	35.03	923.92				
20.00	923.58	49.00	923.82	49.52	923.74	51.9	923.5	45.03	923.5	45.03	923.9				
25.00	923.64	50.50	923.74	53.28	923.50	53.97	923.26	49.9	923.26	49.9	923.98				
32.00	923.68	54.00	923.26	56.32	923.19	56.2	922.95	53.9	923.51	53.9	923.51				
38.00	923.78	57.70	922.56	57.37	922.55	58.38	922.28	56.03	922.95	56.03	922.95				
43.00	923.82	58.70	922.08	58.06	922.22	58.54	922.42	57.87	922.18	57.87	922.18				
48.00	923.90	59.30	921.70	58.46	922.14	58.73	921.77	58.05	922.03	58.05	922.03				
51.00	923.70	60.00	921.51	58.60	921.68	59.18	921.64	58.49	921.92	58.49	921.92				
53.00	923.45	61.30	921.66	59.54	921.77	59.43	921.77	58.87	921.74	58.87	921.74				
55.00	923.05	62.70	921.82	60.76	921.58	59.93	921.64	59.41	921.67	59.41	921.67				
57.00	922.52	63.80	922.04	61.91	921.67	60.31	921.64	59.86	921.59	59.86	921.59				
58.00	922.11	64.80	922.48	62.71	921.62	60.67	921.63	60.6	921.43	60.6	921.43				
59.00	921.61	66.70	922.38	64.14	921.97	61.02	921.63	61.12	921.43	61.12	921.43				
60.00	921.50	69.60	922.98	64.70	921.72	61.72	921.86	61.75	921.77	61.75	921.77				
60.50	921.58	74.00	923.70	65.19	921.84	62.68	921.8	62.46	921.76	62.46	921.76				
61.00	921.85	94.00	923.65	65.63	922.09	63.48	921.8	63.05	921.74	63.05	921.74				
62.00	921.89	115.90	923.38	66.55	922.44	63.5	922.21	63.52	921.85	63.52	921.85				
63.00	921.88			67.65	922.89	63.78	921.8	64.32	921.75	64.32	921.75				
64.00	921.90			69.31	922.94	64.02	921.79	64.69	921.74	64.69	921.74				
65.00	922.07			75.32	923.71	64.78	922.6	64.86	922.17	64.86	922.17				
66.50	922.17			90.09	923.81	66.55	923.59	65.28	922.4	65.28	922.4				
67.00	922.22			103.15	923.83	68.21	923.81	65.99	923.44	65.99	923.44				
67.50	922.40			115.26	923.43	82.06	923.79	67.36	923.86	67.36	923.86				
69.00	922.81					100.31	923.77	77.44	923.89	77.44	923.89				
70.50	923.11					116.25	923.61	103.47	923.67	103.47	923.67				
72.00	923.46							115.9	923.53	115.9	923.53				
74.00	923.73														
76.00	923.81														
80.00	923.76														
88.00	923.77														
95.00	923.65														
105.00	923.70														
116.00	923.37														

Rocky Branch Cross Section 2 - Riffle



CROSS SECTION PLOT - LOOKING DOWNSTREAM



CROSS SECTION PHOTO - LOOKING DOWNSTREAM

CROSS-SECTION: 2  
 FEATURE: Riffle

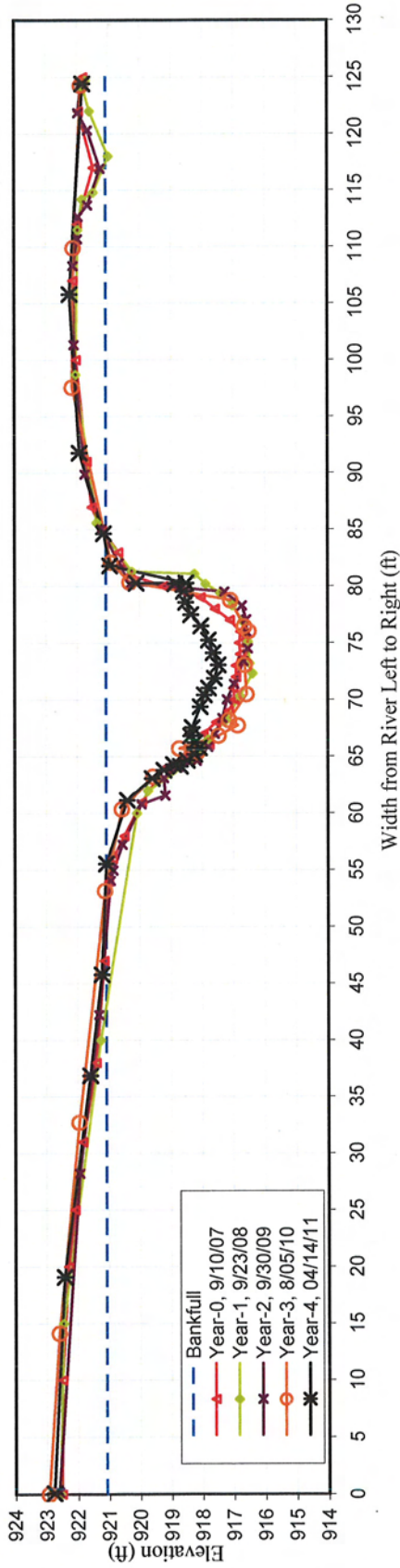
YEAR-4, 2011 SURVEY DATA  
 PROJECT ROCKY BRANCH  
 TASK CROSS SECTION  
 REACH ROCKY BRANCH  
 DATE 4/11/11 to 4/14/11  
 CREW BUCHHOLZ/PARRISH

**Summary Data**  
 All dimensions in feet.

Bankfull X-sec area	20.8	sq. ft.
Bankfull Width	16.4	ft.
Bankfull Mean Depth	1.3	ft.
Bankfull Max Depth	2.4	ft.
Width/Depth Ratio	13.0	
Entrenchment Ratio	6.1	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	923.86	ft.

<b>ROCKY BRANCH</b>		<b>EEP PROJECT # 308</b>										<b>CROSS-SECTION: 3</b>			
<b>Year-0</b>		<b>Year-1</b>		<b>Year-2</b>		<b>Year-3</b>		<b>Year-4</b>		<b>Year-5</b>		<b>Year-6</b>			
<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>	<u>Station (ft)</u>	<u>Elev. (ft)</u>		
0.00	922.51	0.00	922.56	0.18	922.60	0.00	922.92	0.08	922.77						
10.00	922.49	15.00	922.46	28.22	921.93	14.12	922.59	19.08	922.43						
20.00	922.29	40.00	921.25	42.24	921.31	32.74	921.94	36.86	921.60						
25.00	922.08	60.00	920.08	54.05	920.93	53.17	921.11	45.77	921.23						
31.00	921.84	62.00	919.73	54.98	920.84	60.38	920.57	55.55	921.07						
38.00	921.40	64.70	918.25	57.25	920.55	63.24	919.57	61.16	920.40						
47.00	921.14	66.50	917.81	60.83	919.94	65.39	918.16	63.07	919.60						
54.00	920.99	68.20	917.24	61.58	919.18	65.71	918.73	63.78	919.22						
56.00	920.86	70.30	916.79	63.10	919.23	66.84	917.47	64.13	918.70						
58.00	920.49	72.30	916.39	64.06	918.77	67.75	916.86	64.29	918.92						
61.00	919.93	73.20	916.49	64.63	918.17	68.21	917.14	64.65	918.48						
64.00	919.19	75.10	916.55	65.86	917.80	70.48	916.58	65.17	918.24						
65.00	918.62	76.90	916.71	67.00	917.59	73.07	916.64	65.74	918.09						
66.00	917.77	78.30	917.03	68.37	917.35	76.03	916.52	66.22	918.23						
67.00	917.96	79.40	917.41	70.02	917.20	76.46	916.66	66.80	918.37						
68.00	917.56	80.20	917.89	71.38	916.97	78.77	917.09	67.54	918.32						
69.00	917.15	81.10	918.24	73.39	916.68	80.37	920.31	69.37	918.06						
70.00	916.96	81.30	920.24	74.49	916.55	82.12	920.91	70.41	917.93						
71.00	917.00	85.60	921.37	75.91	916.57	97.56	922.15	71.02	917.79						
72.00	916.92	98.70	922.04	77.07	916.59	109.91	922.11	71.87	917.60						
73.00	916.92	111.50	921.97	78.28	916.73	124.27	921.86	73.03	917.48						
74.00	916.78	114.20	921.83	79.50	917.28			74.11	917.64						
75.00	916.81	114.80	921.47	79.87	918.71			75.22	917.79						
76.00	916.77	118.00	920.99	80.18	920.30			76.49	918.03						
77.00	917.11	122.00	921.59	82.06	920.65			77.48	918.36						
78.00	917.58	124.00	921.79	85.06	921.21			78.58	918.52						
79.00	918.04	124.70	921.72	89.88	921.75			79.52	918.59						
79.50	918.60			101.33	922.10			80.20	918.86						
80.00	919.22			108.30	922.13			80.27	920.10						
81.00	920.29			110.69	921.98			80.27	918.51						
83.00	920.67			112.65	921.96			81.81	920.95						
85.00	921.20			113.67	921.65			84.64	921.15						
87.00	921.53			116.93	921.25			91.75	921.92						
91.00	921.68			120.30	921.65			105.78	922.24						
100.00	922.03			121.83	921.96			124.40	921.82						
107.00	922.13			124.42	921.86										
112.00	921.99														
117.00	921.47														
122.00	921.94														
125.00	921.80														

Rocky Branch Cross Section 3 - Pool



CROSS SECTION PLOT - LOOKING DOWNSTREAM



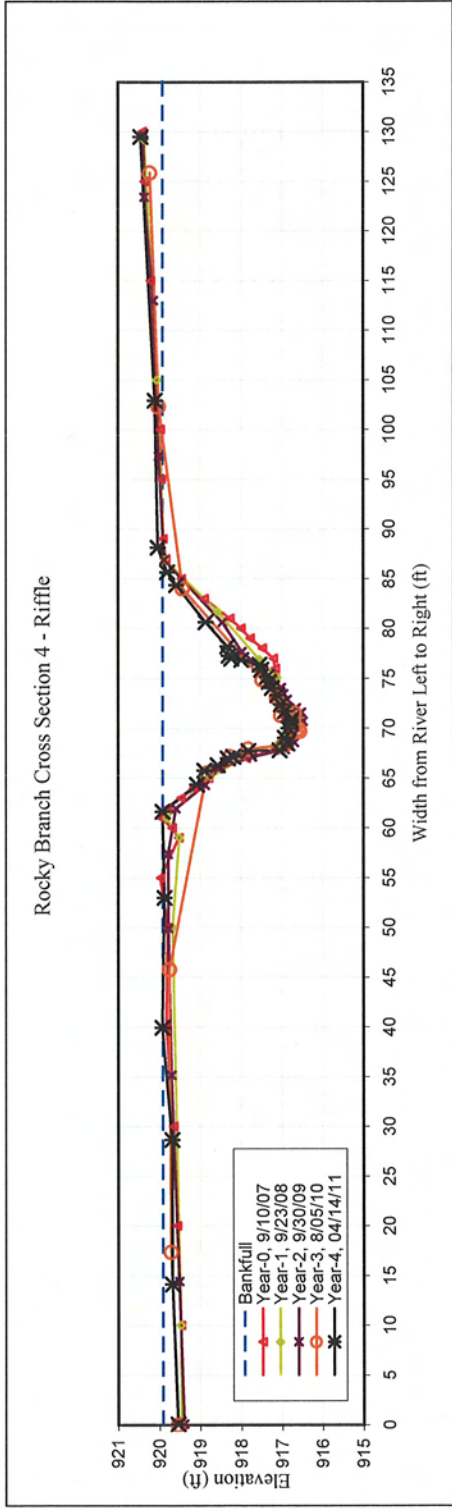
CROSS SECTION PHOTO - LOOKING DOWNSTREAM

CROSS-SECTION: 3  
 FEATURE: Pool

ROCKY BRANCH  
 CROSS SECTION  
 ROCKY BRANCH  
 4/11/11 to 4/14/11  
 BUCHHOLZ/PARRISH

Bankfull X-sec area	56.0	sq. ft.
Bankfull Width	28.0	ft.
Bankfull Mean Depth	2.0	ft.
Bankfull Max Depth	3.6	ft.
Width/Depth Ratio	13.9	
Entrenchment Ratio	3.6	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	0.00	ft.

<b>ROCKY BRANCH</b>		<b>EEP PROJECT # 308</b>		<b>CROSS-SECTION: 4</b>									
<b>Year-0</b>		<b>Year-1</b>		<b>Year-2</b>		<b>Year-3</b>		<b>Year-4</b>		<b>Year-5</b>		<b>Year-6</b>	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	919.45	0.00	919.46	0.08	919.40	0.00	919.54	0.06	919.55				
10.00	919.48	10.00	919.48	14.42	919.51	17.36	919.71	14.13	919.68				
20.00	919.57	50.00	919.67	35.15	919.70	45.79	919.75	28.66	919.69				
30.00	919.66	59.00	919.51	49.90	919.78	65.51	918.84	39.94	919.93				
40.00	919.83	61.00	919.82	57.38	919.78	67.15	918.28	53	919.87				
50.00	919.80	65.00	918.77	61.95	919.60	67.91	917.83	61.64	919.92				
55.00	919.97	67.60	917.73	64.28	918.88	68.27	916.95	64.36	919.07				
59.00	919.52	68.50	917.06	65.96	918.56	69.65	916.66	65.77	918.89				
60.00	919.69	69.00	916.96	67.13	917.73	69.69	916.56	66.32	918.57				
61.00	919.95	70.00	916.80	67.85	916.92	69.93	916.59	67	918.32				
62.00	919.80	70.90	916.58	68.55	916.70	70.76	916.73	67.15	918.19				
63.00	919.47	71.80	916.77	69.40	916.70	70.90	916.71	67.73	917.82				
64.00	919.16	72.80	916.99	70.18	916.74	71.29	917.02	67.79	917.05				
65.00	918.80	74.00	917.08	70.68	916.48	71.54	916.69	68.45	916.86				
66.00	918.51	75.10	917.12	71.60	916.52	72.16	916.98	69.05	916.93				
67.00	917.87	76.90	917.55	72.03	916.65	73.05	917.12	70.01	916.84				
67.80	917.18	81.70	918.58	72.86	916.87	74.87	917.48	70.58	916.78				
68.20	916.83	87.00	919.87	73.44	916.95	84.02	919.43	70.85	916.78				
69.00	916.92	105.00	920.05	74.05	917.02	102.32	920.01	71.7	916.92				
70.00	916.77	129.20	920.36	74.55	917.28	125.87	920.23	72.39	917.02				
70.50	916.55			75.81	917.44			73.32	917.11				
71.00	916.92			77.67	917.99			74.03	917.24				
72.00	916.96			80.62	918.46			74.65	917.31				
73.00	917.16			86.88	919.88			75.15	917.36				
75.00	917.16			97.29	920.01			75.87	917.5				
76.00	917.16			113.02	920.14			76.38	917.54				
77.00	917.21			123.42	920.36			76.86	917.99				
78.00	917.48			129.63	920.39			76.99	918.24				
79.00	917.78							77.27	918.3				
80.00	918.01							78.21	918.33				
81.00	918.28							80.64	918.86				
83.00	918.90							84.39	919.58				
85.00	919.46							85.67	919.8				
87.00	919.84							88.13	920.03				
89.00	919.91							102.95	920.1				
95.00	919.95							129.51	920.45				
100.00	919.97												
115.00	920.21												
125.00	920.36												
130.00	920.41												



**CROSS SECTION PLOT - LOOKING DOWNSTREAM**

**YEAR-4, 2011 SURVEY DATA**      **CROSS-SECTION:**      4

**PROJECT**      ROCKY BRANCH      **FEATURE:**      Riffle

**TASK**      CROSS SECTION

**REACH**      ROCKY BRANCH

**DATE**      4/11/11 to 4/14/14

**CREW**      BUCHHOLZ/PARRISH

**Summary Data**

All dimensions in feet.

Bankfull X-sec area	39.6	sq. ft.
Bankfull Width	25.3	ft.
Bankfull Mean Depth	1.5	ft.
Bankfull Max Depth	3.1	ft.
Width/Depth Ratio	17.3	
Entrenchment Ratio	4.0	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	919.92	ft.

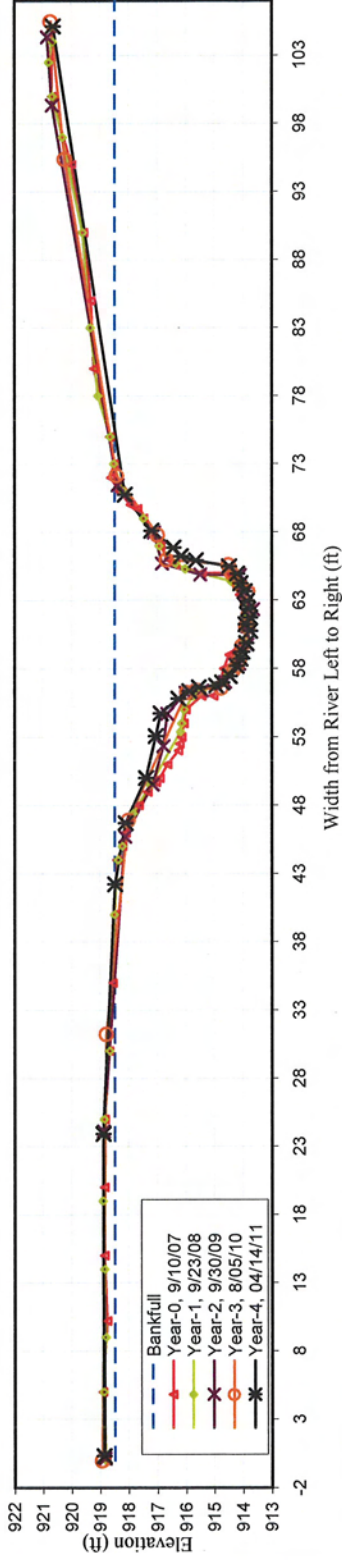


**CROSS SECTION PHOTO - LOOKING DOWNSTREAM**



<b>ROCKY BRANCH</b>		<b>EEP PROJECT # 308</b>										<b>CROSS-SECTION: 5</b>	
<b>Year-0</b>		<b>Year-1</b>		<b>Year-2</b>		<b>Year-3</b>		<b>Year-4</b>		<b>Year-5</b>		<b>Year-6</b>	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	918.78	0.00	918.78	0.13	918.83	0.00	918.91	0.31	918.87				
5.00	918.89	5.00	918.87	24.09	918.87	31.24	918.77	23.91	918.87				
10.20	918.75	9.00	918.79	45.71	918.12	46.90	918.00	42.23	918.47				
15.00	918.84	14.00	918.84	49.52	917.16	56.27	915.96	46.69	918.1				
20.00	918.83	19.00	918.89	52.33	916.78	56.45	915.62	50	917.39				
25.00	918.82	25.00	918.85	54.69	916.65	56.60	914.76	53.07	917.06				
30.00	918.67	30.00	918.66	56.24	916.01	57.94	914.32	54.72	916.89				
35.00	918.54	40.00	918.49	56.38	915.42	58.23	914.20	55.8	916.27				
40.00	918.47	44.00	918.36	57.01	914.62	58.69	914.10	56.35	915.88				
44.00	918.39	45.00	918.21	58.34	914.13	59.68	914.03	56.63	915.55				
45.00	918.20	47.40	917.83	59.73	913.84	61.00	913.81	56.73	914.94				
46.00	918.08	49.50	917.23	61.07	913.84	61.15	913.89	56.96	914.72				
47.00	917.91	53.40	916.19	62.34	913.64	61.94	913.81	57.43	914.46				
48.00	917.63	54.00	916.14	63.50	913.95	62.71	913.83	58.2	914.23				
49.00	917.32	55.00	916.05	64.85	914.11	63.66	913.82	58.71	914.09				
49.70	917.03	56.00	915.74	64.89	915.49	64.17	914.10	59.22	914.02				
50.00	916.91	56.40	915.43	65.71	916.83	65.03	914.38	59.84	913.89				
51.00	916.64	57.30	914.62	67.98	917.11	65.62	914.50	60.75	913.75				
52.00	916.25	60.00	913.93	71.44	918.37	65.98	916.67	61.24	913.91				
52.50	916.21	61.10	913.82	99.35	920.66	67.81	916.99	61.73	913.76				
53.00	916.14	61.80	913.83	104.36	920.82	72.16	918.41	62.34	913.82				
54.00	916.06	62.60	913.81			95.42	920.22	62.95	913.87				
55.00	916.00	64.00	914.17			105.50	920.70	63.64	913.95				
56.00	915.43	64.40	914.41					64.22	914.09				
56.00	915.02	65.30	916.02					64.93	914.21				
57.00	914.78	65.70	916.36					65.46	914.49				
58.00	914.67	67.00	916.93					65.92	915.65				
59.00	914.47	69.00	917.47					66.22	916.18				
60.00	913.99	71.00	918.17					66.84	916.44				
60.80	913.85	73.00	918.51					68.1	917.2				
61.00	913.85	75.00	918.63					70.73	918.13				
62.00	913.85	78.00	919.06					105.12	920.64				
63.00	913.90	83.00	919.33										
63.40	914.12	80.00	919.06										
64.00	914.14	97.00	920.30										
64.80	914.35	100.00	920.65										
65.00	914.59	102.50	920.77										
65.00	915.43	104.00	920.65										
65.60	916.37	105.00	920.64										
66.00	916.61												
67.00	916.89												
68.00	917.24												
69.00	917.47												
69.70	917.67												
70.00	917.92												
71.00	918.32												
72.00	918.61												
73.00	918.50												
75.00	918.64												
80.00	919.21												
85.00	919.31												
90.00	919.57												
95.00	919.98												
100.00	920.66												
105.00	920.67												

Rocky Branch Cross Section 5 - Pool



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-4, 2011 SURVEY DATA CROSS-SECTION: 5

PROJECT ROCKY BRANCH CROSS-SECTION: 5  
 TASK CROSS SECTION FEATURE: Pool  
 REACH ROCKY BRANCH  
 DATE 4/11/11 to 4/14/11  
 CREW BUCHHOLZ/PARRISH

Summary Data

All dimensions in feet.

Bankfull X-sec area	61.1	sq. ft.
Bankfull Width	33.2	ft.
Bankfull Mean Depth	1.8	ft.
Bankfull Max Depth	4.7	ft.
Width/Depth Ratio	18.0	
Entrenchment Ratio	3.0	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	918.47	ft.



CROSS SECTION PHOTO - LOOKING DOWNSTREAM

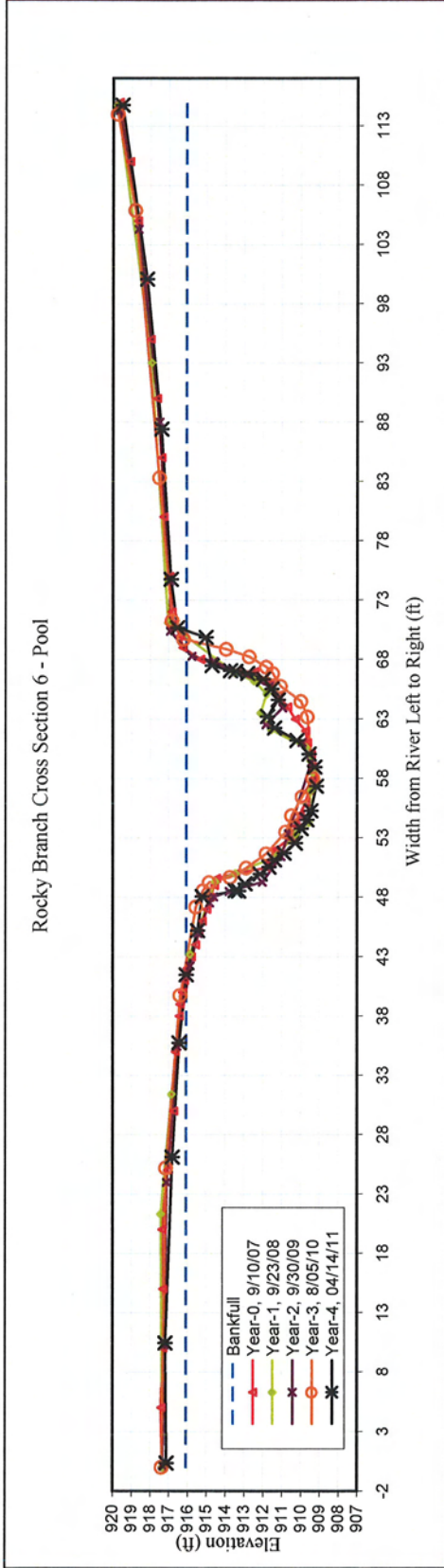
6

CROSS-SECTION:

EEP PROJECT # 308

ROCKY BRANCH

Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	917.33	0.00	917.32	0.13	917.32	0.00	917.36	0.35	917.12				
5.00	917.39	21.30	917.41	10.28	917.22	25.21	917.13	10.42	917.19				
10.00	917.30	31.40	916.85	23.98	917.10	39.75	916.39	26.1	916.81				
15.00	917.30	43.20	915.88	35.45	916.57	47.19	913.56	35.72	916.45				
20.00	917.34	49.30	914.54	42.22	915.86	48.56	915.17	41.45	916.08				
25.00	917.05	50.00	913.46	44.96	915.44	49.27	914.84	45.17	915.47				
30.00	916.73	51.50	911.26	47.53	914.83	49.69	913.73	48.05	915.24				
35.00	916.65	53.30	910.28	48.03	914.62	50.48	912.87	48.53	913.3				
38.00	916.44	54.30	909.55	48.50	913.79	51.67	911.82	48.55	913.47				
39.00	916.41	57.00	909.46	49.28	912.03	53.51	910.77	49.12	912.95				
40.00	916.27	58.50	909.36	51.43	911.04	54.90	910.47	49.95	912.15				
41.00	916.16	59.50	909.47	53.37	910.64	56.47	909.91	50.53	911.69				
42.00	916.04	60.60	909.72	59.31	909.45	58.02	909.35	51.15	911.4				
43.00	915.80	62.10	911.56	61.03	909.93	63.20	909.64	51.7	910.89				
44.00	915.58	63.50	912.12	62.50	911.85	64.50	909.97	52.54	910.28				
45.00	915.40	65.10	911.80	63.94	910.95	65.77	911.07	53.76	909.98				
46.00	915.21	66.20	912.49	65.75	911.65	66.83	911.47	54.51	909.67				
47.00	914.98	66.90	913.53	67.82	914.59	67.36	911.81	55.27	909.45				
48.00	914.80	71.10	917.04	68.27	915.78	68.25	912.73	57.33	909.16				
49.00	914.57	93.00	917.93	70.38	916.93	68.88	913.95	58.93	909.24				
49.60	914.45	114.70	919.76	74.57	916.96	69.71	916.22	60.03	909.56				
50.00	913.45			88.02	917.49	71.27	916.82	61.18	910.2				
50.50	911.79			104.28	918.65	83.31	917.51	62.23	911.39				
51.00	911.68			114.30	919.66	105.89	918.81	63.2	911.77				
52.00	911.35					114.00	919.74	64.59	911.19				
53.00	910.55							65.51	911.54				
54.00	910.23							66.33	911.99				
55.00	910.03							66.81	912.83				
56.00	909.73							67	913.46				
57.00	909.55							67.05	913.73				
58.00	909.35							67.47	914.71				
59.00	909.38							69.85	915.03				
60.00	909.43							70.66	916.55				
61.00	909.63							74.73	916.89				
62.00	909.73							87.39	917.39				
63.00	910.28							100.05	918.17				
64.00	910.69							114.72	919.52				
65.00	911.20												
66.00	911.64												
67.00	912.44												
68.00	913.43												
68.00	915.32												
69.00	916.28												
70.00	916.41												
71.00	916.74												
72.00	916.84												
75.00	916.96												
80.00	917.28												
85.00	917.4												
90.00	917.63												
95.00	917.98												
100.00	918.32												
105.00	918.68												
110.00	919.11												
115.00	919.66												



YEAR-4, 2011 SURVEY DATA      CROSS-SECTION:      6

PROJECT      ROCKY BRANCH      FEATURE:      Pool

TASK      CROSS SECTION

REACH      ROCKY BRANCH

DATE      4/11/11 to 4/14/11

CREW      BUCHHOLZ/PARRISH

**Summary Data**

All dimensions in feet.

Bankfull X-sec area	108.2	sq. ft.
Bankfull Width	29.0	ft.
Bankfull Mean Depth	3.7	ft.
Bankfull Max Depth	6.9	ft.
Width/Depth Ratio	7.8	
Entrenchment Ratio	3.5	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	916.08	ft.



**CROSS SECTION PHOTO - LOOKING DOWNSTREAM**

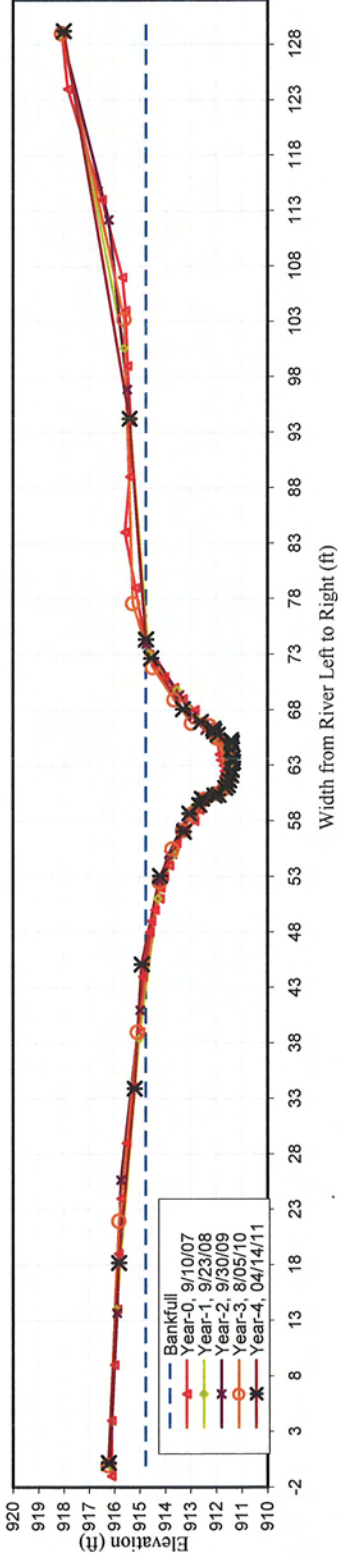
CROSS-SECTION: 7

EEP PROJECT # 308

ROCKY BRANCH

Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
-1.00	916.10	0.00	916.17	0.16	916.17	0.00	916.23	0.18	916.23				
4.00	916.10	14.00	915.91	13.66	915.89	21.98	915.81	18.18	915.82				
9.00	915.99	38.40	915.01	25.66	915.74	39.02	915.08	33.89	915.2				
14.00	915.87	51.00	914.29	40.96	914.98	52.54	914.21	45.08	914.93				
19.00	915.82	55.00	913.65	52.67	914.22	55.51	913.72	53.06	914.21				
24.00	915.73	59.30	912.83	55.00	913.86	57.18	913.30	57.03	913.27				
29.00	915.52	60.70	911.77	57.47	913.55	58.62	912.95	58.68	913.05				
34.00	915.23	61.50	911.52	58.84	912.92	59.97	912.44	59.44	912.66				
39.00	914.97	63.10	911.47	60.20	912.55	60.47	911.91	60	912.56				
44.00	914.87	64.30	911.64	60.68	911.95	60.96	911.66	60.27	912.06				
48.00	914.61	65.20	911.87	61.09	911.60	61.49	911.55	60.33	911.91				
49.00	914.54	65.80	912.15	61.90	911.61	62.14	911.45	60.96	911.64				
50.00	914.40	69.80	913.55	62.69	911.58	62.96	911.46	61.21	911.54				
51.00	914.22	73.10	914.65	63.56	911.52	63.62	911.48	61.63	911.5				
52.00	914.18	100.60	915.62	64.63	911.41	64.19	911.48	62.1	911.42				
53.00	914.04	129.00	918.03	65.32	911.75	64.72	911.50	62.57	911.39				
54.00	913.83			66.17	912.42	65.16	911.70	63.31	911.34				
55.00	913.71			67.42	912.92	65.53	911.96	63.65	911.35				
56.00	913.54			69.36	913.44	66.18	912.09	64.42	911.42				
57.00	913.20			73.93	914.75	66.58	912.25	65	911.38				
58.00	912.84			96.87	915.50	66.83	912.95	65.25	911.42				
59.00	912.63			112.20	916.22	68.95	913.64	65.75	911.94				
60.00	912.47			129.00	918.08	71.85	914.49	66.07	912.07				
60.50	911.93					77.62	915.26	66.29	912.12				
61.00	911.72					103.21	915.62	66.9	912.59				
61.50	911.62					129.05	918.07	68.04	913.31				
62.00	911.69							72.64	914.56				
62.50	911.67							74.32	914.76				
63.00	911.71							94.2	915.41				
63.50	911.81							129.21	918				
64.00	911.86												
65.00	911.93												
65.70	912.07												
66.50	912.19												
67.00	912.60												
68.00	912.82												
69.00	913.29												
70.00	913.63												
71.00	914.03												
72.00	914.39												
73.00	914.63												
74.00	914.77												
79.00	915.16												
84.00	915.58												
89.00	915.39												
94.00	915.36												
99.00	915.48												
104.00	915.56												
107.00	915.68												
114.00	916.5												
124.00	917.84												
129.00	918.06												

Rocky Branch Cross Section 7 - Riffle



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-4, 2011 SURVEY DATA	CROSS-SECTION:	7
PROJECT	ROCKY BRANCH	Riffle
TASK	CROSS SECTION	
REACH	ROCKY BRANCH	
DATE	4/11/11 to 4/14/11	
CREW	BUCHHOLZ/PARRISH	

Summary Data

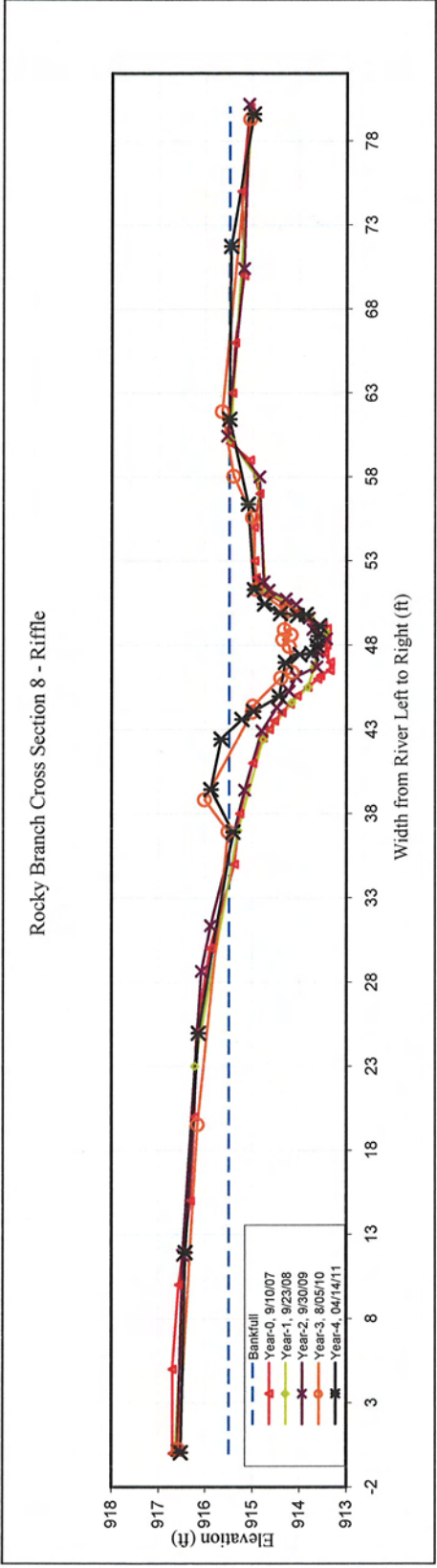
All dimensions in feet.

Bankfull X-sec area	38.6	sq. ft.
Bankfull Width	27.4	ft.
Bankfull Mean Depth	1.4	ft.
Bankfull Max Depth	3.4	ft.
Width/Depth Ratio	19.4	
Entrenchment Ratio	3.7	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	914.76	ft.



CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308										CROSS-SECTION: 8			
		Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	916.69	0.00	916.63	0.17	916.58	0.25	916.56	0.04	916.52						
5.00	916.69	23.00	916.21	11.78	916.47	19.55	916.15	11.91	916.42						
10.00	916.56	37.00	915.30	28.65	916.08	36.95	915.51	24.95	916.14						
15.00	916.30	42.40	914.77	31.35	915.88	38.84	916.01	36.9	915.41						
20.00	916.22	44.60	914.16	39.41	915.16	44.04	915.00	39.41	915.88						
25.00	916.18	45.50	913.81	42.90	914.80	44.39	914.98	42.41	915.66						
30.00	915.89	46.70	913.68	44.28	914.48	46.07	914.39	43.57	915.22						
35.00	915.38	47.80	913.62	45.27	914.22	46.40	914.15	44.05	914.97						
38.00	915.27	48.70	913.40	46.15	914.07	47.93	914.21	44.94	914.43						
41.00	914.99	49.70	913.78	46.71	913.63	48.33	914.35	46.95	914.3						
42.50	914.77	51.20	914.72	47.61	913.61	48.62	914.17	47.43	913.99						
43.00	914.64	57.90	914.89	48.37	913.43	48.94	914.32	47.49	913.74						
43.50	914.53	60.20	915.47	48.94	913.71	50.01	914.27	47.95	913.63						
44.00	914.37	79.60	915.03	49.61	913.79	51.31	914.92	48.52	913.61						
45.00	914.05			50.42	914.07	55.61	915.00	49.14	913.57						
45.50	913.82			50.74	914.28	58.06	915.40	49.75	914.05						
46.00	913.61			51.27	914.65	61.91	915.64	49.81	913.86						
46.20	913.55			51.76	914.76	79.31	915.05	49.87	914.4						
46.50	913.35			58.01	914.85			50.43	914.74						
47.00	913.34			60.44	915.53			51.29	914.96						
47.50	913.46			70.41	915.19			56.37	915.09						
48.00	913.42			80.18	915.08			61.42	915.49						
48.50	913.42							71.71	915.46						
49.00	913.41							79.58	914.98						
49.20	913.50														
49.50	913.78														
50.00	914.02														
50.50	914.33														
51.00	914.65														
51.50	914.84														
52.00	914.92														
53.00	914.95														
55.00	914.96														
57.00	914.85														
59.00	915.05														
60.00	915.48														
63.00	915.43														
66.00	915.37														
70.00	915.18														
75.00	915.24														
80.00	915.06														



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-4, 2011 SURVEY DATA CROSS-SECTION: 8

PROJECT	ROCKY BRANCH	FEATURE:	Riffle
TASK	CROSS SECTION		
REACH	ROCKY BRANCH		
DATE	4/11/11 to 4/14/11		
CREW	BUCHHOLZ/PARRISH		

**Summary Data**  
 All dimensions in feet.

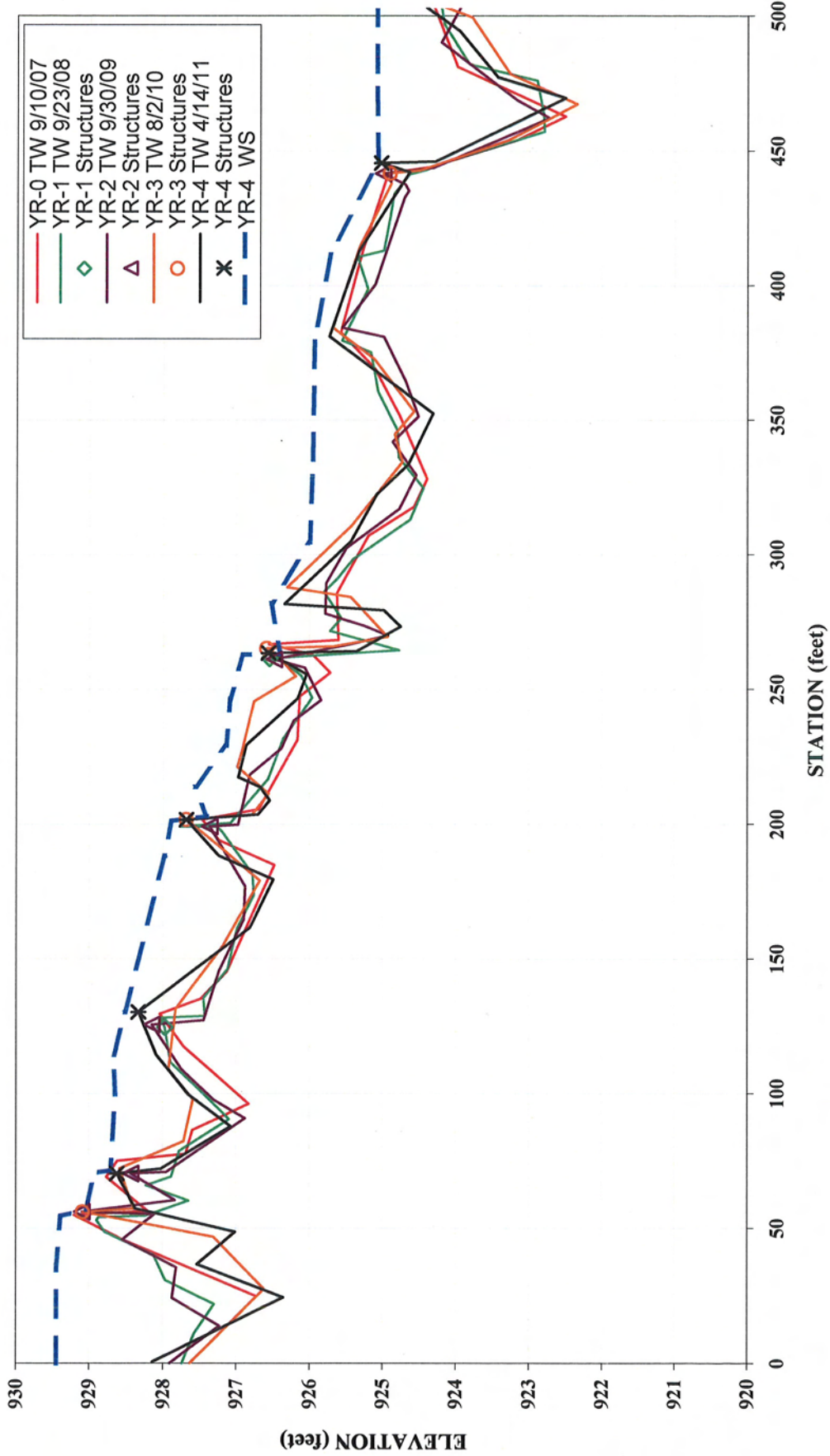
Bankfull X-sec area	12.70	sq. ft.
Bankfull Width	18.60	ft.
Bankfull Mean Depth	0.70	ft.
Bankfull Max Depth	1.90	ft.
Width/Depth Ratio	27.1	
Entrenchment Ratio	5.40	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	915.49	ft.



CROSS SECTION PHOTO - LOOKING DOWNSTREAM

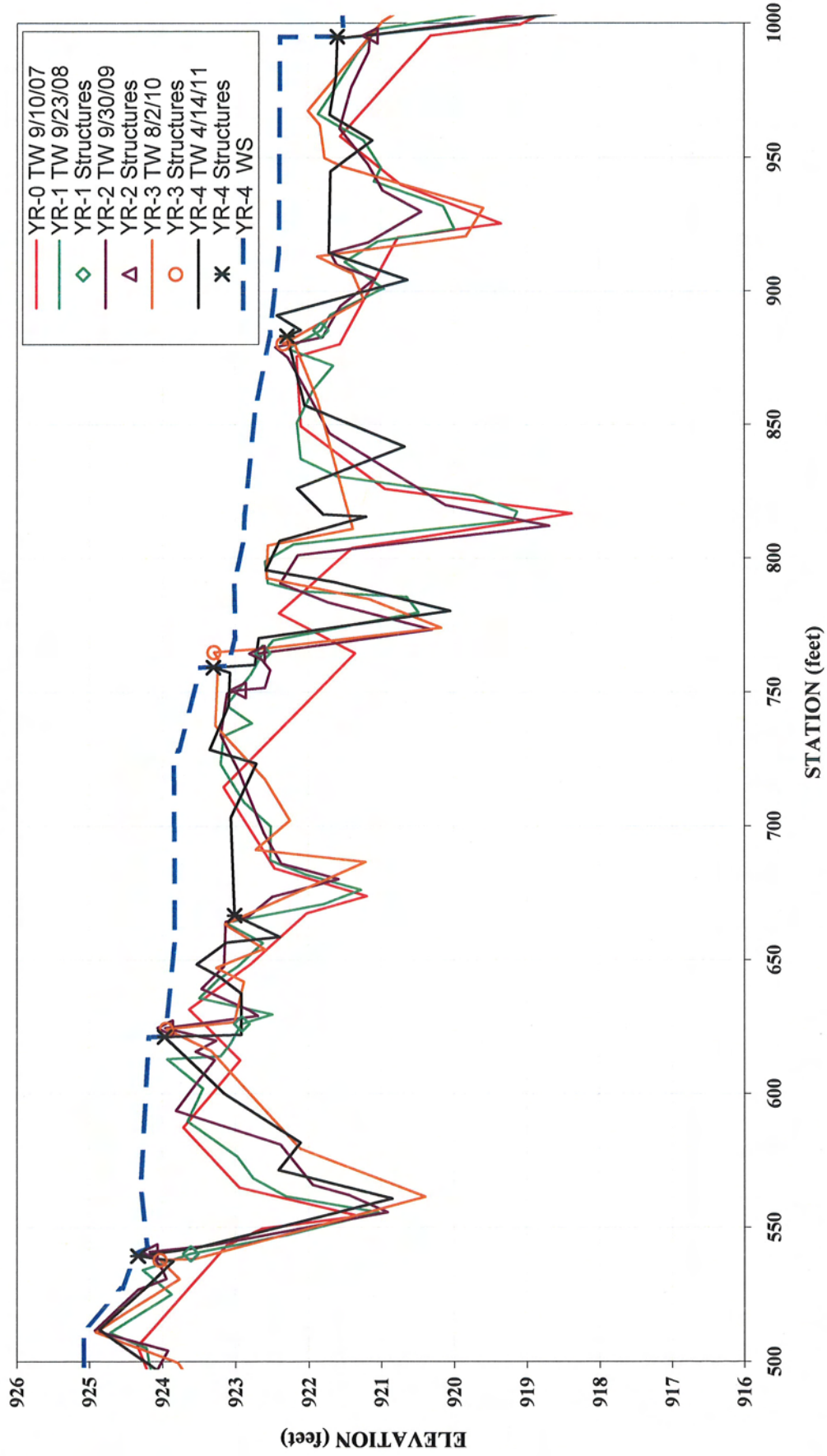


**Rocky Branch  
Longitudinal Profile  
2011 (Year-4) Monitoring**



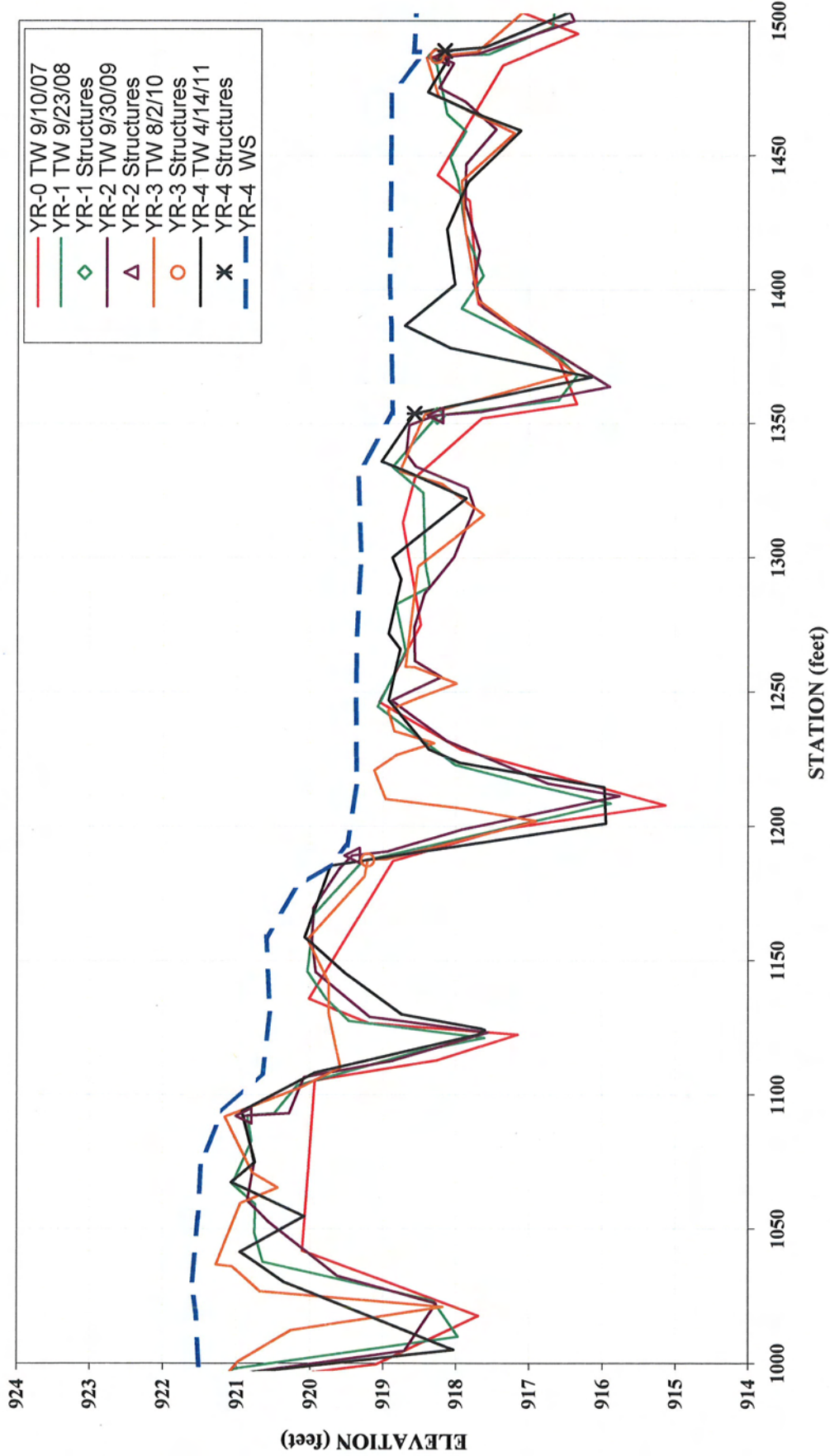
Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

**Rocky Branch  
Longitudinal Profile  
2011 (Year-4) Monitoring**



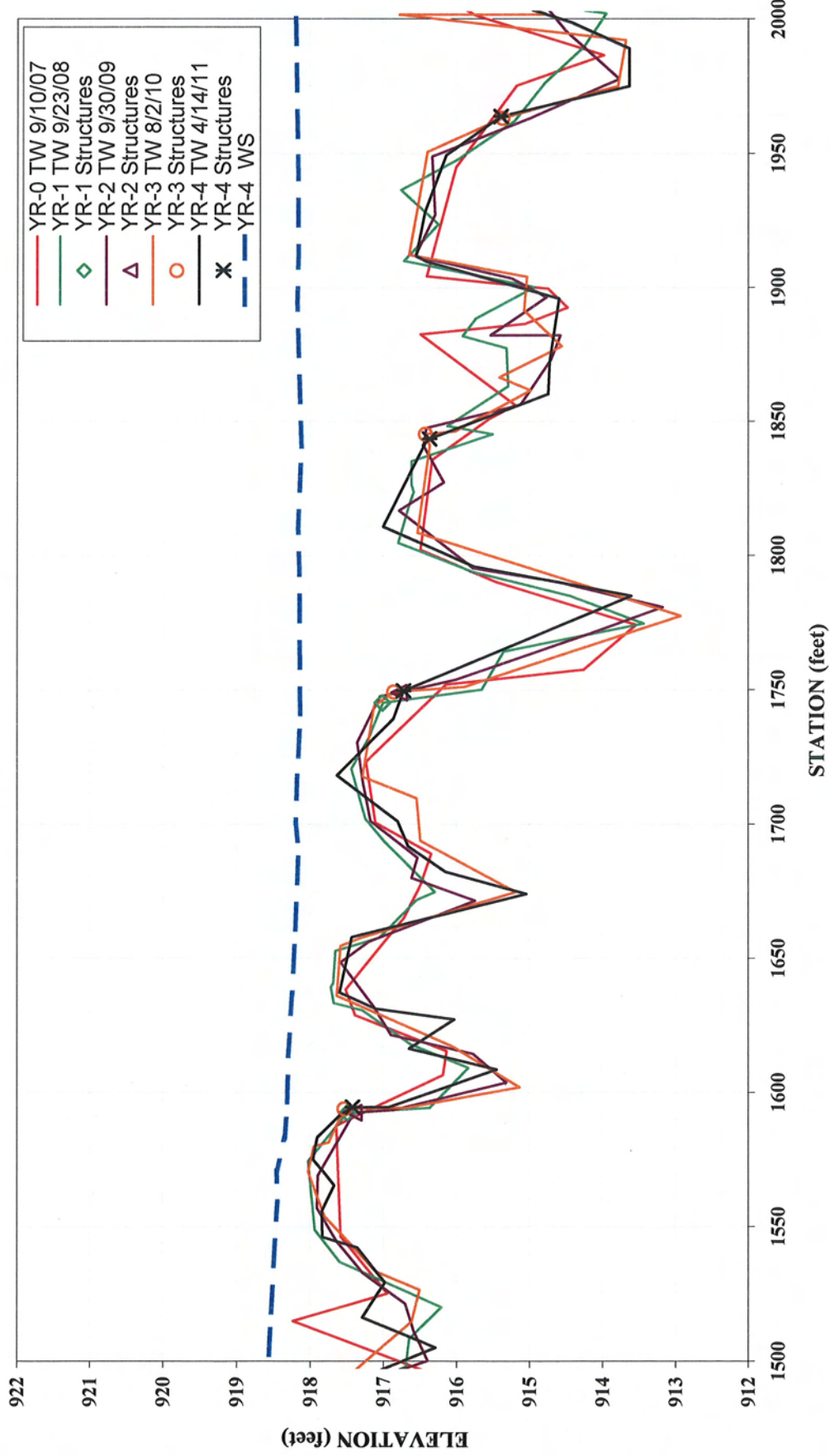
Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

**Rocky Branch  
Longitudinal Profile  
2011 (Year-4) Monitoring**



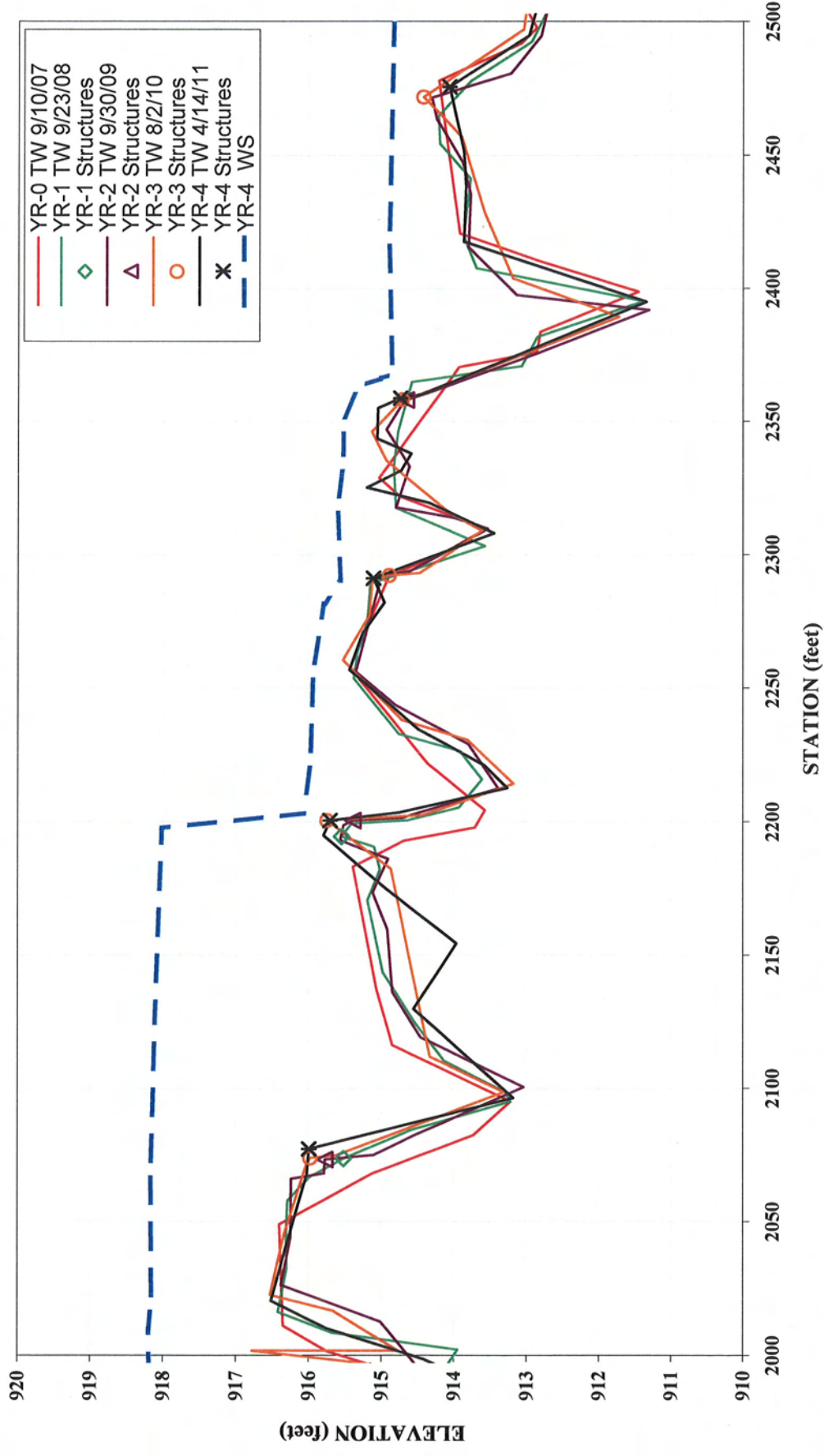
Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

# Rocky Branch Longitudinal Profile 2011 (Year-4) Monitoring



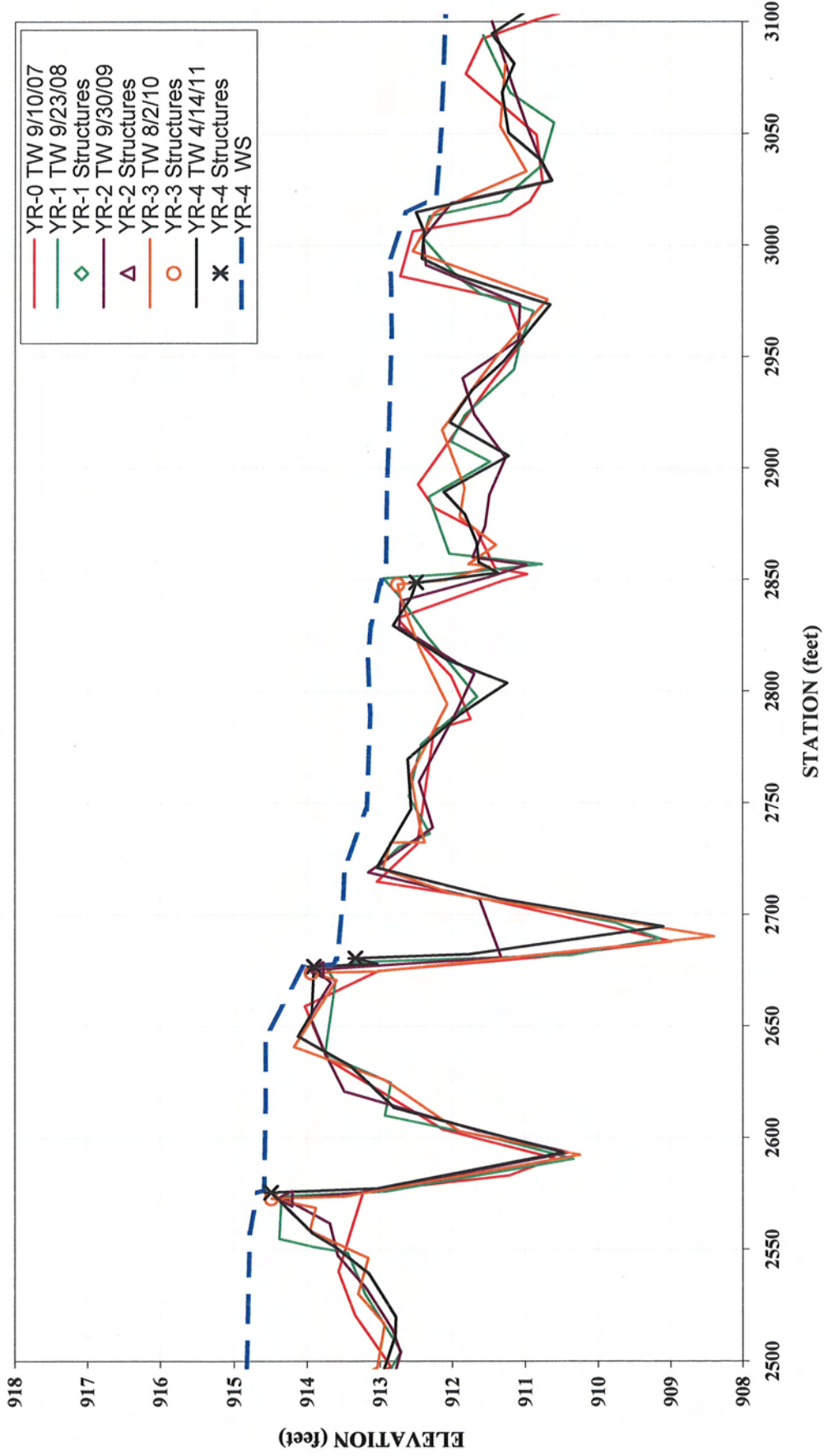
Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

# Rocky Branch Longitudinal Profile 2011 (Year-4) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

**Rocky Branch  
Longitudinal Profile  
2011 (Year-4) Monitoring**



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

**4-YEAR, 2010 SURVEY DATA**

**PROJECT NAME** ROCKY BRANCH

**FEATURE/FACET SLOPE  
LENGTH, AND SPACING AND  
LONGITUDINAL PROFILE DATA**

**TASK** LONGITUDINAL PROFILE  
**REACH** ROCKY BRANCH  
**DATE** 4/11/2011 to 4/14/2011  
**CREW** BUCHHOLZ/PARRISH

Overall water surface slope =	0.6%	<b>DESIGN</b>	<b>MIN.</b>	<b>MAX.</b>
		Riffle	1.1%	3.3%
WS sta. start =	36.44 ft	Run	---	---
WS sta. end =	3113.90 ft	p-p spacing	115	161
ELEV. Start =	929.24 ft msl			
ELEV. End =	912.07 ft msl	Results		

	n =	MIN.	MEDIAN.	AVG.	MAX.
Riffle slopes measured =	29	0.09%	1.90%	2.71%	12.00%
Run slopes measured =	25	0.15%	4.30%	7.64%	36.59%
Pools measured =	33	29	90	94	220

All data reported in units of feet unless otherwise specified.

Feature	Station	Length	Slope		
RIFFLE	120.32	15.92	1.51%	n =	29
RIFFLE	223.38	29.11	2.78%	MIN =	0.09%
RIFFLE	287.57	23.21	3.92%	MEDIAN =	1.90%
RIFFLE	387.02	61.02	1.80%	AVG. =	2.71%
RIFFLE	517.86	25.54	3.95%	MAX =	12.00%
RIFFLE	648.35	8.09	5.07%		
RIFFLE	734.5	28.65	0.98%		
RIFFLE	801.46	10.92	1.74%		
RIFFLE	971.9	34.1	1.99%		
RIFFLE	1080.73	33.38	2.46%		
RIFFLE	1164.67	34.34	12.00%		
RIFFLE	1277.47	28.41	0.18%		
RIFFLE	1341.74	17.94	2.51%		
RIFFLE	1392.44	15.47	4.40%		
RIFFLE	1479.58	13.14	2.21%		
RIFFLE	1589.22	8.2	3.78%		
RIFFLE	1643.23	20.66	0.82%		
RIFFLE	1724.1	20.98	3.67%		
RIFFLE	1816.61	30.92	1.84%		
RIFFLE	1917.58	37.7	1.09%		
RIFFLE	2026.29	47.42	1.03%		
RIFFLE	2262.75	25.2	1.90%		
RIFFLE	2339.03	6.42	7.32%		
RIFFLE	2357.38	11.55	0.09%		
RIFFLE	2556.75	6.39	5.01%		
RIFFLE	2651.48	31.38	0.70%		
RIFFLE	2727.06	26.27	1.83%		
RIFFLE	2835.39	19.03	1.68%		
RIFFLE	2999.99	20.73	0.39%		

4-YEAR, 2010 SURVEY DATA

PROJECT NAME ROCKY BRANCH

Feature	Station	Length	Slope		
RUN	252.49	16.85	2.37%	n =	25
RUN	310.78	17.52	12.10%	MIN =	0.15%
RUN	448.04	3.42	11.40%	MEDIAN =	4.30%
RUN	543.4	1.85	25.95%	AVG. =	7.64%
RUN	656.44	16.12	0.68%	MAX =	36.59%
RUN	763.15	1.95	11.79%		
RUN	812.38	9.04	13.16%		
RUN	1114.11	15.96	36.59%		
RUN	1199.01	13.47	0.15%		
RUN	1305.88	22.16	4.56%		
RUN	1359.68	13.55	17.86%		
RUN	1407.91	38.17	0.47%		
RUN	1492.72	2.14	2.80%		
RUN	1597.42	3.04	5.59%		
RUN	1663.89	16.1	14.84%		
RUN	1745.08	10.38	1.35%		
RUN	1847.53	1.86	3.23%		
RUN	1955.28	14.51	1.72%		
RUN	2073.71	9.54	4.30%		
RUN	2287.95	9.16	1.64%		
RUN	2345.45	6.38	2.19%		
RUN	2368.93	3.69	8.40%		
RUN	2563.14	18.34	3.11%		
RUN	2753.33	22.21	0.23%		
RUN	2854.42	9.28	4.42%		
Feature	Station	Length	p-p spacing		
POOL	24.37	24		n =	33
POOL	93.83	28	69	MIN =	29 (p-p spacing)
POOL	185.46	58	92	MEDIAN =	90
POOL	214.71	10	29	AVG. =	94
POOL	279.19	15	64	MAX =	220
POOL	328.3	29	49		
POOL	475.56	31	147		
POOL	560.66	23	85		
POOL	637.46	22	77		
POOL	786.27	31	149		
POOL	821.42	10	35		
POOL	910.17	29	89		
POOL	1130.07	22	220		
POOL	1212.48	23	82		
POOL	1328.04	32	116		
POOL	1373.23	24	45		
POOL	1446.08	64	73		
POOL	1511	26	65		
POOL	1614.51	25	104		
POOL	1679.99	43	65		
POOL	1866.08	68	186		
POOL	1995	61	129		
POOL	2102.41	127	107		
POOL	2218.62	18	116		
POOL	2313.96	37	95		
POOL	2400.94	49	87		
POOL	2500.7	64	100		
POOL	2599.31	36	99		
POOL	2700.66	25	101		
POOL	2809.71	67	109		
POOL	2872.59	31	63		
POOL	2979.24	38	107		
POOL	3034.76	36	56		

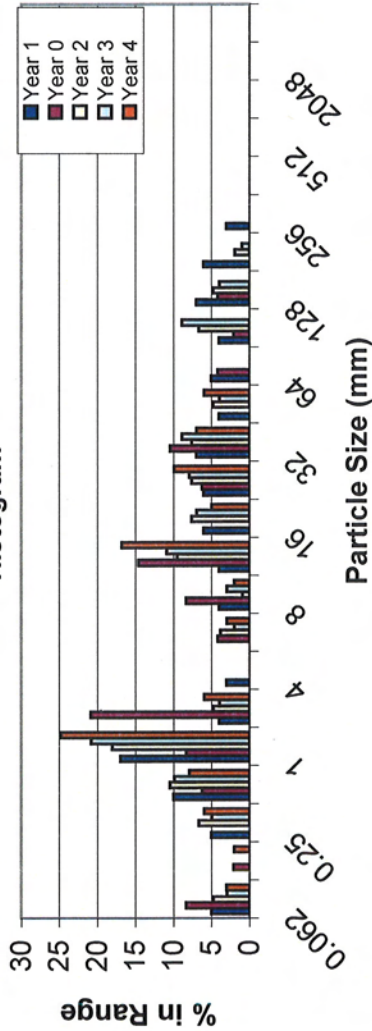


EEP PROJECT ID: 308  
 CROSS-SECTION: 2  
 FEATURE: RIFFLE



PROJECT ROCKY BRANCH  
 TASK PEBBLE COUNT  
 REACH ROCKY BRANCH  
 DATE 04/11/2011 to 04/14/2011  
 CREW BUCHHOLZ/PARRISH

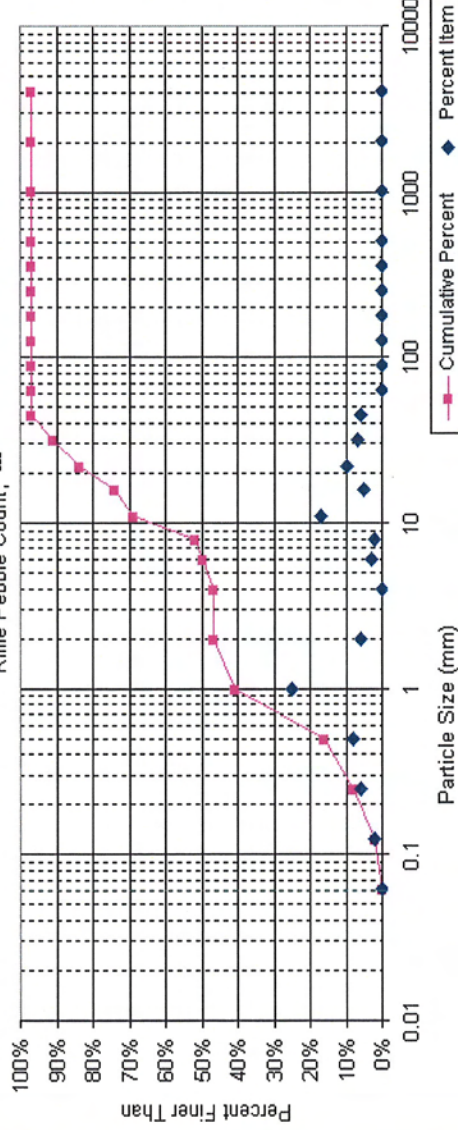
Histogram



Material	Size Range (mm)	Count
silt/clay	0	3
very fine sand	0.062	2
fine sand	0.13	6
medium sand	0.25	8
coarse sand	0.5	25
very coarse sand	1	2
very fine gravel	2	4
fine gravel	4	6
fine gravel	8	2
medium gravel	11	17
medium gravel	16	5
coarse gravel	22	10
coarse gravel	32	7
very coarse gravel	45	6
very coarse gravel	64	
small cobble	90	
medium cobble	128	
large cobble	180	
very large cobble	256	
small boulder	362	
small boulder	512	
medium boulder	1024	
large boulder	2048	
very large boulder	4096	
bedrock		
Total Particle Count:		100

Note:

Riffle Pebble Count, ---



Size percent less than (mm)		Percent by substrate type								
D16	D35	D50	D84	D95	D16	sand	gravel	cobble	boulder	bedrock
0.500	0.85	6.0	22	40	0%	47%	50%	0%	0%	#REF!



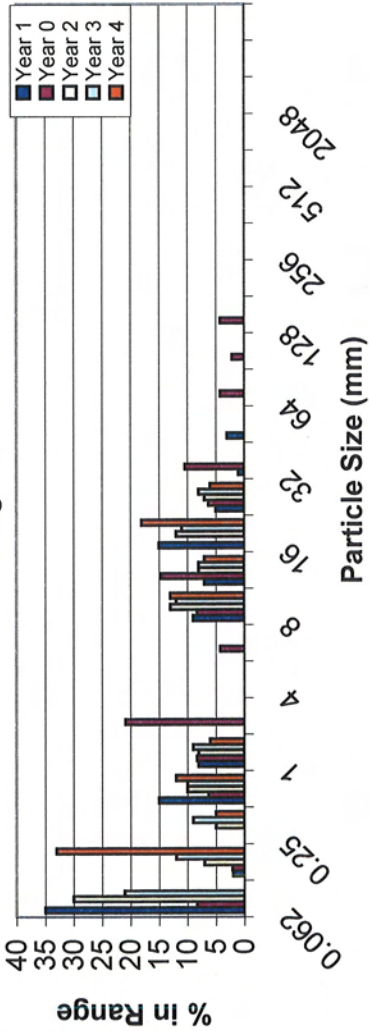
EEP PROJECT ID: 308  
 CROSS-SECTION: 7

FEATURE: RIFFLE

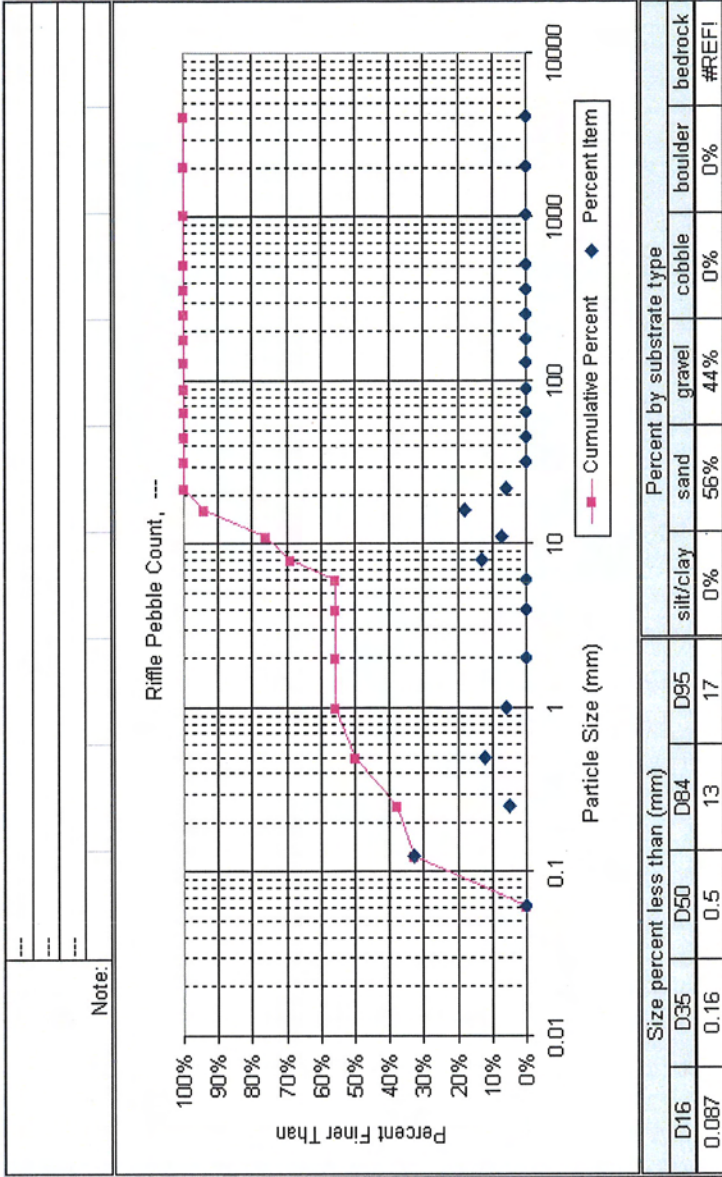


PROJECT ROCKY BRANCH  
 TASK PEBBLE COUNT  
 REACH ROCKY BRANCH  
 DATE 04/11/2011 to 04/14/2011  
 CREW BUCHHOLZ/PARRISH

Histogram



Material	Size Range (mm)	Count
silt/clay	0	0.062
very fine sand	0.062	0.13
fine sand	0.13	0.25
medium sand	0.25	0.5
coarse sand	0.5	1
very coarse sand	1	2
very fine gravel	2	4
fine gravel	4	6
fine gravel	6	8
fine gravel	8	13
medium gravel	11	7
medium gravel	16	18
coarse gravel	22	6
coarse gravel	32	32
very coarse gravel	45	45
very coarse gravel	64	64
small cobble	90	90
medium cobble	128	128
large cobble	180	180
very large cobble	256	256
small boulder	362	362
small boulder	512	512
medium boulder	1024	1024
large boulder	2048	2048
very large boulder	4096	4096
bedrock		
Total Particle Count:		100

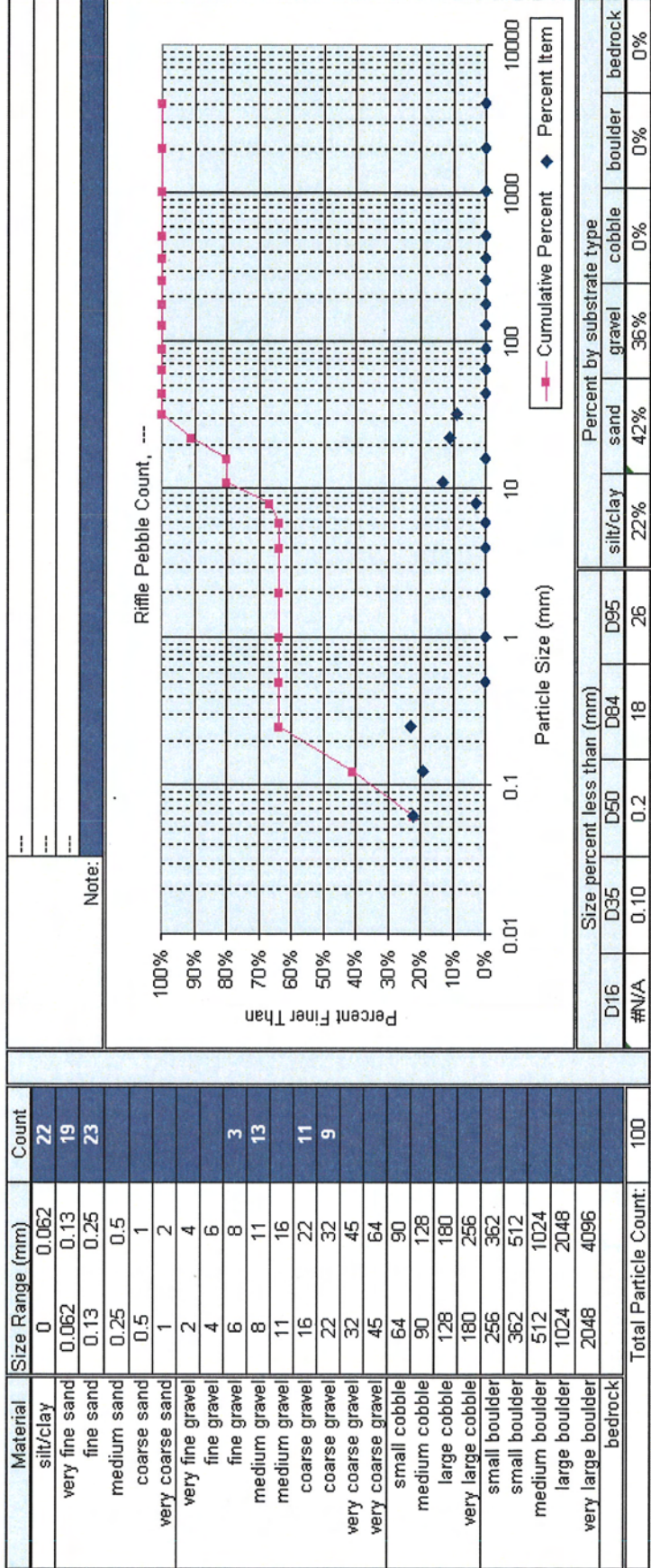
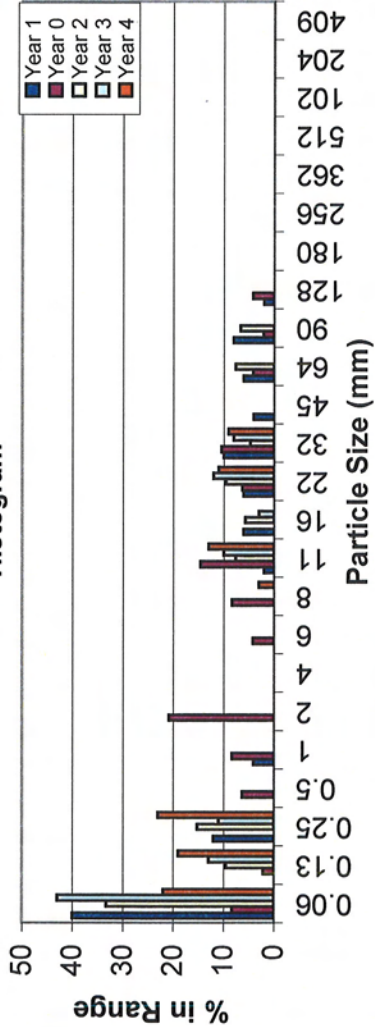


EEP PROJECT ID: 308  
 CROSS-SECTION: 8  
 FEATURE: RIFFLE



PROJECT ROCKY BRANCH  
 TASK PEBBLE COUNT  
 REACH ROCKY BRANCH  
 DATE 04/11/2011 to 04/14/2011  
 CREW BUCHHOLZ/PARRISH

Histogram



APPENDIX E

Wetland Assessment  
(omitted – not applicable)