

Caviness Farm (Tibbs Run) Stream Restoration

NCDENR-EEP Project Number 73

**Annual Monitoring Report
Performance Year: 2005
Monitoring Year: 2 of 5**



February 2006

Project Designed by HSMM
1305 Navaho Drive, Suite 303
Raleigh, NC 27609

Monitoring by:
Earth Tech
701 Corporate Center Drive
Suite 475
Raleigh, NC, 27607



Submitted to:
NCDENR EEP
1619 Mail Service Center
Raleigh, NC 27699-1619

**CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
2005 MONITORING REPORT**

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT
OF
ENVIRONMENT AND NATURAL RESOURCES

Table of Contents

I. Executive Summary/project abstract	1
II. Project Background	2
A. Location and Setting	2
B. Mitigation Structure and Objectives	2
C. Project History and Background	4
III. Project Condition and Monitoring Results	7
A. Vegetation Assessment	7
1. Soil Data	7
2. Vegetative Problem Areas	7
3. Stem Counts.....	8
4. Vegetation Plot Photos	9
B. Stream Assessment	9
C. Wetland Assessment	10

List of Figures

Figure 1. Vicinity Map.....	3
Figure 2. Monitoring Plan View	6

Tables

Table I. Project Mitigation Structure and Objectives	2
Table II. Project Activity and Reporting History.....	4
Table III. Project Contact Table.....	4
Table IV. Project Background Table	5
Table V. Preliminary Soil Data.....	7
Table VI. Vegetative Problem Areas	7
Table VII. Stem Counts for each species arranged by plot.....	8
Table VIII. Verification of Bankfull Events	9
Table X. Stream Problem Areas	10

APPENDICES

Appendix A Vegetation Raw Data

- A-1 Vegetation Survey Data Tables
- A-2 Vegetation Problem Area Plan View
- A-3 Vegetation Problem Area Photos
- A-4 Vegetation Monitoring Plot Photos

Appendix B Geomorphologic Raw Data

- B-1 Exhibit – Problem Areas Plan View
- B-2 Representative Stream Problem Area Photos
- B-3 Stream Photo-station Photos

I. EXECUTIVE SUMMARY/PROJECT ABSTRACT

The Caviness Farm Stream Restoration Site includes 2,255 linear feet of Tibbs Run and 810 linear feet of a tributary referred to as West Branch, in rural Randolph County, North Carolina. Construction of the site was completed in January 2004. The following report provides the Year 2 - 2005 Monitoring.

Several problem areas are noted, including erosion and poor vegetation establishment. The problem areas need to be watched and remediation options developed if they get worse. At this time, the only repair recommended is of the fencing that is down in the vicinity of the crossing at Station 18+60 to 18+80. This fencing was pulled down by a mower operator who apparently misunderstood the landowner's intent.

The vegetation monitoring of the site revealed an average tree density of 813 trees per acre. This average is well above the minimum criteria of at least 320 stems per acre after 3 years. No additional plantings are recommended at this time.

Mowing within the easement has recently occurred in and around Plot 3. The mowing removed much of the herbaceous cover in the plot and damaged some of the planted seedlings. This occurred as a result of a misunderstanding between the landowner and the mower operator. The landowner intervened to correct the error.

Three exotic and invasive species were found. These include Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and Nepalese browntop (*Microstegium vimineum*). The Chinese privet and Japanese honeysuckle occur in all plots, but a large privet shrub greater than 15 feet in height located in Plot 1 is currently producing seeds.

II. PROJECT BACKGROUND

A. Location and Setting

The Caviness Farm Stream Restoration Site includes 2,255 linear feet of Tibbs Run and 810 linear feet of a tributary referred to as West Branch. The site is located between Asheboro and Coleridge near the intersection of Tommy Cox Road and NC 42 in the southeastern portion of Randolph County, North Carolina See **Figure 1**. The site includes 3250 feet of stream footage.

To access the site take US 64 west through Siler City. At Ramseur take NC 22 south to NC 42 in Coleridge. Turn west and follow NC 42 about 3 miles. The site is on the north side of NC 42 just before Tommy Cox Road.

B. Mitigation Structure and Objectives

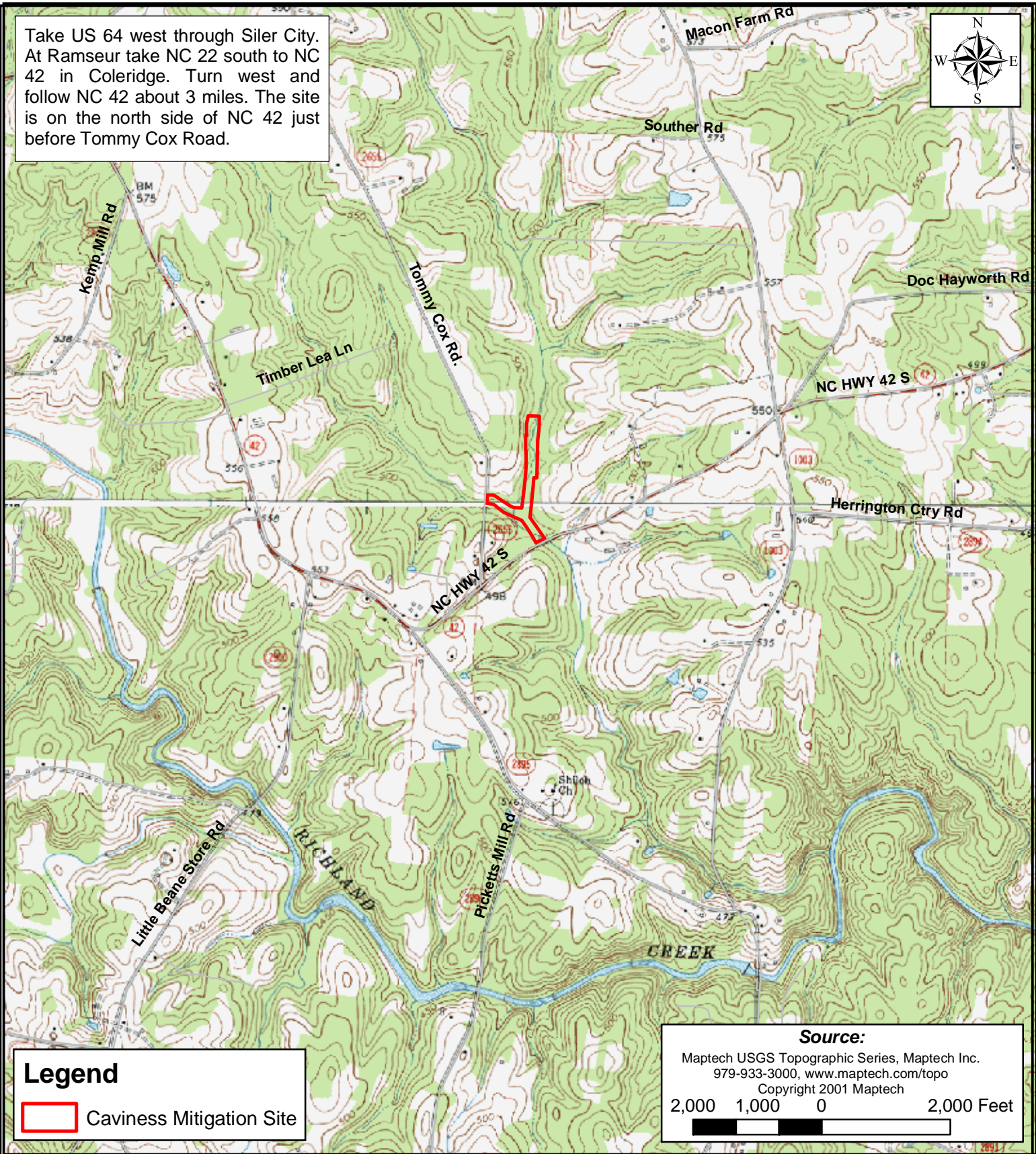
Tibbs Run and its tributary, West Branch, are on an active cattle farm. The stream segments and adjacent floodplains were subject to unrestricted grazing. The upper reach of Tibbs Run was only slightly incised and retained much of its natural meander pattern. A mature tree canopy is present over much of the reach. The lower reach of Tibbs Run was more deeply incised and exhibited excessive erosion. The stream was bounded by active pasturelands, and riparian vegetation consisted only of early successional herbaceous vegetation. The mitigation plan consisted of a Priority 1 restoration of both Tibbs Run and West Branch, along with establishment of a 50-foot vegetated buffer with cattle exclusion fencing.

Table I. Project Mitigation Structure and Objectives Caviness Farm(Tibbs Run) Stream Restoration Site/Project No. 73					
Project Segment	Mitigation Type	Approach	Linear Footage or Acreage	Stationing	Comment
Tibbs Run	R	P1	2255 ft	10+00 to 33+00	
West Branch	R	P1	810 ft	50+00 to 58+00	
Tibbs Run + West Branch			11 acres		Total buffer area

R=Restoration

P1=Priority 1

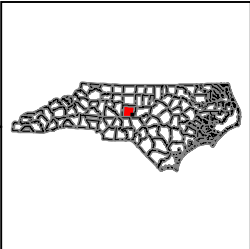
Take US 64 west through Siler City. At Ramseur take NC 22 south to NC 42 in Coleridge. Turn west and follow NC 42 about 3 miles. The site is on the north side of NC 42 just before Tommy Cox Road.



Legend

 Caviness Mitigation Site

Source:
Maptech USGS Topographic Series, Maptech Inc.
979-933-3000, www.maptech.com/topo
Copyright 2001 Maptech
2,000 1,000 0 2,000 Feet



**FIGURE 01
VICINITY MAP**
Caviness Stream Mitigation Site
Randolph County, North Carolina
Map Produced: February 2006

C. Project History and Background

Table II. Project Activity and Reporting History Caviness Farm(Tibbs Run) Stream Restoration Site/Project No. 73			
Activity or Report	Scheduled Completion	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	NA*	NA*	May 2001
Final Design-90%	NA*	NA*	July 2003
Construction	NA*	NA*	January 2004
Temporary S&E mix applied to reach/segments 1 & 2	NA*	NA*	NA*
Containerized and B&B plantings for each reach/segment	NA*	NA*	NA*
Mitigation Plan/As-built (Year 0 Monitoring – baseline)			2004
Year 1 Monitoring			2004
Year 2 Monitoring		Nov 2005	Dec 2005
Year 3 Monitoring	Fall 2006		
Year 4 Monitoring	Fall 2007		
Year 5 Monitoring	Fall 2008		

*Historical project documents necessary to provide this data were not available at the time of this report submission.

Table III. Project Contact Table Caviness Farm(Tibbs Run) Stream Restoration Site/Project No. 73	
Designer Primary project design POC	HSMM 1305 Navaho Drive, Suite 303 Raleigh, NC 27609 Roy Currin tel: 878-5250
Construction Contractor Construction Contractor POC	NCDOT
Planting Contractor Planting Contractor POC	NA*
Seeding Contractor Planting Contractor POC	NA*
Seed Mix Sources	NA*
Nursery Stock Suppliers	NA*
Monitoring Performers 2004	NCDOT
Monitoring Performers 2005	Earth Tech 701 Corporation Center Drive, Suite 475 Raleigh, NC 27607
Stream Monitoring POC	Ron Johnson 919-854-6210
Vegetation Monitoring POC	Ron Johnson 919-854-6210
Wetland Monitoring POC	NA**

*Historical project documents necessary to provide this data were not available at the time of this report submission.

**Not applicable.

Table IV. Project Background Table Caviness Farm (Tibbs Run) Stream Restoration Site/Project No. 73	
Project County	Randolph
Drainage Area	
Tibbs Run	3.3 sq mi
West Branch	1.13 sq mi
Drainage impervious cover estimate (%)	
Tibbs Run	< 1%
West Branch	< 1%
Stream order	
Tibbs Run	3 rd order
West Branch	2 nd order
Physiographic region	Piedmont
Ecoregion	Carolina Slate belt (45c)
Rosgen classification of As-built	E5
Cowardin classification	NA**
Dominant soil types	Georgeville silt loam Cecil sandy clay loam Appling sandy loam Vance sandy loam
Reference site ID	North Branch of Deaton Tributary to Sandy Creek Tributary to Tibbs Run Mud Lick Creek
USGS HUC for Project and reference	03030003
NCDWQ sub-basin for project and reference	03-06-09
NCDWQ classification for project and reference	C (Tibbs Run) WS-III (Tributary to Sandy Creek)*
Any portion of project segment upstream of a 303d listed segment	No
Reasons for 303d listing or stressor	NA**
% of project easement fenced	100%

*Unable to locate other references reaches from information provided.

**Not applicable.







Stream Crossing

Stream Crossing

Vegetation Plot #3

MATCHLINE - FIGURE 2b

LEGEND

-  J-Hook Vane
-  Cross Vane
-  Class-B Rip Rap
-  Root Wad Log Vane
-  Log Vane
-  Stream Channel
-  Easement
-  Stream Photo Point (SPP)

KEY MAP

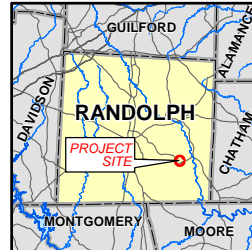
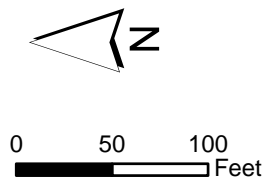
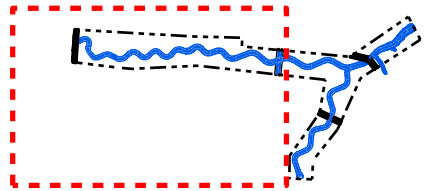
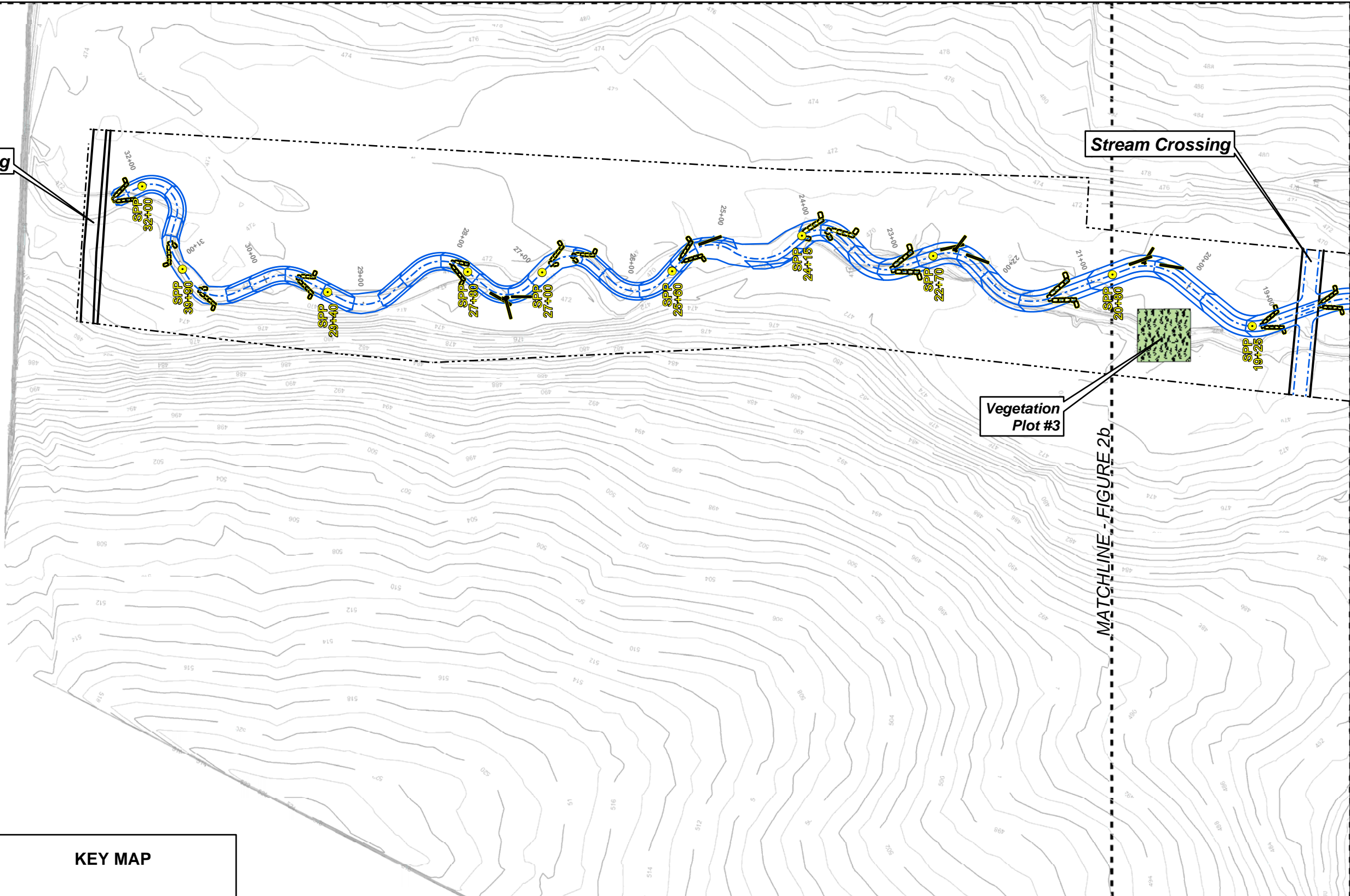
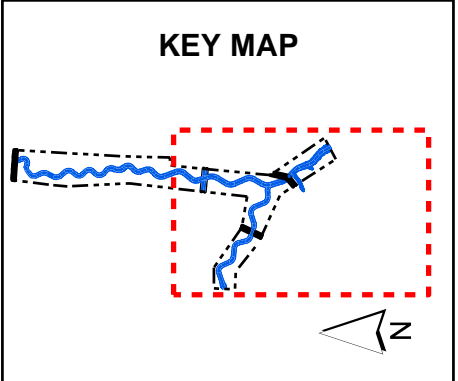
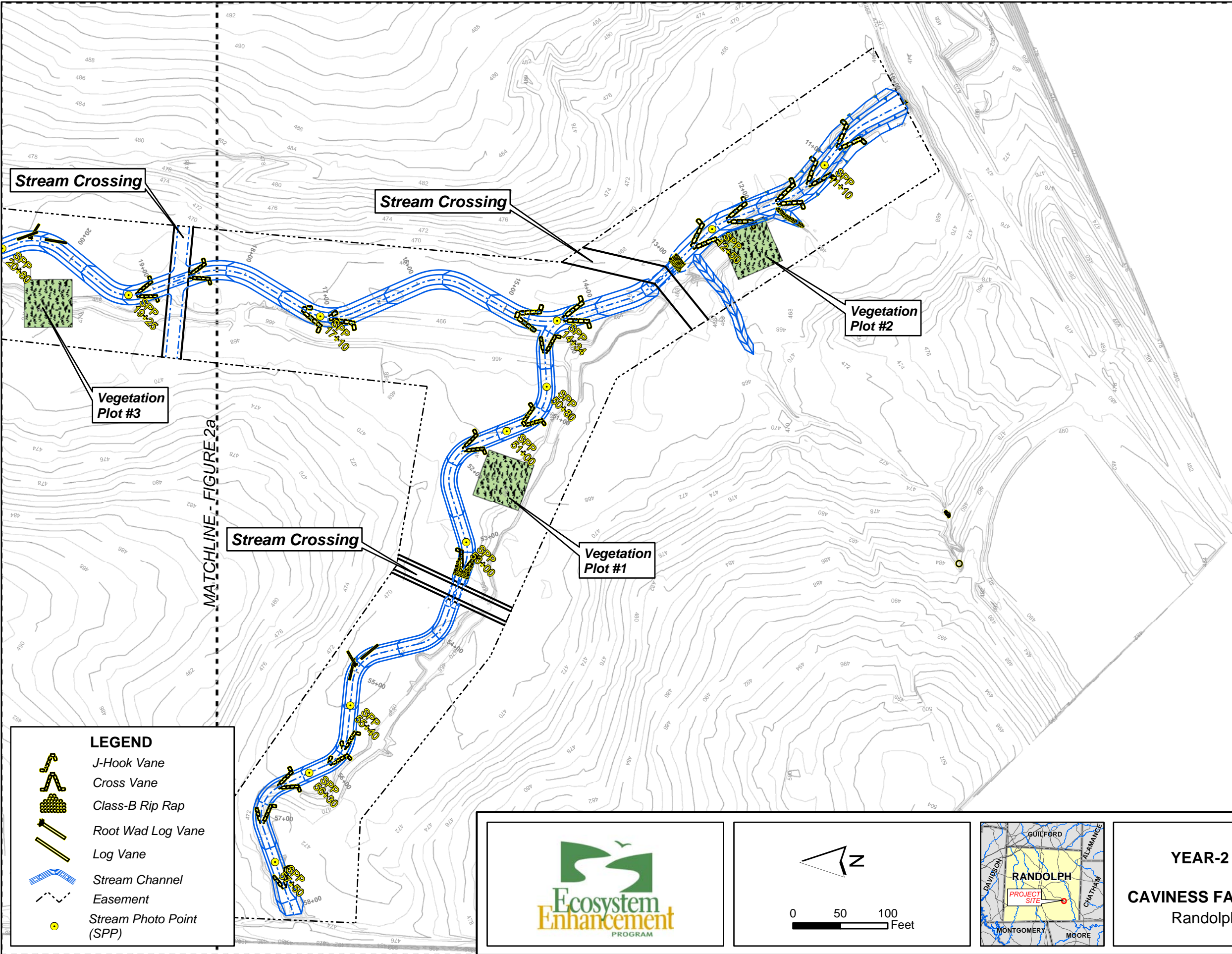


FIGURE 2a
YEAR-2 MONITORING REPORT
PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina

FEB 2006





LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement
- Stream Photo Point (SPP)

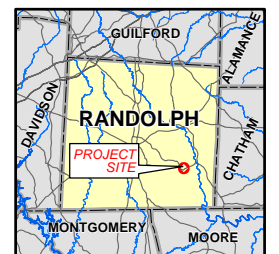
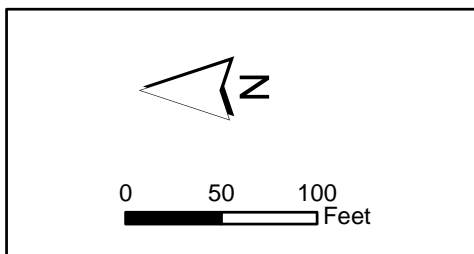


FIGURE 2b
YEAR-2 MONITORING REPORT
PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
FEB 2006

III. PROJECT CONDITION AND MONITORING RESULTS

A. Vegetation Assessment

Success Criteria states that there must be a minimum of 320 trees per acre living after three years and 260 trees per acre after five years.

The following species were planted:

<i>Fraxinus pennsylvanica</i>	Green Ash
<i>Platanus occidentalis</i>	Sycamore
<i>Quercus falcata</i> var. <i>falcata</i>	Southern Red Oak
<i>Quercus alba</i>	White Oak
<i>Quercus phellos</i>	Willow Oak

Stem counts were conducted on November 2, 2005. The number of stems appeared to increase from the previous year's monitoring numbers. This is attributable to the counting of individual stems resulting from natural recruitment.

1. Soil Data

Series	Max Depth (in.)	% Clay on Surface	K	T	OM %
Georgeville	63	5-27	.43	4	0.5-2.0
Cecil	75	5-20	.28	4	0.5-1.0
Appling	65	5-20	.24	4	0.5-2.0
Vance	72	8-20	.24	3	0.5-2.0

2. Vegetative Problem Areas

Feature/Issue	Station #/Range	Probable Cause	Photo #
Invasive/Exotic Populations	Plots 1, 2, & 3	All plots: Nepalese browntop & Japanese honeysuckle Plot 1: Chinese privet	VPA1
Mowing in Easement	Plot 3	Landowner mistake	VPA2
Bare banks	24+00 to end	Failing structures, poor vegetation establishment in multiple locations	VPA3

It was observed that mowing within the right-of-way has recently occurred in and around Plot 3. The mowing removed much of the herbaceous cover in the plot and damaged some of the planted seedlings. This occurred as a result of a misunderstanding between the landowner and the mower operator. The mower operator apparently deliberately removed fencing in the vicinity of the crossing at Station 18+60-18+80 in order to obtain access for mowing. The landowner noticed the error and redirected the mower operator before the entire easement was disturbed.

Three exotic and invasive species were observed within the plots. These include Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and Nepalese browntop (*Microstegium vimineum*). The Chinese privet and Japanese honeysuckle occur in all plots, but a large privet shrub greater than 15 feet in height is located in Plot 1. This large shrub is currently producing seeds. The Nepalese browntop is currently of minor importance in Plot 2.

Every structure from Station 24+00 to the end is failing to some extent. Vegetation is poorly established over much of this length. Specific areas of bare banks and failures are marked on Figure B-2 in **Appendix B**.

3. Stem Counts

Table VII. Stem Counts for each species arranged by plot Caviness Farm (Tibbs Run) Stream Restoration Site/Project No. 73							
Species	Plots 50 ft x 50 ft			Initial Totals	Year 1 Totals	Year 2 Totals	Survival %
	1	2	3				
<i>Fraxinus pennsylvanicum</i>	3	25	10		27	38	
<i>Platanus occidentalis</i>	12	28	9		39	49	
<i>Quercus alba</i>	13	8	14		31	35	
<i>Quercus phellos</i>	5	1	7		0	13	
<i>Quercus falcata</i>	2	3	0		19	5	
Total Trees	35	65	40	151	116	140	93%

* Percent survival calculated for current year based on initial Total.

** Stems per acre calculated on size of plot (0.05739 acre 50x50) and number of stems within plot.

The vegetation monitoring of the site revealed an average tree density of 813 trees per acre. This average is well above the minimum criteria of at least 320 stems per acre after 3 years. No additional plantings are recommended at this time.

The number of stems in Plot 2 increased. This is due to the counting of some stems from natural regeneration. It was difficult to determine which individuals were planted and which were from natural recruitment as not all planted stems retained flagging.

Seedlings found in the plots that are likely due to natural recruitment include American sycamore, black willow (*Salix nigra*), box elder (*Acer negundo*), eastern baccharis, (*Baccharis*

halimifolia), green ash, sweet gum (*Liquidambar styraciflua*), and tulip poplar (*Liriodendron tulipifera*).

The herbaceous cover at the site is good, exhibiting greater than 90 percent cover. The cover is lowest for Plot 2. This is because of the growth of very dense seedlings in this plot. Herbaceous species observed include annual ragweed (*Ambrosia artemisiifolia*), beggar's tick (*Bidens* sp.), dog fennel (*Eupatorium capillifolium*), jewelweed (*Impatiens capensis*), tall pasture fescue (*Lolium arundinaceum*), arrowleaf tearthumb (*Polygonum sagittatum*), and blackberry (*Rubus* sp.). The fescue is significant in and around Plot 2, but is not expected to thrive because of shading.

4. Vegetation Plot Photos

Vegetation plot photos can be viewed in **Appendix A**. Vegetation photopoints previously established by NCDOT do not adequately capture conditions in each of the three plots, so Earth Tech established two new points for each plot. The Earth Tech points will be used for future monitoring.

B. Stream Assessment

Earth Tech personnel performed a site visit at Caviness Farm on June 20th, 2005. During the field visit notes were made regarding the condition of the stream restoration project. Overall, the project is doing well with a few minor erosion areas or areas of minimal vegetation. Stream problem areas are described in Table X and vegetative problem areas were previously described in Table VI.

Earth Tech conducted a second site visit in November 2005 at which time photographs were taken at all permanent photo points.

Table VIII. Verification of Bankfull Events Caviness Farm (Tibbs Run) Stream Restoration Site/Project No. 73			
Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
NA*	NA*	NA*	NA*

*Historical project documents necessary to provide this data were not available at the time of this report submission.

Table IX BEHI and Sediment Export Estimates only apply to Monitoring years 3 and 5 so were not performed this year.

Table X. Stream Problem Areas			
Caviness Farm (Tibbs Run) Stream Restoration Site/Project No. 73			
Feature Issue	Station Numbers	Suspected Cause	Photo Number
Bank Scour	26+20 to 26+90	Eroded, undercut banks	
	27+50 to 27+75	Matting detached DS of cross vane	SPA1
	28+40	Right bank eroded and vertical	
	30+33	Steeply eroded DS of j-hook	
	52+50	Section of eroded bank 15 ft long x 1.5 ft high	
Engineered structures - back or arm scour	10+85	Minor erosion below arm	
	11+73	Steep arm cutting	SPA2
	12+75	Minor piping	
	25+40	Vane washed out because of improper rock	
	28+20	Arm cutting	
	29+67	Arm cutting	
Debris/beaver dams	13+50	Debris	
	32+30	Beaver dam	SPA3
	53+71	Debris	
Fence down at stream crossing	18+60	Stress from accumulated debris during high flows	SPA4
Poor drainage impeding use of crossing	53+50	Improper grading, small berm along fence blocks drainage to stream	SPA5

Fixed photo points established by NCDOT were followed and can be viewed in **Appendix B3**.

Tables XI through XIII are beyond the original scope of this report.

C. Wetland Assessment

There is no wetland restoration associated with this site. Table XIV is not applicable to this project.

Appendix A

Vegetation Raw Data

- A-1 Vegetation Survey Data Tables
- A-2 Vegetation Problem Area Plan View
- A-3 Vegetation Problem Area Photos
- A-4 Vegetation Monitoring Plot Photos

A-1 Vegetation Survey Data Tables

Carmess Site AS-BUILT VEGETATION MONITORING		Date	Nov 2, 2005		
		Investigator	G. Lankford		
Species		Plots			
		Plot 2	Plot #1	Plot 3	
	Plots Disturbed?	N			
	Type of Disturbance?	—			
	Spacing Distance (ft)	—			
Trees					
Green Ash		☒ ☒ 25	☐ ☐ 3	☒ 10	GA
Sycamore		☒ ☒ 28	☒ ☐ 12	☒ 9	Sy
White Oak		☒ 8	☒ ☐ 13	☒ ☐ 14	W/O
Willow Oak		☐ 1	☐ ☐ 5	☒ 7	W/O
Red Oak sp		☐ 3	☐ ☐ 2		S.R.O
Shrubs					
Silky willow		☐ 1			
Exotic Species					
Ligustrum Sino		✓	✓	✓	
T. honey suckle		✓	✓		

5?

GA
Sy
W/O
W/O
S.R.O

Comments (label by plot):

Plot 2 lot of Volun...
Plots # 18 + 19 seedling of
wgs & cover Sycam
* Polygon serrata Green Ash
Blk berry Sweet gum
* Fescue
Green Ash (volunteers)
* Sweet Gum

Plot 7 ~ 50 x 50
a P...
clump to 20' tall
also contain large J-honey suckle
* Fescue (in clump)
Jewel weed
Micro Stigma
Polygon serrata
Acer negundo
Sweet Gum

Plot 3
50 x 50
Strip mowed through plot
6' wide x (50 + 44) long
* Fescue E. Bachus
* Dog Fennel T. Poplar
* Bl den sp Acer negundo
* Ragwort
* Blk berry
Blk willow
Sweet Gum

1 large tree in plot
* = Dominant

2 large trees
1 med canopy tree
in plot

**CAVINESS Farm Stream Restoration
Monitoring Year 2005
EEP Site Number 73**

Exhibit Table VIII. Stem Counts for each species arranged by plot										
Scientific Name	Common Name	Plots (50 FT X 50 FT)					Initial at Planting	Year 1 Totals	Year 2 Totals	Survival %
		Main Channel								
		Plot 1	Plot 2	Plot 3	Total Stems	Average				
Shrubs										
No shrubs monitored at this site.										
Total Shrubs										
		0	0	0	0					
Trees										
<i>Fraxinus pennsylvanicum</i>	Green ash	3	25	10	38	12.7		27	38	
<i>Platanus occidentalis</i>	American sycamore	12	28	9	49	16.3		39	49	
<i>Quercus alba</i>	White oak	13	8	14	35	11.7		19	35	
<i>Quercus phellos</i>	Willow oak	5	1	7	13	4.3		19	13	
<i>Quercus falcata</i>	Southern red oak	2	3	0	5	1.7		19	5	
Total Trees		35	65	40	140	46.7		151	123	140
TABLE SUMMARY		Total Stems of planted Woody vegetaion.	35	65	40	140		151	123	140
Current Density					Average Stems per Acre		Average Stems per Acre			
Stems per acre		610	1133	697	813		877	714	813	
Stems per hectare		1507	2799	1722	2009		2167	1765	2009	

*stems per acre calculated on size of plot (2,500 square feet or 0.05739 acre) and number of stems within plot.

Exotic Invasive Species Observed in Plots				
<i>Ligustrum sinense</i>	Chinese privet	Y	Y	Y
<i>Lolium arundinaceum</i>	Tall fescue	Y	Y	Y
<i>Lonicera japonica</i>	Japanese honeysuckle	Y	Y	Y
<i>Microstegium vimineum</i>	Nepalese browntop		Y	

Additional Tree Seedlings Observed in Plots				
<i>Acer negundo</i>	Box elder maple (seedlings)		Y	Y
<i>Fraxinus pennsylvanica</i>	Green ash (seedlings)	Y		Y
<i>Liquidambar styraciflua</i>	Sweet gum (seedlings)	Y	Y	Y
<i>Liriodendron tulipifera</i>	Tulip poplar (seedlings)			Y
<i>Platanus occidentalis</i>	American sycamore	Y		
<i>Salix nigra</i>	Black willow (seedlings)			Y

Additional Species Observed in Plots				
<i>Ambrosia artemisiifolia</i>	Annual ragweed			Y
<i>Baccharis halimifolia</i>	Eastern baccharis			Y
<i>Bidens</i> sp.	Beggar's tick			Y
<i>Eupatorium capillifolium</i>	Dog fennel			Y
<i>Impatiens capensis</i>	Jewelweed		Y	
<i>Lolium arundinaceum</i>	Tall pasture fescue	Y*	Y*	Y*
<i>Polygonum sagittatum</i>	Arrowleaf tearthumb	Y*	Y	Y*
<i>Rubus</i> sp.	Blackberry	Y		Y

Stems per acre are more than indicated in the previous report due to difference in the way stems per acre are calculated. The initial report assumed only 680 stems per acre were planted. Subsequent year was calculated using percent loss of stems multiplied by the assumed 680 stems per acre.

*= dominant herbaceous vegetation

Stream Crossing

Stream Crossing

Vegetation Plot #3

MATCHLINE - FIGURE 2b










VPA 3

VPP 3A

VPP 3B

VPA 2

LEGEND

-  J-Hook Vane
-  Cross Vane
-  Class-B Rip Rap
-  Root Wad Log Vane
-  Log Vane
-  Stream Channel
-  Easement
-  Vegetation Photo Point (VPP)
-  Vegetation Problem Area (VPA)

KEY MAP

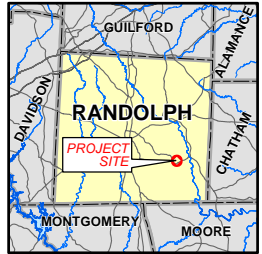
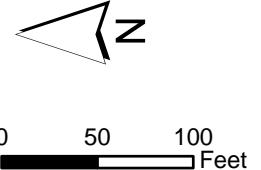
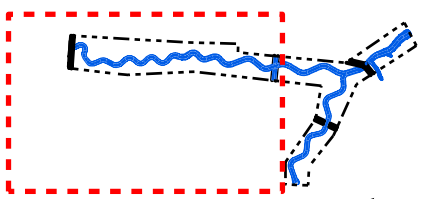
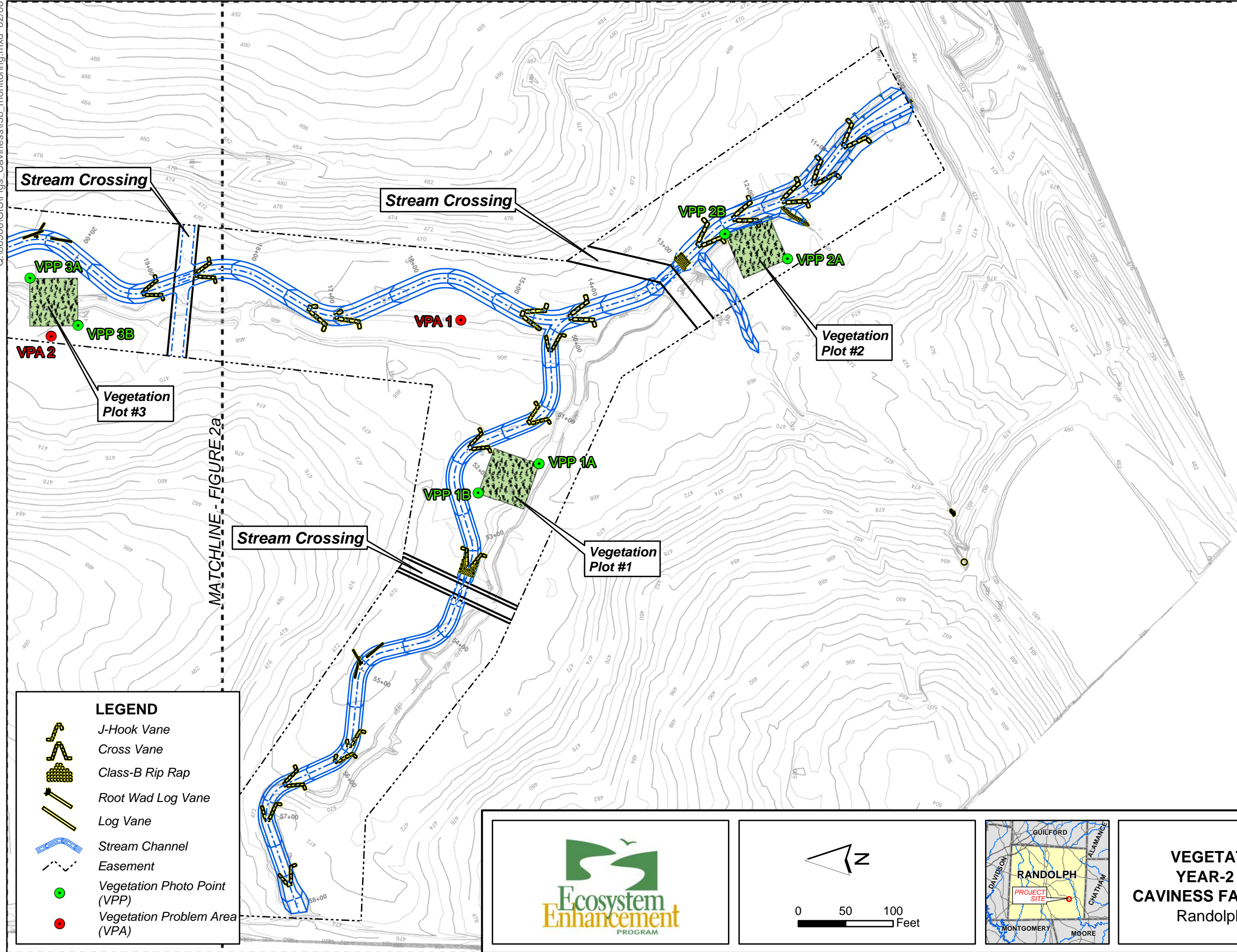
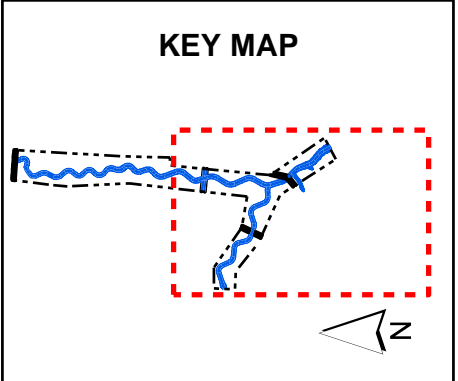


FIGURE A-2a
VEGETATION PROBLEM AREAS
YEAR-2 MONITORING REPORT
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina

FEB 2006



LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement
- Vegetation Photo Point (VPP)
- Vegetation Problem Area (VPA)

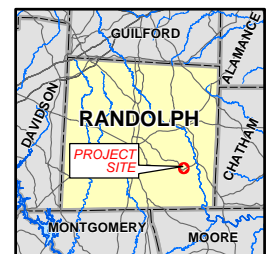
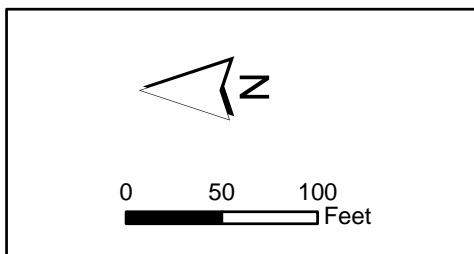


FIGURE A-2b
VEGETATION PROBLEM AREAS
YEAR-2 MONITORING REPORT
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006

**CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
2005 MONITORING REPORT
Vegetation Problem Area Photos
Appendix A-3**



VPA1. Chinese privet.



VPA2. Mowing in Plot 3.



VPA3. Bare banks.

**CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
2005 MONITORING REPORT
Vegetation Monitoring Plot Photos
Appendix A-4**



VPP1a



VPP1b



VPP2a



VPP2b



VPP3a

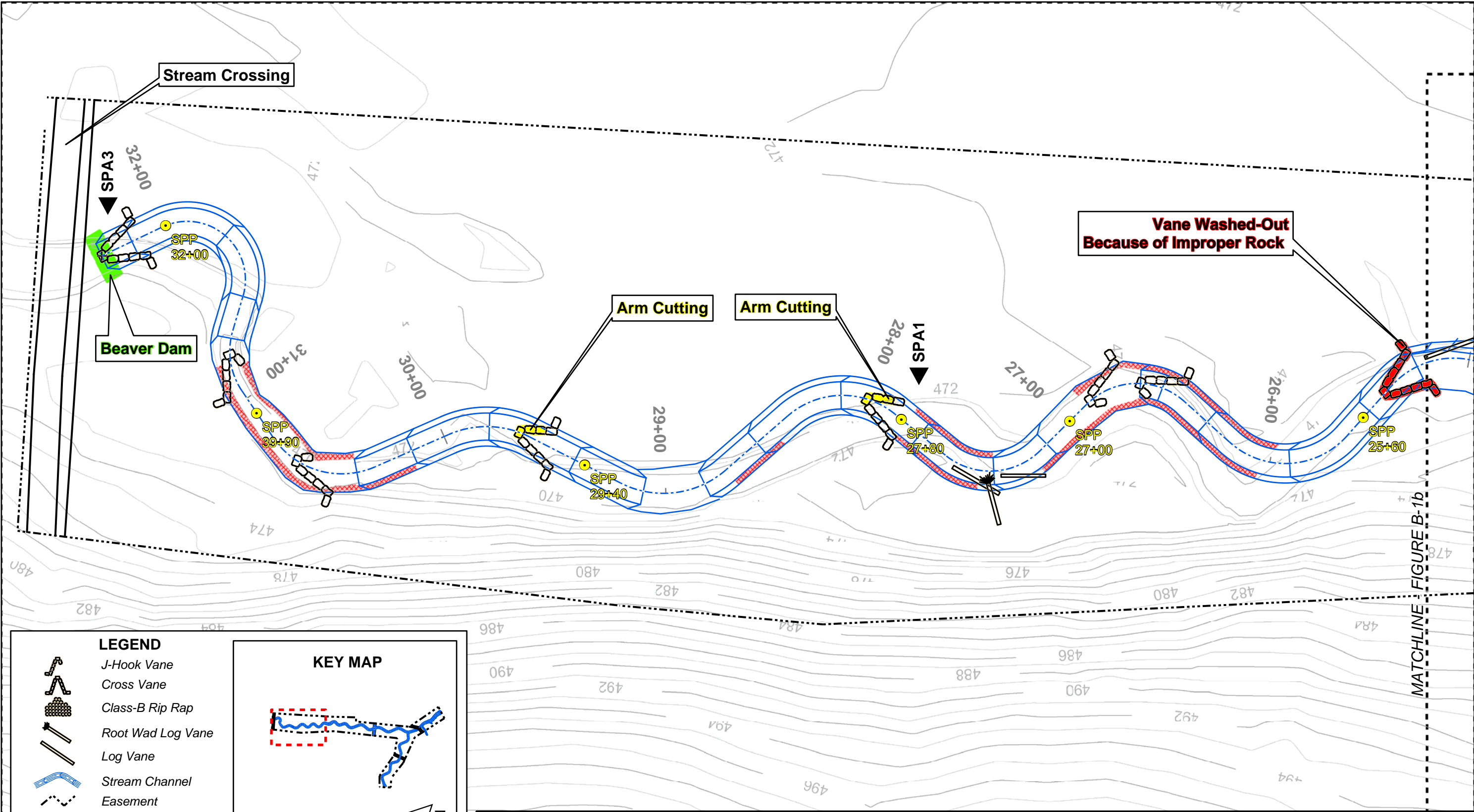


VPP3b

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION

APPENDIX B Geomorphologic Raw Data

- B1 Problem Areas Plan View (Stream)**
- B2 Problem Areas Photos (Stream)**
- B3 Stream Photo-station Photos**



Vane Washed-Out Because of Improper Rock

Beaver Dam

Stream Crossing

Arm Cutting

Arm Cutting

SPA1

SPA3

SPP 32+00

SPP 39+90

SPP 29+40

SPP 27+80

SPP 27+00

SPP 25+60

LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement

Stream Problem Areas

- Eroded Banks
- Minor Problem on Engineered Structure
- Major Problem on Engineered Structure
- Debris Jam
- Drainage Problem
- Stream Photo Point (SPP)

KEY MAP

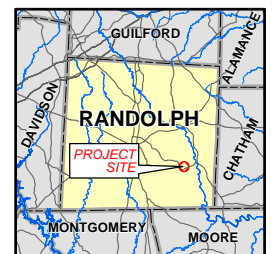
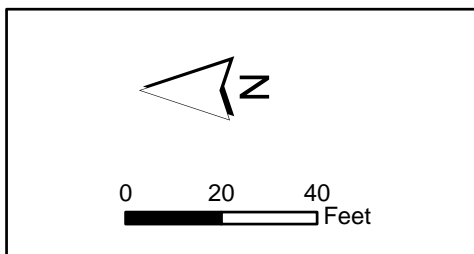
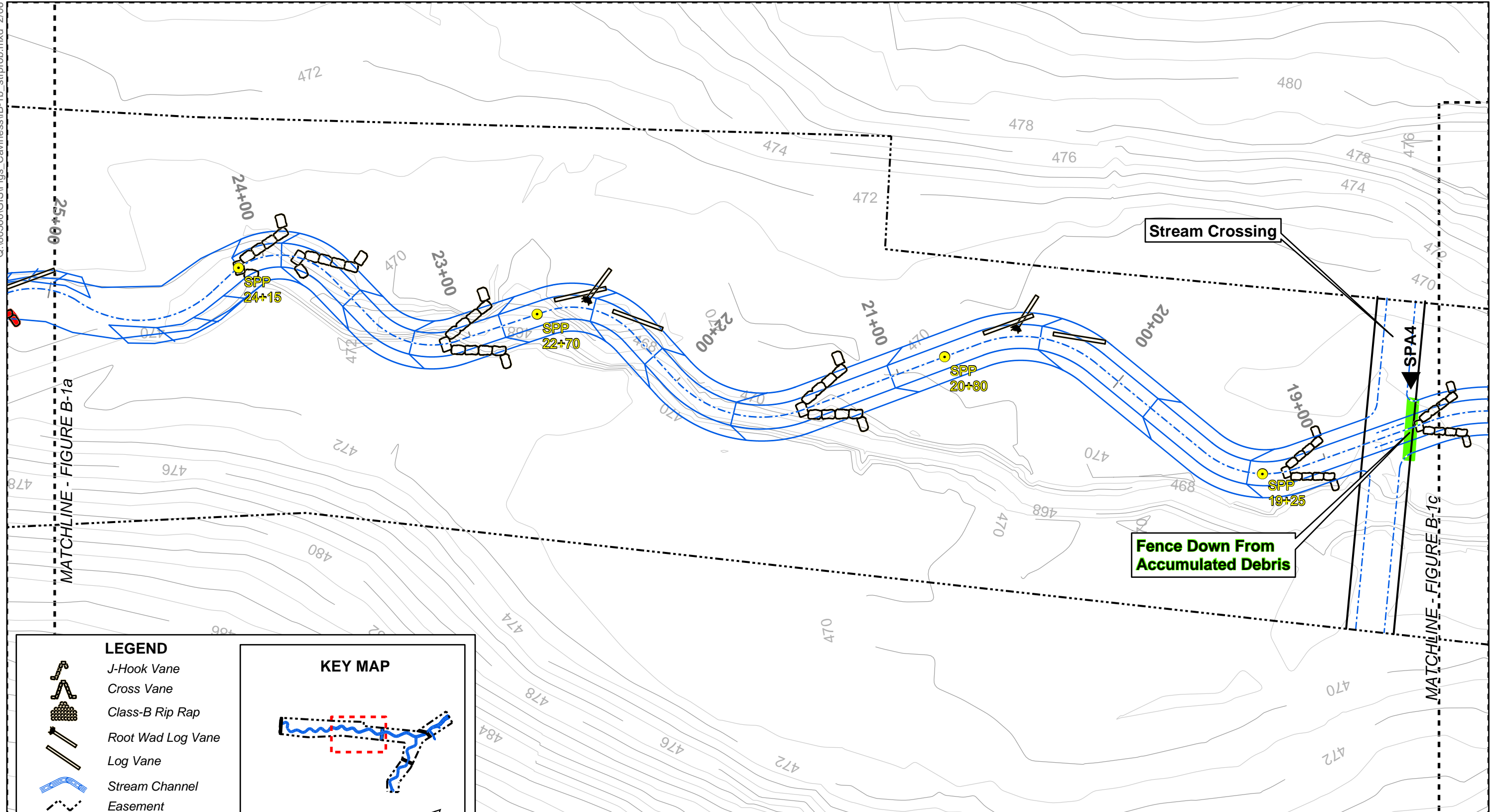


FIGURE B-1a
YEAR-2 MONITORING REPORT
STREAM PROBLEM AREAS PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006

MATCHLINE FIGURE B-1b



LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement

Stream Problem Areas

- Eroded Banks
- Minor Problem on Engineered Structure
- Major Problem on Engineered Structure
- Debris Jam
- Drainage Problem
- Stream Photo Point (SPP)

KEY MAP

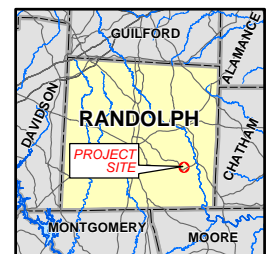
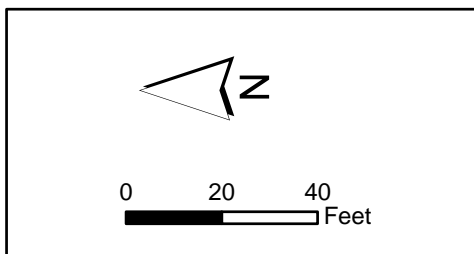
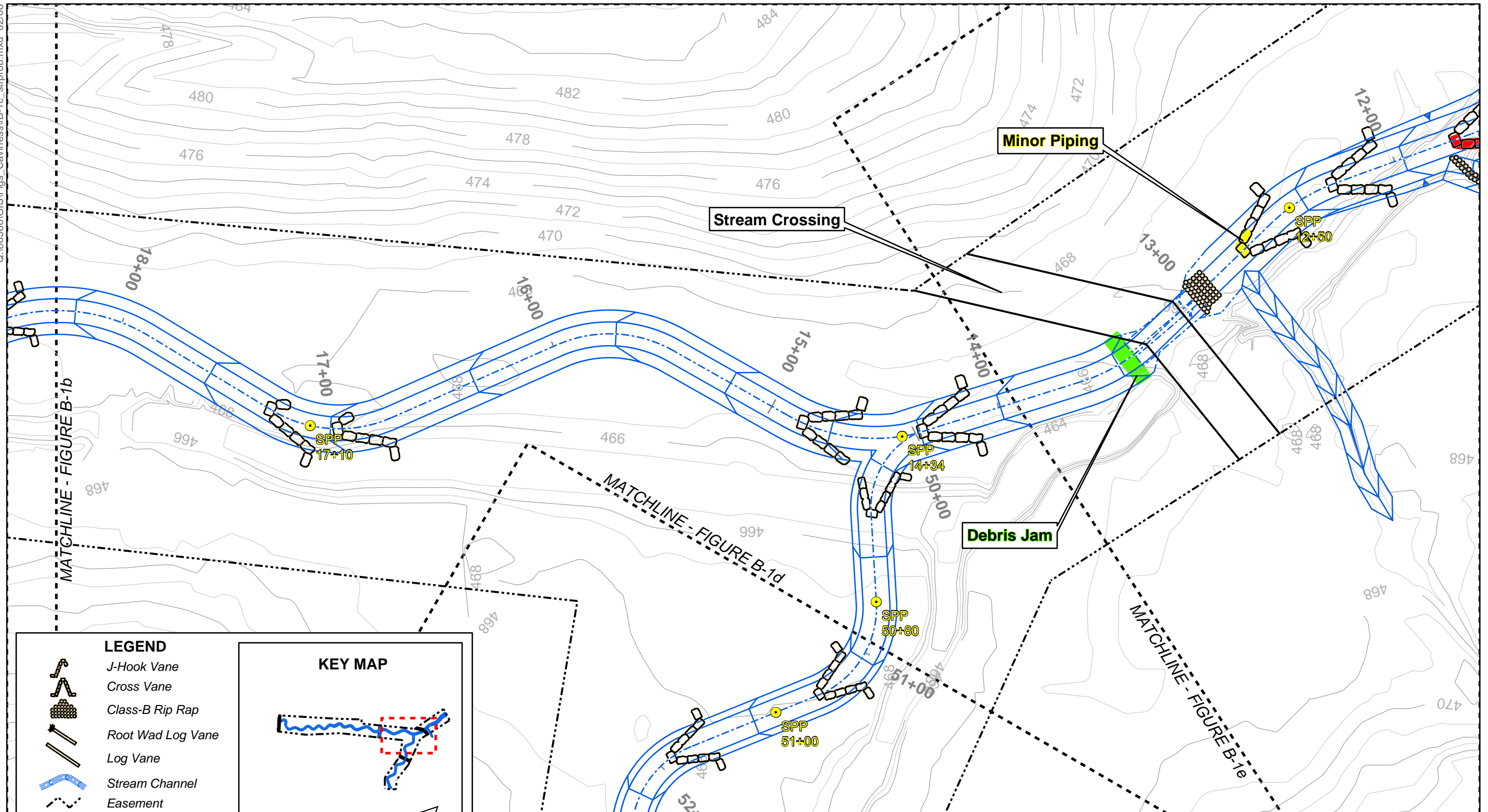


FIGURE B-1b
YEAR-2 MONITORING REPORT
STREAM PROBLEM AREAS PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006



LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement

Stream Problem Areas

- Eroded Banks
- Minor Problem on Engineered Structure
- Major Problem on Engineered Structure
- Debris Jam
- Drainage Problem
- Stream Photo Point (SPP)

KEY MAP

A north arrow is located at the bottom right of the legend area.

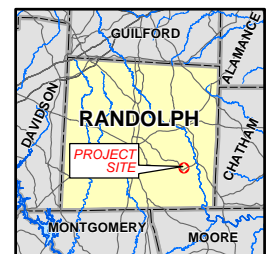
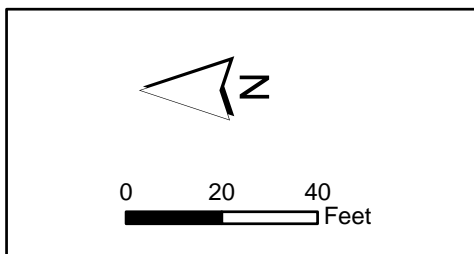
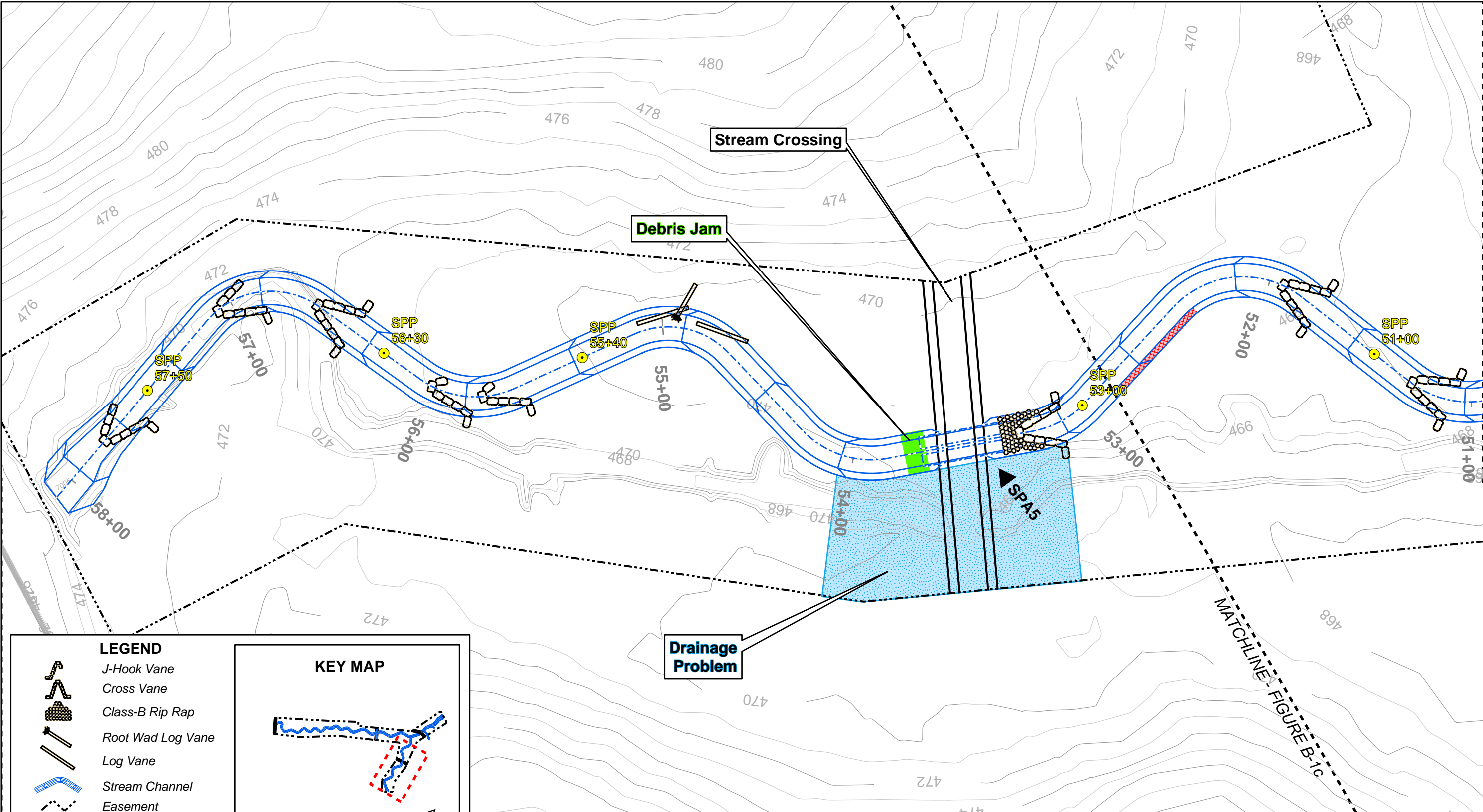


FIGURE B-1c
YEAR-2 MONITORING REPORT
STREAM PROBLEM AREAS PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006



LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement

Stream Problem Areas

- Eroded Banks
- Minor Problem on Engineered Structure
- Major Problem on Engineered Structure
- Debris Jam
- Drainage Problem
- Stream Photo Point (SPP)

KEY MAP

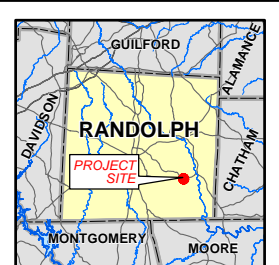
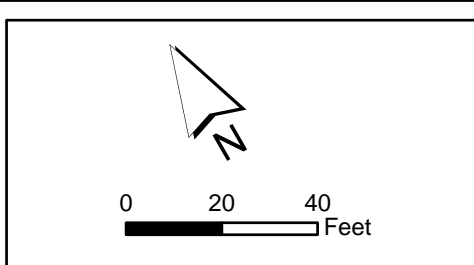
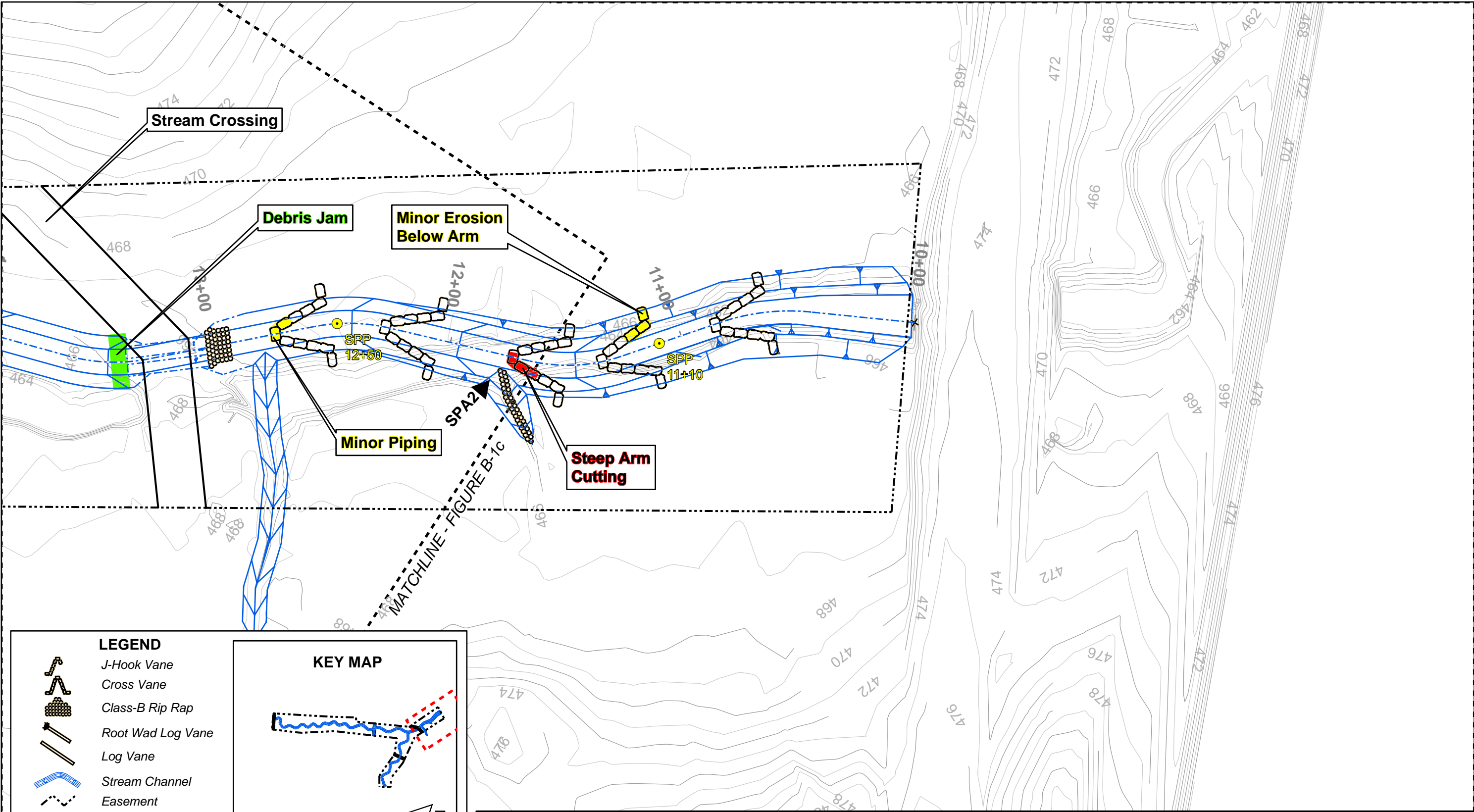


FIGURE B-1d
YEAR-2 MONITORING REPORT
STREAM PROBLEM AREAS PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006



LEGEND

- J-Hook Vane
- Cross Vane
- Class-B Rip Rap
- Root Wad Log Vane
- Log Vane
- Stream Channel
- Easement

Stream Problem Areas

- Eroded Banks
- Minor Problem on Engineered Structure
- Major Problem on Engineered Structure
- Debris Jam
- Drainage Problem
- Stream Photo Point (SPP)

KEY MAP

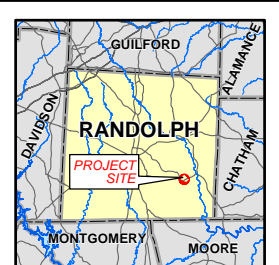
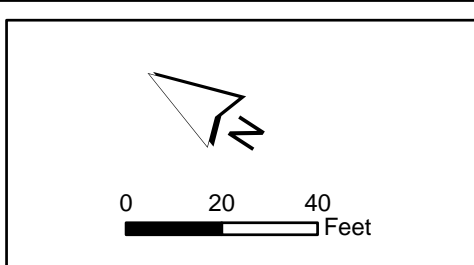


FIGURE B-1e
YEAR-2 MONITORING REPORT
STREAM PROBLEM AREAS PLAN VIEW
CAVINNESS FARM STREAM RESTORATION
 Randolph County, North Carolina
 FEB 2006

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B2
STREAM PROBLEM AREA PHOTOS



SPA1. Station 27+50 to 27+75: Matting detached DS of cross vane



SPA2. Station 10+85: Minor erosion below arm.



SPA3. Station 32+30: Beaver dam.



SPA4. Station 18+60. Fence pulled out by stress from debris jam at high flow.



SPA5. Station 53+50. Poor drainage because of improper grading. Picture taken during severe drought.

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 11+10 Tibbs Run Upstream (US) at X-vane and pool



Sta. 11+10 Tibbs Run Downstream (DS) at riffle, X-vane, and culvert



Sta. 12+50 Tibbs Run US at X-vane and pipe crossing



Sta. 12+50 Tibbs Run DS at X-vane and pool



Sta. 14+34 West Branch US at X-vane with rock seal



Sta. 14+34 Tibbs Run DS at X-vane and pool.

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 17+10 Tibbs Run US at J-hook vane and pool



Sta. 17+10 Tibbs Run DS at J-hook vane



Sta. 19+25 Tibbs Run US at riffle section



Sta. 19+25 Tibbs Run DS at X-vane above stream ford



Sta. 20+80 Tibbs Run US at riffle section



Sta. 20+80 Tibbs Run DS at log vane and root wad

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 22+70 Tibbs Run US at X-vane and pool



Sta. 22+70 Tibbs Run DS at log vane and root wad



Sta. 24+15 Tibbs Run US at run prior to J-hook vane



Sta. 24+15 Tibbs Run DS at J-hook vane and pool



Sta. 25+60 Tibbs Run US at run prior to X-vane



Sta. 25+60 Tibbs Run DS at X-vane and pool

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 27+00 Tibbs Run US at log vane and root wad



Sta. 27+00 Tibbs Run DS at J-hook vane and pool



Sta. 27+80 Tibbs Run US at X-vane and pool



Sta. 27+80 Tibbs Run DS at log vane and pool



Sta. 29+40 Tibbs Run US at X-vane and pool



Sta. 29+40 Tibbs Run DS at run and beginning of point bar

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 30+90 Tibbs Run US at J-hook vane and pool



Sta. 30+90 tibbs Run DS at J-hook vane and pool



Sta. 32+00 Tibbs Run US at X-vane and stream crossing



Sta 32+00 Tibbs Run DS at glide section



Sta. 50+80 West Branch US at X-vane with rock seal



Sta. 50+80 West Branch DS at X-vane prior to confluence

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 51+50 West Branch US at X-vane with rock seal



Sta. 51+50 West Branch DS at X-vane and Test Plot #1



Sta. 53+00 West Branch US at X-vane and pipe crossing



Sta. 53+00 West Branch DS at X-vane and rock outcrop



Sta. 55+40 West Branch US at J-hook vanes



Sta. 55+40 West Branch DS at log vanes

CAVINESS FARM (TIBBS RUN) STREAM RESTORATION
APPENDIX B3
Stream Photostation Photos



Sta. 56+30 West Branch US at X-vane



Sta. 56+30 West Branch DS at X-vane and J-hook



Sta. 57+50 West Branch US at X-vane



Sta. 57+50 West Branch DS at riffle