Lick Creek Stream Restoration Site
MONITORING REPORT 2007 (Year 2)

Cataloging Unit: 0303004 EEP Contract #: D04013-1

Submitted to:

North Carolina Department of Environment and Natural Resources
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Submitted by:

Restoration Systems, LLC
1101 Haynes Street, Suite 107
Raleigh, North Carolina 27604

December 7, 2007

Lick Creek Stream Restoration Site
MONITORING REPORT 2007 (Year 2)

Prepared for:

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Prepared by:

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EXECUTIVE SUMMARY

The Lick Creek Stream Restoration Site located within the Cape Fear River Basin, consists of approximately 9,568 linear feet of Priority 1 stream restoration of portions of Lick Creek and Wallace Branch. These reaches consist of perennial, second and third order streams that have historically been impacted by riparian and bank vegetation removal, the introduction of agricultural ditch inputs, channel straightening, and unrestricted livestock access. The constructed stream channels have restored appropriate morphology including riffle-pool bed form and channel pattern. Cross-vanes, J-Hook vanes, and in-stream log structures have been integrated into the channel to provide grade control, maintain stable stream banks while the riparian vegetation reestablishes, and provide in-stream habitat.

Hydrology
Following completion of construction in March of 2006, the site has been subjected to at least three greater than bankfull events and several near bankfull events. In June of 2006, Hurricane Alberto crossed central North Carolina resulting in five inches of rainfall on-site and water elevations three feet above bankfull. In November of 2006, heavy rainfall resulted in water elevations up to two feet above bankfull. Five additional events including Hurricane Ernesto resulted in water elevations within one to two feet below bankfull. In October of 2007, the crest gages recorded a bankfull event on both Lick Creek and Wallace Branch. It should be noted that the summer of 2007 has been one of the worst droughts on record for the state of North Carolina.

Stream
The project stream reaches have successfully managed the extreme flow events of the first two years; the banks are in stable condition, almost all of the structures are sound and functional, and the bed material is coarsening. There are several areas where matting is no longer in place and bank vegetation has not become established.

Vegetation
Native woody and herbaceous species were used to establish at minimum a fifty foot wide riparian buffer on each side of the restored reach. Planted herbaceous species have successfully established throughout the entire site along with volunteer species from upstream seed sources. While the live stakes used to stabilize the lower stream banks have survived, the ongoing drought has resulted in stunted growth and somewhat weak bank vegetation. The riparian buffer planting had an overall survival rate of 74% with additional volunteer species taking root. A number of Chinese privet (*Ligustrum sinense*) stems are emerging in areas where invasive species removal previously occurred.

Planned Action
1) Continued visual monitoring of areas of concern.
2) Install supplemental live staking in select areas of weak or nonexistent bank vegetation.
3) Removal of emergent Chinese privet.

1.0 PROJECT BACKGROUND

1.1 LOCATION AND SETTING

The Lick Creek Stream Restoration Site is located approximately 2.6 miles northeast of the City of Sanford in rural Lee County, North Carolina. From Raleigh, NC take US-1 south, take Colon Rd exit, turn left onto Colon Road, turn left on Riddle Road, turn right on Lower Moncure Road and the site is approximately ¼ mile on the left and right side of the road. The project reach is located in the Lick Creek watershed of the Cape Fear River Basin (United States Geological Survey (USGS) 14-digit Hydrologic Unit 03030004010010) within North Carolina Division of Water Quality (NCDWQ) sub-basin 03-06-07. The 03-06-07 sub-basin contains all of the Lick Creek drainage area as well as all other drainages to the 25-river miles of the Cape Fear River extending from near the confluence at Lick Creek in Lee County to near Buies Creek in Harnett County. This sub-basin is primarily forested, although agriculture accounts for a significant portion of the sub-basin.

1.2 PROJECT STRUCTURE AND OBJECTIVES

The pre-construction site consisted of approximately 51 acres of floodplain, 5,371 linear feet of stream designated as Lick Creek, and 3,512 linear feet of stream designated as Wallace Branch. These reaches consist of perennial, second and third order streams that have historically been impacted by riparian and bank vegetation removal, the introduction of agricultural ditch inputs, channel straightening, unrestricted livestock access, and the increasing development of the contributing drainage area. Prior land use within the site consists of forested areas and pasture.

The primary goals and objectives of the project were to improve local water quality, enhance flood attenuation and restore aquatic and riparian habitat. The overall mitigation strategy consisted of reconstruction of the stream channels to restore stable channel morphology, construction of in-stream habitat and grade/bank stabilization structures, exclusion of livestock, and reestablishment of native riparian buffers greater than 50 feet in width.

The project is divided into three distinct mitigation elements: Reach 1 consists of Wallace Branch from the upstream end of the site to its confluence with Lick Creek. Reach 2 consists of Lick Creek from the upstream end of the site to its confluence with Wallace Branch. Reach 3 consists of Lick Creek from the confluence with Wallace Branch to the downstream end of the site.

Table 1. Project Structure and Objectives – Lick Creek Stream Restoration Site (D04013-1)

Reach ID	Mitigation Type	Priority Level	Linear Footage	Stationing	Description
1	Restoration	P1	3,690 ft	10+00 – 46+90	3,690 ft of channel relocation of Wallace Branch
2	Restoration	P1	1,870 ft	10+00 – 28+70	1,870 ft of channel relocation of Upper Lick Creek
3	Restoration	P1	4,008 ft	28+70 – 65+20	3,650 ft of channel relocation of Lower Lick Creek and 358 ft of channel relocation of an Unnamed Tributary
		Total	**9,568 ft**		

1.3 PROJECT BACKGROUND

Table 2. Project Activity and Reporting History – Lick Creek Stream Restoration Site (D04013-1)

Activity or Report	Scheduled Completion	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	Oct-04	N/A	Apr-05
Final Design – (at least 90% complete)	Oct-04	N/A	Apr-05
Construction	Mar-05	N/A	Mar-06
Temporary S&E mix applied to entire project area	Mar-05	N/A	Apr-06
Permanent seed mix applied to entire project area	Mar-05	N/A	Apr-06
Live stakes planting	Mar-05	N/A	Apr-06
Bare root trees planting	Mar-05	N/A	Apr-06
Mitigation Plan / As-built (Year 0 Monitoring-baseline)	Mar-05	May-06	Jun-06
Maintenance following Hurricane Alberto (Log vanes added and bank repairs)	N/A	N/A	Nov-06
Year 1 Monitoring	Nov-06	Dec-06	Dec-06
Year 2 Monitoring	Nov-07	Nov-07	Dec-07
Year 3 Monitoring	Nov-08		
Year 4 Monitoring	Nov-09		
Year 5 Monitoring	Nov-10		

Table 3. Project Contact Information – Lick Creek Stream Restoration Site (D04013-1)

Designer URS Corporation	1600 Perimeter Park Drive, Suite 400 Morrisville, NC 27560
Construction Contractor North State Environmental, Inc.	2889 Lowery Street, Suite B Winston-Salem, NC 27101 Contact: Darrell Westmoreland, Tel. 336-725-2010
Planting Contractor H & J Forestry Services	910-264-1612
Seeding Contractor North State Environmental, Inc. Nursery Stock Suppliers	2889 Lowery Street, Suite B Winston-Salem, NC 27101 Contact: Darrell Westmoreland, Tel. 336-725-2010 S.C. Supertree Nursery, Tel 800-222-1290
Monitoring Performer Wolf Creek Engineering	30 Ben Lippen School Rd. Asheville, NC 28806 Contact: Grant Ginn, Tel. 828-505-2186

Table 4. Project Background Information – Lick Creek Stream Restoration Site (D04013-1)

Project County:	Lee County, NC
Drainage Area: Reach 1: Wallace Branch Reach 2: Lick Creek Reach 3: Lick Creek	 4.94 mi^2 8.86 mi^2 13.9 mi^2
Estimated Drainage % Impervious Cover: Reach 1: Wallace Branch Reach 2: Lick Creek Reach 3: Lick Creek	 <5% 5% 5%
Stream Order: Reach 1: Wallace Branch Reach 2: Lick Creek Reach 3: Lick Creek	 2 2 3
Physiographic Region	Piedmont
Ecoregion	Triassic Basin
Rosgen Classification of As-Built	E5
Cowardin Classification	Piedmont/Mountain Bottomland Forrest
Dominant Soil Types Reach 1: Wallace Branch Reach 2: Lick Creek Reach 3: Lick Creek	 Congaree Silt Loam (Cp) Congaree Silt Loam (Cp) Congaree Silt Loam (Cp)
Reference site ID	UT to Reedy Creek
USGS HUC for Project and Reference sites	03030004
NCDWQ Sub-basin for Project and Reference	03-06-07
NCDWQ classification for Project and 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?	N/A
% of project easement fenced	100%

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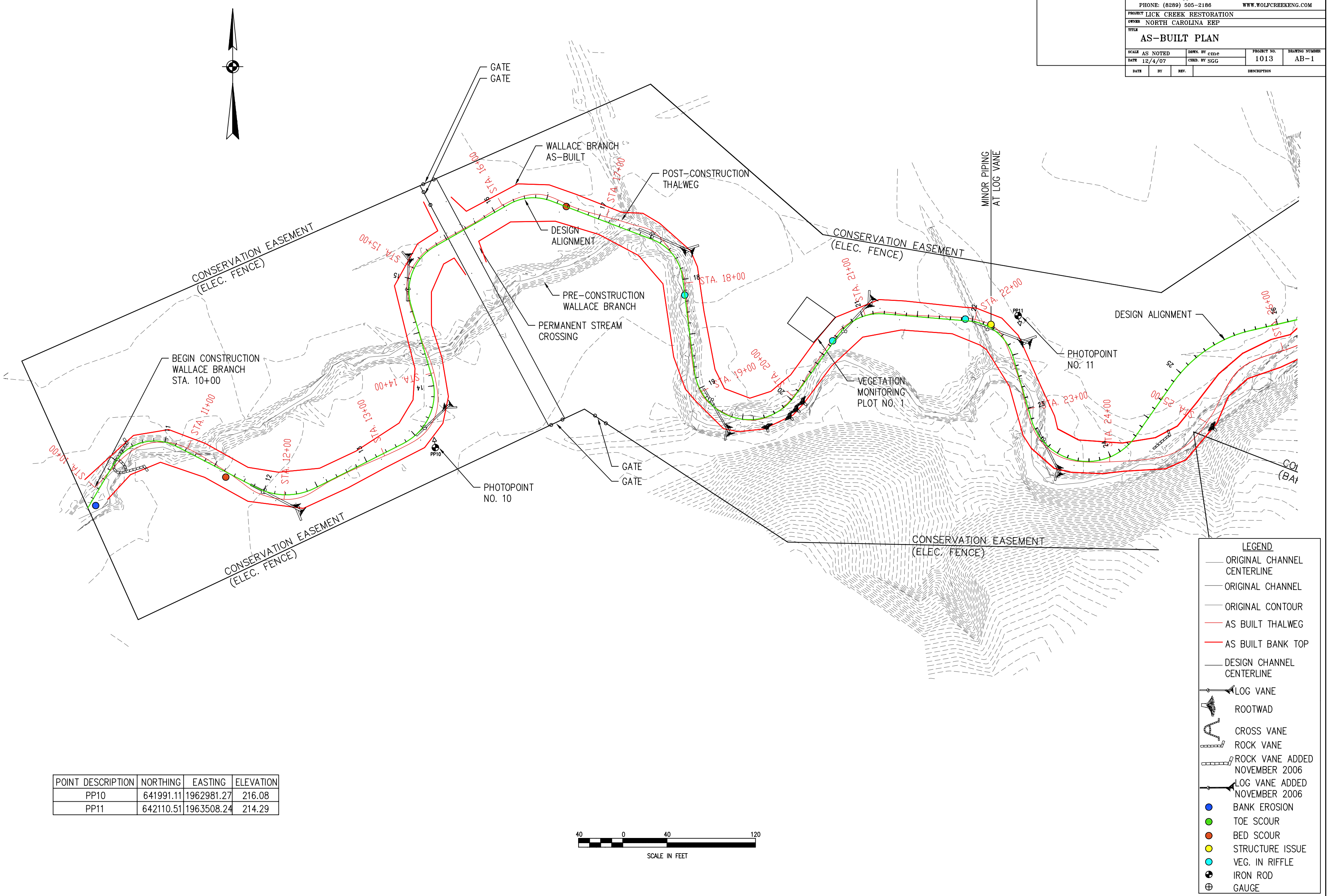
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

PROJECT LICK CREEK RESTORATION
OWNER NORTH CAROLINA EEP
TITLE

AS-BUILT PLAN

SCALE	DATE	DRWN. BY	CHKD. BY	PROJECT NO.	DRAWING NUMBER
AS NOTED	12/4/07	cme	SGG	1013	AB-1

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
PP10	641991.11	1962981.27	216.08
PP11	642110.51	1963508.24	214.29

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PROJECT: LICK CREEK RESTORATION
CLIENT: NORTH CAROLINA EEP
TITLE: AS-BUILT PLAN

SCALE	DESIGN BY	PROJECT NO.	DRAWING NUMBER
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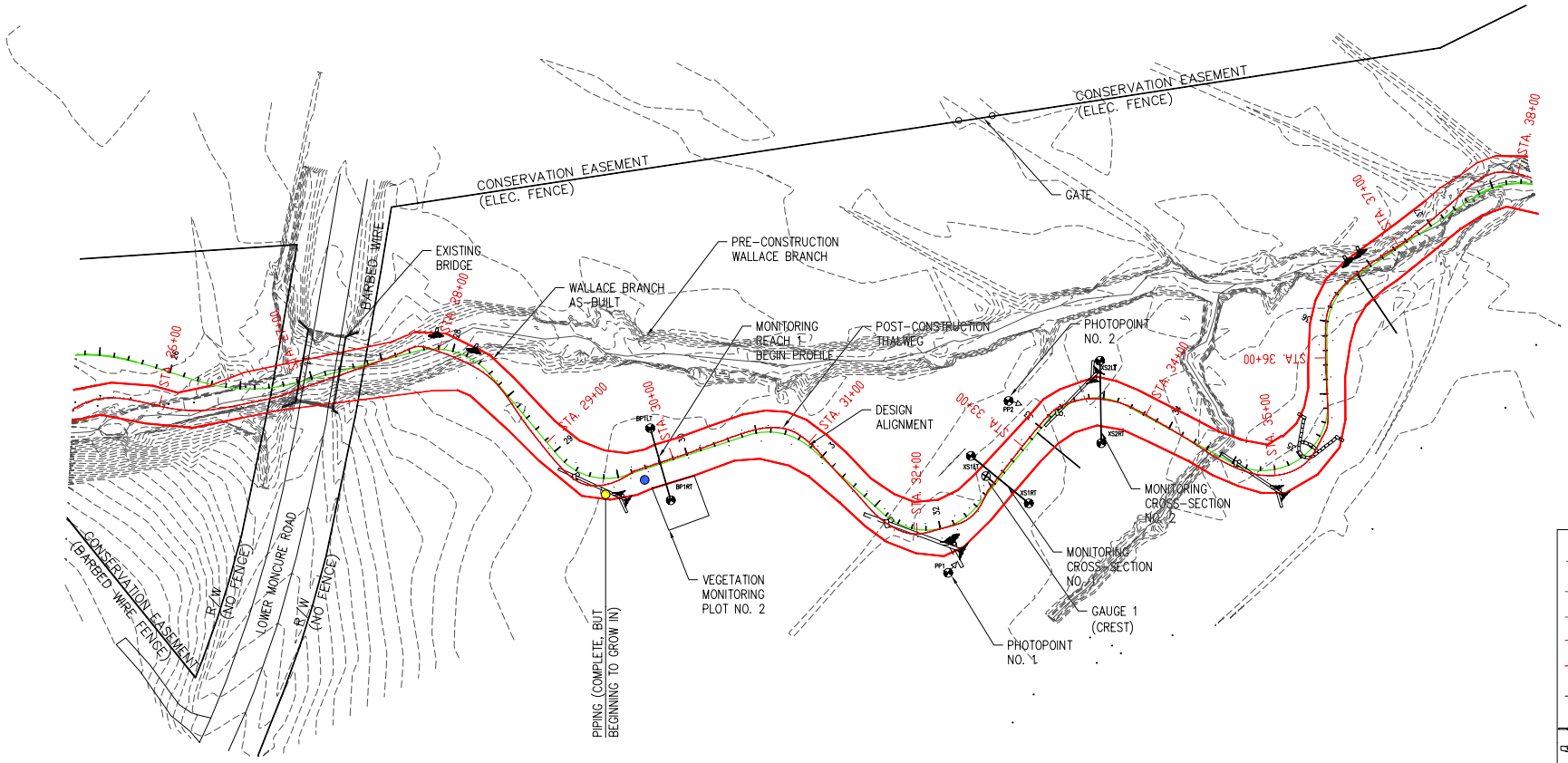
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
BP1LT	642234.97	1964048.74	213.76
BP1RT	642199.00	1964085.84	213.95
PP1	642251.23	1964276.46	213.69
XS1LT	642328.91	1964249.75	213.24
XS1RT	642320.55	1964300.86	213.46
PP2	642374.80	1964253.35	213.03
XS2LT	642430.25	1964293.98	213.08
XS2RT	642381.47	1964323.23	213.05

40 0 40 120
SCALE IN FEET

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS BUILT THALWEG
- AS BUILT BANK TOP
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- ROOTWAD
- CROSS VANE
- ROCK VANE
- ROCK VANE ADDED NOVEMBER 2006
- LOG VANE ADDED NOVEMBER 2006
- BANK EROSION
- TOE SCOUR
- BED SCOUR
- STRUCTURE ISSUE
- VEG. IN RIFFLE
- IRON ROD
- GAUGE

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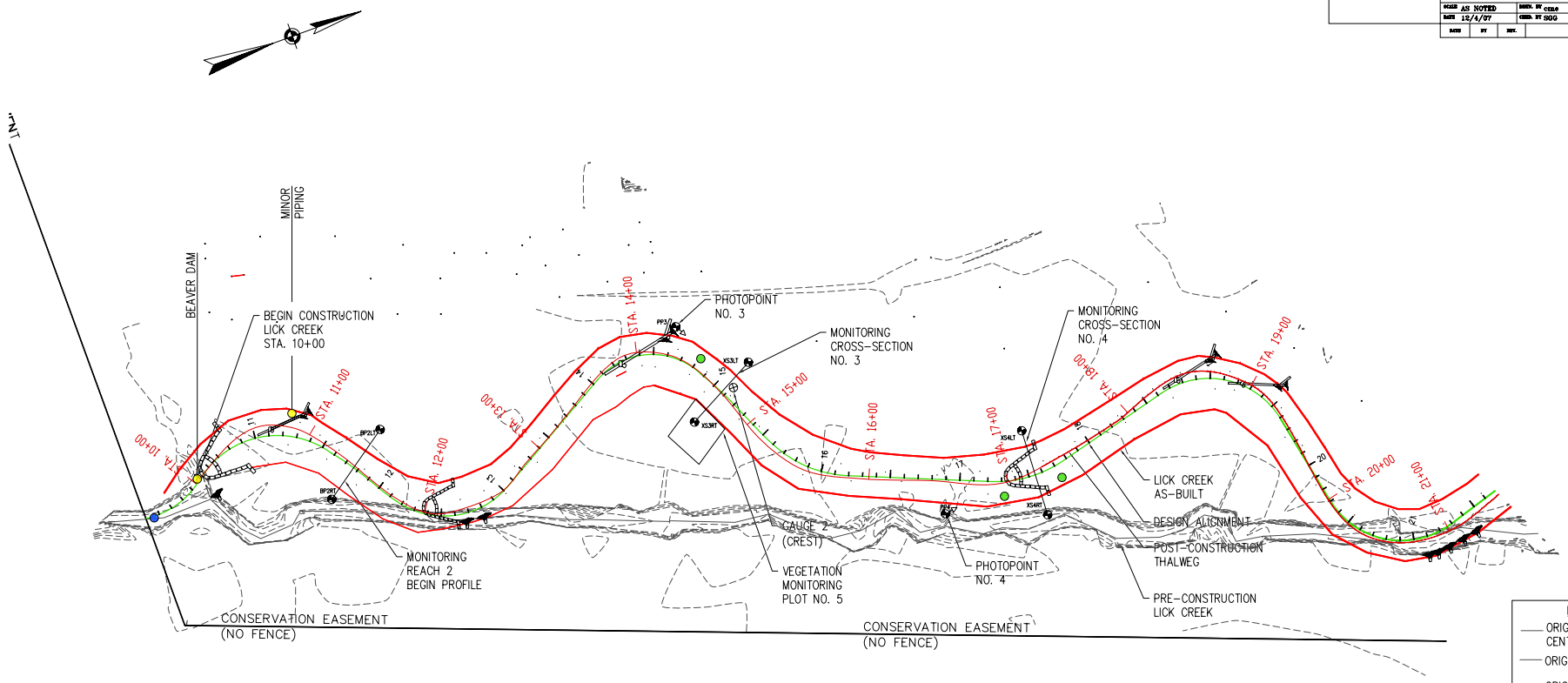
PROJECT: LICK CREEK RESTORATION
CLIENT: NORTH CAROLINA EEP
TITLE: AS-BUILT PLAN

SCALE	DESN. BY	PROJECT NO.	DRAWING NUMBER
AS NOTED	cms	1013	AB-3
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
BP2LT	642035.62	1964459.79	214.41
BP2RT	641985.83	1964494.90	214.55
PP3	642260.45	1964463.01	213.41
XS3LT	642300.70	1964504.80	213.72
XS3RT	642249.61	1964531.93	213.14
PP4	642396.50	194655.51	213.55
XS4LT	642468.31	1964618.15	212.56
XS4RT	642465.14	1964681.20	–

40 0 40 120
SCALE IN FEET

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS BUILT THALWEG
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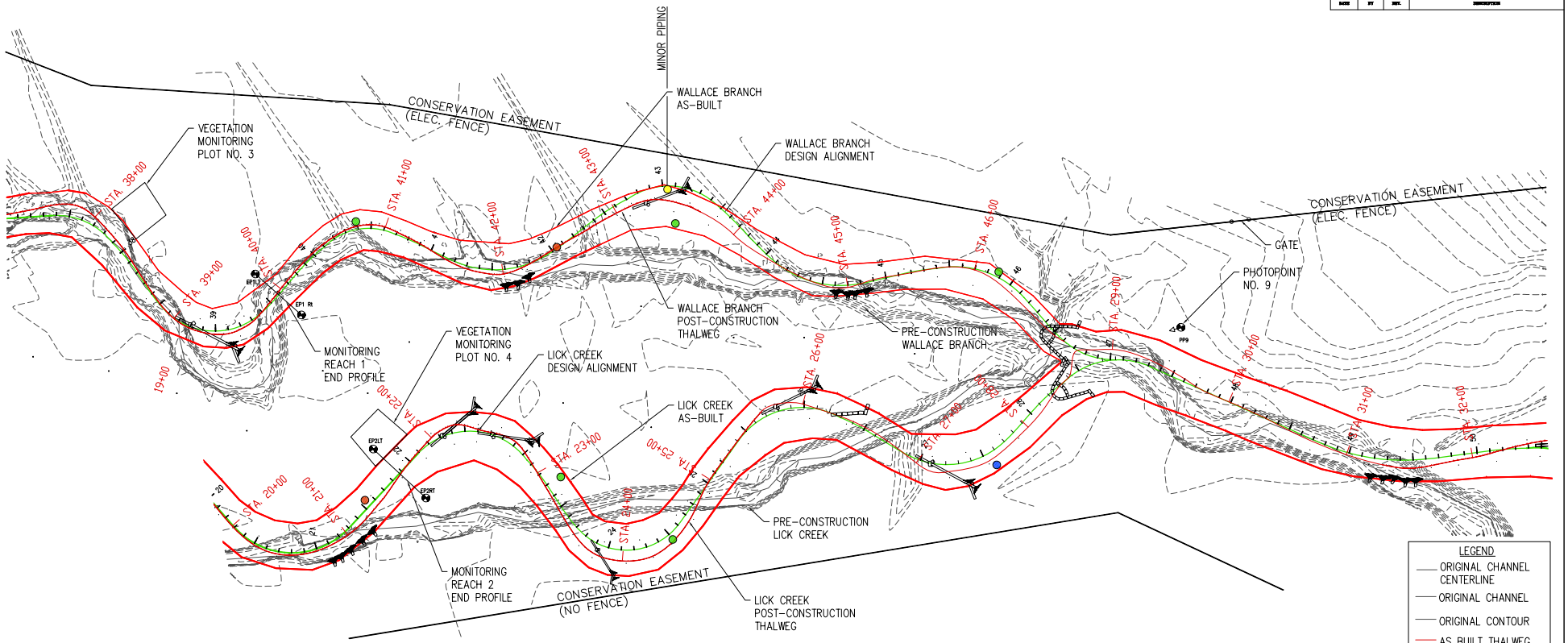
PROJECT: LICK CREEK RESTORATION
CLIENT: NORTH CAROLINA EEP
TITLE: AS-BUILT PLAN

SCALE	DESIGN BY	PROJECT NO.	DRAWING NUMBER
AS NOTED	cmc	1013	AB-4
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
EP2LT	642782.85	1964742.86	211.95
EP2RT	642799.25	1964796.16	212.44
EP1LT	642771.53	1964579.57	212.07
EP1RT	642786.65	1964624.93	211.83
PP9	643372.57	1964974.33	211.30

40 0 40 120
SCALE IN FEET

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
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- AS BUILT THALWEG
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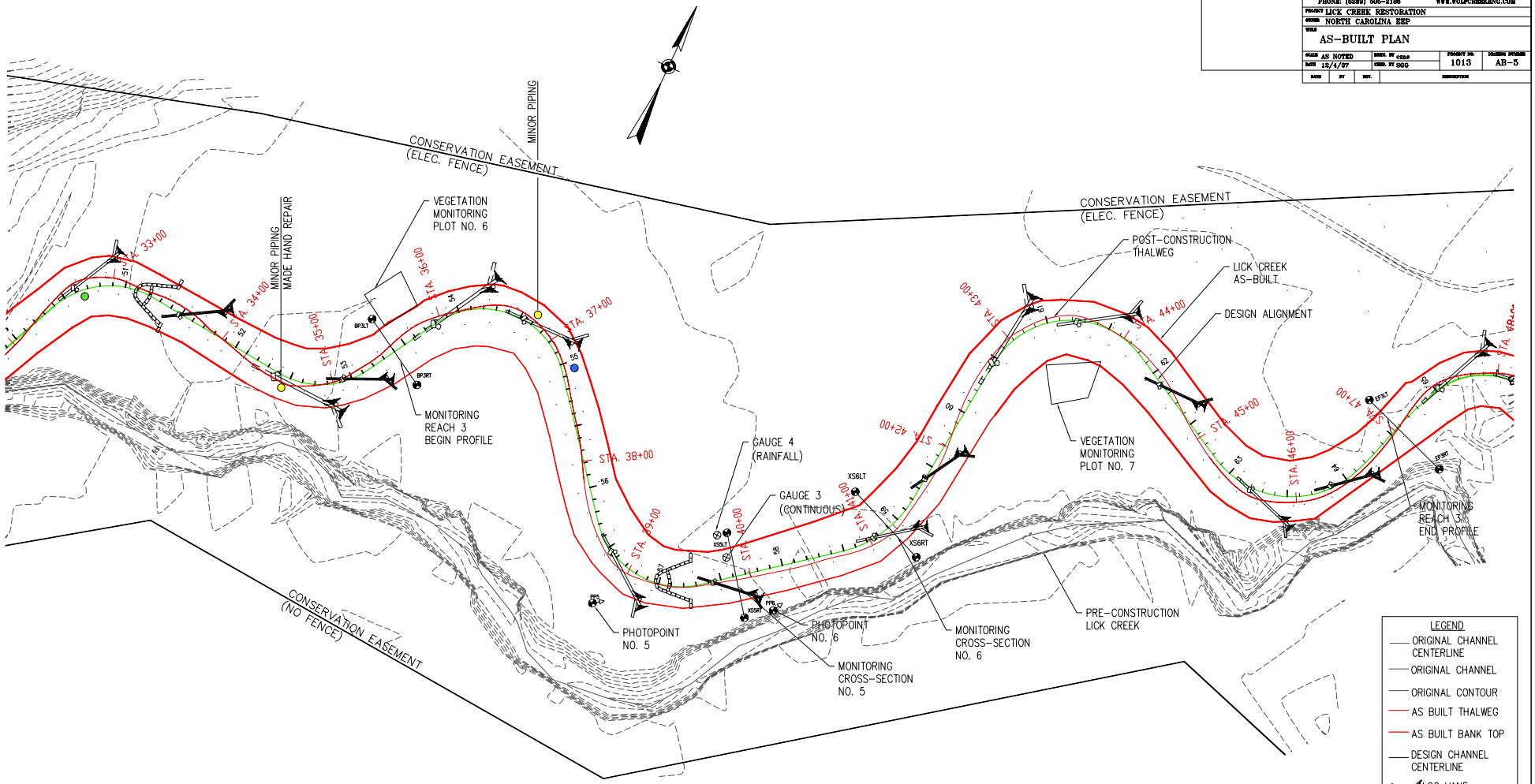
PROJECT LICK CREEK RESTORATION
OWNER NORTH CAROLINA EEP
TITLE **AS-BUILT PLAN**

SCALE	DESN. BY	PROJECT NO.	DRAWING NUMBER
AS NOTED	cmc	1013	AB-5
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
BP3LT	643656.13	1965422.68	210.51
BP3RT	643623.83	1965476.86	210.50
PP5	643525.93	1965675.95	210.34
PP6	643581.04	1965808.22	210.05
XS5LT	643621.47	1965749.03	209.56
XS5RT	643566.26	1965790.05	210.22
XS6LT	643693.80	1965827.37	209.31
XS6RT	643667.29	1965893.12	210.12
EP3LT	643931.89	1966165.79	208.45
EP3RT	643905.52	1966239.12	208.06

40 0 40 120
SCALE IN FEET

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
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SCALE	DESN. BY	PROJECT NO.	DRAWING NUMBER
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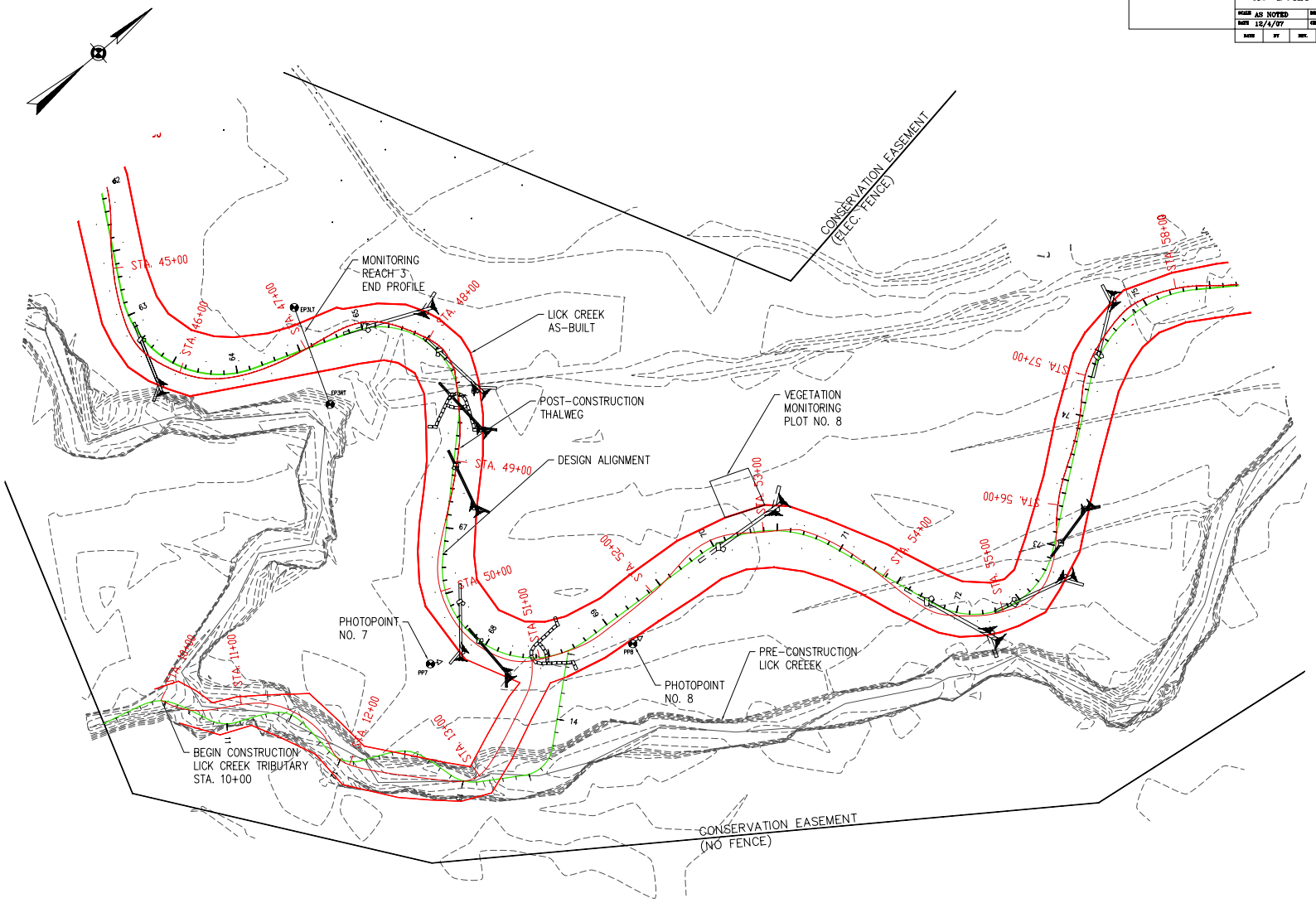
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION



POINT DESCRIPTION	NORTHING	EASTING	ELEVATION
EP3LT	643931.89	1966165.79	208.45
EP3RT	643905.52	1966239.12	208.06
PP8	643964.34	1966524.28	207.04

40 0 40 120
SCALE IN FEET

LEGEND
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- ORIGINAL CHANNEL
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SCALE	DESN. BY	PROJECT NO.	DRAWING NUMBER
AS NOTED	cms	1013	AB-7
DATE	CHKD. BY		
12/4/07	SGG		

DATE	BY	REV.	DESCRIPTION

GATE

CONSERVATION EASEMENT (ELEC. FENCE)

CONSERVATION EASEMENT (BARBED WIRE FENCE)

CONSERVATION EASEMENT (NO FENCE)

CONSERVATION EASEMENT (BARBED WIRE FENCE)

LICK CREEK AS-BUILT

POST-CONSTRUCTION THALWEG

DESIGN ALIGNMENT

PRE-CONSTRUCTION LICK CREEK

VEGETATION MONITORING PLOT NO. 8

END CONSTRUCTION LICK CREEK STA. 65+16

STA. 53+00
STA. 54+00
STA. 55+00
STA. 56+00
STA. 57+00
STA. 58+00
STA. 59+00
STA. 60+00
STA. 61+00
STA. 62+00
STA. 63+00
STA. 64+00
STA. 65+00

SCALE IN FEET
40 0 40 120

LEGEND
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2.0 PROJECT CONDITION AND MONITORING RESULTS

2.1 VEGETATION ASSESSMENT

The survivability of the riparian buffer plantings is evaluated using eight (8) randomly placed 10 meter by 10 meter vegetative sampling plots providing combined sample coverage of two percent of the replanted area. The corners of each monitoring plot have been marked in the field and their position documented by GPS survey. The monitoring consists of a physical inventory within each plot in order to determine the composition and number of surviving species and the total number of stems per acre. To the extent possible, differentiation between planted and volunteer stems was accomplished. The presence of non-native, exotic, and undesirable species was noted. Additionally, sequential photographs are taken from the upstream corner located closest to the stream of each monitoring plot.

Planted herbaceous species have successfully established throughout the entire site along with volunteer species from upstream seed sources. Due to a prolonged and severe regional drought, the willow and dogwood live stakes used for bank stabilization exhibit significantly stunted growth. This has not had a noticeable impact on the stability of the stream banks. The riparian buffer planting had an overall survival rate of 74% with additional volunteer species taking root.

2.1.1 Vegetative Problem

No significant vegetation problem areas were recorded with in the site. An increasing number of non-native Chinese privet (*Ligustrum sinense*) stems were recorded emerging in areas where invasive species removal previously occurred. A relatively high occurrence of privet was observed within the conservation easement along the upstream reach of Lick Creek, adjacent to a densely populated off-site stand of privet. Measures will be implemented this winter to control the new growth of privet.

There are a number of localized areas where the combination of shear stress, loss of matting, and drought conditions have resulted in bare banks and toes. Supplemental live staking will be installed in these areas this winter.

Table 6. Vegetative Problem Areas – Lick Creek Stream Restoration Site (D04013-1)

Feature / Issue	Station # / Range	Problem Cause
Bare Bank or Toe	Wallace Branch 10+00, 29+50, 40+50, 42+50 Lick Creek 14+50, 17+50, 21+50, 27+50, 35+00, 37+50	Local erosion or loss of matting
Invasive / Exotic Populations	Various	Several Chinese privet re-sprouting in areas where it was removed

Additionally, it was observed that cattle have recently entered the easement area at the upper end of Lick Creek. There was evidence that fence repairs had been made and no

cattle were in the easement during the site visit. Evidence of cattle incursion included browsed vegetation and one area of compacted bank.

2.1.2 Stem Counts

Table 7 presents stem counts of surviving individuals found at each of the monitoring plot at the end of Year 2 of the post-construction monitoring period. Trees within each monitoring plot are flagged regularly to prevent the occurrence of unmarked trees due to flag degradation. Volunteer individuals found within the plots are also flagged during this process. The average bare root species survival rate was 74%.

All herbaceous species seeded throughout the site after construction were found onsite at the end of Year 2. In addition, native species such as Switch grass (*Panicum virgatum*), soft rush (*Juncus effuses*), fennel (*Eupatorium* sp.), buttercup (*Ranunculus* spp.), fescue (*Festucca* spp.), smartweed (*Polygonum* spp.), nightshade (*Solanum* spp.), *Rumex* spp., and species of Aster (*Aster* spp.), were found to have colonized throughout the project's riparian area.

Table 7. Stem Counts – Lick Creek Stream Restoration Site (D04013-1)

Species	Plots - Year 2								Initial Totals	Year 2 Totals
	1	2	3	4	5	6	7	8		
Trees										
Asimina triloba		1	3	1	4		3		27	12
Betula nigra	1		5+	1	1	4	2	2	10	11
Callicarpa americana	1	2	3		1		2		11	9
Cephalanthus occidentalis	2	2		6	1	2		1	19	14
Corylus americana			1		1	4	2	2	17	10
Diospyros virginiana		1	1		1		1		6	4
Fraxinus pennsylvanica		1		3				1	6	5
Liriodendron tulipifera	1	4	1		1	1			6	8
Myrica cerifera	1	1	1	2	1	1	3		10	10
Nyssa sylvatica			1						2	1
Platanus occidentalis	1		1	2		1		2	7	7
Quercus michauxii	2		1	2	2	1		1	10	9
Quercus nigra		2	1		1				5	4
Quercus phellos			4			1	1		13	6
Ulmus Americana	4	2		1		1	2		14	10
Initial Totals:	**18**	**22**	**17**	**23**	**26**	**22**	**20**	**15**		
Year 2 Totals:	**13**	**16**	**18**	**18**	**14**	**16**	**15**	**9**	**Average Stem Survival %**	
Stem Survival %	**72.2**	**72.7**	**106**	**78.3**	**53.8**	**72.7**	**75**	**60**	**73.8**	
Density (trees/acre)	**526**	**647**	**728**	**728**	**567**	**647**	**607**	**364**	**602**	

2.1.3 Vegetation Plot Photos

A photo point was established in each vegetation plot. Photo points are positioned at the upstream plot corner located closest to the stream bank and oriented in order to capture the entire vegetation plot. The photographs were captured on the same day as the vegetation plot surveys (Appendix A).

2.2 STREAM ASSESSMENT

Monitoring protocol follows that outlined within the EEP Site Specific Mitigation Plan and detailed in the U.S. Army Corps of Engineers (USACE) Stream Mitigation Guidelines for Monitoring Level I. Specifically, stream monitoring included measurements of stream dimension, profile, pattern, bed materials, photo documentation, and stream bankfull return interval.

The project stream reaches have successfully managed the extreme flow events of the first two years; the banks are generally in stable condition, almost all of the structures are sound and functional, and the bed material is coarsening. The results from the monitoring survey indicate that overall grade has been maintained by the in-stream structures and bed material is beginning to refill scoured portions of the bed.

2.2.1 Hydrology

Since completion of construction in March of 2006, the site has been subjected to at least three greater than bankfull events and several near bankfull events. In June of 2006, Hurricane Alberto crossed central North Carolina resulting in five inches of rainfall on-site and water elevations three feet above bankfull on Reaches 1 and 2 and almost two feet above bankfull on Reach 3. Additionally, Lower Moncure Road was overtopped by Wallace Branch. It is estimated that this storm was approximately a fifty-year event. In November of 2006, heavy rainfall resulted in water elevations up to two feet above bankfull. The severity of this storm resulted in a malfunction of the rain gauge so that the quantity of rainfall was not recorded. Four additional events including Hurricane Ernesto resulted in water elevations within one to two feet below bankfull. Peak rainfall and flow events are documented in Appendix B.

Table 8. Verification of Bankfull Events – Lick Creek Stream Restoration Site (D04013-1)

Date of Data Collection	Date of Occurrence of Bankfull Event	Method of Data Collection
7/24/06	6/14/06	Crest Gauge and Pressure Transducer
12/1/06	11/22/06	Crest Gauge and Pressure Transducer
11/27/07	10/27/07	Crest Gauge

2.2.2 Geomorphology

Following the procedures established in the USDA Forest Service Manual (Harrelson et al 1994) and the methodologies utilized in the Rosgen stream assessment and classification system (Rosgen 1994, 1996), data collected consisted of detailed dimension and pattern measurements, longitudinal profiles, and bed materials sampling.

Re-survey of the permanent cross sections and profile reaches shown some alterations in local bed elevations with the bed form and the channel pattern remaining consistent with the Year 1 condition. Each of the riffle cross sections show nearly the same maximum depth as Year 1. The pools were generally found to be deeper than the Year 1 condition with their location relative to the pattern consistent with the Year 1 survey.

Pebble counts were conducted at each cross-section, as well as across the overall study reach. Pebble count data was plotted by size distribution in order to assess the D_{50} and D_{84} size class. In Reach 1, the material size increased from the first year survey with the D84 increasing from 2 mm to 10 mm, the percent of silt dropped from 33% to 0%, and the percent of gravel increased from 15% to 41%. In Reach 2, the D84 remained at 7 mm and the percent of gravel decreased from 34% to 24%. In Reach 3, the material size decreased slightly from the first year monitoring survey, with D84 decreasing from 9 mm to 8 mm and percent of gravel decreasing from 48% to 25%, however the riffle data showed only a slight decrease in percent of gravel from 49% to 43%.

Table 9. BEHI and Sediment Export Estimates – (Not Required in Year 2)

2.2.3 Problem Areas

The Year 1 monitoring report identified several problem areas as part of the stream assessment. Of these areas, eleven (11) are no longer appear to be areas of concern as they have healed through natural channel process, vegetation growth, or constructed repairs. However, the prolonged drought and localized shear stress have developed the following new areas of concern:

1.) There are three (3) areas where low or nonexistent flow has permitted the growth of vegetation within the bed of riffles. These do not currently present a stability issue but should be visually monitored.
2.) A beaver dam has been constructed on the rock cross vane at Sta. 10+00 on Lick Creek. Currently the dam is only impounding water on approximately 40’ of the site.
3.) There were five (5) additional areas of toe scour identified.
4.) There were three (3) new locations of minor piping identified at log vanes.

Physical repair of structures or eroded toe and bank areas does not appear to be warranted at this time. As noted in the vegetation assessment of this report, supplemental live staking will be installed in areas along the toe or bank exhibiting bare soil.

Plan drawings of the Lick Creek Stream Restoration Site detailing stream problem areas requiring additional observation can be found in Appendix B. Representative photos of stream problem area can be found in Appendix B.

Table 10. Problem Areas – Lick Creek Stream Restoration Site (D04013-1)

Location	Issue	Status	Recommended Response
Wallace Branch			
10+00	Bank Scour	Same	Continued Observation
12+00	Log Vane Piping	Healed	
29+50	Log Vane Piping	Same	Continued Observation
29+70	Toe Scour	Matting Gone	Additional Live Staking
43+50	Toe Scour	Same	Additional Live Staking
43+50	Log Vane Piping	Improved	Continued Observation
Lick Creek			
10+00	Bank Scour	Healed	
10+90	Log Vane Piping	Same	Continued Observation
14+50	Toe Scour	Some Additional Scour	Additional Live Staking
17+30	Toe Scour	Same	Additional Live Staking
27+50	Bank Scour	Increased Scour	Additional Live Staking
33+50	Toe Scour	Repairs are Stable	
35+50	Toe Scour	Repairs are Stable	
39+00	Toe Scour	Repairs are Stable	
43+80	Log Vane Piping	Repairs are Stable	
49+30	Bank Scour	Repairs are Stable	

2.2.4 Photo Reference Stations

Photograph reference Stations (PRSs) have been established to assist in characterizing the site and to allow qualitative evaluation of the site conditions. The location of each photo station has been permanently marked in the field and the bearing/orientation of the photograph is indicated on the As-built plans to allow for consistent repetition. A total of eleven (11) PRSs have been established along the restored stream (Appendix B). Six of these PRSs have been located upstream of the permanent monitoring cross sections. These photographs are taken facing downstream looking at the section, and show as much of the banks and channel as possible.

2.2.5 Stability Assessment Table

Feature	Performance Percentage Reach 1: Wallace Branch (3,690 ft)					
	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			
Meanders	100%	99%	99%			
Bed General	100%	98%	98%			
Vanes / J Hooks etc.	100%	94%	94%			
Wads and Boulders	100%	100%	100%			

Feature	Performance Percentage Reach 2: Lick Creek (1,870 ft)					
	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	89%	95%			
Pools	100%	82%	91%			
Thalweg	100%	100%	100%			
Meanders	100%	100%	98%			
Bed General	100%	97%	98%			
Vanes / J Hooks etc.	100%	96%	96%			
Wads and Boulders	100%	100%	100%			

Feature	Performance Percentage Reach 3: Lick Creek (4,008 ft?)					
	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	98%	98%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			
Meanders	100%	100%	100%			
Bed General	100%	100%	100%			
Vanes / J Hooks etc.	100%	95%	97%			
Wads and Boulders	100%	97%	99%			

Morphoology and Hydraulic Monitoring Summary
Lick Creek Stream Restoration Site (D04013-1)
Reach 1: Wallace Branch

Parameter	Cross Section 1 Riffle						Cross Section 2 Pool						Cross Section					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
Bkf Width (ft)	27	27					25.7	26.2										
Floodprone Width (ft)	>100	>100																
Bkf Cross Sectional Area (ft^2)	63.8	62.7					72.3	83.5										
Bkf Mean Depth (ft)	2.4	2.3					2.8	3.2										
Bkf Max Depth (ft)	4.3	4.4					5.2	5.9										
Width/Depth Ratio	11.4	11.6																
Entrenchment Ratio	>3	>3																
Wetted Perimeter (ft)																		
Hydraulic Radius (ft)																		
Substrate																		
D_{50} (mm)	0.1	1.2																
D_{84} (mm)	2	10																

Parameter	MY-1 (2006)			MY-2 (2007)			MY-3 (2008)			MY-4 (2009)			MY-5 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Beltwidth (ft)	110	130	120	110	130	120												
Radius of Curvature (ft)	48	60	54	48	60	54												
Meander Wavelength (ft)	200	260	230	200	260	230												
Profile																		
Riffle Length (ft)	54	77	65.5	38	65	52												
Riffle Slope (ft/ft)	0.09	0.4	0.245	0.13	0.45	0.29												
Pool length (ft)	40	68	54	42	56	49												
Pool Spacing (ft)	128	157	142.5	134	149	142												
Additional Reach Parameters																		
Valley Length (ft)	774		774	774		774												
Channel Length (ft)	1010		1010	1010		1010												
Sinuosity	1.3		1.3	1.3		1.3												
Water Surface Slope (ft/ft)	0.17		0.17	0.16		0.16												
Bkf Slope (ft/ft)	0.17		0.17	0.16		1.6												
Rosgen Classification	E5			E5														
Habitat Index																		
Macrobenthos																		

Morphoology and Hydraulic Monitoring Summary
Lick Creek Stream Restoration Site (D04013-1)
Reach 2: Lick Creek

Parameter	Cross Section 3 Riffle						Cross Section 4 Pool						Cross Section					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
Bkf Width (ft)	27	26.4					38.1	36										
Floodprone Width (ft)	>100	>100																
Bkf Cross Sectional Area (ft^2)	68	69.8					109.7	102.9										
Bkf Mean Depth (ft)	2.5	2.6					2.9	2.9										
Bkf Max Depth (ft)	4.5	4.5					5.7	5.4										
Width/Depth Ratio	10.7	10																
Entrenchment Ratio	>3	>3																
Wetted Perimeter (ft)																		
Hydraulic Radius (ft)																		
Substrate																		
D_{50} (mm)	0.7	0.8																
D_{84} (mm)	6	7																

Parameter	MY-1 (2006)			MY-2 (2007)			MY-3 (2008)			MY-4 (2009)			MY-5 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Beltwidth (ft)	120	150	135	120	150	135												
Radius of Curvature (ft)	50	90	70	50	90	70												
Meander Wavelength (ft)	260	290	275	260	290	275												
Profile																		
Riffle Length (ft)	86	142	114	80	100	90												
Riffle Slope (ft)	0.19	0.26	0.225	0.2	0.47	0.34												
Pool length (ft)	28	75	51.5	32	80	56												
Pool Spacing (ft)	180	250	215	152	220	186												
Additional Reach Parameters																		
Valley Length (ft)	810		810	810		810												
Channel Length (ft)	1041		1041	1041		1041												
Sinuosity	1.3		1.3	1.3		1.3												
Water Surface Slope (ft/ft)	0.298		0.298	0.31		0.31												
Bkf Slope (ft/ft)	0.298		0.298	0.31		0.31												
Rosgen Classification	E5			E5														
Habitat Index																		
Macrobenthos																		

Morphoology and Hydraulic Monitoring Summary
Lick Creek Stream Restoration Site (D04013-1)
Reach 3: Lick Creek

Parameter	Cross Section 5 Riffle						Cross Section 6 Pool						Cross Section					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
Bkf Width (ft)	43.4	44.5					45	43										
Floodprone Width (ft)	>150	>150																
Bkf Cross Sectional Area (ft^2)	162.1	160.2					164.1	170.9										
Bkf Mean Depth (ft)	3.7	3.6					3.6	4										
Bkf Max Depth (ft)	6.8	7					7.8	8.3										
Width/Depth Ratio	11.6	12.4																
Entrenchment Ratio	>3	>3																
Wetted Perimeter (ft)																		
Hydraulic Radius (ft)																		
Substrate																		
D_{50} (mm)	0.8	0.4																
D_{84} (mm)	13	8																

Parameter	MY-1 (2006)			MY-2 (2007)			MY-3 (2008)			MY-4 (2009)			MY-5 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Beltwidth (ft)	180	250	215	180	250	215												
Radius of Curvature (ft)	70	100	85	70	100	85												
Meander Wavelength (ft)	300	340	320	300	340	320												
Profile																		
Riffle Length (ft)	93	138	115.5	69	104	87												
Riffle Slope (ft)	0.062	0.145	0.104	0.14	0.53	0.33												
Pool length (ft)	47	110	78.5	80	112	96												
Pool Spacing (ft)	200	240	220	180	265	223												
Additional Reach Parameters																		
Valley Length (ft)	794		794	794		794												
Channel Length (ft)	1167		1167	1167		1167												
Sinuosity	1.5		1.5	1.5		1.5												
Water Surface Slope (ft/ft)	0.16		0.16	0.13		0.13												
Bkf Slope (ft/ft)	0.16		0.16	0.13		0.13												
Rosgen Classification	E5			E5														
Habitat Index																		
Macrobenthos																		

APPENDIX A

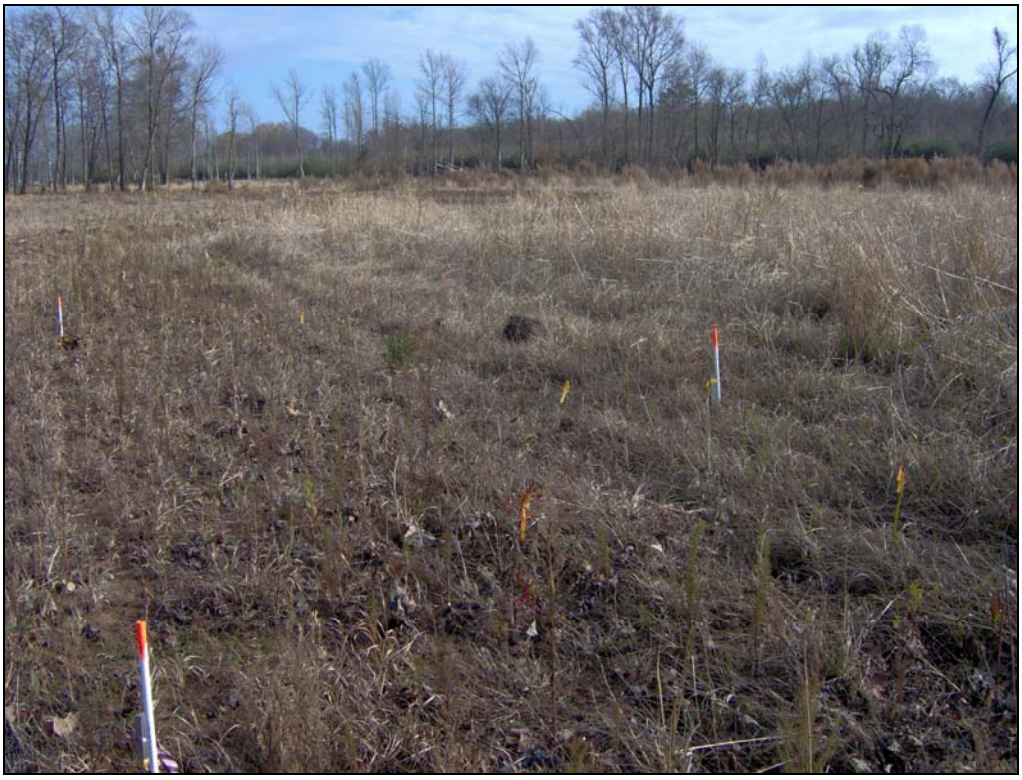
1. Vegetation Monitoring Plot Photos

Vegetation Plot No. 1

Year 1 Photo No. 1

Year 2 Photo No. 2

Vegetation Plot No. 2



Year 1 Photo No. 3

Year 2 Photo No. 4

Vegetation Plot No. 3

Year 1 Photo No. 5

Year 2 Photo No. 6

Vegetation Plot No. 4

Year 1 Photo No. 7

Year 2 Photo No. 8

Vegetation Plot No. 5

Year 1 Photo No. 9

Year 2 Photo No. 10

Vegetation Plot No. 6

Year 1 Photo No. 11

Year 2 Photo No. 12

Vegetation Plot No. 7

Year 1 Photo No. 13

Year 2 Photo No. 14

Vegetation Plot No. 8

Year 1 Photo No. 15

Year 2 Photo No. 16

APPENDIX B

Stream Raw Data

1. Exhibit Problem Areas Plan View (Stream)
2. Representative Stream Problem Area Photos
3. Stream Photo-points
4. Exhibit Table B.1. Qualitative Visual Stability Assessment
5. Cross section Plots and Raw Data Tables
6. Longitudinal Plots and Raw Data Tables
7. Pebble Count Plots and Raw Data Tables

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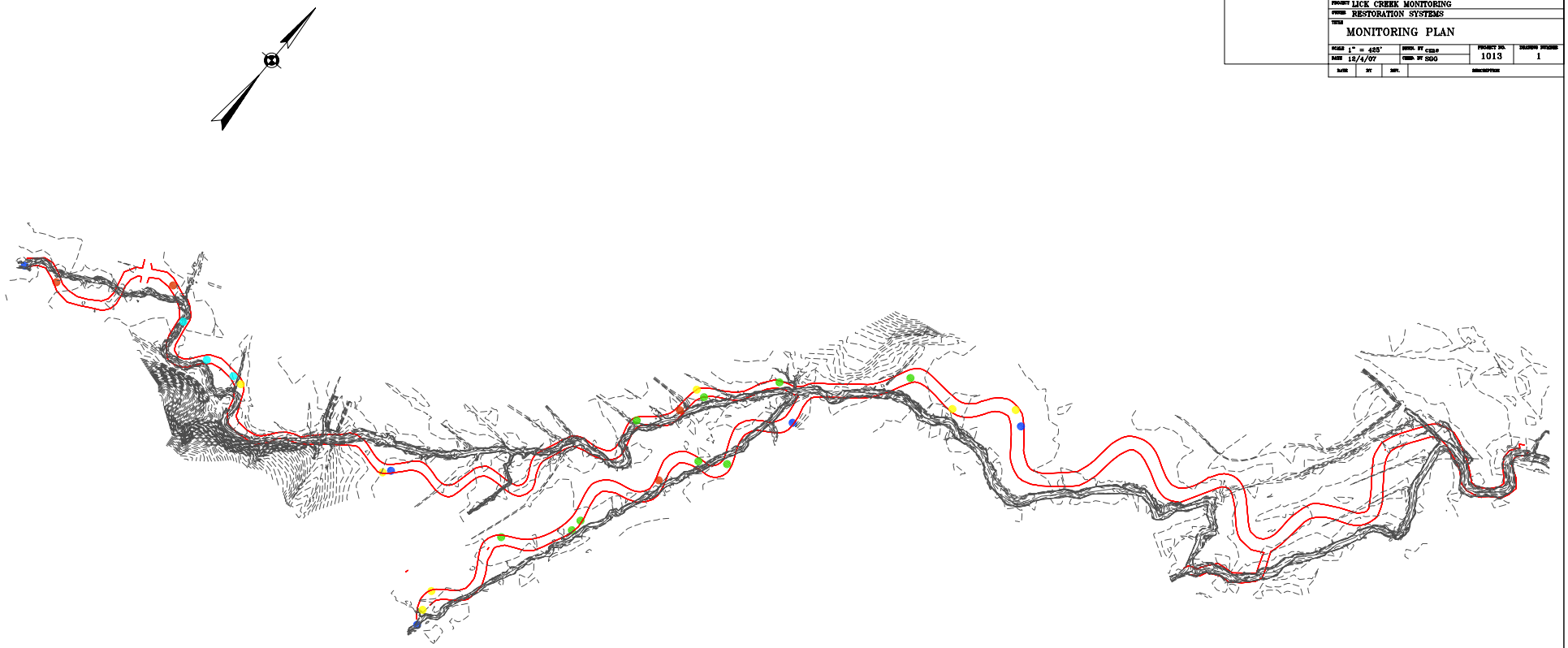
PROJECT LICK CREEK MONITORING
OWNER RESTORATION SYSTEMS
TITLE
MONITORING PLAN

SCALE	1" = 425'	DESIGN BY	CMS	PROJECT NO.	DRAWING NUMBER
DATE	12/4/07	CHECK BY	SGG	1013	1

DATE	BY	REV.	DESCRIPTION



LEGEND

- AS BUILT BANK TOP
- BANK EROSION
- TOE SCOUR
- BED SCOUR
- VEG. IN RIFFLE
- STRUCTURE ISSUE

Projects\1013-LICK\DWG\1013-MONITORING SITE PLAN.DWG

Toe Scour on Lick Creek, STA 23+00 12/03/06
Photo No. 17

Toe Scour on Lick Creek, STA 23+00 11/27/07
Photo No. 18

Bank Erosion at Wallace Branch, STA 10+00 12/03/06
Photo No. 19

Bank Erosion at Wallace Branch, STA 10+00 11/27/07
Photo No. 20

Piping at Log Vane on Lick Creek, STA 29+50 12/03/06
Photo No. 21

Piping at Log Vane on Lick Creek, STA 29+50 11/27/07
Photo No. 22

Piping at Log Vane on Lick Creek, STA 29+50 11/27/07
Photo No. 23

Representative toe scour on outside of bend, Like Creek STA 40+50 11/27/07
Photo No. 24

Loss of Matting, Lick Creek STA 37+50, 11/27/07
Photo No. 25

Photo Station 1

Year 1 Photo No. 26

Year 2 Photo No. 27

Year 2 - 10’ offset from PP1 Photo No. 28

Photo Station 2

Year 1 Photo No. 29

Year 2 Photo No. 30

Year 2 - 10’ offset from PP2 Photo No. 31

Photo Station 3

Year 1 Photo No. 32

Year 2 Photo No. 33

Year 2 - 10’ offset from PP3 Photo No. 34

Photo Station 4

Year 1 Photo No. 35

Year 2 Photo No. 36

Year 2 - 10’ offset from PP4 Photo No. 37

Photo Station 5

Year 1 Photo No. 38

Year 2 Photo No. 39

Year 2 - 10’ offset from PP5 Photo No. 40

Photo Station 6

Year 1 Photo No. 41

Year 2 Photo No. 42

Year 2 - 10’ offset from PP6 Photo No. 43

Photo Station 7

Year 1 Photo No. 44

Year 2 Photo No. 45

Photo Station 8

Year 1 Photo No. 46

Year 2 Photo No. 47

Photo Station 9

Year 1 Photo No. 48

Year 2 Photo No. 49

Year 2 - 10’ offset from PP9 Photo No. 50

Photo Station 10

Year 1 Photo No. 51

Year 2 Photo No. 52

Photo Station 11

Year 1 Photo No. 53

Year 2 Photo No. 54

Year 2 - 10’ offset from PP11 Photo No. 55

Table B1. Visual Morphological Stability Assessment

Lick Creek Stream Restoration Site (D04013-1)

Wallace Branch: Reach 1 3,690 ft

Feature Category	Metric	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performing Mean or Total
A. Riffles	1. Present	25	25	N/A	100%	
	2. Armor stable	1	1	N/A	100%	
	3. Facet grade appears stable	25	25	N/A	100%	
	4. Minimal evidence of embedding/fining	25	25	N/A	100%	
	5. Length appropriate	25	25	N/A	100%	**100%**
B. Pools	1. Present	26	26	N/A	100%	
	2. Sufficently deep	26	26	N/A	100%	
	3. Length appropriate	26	26	N/A	100%	**100%**
C. Thalweg	1. Upstream of meander bend centered	13	13	N/A	100%	
	2. Downstream of meander bend centered	13	13	N/A	100%	**100%**
D. Meanders	1. Outer bend in state of limited erosion	26	26	N/A	100%	
	2. Of those eroding, # w/ concomitant point bar formation	N/A	N/A	N/A	100%	
	3. Apparent Rc within specification	26	26	N/A	100%	
	4. Sufficient floodplain access and relief	25	26	N/A	96%	**99%**
E. Bed General	1. General channel bed agradation areas	N/A	N/A	2/50	99%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting	N/A	N/A	4/130	96%	**98%**
F. Vanes	1. Free of back or arm scour	16	17	N/A	94%	
	2. Height appropriate	17	17	N/A	100%	
	3. Angle and geometry appear appropriate	17	17	N/A	100%	
	4. Free of piping or other structural failures	14	17	N/A	82%	**94%**
G. Wads/Boulders	1. Free of scour	33	33	N/A	100%	
	2. Footing stable	33	33	N/A	100%	**100%**

Table B1. Visual Morphological Stability Assessment

Lick Creek Stream Restoration Site (D04013-1)

Lick Creek: Reach 2 1,870 ft

Feature Category	Metric	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performing Mean or Total
A. Riffles	1. Present	10	11	N/A	91%	
	2. Armor stable	2	2	N/A	100%	
	3. Facet grade appears stable	10	11	N/A	91%	
	4. Minimal evidence of embedding/fining	11	11	N/A	100%	
	5. Length appropriate	10	11	N/A	91%	**95%**
B. Pools	1. Present	10	11	N/A	91%	
	2. Sufficently deep	10	11	N/A	91%	
	3. Length appropriate	10	11	N/A	91%	**91%**
C. Thalweg	1. Upstream of meander bend centered	5	5	N/A	100%	
	2. Downstream of meander bend centered	6	6	N/A	100%	**100%**
D. Meanders	1. Outer bend in state of limited erosion	10	11	N/A	91%	
	2. Of those eroding, # w/ concomitant point bar formation	N/A	N/A	N/A	100%	
	3. Apparent Rc within specification	11	11	N/A	100%	
	4. Sufficient floodplain access and relief	11	11	N/A	100%	**98%**
E. Bed General	1. General channel bed agradation areas	N/A	N/A	2/40	98%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting	N/A	N/A	3/60	97%	**98%**
F. Vanes	1. Free of back or arm scour	12	13	N/A	92%	
	2. Height appropriate	13	13	N/A	100%	
	3. Angle and geometry appear appropriate	13	13	N/A	100%	
	4. Free of piping or other structural failures	12	13	N/A	92%	**96%**
G. Wads/Boulders	1. Free of scour	22	22	N/A	100%	
	2. Footing stable	22	22	N/A	100%	**100%**

Table B1. Visual Morphological Stability Assessment

Lick Creek Stream Restoration Site (D04013-1)

Lick Creek: Reach 3 4,008 ft

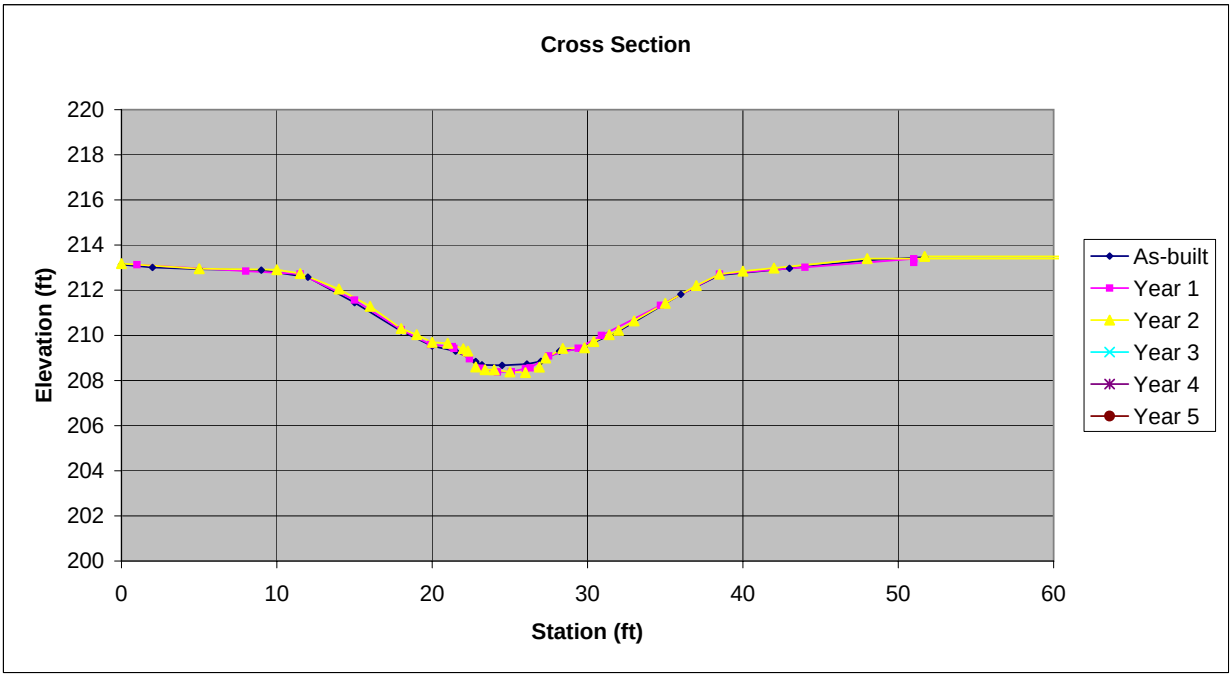
Feature Category	Metric	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performing Mean or Total
A. Riffles	1. Present	17	17	N/A	100%	
	2. Armor stable	1	1	N/A	100%	
	3. Facet grade appears stable	15	17	N/A	88%	
	4. Minimal evidence of embedding/fining	17	17	N/A	100%	
	5. Length appropriate	17	17	N/A	100%	**98%**
B. Pools	1. Present	18	18	N/A	100%	
	2. Sufficently deep	18	18	N/A	100%	
	3. Length appropriate	18	18	N/A	100%	**100%**
C. Thalweg	1. Upstream of meander bend centered	9	9	N/A	100%	
	2. Downstream of meander bend centered	9	9	N/A	100%	**100%**
D. Meanders	1. Outer bend in state of limited erosion	18	18	N/A	100%	
	2. Of those eroding, # w/ concomitant point bar formation	N/A	N/A	N/A	100%	
	3. Apparent Rc within specification	18	18	N/A	100%	
	4. Sufficient floodplain access and relief	18	18	N/A	100%	**100%**
E. Bed General	1. General channel bed agradation areas	N/A	N/A	0/0	100%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting	N/A	N/A	0/0	100%	**100%**
F. Vanes	1. Free of back or arm scour	28	30	N/A	93%	
	2. Height appropriate	30	30	N/A	100%	
	3. Angle and geometry appear appropriate	30	30	N/A	100%	
	4. Free of piping or other structural failures	28	30	N/A	93%	**97%**
G. Wads/Boulders	1. Free of scour	35	36	N/A	97%	
	2. Footing stable	36	36	N/A	100%	**99%**

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 1
Reach 1 - Wallace Branch - Sta 12+83

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/4/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	60.5	Area	63.8	Area	62.7	Area	0.0	Area	0.0	Area	0.0
Bkf W	26.5	Bkf W	27	Bkf W	27	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.3	Dmean	2.4	Dmean	2.3	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	3.9	Dmax	4.3	Dmax	4.4	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	11.6	W/d	11.4	W/d	11.6	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 1
Reach 1 - Wallace Branch - Sta 12+83

As-Built			
Station	FS/BS	Elev.	Desc.
BM	4.65	213.24	IR Lt
HI		217.89	
0	4.75	213.14	GRND
2	4.88	213.01	
5	4.96	212.93	
9	5.00	212.89	
12	5.31	212.58	TOB
15	6.44	211.45	
18	7.70	210.19	
20	8.36	209.53	
21.5	8.59	209.30	
22.8	9.05	208.84	EOW
23.2	9.20	208.69	
24.5	9.22	208.67	
26.1	9.16	208.73	
27	9.04	208.85	EOW
28.2	8.59	209.30	
29.5	8.48	209.41	
32	7.71	210.18	
36	6.07	211.82	HW
38.5	5.22	212.67	TOB
43	4.92	212.97	
48	4.56	213.33	
51.7	4.43	213.46	IP

Year 1			
Station	FS/BS	Elev.	Desc.
BM	5.54	213.24	IR Lt
HI		218.78	
1	5.65	213.13	
8	5.93	212.85	ToB
11.5	6.06	212.72	BKF
15	7.22	211.56	
18	8.53	210.25	
19.9	9.19	209.59	
21.3	9.28	209.50	LEW
21.4	9.36	209.42	
22.4	9.82	208.96	TOE
23.1	10.24	208.54	
24.2	10.40	208.38	
25.1	10.39	208.39	
26	10.25	208.53	TOE
26.3	10.22	208.56	
27.5	9.69	209.09	REW
29.4	9.35	209.43	
30.9	8.78	210.00	BKF
34.7	7.45	211.33	ToB
38.5	6.07	212.71	
44	5.76	213.02	
51	5.39	213.39	IR Rt
51	5.55	213.23	

Year 2			
Station	FS/BS	Elev.	Desc.
BM	5.01	213.24	IR Lt
HI		218.25	
0	5.07	213.18	
5	5.30	212.95	
10	5.34	212.91	
11.5	5.51	212.74	
14	6.20	212.05	
16	6.96	211.29	
18	7.95	210.30	
19	8.22	210.03	
20	8.56	209.69	
21	8.60	209.65	
22	8.84	209.41	
22.3	8.95	209.30	
22.8	9.65	208.60	EOW
23.4	9.77	208.48	
24	9.78	208.47	
25	9.87	208.38	
26	9.90	208.35	
26.9	9.66	208.59	EOW
27.3	9.25	209.00	
28.4	8.83	209.42	
29.8	8.80	209.45	
30.4	8.52	209.73	
31.4	8.22	210.03	
32	8.03	210.22	
33	7.61	210.64	
35	6.83	211.42	
37	6.04	212.21	
38.5	5.54	212.71	
40	5.40	212.85	
42	5.27	212.98	
48	4.85	213.40	
5136	4.80	213.45	
51.7	4.75	213.50	IR Rt

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

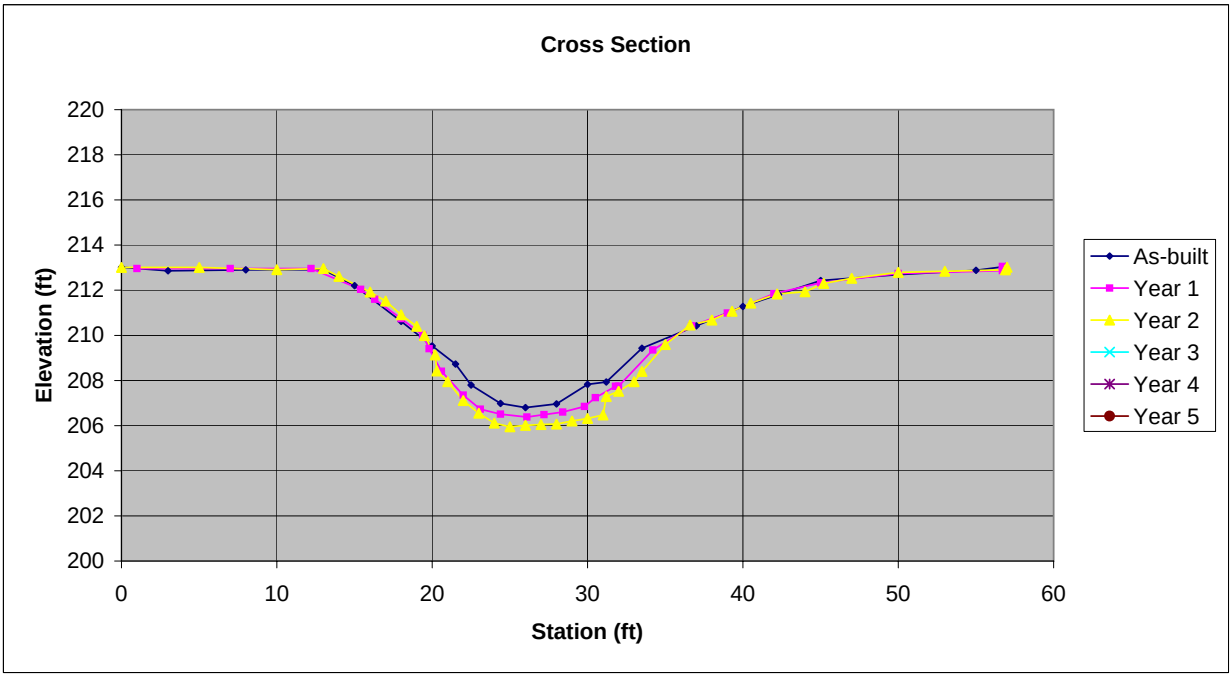
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 2 - Pool
Reach 1 - Wallace Branch - Sta 13+78

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/4/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	69.2	Area	72.3	Area	83.5	Area	0.0	Area	0.0	Area	0.0
Bkf W	27.3	Bkf W	25.7	Bkf W	26.2	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.5	Dmean	2.8	Dmean	3.2	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	5.0	Dmax	5.2	Dmax	5.9	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	10.8	W/d	9.1	W/d	8.2	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 2 - Pool
Reach 1 - Wallace Branch - Sta 13+78

As-Built			
Station	FS/BS	Elev.	Desc.
BM	4.81	213.08	IR Lt
HI		217.89	
0	4.87	213.02	GRND
3	5.03	212.86	
8	4.99	212.90	
13	4.98	212.91	TOB
15	5.69	212.20	
18	7.27	210.62	
20	8.36	209.53	
21.5	9.16	208.73	EOW
22.5	10.09	207.80	
24.4	10.91	206.98	
26	11.09	206.80	
28	10.93	206.96	
30	10.06	207.83	
31.2	9.96	207.93	
33.5	8.46	209.43	
37	7.47	210.42	
40	6.61	211.28	
42.3	6.08	211.81	TOB
45	5.46	212.43	
50	5.20	212.69	
55	5.01	212.88	
56.9	4.84	213.05	

Year 1			
Station	FS/BS	Elev.	Desc.
BM	4.87	213.08	IR Lt
HI		217.95	
1	4.99	212.96	
7	4.99	212.96	
12.2	4.99	212.96	ToB
15.4	5.91	212.04	
16.3	6.35	211.60	BKF
18	7.21	210.74	
19.4	7.95	210.00	
19.8	8.54	209.41	LEW
20.6	9.54	208.41	
22	10.60	207.35	
23.1	11.22	206.73	
24.4	11.44	206.51	
26.1	11.57	206.38	
27.2	11.46	206.49	
28.4	11.35	206.60	
29.8	11.10	206.85	
30.5	10.71	207.24	
31.8	10.21	207.74	
32	10.20	207.75	TOE
34.2	8.60	209.35	REW
36.7	7.53	210.42	
39	6.96	210.99	BKF
42	6.10	211.85	
45	5.62	212.33	ToB
50	5.21	212.74	
56.7	5.08	212.87	
56.7	4.90	213.05	IR Rt

Year 2			
Station	FS/BS	Elev.	Desc.
BM	5.07	213.08	IR Lt
HI		218.15	
0	5.14	213.01	
5	5.14	213.01	
10	5.24	212.91	
13	5.19	212.96	
14	5.54	212.61	
16	6.23	211.92	
17	6.63	211.52	
18	7.24	210.91	
19	7.75	210.40	
19.5	8.16	209.99	
20.2	9.02	209.13	
20.3	9.73	208.42	EOW
21	10.20	207.95	
22	11.04	207.11	
23	11.60	206.55	
24	12.04	206.11	
25	12.20	205.95	
26	12.14	206.01	
27	12.10	206.05	
28	12.08	206.07	
29	11.95	206.20	
30	11.83	206.32	
31	11.68	206.47	
31.2	10.86	207.29	
32	10.63	207.52	
33	10.20	207.95	
33.5	9.75	208.40	EOW
35	8.56	209.59	
36.6	7.69	210.46	
38	7.47	210.68	
39.3	7.08	211.07	
40.5	6.72	211.43	
42.2	6.32	211.83	
44	6.22	211.93	
45.2	5.85	212.30	
47	5.62	212.53	
50	5.36	212.79	
53	5.31	212.84	
56.9	5.25	212.90	
57	5.13	213.02	IR Rt

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

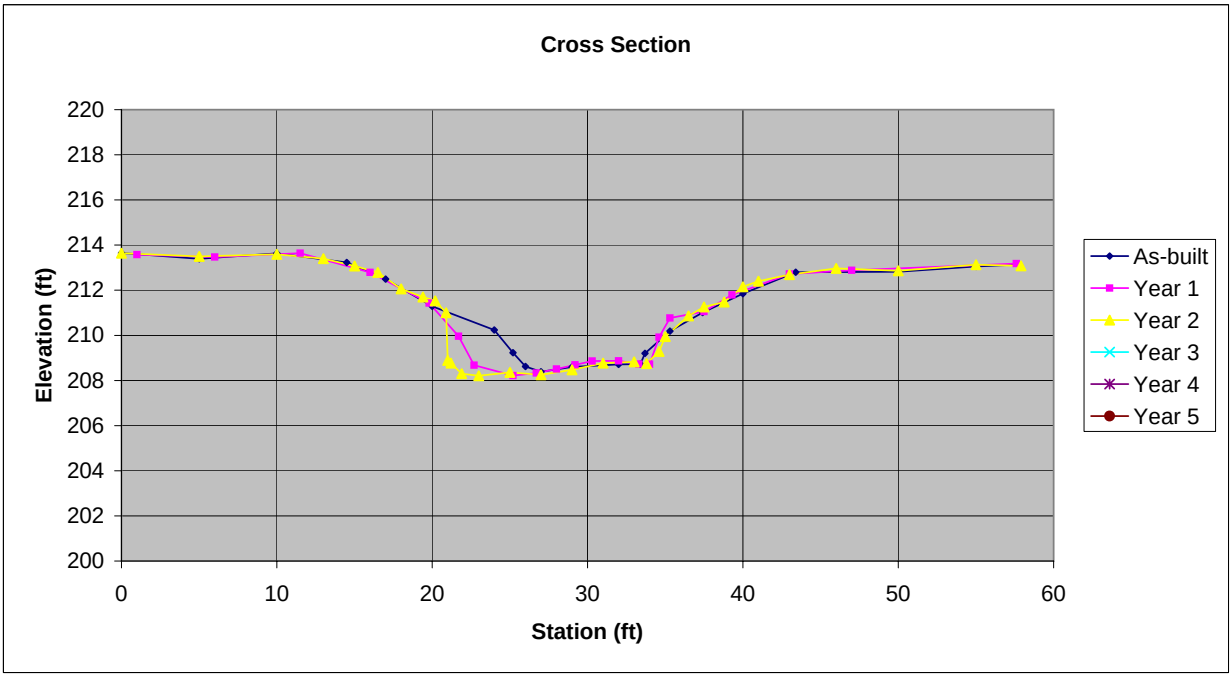
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 3 - Riffle
Reach 2 - Lick Creek - Sta 13+37

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/5/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	64.5	Area	68.0	Area	69.8	Area	0.0	Area	0.0	Area	0.0
Bkf W	28.9	Bkf W	27	Bkf W	26.4	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.2	Dmean	2.5	Dmean	2.6	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	4.4	Dmax	4.5	Dmax	4.5	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	13.0	W/d	10.7	W/d	10.0	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 3 - Riffle
Reach 2 - Lick Creek - Sta 13+37

As-Built			
Station	FS/BS	Elev.	Desc.
BM	4.77	213.72	IR Lt
HI		218.49	
0	4.84	213.65	
5	5.10	213.39	
10	4.86	213.63	
14.5	5.26	213.23	TOB
17	6.00	212.49	
20	7.20	211.29	
24	8.25	210.24	
25.2	9.26	209.23	EOW
26	9.87	208.62	
27	10.10	208.39	
29	9.89	208.60	
32	9.78	208.71	
33.4	9.76	208.73	
33.7	9.29	209.20	EW
35.3	8.30	210.19	
37.4	7.48	211.01	HW
40	6.64	211.85	
43.4	5.69	212.80	TOB
50	5.67	212.82	
55	5.44	213.05	
57.8	5.35	213.14	IP

Year 1			
Station	FS/BS	Elev.	Desc.
BM	4.56	213.72	IR Lt
HI		218.28	
1	4.70	213.58	
6	4.81	213.47	
11.5	4.64	213.64	ToB
16	5.49	212.79	
19.8	6.85	211.43	BKF
21.7	8.32	209.96	LEW
22.7	9.60	208.68	TOE
25.2	10.06	208.22	THL
26.7	9.95	208.33	
28	9.77	208.51	
29.2	9.59	208.69	
30.3	9.42	208.86	
32	9.41	208.87	
33.3	9.55	208.73	
34	9.56	208.72	TOE
34.6	8.36	209.92	REW
35.3	7.51	210.77	
37.5	7.23	211.05	
39.3	6.49	211.79	BKF
43	5.56	212.72	ToB
47	5.40	212.88	
57.6	5.10	213.18	Stake Rt

Year 2			
Station	FS/BS	Elev.	Desc.
BM	5.16	213.72	IR Lt
HI		218.88	
0	5.24	213.64	
5	5.38	213.50	
10	5.29	213.59	
13	5.48	213.40	
15	5.81	213.07	
16.5	6.09	212.79	
18	6.82	212.06	
19.4	7.18	211.70	
20.2	7.35	211.53	
20.9	7.88	211.00	
21	9.99	208.89	
21.2	10.11	208.77	EOW
21.9	10.58	208.30	
23	10.67	208.21	
25	10.52	208.36	
27	10.63	208.25	
29	10.41	208.47	
31	10.11	208.77	EOW
33	10.05	208.83	
33.8	10.13	208.75	
34.6	9.59	209.29	
35	8.93	209.95	
36.5	8.02	210.86	
37.5	7.62	211.26	
38.8	7.40	211.48	
40	6.73	212.15	
41	6.48	212.40	
43	6.19	212.69	
46	5.91	212.97	
50	6.02	212.86	
55	5.75	213.13	
57.9	5.80	213.08	GROUND

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

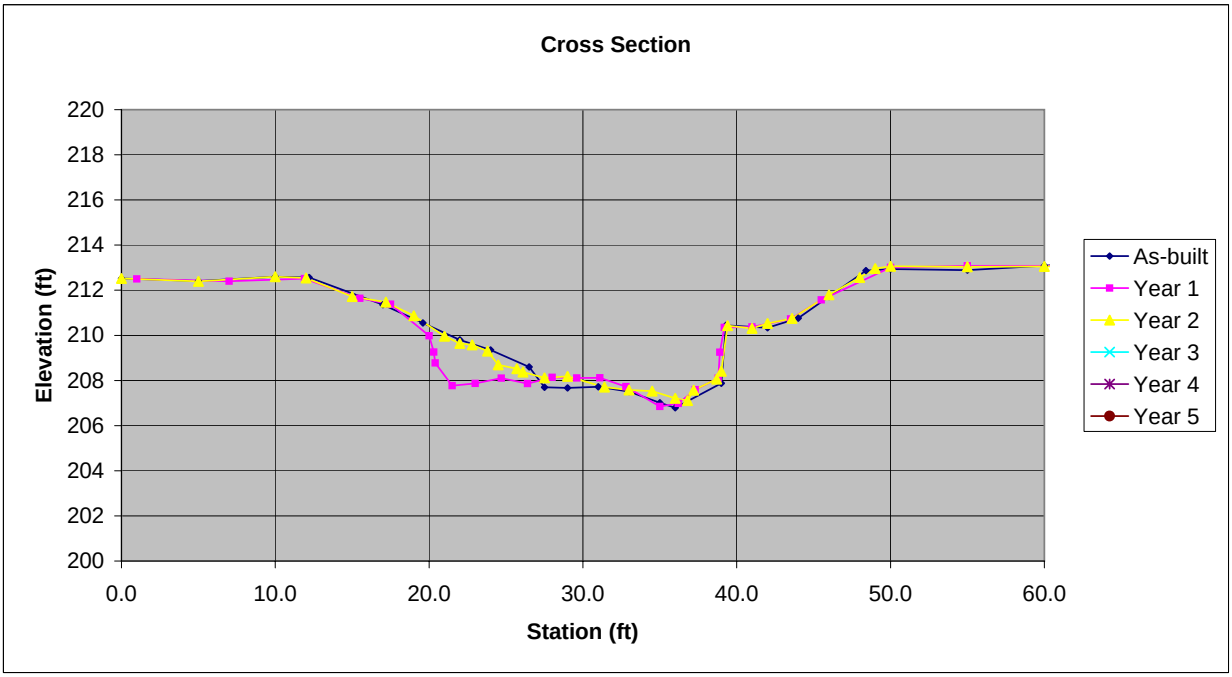
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 4 - Pool
Reach 2 - Lick Creek - Sta 15+91

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/5/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	105.2	Area	109.7	Area	102.9	Area	0.0	Area	0.0	Area	0.0
Bkf W	36.2	Bkf W	38.1	Bkf W	36	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.9	Dmean	2.9	Dmean	2.9	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	5.8	Dmax	5.7	Dmax	5.4	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	12.5	W/d	13.2	W/d	12.6	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 4 - Pool
Reach 2 - Lick Creek - Sta 15+91

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.27	212.56	IR Lt
HI		217.83	
0.0	5.31	212.52	
5.0	5.42	212.41	
10.0	5.23	212.60	
12.2	5.27	212.56	TOB
17.0	6.47	211.36	
19.6	7.28	210.55	HW
22.0	8.03	209.80	
24.0	8.48	209.35	
26.5	9.23	208.60	EW
27.5	10.13	207.70	
29.0	10.16	207.67	
31.0	10.11	207.72	
33.0	10.32	207.51	
35.0	10.82	207.01	
36.0	11.04	206.79	
39.0	9.95	207.88	
39.3	7.39	210.44	
42.0	7.49	210.34	
44.0	7.07	210.76	
46.0	6.11	211.72	
48.4	4.96	212.87	TOB
50.0	4.89	212.94	
55.0	4.94	212.89	
60.0	4.74	213.09	
63.2	4.61	213.22	IP RT

Year 1			
Station	FS/BS	Elev.	Desc.
BM	5.80	212.56	IR Lt
HI		218.36	
1.0	5.86	212.50	
7.0	5.96	212.40	
11.9	5.85	212.51	ToB
15.5	6.72	211.64	BKF
17.5	6.98	211.38	
20.0	8.38	209.98	
20.3	9.10	209.26	LEW
20.4	9.58	208.78	TOE
21.5	10.59	207.77	
23.0	10.49	207.87	
24.7	10.26	208.10	
26.4	10.50	207.86	
28.0	10.22	208.14	
29.6	10.25	208.11	
31.1	10.24	208.12	
32.8	10.63	207.73	
35.0	11.51	206.85	
36.2	11.38	206.98	
37.3	10.77	207.59	
38.8	10.26	208.10	TOE
38.9	9.11	209.25	REW
39.2	8.01	210.35	
41.0	7.99	210.37	
43.5	7.63	210.73	
45.5	6.79	211.57	BKF
50.0	5.35	213.01	ToB
55.0	5.28	213.08	
61.0	5.28	213.08	
63.0	5.25	213.11	
63.0	5.16	213.20	IR Rt

Year 2			
Station	FS/BS	Elev.	Desc.
BM	6.00	212.56	IR Lt
HI		218.56	
0	6.04	212.52	
5	6.17	212.39	
10	5.96	212.60	
12	6.02	212.54	
15	6.84	211.72	
17.2	7.09	211.47	
19	7.69	210.87	
21	8.60	209.96	
22	8.92	209.64	
22.8	8.98	209.58	
23.8	9.26	209.30	
24.5	9.87	208.69	
25.7	10.04	208.52	
26.1	10.19	208.37	EOW
27.5	10.44	208.12	
29	10.38	208.18	
31.4	10.85	207.71	
33	10.98	207.58	
34.5	11.03	207.53	
36	11.35	207.21	
36.8	11.45	207.11	
37.2	10.99	207.57	
38.7	10.50	208.06	
39	10.15	208.41	EOW
39.4	8.13	210.43	
41	8.25	210.31	
42	8.03	210.53	
43.6	7.81	210.75	
46	6.76	211.80	
48	6.00	212.56	
49	5.60	212.96	
50	5.50	213.06	
55	5.52	213.04	
60	5.51	213.05	
63.3	5.49	213.07	GROUND

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

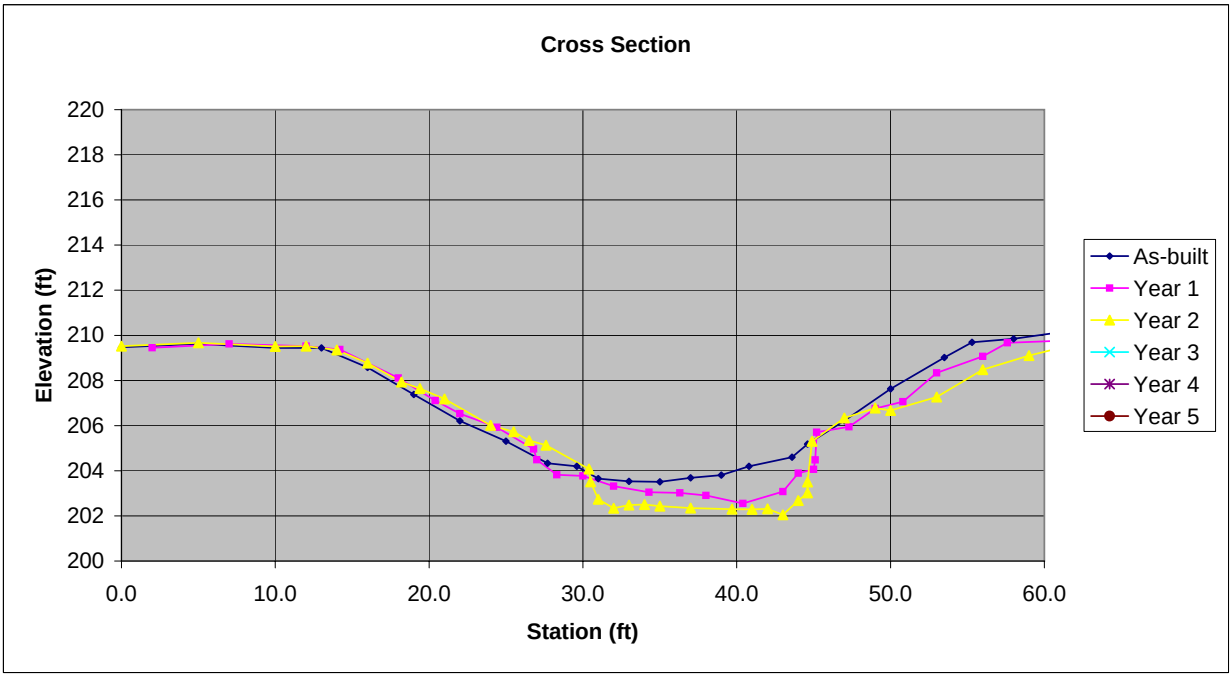
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 5 - Riffle
Reach 3 - Lick Creek - Sta 14+41.5

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/5/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	150.3	Area	162.1	Area	160.2	Area	0.0	Area	0.0	Area	0.0
Bkf W	42.3	Bkf W	43.4	Bkf W	44.5	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	3.6	Dmean	3.7	Dmean	3.6	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	5.9	Dmax	6.8	Dmax	7.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	11.9	W/d	11.6	W/d	12.4	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 5 - Riffle
Reach 3 - Lick Creek - Sta 14+41.5

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.13	209.56	IR Lt
HI		214.69	
0.0	5.22	209.47	GRND
5.0	5.07	209.62	
10.0	5.25	209.44	
13.0	5.25	209.44	TOB
16.0	6.11	208.58	
19.0	7.31	207.38	
22.0	8.48	206.21	
25.0	9.38	205.31	
27.7	10.36	204.33	
29.6	10.49	204.20	EOW
31.0	11.04	203.65	
33.0	11.16	203.53	
35.0	11.18	203.51	
37.0	11.00	203.69	
39.0	10.88	203.81	
40.8	10.49	204.20	EOW
43.6	10.09	204.60	
44.6	9.51	205.18	
47.0	8.47	206.22	
50.0	7.06	207.63	
53.5	5.67	209.02	
55.3	5.00	209.69	TOB
58.0	4.84	209.85	
62.0	4.46	210.23	
67.0	4.68	210.01	
68.7	4.55	210.14	
68.7	4.46	210.23	IR RT

Year 1			
Station	FS/BS	Elev.	Desc.
BM	4.72	209.56	IR Lt
HI		214.28	
2.0	4.83	209.45	
7.0	4.66	209.62	
12.0	4.76	209.52	
14.2	4.91	209.37	ToB
18.0	6.17	208.11	
20.4	7.17	207.11	BKF
22.0	7.75	206.53	
24.4	8.35	205.93	
26.8	9.32	204.96	
27.0	9.79	204.49	LEW
28.3	10.46	203.82	TOE
30.0	10.51	203.77	
32.0	10.96	203.32	
34.3	11.23	203.05	
36.3	11.26	203.02	
38.0	11.37	202.91	
40.4	11.73	202.55	
43.0	11.20	203.08	
44.0	10.39	203.89	
45.0	10.22	204.06	
45.1	9.80	204.48	REW
45.2	8.57	205.71	BOULDER
47.3	8.33	205.95	
49.0	7.52	206.76	
50.8	7.22	207.06	
53.0	5.94	208.34	BKF
56.0	5.21	209.07	
57.6	4.61	209.67	ToB
63.0	4.47	209.81	
69.0	4.11	210.17	
69.0	4.05	210.23	IR Rt

Year 2			
Station	FS/BS	Elev.	Desc.
BM	5.18	209.56	IR Lt
HI		214.74	
0	5.22	209.52	
5	5.07	209.67	
10	5.23	209.51	
12	5.22	209.52	
14	5.39	209.35	
16	5.97	208.77	
18.2	6.81	207.93	
19.4	7.10	207.64	
21	7.56	207.18	
24	8.73	206.01	
25.5	9.01	205.73	
26.5	9.40	205.34	
27.6	9.61	205.13	
30.4	10.66	204.08	
30.5	11.23	203.51	EOW
31	12.00	202.74	
32	12.40	202.34	
33	12.26	202.48	
34	12.24	202.50	
35	12.31	202.43	
37	12.39	202.35	
39.7	12.44	202.30	
41	12.45	202.29	
42	12.43	202.31	
43	12.69	202.05	
44	12.06	202.68	
44.6	11.72	203.02	EOW
44.6	11.24	203.50	ROCK
44.9	9.44	205.30	
47	8.40	206.34	
49	7.96	206.78	
50	8.07	206.67	
53	7.47	207.27	
56	6.26	208.48	
59	5.64	209.10	
62	5.13	209.61	
66	4.70	210.04	
68.9	4.52	210.22	IR Rt

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

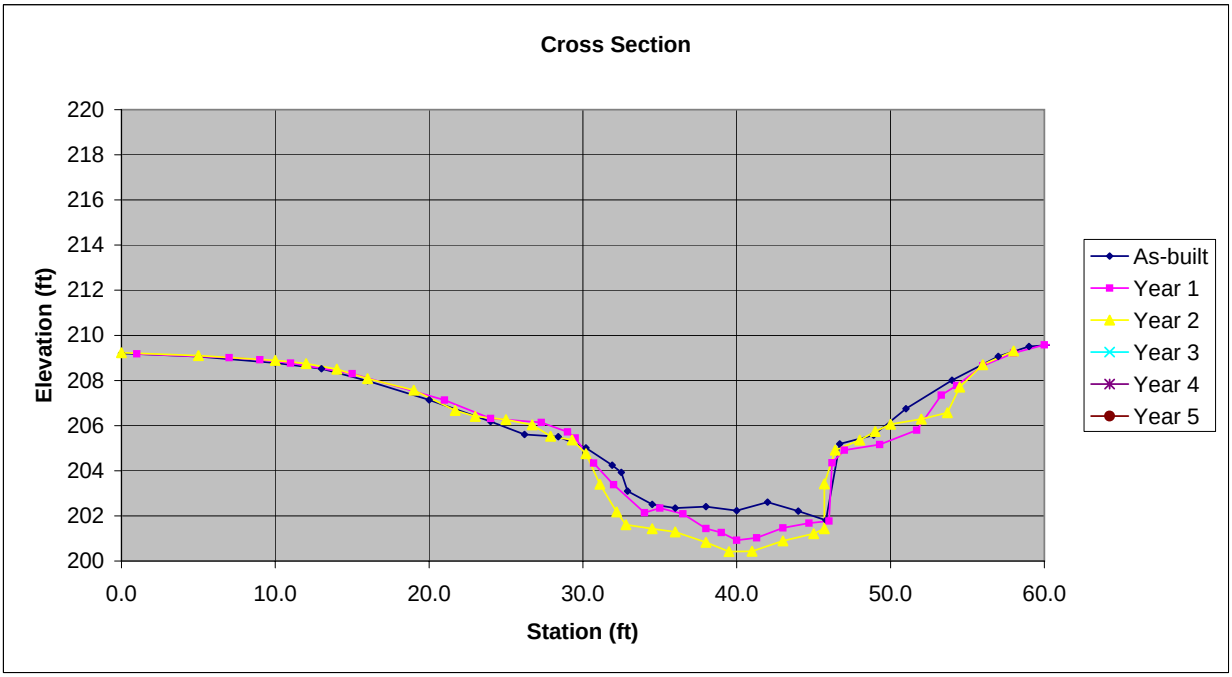
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 6 - Pool
Reach 3 - Lick Creek - Sta 15+73.5

Year 1

Year 2

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/5/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	140.7	Area	164.1	Area	170.9	Area	0.0	Area	0.0	Area	0.0
Bkf W	43	Bkf W	45	Bkf W	43	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	3.3	Dmean	3.6	Dmean	4.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	6.7	Dmax	7.8	Dmax	8.3	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	13.1	W/d	12.3	W/d	10.8	W/d	0.0	W/d	0.0	W/d	0.0

Lick Creek Stream Restoration Site
Lee County, NC
Cross Section No. 6 - Pool
Reach 3 - Lick Creek - Sta 15+73.5

As-Built

Station	FS/BS	Elev.	Desc.
BM	5.40	209.31	IR Lt
HI		214.71	
0.0	5.51	209.20	GRND
5.0	5.65	209.06	
10.0	5.93	208.78	
13.0	6.19	208.52	TOB
16.0	6.73	207.98	
20.0	7.57	207.14	
24.0	8.53	206.18	
26.2	9.10	205.61	
28.4	9.20	205.51	
30.2	9.70	205.01	
31.9	10.46	204.25	
32.5	10.78	203.93	EOW
32.9	11.61	203.10	
34.5	12.20	202.51	
36.0	12.36	202.35	
38.0	12.30	202.41	
40.0	12.48	202.23	
42.0	12.10	202.61	
44.0	12.50	202.21	
45.8	12.90	201.81	
46.7	9.52	205.19	
48.9	9.13	205.58	
51.0	7.96	206.75	
54.0	6.70	208.01	
56.0	6.00	208.71	
57.0	5.64	209.07	TOB
59.0	5.20	209.51	
62.0	5.06	209.65	
66.0	4.72	209.99	
70.9	4.68	210.03	
70.9	4.56	210.15	IR RT

Year 1

Station	FS/BS	Elev.	Desc.
BM	4.77	209.31	IR Lt
HI		214.08	
1.0	4.90	209.18	
7.0	5.07	209.01	
9.0	5.16	208.92	ToB
11.0	5.31	208.77	
15.0	5.78	208.30	
21.0	6.95	207.13	BKF
24.0	7.76	206.32	
27.3	7.94	206.14	
29.0	8.36	205.72	
29.5	8.63	205.45	
30.7	9.74	204.34	LEW
32.0	10.70	203.38	
34.0	11.94	202.14	TOE
35.0	11.73	202.35	
36.5	11.99	202.09	
38.0	12.64	201.44	
39.0	12.82	201.26	
40.0	13.16	200.92	
41.3	13.05	201.03	
43.0	12.61	201.47	
44.7	12.40	201.68	
46.0	12.31	201.77	REW
46.2	9.73	204.35	
47.0	9.17	204.91	
49.3	8.92	205.16	
51.7	8.28	205.80	
53.3	6.73	207.35	
54.3	6.30	207.78	BKF
56.0	5.43	208.65	
58.0	4.86	209.22	ToB
60.0	4.50	209.58	
64.0	4.43	209.65	
68.0	3.96	210.12	IR Rt
71.0	4.12	209.96	

Year 2

Station	FS/BS	Elev.	Desc.
BM	5.87	209.31	IR Lt
HI		215.18	
0	5.95	209.23	
5	6.08	209.10	
10	6.29	208.89	
12	6.43	208.75	
14	6.68	208.50	
16	7.10	208.08	
19	7.61	207.57	
21.7	8.51	206.67	
23	8.77	206.41	
25	8.91	206.27	
26.7	9.15	206.03	
27.9	9.65	205.53	
29.3	9.81	205.37	
30.2	10.42	204.76	
31.1	11.78	203.40	EOW
32.2	13.00	202.18	
32.8	13.57	201.61	
34.5	13.75	201.43	
36	13.89	201.29	
38	14.35	200.83	
39.5	14.76	200.42	
41	14.75	200.43	
43	14.29	200.89	
45	13.97	201.21	
45.7	13.75	201.43	
45.7	11.76	203.42	EOW
46.4	10.27	204.91	LOG
48	9.82	205.36	
49	9.44	205.74	
50	9.12	206.06	
52	8.89	206.29	
53.7	8.61	206.57	
54.5	7.47	207.71	
56	6.48	208.70	
58	5.87	209.31	
60	5.59	209.59	
61.3	5.59	209.59	
62	5.94	209.24	
65	5.96	209.22	
67	5.38	209.80	
70.9	5.23	209.95	GROUND

Year 3

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

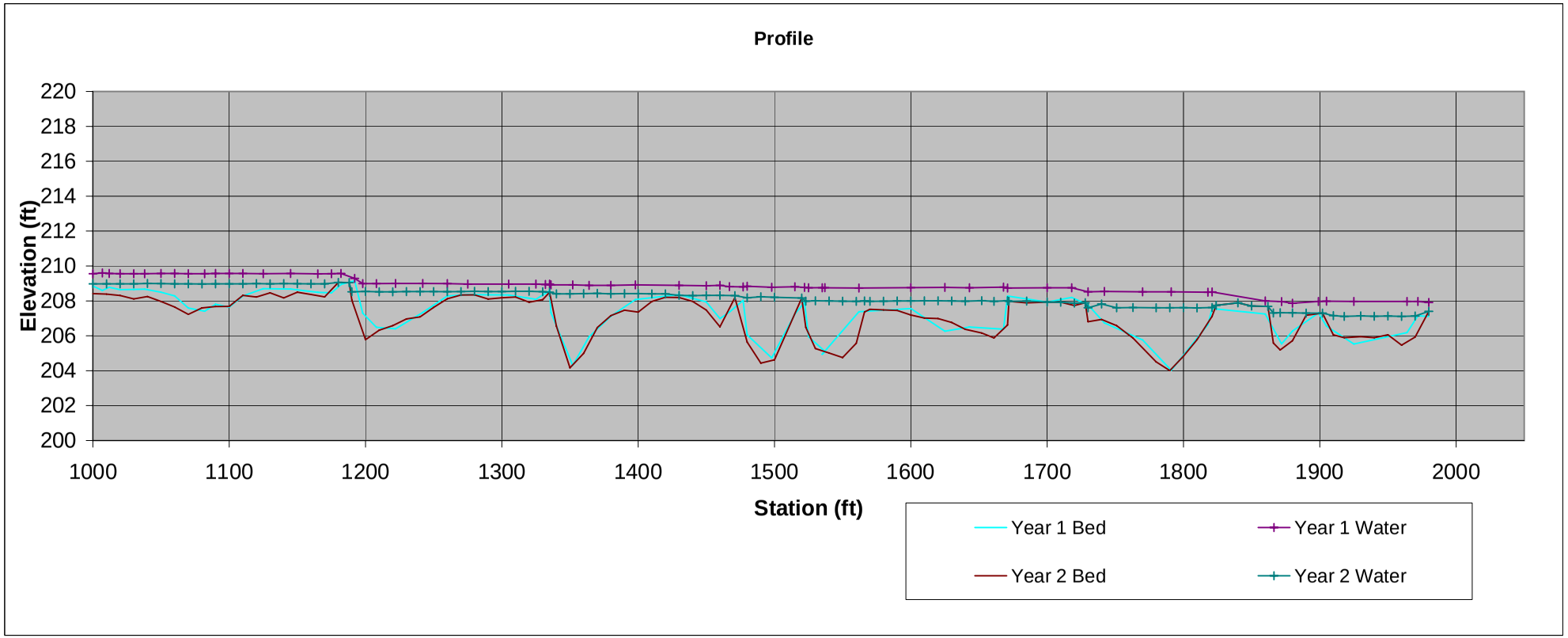
Year 4

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 1 - Wallace Branch



Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 1 - Wallace Branch

Year 2

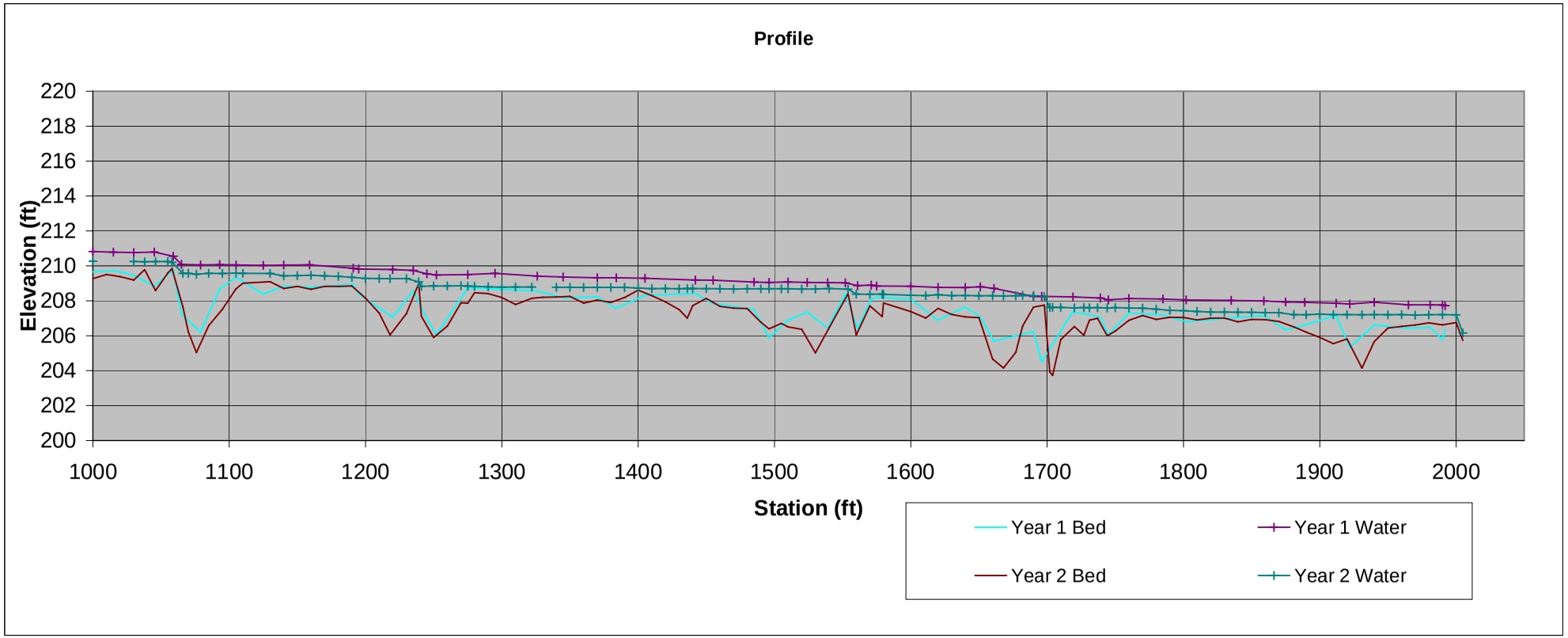
HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
218.26	1000	9.84	208.42	0.56	208.98			Begin Profile
218.26	1010	9.87	208.39	0.59	208.98			
218.26	1020	9.95	208.31	0.67	208.98			
218.26	1030	10.15	208.11	0.87	208.98			
218.26	1040	10.01	208.25	0.75	209.00			
218.26	1050	10.29	207.97	1.02	208.99			
218.26	1060	10.61	207.65	1.33	208.98			
218.26	1070	11.03	207.23	1.75	208.98			
218.26	1080	10.66	207.60	1.37	208.97			
218.26	1090	10.58	207.68	1.30	208.98			
218.26	1100	10.58	207.69	1.29	208.98			
218.26	1110	9.95	208.32	0.66	208.98			
218.26	1120	10.04	208.22	0.77	208.99			
218.26	1130	9.80	208.46	0.52	208.98			
218.26	1140	10.09	208.17	0.82	208.99			
218.26	1150	9.77	208.50	0.49	208.99			
218.26	1160	9.90	208.37	0.61	208.98			
218.26	1170	10.03	208.23	0.75	208.98			
218.26	1180	9.20	209.06	0.00	209.06			
218.26	1188	9.21	209.05	0.00	209.05			Log Vane INV
218.26	1190	10.22	208.04	0.48	208.52			
218.26	1200	12.48	205.78	2.76	208.54			
218.26	1210	11.94	206.32	2.20	208.52			
218.26	1220	11.68	206.58	1.94	208.52			
217.81	1230	10.84	206.97	1.57	208.54			
217.81	1240	10.72	207.09	1.45	208.54			
217.81	1250	10.18	207.63	0.91	208.54			
217.81	1260	9.69	208.12	0.41	208.53			
217.81	1270	9.47	208.34	0.20	208.54			
217.81	1280	9.46	208.35	0.20	208.55			
217.81	1290	9.70	208.11	0.43	208.54			
217.81	1300	9.63	208.18	0.36	208.54			
217.81	1310	9.58	208.23	0.32	208.55			
217.81	1320	9.88	207.93	0.62	208.55			
217.81	1330	9.74	208.07	0.46	208.53			
217.81	1335	9.31	208.50	0.00	208.50			Log Vane INV
217.81	1340	11.25	206.56	1.85	208.41			
217.81	1350	13.64	204.17	4.24	208.41			
217.81	1360	12.81	205.00	3.42	208.42			
217.81	1370	11.33	206.48	1.96	208.44			
217.81	1380	10.65	207.16	1.25	208.41			
217.81	1390	10.34	207.47	0.95	208.42			
217.81	1400	10.45	207.36	1.06	208.42			
217.81	1410	9.84	207.97	0.44	208.41			
217.81	1420	9.60	208.21	0.20	208.41			
217.81	1430	9.61	208.20	0.12	208.32			
217.81	1440	9.84	207.97	0.34	208.31			
217.81	1450	10.33	207.48	0.84	208.32			
217.81	1460	11.29	206.52	1.80	208.32			
217.81	1471	9.62	208.19	0.12	208.31			Log Vane INV
217.81	1480	12.17	205.64	2.54	208.18			
217.81	1490	13.37	204.44	3.80	208.24			
217.81	1500	13.18	204.63	3.58	208.21			
217.28	1520	9.11	208.17	0.00	208.17			Rock Cross Vane INV
217.28	1523	10.79	206.49	1.50	207.99			
217.28	1530	12.01	205.27	2.74	208.01			
217.28	1540	12.26	205.02	2.98	208.00			
217.28	1550	12.52	204.76	3.23	207.99			
217.28	1560	11.70	205.58	2.40	207.98			
217.28	1566	9.91	207.37	0.63	208.00			
217.28	1570	9.76	207.52	0.46	207.98			
217.28	1580	9.79	207.49	0.50	207.99			
217.28	1590	9.82	207.46	0.54	208.00			
217.28	1600	10.08	207.20	0.80	208.00			
217.28	1610	10.26	207.02	0.99	208.01			
217.28	1620	10.29	206.99	1.02	208.01			
217.28	1630	10.52	206.76	1.24	208.00			

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 1 - Wallace Branch

Year 2

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
217.28	1640	10.90	206.38	1.61	207.99			
217.28	1652	11.12	206.16	1.85	208.01			
217.28	1661	11.40	205.88	2.10	207.98			
217.28	1671	10.66	206.62	1.40	208.02			
217.28	1672	9.30	207.98	0.00	207.98			
217.28	1685	9.39	207.89	0.10	207.99			
217.28	1700	9.34	207.94	0.00	207.94			
217.28	1710	9.35	207.93	0.00	207.93			
217.28	1720	9.54	207.74	0.14	207.88			
217.28	1728	9.38	207.90	0.00	207.90			
217.28	1730	10.47	206.81	0.80	207.61			
217.28	1740	10.34	206.94	0.89	207.83			
217.28	1751	10.69	206.59	1.02	207.61			
217.28	1763	11.41	205.87	1.75	207.62			
217.28	1780	12.77	204.51	3.10	207.61			
217.28	1790	13.27	204.01	3.60	207.61			
217.28	1800	12.44	204.84	2.78	207.62			
217.25	1810	11.47	205.78	1.82	207.60			
217.25	1821	10.13	207.12	0.50	207.62			
217.25	1824	9.51	207.74	0.00	207.74			
217.25	1840	9.36	207.89	0.00	207.89			
217.25	1850	9.54	207.71	0.00	207.71			
217.25	1862	9.57	207.69	0.00	207.69			
217.25	1866	11.66	205.59	1.72	207.31			
217.25	1871	12.06	205.19	2.13	207.32			
217.25	1880	11.54	205.72	1.60	207.32			
217.25	1890	10.07	207.18	0.12	207.30			
217.25	1902	9.95	207.30	0.00	207.30			Log Vane INV
217.25	1910	11.20	206.06	1.10	207.16			
217.25	1918	11.36	205.89	1.22	207.11			
217.25	1930	11.30	205.95	1.19	207.14			
217.25	1940	11.36	205.89	1.23	207.12			
217.25	1950	11.19	206.06	1.07	207.13			
217.25	1960	11.79	205.47	1.65	207.12			
217.25	1970	11.32	205.93	1.20	207.13			
217.25	1980	9.85	207.40	0.00	207.40			

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 2 - Lick Creek



Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 2 - Lick Creek

Year 2

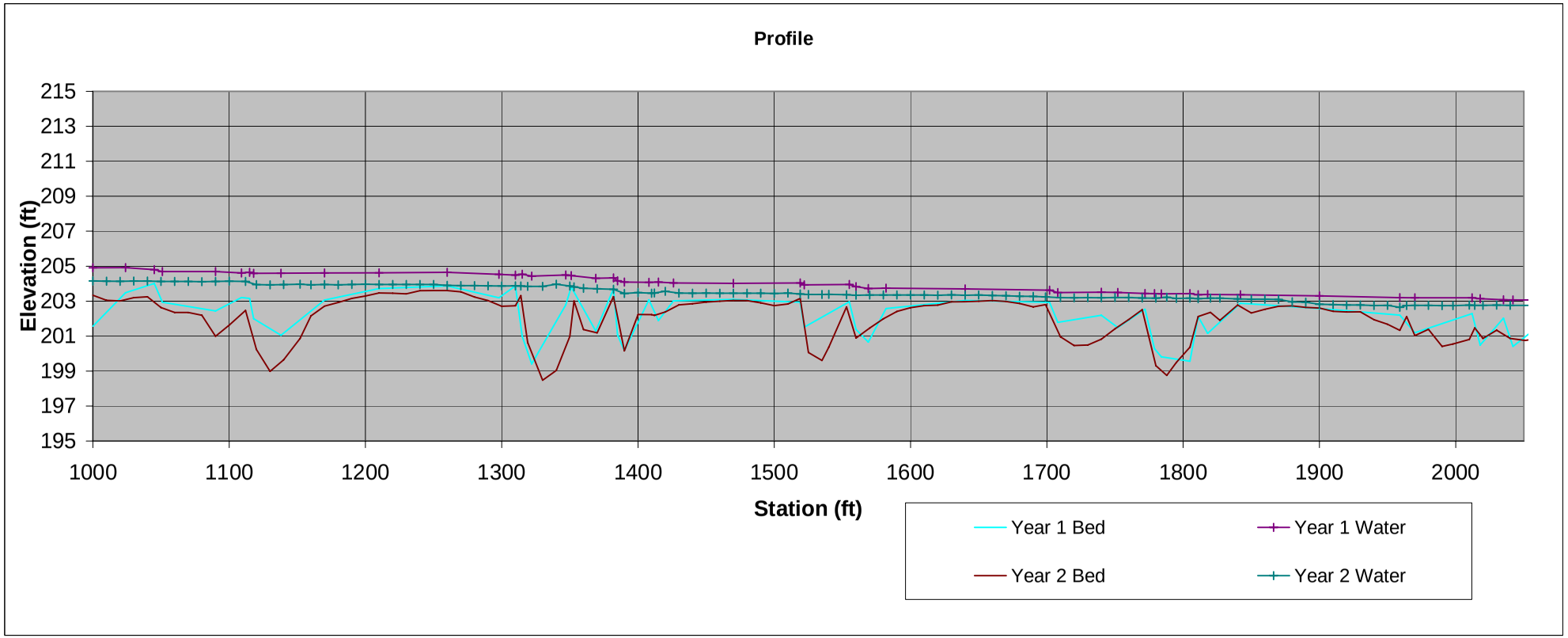
HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
218.74	1000	9.47	209.27	1.00	210.27			
218.74	1010	9.23	209.51					
218.74	1020	9.35	209.39					
218.74	1030	9.55	209.19	1.07	210.26			
218.74	1038	8.95	209.79	0.45	210.24			
218.74	1046	10.15	208.59	1.66	210.25			
218.74	1055	9.15	209.59	0.66	210.25			
218.74	1058	8.89	209.85	0.36	210.21			Rock Cross Vane INV
218.74	1066	11.08	207.66	1.92	209.58			
218.74	1070	12.51	206.23	3.35	209.58			
218.74	1076	13.70	205.04	4.49	209.53			
218.74	1085	12.16	206.58	3.00	209.58			
218.74	1095	11.22	207.52	2.05	209.57			
218.74	1105	10.05	208.69	0.90	209.59			
218.74	1110	9.73	209.01	0.57	209.58			
218.74	1130	9.64	209.10	0.47	209.57			
218.74	1140	10.03	208.71	0.72	209.43			
218.74	1150	9.91	208.83	0.62	209.45			
218.74	1160	10.08	208.66	0.81	209.47			
218.74	1170	9.91	208.83	0.60	209.43			
218.74	1180	9.91	208.83	0.57	209.40			
218.74	1190	9.89	208.85	0.50	209.35			
218.74	1200	10.59	208.15	1.13	209.28			
218.74	1210	11.44	207.30	1.98	209.28			
218.74	1218	12.69	206.05	3.22	209.27			
218.74	1230	11.47	207.27	2.01	209.28			
218.74	1239	9.75	208.99	0.10	209.09			Log Vane INV
218.74	1241	11.62	207.12	1.72	208.84			
218.74	1250	12.84	205.90	2.95	208.85			
218.74	1260	12.19	206.55	2.30	208.85			
218.74	1270	10.85	207.89	0.98	208.87			
218.64	1275	10.78	207.86	0.98	208.84			
218.64	1280	10.17	208.47	0.36	208.83			
218.64	1290	10.22	208.42	0.38	208.80			
218.64	1300	10.45	208.19	0.60	208.79			
218.64	1310	10.85	207.79	1.00	208.79			
218.64	1322	10.50	208.14	0.65	208.79			
218.64	1330	10.43	208.21					
218.64	1340	10.42	208.22	0.56	208.78			
218.64	1350	10.38	208.26	0.52	208.78			
218.64	1360	10.77	207.87	0.90	208.77			
218.64	1370	10.59	208.05	0.72	208.77			
218.64	1380	10.73	207.91	0.86	208.77			
218.64	1390	10.45	208.19	0.58	208.77			
218.64	1400	10.03	208.61	0.12	208.73			
218.64	1410	10.34	208.30	0.40	208.70			
218.64	1420	10.70	207.94	0.76	208.70			
218.64	1430	11.14	207.50	1.19	208.69			
218.64	1436	11.62	207.02	1.69	208.71			
218.64	1440	10.91	207.73	0.98	208.71			
218.64	1450	10.50	208.14	0.56	208.70			
218.64	1460	10.96	207.68	1.01	208.69			
218.64	1470	11.06	207.58	1.10	208.68			
218.64	1480	11.08	207.56	1.13	208.69			
218.64	1490	11.86	206.78	1.91	208.69			
218.64	1496	12.24	206.40	2.29	208.69			
218.64	1505	11.93	206.71	1.98	208.69			
218.64	1510	12.13	206.51	2.18	208.69			
218.64	1520	12.27	206.37	2.31	208.68			
218.64	1530	13.62	205.02	3.66	208.68			
218.64	1540	12.19	206.45	2.26	208.71			
218.64	1554	10.23	208.41	0.26	208.67			Rock Cross Vane INV
218.64	1560	12.59	206.05	2.34	208.39			
218.64	1570	10.93	207.71	0.67	208.38			
218.64	1579	11.54	207.10	1.29	208.39			
218.64	1580	10.76	207.88	0.49	208.37			
218.64	1600	11.25	207.39	0.93	208.32			

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 2 - Lick Creek

Year 2

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
218.64	1611	11.62	207.02	1.28	208.30			
218.64	1620	11.07	207.57	0.78	208.35			
218.64	1630	11.42	207.22	1.08	208.30			
218.64	1640	11.56	207.08	1.23	208.31			
218.64	1650	11.60	207.04	1.25	208.29			
218.64	1660	13.97	204.67	3.62	208.29			
216.78	1668	12.62	204.16	4.12	208.28			
216.78	1677	11.73	205.05	3.24	208.29			
216.78	1682	10.23	206.55	1.76	208.31			
216.78	1690	9.14	207.64	0.65	208.29			
216.78	1698	9.02	207.76	0.49	208.25			Log Vane INV
216.78	1702	12.86	203.92	3.70	207.62			
216.78	1704	13.05	203.73	3.89	207.62			
216.78	1710	11.01	205.77	1.85	207.62			
216.78	1720	10.25	206.53	1.07	207.60			
216.78	1727	10.75	206.03	1.59	207.62			
216.78	1731	9.89	206.89	0.71	207.60			
216.78	1737	9.78	207.00	0.61	207.61			Log Vane INV
216.78	1744	10.78	206.00	1.59	207.59			
216.78	1750	10.51	206.27	1.34	207.61			
216.78	1760	9.89	206.89	0.70	207.59			
216.78	1770	9.62	207.16	0.42	207.58			
216.78	1780	9.85	206.93	0.59	207.52			
216.78	1790	9.72	207.06	0.40	207.46			
216.78	1800	9.73	207.05	0.39	207.44			
216.78	1810	9.88	206.90	0.49	207.39			
216.78	1820	9.77	207.01	0.35	207.36			
216.78	1830	9.77	207.01	0.34	207.35			
216.78	1840	9.98	206.80	0.55	207.35			
216.78	1850	9.85	206.93	0.41	207.34			
216.78	1860	9.86	206.92	0.41	207.33			
216.78	1870	9.96	206.82	0.50	207.32			
216.78	1881	10.27	206.51	0.70	207.21			
216.78	1890	10.57	206.21	0.99	207.20			
216.78	1900	10.88	205.90	1.34	207.24			
216.78	1910	11.23	205.55	1.66	207.21			
216.78	1920	10.96	205.82	1.39	207.21			
218.57	1931	14.42	204.15	3.05	207.20			
218.57	1940	12.91	205.67	1.54	207.21			
218.57	1950	12.13	206.44	0.76	207.20			
218.57	1960	12.04	206.54	0.67	207.21			
218.57	1970	11.96	206.61	0.57	207.18			
218.57	1980	11.83	206.74	0.46	207.20			
218.57	1990	11.95	206.62	0.59	207.21			
218.57	2000	11.82	206.75	0.44	207.19			
218.57	2005	12.84	205.73	0.43	206.16			

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 3 - Lick Creek



Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 3 - Lick Creek

Year 2

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
215.40	1000	12.06	203.34	0.82	204.16			
215.40	1010	12.35	203.05	1.10	204.15			
215.40	1020	12.38	203.02	1.12	204.14			
215.40	1030	12.20	203.20	0.95	204.15			
215.40	1040	12.15	203.25	0.90	204.15			Log Vane INV
215.40	1050	12.76	202.64	1.49	204.13			
215.40	1060	13.04	202.36	1.77	204.13			
215.40	1070	13.05	202.35	1.78	204.13			
215.40	1080	13.20	202.20	1.92	204.12			
215.40	1090	14.41	200.99	3.14	204.13			
215.40	1100	13.77	201.63	2.51	204.14			
215.40	1112	12.93	202.47	1.66	204.13			Log Vane INV
215.40	1120	15.16	200.24	3.71	203.95			
215.40	1130	16.41	198.99	4.95	203.94			
215.40	1140	15.75	199.65	4.30	203.95			
215.40	1152	14.53	200.87	3.10	203.97			
215.40	1160	13.24	202.16	1.78	203.94			
215.40	1170	12.68	202.72	1.24	203.96			
215.40	1180	12.47	202.93	1.01	203.94			
215.40	1190	12.24	203.16	0.80	203.96			
215.40	1200	12.10	203.30	0.67	203.97			
215.40	1210	11.93	203.47	0.49	203.96			
215.40	1220	11.95	203.45	0.50	203.95			
215.40	1230	11.98	203.42	0.54	203.96			
215.40	1240	11.80	203.60	0.36	203.96			
215.40	1250	11.79	203.61	0.35	203.96			
215.40	1260	11.79	203.61	0.30	203.91			
215.40	1270	11.86	203.54	0.35	203.89			
215.40	1280	12.16	203.24	0.65	203.89			
215.40	1290	12.36	203.04	0.84	203.88			
215.40	1300	12.69	202.71	1.16	203.87			
215.40	1310	12.66	202.74	1.14	203.88			
215.40	1314	12.08	203.32	0.55	203.87			Log Vane INV
215.40	1319	14.76	200.64	3.21	203.85			
215.40	1330	16.92	198.48	5.37	203.85			
215.40	1340	16.36	199.04	4.93	203.97			
215.40	1350	14.41	200.99	2.88	203.87			
215.40	1353	12.38	203.02	0.80	203.82			Rock Cross Vane INV
215.40	1360	14.02	201.38	2.36	203.74			
214.66	1370	13.48	201.19	2.52	203.71			
214.66	1382	11.40	203.26	0.42	203.68			Log Vane INV
214.66	1390	14.50	200.16	3.28	203.44			
214.66	1400	12.42	202.24	1.25	203.49			
214.66	1410	12.43	202.23	1.22	203.45			
214.66	1412	12.48	202.19	1.28	203.47			
214.66	1420	12.28	202.38	1.18	203.56			
214.66	1430	11.87	202.79	0.67	203.46			
214.66	1440	11.81	202.86	0.60	203.46			
214.66	1450	11.71	202.95	0.51	203.46			
214.66	1460	11.66	203.00	0.45	203.45			
214.66	1470	11.62	203.04	0.41	203.45			
214.66	1480	11.63	203.03	0.42	203.45			
214.66	1490	11.76	202.90	0.55	203.45			
214.66	1500	11.92	202.74	0.70	203.44			
214.66	1510	11.82	202.84	0.62	203.46			Log Vane INV
214.66	1519	11.50	203.16	0.25	203.41			
214.66	1525	14.60	200.06	3.32	203.38			
214.66	1535	15.05	199.61	3.77	203.38			
214.66	1540	14.29	200.37	3.02	203.39			
214.66	1553	11.99	202.67	0.70	203.37			Log Vane INV
214.66	1560	13.77	200.89	2.45	203.34			
214.66	1570	13.20	201.46	1.89	203.35			
214.66	1580	12.67	201.99	1.36	203.35			
214.66	1590	12.25	202.41	0.94	203.35			
214.66	1600	12.03	202.63	0.72	203.35			
214.66	1610	11.92	202.74	0.61	203.35			
214.66	1620	11.89	202.78	0.56	203.34			

Lick Creek Stream Restoration Site
Lee County, NC
Profile Reach 3 - Lick Creek

Year 2

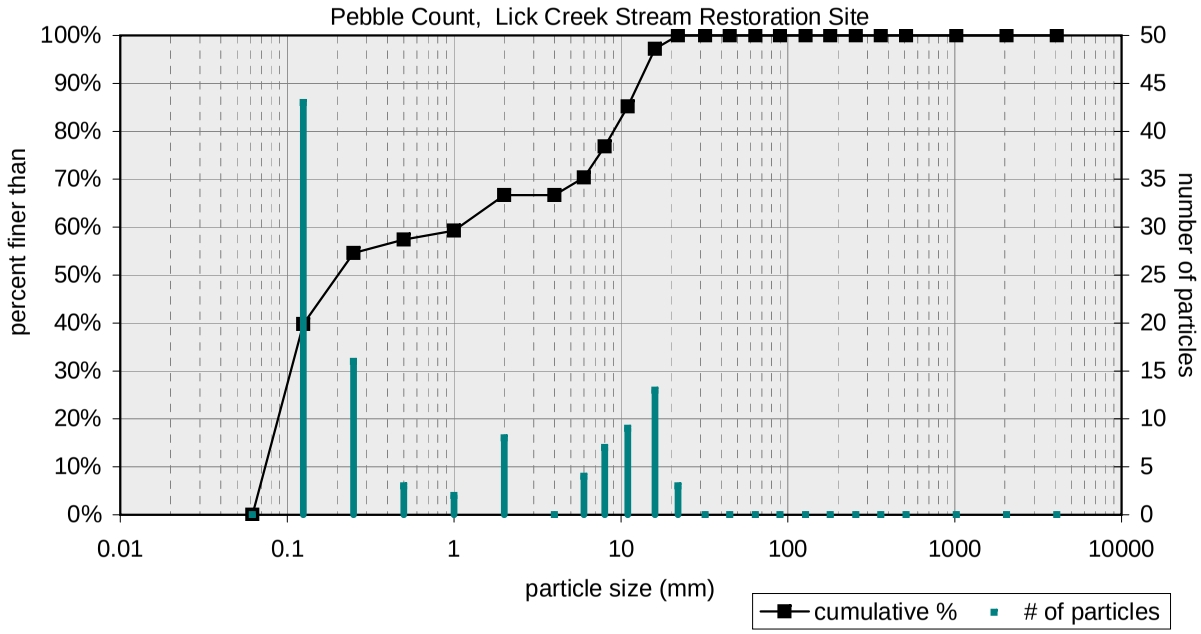
HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
214.66	1630	11.70	202.96	0.40	203.36			
214.66	1640	11.70	202.97	0.37	203.34			
214.66	1650	11.66	203.00	0.35	203.35			
214.66	1660	11.63	203.03	0.29	203.32			
214.66	1670	11.68	202.98	0.33	203.31			
214.66	1680	11.79	202.87	0.41	203.28			
214.66	1690	11.99	202.67	0.60	203.27			
214.66	1699	11.86	202.80	0.44	203.24			Log Vane INV
214.66	1710	13.70	200.96	2.24	203.20			
214.66	1720	14.20	200.46	2.73	203.19			
214.66	1730	14.17	200.49	2.71	203.20			
214.66	1740	13.84	200.83	2.37	203.20			
214.66	1750	13.24	201.42	1.79	203.21			
214.66	1760	12.71	201.95	1.26	203.21			
214.66	1770	12.15	202.51	0.67	203.18			Log Vane INV
214.66	1780	15.35	199.31	3.86	203.17			
214.66	1788	15.91	198.75	4.47	203.22			
214.66	1795	15.16	199.50	3.66	203.16			
214.66	1805	14.29	200.37	2.80	203.17			
214.66	1811	12.54	202.12	1.02	203.14			Log Vane INV
213.95	1820	11.59	202.36	0.81	203.17			
213.95	1827	12.05	201.90	1.27	203.17			
213.95	1840	11.17	202.78	0.35	203.13			
213.95	1850	11.63	202.32	0.79	203.11			
213.95	1860	11.42	202.53	0.58	203.11			
213.95	1870	11.24	202.71	0.39	203.10			
213.95	1880	11.22	202.73	0.23	202.96			
213.95	1890	11.31	202.64	0.30	202.94			
213.95	1900	11.35	202.61	0.22	202.83			
213.95	1910	11.53	202.42	0.38	202.80			
213.95	1920	11.57	202.38	0.40	202.78			
213.95	1930	11.56	202.39	0.39	202.78			
213.95	1940	12.01	201.94	0.81	202.75			
213.95	1950	12.27	201.68	1.08	202.76			
213.95	1959	12.62	201.33	1.32	202.65			
213.95	1964	11.83	202.12	0.63	202.75			Log Vane INV
213.95	1970	12.92	201.03	1.73	202.76			
213.95	1980	12.56	201.39	1.37	202.76			
213.95	1990	13.54	200.41	2.33	202.74			
213.95	1998	13.40	200.55	2.19	202.74			
213.95	2010	13.14	200.81	1.96	202.77			
213.95	2014	12.48	201.47	1.29	202.76			Log Vane INV
213.95	2020	13.08	200.87	1.89	202.76			
213.95	2030	12.61	201.34	1.43	202.77			
213.95	2040	13.08	200.87	1.89	202.76			
213.95	2051	13.20	200.75	2.01	202.76			
213.95	2060	13.08	200.87	1.89	202.76			
213.95	2070	11.93	202.02	0.74	202.76			
213.95	2080	11.51	202.44	0.32	202.76			
213.95	2090	11.48	202.47	0.07	202.54			
213.95	2105	11.71	202.24	0.39	202.63			

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**0**	##
very fine sand	0.062	0.13	**43**	##
fine sand	0.13	0.25	**16**	##
medium sand	0.25	0.5	**3**	##
coarse sand	0.5	1	**2**	##
very coarse sand	1	2	**8**	##
very fine gravel	2	4	**0**	##
fine gravel	4	6	**4**	##
fine gravel	6	8	**7**	##
medium gravel	8	11	**9**	##
medium gravel	11	16	**13**	##
coarse gravel	16	22	**3**	##
coarse gravel	22	32	**0**	##
very coarse gravel	32	45	**0**	##
very coarse gravel	45	64	**0**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		108	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	108

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 1 - Wallace Branch Riffle**



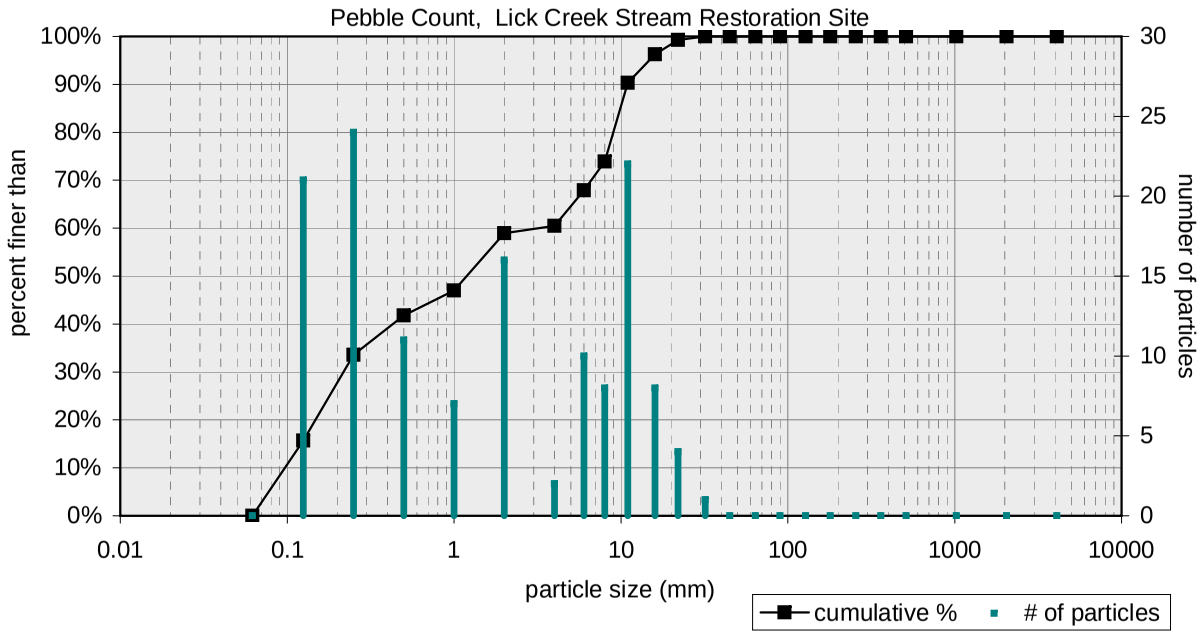
based on sediment particles only	size percent less than (mm) D16	D35	D50	D65	D84	D95	particle size distribution gradation	geo mean	std dev
	0.082	0.11	0.2	2	11	15	27.3	0.9	11.3

based on total count	percent by substrate type silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	0%	67%	33%	0%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 1 - Wallace Branch**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**0**	##
very fine sand	0.062	0.13	**21**	##
fine sand	0.13	0.25	**24**	##
medium sand	0.25	0.5	**11**	##
coarse sand	0.5	1	**7**	##
very coarse sand	1	2	**16**	##
very fine gravel	2	4	**2**	##
fine gravel	4	6	**10**	##
fine gravel	6	8	**8**	##
medium gravel	8	11	**22**	##
medium gravel	11	16	**8**	##
coarse gravel	16	22	**4**	##
coarse gravel	22	32	**1**	##
very coarse gravel	32	45	**0**	##
very coarse gravel	45	64	**0**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		134	



bedrock				
clay hardpan				
detritus/wood				
artificial				
	total count:		134	

based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.127	0.28	1.2	5	10	15	8.8	1.1	8.8

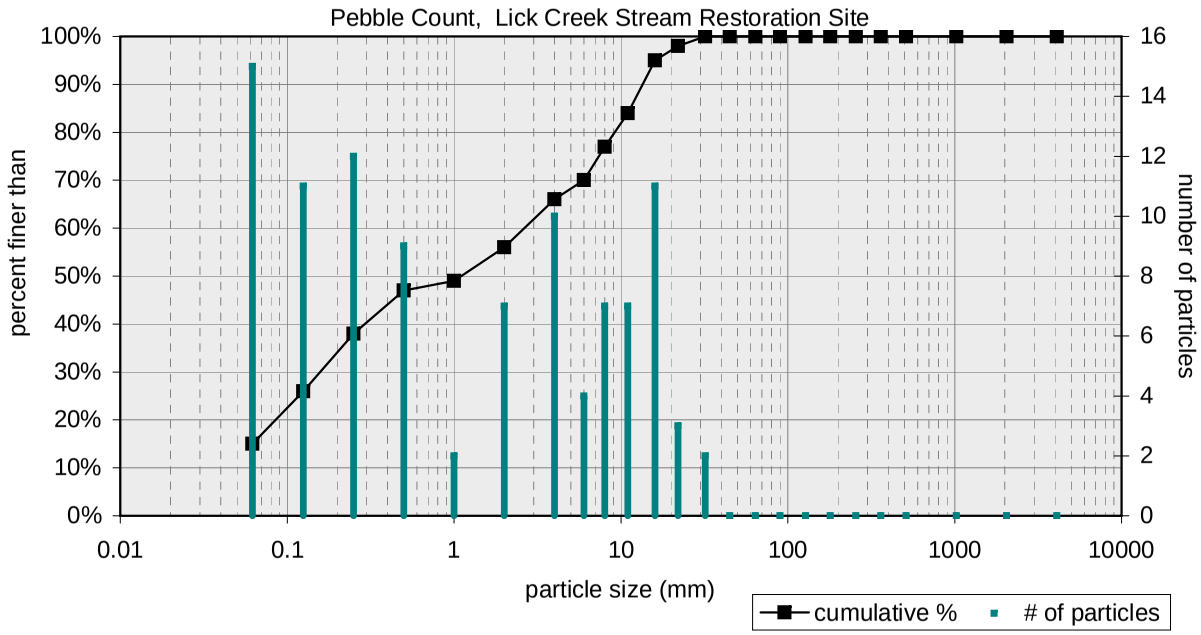
based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	0%	59%	41%	0%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**15**	##
very fine sand	0.062	0.13	**11**	##
fine sand	0.13	0.25	**12**	##
medium sand	0.25	0.5	**9**	##
coarse sand	0.5	1	**2**	##
very coarse sand	1	2	**7**	##
very fine gravel	2	4	**10**	##
fine gravel	4	6	**4**	##
fine gravel	6	8	**7**	##
medium gravel	8	11	**7**	##
medium gravel	11	16	**11**	##
coarse gravel	16	22	**3**	##
coarse gravel	22	32	**2**	##
very coarse gravel	32	45	**0**	##
very coarse gravel	45	64	**0**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 2 - Lick Creek Riffle**



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.066	0.21	1.1	4	11	16	13.3	0.9	12.9

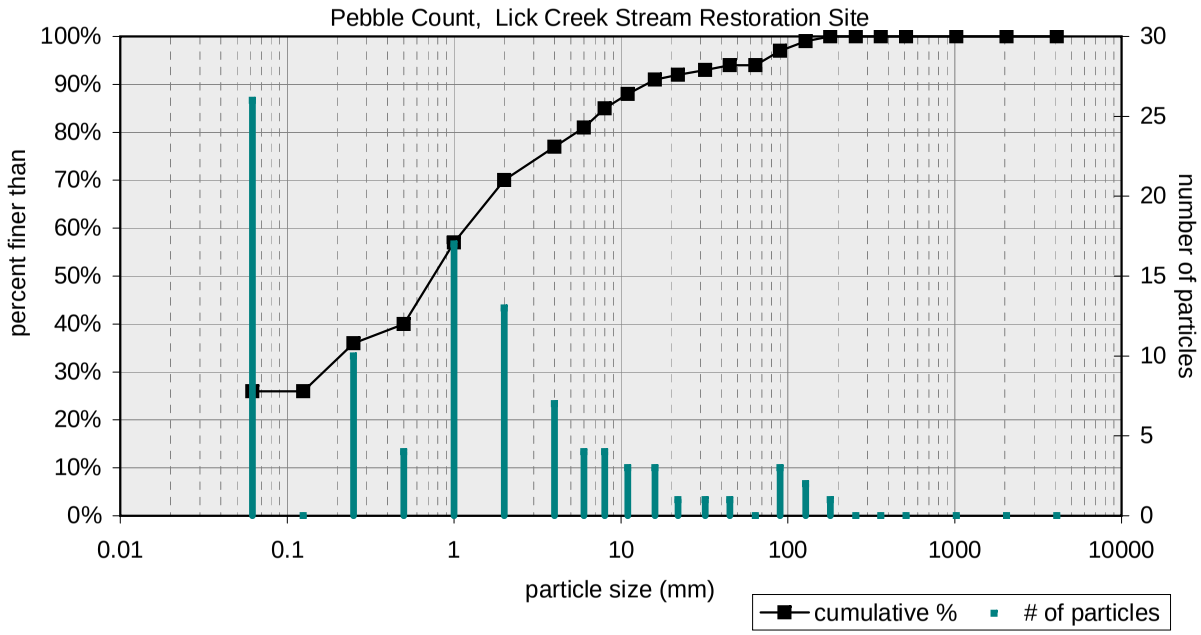
based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	15%	41%	44%	0%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**26**	##
very fine sand	0.062	0.13	**0**	##
fine sand	0.13	0.25	**10**	##
medium sand	0.25	0.5	**4**	##
coarse sand	0.5	1	**17**	##
very coarse sand	1	2	**13**	##
very fine gravel	2	4	**7**	##
fine gravel	4	6	**4**	##
fine gravel	6	8	**4**	##
medium gravel	8	11	**3**	##
medium gravel	11	16	**3**	##
coarse gravel	16	22	**1**	##
coarse gravel	22	32	**1**	##
very coarse gravel	32	45	**1**	##
very coarse gravel	45	64	**0**	##
small cobble	64	90	**3**	##
medium cobble	90	128	**2**	##
large cobble	128	180	**1**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 2 - Lick Creek**



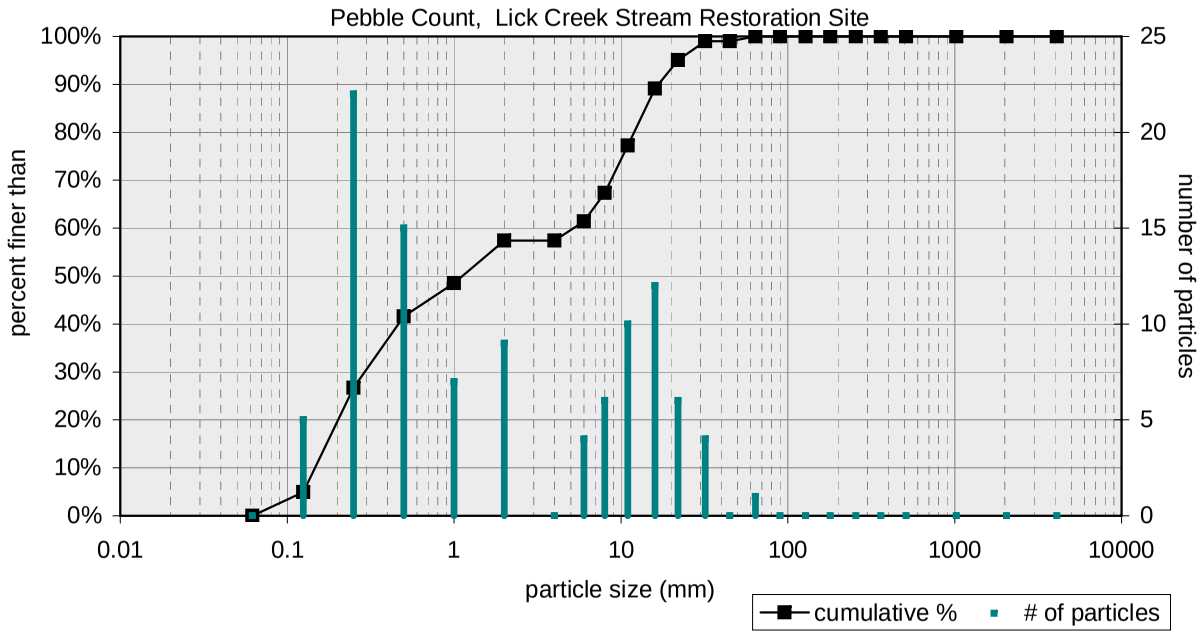
based on sediment particles only	size percent less than (mm) D16	D35	D50	D65	D84	D95	particle size distribution gradation	geo mean	std dev
	0.062	0.23	0.8	2	7	72	11.0	0.7	11.0

based on total count	percent by substrate type silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	26%	44%	24%	6%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**0**	##
very fine sand	0.062	0.13	**5**	##
fine sand	0.13	0.25	**22**	##
medium sand	0.25	0.5	**15**	##
coarse sand	0.5	1	**7**	##
very coarse sand	1	2	**9**	##
very fine gravel	2	4	**0**	##
fine gravel	4	6	**4**	##
fine gravel	6	8	**6**	##
medium gravel	8	11	**10**	##
medium gravel	11	16	**12**	##
coarse gravel	16	22	**6**	##
coarse gravel	22	32	**4**	##
very coarse gravel	32	45	**0**	##
very coarse gravel	45	64	**1**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		101	

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 3 - Lick Creek Riffle**



bedrock				
clay hardpan				
detritus/wood				
artificial				
	total count:		101	

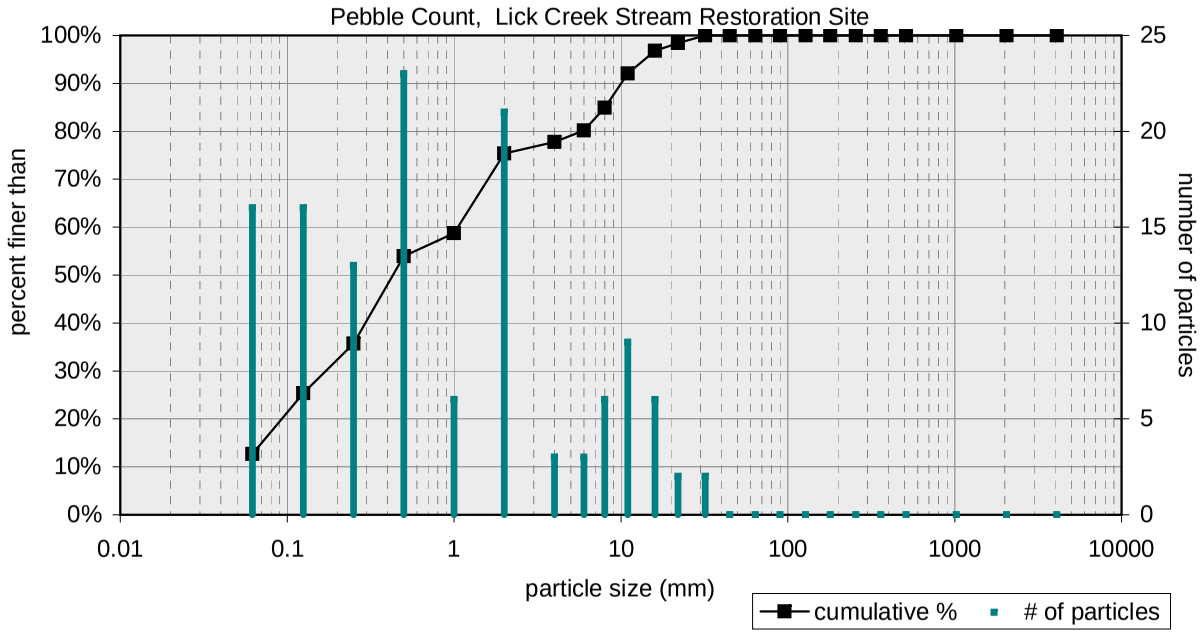
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.178	0.37	1.1	7	14	22	9.2	1.6	8.8

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	0%	57%	43%	0%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,
Lick Creek Stream Restoration Site
Lee County, NC
Year 1
Note: **Reach 3 - Lick Creek**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**16**	##
very fine sand	0.062	0.13	**16**	##
fine sand	0.13	0.25	**13**	##
medium sand	0.25	0.5	**23**	##
coarse sand	0.5	1	**6**	##
very coarse sand	1	2	**21**	##
very fine gravel	2	4	**3**	##
fine gravel	4	6	**3**	##
fine gravel	6	8	**6**	##
medium gravel	8	11	**9**	##
medium gravel	11	16	**6**	##
coarse gravel	16	22	**2**	##
coarse gravel	22	32	**2**	##
very coarse gravel	32	45	**0**	##
very coarse gravel	45	64	**0**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		126	



bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	126

based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.074	0.24	0.4	1	8	14	11.7	0.8	10.1

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	13%	63%	25%	0%	0%	0%	0%	0%	0%