Spring Valley Park Stream Restoration
Guilford County, North Carolina
Annual Monitoring Report

Monitoring Year: 2005

Monitoring Year: 2005
Measurement Year 2
As-Built Date: 2003
Project Design by Kimley-Horn and Associates
NCEEP Project Number: 354

April 2006

SPRING VALLEY PARK STREAM RESTORATION
2005 MONITORING REPORT

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT
OF
ENVIRONMENT AND NATURAL RESOURCES

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Not applicable to this project

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I. EXECUTIVE SUMMARY/PROJECT ABSTRACT

The Spring Valley Park Stream Restoration Site covers approximately 1,409 linear feet of Piedmont Creek in Greensboro, North Carolina. The project was constructed in the winter of 2003/2004 and the restoration site is in its second year of monitoring. Monitoring consists only of visual observations and photo point documentation. The following report provides the Year 2 2005 Monitoring.

The project has some issues with piping around structures and areas of severe erosion. At this time, repairs are recommended for the structures where water is flowing under them and for the eroded bank behind the rootwad at station 19+50. The other problem areas need to be watched and remediation options developed if they get worse.

II. PROJECT BACKGROUND

A. Location and Setting

The Spring Valley Park Stream Restoration Site includes 1,409 linear feet of Piedmont Creek. The site is located in the City of Greensboro, North Carolina near the intersection of Interstate 40 and Freeman Mill Road. See **Figure 1**. The mitigation site is in its second year of monitoring.

To access the site take I-40 west to Greensboro. Take Exit 218B (Freeman Mill Road) off of I-40. Travel north on Freeman Mill Road to Meadowview Road. Turn right onto Meadowview Road and follow to Spring Valley Park.

B. Structure and Objectives

Piedmont Creek, located in Spring Valley Park, City of Greensboro, Guilford County, North Carolina was identified as a potential stream mitigation opportunity through a joint City of Greensboro and NC Department of Transportation (NCDOT0 initiative. Prior to restoration the upper reach (500 feet) was an E/C stream type that was horizontally unstable with slumping banks and low sinuosity due to lack of vegetation. The 850 foot reach was an incised E5 that was evolving into an entrenched channel (G5) with unstable stream banks.

According to the Mitigation Plan, restoration of the upper reach involved modifications to the channel dimension with only minor modifications to the pattern to relocate the channel away from a sewer line. Some rock structures were used to help control the grade. The lower reach involved restoration of dimension, pattern, and profile to create a C type stream. Several outfall structures were also installed to help reduce erosion from storm water.

Ecosystem Enhancement Program

FIGURE 01
VICINITY MAP

Spring Valley Park Stream Restoration Site
Greensboro, North Carolina
Guilford County

Map Produced: February 2006

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Table I. Project Mitigation Structure and Objectives Spring Valley Park Stream Restoration Site/Project No. 354					
Project Segment	Mitigation Type	Approach	Linear Footage or Acreage	Stationing	Comment
Reach 1	EI	PII	619	10+00 to 16+19	
Reach 2	R	PI	790	16+19 to 24+9	

R=Restoration
EI=Enhancement I
EII=Enhancement II
S=Stabilization
PI=Priority I
PII=Priority II
PIII=Priority III
SS-Stream Bank Stabilization

C. Project History and Background

Table II. Project Activity and Reporting History Spring Valley Park Stream Restoration Site/Project No. 354			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	NA*	NA	September 2001
Final Design-90%	NA	NA	October 2002
Construction	NA	NA	2004
Temporary S&E mix	NA	NA	NA
Containerized and B&B plantings for each reach/segment	NA	NA	NA
Mitigation Plan/As-built (Year 0 Monitoring – baseline)	NA	NA	NA
Structural maintenance			2005?
Year 1 Monitoring-	NA	12/7/04	12/7/04
Year 2 Monitoring-		11/2005	12/2005
Year 3 Monitoring-	Fall 2006		
Year 4 Monitoring-	Fall 2007		
Year 5 Monitoring-	Fall 2008		

* Historical project documents necessary to provide this data were unavailable at the time of submission of this report.

Table III. Project Contact Table Spring Valley Park Stream Restoration Site/Project No. 354	
Designer	Kimley-Horn Associates Raleigh, North Carolina
Primary project design POC	NA*

Table III. Project Contact Table Spring Valley Park Stream Restoration Site/Project No. 354	
Construction Contractor Construction Contractor POC	NA NA
Planting Contractor Planting Contractor POC	NA NA
Seeding Contractor Planting Contractor POC	NA NA
Seed Mix Sources	NA
Nursery Stock Suppliers	NA
Monitoring Performers-2004	NCDOT Roadside Environmental Unit 1425 Rock Quarry Road Raleigh, NC 27610 M. Green and J. Wait
Monitoring Performers-2005	Earth Tech of North Carolina 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 Mr. Ron Johnson (919) 854-6210
Vegetation Monitoring POC	NA
Wetland Monitoring POC	NA

* Historical project documents necessary to provide this data were unavailable at the time of submission of this report.

Table IV. Project Background Table Spring Valley Park Stream Restoration Site/Project No. 354	
Project County	Guilford
Drainage Area	550 acres
Drainage impervious cover estimate (%)	> 20%
Stream order	2nd order
Physiographic region	Piedmont
Ecoregion	Southern Outer Piedmont (45b)
Rosgen classification of As-built	C
Cowardin classification	NA
Dominant soil types	Chewacla loam
Reference site ID	Piedmont Creek upstream Reddicks Creek
USGS HUC for Project	Deep River - HUC 03030002
NCDWQ sub-basin for project and reference	16-11-14-2
NCDWQ classification for project and reference	C, NSW
Any portion of project segment upstream of a 303d listed segment	No
Reasons for 303d listing or stressor	NA
% of project easement fenced	None – in City park

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BEGIN STATE PROJECT U-2524WM
-L- POTSta. 10+00.00

END STATE PROJECT U-2524WM
-L- POTSta. 24+09.00

LEGEND

- Cross Vane
- Root Wad
- Photo Points
- CE — Conservation Easement
- Sanitary Sewer
- Stormwater Outfall
- Rock Toe Protection
- Constructed Riffle

Ecosystem Enhancement PROGRAM

0 50 100 Feet

ROCKINGHAM / GUILFORD / FORSYTH / ALAMANCE / RANDOLPH

FIGURE 2
MONTORING PLAN VIEW
YEAR-2 MONITORING REPORT
SPRING VALLEY PARK STREAM RESTORATION
Guilford County, North Carolina
APR 2006

III. PROJECT CONDITION AND MONITORING RESULTS

Monitoring Results are shown below. An initial visual survey was conducted on June 9, 2005 with a more detailed 2005 monitoring survey (evaluation of vegetation plots) was conducted on November 1, 2005.

Evaluation of vegetation plots or detailed stream measurements are not part of the monitoring established for this site by NCDOT.

A. Vegetation Assessment
1. Soil Data

Table V. Preliminary Soil Data
Spring Valley Park Stream Restoration Site/Project No. 354

Series	Max Depth (in)	% Clay on surface	K	T	OM %
Chewacla loam	65	10-35	0.28	5	1-4

Data from the Soil Survey of Guilford County (NRCS 1977).

2. Vegetative Problem Areas

Table VI. Vegetative Problem Areas
Spring Valley Park Stream Restoration Site/Project No. 354

Feature/Issue	Station # /Range	Probable Cause	Photo #
N/A	N/A	N/A	N/A

No vegetation problem areas were noted during the evaluation of the site.

B. Stream Assessment

Earth Tech personnel performed an initial site visit at Spring Valley Park on June 16, 2005. During the field visit notes were made regarding the condition of the stream restoration project and photos of the problem areas were taken. The site was visited again on November 17, 2005 at which time photographs were taken at all permanent photo points.

Vegetative problem areas were described in Table VI and stream problem areas are described in Table IX.

The project has some issues with piping around structures and areas of severe erosion. The following problem areas were observed:

- At stations 11+50-12+00, the left banks have undercut behind the coir matting
- At station 14+25, water is not flowing over the center cross piece for the cross-vane, water is draining from the left bank down over the left arm also,

- At station 14+50, the center cross piece for the cross-vane is flat; therefore no pool downstream
- At station 16+25, the 6th cross-vane is not there (possibly buried or never installed)
- At station 17+00, a large erosion hold is at the end of the left vane for the cross-vane structure and the cross piece is too high and water is flowing underneath,
- At station 17+00 a gravel bar is forming downstream of the left arm towards the center of the channel (not quite a mid channel bar and not a lateral bar seems to be in transition),
- At station 17+25, erosion on right bank in the direct flow pattern of water coming over the cross-vane upstream,
- At stations 17+50-18+00, along right bank, erosion from rootwad to cross-vane.
- At station 18+00, cross-vane arms are too high, water flowing underneath cross piece
- At stations 18+00-18+50, left bank eroding downstream of cross-vane,
- At station 19+00, around a cross-vane 20 feet of erosion approximately 4 foot vertical banks,
- At station 19+50, completely washed out behind rootwad,
- At stations 20+50-21+50, mid channel sand bars,
- At stations 21+50-22+00, mid channel vegetated clumps in channel,
- At stations 23+75-24+00, erosion in between last two cross-vanes on both banks, and
- At station 24+00, water not flowing over but piping underneath last cross-vane.

At this time, repairs are recommended for the structures where water is flowing under them and for the eroded bank behind the rootwad at station 19+50. The other problem areas need to be watched and if the problems worsen over time, then the areas need to be evaluated a remedial plan developed.

No crest gauges are installed at this site to document bankfull events. Therefore, potential occurrence was extrapolated based on USGS stream gauge discharge data for South Buffalo Creek at US 220 (approximately 0.5 miles southwest of project site) with a drainage area of 15.4 square miles. Although the drainage area for this gauge is significantly larger than the drainage area for Piedmont Creek it is the only gauge in the vicinity of the site. Bankfull events were determined by comparing the stream discharge [cubic feet per second (cfs)] against the drainage area on the urban piedmont regional curve. According to the urban piedmont regional curve a bankfull event occurs on a stream with a 15.4 mi^2 drainage area when the discharge is between 1,538 and 1,704 cfs. Based on USGS data no bankfull events occurred in 2005. However, there may have been one bankfull event on December 10, 2004 when the maximum discharge reached 1,700 cfs for one day. Two high flow events were recorded for 2005. On January 14 and March 28 maximum discharge was recorded at 1,040 and 1,140 cfs respectively.

Figure 3. USGS Stream gauge discharge data for South Buffalo Creek at US 220.

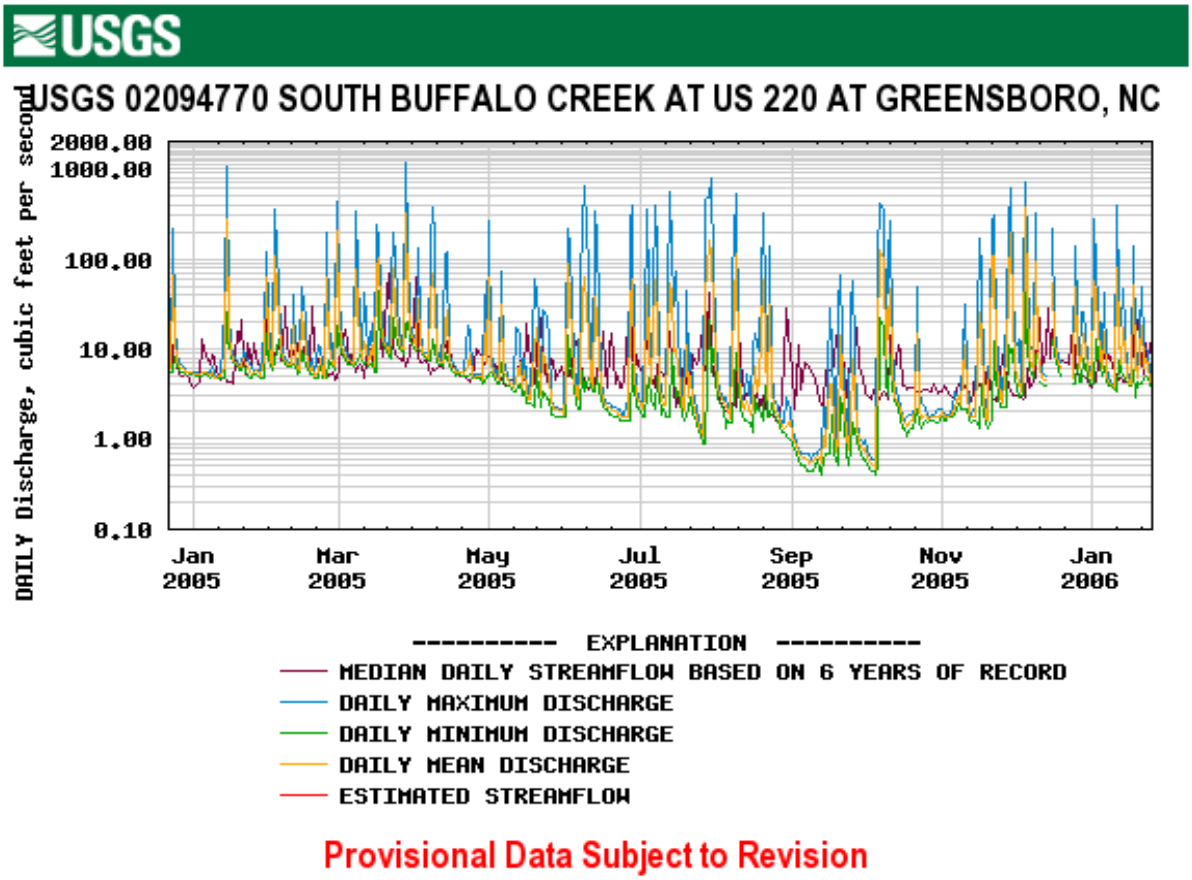

Table VIII. Verification of Bankfull Events Spring Valley Park Stream Mitigation Site/Project No. 354			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo # (if available)**
2004	12-10-2004	Proximal USGS gauge resource	NA
2005	None	Proximal USGS gauge resource	NA

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 Spring Valley Park Stream Mitigation Site/Project No. 354			
Feature/Issue	**Station # /Range**	**Probable Cause**	**Photo #**
Bank erosion	11+50-12+00	Coir mat failure	SPA 3 SPA 4
	17+25	Upstream cross vane directing flow into bank	
	17+50 – 18+00	Erosion along right bank	
	18+00 – 18+50	Left bank eroding	
	19+00	Erosion around cross-vane	
	19+50	Rootwad failure	
Structure failure	14+25	Improper construction	SPA 1 SPA 5
	14+50	Flat cross piece	
	17+00	Improper construction	
	18+00	Cross-vane arms too high	
	24+00	Piping beneath cross-vane	
Sediment transport	17+00	Gravel bar forming	SPA 6
	20+50 – 21+00	Mid channel sand bars	
	21+50 – 22+00	Veg. clumps in channel	

Table XI. Categorical Stream Feature Visual Stability Assessment Spring Valley Park Stream Mitigation Site/Project No. 354					
Feature	Initial	MY-01	MY-02	MY-03	MY-04
A. Riffles	100%	100%	90%		
B. Pools	100%	100%	95%		
C. Thalweg	100%	100%	95%		
D. Meanders	100%	100%	95%		
E. Bed General	100%	100%	80%		
F. Vanes/J Hooks etc.	100%	80%	70%		
G. Wads and Boulders	100%	80%	70%		

Note: The Year 1 estimates are Earth Tech's estimate based upon review of text within the NCDOT Year 1 Monitoring Report.

No background information was available regarding gage data or reference reach data necessary to complete Table XII. Additionally, stream surveys were not required for monitoring of this site and Table XIII is not applicable to this project.

C. Wetland Assessment

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

APPENDIX B
Geomorphologic Raw Data

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

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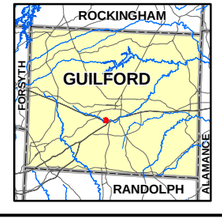
LEGEND

- Cross Vane
- Root Wad
- CE — Conservation Easement
- Sanitary Sewer
- Stormwater Outfall
- Structure Failure
- Bank Erosion
- Rock Toe Protection
- Constructed Riffle

Ecosystem Enhancement Program

0 50 100 Feet

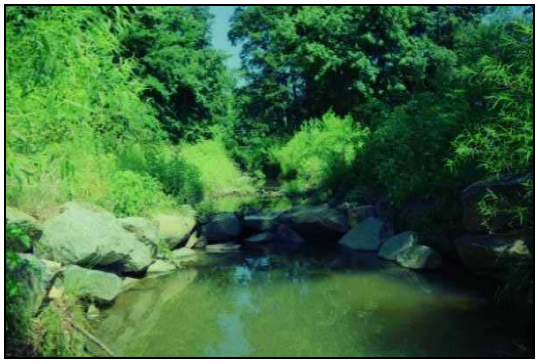


APPENDIX B-1
PROBLEM AREAS PLAN VIEW
SPRING VALLEY PARK STREAM RESTORATION

Guilford County, North Carolina

APR 2006

SPRING VALLEY PARK STREAM RESTORATION
APPENDIX B2
STREAM PROBLEM AREA PHOTOS



SPA1. Station 14+25 water not flowing over center piece in cross-vane.

SPA2. Station 17+25 erosion on right bank from upstream cross-vane.

SPA3. Station 18+00 left bank eroding downstream of cross-vane

SPA4. 19+00 Erosion around and downstream of cross-vane.

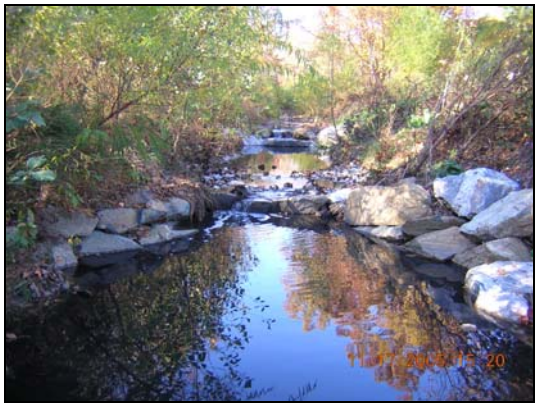
SPA5. Station 19+50 Erosion behind rootwad.

SPA6. 20+50 mid channel sand bars.

SPRING VALLEY PARK STREAM RESTORATION
APPENDIX B3
Stream Photos-station Photos

SPP 01A Upstream.

SPP 01B Downstream



SPP 02A Upstream

S SPP 02B Downstream

SPP 03A Upstream

SPP 03B Downstream

SPRING VALLEY PARK STREAM RESTORATION
APPENDIX B3
Stream Photos-station Photos

SPP 04A Upstream

SPP 04B Downstream

SPP 05A Upstream

SPP 05B Downstream

SPP 06A Upstream

SPP 06B Downstream