Price Park Stream Restoration

2004 Annual Monitoring Report

Delivered to: NCDENR/Ecosystem Enhancement Program
1619 Mail Service Center
Raleigh, NC 27699-1619

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Campus Box 7625
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February, 2005

Ecosystem Enhancement PROGRAM

NCDENR

NC STATE UNIVERSITY

2004 Price Park Stream Restoration Monitoring Abstract

An unnamed Tributary to Horsepen Creek, henceforth referred to as Price Park, was enhanced/restored through the North Carolina Ecosystem Enhancement Program (NCEEP). The goals and objectives of this project are as follows:

1.) Restore 1,776-linear feet of unnamed tributary to Horsepen Creek.
2.) Establish a riparian zone surrounding restored channel.

This is the 4th year of the 5-year monitoring plan for Price Park Stream Restoration.

Table 1A. Background Information

Project Name	Price Park - unnamed Tributary to Horsepen Creek
Designer's Name	Earth Tech of NC, Inc 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607
Contractor's Name	SEI, Inc
Project County	Guilford County
Directions to Project Site	Guildford College Road Exit off I-40. Follow north to New Garden Road. After passing Guilford College and Jefferson School, turn right at the light. Follow to the bottom of the hill where the creek crosses the road at Price Park. The project is upstream and downstream of the road crossing and is fully contained within the limits of Price Park.
Drainage Area	1.0 sq mi
USGS Hydro Unit	3030002
NCDWQ Subbasin	16-11-5-1
Project Length	1,776 linear feet
Restoration Approach	- Restore 1,464 linear feet of impaired stream into 1,776 linear using Priority I techniques - 50 foot riparian buffer throughout the project
Date of Completion	August 2001 with modifications, Feb. 2002 and planting completed March 2002
Monitoring Dates	4-2002, 12-2002, 9-2003, 6-2004

Results and Discussion

Overall, while the majority of the stream is stable, there are areas of concern and areas of immediate need. Table 2A shows a summary of the 2004 monitoring measurement results. Channel dimension, pattern, and profile are similar to as-built conditions with the exceptions of some limited areas of bank slumping. Vegetation is not succeeding to levels required for mitigation credit.

Problem areas are highlighted in the areas of concern section and photos of those concern areas are shown following that section.

Table 1. Background information

Project Name	Jefferson Pilot - unnamed Tributary to Horsepen Creek
Designer's Name	Earth Tech of NC, Inc 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607
Contractor's Name	SEI, Inc
Project County	Guilford County
Directions to Project Site	Guildford College Road Exit off I-40. Follow north to New Garden Road. After passing Guilford College and Jefferson School, turn right at the light. Follow to the bottom of the hill where the creek crosses the road at Price Park. The project is upstream and downstream of the road crossing and is fully contained within the limits of Price Park.
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Monitoring Dates	4-2002, 12-2002, 6-2004

Table 2. Summary of Channel Conditions

DIMENSION	Price Park Cross-section #1 Riffle				Price Park Cross-section #2 Pool				Price Park Cross-section #3 Riffle				Price Park Cross-section #4 Riffle			
	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004
Bankfull Cross-sectional Area	24.1	25.6	37.0	36.5	50.6	49.3	44.9	46.2	31.9	28.4	31.9	28.4	36.7	43.4	36.3	35.1
Bankfull Width	13.3	14.8	15.0	16.8	22.2	21.0	21.2	21.2	14.0	14.0	14.7	14.7	17.2	19.1	17.2	17.1
Bankfull Mean Depth	1.8	1.7	2.5	2.2	2.3	2.3	2.1	2.2	2.3	2.0	2.2	1.9	2.1	2.3	2.1	2.0
Bankfull Max Depth	3.5	3.6	4.3	4.3	4.9	4.8	4.8	4.3	3.6	3.4	3.6	3.5	3.2	3.6	3.7	3.7

PATTERN	Price Park As-built			Price Park 2002			Price Park 2004		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Meander Wave Length	127	183	150	118	197	162	126	211	162
Radius of Curvature	49	84	65	48	85	61	27	97	50
Beltwidth	49	80	-	52	95	-	46	97	69

PROFILE	Price Park As-built			Price Park 2003*			Price Park 2004		
	Min	Max	Median	Min	Max	Median	Min	Max	Median
Riffle Length	Not Reported			9	87	47	8.6	38.0	19.1
Riffle Slope	Not Reported			0.32%	3.01%	0.92%	0.58%	8.42%	1.83%
Run Length	Not Reported			29.4	79.3	37.3	16.8	104.8	54.3
Run Slope	Not Reported			-0.03%	0.69%	0.12%	-0.03%	0.48%	0.07%
Pool Length	Not Reported			28	73	59	15.0	71.0	35.0
Pool to Pool Spacing	21	153	92	34.5	219	62.5	15.0	58.0	35.0

SUBSTRATE	Price Park Cross-section #1 Riffle			Price Park Cross-section #2 Pool			Price Park Cross-section #3 Riffle			Price Park Cross-section #4 Riffle		
	As-built	2003	2004	As-built	2003	2004	As-built	2003	2004	As-built	2003	2004
D50	0.34	0.11	2.6	0.26	1.35	2.3	0.16	0.14	0.60	0.25	0.30	1.41
D85	87.7	19.6	8.0	1.5	14.5	13.7	6.7	12.1	8.5	6.9	14.8	16.7

VEGETATION	Quad 1 - JP		Quad 2 - JP		Quad 3 -JP		Quad 4 - JP		Quad 5 -JP	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Tree Stratum (stems/acre)-planted	0	0	40	40	0	0	120	80	80	40
Trees - natural regeneration	160	202	240	405	40	81	0	0	0	0
Shrub Stratum (% cover)	0.5	1.5	0.5	0	0.5	0	1	1	0	0
Herb Stratum (%cover)	7.5	6.5	97	2	17.5	0	87	125	70	41

40' SANITARY SEWER ESM'T.

EXISTING 10" SEWER LINE

25' SANITARY SEWER ESM'T.

EXISTING 10" SEWER LINE

MATCH LINE (9+00)

0+00

1+00

2+00

3+00

4+00

5+00

6+00

7+00

8+00

9+

EXISTING SSMH
RIM 824.16'

NEW ROCKVANE
SEE NOTE #5

NEW ROOTWAD
SEE NOTE #5

NEW ROCKVANE
SEE NOTE #5

NEW ROOTWAD
SEE NOTE #5

IP-2

IP-3

IP-4

IP-5

IP-6

IP-7

IP-8

Cross Section 1
STA: 4+43

Cross Section 2
STA: 6+79

Cross Section 3
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JEFFERSON CLUB ROAD

EXISTING 10" SEWER LINE

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10+00

11+00

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IP-10

IP-11

IP-12

IP-9

BENCH MARK
INVERT OF
10'x8' DOUBLE BOX
CULVERT
ELEVATION 807.41'

EXISTING 6" DI PIPE

HOBBS ROAD

Cross Section 4
STA: 15+01

SCALE 1" = 50'

25 0 25 50

NO	REVISIONS	DRN	CHK	DATE
1	2004 MONITORING	DRC	DAB	02/04/05

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PRICE PARK
UT to HORSEPEN CREEK
GUILFORD COUNTY, N.C.

YEAR 2004 MONITROING
1:50 SCALE PLAN SHEET

DATE 02/04/2005

PROJECT NO.

FILENAME PRICE-04 FINAL.DWG

SHEET NO. PL - 1

DRAWING NO.

2004 Areas of Concern

The following areas of concern should be monitored closely and considered for repair as suggested:

- The lack of successful vegetation in the riparian buffer
    - Supplemental plantings are needed to meet minimum density.
    - Soil should be tested for fertility and amended as directed.
- Areas with bank erosion due to overland flow washing into the channel
    - Stations 3+90, 4+40, 12+20, 14+00 and 15+50
    - Station 12+20 has degraded to the point that the bank is not likely to heal with the addition of vegetation alone.
    - These areas should be examined closely to see if a structure is necessary to provide a stable method of allowing the water to enter the channel or if vegetation will be adequate.
    - These areas should be monitored closely during upcoming site visits to monitor degradation.
- The lack of successful herbaceous cover along sections of the streambanks.
    - Areas included are from stations 0+80 to 3+50 and small sections around stations 4+40, 14+00 and 15+50
    - These areas should be reseeded.
    - It will be required to prepare a seedbed in order establish herbaceous cover.
    - Station 14+00 has degraded to the point that the bank is not likely to heal with the addition of vegetation alone.
- The lack of successful vegetation in the riparian buffer
    - Supplemental plantings are needed to meet minimum density.
- Vegetation
    - Live stakes are needed to enhance the rootmass along the streambanks
    - Replanting trees to obtain mitigation requirements
    - The site could benefit from larger containerized trees both for bank stability and aesthetics.
    - Monitor invasive vegetation.

In order to re-establish a stable stand of herbaceous cover on many of the degraded areas along the streambanks, soil preparation will be necessary because the exposed soil is nutrient poor and highly compacted.

Photos
The following are photographs of typical sections, areas of interest (highlight photos), and areas of concern throughout the project.

Price Park – Unnamed Tributary to Horsepen Creek

Typical Riffle.

Typical Pool.

Highlight Photo 1 - Station 16+00.
Floodplain Wetland off of right bank.
Not a concern area.

Highlight Photo 2 – Station 5+50
Gravel depositing on point bar. Indication that course gravel is moving thorough the system.

Issue Photo 1 - Station 0+80
Left bank un-vegetated

Issue Photo 2 - Station 1+00
Un-vegetated right bank

Issue Photo 3 - Station 1+50
Vertical and un-vegetated left bank

Issue Photo 4 - Station 2+10. Cross vane with footers undermined and boulders slumping

Issue Photo 5 - Station 2+40
Eroding streambank, coir matting ripped, and inadequate vegetation

Issue Photo 6 - Station3+20
Poor vegetation establishment on right bank

Issue Photo 7 - Station3+90
Outside meander slump resulting from overland flow

Issue Photo 8 – Station 4+40
Overland flow eroding channel bank

Issue Photo 9– Station 6+80
Right bank scour and inadequate vegetation

Issue Photo 10 – Station 12+20
Bank scour behind rootwads resulting from overland flow.

Issue Photo 11 – Station 14+00
Right bank un-vegetated and scoured

Issue Photo 12 – Station 15+50.
Left bank unvegetated with signs of scour from stormflow and overland flow

Issue Photo 13 - Station 16+20.
Concentrated flow leaving wetland.
Scouring streambank.

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Tables and Figures

1.0 BACKGROUND INFORMATION

The background information for this report is referenced from previous monitoring reports conducted by Earth Tech, Inc. The following was excerpted from 2001 Earth Tech As-Built monitoring report section 1.1:

> This site is located on the west side of Greensboro off New Garden Road. The stream reach is located at the entrance to Price Park on land that is held by the City of Greensboro (Figure 1). The stream is situated in the Upper Cape Fear River Basin (8-digit hydrologic code: 03030002). Jefferson Elementary is located to the west, Price Park to the east, and Guilford College is located south of the site. Local residents use the area surrounding the stream for walking, biking, and other recreational activities.
>
> The stream is the unnamed tributary to Horsepen Creek, henceforth referred to as the Jefferson Pilot stream. This stream drains into a private pond that backs up the lower portion of the channel. The pond elevation was raised after the restoration construction was completed. From a review of historical aerial photographs, this second order stream appears to have been straightened prior to 1937 for agricultural purposes. The drainage area is approximately 1.0 square mile (Figure 1).
>
> Prior to the restoration, a narrow riparian corridor existed along much of the stream banks and the channel was deeply incised with active erosion and undercutting. Within this buffer, the vegetation was relatively weedy and scrubby with only approximately 10 trees with a basal diameter greater than 10 inches. Development pressures continue to increase the urbanization in the Jefferson Pilot watershed and adjacent watersheds.
>
> The Priority I restoration involved converting the 1436 ft straightened channel into a sinuous channel that meanders for a total of 1646 ft as measured along the centerline or 1,776 along the thalweg (Appendix A). Cross-vanes and rootwads were incorporated for aquatic habitat enhancement and bed and bank stability. A 50-foot riparian buffer on either side of the stream was planted with native vegetation. In addition, an aerial sanitary sewer line was re-aligned to be perpendicular to the stream flow and a gas line was re-routed under the stream channel.
>
> Table 1 contains a schedule of events for the construction of the Jefferson Pilot stream.

Table 1. Schedule of Construction Events

Construction Event	Date
Channel construction	June-August 2001
Additional structure construction	February 25-28, 2002
Temporary Seeding	July-August 2001 February 2002 (limited to disturbed areas after construction of additional structures)
Permanent Seeding	August 2001
Planting of bare-root stock	February 18-19, 2002 & March 7, 2002
As-built Stream Survey	April 11, 2002
As-built Vegetation Survey	June 6, 2002

1.1 Goals and Objective

The goals and objectives of this project are as follows.

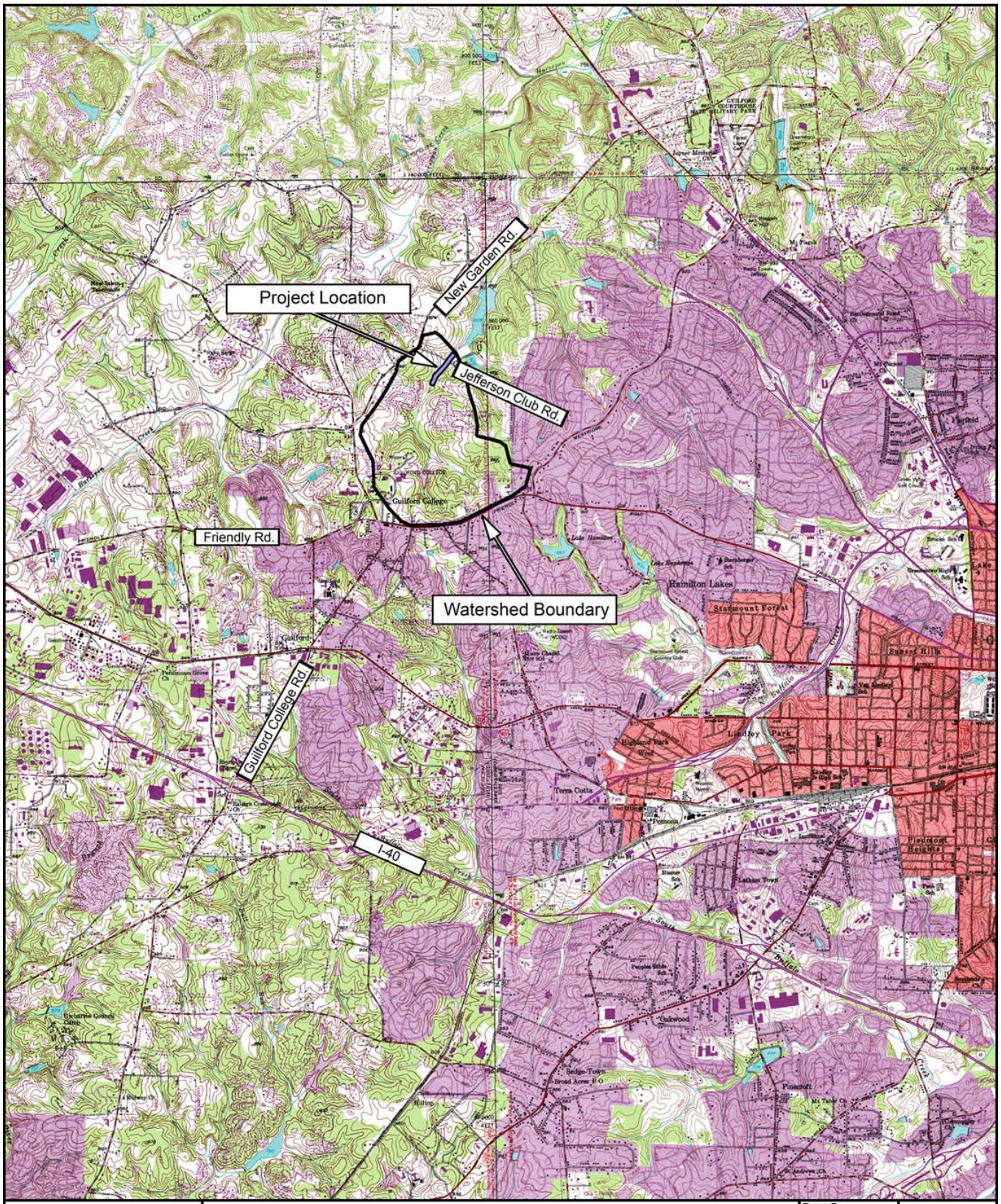
1.) Restore 1,776-linear feet of unnamed tributary to Horsepen Creek.
2.) Establish a riparian zone surrounding restored channel.

1.2 Project Location

The project is located in Greensboro, North Carolina. From Interstate I-40 exit on Guilford College road north. Follow Guildford College road for about 2 miles and near right onto New Garden road. Follow New Garden road for about 1 mile. Past Guildford College, turn right onto Jefferson Club road. The project is located at the bottom of the hill at the stream crossing. The culvert is located in the middle of the project.

1.3 Project Description

The restoration of 1,776 linear feet of the Unnamed Tributary to Horsepen Creek, hereafter referred to as Price Park, consists of re-meandering and re-connecting the existing channel to the floodplain. Riffle-pool bedform was constructed as well as a stable meander pattern developed from stable reference streams. Pools were maintained through the use of cross vane structures used to hold the bed elevation at the outlet of the pools. Rootwads were used to stabilize the outside of the meander bends. Vegetation was planted to establish a dense root mass along the stream banks and in the riparian zone.



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Project Location: Price Park

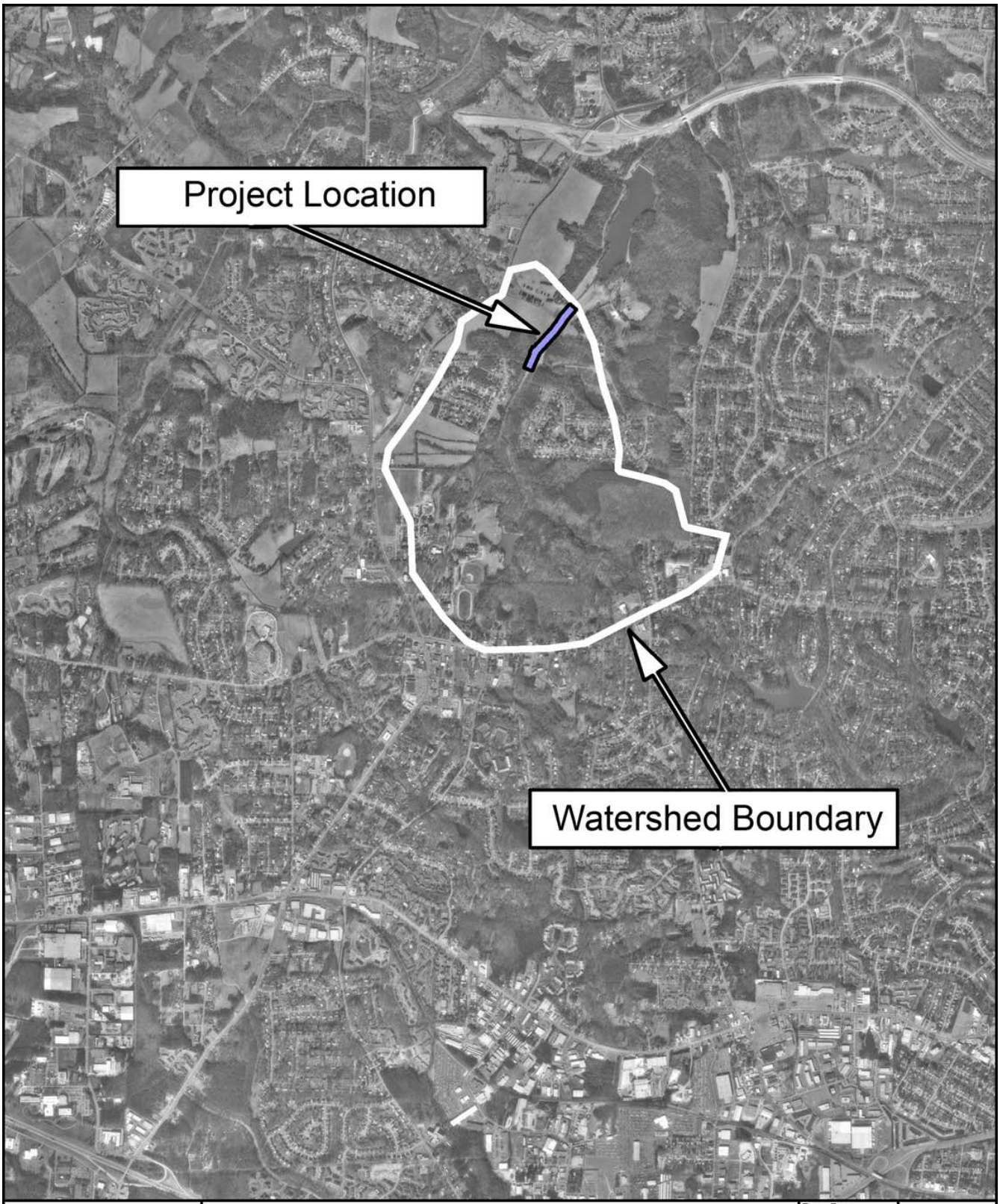
Guilford County, North Carolina

EEP Monitoring Report

SCALE 1:60,000

Dwn. By: MVH
Ckd By: DAB
Date: March 2004

FIGURE 1



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Aerial Watershed Photo: Price Park

Guilford County, North Carolina

EEP Monitoring Report

SCALE 1:30,000

0 1 MILE

0 1000 2000 3000 4000 5000 FEET

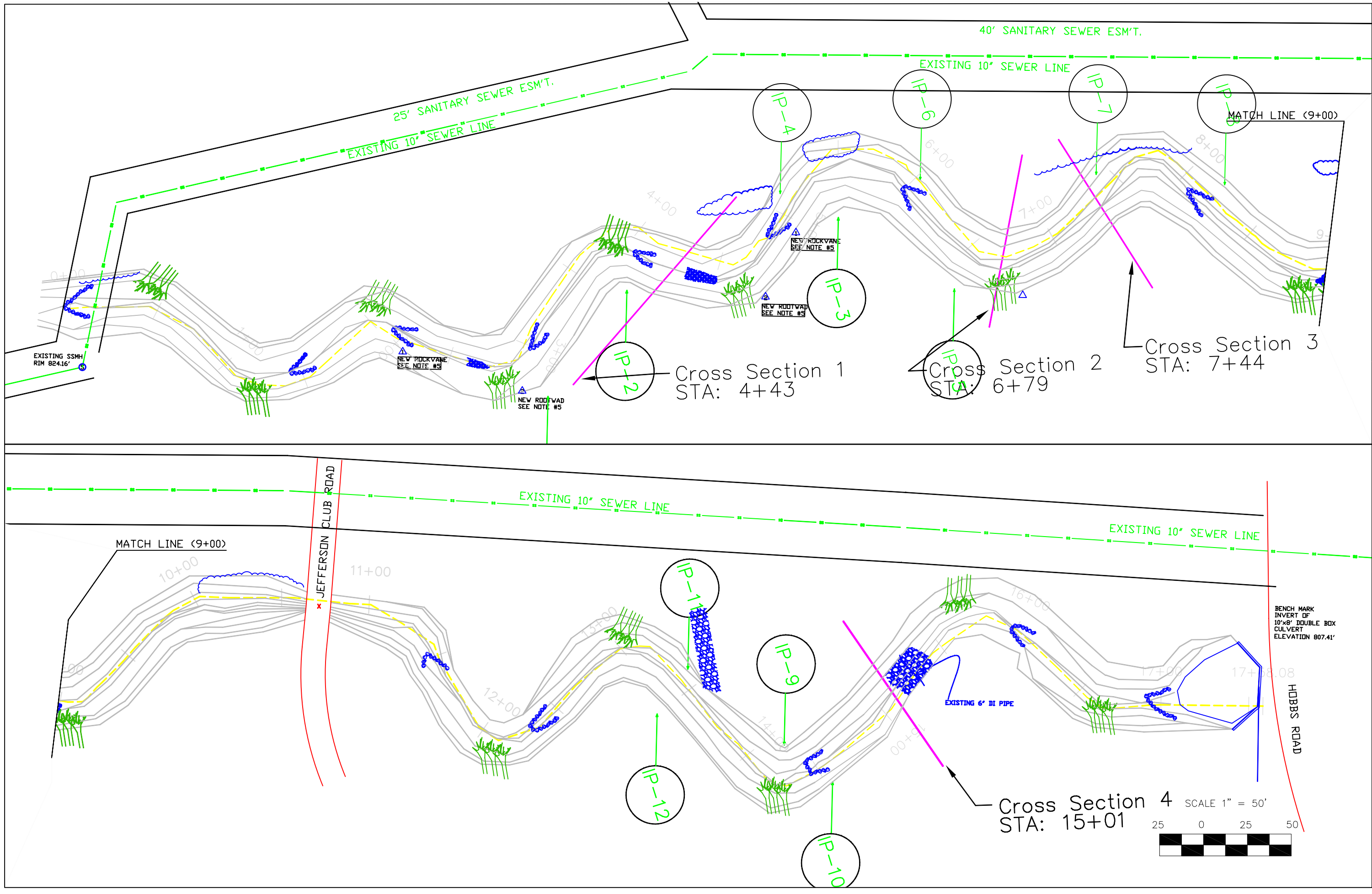
N

Dwn. By: MVH

Ckd By: DAB

Date: March 2004

FIGURE 2



NO	REVISIONS	DRN	CHK	DATE
1	AS-BUILT MONITORING PLAN	DRC	DAB	02/04/05

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AS-BUILT PLAN
1:50 SCALE PLAN SHEET

DATE	02/04/2005
PROJECT NO.	
FILENAME	PRICE-04 FINAL.DWG
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SEE NOTE #5

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2.0 YEAR 2004 RESULTS AND DISCUSSION

Year 2004 monitoring results are shown for Little Pine and Brush Creek Monitoring.

2.1 Vegetation

The following describes the results of 2004 vegetation monitoring conducted at the Price Park Stream Restoration Site. Sampling and analysis methods used can be found in the appendix. Modifications to those methods are described below. Using the Draft Vegetation Monitoring Plan for NCWRP Riparian Buffer and Wetland Restoration Projects, 5 vegetation-monitoring plots located within the riparian buffer of the Price Park project were resurveyed. No reference area was studied; therefore no comparisons could be made to reference conditions.

2.1.1 Results and Discussion

Vegetation within the riparian buffer of this unnamed tributary to Horsepen Creek is overall considered unsuccessful. The upper portion of the restoration site (above road culvert) was scantily vegetated with very few native species. Vegetation below the culvert was slightly denser as the area was more wetland-like and contained wetter herbaceous species such as *Juncus* spp. (rushes) and *Care* spp. (sedges). The planted native herbaceous vegetation noted was *Helianthus* spp. (sunflowers) and *Panicum* spp. (switchgrass and deertongue). These occurred mainly on the floodplain and were growing well. The banks were largely devoid of vegetation. Microstegium and Lespedeza were among many exotics located within these areas. Live stakes were absent throughout the entire project. Planted trees and shrubs are doing poorly throughout the entire buffer, although a few sycamores (*Platanus occidentalis*) were growing well at a few locations. Volunteer species of *Cornus amomum* (silky dogwood), *Alnus serrulata* (tag alder), and *Sambucus canadensis* (elderberry) are scattered sparsely throughout. Tree mortality was apparently high when compared to the number of trees initially planted. Extrapolation from the five plots resulted in an overall average of approximately 32-planted trees per acre for this restoration site. If natural regeneration is included with planted trees, the number is increased to an average of approximately 168 trees per acre. Both of these estimates are based on a diverse mix of species as well. Natural regeneration obviously plays an important role in the restoration of this site; however, more trees are needed to meet mitigation requirements.

Invasive plant species on the site included *Lonicera japonica* (Japanese honeysuckle), *Pueraria lobata* (kudzu), *Lespedeza cuneata*, *Celastrus orbiculatus* (oriental bittersweet), *Microstegium vimineum*, and *Rosa multiflora* (multiflora rose). Kudzu and oriental bittersweet are of major concern due to their prolific spreading and choking tendencies. Kudzu was documented both upstream and downstream of the culvert in small patches. It has covered more area as compared to last year's survey. Bittersweet was heavy in adjacent mature trees above the culvert and will likely work its way into the buffer. Multiflora rose, honeysuckle, and lespedeza were scattered throughout and nowhere abundant.

Recommendations include replanting trees to obtain mitigation requirements. The site could benefit from larger containerized trees both for bank stability and aesthetics. This site would have greatly benefited from live stakes during the initial restoration construction. It is recommended to stake in areas where erosion is problematic, particularly on outside meander bends. Live staking should also help in the establishment of herbaceous vegetation on the bare banks. Coir matting in critical areas along the banks may also help with the establishment of vegetation and protect banks from further erosion. Although invasive vegetation has not consumed this project site, there are numerous species that should be controlled now, most importantly kudzu and oriental bittersweet.

2.2 Morphology

Restored channel dimension, pattern, profile and substrate were examined during the 2004 monitoring.

2.2.1 Results and Discussion

Channel profile along Price Park has maintained grade over the past year for the majority of the restored reach. Down cutting that occurred in the first two years has not continued. Channel profile results have remained similar to 2003 measurements. The riffles have steepened and runs have flattened slightly. Feature locations have remained in tact from 2003 survey. Pools have maintained dept and have not scoured excessively.

Channel pattern has not changes significantly from 2003 measurements. There is some bank scour and erosion but not to the point it has changed pattern to any measurable degree.

Channel cross-sections have remained mostly consistent since construction. There are areas of bank slumping as evident in cross-section #3. Most bank slumping appears to be the result of overland flow washing into the channel. Cross-section #1 has maintained cross-section over the past year where it was enlarging the prior two years. The pool cross section slightly increased in area and the two other riffles (#3 and #4) have maintained there area over the past year.

Channel substrate in cross section #4 (riffle) coarsened slightly over the past year. Cross-sections #2 (pool) and #3 (riffle) remained similar to last year's condition. Cross section #1 (riffle) had a decrease in coarseness over the past year.

Channel banks throughout the project vary in condition from stable and well vegetated to eroding with no vegetation. Eroded areas appear to be the result of upland and floodplain drainage into the channel and lack of stream bank vegetation. This is a particular problem in areas where the new channel approached the old channel that we filled in. Stormwater appears to be traveling down the floodplain in the location of the old channel and intersecting the new channel in two locations (stations 3+50 and 5+00). In these areas, herbaceous vegetation has not established and the channel bank is scouring from the top down. Stormwater is also draining from depressions on the floodplain and entering the channel in concentrated form at stations 7+40, 8+50, 13+50 through 13+70

and 14+10. Streambanks in these areas are eroded as well. Vegetation along some of the streambanks is sparse and needs supplemental planting to establish root mass on the banks. Lack of vegetation is a problem between station 0+80 and 4+00.

2.3 Macroinvertebrate Results

This restoration project is in a small, stormwater driven stream in Greensboro. The reference site was selected above the restoration reach and station 2 is within the restoration reach just below a walkway/road over the stream. The reference site is located at the end of a paved walkway at a fence line marking a property line. The stream at this point appeared relatively stable with good habitat. Rocky riffles and undercut banks provided good habit. A few relatively intolerant taxa were collected from this site during the pre-construction survey and not at the downstream location (Paraleptophlebia, Triaenodes tardus, Brillia, Stylogomphus and Gomphus) and many more taxa were abundant here and reduced in abundance at the downstream site during this survey. Part of the difference in taxa richness between these two sites is likely due to the lack of riparian canopy and habitat at the downstream location (both prior and following construction) compared to riparian density upstream within the reference reach.

The results of the first survey following construction (2003) illustrate that water quality conditions at both sites declined. Note significantly lower taxa richness values and fewer keystone species at both sites. This may be a response to flow conditions prior to the investigations, since small urban streams will receive more stormwater during wet years (i.e. 2003) than during dry years (i.e. 2001). Despite these catchment wide conditions, there were differences in the fauna at these two sites in 2003. Principle among these differences is the presence of keystone taxa (intolerant taxa or those taxa that represent stable habitat) at the upstream site and not at the restored location. These taxa include the mayfly Paraleptophlebia, the Dipteran Dixa and the snail Ferrissia. The two EPT taxa that accounted for the increase in EPT abundance are tolerant taxa (Baetis flavistriga and Cheumatopsyche). Success at this project may approach proposed DIC criteria with more time during which stabilization may occur and some of the keystone species may start to inhabit the downstream reach of this stream.

Table 2. Summary statistics from the stream restoration project at Price Park (Guilford County)

	Upstream Reference			Restored Reach, site 2		
Metric/Survey	5/2001	5/2003	6/2004	5/2001	5/2003	6/2004
Total Taxa Richness	35	22	28	37	18	22
EPT Taxa Richness	7	3	5	7	2	4
EPT Abundance	27	5	18	13	20	31
Dominant in Common Index (%)	-	-	-	40%	64%	44%
# Keystone taxa	5	3	3	1	0	2

Water quality conditions appear to improve somewhat within this catchment during the 2004 survey compared to the data in 2003. Taxa richness and EPT abundance values are higher at both locations during this survey. Some improvements were also noted within

the restored reach as the number of keystone taxa increased from 0 in 2003 to 2 in 2004. Lower DIC numbers were seen at this location, but this may be an artifact of the very low numbers of taxa (and higher DIC) during the 2003 survey. The EPT abundance value at the restored reach is due to the high numbers of the tolerant mayfly Baetis flavistriga, and the net-spinning caddisfly (Hydropsychidae).

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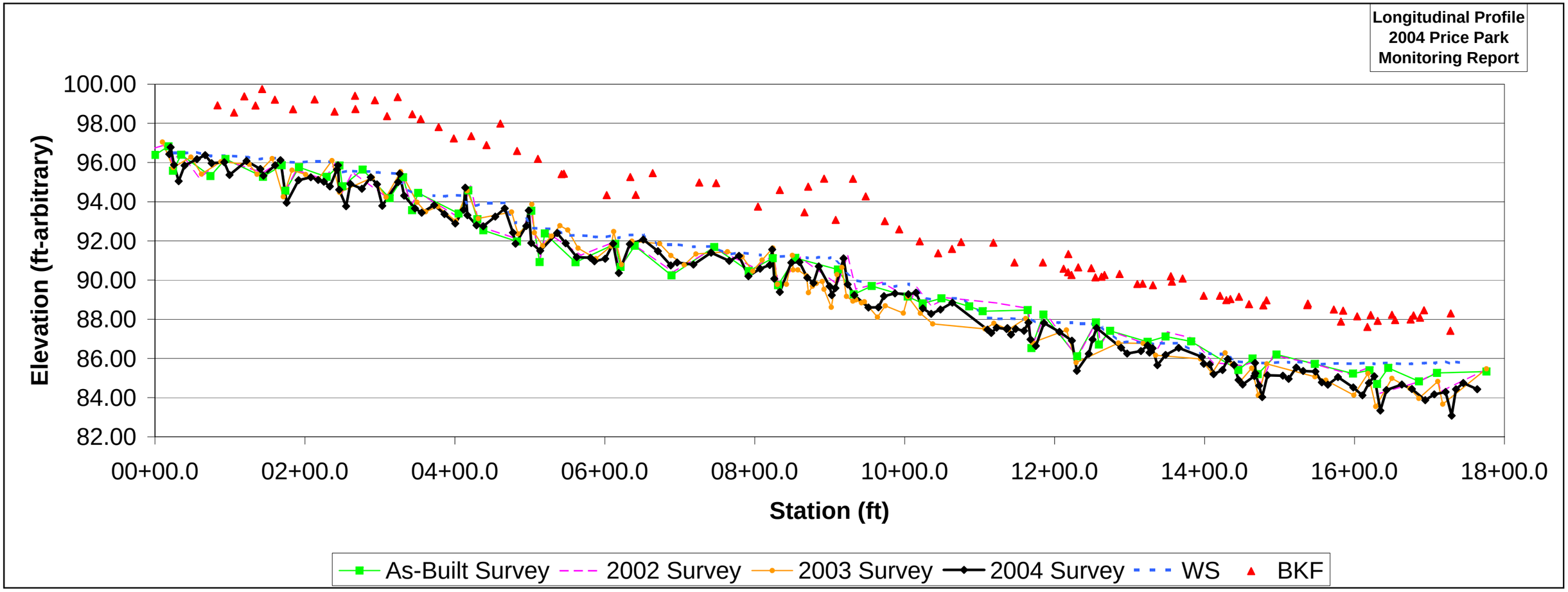
	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004	As-built	Dec-02	2003	2004
Bankfull Cross-sectional Area	24.1	25.6	37.0	36.5	50.6	49.3	44.9	46.2	31.9	28.4	31.9	28.4	36.7	43.4	36.3	35.1
Bankfull Width	13.3	14.8	15.0	16.8	22.2	21.0	21.2	21.2	14.0	14.0	14.7	14.7	17.2	19.1	17.2	17.1
Bankfull Mean Depth	1.8	1.7	2.5	2.2	2.3	2.3	2.1	2.2	2.3	2.0	2.2	1.9	2.1	2.3	2.1	2.0
Bankfull Max Depth	3.5	3.6	4.3	4.3	4.9	4.8	4.8	4.3	3.6	3.4	3.6	3.5	3.2	3.6	3.7	3.7

PATTERN	Price Park As-built			Price Park 2002			Price Park 2004		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Meander Wave Length	127	183	150	118	197	162	126	211	162
Radius of Curvature	49	84	65	48	85	61	27	97	50
Beltwidth	49	80	-	52	95	-	46	97	69

PROFILE	Price Park As-built			Price Park 2003*			Price Park 2004		
	Min	Max	Median	Min	Max	Median	Min	Max	Median
Riffle Length	Not Reported			9	87	47	8.6	38.0	19.1
Riffle Slope	Not Reported			0.32%	3.01%	0.92%	0.58%	8.42%	1.83%
Run Length	Not Reported			29.4	79.3	37.3	16.8	104.8	54.3
Run Slope	Not Reported			-0.03%	0.69%	0.12%	-0.03%	0.48%	0.07%
Pool Length	Not Reported			28	73	59	15.0	71.0	35.0
Pool to Pool Spacing	21	153	92	34.5	219	62.5	15.0	58.0	35.0

SUBSTRATE	Price Park Cross-section #1 Riffle			Price Park Cross-section #2 Pool			Price Park Cross-section #3 Riffle			Price Park Cross-section #4 Riffle		
	As-built	2003	2004	As-built	2003	2004	As-built	2003	2004	As-built	2003	2004
D50	0.34	0.11	2.6	0.26	1.35	2.3	0.16	0.14	0.60	0.25	0.30	1.41
D85	87.7	19.6	8.0	1.5	14.5	13.7	6.7	12.1	8.5	6.9	14.8	16.7

VEGETATION	Quad 1 - JP		Quad 2 - JP		Quad 3 -JP		Quad 4 - JP		Quad 5 -JP	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Tree Stratum (stems/acre)-planted	0	0	40	40	0	0	120	80	80	40
Trees - natural regeneration	160	202	240	405	40	81	0	0	0	0
Shrub Stratum (% cover)	0.5	1.5	0.5	0	0.5	0	1	1	0	0
Herb Stratum (%cover)	7.5	6.5	97	2	17.5	0	87	125	70	41


Longitudinal Profile
2004 Price Park
Monitoring Report
Elevation (ft-arbitrary)
100.00
98.00
96.00
94.00
92.00
90.00
88.00
86.00
84.00
82.00
00+00.0
02+00.0
04+00.0
06+00.0
08+00.0
10+00.0
12+00.0
14+00.0
16+00.0
18+00.0
Station (ft)
As-Built Survey
2002 Survey
2003 Survey
2004 Survey
WS
BKF

2.4 Areas of Concern

2004 Areas of Concern

The following areas of concern should be monitored closely and considered for repair as suggested:

- The lack of successful vegetation in the riparian buffer
    - Supplemental plantings are needed to meet minimum density.
    - Soil should be tested for fertility and amended as directed.
- Areas with bank erosion due to overland flow washing into the channel
    - Stations 3+90, 4+40, 12+20, 14+00 and 15+50
    - Station 12+20 has degraded to the point that the bank is not likely to heal with the addition of vegetation alone.
    - These areas should be examined closely to see if a structure is necessary to provide a stable method of allowing the water to enter the channel or if vegetation will be adequate.
    - These areas should be monitored closely during upcoming site visits to monitor degradation.
- The lack of successful herbaceous cover along sections of the streambanks.
    - Areas included are from stations 0+80 to 3+50 and small sections around stations 4+40, 14+00 and 15+50
    - These areas should be reseeded.
    - It will be required to prepare a seedbed in order establish herbaceous cover.
    - Station 14+00 has degraded to the point that the bank is not likely to heal with the addition of vegetation alone.
- The lack of successful vegetation in the riparian buffer
    - Supplemental plantings are needed to meet minimum density.
- Vegetation
    - Live stakes are needed to enhance the rootmass along the streambanks
    - Replanting trees to obtain mitigation requirements
    - The site could benefit from larger containerized trees both for bank stability and aesthetics.
    - Monitor invasive vegetation.
    - In order to re-establish a stable stand of herbaceous cover on many of the degraded areas along the streambanks, soil preparation will be necessary because the exposed soil is nutrient poor and highly compacted.

2003 Areas of Concern

The following 2003 areas of concern and how they were resolved:

- The lack of successful vegetation in the riparian buffer
    - Supplemental plantings are needed to meet minimum density.
    - Soil should be tested for fertility and amended as directed.

Resolution: Replanting remains necessary to meet mitigation requirements.

- Down-cutting
    - This area should be monitored to ensure the down-cutting does not continue up through the project.

Resolution: No further downcutting has occured between 2003 and 2004 monitoring periods.

- Areas with bank erosion due to overland flow washing into the channel
    - These areas should be examined closely to see if a structure is necessary to provide a stable method of allowing the water to enter the channel or if vegetation will be adequate.
    - These areas should be monitored closely during upcoming site visits to monitor degradation.

Resolution: Erosional areas resulting from concentrated overland flow remain a problem

- The lack of successful herbaceous cover along sections of the streambanks.
    - These areas should be reseeded.
    - It will be required to prepare a seedbed in order establish herbaceous cover.

Resolution: Herbaceous cover remains a problem on several areas of streambank.

Vegetation Overall

- Replanting trees to obtain mitigation requirements
    - The site could benefit from larger containerized trees both for bank stability and aesthetics.

Resolution: Recommendation remains.

- Stake only in areas where erosion is problematic
    - Live staking should also help in the establishment of herbaceous vegetation on the bare banks.

Resolution: Recommendation remains.

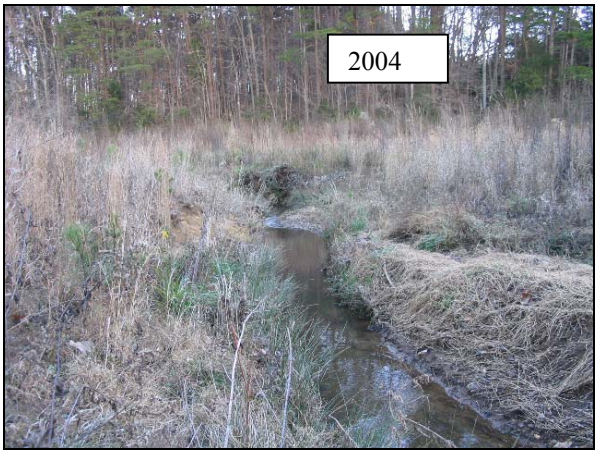
- Monitor invasive vegetation
    - Although invasive vegetation has not consumed this project site, there are numerous species that should be controlled now, most importantly kudzu and oriental bittersweet.

Resolution: Recommendation remains.

Photo Reference Points

Price Park Stream Restoration
Guilford County, North Carolina

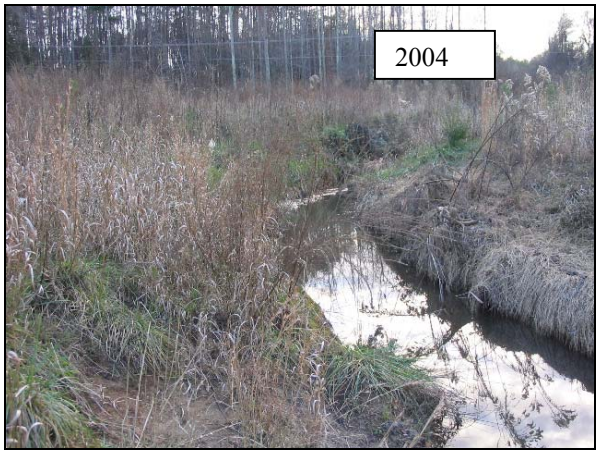
M1-US: Meander 1, looking in the upstream direction. Fenceline represents the beginning of the project and longitudinal profile. Note bar formation and vegetation establishment in this region.



M1-DS: View from Meander 1, looking downstream towards M2.

M2-US: View from Meander 2 looking in the upstream direction towards M1.

M2-DS: View from Meander 2, looking downstream at M3.



M3-US: View from Meander 3 looking upstream.

M3-DS: View from Meander 3 looking downstream towards a cross vane that was installed after the main construction period due to concerns with the grade downstream.

M4-US: View from Meander 4 looking upstream at Meander 3.

M4-DS: View from Meander 4 looking downstream towards Meander 5.

M5-US: View from Meander 5 looking upstream towards Meander 4.62

M5-DS: View from Meander 5 looking downstream towards Meander 6. 63

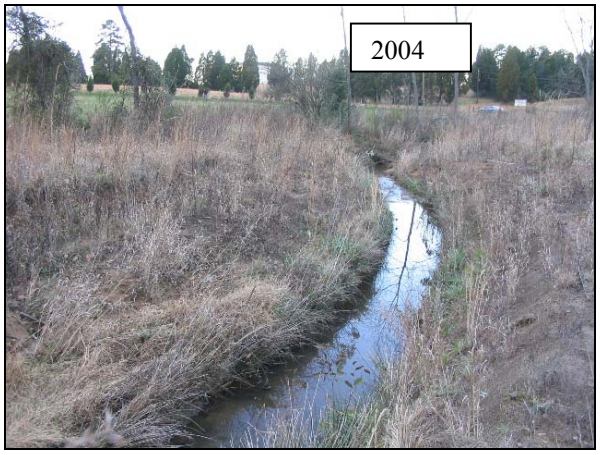
M6-US: View from Meander 6 looking upstream towards Meander 5. Note rip-rap was installed at the end of construction due to bed downcutting. 64

M6-DS: View from Meander 6 looking downstream. 65

M7-US: View from Meander 7 looking upstream. 66

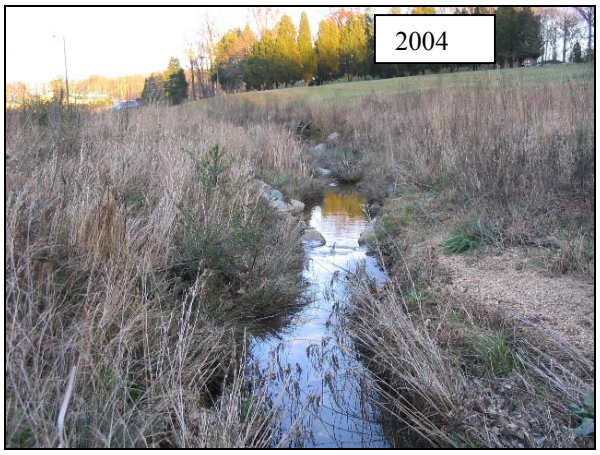
M7-DS: View from Meander 7 looking downstream.67

M8-US: View from Meander 8 looking upstream. 68



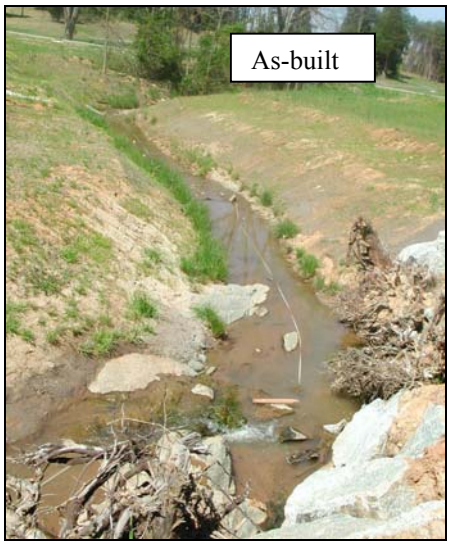
M8-DS: View from Meander 8 looking downstream towards Meander 9. 69

M9-US: View from Meander 9 looking upstream. 70



M9-DS: View from Meander 9 looking downstream. Note the point bar formation in the lower right corner of picture.71

M10-US: View from Meander 10 looking upstream. 72



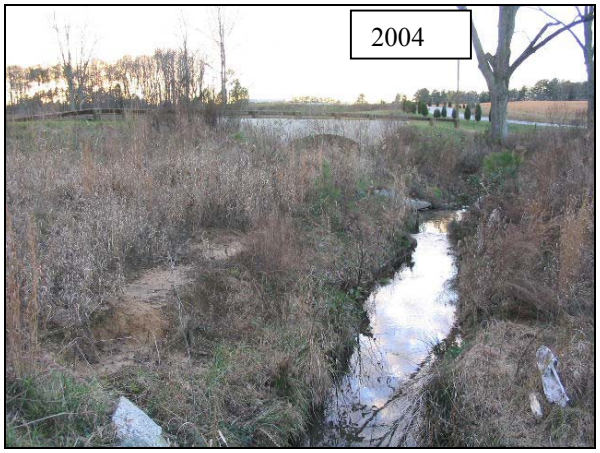
M10-DS: View from Meander 10 looking downstream. Note the bedrock in the bed of the channel exposed during construction.73

M11-US: View from Meander 11 looking upstream. 74

M11-DS: View from Meander 11 looking downstream. Jefferson Club Road crosses the stream via this 14' x 7.5 box culvert. 75

M12-US: View from Meander 12 looking upstream through the culvert. Note how the channel has narrowed and vegetated in the Year 1 photograph.76

M12-DS: View from Meander 12 looking downstream. 77



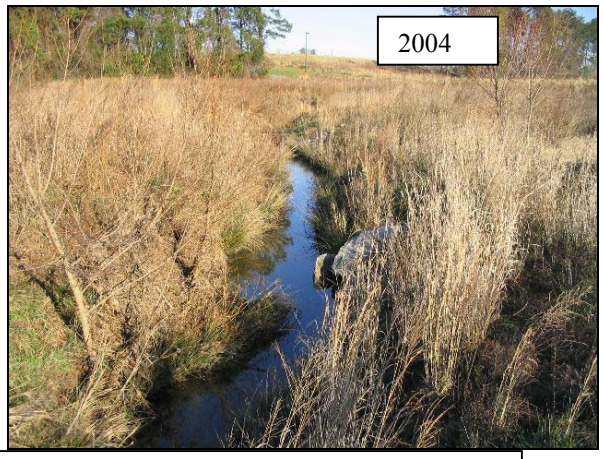
M13-US: View from Meander 13 looking upstream. 79

M13-DS: View from Meander 13 looking downstream. 80

M14-US: View from Meander 14 looking upstream. 81

M14-DS: View from Meander 14 looking downstream. Note stone step-pool outfall to connecting roadway drainage to stream channel.82

M15-US: View from Meander 15 looking upstream. 83



M15-DS: View from Meander 15 looking downstream. Note this cross-vane was moved upstream into the meander to avoid a gas line during construction. In effect, the upper portion of the cross vane has been covered up by the point bar.84

M16-US: View from Meander 16 looking upstream. The aerial sewer line was re-routed to make it perpendicular to the stream.85

M16-DS: View from Meander 16 looking downstream. Cross-vane is drowned out due to backwater from the off-site lake downstream. 86

M17-US: View from Meander 17 looking upstream. 87

M17-DS: View from Meander 17 looking downstream towards the double 10’ x 8’ box culvert. Cross-vane is drowned out.88

Project Name	Price Park
Cross Section	#1
Feature	Riffle
Date	6/4/04
Crew	Howard, Spangler, Langagar, Small, Godley

adjusted up 1.63

adjusted up 1.63

2001 As-Build Survey

Station	Elevation	Notes
0.0	98.4	edge scrub v
23.6	98.9	LT BOB
25.6	97.8	Toe BOB
27.5	97.5	
34.0	97.2	LBKF
38.6	95.1	
39.4	94.0	LEW/WS
41.4	93.8	TW
43.0	94.1	REW
43.7	95.3	
45.2	96.1	
47.3	97.2	RBKF
49.0	98.1	
54.8	98.5	Toe BOB
57.7	99.7	RT BOB
59.7	100.1	
74.0	100.6	
100.0	100.6	
124.0		edge g-way

2002 2002 Survey

Station	Elevation	Notes
0	98.55	LPIN GRD
12	98.72	
24	98.99	LT BOB
26	97.76	Toe BOB
34.3	97.35	LBKF
37.5	96.03	
38.7	94.58	
38.9	94.32	LEW
42.2	93.71	TW
44	93.8	REW
44.1	95.78	
44.8	96.01	
47.4	97.35	
49.1	98.25	RBKF
55.3	98.71	Toe BOB
56	98.99	
59	100.17	RT BOB
73	100.67	
86	100.67	
91.5	100.49	
100	100.67	RPIN GRD
124	101.4	edge g-way

2003 2003 Survey

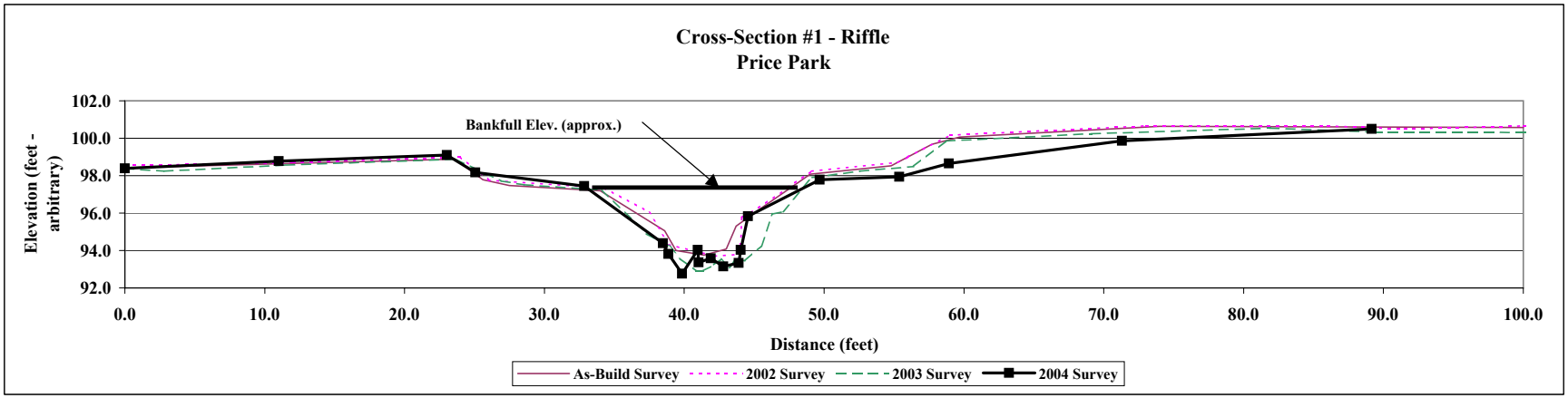
Station	Elevation	Notes
0	98.3877	
2.81	98.25001	
11.5	98.56661	LPIN GRD
23.67	98.89014	LT BOB
26.91	97.71921	
28.56	97.51953	
34.14	97.244	LBKF
37.32	94.89443	
38.96	94.22712	
39.72	93.5669	
40.82	92.9152	
41.35	92.9173	
42.14	93.23559	
42.62	93.53453	TW
43.21	93.08141	
43.7	93.5185	
44.38	93.45383	
45.51	94.24056	
46.3	95.96063	
47.05	96.08462	
49.14	97.90004	RBKF
52.56	98.24567	
56.42	98.5006	
58.72	99.86416	
69.13	100.25143	RPIN GRD
81.89	100.54242	
89.22	100.33631	
101.78	100.30646	
113.56	100.53927	
122.79	100.89963	

2004 2004 Survey

Station	Elevation	Notes
0	98.39	X1PIN
11.01	98.78	
23.03	99.11	
25.07	98.18	
32.85	97.45	LBKF
38.48	94.39	
38.88	93.82	
39.84	92.76	
40.96	94.03	X1W
41.02	93.36	
41.91	93.58	X1W
42.79	93.15	
43.9	93.34	
44.04	94.04	
44.57	95.83	
49.68	97.79	RBKF
55.37	97.94	
58.92	98.66	
71.3	99.87	
89.17	100.50	X1PIN

Photo of Cross-Section #1 - Looking Upstream

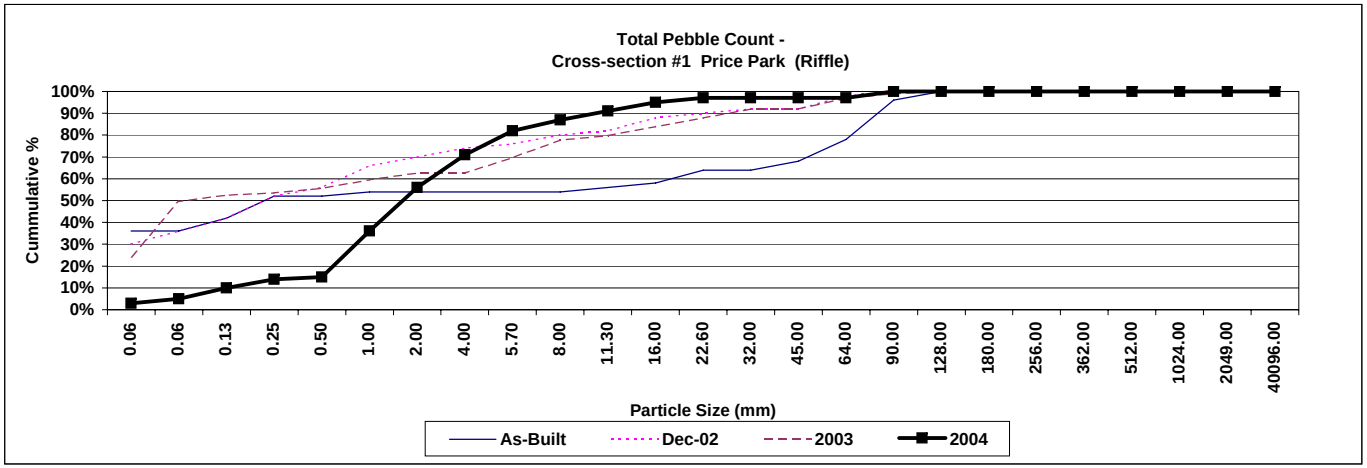
	As-Built	2002	2003	2004
Area	24.1	25.64	36.31	36.52
Width	13.3	14.8	15.0	16.8
Mean Depth	1.8	1.7	2.4	2.2
Max Depth	3.5	3.6	4.3	4.3



Project Name	Price Park
Cross Section	#1
Feature	Riffle
Date	
Crew	Clinton, Bidelspach

			As-Built			Dec-02			2003	2003			2004		
Description	**Material**	**Size (mm)**	**Riffle**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**	**Bank**	**Bed**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	18	36.0%	36.0%	15	30.0%	30.0%	15	9	24.2%	24.2%	3	3.0%	3.0%
Sand	very fine sand	0.062	0	0.0%	36.0%	3	6.0%	36.0%	24	1	25.3%	49.5%	2	2.0%	5.0%
	fine sand	0.125	3	6.0%	42.0%	3	6.0%	42.0%	1	2	3.0%	52.5%	5	5.0%	10.0%
	medium sand	0.25	5	10.0%	52.0%	5	10.0%	52.0%		1	1.0%	53.5%	4	4.0%	14.0%
	course sand	0.50	0	0.0%	52.0%	2	4.0%	56.0%		2	2.0%	55.6%	1	1.0%	15.0%
	very course sand	1.0	1	2.0%	54.0%	5	10.0%	66.0%		4	4.0%	59.6%	21	21.0%	36.0%
G r a v e l	very fine gravel	2.0	0	0.0%	54.0%	2	4.0%	70.0%		3	3.0%	62.6%	20	20.0%	56.0%
	fine gravel	4.0	0	0.0%	54.0%	2	4.0%	74.0%		0	0.0%	62.6%	15	15.0%	71.0%
	fine gravel	5.7	0	0.0%	54.0%	1	2.0%	76.0%		7	7.1%	69.7%	11	11.0%	82.0%
	medium gravel	8.0	0	0.0%	54.0%	2	4.0%	80.0%		8	8.1%	77.8%	5	5.0%	87.0%
	medium gravel	11.3	1	2.0%	56.0%	1	2.0%	82.0%		2	2.0%	79.8%	4	4.0%	91.0%
	course gravel	16.0	1	2.0%	58.0%	3	6.0%	88.0%		4	4.0%	83.8%	4	4.0%	95.0%
	course gravel	22.6	3	6.0%	64.0%	1	2.0%	90.0%		4	4.0%	87.9%	2	2.0%	97.0%
	very course gravel	32	0	0.0%	64.0%	1	2.0%	92.0%		4	4.0%	91.9%	0	0.0%	97.0%
	very course gravel	45	2	4.0%	68.0%	0	0.0%	92.0%		0	0.0%	91.9%	0	0.0%	97.0%
Cobble	small cobble	64	5	10.0%	78.0%	3	6.0%	98.0%		5	5.1%	97.0%	0	0.0%	97.0%
	medium cobble	90	9	18.0%	96.0%	1	2.0%	100.0%		2	2.0%	99.0%	3	3.0%	100.0%
	large cobble	128	2	4.0%	100.0%	0	0.0%	100.0%		1	1.0%	100.0%	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		40	59	100.0%		100	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.06	0.06	0.34	87.67	107.22
Dec-02	0.06	0.09	0.34	15.53	65.75
2003	0.06	0.08	0.11	19.62	68.22
2004	0.79	1.46	2.55	7.97	19.30



Project Name	Price Park
Cross Section	#2
Feature	Pool
Date	6/4/04
Crew	Howard, Spangler, Langagar, Small, Godley

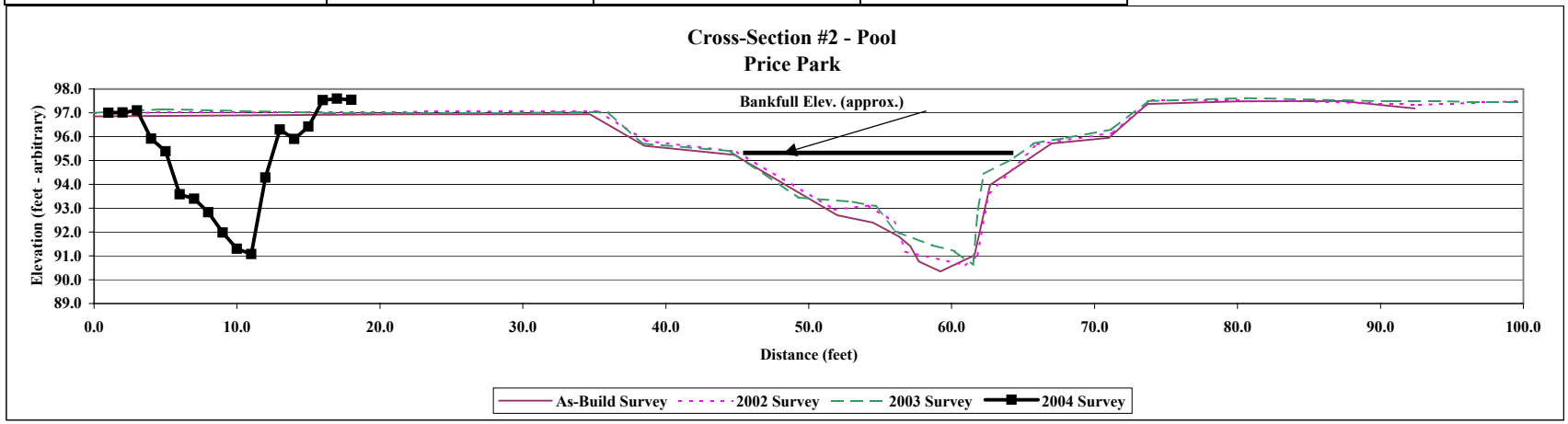
2001			**2002**			**2003**			**2004**		
As-Build Survey			**2002 Survey**			**2003 Survey**			**2004 Survey**		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
0.0	96.9	LPIN	0	97	LPIN GRD	0	97.00	LPIN GRD	0	97.00	X2PIN
21.4	96.9		15	97.03		4.81	97.14		15.5	97.01	
34.7	96.9	LT BOB	35.3	97.07	LT BOB	16.12	97.00		34.58	97.10	
38.5	95.6	Toe BOB	38.6	95.83	Toe BOB	26.54	96.98		38.51	95.91	
44.8	95.2	LBKF	45	95.37	LBKF	35.97	97.04	LT BOB	44.84	95.38	LBKF
52.0	92.7		51.8	92.94	bench	38.34	95.72	Toe BOB	49.13	93.58	
54.5	92.4		54.2	93.11		44.55	95.40	LBKF	53.27	93.40	
56.3	91.8	LEW/WS	56	92.42		49.27	93.44		55.87	92.83	
57.1	91.4		56.8	91.17	LEW	53.1	93.27		56.69	91.97	
57.7	90.8		61	90.6	TW	54.65	93.09		59.27	91.94	X2W
59.2	90.4	TW @ root	61.8	91.04		56.06	92.04		59.34	91.30	
61.6	91.0		62.6	93.64		58.62	91.44		62.03	91.07	
62.7	94.0		66	95.68	RBKF	58.67	91.44		64.1	94.29	
67.0	95.7	RBKF	71.3	96.16	Toe BOB	60.21	91.20		66.03	96.30	RBKF
71.0	96.0	Toe BOB	74	97.54	RT BOB	61.49	90.63	TW	66.41	95.90	
73.7	97.4	RT BOB	84	97.5		61.83	92.93		71.99	96.42	
80.0	97.5		92.7	97.33		62.24	94.44		74.03	97.53	
87.3	97.5		100	97.49	RPIN GRD	64.43	95.12		82.22	97.59	
92.4	97.2					65.71	95.72	RBKF	99.9	97.54	X2PIN
100	97.29					68.03	95.96	Toe BOB			
						71.17	96.29				
						73.74	97.50	RT BOB			
						80.58	97.62				
						90.67	97.48				
						99.55	97.47	RPIN GRD			

adjusted up 2.50

adjusted up 2.50

Photo of Cross-Section #2 - Looking Upstream

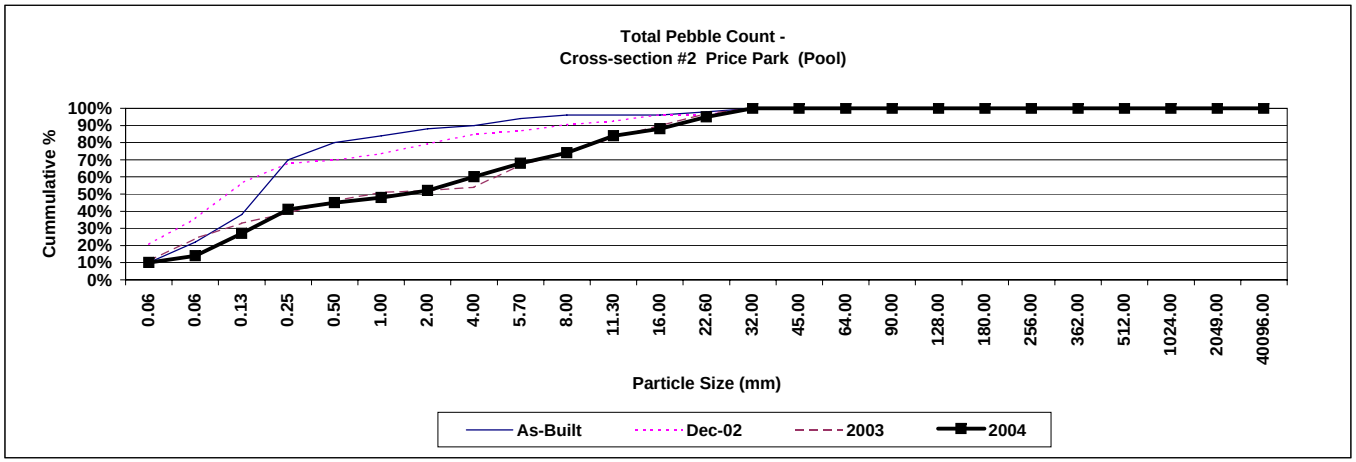
	As-Built	**2002**	**2003**	**2004**
Area	50.6	49.28	44.90	47.04
Width	22.2	21.0	21.2	21.2
Mean Dept	2.3	2.3	2.1	2.2
Max Depth	4.9	4.8	4.8	4.3



Project Name	Price Park
Cross Section	#2
Feature	Pool
Date	
Crew	Clinton, Bidelspach

			As-Built			Dec-02							2004		
Description	**Material**	**Size (mm)**	**Pool**	**%**	**Cum %**	**Pool**	**%**	**Cum %**	**Bank**	**Bed**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	5	10.0%	10.0%	11	20.8%	20.8%	11	0	11.0%	11.0%	10	10.0%	10.0%
Sand	very fine sand	0.062	6	12.0%	22.0%	8	15.1%	35.8%	13	0	13.0%	24.0%	4	4.0%	14.0%
	fine sand	0.125	8	16.0%	38.0%	11	20.8%	56.6%	9	0	9.0%	33.0%	13	13.0%	27.0%
	medium sand	0.25	16	32.0%	70.0%	6	11.3%	67.9%	6	0	6.0%	39.0%	14	14.0%	41.0%
	course sand	0.50	5	10.0%	80.0%	1	1.9%	69.8%	7	0	7.0%	46.0%	4	4.0%	45.0%
	very course sand	1.0	2	4.0%	84.0%	2	3.8%	73.6%	4	1	5.0%	51.0%	3	3.0%	48.0%
G r a v e l	very fine gravel	2.0	2	4.0%	88.0%	3	5.7%	79.2%	1	0	1.0%	52.0%	4	4.0%	52.0%
	fine gravel	4.0	1	2.0%	90.0%	3	5.7%	84.9%	0	2	2.0%	54.0%	8	8.0%	60.0%
	fine gravel	5.7	2	4.0%	94.0%	1	1.9%	86.8%	2	11	13.0%	67.0%	8	8.0%	68.0%
	medium gravel	8.0	1	2.0%	96.0%	2	3.8%	90.6%	1	6	7.0%	74.0%	6	6.0%	74.0%
	medium gravel	11.3	0	0.0%	96.0%	1	1.9%	92.5%	2	7	9.0%	83.0%	10	10.0%	84.0%
	course gravel	16.0	0	0.0%	96.0%	2	3.8%	96.2%	1	6	7.0%	90.0%	4	4.0%	88.0%
	course gravel	22.6	1	2.0%	98.0%	0	0.0%	96.2%	1	6	7.0%	97.0%	7	7.0%	95.0%
	very course gravel	32	1	2.0%	100.0%	2	3.8%	100.0%		3	3.0%	100.0%	5	5.0%	100.0%
	very course gravel	45	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%		0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		53	100.0%		58	42	100.0%		100	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.08	0.17	0.26	1.50	8.25
Dec-02	0.00	0.09	0.16	4.55	17.46
2003	0.07	0.25	1.35	14.46	25.01
2004	0.11	0.29	2.25	13.65	27.30



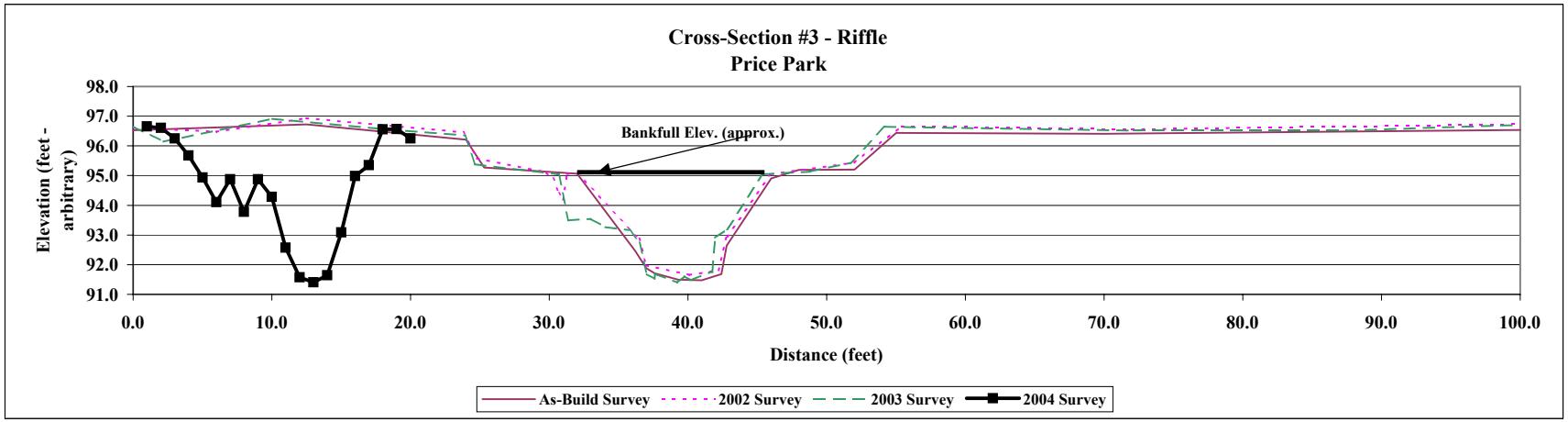
Project Name	Price Park
Cross Section	#3
Feature	Riffle
Date	6/4/04
Crew	Howard, Spangler, Langagar, Small, Godley

*adjusted up 2.51 feet adjusted up 2.51

2001 As-Build Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
0.0	96.5	LPIN	0	96.62	LPIN GRD	0	96.65	LPIN GRD	0	96.65	X3PIN
12.5	96.7		6	96.48		2.2	96.14		16.9	96.60	
24.0	96.2	LT BOB	12.5	96.93		10.05	96.91		23.68	96.25	
25.3	95.3		23.8	96.46	LT BOB	18.28	96.56		23.96	95.67	
32.0	95.1	LBKF	24.8	95.58	Toe BOB	23.93	96.35	LT BOB	28.42	94.93	
36.2	92.5		29.8	95.1	overland wa	24.66	95.38	Toe BOB	29.32	94.10	
37.0	91.9		30.3	94.91	overland wa	30.59	95.04		30.31	94.87	
37.6	91.7	LEW/WS	30.7	94.4	overland wa	30.7	95.04	LBKF	30.44	93.77	
39.3	91.5		31	94.18	overland wa	31.38	93.49		31.13	94.87	LBKF
41.0	91.5	TW	31.3	95.05		33.01	93.54		31.36	94.28	
42.4	91.7	REW	32	95.07	LBKF	34.05	93.26		36.95	92.57	
42.8	92.6		36.5	92.88		35.78	93.16		37.67	91.57	
46.0	94.9	RBKF	37	91.98	LEW	36.52	92.74		39.15	91.65	X3W
48.0	95.2		40.1	91.65	TW	37.03	91.68		39.16	91.40	
52.0	95.2		42.2	91.81	REW	37.58	91.52		41.64	91.64	
55.0	96.4	RT BOB	42.8	92.95		37.64	91.70		42.53	93.08	
70.0	96.4		46	95.04	RBKF	39.23	91.40	TW	45.87	94.98	RBKF
100.0	96.5	RPIN	52	95.44	Toe BOB	39.75	91.61		51.78	95.35	
			55.4	96.67	RT BOB	40.22	91.48		54.61	96.55	
			72	96.56		41.54	91.74		70.57	96.56	
			100	96.73	RPIN GRD	41.75	91.75		90.23	96.25	
						41.96	92.91				
						42.8	93.20				
						45.42	95.04	RBKF			
						48.8	95.13	Toe BOB			
						51.69	95.43	RT BOB			
						54.21	96.65				
						72.15	96.52				
						87.47	96.52				
						99.76	96.71	RPIN GRD			

Photo of Cross-Section #3 - Looking Downstream

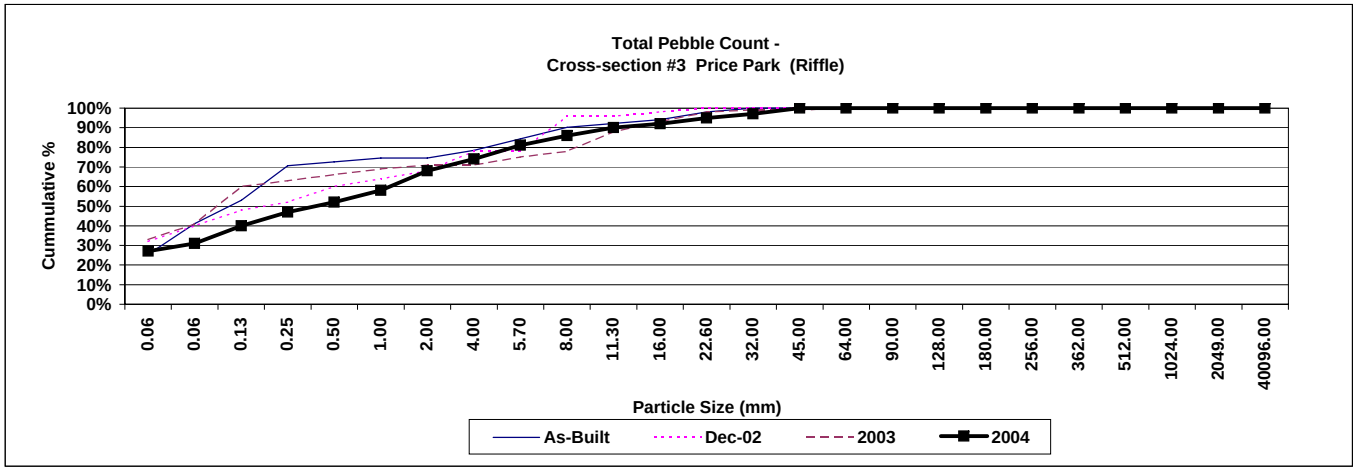
	As-Built	2002	2003	2004
Area	31.9	28.41	31.93	29.98
Width	14.0	14.0	14.7	14.7
Mean Dept	2.3	2.0	2.2	2.0
Max Depth	3.6	3.4	3.6	3.6



Project Name	Price Park
Cross Section	#3
Feature	Riffle
Date	
Crew	Clinton, Bidelspach

			As-Built			Dec-02						2004			
Description	**Material**	**Size (mm)**	**Riffle**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**	**Bank**	**Bed**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	13	25.5%	25.5%	16	32.0%	32.0%	30	3	33.0%	33.0%	27	27.0%	27.0%
Sand	very fine sand	0.062	8	15.7%	41.2%	4	8.0%	40.0%	6	2	8.0%	41.0%	4	4.0%	31.0%
	fine sand	0.125	6	11.8%	52.9%	4	8.0%	48.0%	11	8	19.0%	60.0%	9	9.0%	40.0%
	medium sand	0.25	9	17.6%	70.6%	2	4.0%	52.0%		3	3.0%	63.0%	7	7.0%	47.0%
	course sand	0.50	1	2.0%	72.5%	4	8.0%	60.0%		3	3.0%	66.0%	5	5.0%	52.0%
	very course sand	1.0	1	2.0%	74.5%	2	4.0%	64.0%		3	3.0%	69.0%	6	6.0%	58.0%
G r a v e l	very fine gravel	2.0	0	0.0%	74.5%	2	4.0%	68.0%		2	2.0%	71.0%	10	10.0%	68.0%
	fine gravel	4.0	2	3.9%	78.4%	5	10.0%	78.0%		0	0.0%	71.0%	6	6.0%	74.0%
	fine gravel	5.7	3	5.9%	84.3%		0.0%	78.0%	1	3	4.0%	75.0%	7	7.0%	81.0%
	medium gravel	8.0	3	5.9%	90.2%	9	18.0%	96.0%		3	3.0%	78.0%	5	5.0%	86.0%
	medium gravel	11.3	1	2.0%	92.2%		0.0%	96.0%	1	9	10.0%	88.0%	4	4.0%	90.0%
	course gravel	16.0	1	2.0%	94.1%	1	2.0%	98.0%	1	4	5.0%	93.0%	2	2.0%	92.0%
	course gravel	22.6	2	3.9%	98.0%	1	2.0%	100.0%		5	5.0%	98.0%	3	3.0%	95.0%
	very course gravel	32	1	2.0%	100.0%		0.0%	100.0%		1	1.0%	99.0%	2	2.0%	97.0%
	very course gravel	45	0	0.0%	100.0%		0.0%	100.0%		0	0.0%	99.0%	3	3.0%	100.0%
Cobble	small cobble	64	0	0.0%	100.0%		0.0%	100.0%		1	1.0%	100.0%	0	0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	large cobble	128	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
TOTAL / %of whole count			51	100.0%		50	100.0%		50	50	100.0%		100	100.0%	

	d16	**d35**	**d50**	**d85**	**d95**
As-Built	0.00	0.08	0.16	6.74	21.10
Dec-02	0.00	0.07	0.28	7.78	9.49
2003	0.00	0.07	0.14	12.05	22.50
2004	0.06	0.14	0.60	8.53	27.30



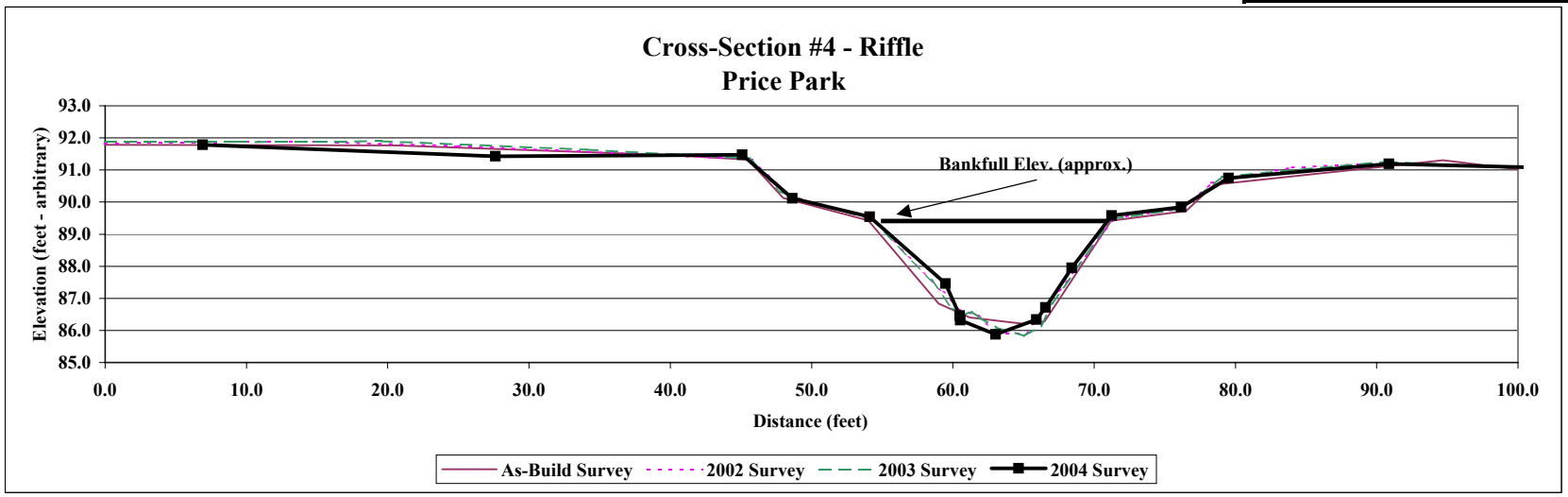
Project Name	Price Park
Cross Section	#4
Feature	Riffle
Date	6/4/04
Crew	Howard, Spangler, Langagar, Small, Godley

*adjusted by 2.43 sta adj 6.9 ft, elev adj 2.35

2001 As-Build Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
0.0	91.8		0	91.83	LPIN GRD	0	91.87	LPIN GRD	6.9	91.79	XS4LP
20.6	91.8		14	91.89		9.24	91.87		27.62	91.43	
40.0	91.5		25	91.75		19.52	91.90		45.09	91.48	XS4TB
45.5	91.3	LT BOB	45.8	91.33	LT BOB	34.09	91.63		48.65	90.12	
48.0	90.1		48.4	90.2	Toe BOB	45.58	91.36	LT BOB	54.12	89.54	XS4BF
54.0	89.4	LBKF	54.2	89.5	LBKF	47.77	90.34	Toe BOB	59.49	87.46	
59.0	86.8		59.3	87.2		49.57	90.02		60.48	86.46	XS4WS
61.2	86.4	LEW/WS	60.4	86.67	LEW/WS	54.12	89.49	LBKF	60.53	86.32	
65.0	86.2	TW	61.8	86.45		58.46	87.57		63.03	85.88	
66.5	86.3	REW	63	85.9	TW	59.96	86.69		65.91	86.34	
71.2	89.4	RBKF	65.2	85.91		60.86	86.49		66.57	86.72	
76.5	89.7		66.4	86.64	REW	61.36	86.59		68.43	87.95	
78.5	90.5	RT BOB	67.5	87.24		61.8	86.44		71.25	89.58	XS4BF
94.7	91.3		71.5	89.5	RBKF	63.07	86.09		76.15	89.85	
100.0	91.0		76.3	89.81	Toe BOB	65.05	85.83	TW	79.51	90.75	XS4TB
			78.3	90.6	RT BOB	66.25	86.14		90.88	91.19	
86.0		Sewerline C	84	91.08		66.99	86.84		100.48	91.09	XS4RP
			89	91.18		71.27	89.47	RBKF	100.48	91.08	
			100	91.11	RPIN GRD	76.27	89.79	Toe BOB			
						79.03	90.78	RT BOB			
						90.66	91.26				
						99.89	91.07	RPIN GRD			

Photo of Cross-Section #4 - Looking Upstream

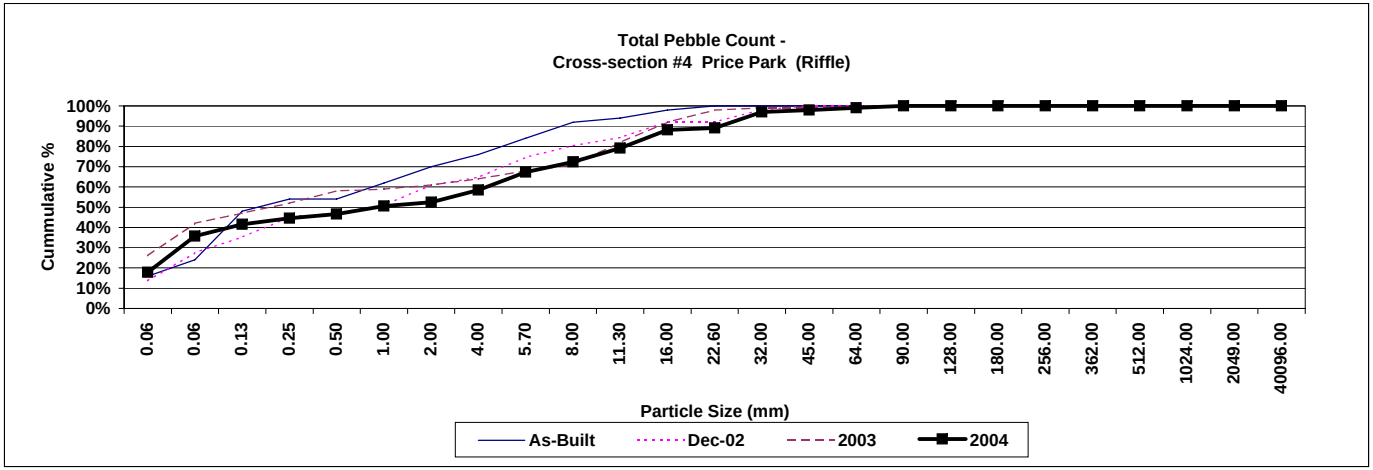
	As-Built	2002	2003	2004
Area	36.7	36.69	36.28	35.05
Width	17.2	13.3	17.2	17.1
Mean Depth	2.1	2.8	2.1	2.0
Max Depth	3.2	3.6	3.7	3.7



Project Name	Price Park
Cross Section	#4
Feature	Riffle
Date	
Crew	Clinton, Bidelspach

			As-Built			Dec-02							2004		
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bank**	**Riffle - Bed**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	8	16.0%	16.0%	7	13.7%	13.7%	24	2	26.0%	26.0%	18	17.8%	17.8%
Sand	very fine sand	0.062	4	8.0%	24.0%	7	13.7%	27.5%	16	0	16.0%	42.0%	18	17.8%	35.6%
	fine sand	0.125	12	24.0%	48.0%	4	7.8%	35.3%	4	1	5.0%	47.0%	6	5.9%	41.6%
	medium sand	0.25	3	6.0%	54.0%	5	9.8%	45.1%	2	3	5.0%	52.0%	3	3.0%	44.6%
	course sand	0.50	0	0.0%	54.0%	1	2.0%	47.1%	2	4	6.0%	58.0%	2	2.0%	46.5%
	very course sand	1.0	4	8.0%	62.0%	2	3.9%	51.0%		1	1.0%	59.0%	4	4.0%	50.5%
G r a v e l	very fine gravel	2.0	4	8.0%	70.0%	5	9.8%	60.8%		2	2.0%	61.0%	2	2.0%	52.5%
	fine gravel	4.0	3	6.0%	76.0%	2	3.9%	64.7%		3	3.0%	64.0%	6	5.9%	58.4%
	fine gravel	5.7	4	8.0%	84.0%	5	9.8%	74.5%	1	3	4.0%	68.0%	9	8.9%	67.3%
	medium gravel	8.0	4	8.0%	92.0%	3	5.9%	80.4%		3	3.0%	71.0%	5	5.0%	72.3%
	medium gravel	11.3	1	2.0%	94.0%	2	3.9%	84.3%	1	10	11.0%	82.0%	7	6.9%	79.2%
	course gravel	16.0	2	4.0%	98.0%	4	7.8%	92.2%		10	10.0%	92.0%	9	8.9%	88.1%
	course gravel	22.6	1	2.0%	100.0%	0	0.0%	92.2%		6	6.0%	98.0%	1	1.0%	89.1%
	very course gravel	32	0	0.0%	100.0%	3	5.9%	98.0%		1	1.0%	99.0%	8	7.9%	97.0%
	very course gravel	45	0	0.0%	100.0%	1	2.0%	100.0%		0	0.0%	99.0%	1	1.0%	98.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%		1	1.0%	100.0%	1	1.0%	99.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	1	1.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0	0.0%	100.0%
TOTAL / %of whole count			50	100.0%		51	100.0%		50	50	100.0%		101	100.0%	

	d16	d35	d50	d85	d95
As-Built	0.06	0.14	0.25	6.85	15.06
Dec-02	0.07	0.18	1.31	13.33	32.71
2003	0.00	0.08	0.30	14.78	23.30
2004	0.06	0.09	1.41	16.69	35.63



Project Name	Price Park
Task	Vegetation Measurements
Veg Plot	#1
Date	
Crew	Clinton, Bidelspach

Quad 1

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Pinus taeda	60	8	4	50.3	**100.0**	**5**	**100.0**	1	100
	65	8	4	50.3					
	36	3	1.5	7.1					
	52	10	5	78.5					
	59	9	4.5	63.6					
Total				**249.8**					
Overall Total				**249.8**	**100.0**	**5.0**	**100.0**		100
Total Trees per acre						202			
Planted trees per acre						0			
Natural Regeneration/acre						202			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Cornus amomum	0.5	33.3	2	40	1
Eleagnus umbellata	0.5	33.3	2	40	1
Myrica cerifera	0.5	33.3	1	20	2
Total	**1.5**	**100**	**5**	**100**	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Panicum virgatum	1	15.4	2
Andropogon sp.	0.5	7.7	3
Microstegium	5	76.9	1
Total	**6.5**	100.0	

Project Name	Price Park
Task	Vegetation Measurements
Veg Plot	#2
Date	
Crew	Clinton, Bidelspach

Quad 2

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Salix nigra	210	25	12.5	490.9	**65.9**	**2**	**18.2**	2	42.0246
	315	40	20	1256.6					
Total				**1747.5**					
Platanus occidentalis	256	18	9	254.5	**9.6**	**1**	**9.1**	3	9.341192
Total				**254.5**					
Pinus sp.	110	18	9	254.5	**24.5**	**8**	**72.7**	1	48.63421
	98	12	6	113.1					
	44	2	1	3.1					
	45	2	1	3.1					
	56	4	2	12.6					
	50	3	1.5	7.1					
	99	18	9	254.5					
	46	2	1	3.1					
Total				**651.1**					
Overall Total				**2653.1**	**100.0**	**11.0**	**100.0**		100
Total Trees per acre						445			
Planted trees per acre						40			
Natural Regeneration/acre						405			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
None					

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Festuca sp.	30	38.5	1
Pueraria lobata	30	38.5	1
Lonicera japonica	1	1.3	5
Duchesnia	2	2.6	4
Panicum virgatum	5	6.4	3
Microstegium	10	12.8	2
Total	**78**	100.0	

Project Name	Price Park
Task	Vegetation Measurements
Veg Plot	#3
Date	
Crew	Clinton, Bidelspach

Quad 3

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Pinus sp.	65	10	5	78.5	61.0	**2**	**100.0**	1	
	55	8	4	50.3	39.0				
Total				**128.8**					
Overall Total				**128.8**	**100.0**	**2.0**	**100.0**		
Total Trees per acre						81			
Planted trees per acre						0			
Natural Regeneration/acre						80			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
None					

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
None			

Project Name	Price Park
Task	Vegetation Measurements
Veg Plot	#4
Date	
Crew	Clinton, Bidelspach

Quad 4

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Quercus michauxii	89	18	9	254.5	**100.0**	**2**	**100.0**	1	100
	90	18	9	254.5					
Total				**508.9**					
Overall Total				**508.9**	**100.0**	**2.0**	**100.0**		
Total Trees per acre						81			
Planted trees per acre						80			
Natural Regeneration/acre						0			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Alnus serrulata	0.5	50	2	33.3	1
Cornus amomum	0.5	50	1	16.7	2

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Festuca sp.	50	40.0	1
Panicum virgatum	30	24.0	3
Aster sp.	5	4.0	4
Microstegium	40	32.0	2
Total	**125**	100.0	

Project Name	Price Park
Task	Vegetation Measurements
Veg Plot	#5
Date	
Crew	Clinton, Bidelspach

Quad 5

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Platanus occidentalis	181	6	3	28.3	**100.0**	**1**	**100.0**	1	100
Total				**28.3**					
Overall Total				**28.3**	**100.0**	**1.0**	**100.0**		
Total Trees per acre						40			
Planted trees per acre						40			
Natural Regeneration/acre						0			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
none					

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Lespedeza sp.	10	24.4	2
Juncus sp.	1	2.4	3
Panicum virgatum	20	48.8	1
Microstegium	10	24.4	2
Total	**41**	100.0	

Task	Channel Pattern Measurements
	Price Park
Date	
Crew	Clinton

Price Park			**2004**		
Radius of Curvature	**Meander Wavelength**	**Channel Beltwidth**	**Radius of Curvature**	**Meander Wavelength**	**Channel Beltwidth**
59.5		49-80	72.38	136.25	52.88
64.5	127		53.95	145.57	45.51
48.5	135		26.62	136.98	61.72
59.5	139		38.32	125.55	49.98
76.5	152		40.15	138.67	53.43
68.5	150		44.66	169.52	75.32
55.5	145		45.55	188.14	69.49
72.5	174		54.19	176.98	74.27
53.5	183		35.65		70.01
69.5	166		57.39		81.92
83.8			62.06	150.14	74.79
64.0		52-95	96.67	176.04	75.86
47.5	118		34.93	193.39	96.80
61.0	170		49.61	211.61	85.68
59.5	197		39.36		
53.5	179		39.25		
61.5	123		61.28		
84.5					
47.5	118.0	***Min***	26.6	125.6	45.5
84.5	197.0	***Max***	96.7	211.6	96.8
63.5	154.1	***Avg***	50.1	162.4	69.1

Project Name	Price Park
Task	Feature Slope and Length Calculations
Date	12/17/02
Crew	Bidelspach, Shaffer, Clinton

Data given is Head of Riffle and max pool, cannot calculate lengths or slope.

2003 Data
Price Park

Riffle Station	Change	Water elevation	change	slope
540.36		92.98		
549.82	9.46	92.71	0.27	2.86%
722.91		92.14		
763.83	40.92	91.91	0.23	0.56%
1232.47		88.15		
1285.02	52.55	87.11	1.04	1.98%
1335.78		87.03		
1395.23	59.45	86.52	0.51	0.86%
	162.38			

2004 Data
Price Park

Riffle Station	Change	Water elevation	change	slope
55.74		96.53		
74.92	19.18	96.34	0.19	0.99%
160.02		96.22		
175.46	15.44	96.03	0.19	1.23%
232.95		96.04		
244.10	11.15	95.86	0.18	1.61%
287.62		95.55		
296.25	8.63	95.50	0.05	0.58%
332.13		94.72		
355.38	23.25	94.32	0.40	1.72%
466.12		93.95		
476.81	10.69	93.05	0.90	8.42%
535.99		92.61		
547.46	11.47	92.27	0.34	2.96%
651.31		92.31		
670.29	18.98	91.82	0.49	2.58%
741.52		91.72		
779.51	37.99	91.41	0.31	0.82%
859.27		91.22		
878.00	18.73	91.11	0.11	0.59%
902.67		91.18		
932.90	30.23	90.00	1.18	3.90%
1015.07		89.54		
1035.20	20.13	89.01	0.53	2.63%
1164.98		88.03		
1185.71	20.73	87.85	0.18	0.87%
1256.04		87.77		
1288.61	32.57	86.81	0.96	2.95%
1365.78		86.78		
1396.16	30.38	86.19	0.59	1.94%
1430.83		86.21		
1439.39	8.56	85.86	0.35	4.09%
	318.11			

2003 Data
Price Park

Run Station	Change	Water elevation	change	slope
88.17		96.69		
124.21	36.04	96.67	0.02	0.06%
183.04		96.49		
220.31	37.27	96.50	-0.01	-0.03%
247.95		95.99		
289.70	41.75	95.85	0.14	0.34%
350.14		94.90		
379.52	29.38	94.86	0.04	0.12%
608.74		92.72		
687.99	79.25	92.17	0.54	0.69%
1021.26		88.66		
1108.58	87.32	88.38	0.28	0.32%
1285.02		87.11		
1335.78	50.76	87.03	0.08	0.16%
	361.77			

2004 Data
Price Park

Run Station	Change	Water elevation	change	slope
74.92		96.34		
160.02	85.1	96.22	0.12	0.14%
260.39		95.57		
287.62	27.23	95.55	0.02	0.07%
355.38		94.32		
372.15	16.77	94.31	0.01	0.06%
547.46		92.27		
610.8	63.34	92.29	-0.02	-0.03%
670.29		91.82		
741.52	71.23	91.72	0.1	0.14%
964.6		89.78		
1015.07	50.47	89.54	0.24	0.48%
1110.26		88.07		
1164.58	54.32	88.03	0.04	0.07%
1288.61		86.81		
1326.46	37.85	86.8	0.01	0.03%
1473.48		85.82		
1578.27	104.79	85.75	0.07	0.07%
	511.1			

2003 Data
Price Park

Pool	length	p-p spacing
47		
88	41	
124		
157	33	73
200		
235	35	77
289		
328	39	91
379		
417	38	90
474		
496	22	87
549		
611	62	95
687		
722	35	125
783		
810	27	92
1119		
1160	41	343
1173		
1235	62	65
1437		
1474	37	252
1560		
1621	61	135

2004 Data
Price Park

Pool	length	p-p spacing
25		
56	31	
175		
233	58	164
245		
260	15	49
296		
324	28	58
372		
411	39	82
416		
466	50	50
476		
495	19	45
501		
536	35	33
610		
651	41	112
779		
820	41	169
826		
859	33	43
885		
902	17	51
1035		
1077	42	163
1185		
1256	71	165
1326		
1365	39	125
1396		
1430	34	68
1439		
1473	34	43
1578		
1745	167	206

PROFILE	Price Park As-built - 2001			Price Park 2003			Price Park 2004			
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	
Riffle Length	Not Reported			9.5	59.5	46.7	8.6	38.0	19.1	Riffle Length
Riffle Slope	Not Reported			0.56%	2.86%	1.42%	0.58%	8.42%	1.83%	Riffle Slope
Run Length	Not Reported			29.4	87.3	41.8	16.8	104.8	54.3	Run Length
Run Slope	Not Reported			-0.03%	0.69%	0.16%	-0.03%	0.48%	0.07%	Run Slope
Pool Length	Not Reported			22	62	38	15.0	167.0	36.9	Pool Length
ool to Pool Spacing	51	150.3	63.7	64.5	343	91.5	32.8	205.3	67.4	Pool to Pool Spacing

Project Name Price Park
Task Longitudinal Profile

Date 6/5/04
Crew Shaffer, Bidelspach, Clinton

Symbol Key

T	Thalweg	TU	Head of Run
TR	Head of Riffle	TM	Max Pool
TP	Head of Pool		

2004 Survey

Note: Station adjusted downstream by 19 feet and elevation adjusted down by -724.60 feet

TW Station	TW Elevation	WS Station	WS Elevation	BKF Station	BKF Elevation	Feature
19.00	96.43	19.04	96.94			
20.86	96.78	20.69	96.92			TR
25.45	95.88	25.27	96.48			TP
31.58	95.05	31.38	96.48			
39.51	95.85	40.26	96.48			
55.91	96.17	55.74	96.53			TR
66.95	96.38	67.59	96.38			
75.48	95.97	74.92	96.34	83.44	98.92	Trun
92.36	96.02	92.32	96.34			
99.44	95.37	99.20	96.34	105.48	98.55	
122.08	96.08	122.18	96.29	119.09	99.38	
140.54	95.67	140.02	96.17	134.07	98.91	
144.60	95.33	146.62	96.23	142.95	99.75	
160.19	95.86	160.02	96.22	159.91	99.21	TR
167.37	96.12	167.19	96.02			
175.64	93.95	167.97	96.10			
191.48	95.10	175.46	96.03	184.17	98.72	TP
207.82	95.25	191.35	96.00			
217.68	95.11	207.76	96.06	212.94	99.22	
225.30	95.02	225.11	96.05			
233.22	94.78	232.95	96.04			TR
242.68	95.64	242.60	95.95			
244.12	95.86	244.10	95.86	239.49	98.60	Tstep
245.70	94.61	245.44	95.47			TP
254.85	93.77	254.57	95.56			
260.54	94.91	260.39	95.57	266.77	99.41	Trun
275.97	94.66	275.46	95.53	267.38	98.73	
287.75	95.25	287.62	95.55			TR
296.13	94.89	296.25	95.50	293.26	99.18	TP
303.15	93.79	324.07	95.43	309.51	98.37	Tstep
324.30	95.00	332.13	94.72	323.68	99.34	TR
326.28	95.43	346.67	94.38			
332.40	94.31	355.38	94.32			Trun
346.71	93.66	372.15	94.31			TP
355.79	93.44	385.97	94.28	343.14	98.47	
372.36	93.83	399.83	94.34	354.39	98.22	
386.10	93.37	411.29	94.31	378.40	97.81	TR - Vane piping
400.48	92.89	416.00	93.94			TP - Scour
411.72	93.59	428.55	93.79	398.58	97.23	
413.82	94.72	437.17	93.92			
416.81	93.31	453.14	93.92			
428.83	92.80	466.12	93.95			TR- Step
437.86	92.75	476.81	93.05	421.89	97.35	TP - Scour
453.83	93.24	480.89	92.91	442.17	96.89	
466.48	93.66	495.29	93.12	460.66	97.99	TR - Vane piping
477.43	92.42	501.73	92.66			TP - Scour
480.93	91.86	513.95	92.63			
495.22	92.76	535.99	92.61	482.99	96.59	TR
498.54	93.55	547.46	92.27			Trun
501.92	91.89	562.84	92.29			
513.80	91.50	580.90	92.25	510.77	96.19	
536.39	92.40	585.85	92.21			
547.75	91.88	600.64	92.19	542.37	95.41	
562.57	91.17	610.80	92.29	545.39	95.43	TP
580.88	91.14	618.40	92.15			
586.16	90.96	633.54	92.30			
600.49	91.09	651.31	92.31			TR
611.05	91.86	670.29	91.82	602.50	94.34	Trun
618.60	90.36	688.24	91.82			
633.35	91.84	696.02	91.82			
651.36	92.07	718.03	91.70	633.96	95.26	
670.81	91.48	741.52	91.72	641.21	94.35	TR
688.02	90.75	766.01	91.31			
696.41	90.90	779.51	91.41	663.92	95.46	TP
718.14	90.79	807.54	91.28			
741.73	91.40	820.34	91.23			TR - Vane piping
765.97	90.98	826.08	91.21			TP - Scour
779.00	91.24	833.65	91.20			
791.54	90.20	848.61	91.24	726.00	94.98	
807.07	90.58	859.27	91.22	748.47	94.95	TR
820.01	90.77	870.36	91.13	804.32	93.75	
823.25	91.56	878.12	91.11			
826.10	90.07	885.41	91.17			TP
833.42	89.39	899.53	91.12	833.44	94.60	
848.72	90.89	902.67	91.18			TR - Vane piping
859.62	90.92	907.60	90.98	866.32	93.46	
870.07	90.12	932.90	90.00	871.27	94.77	Bottom Step
878.26	89.85	951.93	89.85			
885.33	90.70	964.60	89.78	892.44	95.18	Trun
899.80	89.68	973.37	89.82			
902.81	89.23	986.87	89.67			
907.55	89.59	1005.47	89.81	907.97	93.07	
918.47	91.11	1015.07	89.54			TR - Step
923.98	89.78	1024.15	89.10			
932.85	89.23	1035.20	89.01	931.04	95.17	TP - Scour
951.66	88.60	1048.48	89.08	947.99	94.27	
964.99	88.61	1077.58	89.06			Culvert in
972.30	89.18	1110.26	88.07	973.48	93.01	Trun - Culvert out
987.04	89.32	1116.21	88.06	992.69	92.59	
1004.88	89.28	1122.6	88.02			
1015.11	89.36	1141.87	88.04			
1024.17	88.56	1147.96	88.02	1020.08	91.98	
1035.32	88.28	1158.47	88			
1047.70	88.50	1164.58	88.03			TR
1063.51	88.85	1168	88.02	1044.61	91.37	
1110.5	87.47	1174.56	87.84	1063.10	91.59	
1115.44	87.3	1185.71	87.85			TP
1122.63	87.57	1206.39	87.83	1075.18	91.94	
1135.89	87.5	1222.42	87.83	1118.3	91.91	
1136.97	87.55	1229.27	87.78	1146.44	90.9	
1141.77	87.22	1245.85	87.78	1184.23	90.9	
1148.07	87.51	1250.49	87.76	1212.02	90.58	
1159.18	87.41	1256.04	87.77	1217.9	90.4	TR

2004 Survey - Continued

Note: Station adjusted downstream19 feet and elevation adjusted down -724.60 feet

TW Station	TW Elevation	WS Station	WS Elevation	BKF Station	BKF Elevation	Feature
1164.97	87.83	1263.2	87.59	1218.2	91.33	
1167.81	86.97	1288.61	86.81	1222.46	90.26	Trun
1174.93	86.64	1296.92	86.85	1231.45	90.65	
1185.81	87.81	1326.46	86.8			TP
1206.37	87.36	1331.03	86.73	1248.92	90.61	
1222.99	86.91	1337.13	86.78	1254.35	90.14	
1229.62	85.37	1347.87	86.77	1262.55	90.17	
1245.47	86.24	1365.78	86.78	1266.53	90.26	TR
1250.6	86.97	1396.16	86.19	1286.64	90.31	TP
1256.04	87.56	1398.79	86.22			
1288.67	86.55	1406.69	86.25	1310.3	89.8	
1296.67	86.25	1412.24	86.22	1317.35	89.82	
1315.04	86.38	1423.92	86.22			
1323.99	86.67	1430.83	86.21	1331.14	89.74	TR - Step
1326.56	86.3	1439.39	85.86	1355.05	90.2	TP - Scour
1330.71	86.52	1445.32	85.84	1356.39	89.92	
1337.06	85.66	1450.86	85.81	1370.72	90.08	
1348	86.18	1473.48	85.82			Trun - begin bac
1365.51	86.54	1477.4	85.77	1398.83	89.2	
1396.42	86.08	1483.95	85.75	1420.56	89.2	
1398.88	85.73	1504.54	85.83	1428.97	88.98	
1406.85	85.7	1512.56	85.8	1434.41	89.03	
1412.04	85.2	1522.56	85.83	1445.86	89.15	
1423.95	85.41	1531.57	85.8	1459.28	88.77	
1430.91	85.97	1547.88	85.8	1478.34	88.71	
1439.16	85.67	1556.69	85.71	1482.51	88.97	
1445.35	84.9	1564.59	85.73	1537.03	88.72	
1450.74	84.67	1578.27	85.75	1537.73	88.8	TP
1466.32	85.1	1598.34	85.73			
1467.34	85.77	1619.2	85.78	1572.38	88.5	
1467.7	85.24	1626.34	85.72	1581.87	87.88	
1472.77	84.61	1635.28	85.76	1584.82	88.44	
1476.87	84.03	1642.49	85.77	1603.53	88.15	
1483.85	85.14	1663.2	85.72	1617.16	87.61	
1504.47	85.12	1676.59	85.73	1621.54	88.22	
1512.07	84.96	1694.88	85.77			
1522.3	85.54	1706.77	85.77	1630.86	87.92	
1531.44	85.36	1721.56	85.85	1649.96	88.23	
1547.78	85.33	1729.84	85.7	1654.14	87.96	
1556.37	84.78	1736.06	85.82	1674.77	87.99	
1564.31	84.66	1745.22	85.77	1678.7	88.2	
1577.85	85.05			1687.38	88.08	
1598.32	84.52			1692.72	88.46	
1610.59	84.12			1727.85	87.41	
1619.2	84.75					
1626.32	85.09			1728.39	88.3	
1634.48	83.34					
1642.54	84.39					
1663.14	84.67					
1676.55	84.44					
1694.33	83.87					
1706.36	84.17					
1721.45	84.29					
1729.56	83.08					
1735.35	84.43					
1745.06	84.75					
1763.66	84.43					

2003 Survey

Note: Station adjusted downstream by 10 feet and elevation adjusted up by 2.0 feet

TW Station	TW Elev	WS Station	WS Elev	LBKF Station	LBKF Elev	RBKF Station	RBKF Elevation	Feature
10.00	97.05			13.93	99.90	12.86	100.46	XV
24.12	95.75			23.38	99.98			T
24.33	95.75	26.66	97.32			28.28	99.77	T
47.94	96.28	47.53	97.06	52.35	99.72	53.58	99.71	TP
61.95	95.41	63.03	96.86	72.03	99.50	62.05	99.74	TM
87.88	96.04	88.17	96.69			79.94	99.80	TU
125.61	95.91	124.21	96.67	112.25	99.44			TP
136.14	95.40	136.81	96.68	139.91	99.47	136.45	100.02	TM
156.38	96.20	157.56	96.62	159.15	99.44	159.87	99.33	XV
171.14	94.25	172.40	96.47					T
182.85	95.61	183.04	96.49	190.37	99.64			TU
200.87	95.39	200.29	96.50	192.18	99.57			TP
218.05	95.16	220.31	96.50					TM
236.13	96.10	235.19	96.52	227.74	99.34			XV
246.11	94.48	247.95	95.99					T
290.00	95.23	289.70	95.85	284.17	99.56			TP
308.26	94.24	310.34	95.82			306.32	99.59	TM
327.71	95.54	328.94	95.90	322.72	99.03	336.35	99.33	XV
349.57	93.97	350.14	94.90	338.22	99.01			T
360.88	93.49	362.20	94.85	365.59	98.99			T
377.52	93.76	379.52	94.86			378.86	98.44	TP
401.05	93.02	403.96	94.90			394.01	98.12	TM
416.47	94.56	417.05	94.84	416.24	98.15	426.62	98.38	XV
431.23	93.15			445.98	97.63			TP
475.59	93.48	474.31	93.79	465.50	97.50			TP
484.16	92.36	485.40	93.87					TM
495.25	92.76	496.02	93.83	498.98	96.89			T
502.66	93.87	502.78	93.64					XV
506.04	92.42	505.56	93.00					T
517.05	91.75	517.67	92.97			517.25	96.74	T
528.75	92.24	529.62	92.97	531.01	96.68			T
540.07	92.78	540.36	92.98					T
550.63	92.56	549.82	92.71			553.22	95.92	TU
564.38	91.63			570.37	95.84			TP
588.00	91.10	588.04	92.70	592.32	95.44			TM
608.39	91.73	608.74	92.72			604.23	95.75	TG
611.82	92.48	611.58	92.71	616.15	95.84			T
622.19	90.79	622.08	92.70					T
636.20	91.99			647.63	95.64	640.16	95.39	T
673.22	91.86	674.37	92.22			673.30	95.81	TU
688.06	91.25	687.99	92.17	681.05	95.47	690.20	96.19	TP
705.81	90.78	706.58	92.18					TM
721.59	91.33	722.91	92.14	712.72	95.38	723.38	95.38	TG
763.64	91.45	763.83	91.91	758.71	95.26	757.33	95.20	TU
783.25	91.20	783.82	91.92	788.26	94.81	789.89	94.98	TP
797.24	90.46							TM
809.78	91.02	810.06	91.92					T
824.13	91.64	823.76	91.88			824.37	94.93	XV
830.26	89.78							T
842.23	89.78			841.72	94.04			T
850.19	91.26	850.11	91.62			849.62	95.14	T
851.20	90.52	851.16	90.85					T
857.51	90.52	857.19	90.79	860.48	93.48	856.46	94.34	TU
868.99	90.22							T
871.57	89.36							T
876.98	89.69							T
882.23	89.83	884.07	90.79	885.86	93.61	886.69	94.77	T
890.14	89.93							T
892.42	89.53							T
902.12	88.62	901.42	90.82			905.08	95.33	TM
909.70	90.29							TBROCK
916.20	90.65	916.15	90.73	918.24	93.46			TBROCK
922.31	89.17	922.39	89.58			925.41	94.33	TBROCK
930.93	88.93							T
934.80	88.99	935.30	89.59					T
942.32	88.84							T
946.29	88.90							T
963.62	88.11	963.56	89.36	960.23	92.61			T
974.07	88.69	973.85	89.40	982.19	92.58	975.92	93.22	T
998.21	88.32	998.46	89.41					T
1004.26	89.16	1004.20	89.37	1004.39	92.81	1010.05	92.76	TBROCK
1020.90	88.31	1021.26	88.66					TBROCK
1037.32	87.76	1037.61	88.71			1043.94	93.25	T
1107.03	87.51	1108.58	88.38	1073.03	93.23			TC
1118.90	87.80	1119.02	88.47	1119.04	92.00			TP
1138.52	87.48	1144.29	88.43					TM
1161.38	88.04	1160.83	88.40	1152.43	91.52	1153.75	91.91	TM
1170.32	86.81	1173.83	88.15	1178.96	90.99			T
1215.71	87.46	1215.21	88.14	1207.46	90.76	1213.45	90.86	TP
1228.65	85.79	1232.47	88.15	1239.38	90.75	1235.35	90.88	TM
1285.00	86.79	1285.02	87.11	1273.02	90.73			TU
1317.96	86.77	1317.27	87.05	1317.09	90.24			TB
1329.50	86.59	1328.92	87.00	1331.67	90.41	1327.02	90.41	TB
1334.70	86.16	1335.78	87.03					T
1394.62	85.98	1395.23	86.52	1403.70	89.75	1382.54	89.81	TU
1409.95	85.25	1410.31	86.53					T
1427.37	86.29	1427.19	86.55	1426.49	89.05	1428.41	89.46	TB
1436.65	85.70	1437.41	86.14					TP
1447.66	84.84	1450.81	86.12					TM
1462.86	85.51	1463.24	86.06	1461.40	89.27			XV
1471.68	84.11	1474.49	86.09			1478.53	89.12	T
1482.96	85.72	1483.41	86.18	1488.93	89.25			TU
1547.13	85.07	1547.18	86.10	1538.71	89.15	1527.79	89.25	TU
1561.80	84.89	1560.65	86.10	1576.57	88.81	1570.78	88.64	TP
1599.04	84.13	1597.87	86.12			1591.15	88.89	TM
1617.96	85.23	1621.73	86.14					XV
1628.32	83.55			1622.92	88.28	1622.64	88.79	T
1649.82	84.98							T
1673.77	84.47	1661.30	86.12	1676.98	88.36	1662.05	88.53	T
1685.73	83.96					1688.44	88.71	T
1711.10	84.83							XV
1717.63	83.67	1715.91	86.09	1719.18	87.72	1716.55	88.61	T
1776.02	85.47	1775.91	86.17					TCI

Project Name Price Park
Task Longitudinal Profile

Date
Crew Shaffer, Bidelspach, Clinton

Symbol Key

T	Thalweg	TU	Head of Run
TR	Head of Riffle	TM	Max Pool
TP	Head of Pool		

2002 Survey

TW Station	TW Elevation	WS Elevation	BKF Elevation	Feature
00+00.0	96.74	97.23		Fenceline
00+18.0	96.96	97.09	99.91	XVANE
00+22.0	96.01	96.80		XVANE-Max Pool
00+34.0	96.48	96.71	99.18	TR
00+60.0	95.19	96.59		TM
00+89.0	96.17	96.50	99.52	TR
01+44.0	95.47	96.57		TM
01+69.0	96.12	96.44	99.29	XVANE
01+73.0	94.50	96.44		XVANE-Max Pool
01+89.0	95.62	96.43	99.52	TR
02+25.0	95.14	96.39		TM
02+42.0	96.02	96.33	99.29	XVANE
02+47.0	94.32	95.89		XVANE-Max Pool
02+64.0	95.51	95.88	99.78	TR
03+08.0	94.24	95.75		TM
03+28.0	95.43	95.63	99.16	XVANE
03+42.0	93.87	95.03		XVANE-Max Pool
03+52.0	94.48	95.04	98.57	TR
04+06.0	93.16	95.00		TM
04+21.0	94.79	94.94	98.11	XVANE
04+30.0	93.28	94.61		XVANE-Max Pool
04+39.0	92.67	94.61	97.97	TR
04+86.0	92.06	93.86		TM
05+01.0	93.62	93.72	96.94	XVANE
05+13.0	91.03	92.87		XVANE-Max Pool
05+22.0	92.48	92.86	96.61	TR
05+68.0	91.26	92.54		TM
06+12.0	91.95	92.2	95.17	XVANE
06+20.0	90.39	92.22		XVANE-Max Pool
06+36.0	91.91	92.15	95.48	TR
06+91.0	90.40	92.02		TM
07+46.0	91.66	92.04	94.31	TR
08+00.0	90.61	91.71		TM
08+25.0	91.30	91.7	94.92	XVANE
08+32.0	89.66	91.58		XVANE-Max Pool
08+61.0	91.16	91.5	94.15	TR
09+10.0	89.78	91.34		TM
09+24.0	91.23			Top Bedrock
09+35.0	89.54	90.26		Max Pool
09+70.0	89.89	90.15	93.5	TR
10+09.0	89.02	89.91		Top Bedrock
10+15.0	89.66	89.87	93.54	TM
10+36.0	88.68	89.51		TR
10+56.0	89.1	89.51		US Box Culvert
11+23.0	88.83	89.09		DS Box Culvert
11+65.0	88.55	88.98	92.15	XVANE
11+69.0	86.56	88.75		XVANE-Max Pool
11+88.0	88.3	88.64	91.81	TR
12+30.0	86.07	88.28		TM
12+57.0	87.94	88.13	91.1	XVANE
12+61.0	86.73	87.84		XVANE-Max Pool
12+74.0	87.42	87.82	90.86	TR
13+37.0	86.52	87.68		TM
13+51.0	87.35	87.69	90.68	TR
13+82.0	87.04	87.36	90.48	Intermediate Point
14+12.0	85.79	86.95		Lateral Scour Pool
14+51.0	85.63	86.95		TM
14+64.0	85.82	86.72	89.65	XVANE
14+75.0	84.72	86.72		XVANE-Max Pool
14+92.0	86.17	86.69	89.76	TR
15+47.0	85.72	86.71		Aerial Sewer Line
15+95.0	85.18	86.66		TM
16+20.0	85.56	86.69	89.4	XVANE
16+31.0	84.18	86.66		XVANE-Max Pool
16+88.0	84.84	86.68		TM
17+09.0	85.31	86.67	89.17	XVANE
17+15.0	84.30	86.63		XVANE-Max Pool
17+76.0	85.46	86.67		DBL 10' x 8' Box Cu

As-Built Survey

TW Station	TW Elevation	WS Elevation	BKF Elevation	Feature
00+00.0	96.39	96.86		Fenceline
00+18.0	96.83	96.83	99.55	XVANE
00+24.0	95.58	96.41		XVANE-Max Pool
00+35.0	96.40	96.51	98.85	TR
00+74.0	95.31	96.32		TM
00+94.0	96.18	96.32	98.90	TR
01+44.0	95.27	96.21		TM
01+69.0	95.86	96.11	98.90	XVANE
01+74.0	94.56	96.11		XVANE-Max Pool
01+92.0	95.76	96.11	99.30	TR
02+29.0	95.27	96.11		TM
02+46.0	95.85	96.06	99.01	XVANE
02+50.0	94.79	96.04		XVANE-Max Pool
02+77.0	95.64	96.01	99.37	TR
03+13.0	94.18	95.39		TM
03+31.0	95.25	95.32	98.89	XVANE
03+43.0	93.57	94.89		XVANE-Max Pool
03+51.0	94.45	94.86	98.31	TR
04+05.0	93.40	94.86		TM
04+18.0	94.58	94.86	97.83	XVANE
04+30.0	93.11	94.85		XVANE-Max Pool
04+38.0	92.54	94.82	97.73	TR
04+83.0	91.97	93.46		TM
05+02.0	93.54	93.37	96.51	XVANE
05+13.0	90.92	92.79		XVANE-Max Pool
05+20.0	92.38	92.78	96.45	TR
05+61.0	90.91	92.33		TM
06+14.0	91.85	92.09	94.88	XVANE
06+21.0	90.67	91.94		XVANE-Max Pool
06+40.0	91.75	91.94	95.19	TR
06+89.0	90.24	91.82		TM
07+46.0	91.69	91.81	94.98	TR
07+92.0	90.46	91.44		TM
08+24.0	91.12	91.41	94.24	XVANE
08+31.0	89.74	91.28		XVANE-Max Pool
08+54.0	91.13	91.29	94.00	TR
09+11.0	90.54	91.12		TM
09+32.0	89.27	90.02		TM
09+56.0	89.7	89.99	94.15	TR
10+04.0	89.16	89.68		Top Bedrock
10+24.0	88.81	89.27	93.41	TM
10+49.0	89.07	89.25		TR
10+86.0	88.66	89.04		US Box Culvert
11+04.0	88.41	88.93		DS Box Culvert
11+64.0	88.47	88.62	91.81	XVANE
11+69.0	86.53	88.46		XVANE-Max Pool
11+85.0	88.24	88.46	91.72	TR
12+30.0	86.11	88.09		TM
12+55.0	87.84	87.95	90.9	XVANE
12+59.0	86.71	87.66		XVANE-Max Pool
12+74.0	87.41	87.62	91.07	TR
13+24.0	86.85	87.39		TM
13+48.0	87.12	87.37	90.48	TR
13+82.0	86.87	87.36		Intermediate Point
14+45.0	85.41	86.43		TM
14+64.0	86.00	86.47	89.52	XVANE
14+71.0	85.20	86.47		XVANE-Max Pool
14+96.0	86.20	86.43	89.62	TR
15+47.0	85.72	86.35		Aerial Sewer Line
15+98.0	85.23	86.35		TM
16+20.0	85.40	85.35	89.18	XVANE
16+30.0	84.70	86.35		XVANE-Max Pool
16+45.0	85.52	86.35	89.11	TR
16+86.0	84.83	86.35		TM
17+10.0	85.26	86.35	88.94	XVANE
17+76.0	85.33	86.35		DBL 10' x 8' Box Cu

Symbol Key																	
T	Thalweg		XV	Cross Vane													
TR	Head of Riffle		BR	Bedrock													
TP	Head of Pool		UBR	Upper Bedrock													
TU	Head of Run		SP	Scour pool									2002 Survey				
TM	Max Pool		V	Vane									TW	TW	WS	BKF	
2003 Survey													Station	Elevation	Elevation	Elevation	Feature
TW Shot	TW	TW	WS	WS	LBKF	LBKF	RBKF	RBKF					00+00.0	96.74	97.23		Fenceline
number	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Feature				00+18.0	96.96	97.09	99.91	XVANE
3.00	0.00	95.05			3.93	97.90	2.86	98.46	XV				00+22.0	96.01	96.80		XVANE-Max Pool
8.00	14.12	93.75			13.38	97.98			T				00+34.0	96.48	96.71	99.18	TR
7.00	14.33	93.75	16.66	95.32			18.28	97.77	T				00+60.0	95.19	96.59		TM
24.00	37.94	94.28	37.53	95.06	42.35	97.72	43.58	97.71	TP				00+89.0	96.17	96.50	99.52	TR
26.00	51.95	93.41	53.03	94.86	62.03	97.50	52.05	97.74	TM				01+44.0	95.47	96.57		TM
30.00	77.88	94.04	78.17	94.69			69.94	97.80	TU				01+69.0	96.12	96.44	99.29	XVANE
32.00	115.61	93.91	114.21	94.67	102.25	97.44			TP				01+73.0	94.50	96.44		XVANE-Max Pool
34.00	126.14	93.40	126.81	94.68	129.91	97.47	126.45	98.02	TM				01+89.0	95.62	96.43	99.52	TR
36.00	146.38	94.20	147.56	94.62	149.15	97.44	149.87	97.33	XV				02+25.0	95.14	96.39		TM
38.00	161.14	92.25	162.40	94.47					T				02+42.0	96.02	96.33	99.29	XVANE
40.00	172.85	93.61	173.04	94.49	180.37	97.64			TU				02+47.0	94.32	95.89		XVANE-Max Pool
42.00	190.87	93.39	190.29	94.50	182.18	97.57			TP				02+64.0	95.51	95.88	99.78	TR
44.00	208.05	93.16	210.31	94.50					TM				03+08.0	94.24	95.75		TM
46.00	226.13	94.10	225.19	94.52	217.74	97.34			XV				03+28.0	95.43	95.63	99.16	XVANE
48.00	236.11	92.48	237.95	93.99					T				03+42.0	93.87	95.03		XVANE-Max Pool
52.00	280.00	93.23	279.70	93.85	274.17	97.56			TP				03+52.0	94.48	95.04	98.57	TR
54.00	298.26	92.24	300.34	93.82			296.32	97.59	TM				04+06.0	93.16	95.00		TM
57.00	317.71	93.54	318.94	93.90	312.72	97.03	326.35	97.33	XV				04+21.0	94.79	94.94	98.11	XVANE
59.00	339.57	91.97	340.14	92.90	328.22	97.01			T				04+30.0	93.28	94.61		XVANE-Max Pool
61.00	350.88	91.49	352.20	92.85	355.59	96.99			T				04+39.0	92.67	94.61	97.97	TR
63.00	367.52	91.76	369.52	92.86			368.86	96.44	TP				04+86.0	92.06	93.86		TM
65.00	391.05	91.02	393.96	92.90			384.01	96.12	TM				05+01.0	93.62	93.72	96.94	XVANE
67.00	406.47	92.56	407.05	92.84	406.24	96.15	416.62	96.38	XV				05+13.0	91.03	92.87		XVANE-Max Pool
69.00	421.23	91.15			435.98	95.63			TP				05+22.0	92.48	92.86	96.61	TR
73.00	465.59	91.48	464.31	91.79	455.50	95.50			TP				05+68.0	91.26	92.54		TM
75.00	474.16	90.36	475.40	91.87					TM				06+12.0	91.95	92.2	95.17	XVANE
79.00	485.25	90.76	486.02	91.83	488.98	94.89			T				06+20.0	90.39	92.22		XVANE-Max Pool
77.00	492.66	91.87	492.78	91.64					XV				06+36.0	91.91	92.15	95.48	TR
81.00	496.04	90.42	495.56	91.00					T				06+91.0	90.40	92.02		TM
83.00	507.05	89.75	507.67	90.97			507.25	94.74	T				07+46.0	91.66	92.04	94.31	TR
85.00	518.75	90.24	519.62	90.97	521.01	94.68			T				08+00.0	90.61	91.71		TM
87.00	530.07	90.78	530.36	90.98					T				08+25.0	91.30	91.7	94.92	XVANE
89.00	540.63	90.56	539.82	90.71			543.22	93.92	TU				08+32.0	89.66	91.58		XVANE-Max Pool
91.00	554.38	89.63			560.37	93.84			TP				08+61.0	91.16	91.5	94.15	TR
93.00	578.00	89.10	578.04	90.70	582.32	93.44			TM				09+10.0	89.78	91.34		TM
95.00	598.39	89.73	598.74	90.72			594.23	93.75	TG				09+24.0	91.23			Top Bedrock
97.00	601.82	90.48	601.58	90.71	606.15	93.84			T				09+35.0	89.54	90.26		Max Pool
99.00	612.19	88.79	612.08	90.70					T				09+70.0	89.89	90.15	93.5	TR
101.00	626.20	89.99			637.63	93.64	630.16	93.39	T				10+09.0	89.02	89.91		Top Bedrock
104.00	663.22	89.86	664.37	90.22			663.30	93.81	TU				10+15.0	89.66	89.87	93.54	TM
106.00	678.06	89.25	677.99	90.17	671.05	93.47	680.20	94.19	TP				10+36.0	88.68	89.51		TR
108.00	695.81	88.78	696.58	90.18					TM				10+56.0	89.1	89.51		US Box Culvert
110.00	711.59	89.33	712.91	90.14	702.72	93.38	713.38	93.38	TG				11+23.0	88.83	89.09		DS Box Culvert
114.00	753.64	89.45	753.83	89.91	748.71	93.26	747.33	93.20	TU				11+65.0	88.55	88.98	92.15	XVANE
116.00	773.25	89.20	773.82	89.92	778.26	92.81	779.89	92.98	TP				11+69.0	86.56	88.75		XVANE-Max Pool
118.00	787.24	88.46							TM				11+88.0	88.3	88.64	91.81	TR
120.00	799.78	89.02	800.06	89.92					T				12+30.0	86.07	88.28		TM
122.00	814.13	89.64	813.76	89.88			814.37	92.93	XV				12+57.0	87.94	88.13	91.1	XVANE
124.00	820.26	87.78							T				12+61.0	86.73	87.84		XVANE-Max Pool
287.00	832.23	87.78			831.72	92.04			T				12+74.0	87.42	87.82	90.86	TR
126.00	840.19	89.26	840.11	89.62			839.62	93.14	T				13+37.0	86.52	87.68		TM
289.00	841.20	88.52	841.16	88.85					T				13+51.0	87.35	87.69	90.68	TR
291.00	847.51	88.52	847.19	88.79	850.48	91.48	846.46	92.34	TU				13+82.0	87.04	87.36	90.48	Intermediate Point
293.00	858.99	88.22							T				14+12.0	85.79	86.95		Lateral Scour Pool
294.00	861.57	87.36							T				14+51.0	85.63	86.95		TM
295.00	866.98	87.69							T				14+64.0	85.82	86.72	89.65	XVANE
296.00	872.23	87.83	874.07	88.79	875.86	91.61	876.69	92.77	T				14+75.0	84.72	86.72		XVANE-Max Pool
299.00	880.14	87.93							T				14+92.0	86.17	86.69	89.76	TR
300.00	882.42	87.53							T				15+47.0	85.72	86.71		Aerial Sewer Line
301.00	892.12	86.62	891.42	88.82			895.08	93.33	TM				15+95.0	85.18	86.66		TM
303.00	899.70	88.29							TBROCK				16+20.0	85.56	86.69	89.4	XVANE
304.00	906.20	88.65	906.15	88.73	908.24	91.46			TBROCK				16+31.0	84.18	86.66		XVANE-Max Pool
306.00	912.31	87.17	912.39	87.58			915.41	92.33	TBROCK				16+88.0	84.84	86.68		TM
308.00	920.93	86.93							T				17+09.0	85.31	86.67	89.17	XVANE
309.00	924.80	86.99	925.30	87.59					T				17+15.0	84.30	86.63		XVANE-Max Pool
311.00	932.32	86.84							T				17+76.0	85.46	86.67		DBL 10' x 8' Box Cul
313.00	936.29	86.90							T								
314.00	953.62	86.11	953.56	87.36	950.23	90.61			T								
316.00	964.07	86.69	963.85	87.40	972.19	90.58	965.92	91.22	T								
318.00	988.21	86.32	988.46	87.41					T								
320.00	994.26	87.16	994.20	87.37	994.39	90.81	1000.05	90.76	TBROCK								
322.00	1010.90	86.31	1011.26	86.66					TBROCK								
324.00	1027.32	85.76	1027.61	86.71			1033.94	91.25	T								
330.00	1097.03	85.51	1098.58	86.38	1063.03	91.23			TC								
332.00	1108.90	85.80	1109.02	86.47	1109.04	90.00			TP								
334.00	1128.52	85.48	1134.29	86.43					TM								
335.00	1151.38	86.04	1150.83	86.40	1142.43	89.52	1143.75	89.91	TM								
339.00	1160.32	84.81	1163.83	86.15	1168.96	88.99			T								
343.00	1205.71	85.46	1205.21	86.14	1197.46	88.76	1203.45	88.86	TP								
345.00	1218.65	83.79	1222.47	86.15	1229.38	88.75	1225.35	88.88	TM								
349.00	1275.00	84.79	1275.02	85.11	1263.02	88.73			TU								
351.00	1307.96	84.77	1307.27	85.05	1307.09	88.24			TB								
353.00	1319.50	84.59	1318.92	85.00	1321.67	88.41	1317.02	88.41	TB								
355.00	1324.70	84.16	1325.78	85.03					T								
359.00	1384.62	83.98	1385.23	84.52	1393.70	87.75	1372.54	87.81	TU								
361.00	1399.95	83.25	1400.31	84.53					T								
363.00	1417.37	84.29	1417.19	84.55	1416.49	87.05	1418.41	87.46	TB								
365.00	1426.65	83.70	1427.41	84.14					TP								
367.00	1437.66	82.84	1440.81	84.12					TM								
369.00	1452.86	83.51	1453.24	84.06	1451.40	87.27			XV								
371.00	1461.68	82.11	1464.49	84.09			1468.53	87.12	T								
373.00	1472.96	83.72	1473.41	84.18	1478.93	87.25			TU								
377.00	1537.13	83.07	1537.18	84.10	1528.71	87.15	1517.79	87.25	TU								
380.00	1551.80	82.89	1550.65	84.10	1566.57	86.81	1560.78	86.64	TP								
382.00	1589.04	82.13	1587.87	84.12			1581.15	86.89	TM								
384.00	1607.96	83.23	1611.73	84.14					XV								
385.00	1618.32	81.55			1612.92	86.28	1612.64	86.79	T								
386.00	1639.82	82.98							T								
387.00	1663.77	82.47	1651.30	84.12	1666.98	86.36	1652.05	86.53	T								
388.00	1675.73	81.96					1678.44	86.71	T								
389.00	1701.10	82.83							XV								
390.00	1707.63	81.67	1705.91	84.09	1709.18	85.72	1706.55	86.61	T								
391.00	1766.02	83.47	1765.91	84.17					TCI								

Project Name Price Park
Task Longitudinal Profile

Date 4/11/02
Crew Lankford, Patterson

As-Built Survey

Station	TW (FS)	TW	WS (FS)	WS	BKF (FS)	BKF	BOB (FS)	BOB	Notes	HI
00+00.0	8.47	96.39	8.00	96.86					Fenceline	104.86
00+18.0	8.03	96.83	8.03	96.83	5.31	99.55	3.92	100.94	XVANE	104.86
00+24.0	9.28	95.58	8.45	96.41					XVANE-Max Pool	104.86
00+35.0	8.46	96.40	8.35	96.51	6.01	98.85	3.84	101.02	Head of Riffle	104.86
00+74.0	9.55	95.31	8.54	96.32					Max Pool	104.86
00+94.0	8.68	96.18	8.54	96.32	5.96	98.90	4.15	100.71	Head of Riffle	104.86
01+44.0	9.59	95.27	8.65	96.21					Max Pool	104.86
01+69.0	9.00	95.86	8.75	96.11	5.96	98.90	4.54	100.32	XVANE	104.86
01+74.0	10.30	94.56	8.75	96.11					XVANE-Max Pool	104.86
01+92.0	9.10	95.76	8.75	96.11	5.56	99.30	4.19	100.67	Head of Riffle	104.86
02+29.0	9.59	95.27	8.75	96.11					Max Pool	104.86
02+46.0	9.01	95.85	8.80	96.06	5.85	99.01	4.16	100.70	XVANE	104.86
02+50.0	10.07	94.79	8.82	96.04					XVANE-Max Pool	104.86
02+77.0	9.22	95.64	8.85	96.01	5.49	99.37	4.50	100.36	Head of Riffle	104.86
03+13.0	10.68	94.18	9.47	95.39					Max Pool	104.86
03+31.0	9.61	95.25	9.54	95.32	5.97	98.89	5.08	99.78	XVANE	104.86
03+43.0	11.29	93.57	9.97	94.89					XVANE-Max Pool	104.86
03+51.0	10.41	94.45	10.00	94.86	6.55	98.31	4.66	100.20	Head of Riffle	104.86
04+05.0	11.46	93.40	10.00	94.86					Max Pool	104.86
04+18.0	10.28	94.58	10.00	94.86	7.03	97.83	5.11	99.75	XVANE	104.86
04+30.0	11.75	93.11	10.01	94.85					XVANE-Max Pool	104.86
04+38.0	10.50	92.54	10.04	94.82	7.13	97.73	5.90	98.96	Head of Riffle	104.86
04+83.0	12.89	91.97	11.40	93.46					Max Pool	104.86
05+02.0	11.32	93.54	11.49	93.37	8.35	96.51	6.25	98.61	XVANE	104.86
05+13.0	13.94	90.92	12.07	92.79					XVANE-Max Pool	104.86
05+20.0	12.48	92.38	12.08	92.78	8.41	96.45	6.96	97.90	Head of Riffle	104.86
05+61.0	10.23	90.91	8.81	92.33					Max Pool	101.14
06+14.0	9.29	91.85	9.05	92.09	6.26	94.88	4.15	96.99	XVANE	101.14
06+21.0	10.47	90.67	9.20	91.94					XVANE-Max Pool	101.14
06+40.0	9.39	91.75	9.20	91.94	5.95	95.19	4.36	96.78	Head of Riffle	101.14
06+89.0	10.90	90.24	9.32	91.82					Max Pool	101.14
07+46.0	9.45	91.69	9.33	91.81	6.16	94.98	4.67	96.47	Head of Riffle	101.14
07+92.0	10.68	90.46	9.70	91.44					Max Pool	101.14
08+24.0	10.02	91.12	9.73	91.41	6.90	94.24	5.30	95.84	XVANE	101.14
08+31.0	11.40	89.74	9.86	91.28					XVANE-Max Pool	101.14
08+54.0	10.01	91.13	9.85	91.29	7.14	94.00	5.35	95.79	Head of Riffle	101.14
09+11.0	10.60	90.54	10.02	91.12					Max Pool	101.14
09+32.0	11.87	89.27	11.12	90.02					Max Pool	101.14
09+56.0	11.44	89.7	11.15	89.99	6.99	94.15	5.20	95.94	Head of Riffle	101.14
10+04.0	11.98	89.16	11.46	89.68					Top Bedrock	101.14
10+24.0	12.33	88.81	11.87	89.27	7.73	93.41	5.80	95.34	Max Pool	101.14
10+49.0	12.07	89.07	11.89	89.25					Head of Riffle	101.14
10+86.0	12.48	88.66	12.1	89.04					US Box Culvert	101.14
11+04.0	8.11	88.41	7.59	88.93					DS Box Culvert	96.52
11+64.0	8.05	88.47	7.9	88.62	4.71	91.81	3.40	93.12	XVANE	96.52
11+69.0	9.99	86.53	8.06	88.46					XVANE-Max Pool	96.52
11+85.0	8.28	88.24	8.06	88.46	4.80	91.72	3.50	93.02	Head of Riffle	96.52
12+30.0	10.41	86.11	8.43	88.09					Max Pool	96.52
12+55.0	8.68	87.84	8.57	87.95	5.62	90.9	5.00	91.52	XVANE	96.52
12+59.0	9.81	86.71	8.86	87.66					XVANE-Max Pool	96.52
12+74.0	9.11	87.41	8.9	87.62	5.45	91.07	4.71	91.81	Head of Riffle	96.52
13+24.0	9.67	86.85	9.13	87.39					Max Pool	96.52
13+48.0	9.40	87.12	9.15	87.37	6.04	90.48	5.19	91.33	Head of Riffle	96.52
13+82.0	9.65	86.87	9.16	87.36					Intermediate Point	96.52
14+45.0	11.11	85.41	10.09	86.43					Max Pool	96.52
14+64.0	10.52	86.00	10.05	86.47	7.00	89.52	6.38	90.14	XVANE	96.52
14+71.0	11.32	85.20	10.05	86.47					XVANE-Max Pool	96.52
14+96.0	10.32	86.20	10.09	86.43	6.90	89.62	5.16	91.36	Head of Riffle	96.52
15+47.0	10.80	85.72	10.17	86.35					Aerial Sewer Line	96.52
15+98.0	11.29	85.23	10.17	86.35					Max Pool	96.52
16+20.0	11.12	85.40	11.17	85.35	7.34	89.18	6.25	90.27	XVANE	96.52
16+30.0	11.82	84.70	10.17	86.35					XVANE-Max Pool	96.52
16+45.0	11	85.52	10.17	86.35	7.41	89.11	6.37	90.15	Head of Riffle	96.52
16+86.0	11.69	84.83	10.17	86.35					Max Pool	96.52
17+10.0	11.26	85.26	10.17	86.35	7.58	88.94	5.92	90.60	XVANE	96.52
17+76.0	11.19	85.33	10.17	86.35					DBL 10' x 8' Box Cul	96.52

ws slope 0.0062 tw slope 0.0059