UT TO SOUTH FORK
FINAL MONITORING REPORT
YEAR 2 OF 5
2007

EEP Project # 435

Alamance County, North Carolina

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Executive Summary

The North Carolina Ecosystem Enhancement Program (EEP) restored the UT to South Fork in 2004. This project is located in the southern portion of Alamance County, NC. The different reaches flow through former pasture areas and wooded sections. Prior to restoration, cattle had unlimited access to the stream channels which created areas of severe bank erosion and loss of vegetation. Since the restoration has been completed, the livestock have been fenced out of the stream with the exception of a few crossings that are used throughout the year to move the cattle from one field to another.

There were several goals for this stream and buffer restoration project. Goals of the stream project included: reducing the bank erosion; reducing nutrient runoff on the site; stabilizing stream channel banks by planting vegetation; and, helping the stream reach its equilibrium though the proper design ratios for dimension, pattern, and profile.

This report documents the data collected for Year 1 monitoring. Current monitoring for the site consists of evaluating both stream morphology and riparian vegetation for all three monitoring reaches. The stream monitoring included a longitudinal survey, cross section surveys, pebble counts, problem area identification, and photo documentation. A plan view featuring bankfull, edge of water, and thalweg lines as well as problem area locations was developed from the longitudinal survey. The vegetation assessment included a tally of planted vegetation in permanent vegetation plots, vegetation-specific problem area identification (i.e. bare areas and invasive species), and photo documentation. A vegetation problem area plan view was developed from the problem area identification. All morphological data, vegetation plot and pebble counts, cross section surveys, the longitudinal profile, and the plan view features were compared between monitoring years to assess project performance.

All reaches remained geomorphically stable between Monitoring Years 1 and 2, with the exception of several areas of aggradation occurring in riffle sections of all three reaches. However, Reach 1 is the only reach where this problem may have contributed to any noticeable geomorphic change (i.e., increase in riffle length and slope), probably due to the smaller size of Reach 1. There are several areas with stream problems, especially in Reaches 1 and 2, where structures are failing. Several of the structures had water flowing under or piping around stones. Several more structures had loose stones or stones that have already been displaced. In addition, several rootwads of Reaches 1 and 2 have some portion of bank caving in or piping behind the structure or around the footing. There were small amounts of bank erosion in all reaches, but no areas were considered severe. There is good herbaceous vegetation growth along all of the monitored stream reach. In many areas, fescue was prevalent, preventing the establishment of the planted bare root trees. Although not considered to be problem now, Japanese honeysuckle was noted in several areas. There are several concern areas with regard to the vegetation plots. The number of stems/acre in VP #1, 2, 4 and 5 remain below the Year 5 goal of 260 stems/acre. The stem/acre for VP #3 is 280 stems/acre. Overall survivability from Year 1 to Year 2 was good (81% for all counted vegetation) despite the area being in a drought.

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1.0 PROJECT BACKGROUND

1.1 Project Objectives

The goal of this stream restoration project is to improve water quality in the Cape Fear River Basin. The UT to South Fork is typical of other streams in this area, exhibiting instability and degradation in response to current and historical land use practices. The goal of improving water quality will be accomplished by re-establishing a stable dimension, pattern, and profile to the stream. Stabilization of the streambed and banks will reduce the amount of sediment entering the river basin and re-establishment of a permanent vegetated riparian buffer (consisting of native species) will help decrease nutrient input. This buffer will provide shading for wildlife habitat within the stream and along the stream buffer.

1.2 Project Structure, Restoration Type, and Approach

All four restoration subreaches were classified as E4/1 type streams prior to restoration, and exhibited instability that was attributed to excessive cattle access and other current and past land-use practices. The restoration of restoration subreaches 1 and 2 involved channel relocation with adjusted dimension, pattern, and profile resulting in a Priority Level I approach. Restoration for subreach 3 most closely resembled a Priority II and III restoration approach while restoration for subreach 4 most closely resembled a Priority I and II restoration approach. Table I details the specific restoration components employed on each restoration reach.

Table I. Project Restoration Components
UT to South Fork/EEP Project Number 435

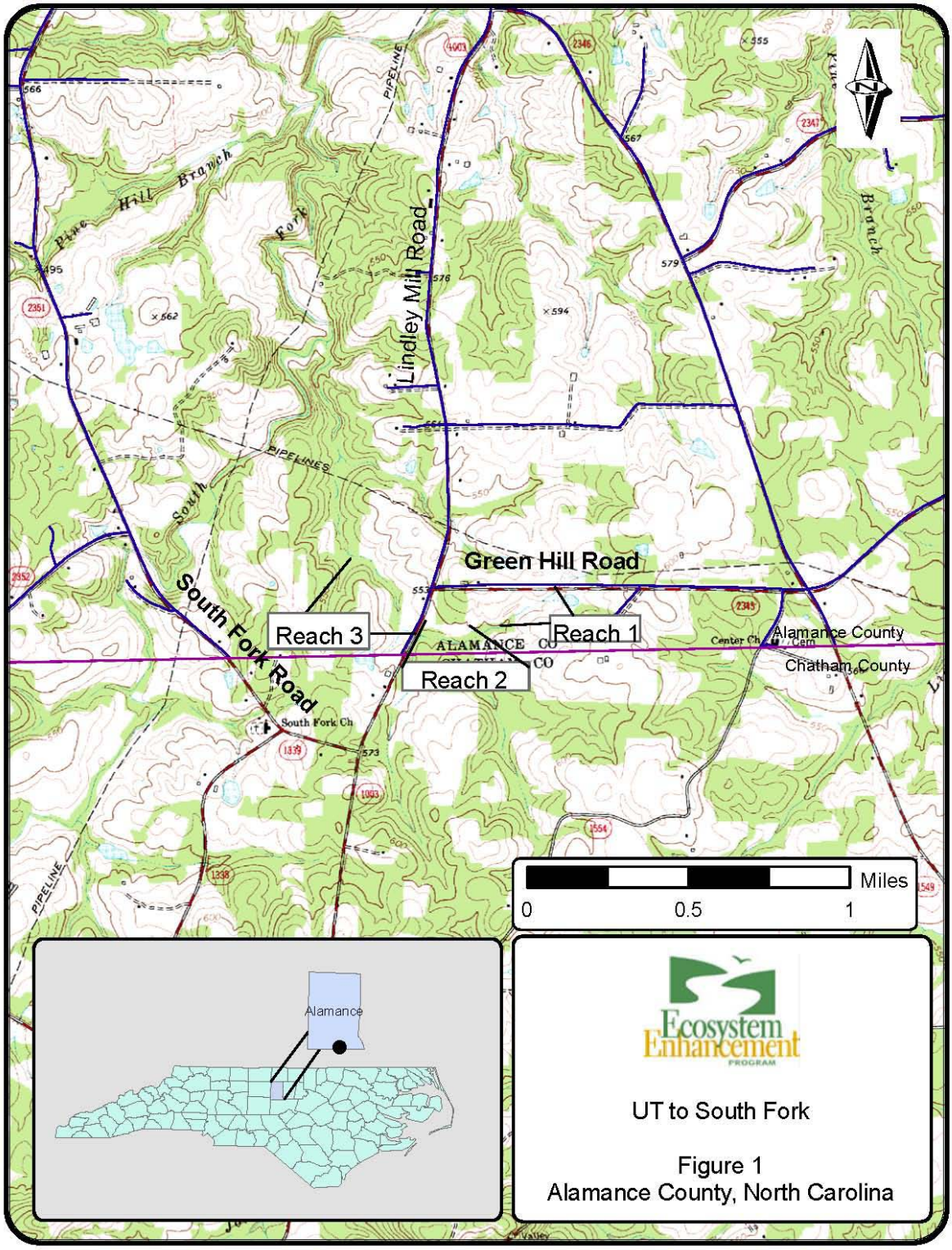
Project Segment or Reach ID**	Mitigation Type	Approach*	Linear Footage or Acreage Stationing*	Comment
Subreach 1	Restoration	P I	10+00 to 26+03	New channel construction
Subreach 2	Restoration	P I, PII	26+03 to 33+13	Modified pattern, dimension & profile
Subreach 3	Enhancement Level I	P II, P III	33+13 to 42+00	Modified dimension & profile
Subreach 4	Restoration	P I, P II	42+00-to 70+37	Modified pattern, dimension & profile

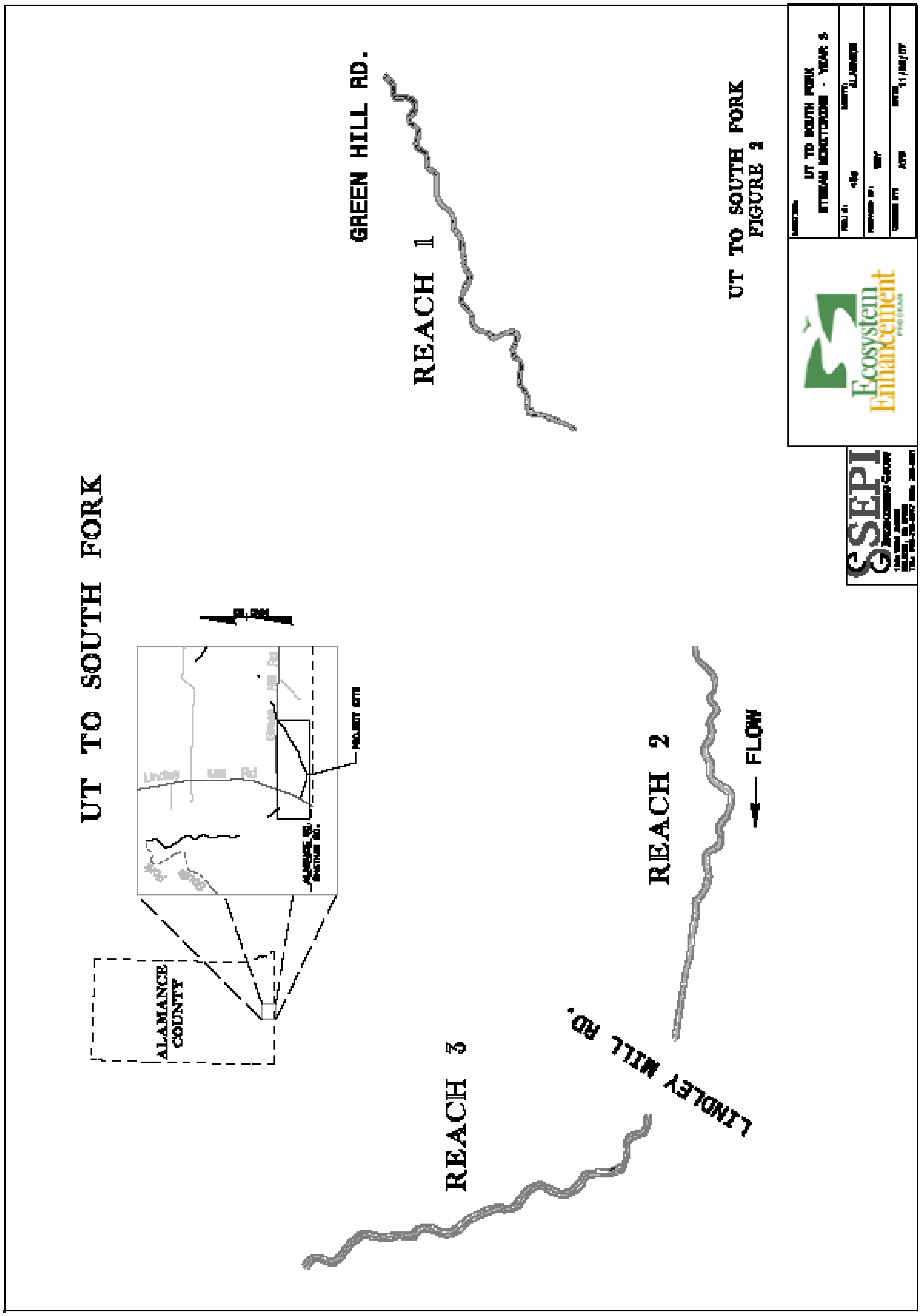
Note: "P" refers to Priority Level.
"*" – Determinations made from the Restoration Design Report for the project.
"**" – For monitoring purposes Reach 1 is Design Subreach 1, Reach 2 combines portions of both Design Subreach 2 and Design Subreach 3, and Reach 3 is Design Subreach 4.

1.3 Project Location and Setting

This project is near Snow Camp, North Carolina in south-central Alamance County. To reach the site from Raleigh, go west on US 64 towards Siler City. Take the exit for NC 87 and turn right, heading north. Take a left onto Chapel Hill-Greensboro Road. At the intersection with Lindley Mill Road take a left towards the community of Sutphin. The site is near the intersection with Green Hill Road before the Chatham County line. To access Reach 1, turn left onto Green Hill Road, you will cross the beginning of that reach. Reaches 2 and 3 can be accessed off of Lindley Mill Road. Figure 1 shows the location of the site and Figure 2 shows the location of each reach surveyed.

The project lies in a mostly open, abandoned agricultural field where cattle once had unlimited access to the stream. Since restoration, the stream has been fenced off, and cattle do not have access to the channel. The surrounding pastures are used for cattle grazing or crop production (hay). Less than 25% of the stream restoration area lies within a sparsely forested buffer area. The surrounding topography is gentle rolling hills.


Lindley Mill Road
Green Hill Road
South Fork Road
Reach 3
Reach 1
Reach 2
Alamance County
Chatham County
ALAMANCE CO
South Fork Ch
PIPELINE
PIPELINES
Miles
0
0.5
1
Alamance
Ecosystem Enhancement Program
UT to South Fork
Figure 1
Alamance County, North Carolina


UT TO SOUTH FORK
GREEN HILL RD.
REACH 1
REACH 2
REACH 3
FLOW
LINDLEY MILL RD.
ALAMANCE COUNTY
UT TO SOUTH FORK
FIGURE 2
Ecosystem
Enhancement
SEPI

1.4 History and Background

Tables II, III, and IV provide the project history, contact information for the contractors on the project, and the project background/setting, respectively.

Table II. Project Activity and Reporting History			
UT to South Fork/EEP Project Number 435			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan			September 2002
Final Design - 90%	Raw data being acquired by EEP and will be included in the 2008 monitoring report for the site.		
Construction			
Temporary S&E mix applies to entire project area			
Permanent seed mix applies to reach/segments 1&2			
Containerized and B&B plantings for reach/segments 1&2			
Mitigation Plan/ As-built (Year 0 Monitoring - baseline)			
Year 1 monitoring	December 1, 2006	June 1, 2006	November 2006
Year 2 monitoring	December 1, 2007	October 2007	December 1, 2007
Year 3 monitoring	December 1, 2008		
Year 4 monitoring	December 1, 2009		
Year 5 monitoring	December 1, 2010		
Year 5+ monitoring			

Table III. Project Contact Table	
UT to South Fork/EEP Project Number 445	
Designer	ARCADIS G&M 801 Corporate Center Drive, Suite 300 Raleigh, NC 27607
Construction Contractor	*
Planting Contractor	*
Seeding Contractor	*
2006 & 2007 Monitoring Performers	SEPI Engineering Group 1025 Wade Avenue Raleigh, NC 27607 Phillip Todd (919) 789-9977
Stream Monitoring POC	Ira Poplar-Jeffers (919) 789-9977
Vegetation Monitoring POC	Phil Beach (919) 789-9977
Wetland Monitoring POC	N/A

*Raw data being acquired by EEP and will be included in the 2008 monitoring report.

Table IV. Project Background Table	
UT to South Fork/EEP Project Number 445	
Project County	Alamance County, NC
Drainage impervious cover estimate (%)	5
Stream Order	1
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Rosgen Classification of As-built	E
Cowardin Classification	N/A
Dominant soil types	Georgeville-Heron-Alamance & Orange-Efland-Herndon
Reference site ID	UT Wells Creek & UT Varnal Creek
USGS HUC for Project and Reference	03030002 Haw River
NCDWQ Sub-basin for Project and Reference	03-04-06
NCDWQ classification for Project and Reference	C, NSW
Any portion of any project segment 303d listed?	no
Any portion of any project segment upstream of a 303d listed segment?	no
Reasons for 303d listing or stressor	N/A
% of project easement fenced	99
% of project easement demarcated with bollards (if fencing absent)	0

2.0 PROJECT MONITORING METHODOLOGY

2.1 Vegetation Methodology

The following methodology was used for the stem count. The configuration of the vegetation plots was marked out with tape to measure 10 meters by 10 meters (or equivalent to 100 square meters) depending on buffer width. The planted material in the plot was marked with flagging. The targeted vegetation was then identified by species and a tally of each species was kept and recorded in a field book.

2.2 Stream Methodology

The project monitoring for the stream channel included a longitudinal survey, cross-sectional surveys, pebble counts, problem area identification, and photo documentation. These measurements were taken at each reach. The stationing was based on thalweg. The methodology for each portion of the stream monitoring is described in detail below.

2.2.1 Longitudinal Profile and Plan View

A longitudinal profile was surveyed for each reach with a Nikon DTM-520 Total Station, prism, and a TDS Recon Pocket PC. The heads of features (i.e., riffles, runs, pools, and glides) were surveyed, as well as the point of maximum depth of each pool, boundaries of problem areas, and any other significant slope-breaks or points of interest. At the head of each feature and at the maximum pool depth, thalweg, water surface, edge of water, left and right bankfull, and left and right top of bank (if different than bankfull) were surveyed. All profile measurements were calculated from this survey, including channel and valley length and length of each feature, water surface slope for each reach and feature, bankfull

slope for the reach, and pool spacing. This survey also was used to draw plan view figures with Microstation v8 (Bentley Systems, Inc., Exton, PA) for each reach, and all pattern measurements (i.e. meander length, radius of curvature, belt width, meander width ratio, and sinuosity) were measured from the plan view. Stationing was calculated along the thalweg.

2.2.2 Permanent Cross Sections

Four permanent cross sections (two riffles and two pools) were surveyed at Reach 1. Two permanent cross sections (one riffle and one pool) were surveyed at Reach 2, and six permanent cross sections (3 riffles and 3 pools) were surveyed at Reach 3. The beginning and end of each permanent cross section were originally marked with a wooden stake and metal conduit. Cross sections were installed perpendicular to the stream flow. Each survey noted all changes in slope, tops of both banks, left and right bankfull, edges of water, thalweg, and water surface. Before each cross section was surveyed, bankfull level was identified, and a quick bankfull area was calculated by measuring a bankfull depth at 1-foot intervals between the left and right bankfull locations and adding the area of each interval block across the channel. This rough area was then compared to the North Carolina Rural Piedmont Regional Curve-calculated bankfull area to ensure that bankfull was accurately located prior to the survey. The cross sections were then plotted and Monitoring Year 2 monitoring data was overlain on Monitoring Year 1 data for comparison.. All dimension measurements (i.e. bankfull width, floodprone width, bankfull mean depth, cross sectional area, width-to-depth ratio, entrenchment ratio, bank height ratio, wetted perimeter, and hydraulic radius) were calculated from these plots and compared to the Monitoring Year 1 data.

2.2.3 Pebble Counts

A modified Wolman pebble count (Rosgen 1994), consisting of 50 samples, was conducted at each permanent cross section. The cumulative percentages were graphed, and the D50 and D84 particle sizes were calculated and compared to Monitoring Year 1 data.

2.3 Photo Documentation

Permanent photo points were established during Monitoring Year 1. A set of three photographs (facing upstream, facing downstream, and facing the channel) were taken at each photo point with a digital camera. Two photographs were taken at each cross-section (facing upstream and downstream). A representative photograph of each vegetation plot was taken at the designated corner of the vegetation plot and in the same direction as the Monitoring Year 1 photograph. An arrow was placed on the designated corner of each vegetation plot on the plan view sheets to document the corner and direction of each photograph. Photos were also taken of all significant stream and vegetation problem areas.

3.0 PROJECT CONDITION AND MONITORNING RESULTS

3.1 Vegetation Assessment

3.1.1 Soils Data

Table V. Preliminary Soil Data					
Series	**Max Depth (in.)**	**% Clay on Surface**	**K**	**T**	**OM %**
Chewacla (Cd)	80	5.0 - 20.0	0.48	*	1.0 - 4.0
Efland (EaB2)	86	<<<<<<< Information unavailable >>>>>>>			
Georgeville (GaB2)	63	5.0 - 27.0	0.48	*	0.5 - 2.0
Georgeville (GbD3)	63	27.0 - 35.0	0.35	*	0.5 - 2.0
Herndon (HdB2)	68	5.0 - 27.0	0.48	*	0.5 - 1.0
Local Alluvial (Lc)		<<<<<<< High variability of data >>>>>>>			
Orange (ObB2)	55	10.0 - 27.0	0.44	*	1.0 - 3.0
Orange (ObC2)	55	10.0 - 27.0	0.44	*	1.0 - 3.0

* The soils information was not available from the Natural Resources Conservation Service (NRCS)

3.1.2 Vegetative Problem Area Plan View

Overall, there appears to be good vegetation along the stream channel. There are some bank erosion areas, and these areas are described in the stream problem area section of the report (See Section 3.2.4).

There is good herbaceous vegetation growth along all of the monitored stream reach. In many areas, fescue was prevalent, preventing the establishment of the planted bare root trees. This was particularly noted in Vegetation Plot (VP) #2 where no bare roots were noted. VP #1 only has 3 trees in it. In VP #4, only a single bare root of green ash was located although there are several volunteers of red maple. The vegetative plots and problem areas are shown on the plan view sheets in Appendix C.

Although not considered to be problem now, Japanese honeysuckle was noted in several areas. It was noted in VP #1, #4, #5, #6, and #7 (the side of the plot opposite the stream). These are "watch" areas.

3.1.3 Stem Counts

The planted bare root stems in Reach 1 remain a concern. No stems were located in VP #2, one stem in VP #4 and few stems were located in VP #1, 3, and 5. The number of stems/acre in VP #1, 2, 4 and 5 are already below the Year 5 goal of 260 stems/acre. VP #3 remains a "watch" area as the stem/acre was 280. It was noted that outside of the vegetation plots for Reach 1, going downstream, and VP# 5 in Reach 2, the number of bare root stems remain substantial.

The overall survival from Monitoring Year 1 to Year 2 was 81% among all plants. This number is good considering the area is in a drought for 2007.

It should be noted that there were several species for which several-to-many additional stems were counted within a given plot relative to the Monitoring Year 1 count. These additional stems were assumed to be volunteers and were not included in the survival calculations. The species were *Cornus ammomum* (VP #6 and 7), *Acer negundo* (VP #7), *Betula nigra* (VP #8, 9, and 12), *Diospyros virginiana* (VP #6 and 11), *Fraxinus pennsylvanica* (VP #1, 4, and 12), *Symphoricarpos orbiculatus* (VP #10), *Platanus occidentalis* (VP #6 and 7), *Quercus michauxii* (VP #9), and *Ulmus americana* (VP #12). In addition, the following species were found in plots

but were assumed to be volunteers because they were apparently not found during Monitoring Year 1: *Liquidambar styraciflua* (VP #3, 7, 9, 10, and 12), *Pinus taeda* (plots 9, 10, and 12), *Myrica cerifera* (plot 9), *and Celtis laevigata* (plot 10). SEPI believes that *Symphoricarpos orbiculatus* was accidentally misidentified as *Hypericum* spp. during Monitoring Year 1. This was corrected in the Monitoring Year 2 stem counts table (Table VII).

3.2 Stream Assessment

Considering the 5 year timeframe of standard mitigation monitoring, restored streams should demonstrate morphologic stability in order to be considered successful. Stability does not equate to an absence of change, but rather to sustainable rates of change or stable patterns of variation. Restored streams often demonstrate some level of initial adjustment in the several months that follow construction and some change/variation subsequent to that is to also be expected. However, the observed change should not indicate a high rate or be unidirectional over time such that a robust trend is evident. If some trend is evident, it should be very modest or indicate migration to another stable form. Examples of the latter include depositional processes resulting in the development of constructive features on the banks and floodplain, such as an inner berm, slight channel narrowing, modest natural levees, and general floodplain deposition. Annual variation is to be expected, but over time this should demonstrate maintenance around some acceptable central tendency while also demonstrating consistency or a reduction in the amplitude of variation. Lastly, all of this must be evaluated in the context of hydrologic events to which the system is exposed over the monitoring period.

For channel dimension, cross-sectional overlays and key parameters such as cross-sectional area and the channel's width to depth ratio should demonstrate modest overall change and patterns of variation that are in keeping with above. For the channels' profile, the reach under assessment should not demonstrate any consistent trends in thalweg aggradation or degradation over any significant continuous portion of its length. Over the monitoring period, the profile should also demonstrate the maintenance or development of bedform (facets) more in keeping with reference level diversity and distributions for the stream type in question. It should also provide a meaningful contrast in terms of bedform diversity against the pre-existing condition. Bedform distributions, riffle/pool lengths and slopes will vary, but should do so with maintenance around design/As-built distributions. This requires that the majority of pools are maintained at greater depths with lower water surface slopes and riffles are shallow with greater water surface slopes. Substrate measurements should indicate the progression towards, or the maintenance of, the known distributions from the design phase.

In addition to these geomorphic criteria, a minimum of two bankfull events must be documented during separate monitoring years within the five year monitoring period for the monitoring to be considered complete. Table VIII documents all bankfull events recorded since the start of Monitoring Year 1.

Table VIII. Verification of Bankfull Events - UT to South Fork

Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
1/9/2007	Unknown	Crest Stage Gauge measurement of approximately 7" on stick (bottom of stick at bkf).	
4/5/2007	Unknown	Crest Stage Gauge measurement of 16" (bottom of gauge 12" below bkf).	
6/4/2007	6/3/2007 – 6/4/2007	According to NOAA National Weather Service daily climate data, approximately 1.45" of precipitation fell over the listed two day period. 1" of this fell on 6/3. An additional 0.4" fell on 6/5/2007. It was assumed, but not confirmed, that this event resulted in a bankfull flow.	No Photo.

3.2.1 Longitudinal Profile and Plan View

The overall water surface slopes of the three reaches appear stable. In Reach 1, the median riffle slope and length have both increased enough since Monitoring Year 1 to cause some concern (Table XIII, Appendix B). This trend was probably the result of measurement sensitivities in such a small channel, riffle aggradation also may have contributed the trend. Additionally, the median pool spacing has decreased significantly both in Reaches 1 and 2, and there was a slight decrease in pool length in Reach 2 (Table XIII, Appendix B). It appears that this trend is most likely the result of differences between surveys by different performers. For example, there are a couple of sections of Reach 1 (e.g., a series of pools starting at Station 14+46), and at least one in Reach 2 starting at Station 15+47, where there are several pools in a row that were grouped into one feature during Monitoring Year 1 and were divided into separate features during Monitoring Year 2. The resulting effect was the replacement of one large pool length value from Monitoring Year 1 with several smaller values from Monitoring Year 2. This change between the two monitoring years artificially decreases the median pool length and spacing values for Monitoring Year 2.

However, several more pools were documented in the Monitoring Year 2 data along Reaches 1 and 2 where pools were not documented in Monitoring Year 2. It is uncertain whether this result is indicative of different decisions in the field toward what constitutes a pool, or if extra pools are forming in the riffles. It is unlikely that the latter is the case, based on the consistency of the longitudinal profiles of both reaches between Monitoring Years 1 and 2. In fact, this consistency holds true for all three reaches. The pools and riffles of Reach 3 appear stable. Additionally, the stream pattern appears stable in all three reaches, and the plan view overlays remain consistent between monitoring years. The longitudinal profile and stream monitoring plan views are shown in Appendix B.

3.2.2 Permanent Cross Sections

All Reach 1 cross sections overlay nicely and have remained stable between monitoring years. Cross section #4 has filled in slightly on stream-right due to normal point bar development.

Both of the Reach 2 cross sections overlay nicely, although Monitoring Year 1's elevations had to be adjusted slightly (+0.13 ft to all points) for cross section #6 to overlap. However, the dimension has remained stable, and it is concluded that this was just a survey error.

All Reach 3 cross sections have remained stable and overlay nicely, except for cross section #10, which appears laterally out-of-line. However, this result was most likely a survey error as the stream channel shows no sign of recent migration in this section. Additionally, all of the elevations along Monitoring Year 1 cross section #9 were adjusted 0.13 feet higher to align with the Monitoring Year 2 survey. However, the dimension remained stable, and it is concluded that this was the result of a survey error as well.

No cross sections have specific problem areas associated with them. However, there is a bank erosion (right) located just downstream of cross section #4 in Reach 1. This erosion has not affected the dimension of the cross section, but the area should be observed closely during future monitoring years to track any changes. All cross-section graphs are located in Appendix B.

3.2.3 Pebble Counts

Pebble counts in Reach 1 show a dramatic increase in silt percentages across the entire reach between Monitoring Years 1 and 2. This result makes sense, to a degree, because aggradation (i.e. fine sediment deposition) is a stated problem within the reach. Soon, the channel should reach a stable state, and the

bed materials should coursen over time, especially in the riffles. The fine particle source is unknown, but it is likely that it is associated with the general agricultural land use of the watershed upstream of this reach. It is unlikely that bank erosion within the Reach 1 is contributing much to this result because a very low percentage of the banks are eroding in this reach.

Pebble counts in Reach 2 show a general increase in the silt/clay size class, a general decrease in the sand size classes, and an increase in the size classes between medium gravel and large cobble between Monitoring Years 1 and 2. This trend indicates that the bed materials are coarsening in general, but there is an upstream source of silt deposition as in Reach 1.

Reach 3 shows the same trend as in Reaches 1 and 2 (i.e., definite increase in silt percentages between Monitoring Years 1 and 2), but the percentages of other size classes remained very similar between monitoring years. The only exception to this trend was with cross section #10 where a coarsening of bed materials was observed between monitoring years. It is unclear how to explain this trend at a pool (i.e., depositional) feature, unless there is significant scouring or flushing of the stream bed at this cross section. The pebble count data is located in Appendix B.

3.2.4 Stream Problem Areas

Aggradation in riffle sections remains fairly prominent in all three restoration reaches. In many cases, this aggradation may not be a problem as the stream appears to be narrowing to a stable dimension where it appears the riffle sections were built too wide. However, in some cases, the aggradation is a result of grass or cattails growing in the channel substrate and retaining excess fine sediments. There is some bank erosion in all reaches, but there are no areas of severe status, and many areas appear to be healing over. Many of the stone structures (i.e. cross vanes and j-hooks) in Reaches 1 and 2 have water piping around or under the structure and/or have stones that are loose or have already been displaced. Some of these structures may require maintenance. In addition, several rootwads on Reaches 1 and 2 have problems with the soil caving in behind the structure or around the footing. In some cases, this instability may just be the result of the ground settling after installation, but in several cases it appears that there is water piping through the structure at certain times, a more serious problem. The structures in Reach 3 appear stable overall. Problem areas that were observed in the field were marked on the plan sheets in Appendix B. The stream problem areas table is located in Appendix B and describes the problem areas, station numbers, and respective probable causes.

Table XI a. Categorical Stream Feature Visual Stability Assessment

UT to South Fork

Segment/Reach: 1 (1140 linear feet)

Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
A. Riffles	100%	80%	71%			
B. Pools	100%	80%	90%			
C. Thalweg	100%	85%	88%			
D. Meanders	100%	87%	87%			
E. Bed General	100%	92%	87%			
F. Bank Condition	100%	98%	98%			
G. Vanes / J Hooks etc.	100%	58%	91%			
H. Wads and Boulders	100%	50%	56%			

Table XI b. Categorical Stream Feature Visual Stability Assessment						
UT to South Fork						
Segment/Reach: 2 (1022 linear feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	91%	83%			
B. Pools	100%	90%	100%			
C. Thalweg	100%	94%	93%			
D. Meanders	100%	79%	98%			
E. Bed General	100%	87%	82%			
F. Bank Condition	100%	98%	99%			
G. Vanes / J Hooks etc.	100%	71%	97%			
H. Wads and Boulders	100%	27%	77%			

Table XI c. Categorical Stream Feature Visual Stability Assessment						
UT to South Fork						
Segment/Reach: 3 (1024 linear feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	90%	84%			
B. Pools	100%	91%	88%			
C. Thalweg	100%	88%	100%			
D. Meanders	100%	75%	97%			
E. Bed General	100%	89%	90%			
F. Bank Condition	100%	93%	98%			
G. Vanes / J Hooks etc.	100%	100%	100%			
H. Wads and Boulders	100%	90%	100%			

3.3 Photo Documentation

Photos taken of the vegetation problem areas and photos of the vegetation plots are in Appendix A. Stream problem area photographs are provided in Appendix B. The photographs taken at the marked photo point locations and at the cross-sections are provided in Appendix B.

4.0 RECOMMENDATIONS AND CONCLUSIONS

All reaches remained geomorphically stable between Monitoring Years 1 and 2, with the exception of several areas of aggradation occurring in riffle sections of all three reaches. However, Reach 1 is the only reach where this problem may have contributed to any noticeable geomorphic change (i.e., increase in riffle length and slope), probably due to the smaller size of Reach 1. All other plan, profile, and pattern factors appear stable between monitoring years. There are several areas with stream problems, especially in Reaches 1 and 2, where structures are failing. Several of the structures had water flowing under or piping around stones. Several more structures had loose stones or stones that have already been displaced. In addition, several rootwads of Reaches 1 and 2 have some portion of bank caving in or piping behind the structure or around the footing. The most severe of these problem structures (i.e., colored “red” on the plan views) may require maintenance, and these areas should be further evaluated. There were small amounts of bank erosion in all reaches, but no areas were considered severe. Many areas are healing, and erosion impacted a low percentage of all reaches. Therefore, bank erosion is not a serious concern at this time.

There are several concern areas with regard to the vegetation plots. The number of stems/acre in VP #1, 2, 4 and 5 remain below the Year 5 goal of 260 stems/acre. The stem/acre for VP #3 is 280 stems/acre.

Overall survivability from Year 1 to Year 2 was good (81% for all counted vegetation) despite the area being in a drought.

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Appendix A1

Photolog - Vegetation Problem Areas

APPENDIX A1
PHOTOLOG – UT SOUTH FORK (REACH 1)

PROBLEM AREAS (Vegetation)

Photo 1: Representative bank erosion problem area (17+60 along plan view).

Photo 3: Representative problem cross vane (20+94 along plan view).

Photo 2: Bank Undercut/Erosion (Jan 31 - IMG 5278 – Pts 837) (Station XX along plan view).

APPENDIX A1
PHOTOLOG – UT SOUTH FORK (REACH 2)

PROBLEM AREAS (Vegetation)

Photo 1: Bank Erosion (Station17+55 along plan view).

Photo 2: Bank Undercut/Erosion (Station 16+10 along plan view).

APPENDIX A1
PHOTOLOG – UT SOUTH FORK (REACH 3)

PROBLEM AREAS (Vegetation)

Photo 1: Bank Erosion (Station 11+30 along plan view).

Photo 3. Bank Erosion (Station 16+10) upstream of J-hook

Photo 2: Bank Undercut/Erosion (Station 11+65 along plan view).

Photo 4. Bank Erosion (Station 19+15 along plan view)

Appendix A2

Photolog - Vegetation Plots

APPENDIX A1
PHOTOLOG UT to SOUTH FORK

VEGETATION PLOTS


Photo 1: Vegetation Plot 1


Photo 2: Vegetation Plot 2


Photo 3: Vegetation Plot 3


Photo 4: Vegetation Plot 4


Photo 5: Vegetation Plot 5


Photo 6: Vegetation Plot 6


Photo 7: Vegetation Plot 7


Photo 8: Vegetation Plot 8


Photo 9: Vegetation Plot 9


Photo 10: Vegetation Plot 10


Photo 11: Vegetation Plot 11


Photo 12: Vegetation Plot 12

Appendix A3

Vegetation Data Tables

Table VI. Vegetative Problem Areas

Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank			
Bare Bench	Reach 2 - 13+10 to 13+25		
Bare Flood Plain			
Invasive/Exotic Populations			

Table VII. Stem counts for each species arranged by plot - UT South Fork

Species	Plots												Year 1 Totals	Year 2 Totals	Survival %
	1	2	3	4	5	6	7	8	9	10	11	12			
Shrubs															
Cornus ammomum						(LS 15)	0		1 (LS 1)	2 (LS 5)	(LS 5)	(LS 5)	3 (LS 31)	3 (LS 31)	100.0%
Salix nigra							1						1	1	100.0%
Trees															
Acer negundo							0				1		1	1	100.0%
Acer rubrum				5			1						7	6	85.7%
Betula nigra							2	2	1	11	3	8	31	27	87.1%
Carpinus caroliniana													2	0	0.0%
Diospyros virginiana						1	5	3	2	3	1	1	18	16	88.9%
Fraxinus pennsylvanica	3		4	1	3		8	10	13	16	2	3	70	63	90.0%
Symphoricarpos orbiculatus			3							1			4	4	100.0%
Juglans nigra									3	1		4	27	8	29.6%
Platanus occidentalis						10	13	1	1		2	3	32	30	93.8%
Sambucus canandensis					2								5	2	40.0%
Quercus michauxii									1	5	2	2	14	10	71.4%
Quercus sp.							1						1	1	100.0%
Quercus alba						2		5					10	7	70.0%
Ulmus americana							1				1	0	3	2	66.7%
Total including live stake	3	0	7	6	5	28	32	21	23	44	17	26	260	212	81.5%
Stems per acre	120	0	280	240	200	1120	1280	840	920	1760	680	1040	867	707	
Total exluding live stake	3	0	7	6	5	13	32	21	22	39	12	21	229	181	79.0%
Stems per acre	120	0	280	240	200	520	1280	840	880	1560	480	840	763	603	

Appendix B1

Photolog – Stream Problem Areas

APPENDIX B1
PHOTOLOG – UT SOUTH FORK (REACH 1)

PROBLEM AREAS

Photo 1: Representative grass aggradation problem area (13+88 along plan view).

Photo 4: Representative problem J-hook (14+12 along plan view).

Photo 2: Representative cattail aggradation problem area (20+38 along plan view).

Photo 5: Representative problem Root Wad (19+56 along plan view).

Photo 3: Representative problem cross vane (20+94 along plan view).

APPENDIX B1
PHOTOLOG – UT SOUTH FORK (REACH 2)

PROBLEM AREAS (Stream)

Photo 1: Representative grass aggradation problem area (11+12 along plan view).

Photo 3: Representative problem cross vane (20+22 along plan view).

Photo 2: Representative cattail aggradation problem area (10+78 along plan view).

Photo 4: Representative problem Root Wad (12+99 along plan view).

APPENDIX B1
PHOTOLOG – UT to SOUTH FORK (REACH 3)

PROBLEM AREAS (Stream)

Photo 1: Representative grass aggradation problem area (Station 12+66 along plan view).

Photo 2: Representative cattail aggradation problem area (Station 10+85 along plan view).

Appendix B2

Photolog – Cross-Sections & Photo Points

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 1)

CROSS-SECTIONS & PHOTOPOINTS


Cross-Section 1: Looking Downstream


Cross-Section 1: Looking Upstream


Cross-Section 2: Looking Downstream


Cross-Section 2: Looking Upstream


Cross-Section 3: Looking Downstream


Cross-Section 3: Looking Upstream

Cross-Section 4: Looking Downstream

Cross-Section 4: Looking Upstream

Photo point 1: Looking Upstream

Photo point 2: Looking Upstream

Photo point 1: Looking Downstream

Photo point 2: Looking Downstream

Photo point 1: Looking at Channel

Photo point 2: Looking at Channel

Photo point 3: Looking Upstream

Photo point 4: Looking Upstream

Photo point 3: Looking Downstream

Photo point 4: Looking Downstream

Photo point 3: Looking at Channel

Photo point 4: Looking at Channel

Photo point 5: Looking Upstream

Photo point 6: Looking Upstream

Photo point 5: Looking Downstream

Photo point 6: Looking Downstream

Photo point 5: Looking at Channel

Photo point 6: Looking at Channel

Photo point 7: Looking Upstream

Photo point 8: Looking Upstream

Photo point 7: Looking Downstream

Photo point 8: Looking Downstream

Photo point 7: Looking at Channel

Photo point 8: Looking at Channel

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 2)

CROSS-SECTIONS & PHOTOPOINTS


Cross-Section 5: Looking Downstream


Cross-Section 5: Looking Upstream


Cross-Section 6: Looking Downstream


Cross-Section 6: Looking Upstream

Photo point 1: Looking Upstream

Photo point 2: Looking Upstream

Photo point 1: Looking Downstream

Photo point 2: Looking Downstream

Photo point 1: Looking at Channel

Photo point 2: Looking at Channel

Photo point 3: Looking Upstream

Photo point 4: Looking Upstream

Photo point 3: Looking Downstream

Photo point 4: Looking Downstream

Photo point 3: Looking at Channel

Photo point 4: Looking at Channel

Photo point 5: Looking Upstream

Photo point 6: Looking Upstream

Photo point 5: Looking Downstream

Photo point 6: Looking Downstream

Photo point 5: Looking at Channel

Photo point 6: Looking at Channel

Photo point 7: Looking Upstream

Photo point 7: Looking Downstream

Photo point 7: Looking at Channel

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 3)

CROSS-SECTION & PHOTOPOINTS


Cross-Section 7: Looking Downstream


Cross-Section 9: Looking Downstream


Cross-Section 8: Looking Downstream


Cross-Section 7: Looking Upstream

Cross-Section 8: Looking Upstream

Cross-Section 9: Looking Upstream

Cross-Section 10: Looking Downstream

Cross-Section 10: Looking Upstream

Cross-Section 11: Looking Downstream

Cross-Section 11: Looking Upstream

Cross-Section 12: Looking Downstream

Cross-Section 12: Looking Upstream


Photo point 1: looking upstream


Photo point 2: looking upstream


Photo point 1: looking downstream


Photo point 2: looking downstream


Photo point 1: looking at channel


Photo point 2: looking at channel

Photo point 3: looking upstream

Photo point 4: looking upstream

Photo point 3: looking downstream

Photo point 4: looking downstream

Photo point 3: looking at channel

Photo point 4: looking at channel

Photo point 5: looking upstream

Photo point 5: looking downstream

Photo point 5: looking at channel

Appendix B3

Stream Data Tables

Table B2. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 1 (1152 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	23	28	NA	82%	
	2. Armor stable	23	28	NA	82%	
	3. Facet grade appears stable	20	28	NA	71%	
	4. Minimal evidence of embedding/fining	14	28	NA	50%	
	5. Length appropriate	20	28	NA	71%	**71%**
B. Pools	1. Present	27	29	NA	93%	
	2. Sufficiently deep	26	29	NA	90%	
	3. Length appropriate	25	29	NA	86%	**90%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	12	13	NA	92%	
	2. Downstream of meander (glide/inflection) centering	11	13	NA	85%	**88%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	23	26	NA	88%	
	2. Of those eroding, # w/concomitant point bar formation	2	3	NA	67%	
	3. Apparent Rc within specifications	24	26	NA	92%	
	4. Sufficient floodplain access and relief	26	26	NA	100%	**87%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	21/285	75%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	1/8	99%	**87%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	7/36	98%	**98%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	47	50	NA	94%	
	2. Height appropriate	50	50	NA	100%	
	3. Angle and geometry appear appropriate	49	50	NA	98%	
	4. Free of piping or other structural failures	35	50	NA	70%	**91%**
H. Wads and Boulders	1. Free of scour	5	8	NA	63%	
	2. Footing stable	4	8	NA	50%	**56%**

Table B2. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 2 (1030 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	13	13	NA	100%	
	2. Armor stable	13	13	NA	100%	
	3. Facet grade appears stable	11	13	NA	85%	
	4. Minimal evidence of embedding/fining	5	13	NA	38%	
	5. Length appropriate	12	13	NA	92%	**83%**
B. Pools	1. Present	14	14	NA	100%	
	2. Sufficiently deep	14	14	NA	100%	
	3. Length appropriate	14	14	NA	100%	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	8	8	NA	100%	
	2. Downstream of meander (glide/inflection) centering	6	7	NA	86%	**93%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	13	14	NA	93%	
	2. Of those eroding, # w/concomitant point bar formation	1	1	NA	100%	
	3. Apparent Rc within specifications	14	14	NA	100%	
	4. Sufficient floodplain access and relief	14	14	NA	100%	**98%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	18/359	65%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**82%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	4/19	99%	**99%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	28	28	NA	100%	
	2. Height appropriate	28	28	NA	100%	
	3. Angle and geometry appear appropriate	28	28	NA	100%	
	4. Free of piping or other structural failures	25	28	NA	89%	**97%**
H. Wads and Boulders	1. Free of scour	7	11	NA	64%	
	2. Footing stable	10	11	NA	91%	**77%**

Table B2. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 3 (1028 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	15	16	NA	94%	
	2. Armor stable	15	16	NA	94%	
	3. Facet grade appears stable	12	16	NA	75%	
	4. Minimal evidence of embedding/fining	12	16	NA	75%	
	5. Length appropriate	13	16	NA	81%	**84%**
B. Pools	1. Present	18	19	NA	95%	
	2. Sufficiently deep	14	19	NA	74%	
	3. Length appropriate	18	19	NA	95%	**88%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	6	6	NA	100%	
	2. Downstream of meander (glide/inflection) centering	7	7	NA	100%	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	12	14*	NA	86%	
	2. Of those eroding, # w/concomitant point bar formation	2	2	NA	100%	
	3. Apparent Rc within specifications	14	14*	NA	100%	
	4. Sufficient floodplain access and relief	14	14*	NA	100%	**97%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	15/201	80%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**90%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	3/42	98%	**98%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	30	30	NA	100%	
	2. Height appropriate	30	30	NA	100%	
	3. Angle and geometry appear appropriate	30	30	NA	100%	
	4. Free of piping or other structural failures	30	30	NA	100%	**100%**
H. Wads and Boulders	1. Free of scour	10	10	NA	100%	
	2. Footing stable	10	10	NA	100%	**100%**
"*" - Total number of meanders changed from Year 1 monitoring report based upon actual number of meanders according to Year 1 and Year 2 plan views.						

Table X. Stream Problem Areas

UT to South Fork, Reach 1

Feature Issue	Station numbers	Suspected Cause	Photo number
Aggradation (grass)	10+10 10+18	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	10+30 10+34	Channel possibly built too wide, naturally narrowing.	
J-hook	10+50	Piping around structure.	
J-hook	10+91	Center stone positioned wrong, loose rock.	
J-hook	11+10	Loose center stone, structure may need extra stone and repositioning of center rock	
Aggradation (grass)	11+35 11+43	Channel possibly built too wide, naturally narrowing.	
J-hook	11+45	Angle of structure directing flow into outside of meander (right bank).	
Bank Erosion (right bank)	11+53 11+57	Angle of upstream j-hook is directing flow into unprotected bank and causing erosion.	
Aggradation (grass)	11+73 11+81	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	12+00 12+10	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	12+31 12+37	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	12+68 12+79	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	13+06 13+12	Area is "washing" out and aggradation now located downstream of j-hook.	
Aggradation (grass)	13+88 14+00	Channel possibly built too wide, naturally narrowing.	Photo 1
Aggradation (grass)	14+05 14+10	Fine sediment deposition in tail of pool just upstream of j-hook.	
J-hook	14+12	Piping around structure, may have been placed too high.	Photo 5
Aggradation (grass)	14+74 14+79	Channel possibly built too wide, naturally narrowing.	
J-hook	14+80	Piping/undermining of center stone & center stone loose.	
Aggradation (grass)	14+90 14+93	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	15+09 15+65	Channel possibly built too wide, naturally narrowing.	
Rootwad	15+39	Structure exposed, placed too high.	
J-hook	15+69	Piping around structure.	
Aggradation (grass)	15+79 16+18	Channel possibly built too wide, naturally narrowing.	
Rootwad	15+79	Placed too high, resulting in erosion and undercutting around structure	
Rootwad	15+81	Placed too high, resulting in erosion and undercutting around structure	
Aggradation (grass)	16+52 16+75	Channel possibly built too wide, naturally narrowing.	
J-hook	16+75	Gap in structure (i.e. missing center rock).	
Aggradation (grass)	16+85 16+94	Channel possibly built too wide, naturally narrowing.	
J-hook	17+15	Missing center rock.	
Aggradation (grass)	17+22 17+36	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (right bank)	17+58 17+62	Healing over, cause of old erosion was angle of upstream j-hook.	Photo 3
Aggradation (grass)	17+62 17+65	Channel possibly built too wide, naturally narrowing.	
Crossvane	18+39	Piping/undermining around center stone.	
Bank Erosion (right bank)	18+52 18+54	Ponding at high flows due to j-hook placement as well as piping causing scour of bank upstream of structure.	
J-hook	18+55	Installed too high, ponding during high flows, piping b/t center stone bank.	
Bank Erosion (left bank)	18+71 18+73	Ponding upstream of j-hook at high flows as well as piping causing bank scour.	
J-hook	18+73	Installed too high, piping around center stone, loose center stone.	
Bank Erosion (both banks)	18+85 18+93	Section appears to be downcutting (i.e. incising), leaving weakened banks. The incision is possibly due to channel scour downstream (i.e. directly upstream of downstream j-hook) that created a headcut.	
Bank Erosion (left bank)	18+95 18+97	Piping around j-hook causing bank scour directly upstream.	
J-hook	18+97	Installed too high, undermining/piping under structure causing scour.	
Bank Erosion (left bank)	19+05 19+13	Piping around j-hook causing bank scour/undercutting directly upstream.	
J-hook	19+10	Installed too high, undermining/piping under structure causing scour.	
Aggradation (grass)	19+22 19+40	Channel possibly built too wide, naturally narrowing.	
J-hook	19+48	Loose center stone, piping around structure.	
Rootwad	19+56	Bank failing behind structure, possibly installed too high.	Photo 6
Aggradation (grass)	19+99 20+11	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	20+38 20+53	Cattails growing in fine sediment deposition of slack pool section.	Photo 2
Aggradation (grass)	20+53 20+63	Channel possibly built too wide, naturally narrowing.	
Crossvane	20+94	Piping around/underming of center stone, possibly installed too high.	Photo 4
J-hook	21+30	Possibly installed too high.	

Table X. Stream Problem Areas

UT to South Fork, Reach 2

Feature Issue	Station numbers	Suspected Cause	Photo number
Aggradation (grass)	10+11 10+31	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	10+78 11+05	Channel possibly built too wide, naturally narrowing.	Photo 2
Aggradation (grass)	11+12 11+17	Channel possibly built too wide, naturally narrowing.	Photo 1
Crossvane	11+18	Piping around structure, pool behind structure filling in with sediment deposit on right side.	
Aggradation (grass)	11+24 11+26	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	11+50 12+08	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass & willows)	12+27 12+33	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	12+38 12+66	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	12+82 13+06	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (right bank)	12+97 13+00	Flow directed into bank from structure directly upstream and rootwad inadequate to protect bank.	
Rootwad (severe)	12+99	Exposed, installed too high, bank failures caving in and around structure.	Photo 5
Aggradation (cattails)	13+29 13+49	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	13+87 14+02	Riffle narrowing, channel possibly built too wide, naturally narrowing.	
Rootwad	14+18	Some evidence of undercutting, possibly installed too high.	
Aggradation (grass)	14+24 14+44	Channel possibly built too wide, naturally narrowing.	
Rootwad	14+98	Bank failure around structure.	
Bank Erosion (right bank)	14+99 15+03	Possible improper installation of rootwads causing bank to cave in around structures, however area is healing over with new vegetation.	
Rootwad	15+03	Bank failure around structure.	
Aggradation (cattails)	15+38 15+47	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	16+02 16+36	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (left bank)	16+03 16+10	Lack of protective vegetation and/or soil stability characteristics.	Photo 3
Aggradation (grass)	16+54 16+82	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (left bank)	17+49 17+54	Possibly unstable soil characteristics and/or lack of vegetation at a point of moderate shear stress (outside of slight meander). Channel may be naturally narrowing.	
Aggradation (cattails)	18+20 18+31	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	18+51 18+76	Channel possibly built too wide, naturally narrowing.	
Crossvane	18+56	Missing center rock.	
Aggradation (cattails)	19+27 19+32	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	19+43 19+55	Channel possibly built too wide, naturally narrowing.	
Crossvane	20+22	Piping around structure.	Photo 4

Table X. Stream Problem Areas

UT to South Fork, Reach 3

Feature Issue	Station numbers	Suspected Cause	Photo number
Aggradation (cattails)	10+85 11+14	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (Right Bank)	11+33 11+37	Soil type or lack of vegetation. Perhaps built too wide and is narrowing.	
Aggradation (cattails)	11+85 11+97	Channel possibly built too wide, naturally narrowing.	Photo 2
Aggradation (grass)	12+14 12+34	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	12+66 12+87	Channel possibly built too wide, naturally narrowing.	Photo 1
Aggradation (cattails)	13+30 13+33	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	13+56 13+60	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	13+79 13+84	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	14+01 14+11	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	15+31 15+39	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass & cattails)	15+39 15+69	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	15+69 15+83	Channel possibly built too wide, naturally narrowing.	
Aggradation (cattails)	16+06 16+26	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (Left Bank)	16+13 16+26	Lack of protective vegetation and/or soil stability around structure on outside of meander.	
Aggradation (grass)	18+27 18+38	Channel possibly built too wide, naturally narrowing.	
Aggradation (grass)	18+81 18+90	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (Left Bank)	19+19 19+44	Lack of protection on outside of meander in area of highest shear stress. J-hook placed too far downstream along meander. Area currently healing but needs additional protective measures t prevent future erosional events.	Photo 3
Aggradation (grass)	19+21 19+26	Channel possibly built too wide, naturally narrowing.	

Appendix B3
UT to South Fork

Table XII Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 1)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**3.00**	**3.40**	**3.20**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**9.40**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**10.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>33**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**2.90**	**3.60**	**3.20**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**5.90**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**1.00**	**1.10**	**1.00**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**0.60**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.00**	**1.80**	**1.40**	**0.90**	**1.40**	**1.10**	**0.80**	**1.30**	**1.00**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**3.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**15.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**2.90**	**3.30**	**3.10**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**0.60**	**3.10**	**1.80**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**5.00**	**5.60**	**5.20**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**10.60**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**0.58**	**0.64**	**0.62**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.56**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**22.00**	**122.00**	**48.90**	**10.00**	**35.00**	**20.90**	**12.20**	**41.40**	**24.50**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**7.00**	**100.00**	**26.10**	**2.30**	**31.80**	**13.50**	**2.80**	**37.60**	**15.10**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**21.00**	**282.00**	**136.70**	**35.00**	**70.00**	**50.00**	**41.40**	**82.80**	**59.30**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**6.90**	**38.10**	**15.30**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.01**	**0.03**	**0.02**	**0.02**	**0.08**	**0.04**	**0.01**	**0.04**	**0.02**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**3.80**	**27.60**	**11.70**	**7.00**	**27.00**	**14.50**	**8.50**	**32.00**	**16.90**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**23.20**	**165.60**	**75.40**	**17.00**	**63.00**	**36.50**	**19.80**	**74.30**	**43.30**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**44.00**	**N/A**	**N/A**	**33.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.22**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.26**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

Table XII Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 2)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**N/A**	**N/A**	**9.00**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**12.20**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**68.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>26.8**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**N/A**	**N/A**	**10.20**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**10.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**N/A**	**N/A**	**1.10**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**0.80**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.00**	**2.10**	**1.50**	**0.90**	**1.40**	**1.10**	**1.00**	**1.60**	**1.30**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**8.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**15.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**N/A**	**N/A**	**7.60**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.70**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**N/A**	**N/A**	**11.20**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**13.80**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**N/A**	**N/A**	**0.91**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.72**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**12.00**	**114.00**	**45.70**	**10.00**	**35.00**	**20.90**	**15.90**	**53.90**	**31.80**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**5.00**	**140.00**	**28.00**	**2.30**	**31.80**	**13.50**	**3.70**	**49.00**	**19.60**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**40.00**	**172.00**	**87.90**	**35.00**	**70.00**	**50.00**	**53.90**	**107.80**	**77.20**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.30**	**12.70**	**5.10**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.08**	**0.03**	**0.02**	**0.08**	**0.04**	**0.01**	**0.05**	**0.03**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**3.80**	**27.60**	**12.40**	**7.00**	**27.00**	**14.50**	**11.00**	**41.60**	**22.00**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**12.90**	**75.90**	**35.40**	**17.00**	**63.00**	**36.50**	**25.70**	**96.80**	**56.30**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**44.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.27**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.58**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

Table XII Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 3)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**N/A**	**N/A**	**12.00**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**14.00**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**25.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>30.8**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**N/A**	**N/A**	**12.10**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**15.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**N/A**	**N/A**	**1.00**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**1.10**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.20**	**3.20**	**1.80**	**0.90**	**1.40**	**1.10**	**1.40**	**2.20**	**1.80**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**12.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**13.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**N/A**	**N/A**	**2.10**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**2.40**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**N/A**	**N/A**	**14.00**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**16.20**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**N/A**	**N/A**	**0.86**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.93**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**19.00**	**77.00**	**39.70**	**10.00**	**35.00**	**20.90**	**4.00**	**56.00**	**22.00**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**11.00**	**46.00**	**22.20**	**2.30**	**31.80**	**13.50**	**4.00**	**56.00**	**22.00**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**60.00**	**109.00**	**80.40**	**35.00**	**70.00**	**50.00**	**62.00**	**123.00**	**88.00**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.60**	**6.40**	**3.30**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.05**	**0.02**	**0.02**	**0.08**	**0.04**	**0.00**	**0.02**	**0.01**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**9.40**	**59.20**	**35.30**	**7.00**	**27.00**	**14.50**	**13.00**	**48.00**	**25.00**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**37.80**	**103.90**	**73.20**	**17.00**	**63.00**	**36.50**	**29.00**	**111.00**	**64.00**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**45.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.16**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.16**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

Table XII Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 4)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**13.00**	**18.00**	**15.70**	**6.50**	**10.00**	**8.00**			**14.10**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**21.00**	**200.00**	**82.00**	**16.00**	**22.00**	**18.80**			**>31.00**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**19.40**	**33.00**	**25.10**	**3.90**	**6.30**	**5.30**			**25.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**1.50**	**1.80**	**1.60**	**0.40**	**1.00**	**0.70**			**1.80**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.60**	**2.90**	**1.90**	**0.90**	**1.40**	**1.10**	**2.30**	**3.50**	**2.80**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**9.00**	**11.00**	**10.00**	**7.00**	**26.00**	**13.50**			**8.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**1.60**	**11.10**	**4.40**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.20**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**0.60**	**2.10**	**1.90**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**16.00**	**21.60**	**18.90**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**17.70**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**1.21**	**1.53**	**1.33**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**1.41**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**27.00**	**151.00**	**56.10**	**10.00**	**35.00**	**20.90**	**18.40**	**62.20**	**36.80**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**5.00**	**138.00**	**29.30**	**2.30**	**31.80**	**13.50**	**4.20**	**56.60**	**22.60**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**45.00**	**340.00**	**127.30**	**35.00**	**70.00**	**50.00**	**62.20**	**124.40**	**89.10**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.70**	**9.60**	**3.60**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.06**	**0.02**	**0.02**	**0.08**	**0.04**	**0.00**	**0.02**	**0.01**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**15.90**	**197.30**	**67.80**	**7.00**	**27.00**	**14.50**	**12.70**	**48.10**	**25.40**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**34.60**	**280.60**	**121.60**	**17.00**	**63.00**	**36.50**	**29.70**	**111.70**	**65.00**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**2.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**30.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.23**	**N/A**	**N/A**	**1.4**	**N/A**	**N/A**	**1.23**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**1.01**	**N/A**	**N/A**	**1.02**	**N/A**	**N/A**	**1.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			

*Habitat Index																		
*Macrobenthos																		

Appendix B3
UT to South Fork

Table XIII. Morphology and Hydraulic Monitoring Summary

UT to South Fork Creek

Segment/Reach: 1 (1140 linear feet)

Parameter	Cross Section 1 Riffle						Cross Section 2 Pool						Cross Section 3 Riffle						Cross Section 4 Pool					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	12.1	13.4					12.6	12.6					13.8	10.9					11.8	12.0				
Floodporne Width (ft)	99	100+					NA	NA					40+	35+					NA	NA				
BFCross Sectional Area (ft)	8.2	8.7					12.3	11.9					8.1	6.1					13.7	11.1				
BF Mean Depth (ft)	0.7	0.6					1.0	0.9					0.6	0.6					1.2	0.9				
Width/Depth Ratio	17.9	20.7					NA	NA					23.6	18.1					NA	NA				
Entrenchment Ratio	8.5	7.5+					NA	NA					3.0+	3.2+					NA	NA				
Bank Height Ratio	1.0	1.0					NA	NA					1.0	1.0					NA	NA				
Wetted Perimeter (ft)	50.5	15.6					13.6	14.1					14.9	14.2					12.3	14				
Hydraulic radius (ft)	0.4	0.5					0.9	0.8					0.5	0.4					1.1	0.8				
Substrate																								
d50 (mm)	sand	<0.062					sand	<0.062					sand	<0.062					sand	<0.062				
d84 (mm)	sand	15					sand	<0.062					sand	<0.062					sand	<0.062				

Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	8.9	51.8	20.7	17.7	63.6	24.8												
Radius of Curvature (ft)	9.1	39.1	14.4	8.5	41.7	20.1												
Meander Wavelenght (ft)	46.4	95.8	62.9	38.6	120	68.4												
Meander Width Ratio	0.69	4.02	1.61	1.32	4.73	1.90												
Profile																		
Riffle length (ft)	2.6	61.1	8.9*	2.7	43.7	11.1												
Riffle slope (ft/ft)	0.000	0.082	0.014*	0.002	0.113	0.023												
Pool length (ft)	4.4	71.0	12.1*	5.6	46.6	13.8												
Pool spacing (ft)	8.5	126.5	34.4*	6.4	72.2	25.7												
Additional Reach Parameters																		
Valley Length (ft)	925.9			925.1														
Channel Length (ft)	1166.1			1140.1														
Sinuosity	1.26			1.23														
Water Surface Slope (ft/ft)	0.0098			0.0096														
BF slope (ft/ft)	0.0094			0.0099														
Rosgen Classification	C5			C6														
*Habitat Index	NA			NA														
*Macrobenthos	NA			NA														

"*" -- Values reported last year were averages instead of medians. The values have been changed to medians in MY-1 & MY-2 columns for the 2007 report.

Appendix B3
UT to South Fork

Table XIII. Morphology and Hydraulic Monitoring Summary

UT to South Fork Creek

Segment/Reach: 2 (1022 linear feet)

Parameter	Cross Section 5 Pool						Cross Section 6 Riffle					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	10.5	12.2					10.4	11.3				
Floodporne Width (ft)	NA	NA					50+	60+				
BFCross Sectional Area (ft)	11.4	13.7					12.1	11.0				
BF Mean Depth (ft)	1.1	1.1					1.2	1.0				
Width/Depth Ratio	NA	NA					9.0	11.5				
Entrenchment Ratio	NA	NA					4.8+	5.3+				
Bank Height Ratio	NA	NA					1.0	1.0				
Wetted Perimeter (ft)	39.0	13.8					12.3	11.9				
Hydraulic radius (ft)	0.6	1.0					1.0	0.9				
Substrate												
d50 (mm)	sand	<0.062					sand	<0.062				
d84 (mm)	sand	51					sand	30				

Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	14.3	64.2	27.5	21.2	54.0	30.9												
Radius of Curvature (ft)	7.9	45.5	24.8	5.2	45.5	26.7												
Meander Wavelenght (ft)	56.6	116.7	73.4	54.4	115.6	74.1												
Meander Width Ratio	1.38	6.17	2.65	1.9	4.8	2.7												
Profile																		
Riffle length (ft)	1.3	30.1	9.1*	1.9	46.7	11.6												
Riffle slope (ft/ft)	0.000	0.383	0.020*	0.000	0.133	0.015												
Pool length (ft)	7.0	53.0	20.6*	5.2	52.2	16.0												
Pool spacing (ft)	22.0	188.0	56.7*	7.2	77.6	26.2												
Additional Reach Parameters																		
Valley Length (ft)	906.9			905.5														
Channel Length (ft)	1029.0			1022.4														
Sinuosity	1.1			1.1														
Water Surface Slope (ft/ft)	0.0081			0.0077														
BF slope (ft/ft)	0.0073			0.0074														
Rosgen Classification	C5			C6														
*Habitat Index	NA			NA														
*Macrobenthos	NA			NA														

"*" -- Values reported last year were averages instead of medians. The values have been changed to medians in MY-1 & MY-2 columns for the 2007 report.

Table XIII. Morphology and Hydraulic Monitoring Summary
UT to South Fork Creek
Segment/Reach: 3 (1024 linear feet)

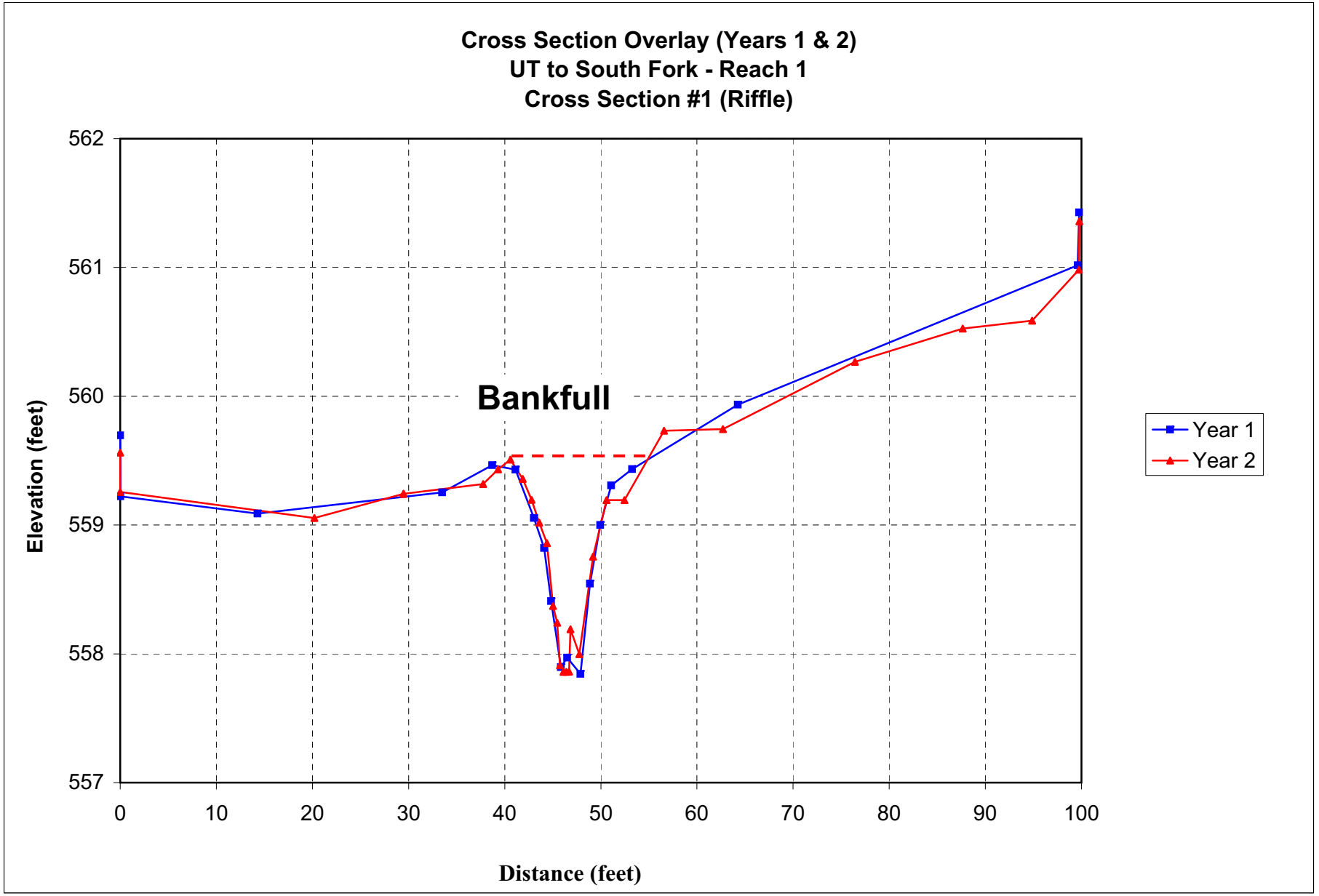
Parameter	Cross Section 7 Pool						Cross Section 8 Riffle						Cross Section 9 Riffle						Cross Section 10 Pool						Cross Section 11 Pool						Cross Section 12 Riffle					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	12.4	11.9					12.2	14.4					15.3	14.2					15	17.4					11.2	11.2					15.9	14.4				
Floodporne Width (ft)	NA	NA					50+	50+					45+	45+					NA	NA					NA	NA					45+	45+				
BFCross Sectional Area (ft)	20.4	20.6					14	18.8					21.4	20.4					26.6	30.5					21	22					21.6	19.7				
BF Mean Depth (ft)	1.6	1.7					1.2	1.3					1.4	1.4					1.8	1.7					1.9	2.0					1.4	1.4				
Width/Depth Ratio	NA	NA					10.6	11.1					11.0	9.9					NA	NA					NA	NA					11.7	10.3				
Entrenchment Ratio	NA	NA					3.2+	3.5+					3.2+	3.2+					NA	NA					NA	NA					3.2+	3.1+				
Bank Heigh Ratio	NA	NA					1.0	1.0					1.0	1.0					NA	NA					NA	NA					1.0	1.0				
Wetted Perimeter (ft)	14.4	13.9					13.4	15.8					16.5	15.5					16.3	19.5					14.2	14.0					17.6	15.6				
Hydraulic radius (ft)	1.4	1.5					1.0	1.2					1.3	1.3					1.4	1.6					1.6	1.6					1.3	1.3				
Substrate																																				
d50 (mm)	sand	<0.062					sand	<0.062					sand	1.6					sand	15					sand	1.5					sand	0.35				
d84 (mm)	sand	11.3					sand	26					sand	13.7					sand	59					sand	18					sand	8				

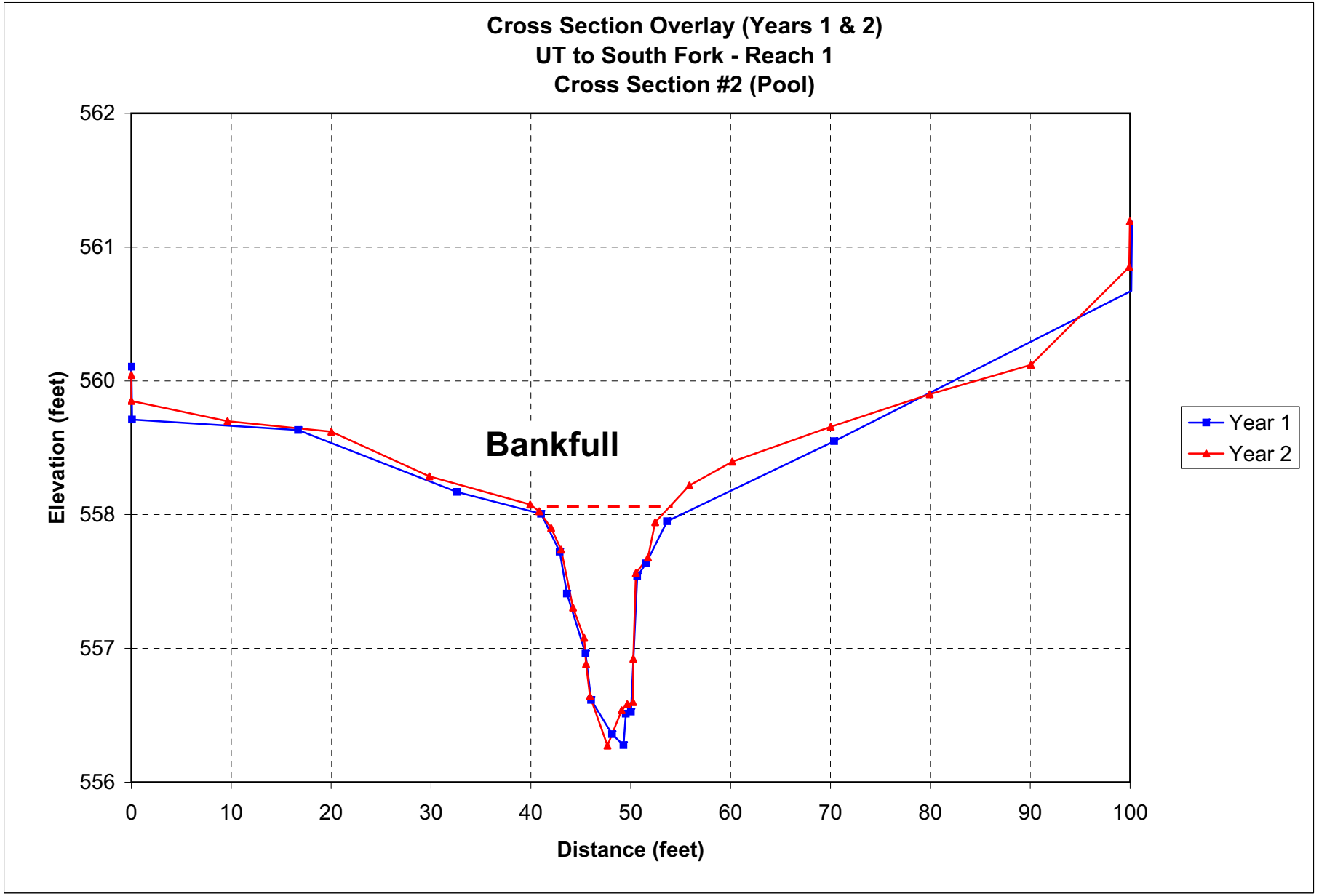
Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	13.8	68.7	37.1	31.1	53.3	42.2												
Radius of Curvature (ft)	16.8	107.9	30.9	19.5	51.5	33.6												
Meander Wavelenght (ft)	79.3	151.6	125.3	87.9	197.5	94.2												
Meander Width Ratio	0.91	4.55	2.46	2.18	3.74	2.71												
Profile																		
Riffle length (ft)	2.1	40.9	12.0*	2.2	43.1	11.3												
Riffle slope (ft/ft)	0.000	0.140	0.012*	0.000	0.162	0.015												
Pool length (ft)	7.0	84.0	28.8*	11.0	83.0	23.9												
Pool spacing (ft)	21.0	101.0	45.8	20.8	86.9	42.3												
Additional Reach Parameters																		
Valley Length (ft)	862.4			863.4														
Channel Length (ft)	1020.0			1023.8														
Sinuosity	1.2			1.2														
Water Surface Slope (ft/ft)	0.0046			0.0049														
BF slope (ft/ft)	0.0036			0.0039														
Rosgen Classification	C5			C5														
*Habitat Index	NA			NA														
*Macrobenthos	NA			NA														

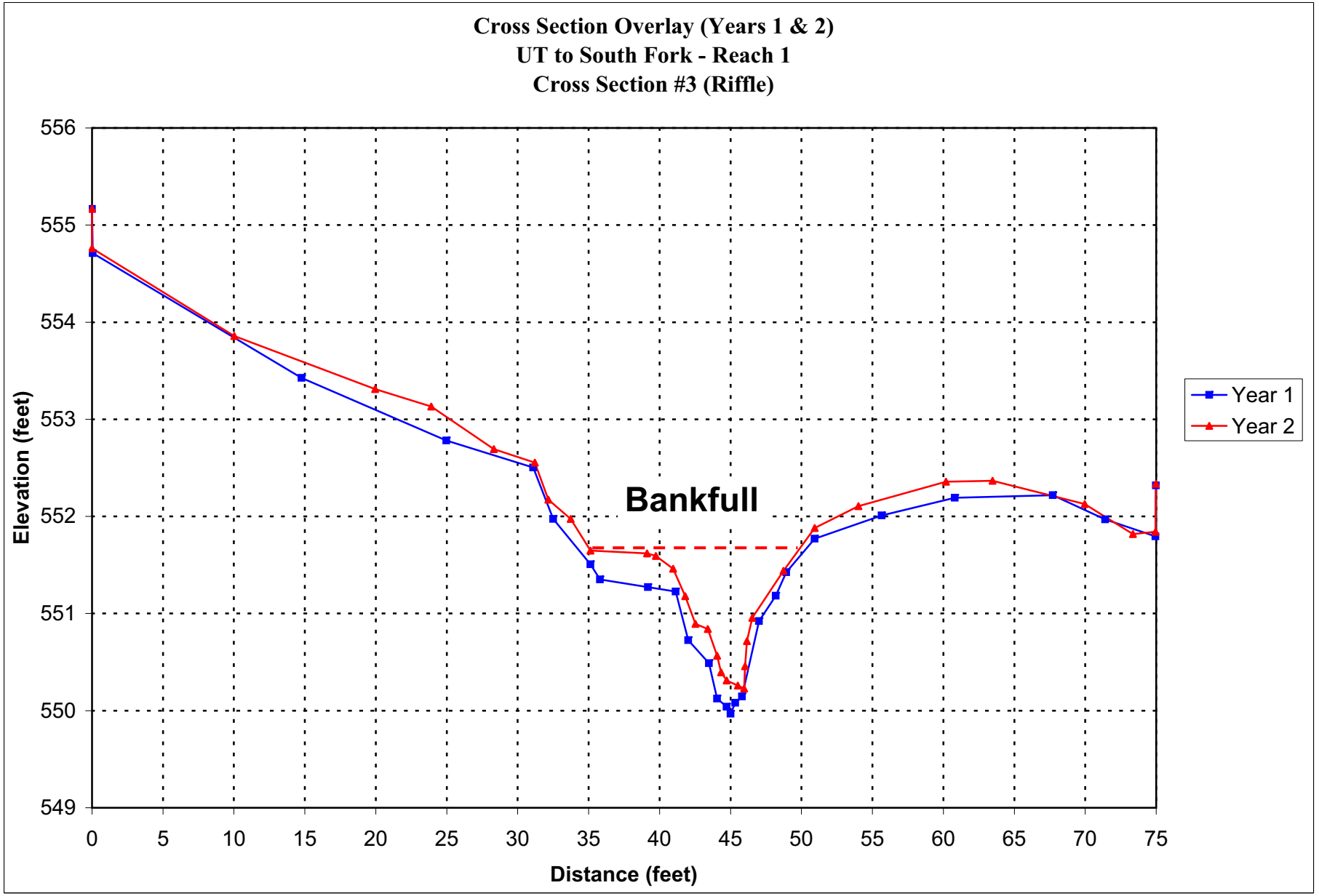
"*" -- Values reported last year were averages instead of medians. The values have been changed to medians in MY-1 & MY-2 columns for the 2007 report.

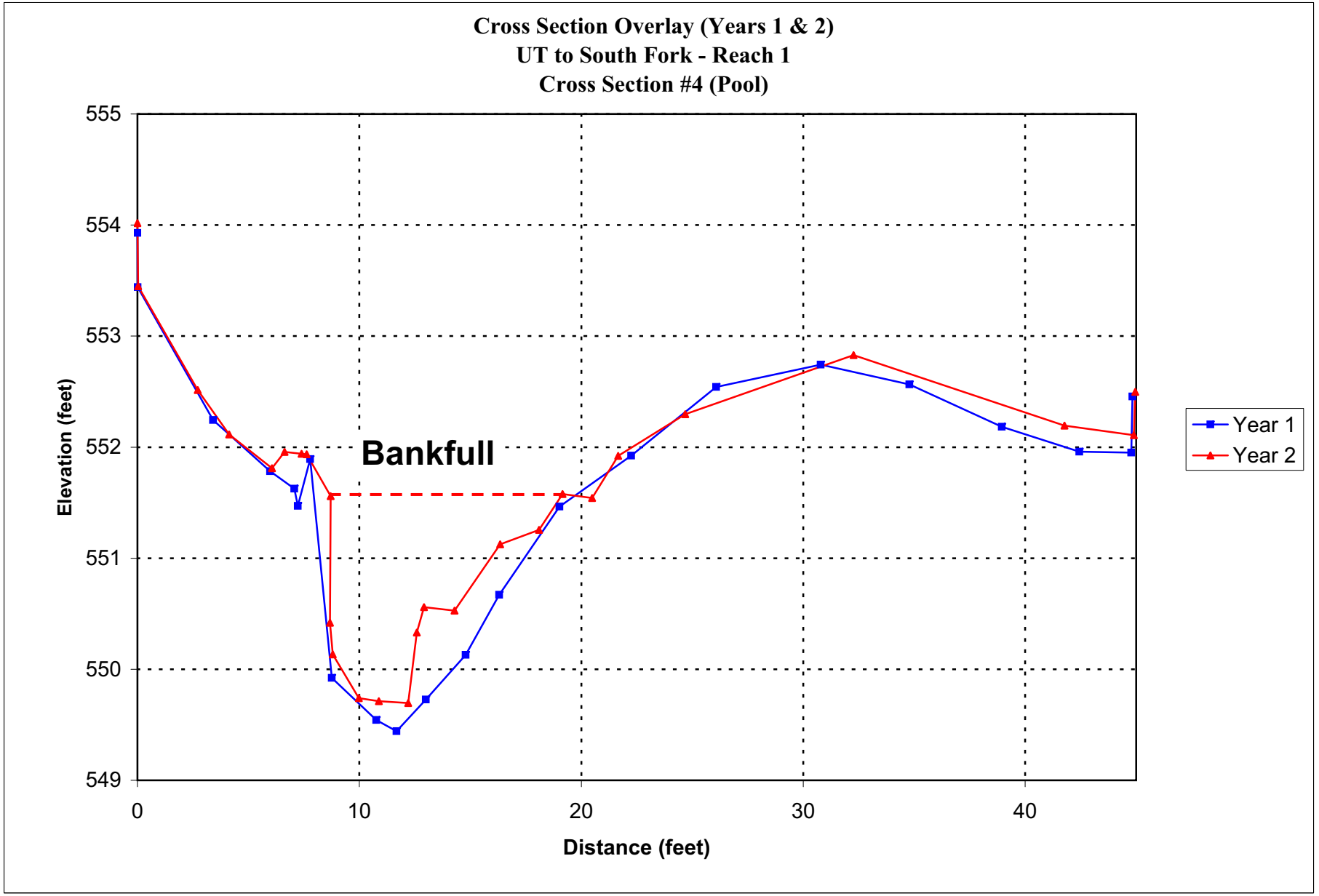
Appendix B4

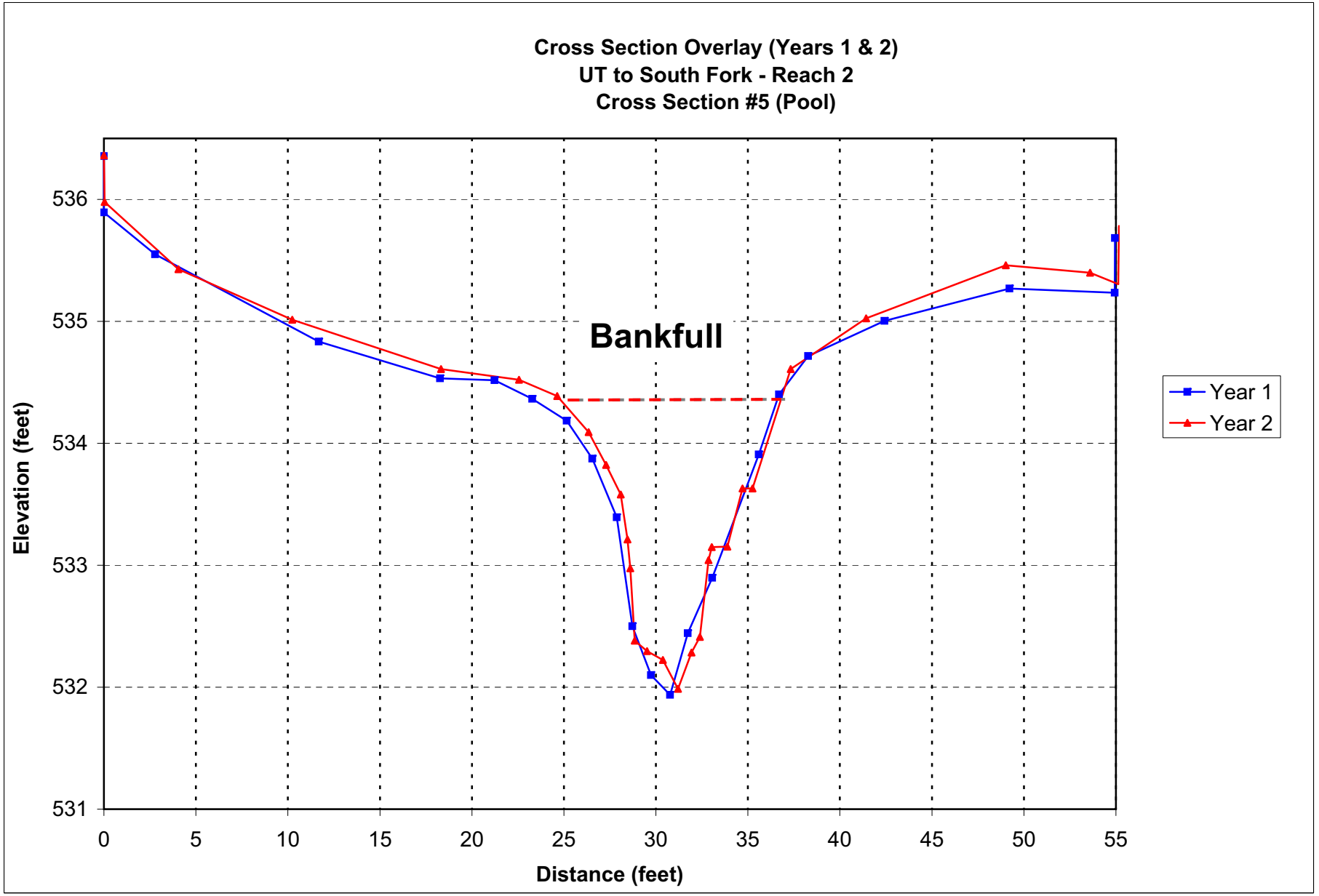
Stream Cross-Sections

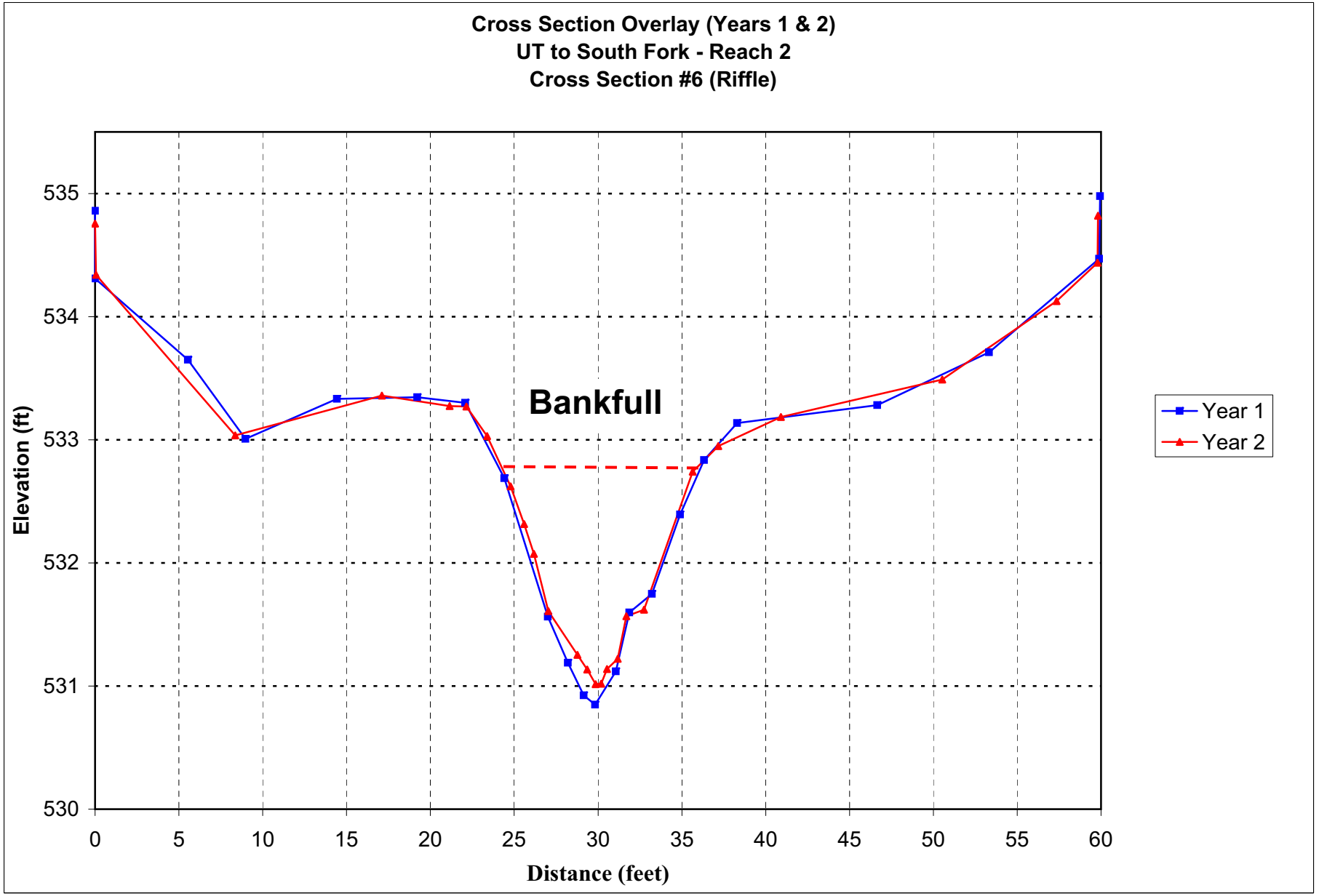

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 1
Cross Section #1 (Riffle)
Bankfull
Elevation (feet)
562
561
560
559
558
557
0
10
20
30
40
50
60
70
80
90
100
Distance (feet)
Year 1
Year 2

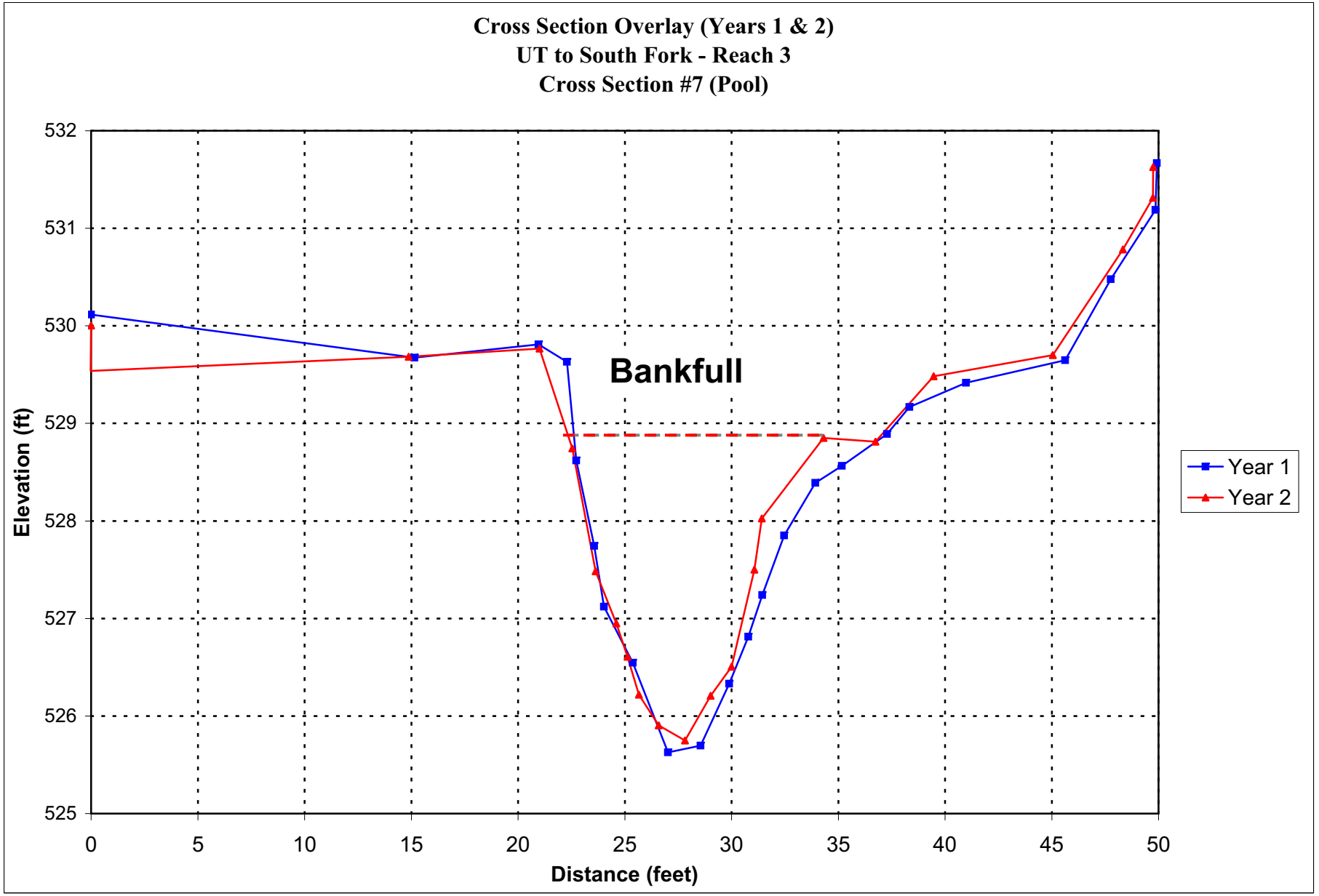

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 1
Cross Section #2 (Pool)
Elevation (feet)
562
561
560
559
558
557
556
0
10
20
30
40
50
60
70
80
90
100
Distance (feet)
Bankfull
Year 1
Year 2

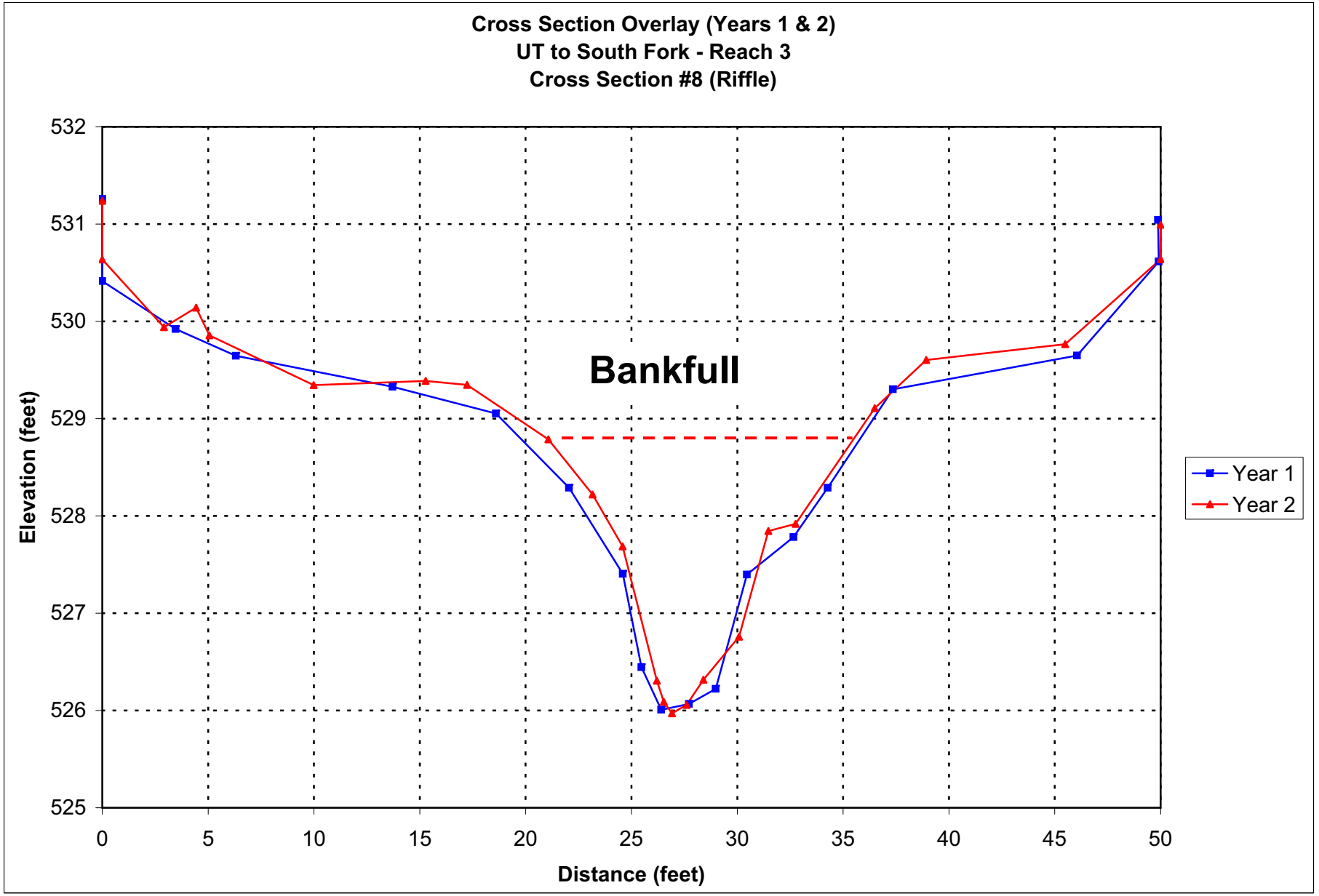

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 1
Cross Section #3 (Riffle)
Elevation (feet)
556
555
554
553
552
551
550
549
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Distance (feet)
Bankfull
Year 1
Year 2

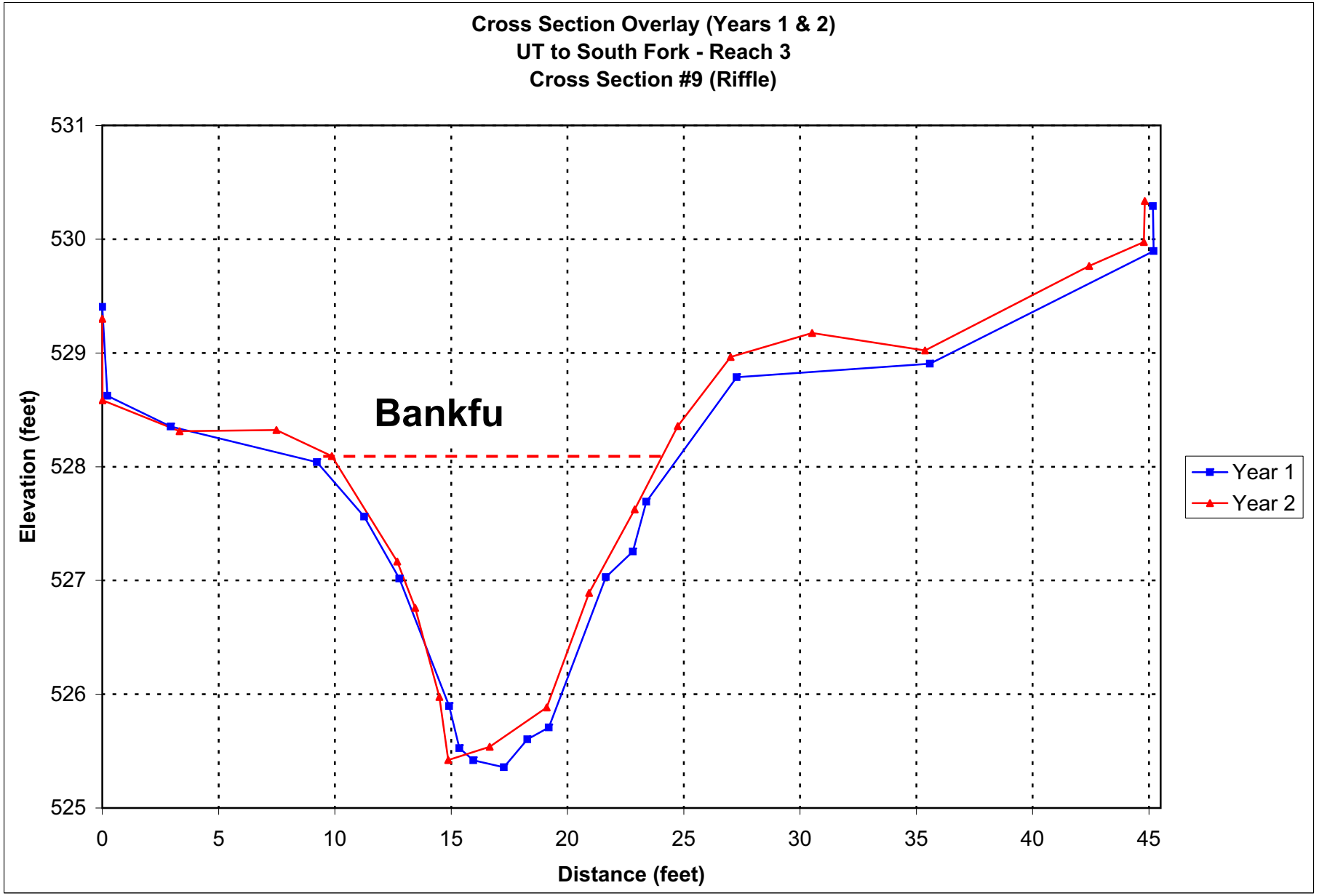

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 1
Cross Section #4 (Pool)
555
554
553
552
551
550
549
Elevation (feet)
Bankfull
0
10
20
30
40
Distance (feet)
Year 1
Year 2

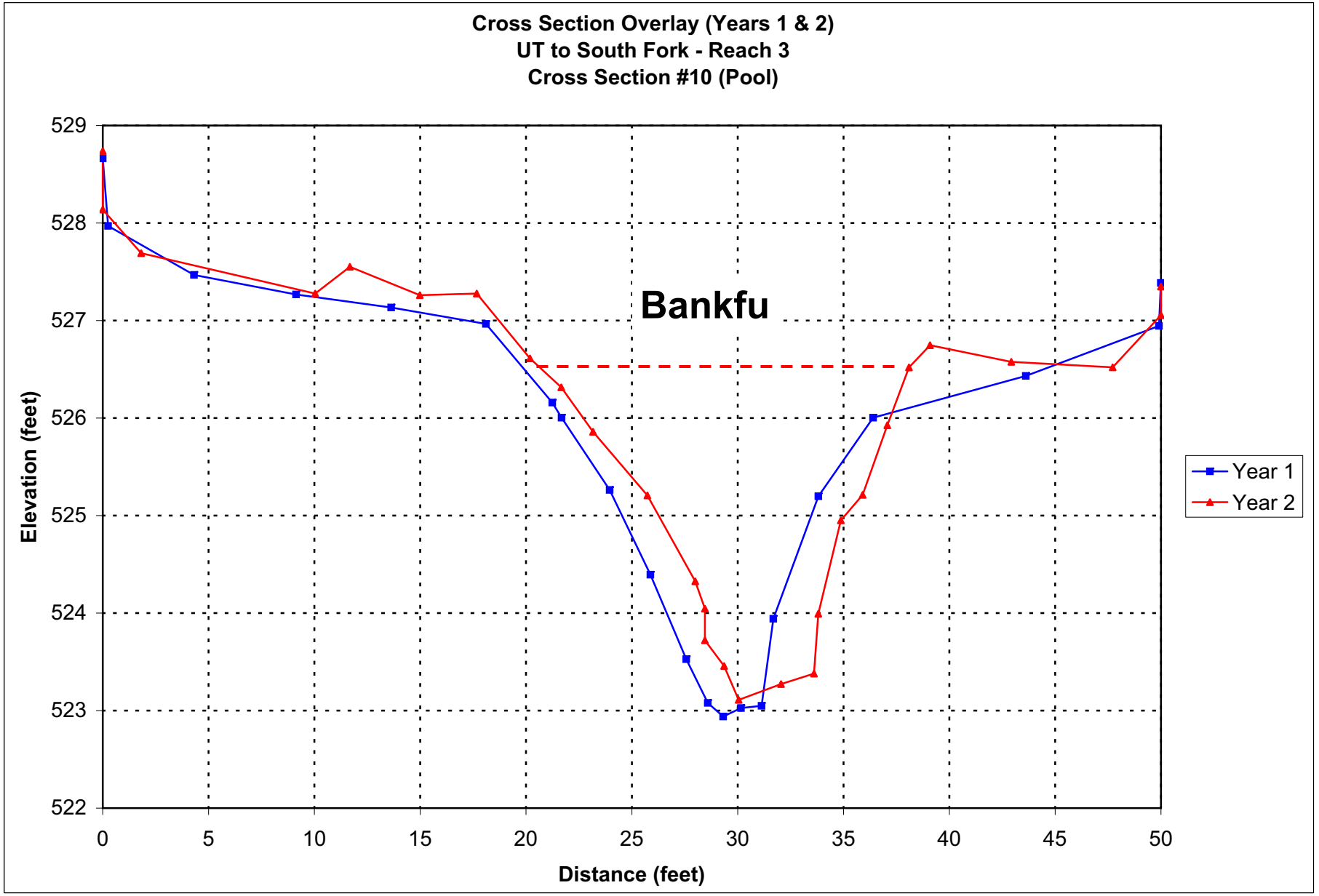

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 2
Cross Section #5 (Pool)
Bankfull
Year 1
Year 2
Elevation (feet)
Distance (feet)
536
535
534
533
532
531
0
5
10
15
20
25
30
35
40
45
50
55

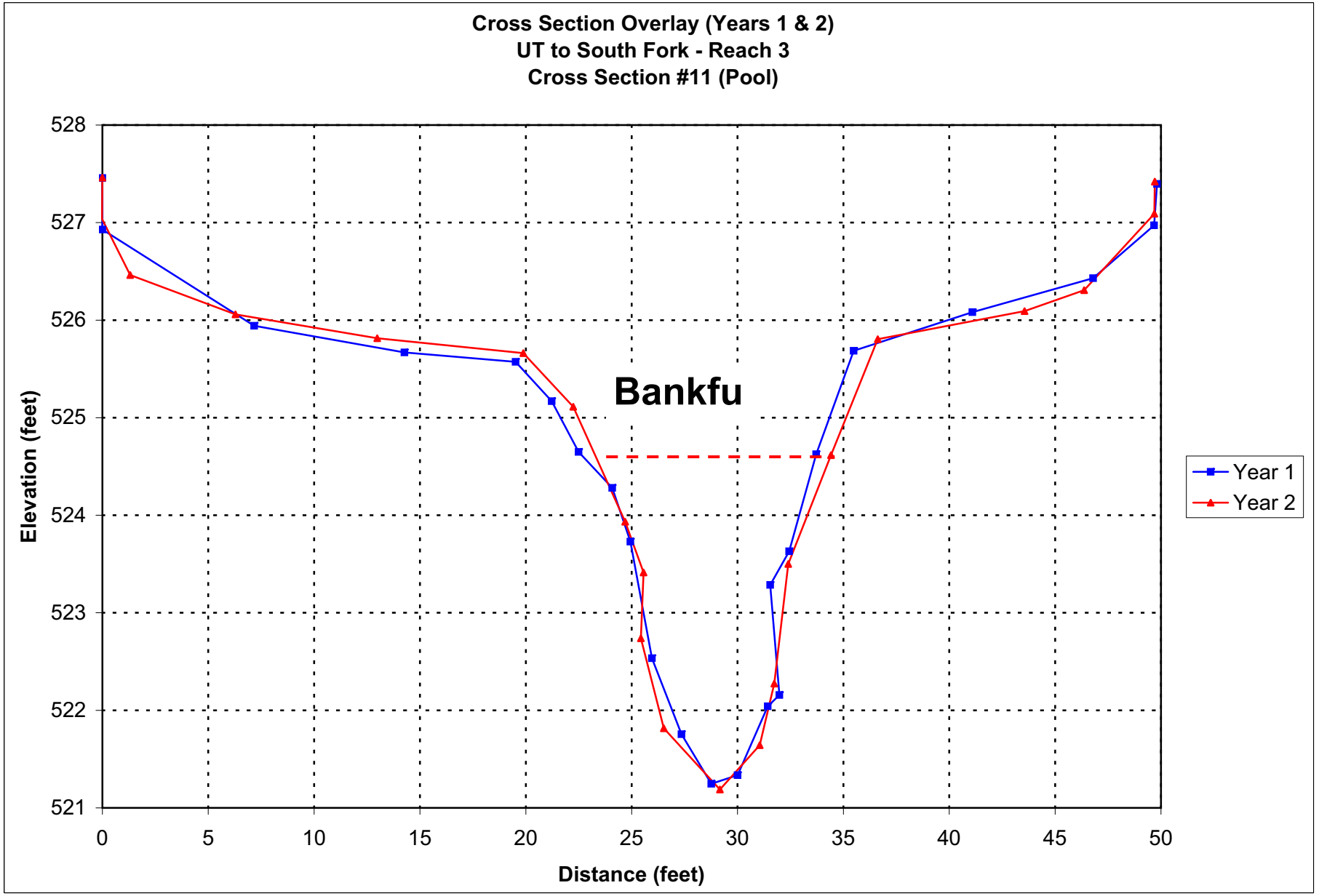

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 2
Cross Section #6 (Riffle)
Bankfull
Year 1
Year 2
Elevation (ft)
Distance (feet)
535
534
533
532
531
530
0
5
10
15
20
25
30
35
40
45
50
55
60

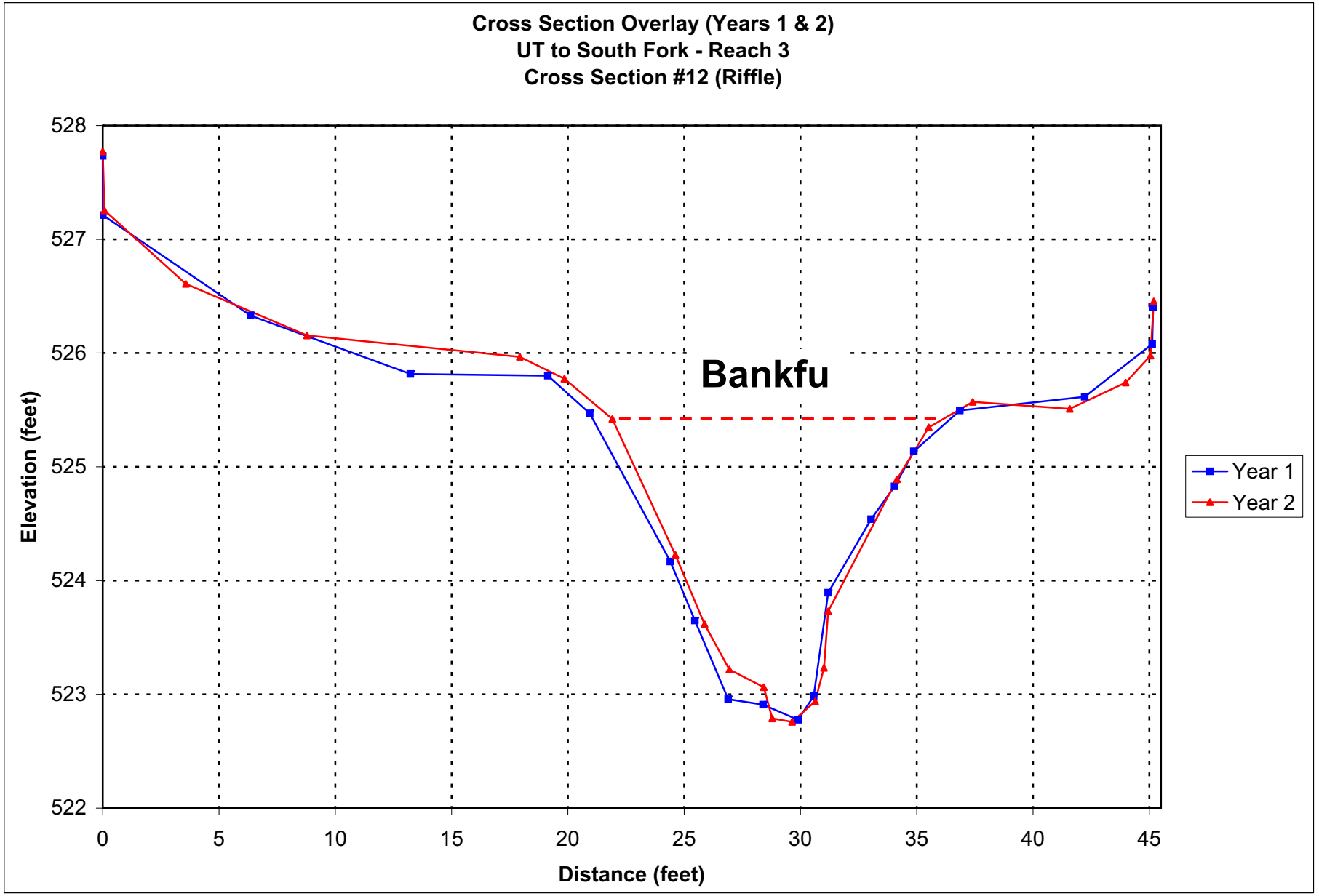

Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #7 (Pool)
Bankfull
Elevation (ft)
Distance (feet)
532
531
530
529
528
527
526
525
0
5
10
15
20
25
30
35
40
45
50
Year 1
Year 2


Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #8 (Riffle)
Bankfull
Elevation (feet)
Distance (feet)
532
531
530
529
528
527
526
525
0
5
10
15
20
25
30
35
40
45
50
Year 1
Year 2


Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #9 (Riffle)
Bankfu
Elevation (feet)
Distance (feet)
531
530
529
528
527
526
525
0
5
10
15
20
25
30
35
40
45
Year 1
Year 2


Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #10 (Pool)
Bankfu
Elevation (feet)
Distance (feet)
529
528
527
526
525
524
523
522
0
5
10
15
20
25
30
35
40
45
50
Year 1
Year 2


Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #11 (Pool)
Bankfu
Elevation (feet)
Distance (feet)
528
527
526
525
524
523
522
521
0
5
10
15
20
25
30
35
40
45
50
Year 1
Year 2


Cross Section Overlay (Years 1 & 2)
UT to South Fork - Reach 3
Cross Section #12 (Riffle)
Bankfu
Elevation (feet)
Distance (feet)
528
527
526
525
524
523
522
0
5
10
15
20
25
30
35
40
45
Year 1
Year 2

Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Jan-06
Monitoring Year	2

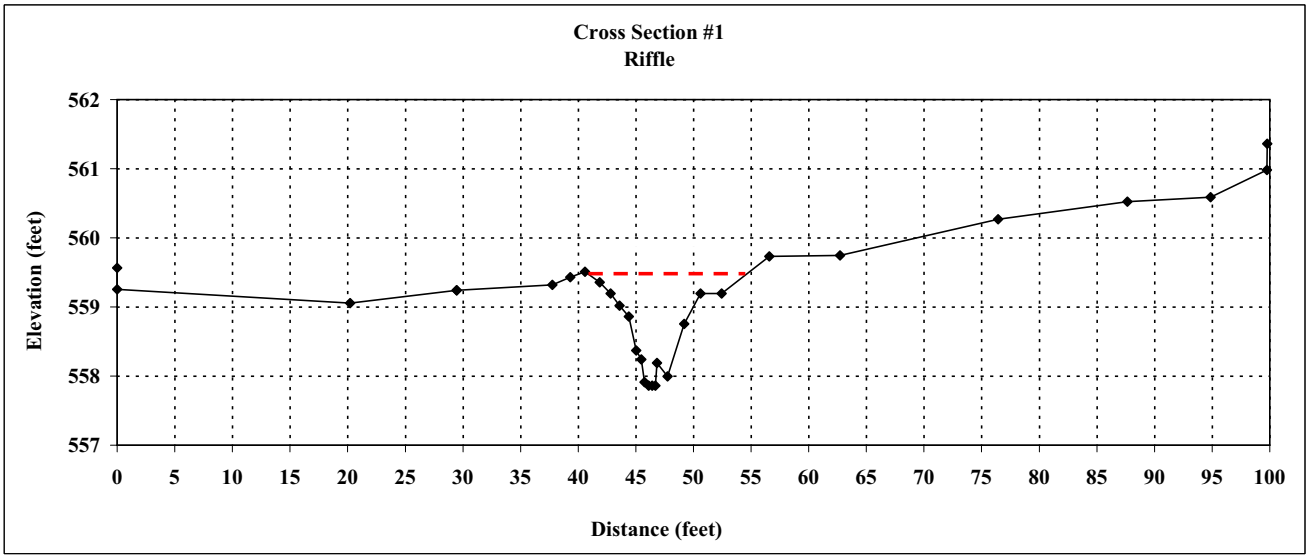
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	559.56	
0.01	559.26	
20.20	559.05	
29.47	559.24	
29.47	559.24	
37.75	559.32	
39.30	559.43	
40.58	559.51	BKF
41.88	559.36	
42.80	559.20	
43.60	559.02	
44.38	558.86	
45.03	558.37	
45.46	558.24	
45.74	557.91	
46.12	557.86	LEW
46.41	557.86	TW
46.69	557.86	REW
46.83	558.19	
47.76	558.00	
49.19	558.75	
50.60	559.19	
52.46	559.19	
56.59	559.73	
62.71	559.74	
76.44	560.27	
87.65	560.52	
94.87	560.59	
99.74	560.98	
99.78	561.36	

Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	1.3	0.2	0.1
	0.9	0.3	0.2
	0.8	0.5	0.3
	0.8	0.6	0.4
	0.6	1.1	0.6
	0.4	1.3	0.5
	0.3	1.6	0.4
	0.4	1.6	0.6
	0.3	1.6	0.5
	0.3	1.6	0.5
	0.1	1.3	0.2
	0.9	1.5	1.3
	1.4	0.8	1.6
	1.4	0.3	0.8
	1.9	0.3	0.6
	1.5	-0.2	0.1
TOTALS	13.4		8.7

SUMMARY DATA (BANKFULL)

A(BKF)	8.7	W(FPA)	100+
W(BKF)	13.4	Slope	0.010
Max d	1.6		
Mean d	0.6	Area=	A
W/D	20.7	Width=	W
Entrenchment	7.5+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			6.2



Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Jan-06
Monitoring Year	2

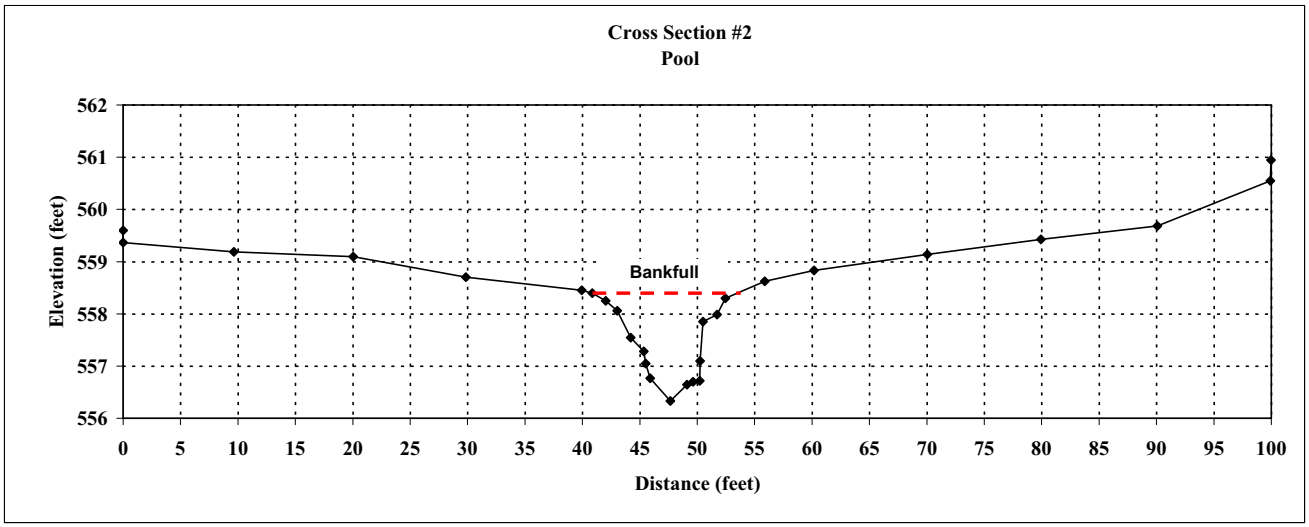
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	559.59	
0.00	559.37	
9.63	559.19	
20.03	559.10	
29.84	558.70	
39.93	558.45	
40.85	558.40	BKF
42.02	558.25	
43.03	558.06	
44.21	557.55	
45.34	557.28	
45.52	557.05	LEW
45.91	556.77	
47.67	556.33	TW
49.10	556.64	
49.64	556.70	
50.23	556.72	
50.25	557.10	REW
50.50	557.85	
51.72	557.99	
52.44	558.30	TOB
55.88	558.62	
60.16	558.83	
70.03	559.14	
79.94	559.43	
90.08	559.68	
99.92	560.54	
99.98	560.95	

Bankfull/Top of Bank Hydraulic Geometry

Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
0.0	0.0	0.0
1.2	0.1	0.1
1.0	0.3	0.2
1.2	0.8	0.7
1.1	1.1	1.1
0.2	1.3	0.2
0.4	1.6	0.6
1.8	2.1	3.3
1.4	1.8	2.7
0.5	1.7	0.9
0.6	1.7	1.0
0.0	1.3	0.0
0.3	0.5	0.2
1.2	0.4	0.6
0.7	0.1	0.2
1.0		0.1
TOTALS 12.6		11.9

SUMMARY DATA

A(BKF)	11.9
W(BKF)	12.6
Max d	2.1
Mean d	0.9



Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Jan-06
Monitoring Year	2

STATION (Feet)	HI (Feet)	NOTES
0.00	555.17	
0.00	554.76	
10.02	553.86	
19.96	553.31	
23.91	553.13	
28.32	552.69	
31.20	552.55	
32.16	552.17	
33.73	551.97	
35.13	551.65	
39.12	551.62	BKF
39.74	551.59	
40.95	551.46	
41.80	551.18	
42.52	550.89	
43.40	550.84	
44.05	550.56	
44.34	550.40	LEW
44.73	550.31	
45.52	550.26	TW
45.96	550.23	
46.03	550.46	REW
46.16	550.72	
46.53	550.96	
48.73	551.44	
50.93	551.88	
54.01	552.11	TOB
60.19	552.36	
63.46	552.37	
69.97	552.13	
73.36	551.82	
74.95	551.84	
74.99	552.34	

Bankfull Hydraulic Geometry

Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
0.0	0.0	0.0
0.6	0.0	0.0
1.2	0.2	0.1
0.9	0.4	0.3
0.7	0.7	0.4
0.9	0.8	0.7
0.6	1.1	0.6
0.3	1.2	0.3
0.4	1.3	0.5
0.8	1.4	1.0
0.4	1.4	0.6
0.1	1.2	0.1
0.1	0.9	0.1
0.4	0.7	0.3
2.2	0.2	0.9
0.9		0.1
TOTALS 10.5		6.1

Top of Bank Hydraulic Geometry

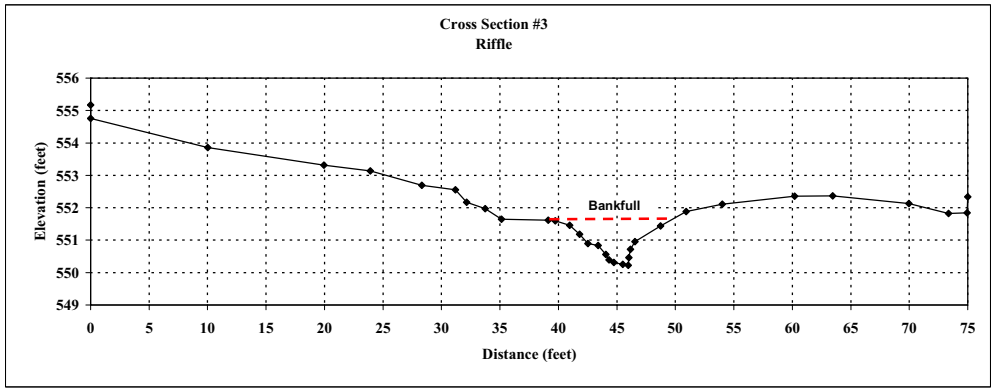
Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
0.0	0.0	0.0
1.0	0.1	0.1
1.4	0.5	0.4
4.0	0.5	1.9
0.6	0.5	0.3
1.2	0.6	0.7
0.9	0.9	0.7
0.7	1.2	0.8
0.9	1.3	1.1
0.6	1.5	0.9
0.3	1.7	0.5
0.4	1.8	0.7
0.8	1.8	1.4
0.4	1.9	0.8
0.1	1.6	0.1
0.1	1.4	0.2
0.4	1.2	0.5
2.2	0.7	2.0
2.2	0.2	1.0
3.1	0.0	0.3
TOTALS 16.0		13.0

SUMMARY DATA (BANKFULL)

A(BKF)	6.1	W(FPA)	35+
W(BKF)	10.5	Slope	0.010
Max d	1.4		
Mean d	0.6	Area=	A
W/D	18.1	Width=	W
Entrenchment	3.2+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			6.2

SUMMARY DATA (TOB)

A	13.0
W	16.0
Max d	1.9
Mean d	0.8



Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Jan-06
Monitoring Year	2

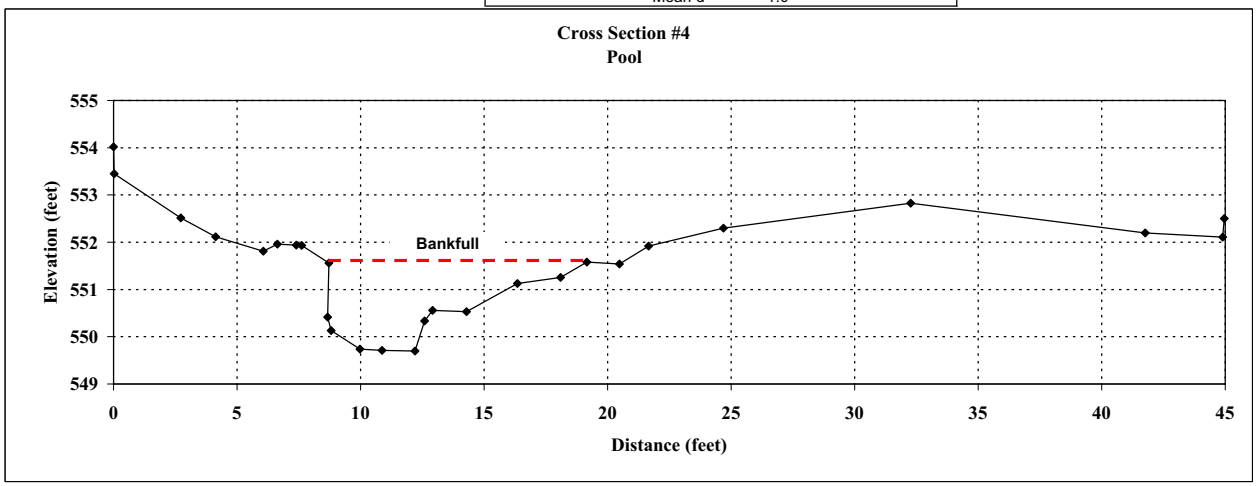
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	554.02	
0.03	553.45	
2.72	552.51	
4.13	552.11	
6.06	551.81	
6.63	551.96	TOB
7.40	551.94	
7.62	551.94	
8.71	551.56	
8.67	550.42	LEW
8.80	550.13	
9.98	549.74	
10.87	549.71	TW
12.20	549.70	
12.59	550.33	REW
12.92	550.56	
14.29	550.53	
16.34	551.13	
18.09	551.25	
19.15	551.58	BKF
20.48	551.54	
21.66	551.92	
24.69	552.30	
32.27	552.83	
41.77	552.19	
44.90	552.11	
44.96	552.50	

Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	0.1	0.0	0.0
	0.0	1.2	0.0
	0.1	1.4	0.2
	1.2	1.8	1.9
	0.9	1.9	1.7
	1.3	1.9	2.5
	0.4	1.2	0.6
	0.3	1.0	0.4
	1.4	1.0	1.4
	2.1	0.5	1.5
	1.7	0.3	0.7
	1.1	0.0	0.2
TOTALS	10.6		11.0

SUMMARY DATA

A(BKF)	11.0
W(BKF)	10.6
Max d	1.9
Mean d	1.0



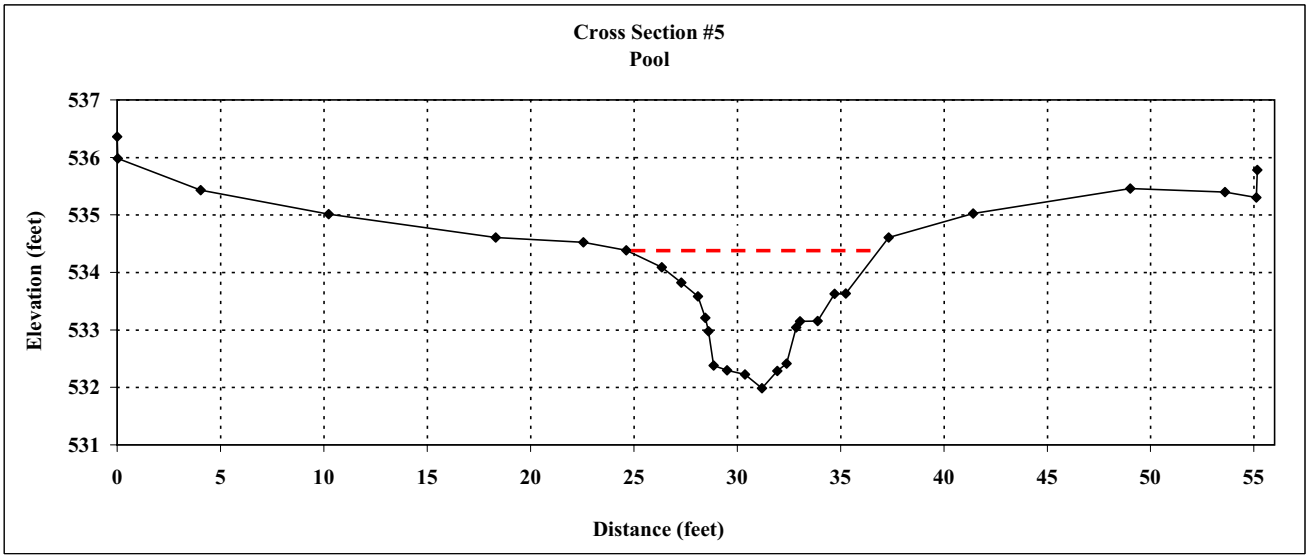
Field Crew:	IPJ and PDB
Stream Reach:	2
Drainage Area:	0.38
Date:	Feb-07
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	536.36	
0.04	535.98	
4.04	535.43	
10.23	535.01	
18.32	534.61	
22.56	534.52	TOB
24.63	534.39	BKF
26.35	534.09	
27.29	533.82	
28.09	533.58	
28.45	533.21	
28.61	532.98	LEW
28.85	532.38	
29.52	532.30	
30.37	532.22	
31.20	531.99	TW
31.93	532.28	
32.39	532.41	
32.86	533.04	REW
33.04	533.15	
33.89	533.15	
34.71	533.63	
35.25	533.63	
37.33	534.61	TOB
41.42	535.02	
49.02	535.46	
53.60	535.40	
55.12	535.30	
55.16	535.78	

Bankfull/Top of Bank Hydraulic Geometry		
Width (Feet)	**Depth (Feet)**	**Area (Sq. Ft.)**
0.0	0.0	0.0
1.7	0.3	0.3
0.9	0.6	0.4
0.8	0.8	0.6
0.4	1.2	0.4
0.2	1.4	0.2
0.2	2.0	0.4
0.7	2.1	1.4
0.9	2.2	1.8
0.8	2.4	1.9
0.7	2.1	1.6
0.5	2.0	0.9
0.5	1.3	0.8
0.2	1.2	0.2
0.8	1.2	1.0
0.8	0.8	0.8
0.5	0.8	0.4
1.6		0.6
TOTALS 12.2		13.7

SUMMARY DATA

A(BKF)	13.7
W(BKF)	12.2
Max d	2.4
Mean d	1.1



Field Crew:	IPJ and PDB
Stream Reach:	2
Drainage Area:	0.38
Date:	Feb-06
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	534.76	
0.05	534.34	
8.36	533.04	
17.11	533.36	
21.15	533.27	
22.15	533.27	TOB
23.39	533.03	
24.78	532.62	
25.58	532.31	
26.18	532.07	
27.03	531.61	
28.77	531.25	LEW
29.36	531.13	
29.86	531.02	
30.19	531.02	TW
30.53	531.14	
31.18	531.22	REW
31.69	531.57	
32.75	531.62	
35.64	532.74	BKF
37.18	532.95	TOB
40.91	533.18	
50.53	533.49	
57.35	534.13	
59.80	534.44	
59.82	534.82	

Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	0.5	0.1	0.0
	0.8	0.4	0.2
	0.6	0.7	0.3
	0.9	1.1	0.8
	1.7	1.5	2.3
	0.6	1.6	0.9
	0.5	1.7	0.8
	0.3	1.7	0.6
	0.3	1.6	0.6
	0.6	1.5	1.0
	0.5	1.2	0.7
	1.1	1.1	1.2
	2.9	0.0	1.6
TOTALS	11.3		11.0

Top of Bank Hydraulic Geometry

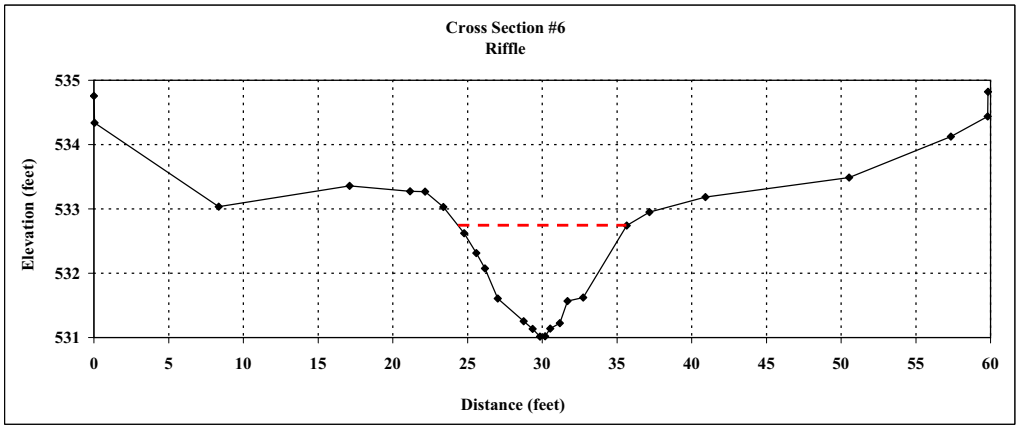
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	1.2	0.3	0.2
	0.8	0.4	0.3
	0.6	0.7	0.3
	0.9	0.9	0.7
	1.7	1.3	1.9
	0.6	1.5	0.8
	0.5	2.1	0.9
	0.3	2.2	0.7
	0.3	2.3	0.8
	0.6	2.5	1.6
	0.5	2.2	1.2
	1.1	2.1	2.3
	2.9	1.5	5.2
	1.5	1.4	2.2
TOTALS	13.6		19.2

SUMMARY DATA (BANKFULL)

A(BKF)	11.0	W(FPA)	60+
W(BKF)	11.3	Slope	0.008
Max d	1.7		
Mean d	1.0	Area=	A
W/D	11.5	Width=	W
Entrenchment	5.3+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			11.5

SUMMARY DATA (TOB)

A	19.2
W	13.6
Max d	2.5
Mean d	1.4



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

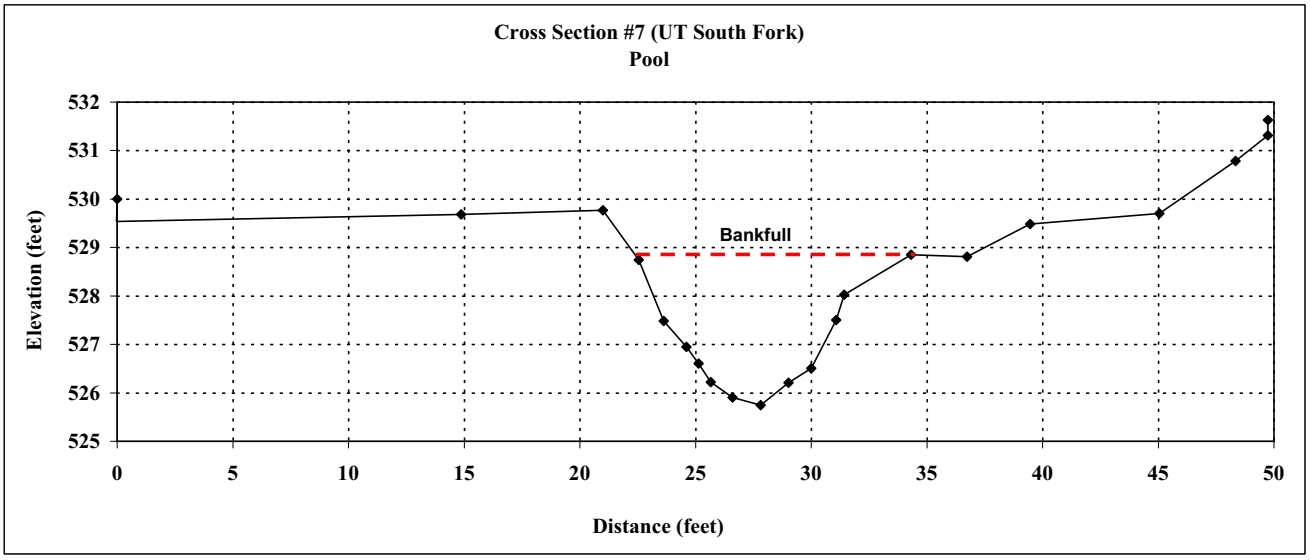
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	530.00	
-0.03	529.54	
14.87	529.68	
21.00	529.77	TOB
22.54	528.74	
23.63	527.48	LEW
24.60	526.95	
25.13	526.61	
25.66	526.22	
26.59	525.90	
27.82	525.75	TW
29.02	526.21	
30.00	526.51	
31.07	527.50	REW
31.42	528.03	
34.31	528.85	BKF
36.74	528.81	
39.47	529.48	TOB
45.05	529.70	
48.33	530.78	
49.74	531.31	
49.74	531.63	

Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	0.1	0.1	0.0
	1.1	1.4	0.8
	1.0	1.9	1.6
	0.5	2.2	1.1
	0.5	2.6	1.3
	0.9	2.9	2.6
	1.2	3.1	3.7
	1.2	2.6	3.5
	1.0	2.3	2.4
	1.1	1.3	2.0
	0.3	0.8	0.4
	2.9	0.0	1.2
TOTALS	11.9		20.6

SUMMARY DATA

A(BKF)	20.6
W(BKF)	11.9
Max d	3.1
Mean d	1.7



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	531.24	
0.00	530.64	
2.91	529.94	
4.43	530.14	
5.06	529.86	
9.98	529.34	
15.28	529.39	
17.24	529.35	TOB
21.07	528.79	BKF
23.16	528.22	
24.58	527.69	
26.20	526.31	
26.53	526.09	
26.92	525.97	TW
27.61	526.06	
28.40	526.32	
30.08	526.76	
31.47	527.84	
32.75	527.92	
36.50	529.11	
38.92	529.60	TOB
45.50	529.77	
50.00	530.64	
50.00	530.99	

Bankfull/Top of Bank Hydraulic Geometry

Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
0.0	0.0	0.0
2.1	0.6	0.6
1.4	1.1	1.2
1.6	2.5	2.9
0.3	2.7	0.8
0.4	2.8	1.1
0.7	2.7	1.9
0.8	2.5	2.1
1.7	2.0	3.8
1.4	0.9	2.1
1.3	0.9	1.2
2.7		1.2
TOTALS 14.4		18.8

Top of Bank Hydraulic Geometry

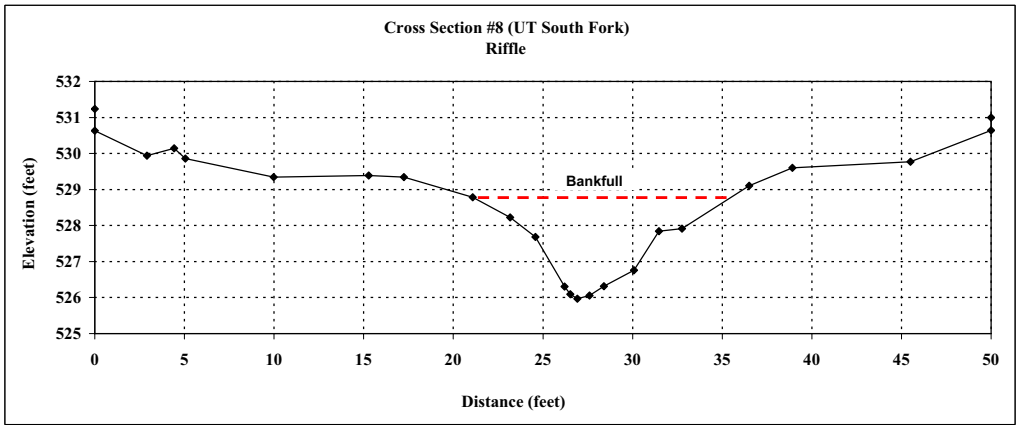
Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
0.0	0.0	0.0
3.8	0.6	1.1
2.1	1.1	1.8
1.4	1.7	2.0
1.6	3.0	3.8
0.3	3.3	1.0
0.4	3.4	1.3
0.7	3.3	2.3
0.8	3.0	2.5
1.7	2.6	4.7
1.4	1.5	2.8
1.3	1.4	1.9
3.7	0.2	3.1
1.1		0.1
TOTALS 20.4		28.5

SUMMARY DATA (BANKFULL)

A(BKF)	18.8	W(FPA)	50+
W(BKF)	14.4	Slope	0.005
Max d	2.8		
Mean d	1.3	Area=	A
W/D	11.1	Width=	W
Entrenchment	3.5+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

SUMMARY DATA (TOB)

A	28.5
W	20.4
Max d	3.4
Mean d	1.4



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	529.30	
0.01	528.58	
3.32	528.31	
7.48	528.32	TOB
9.87	528.09	BKF
12.68	527.17	
13.45	526.76	
14.50	525.98	LEW
14.88	525.42	
16.66	525.54	TW
19.11	525.88	REW
20.93	526.89	
22.89	527.62	
24.74	528.36	
27.01	528.96	TOB
30.51	529.17	
35.37	529.02	
42.43	529.77	
44.78	529.98	
44.82	530.34	

	Bankfull/Top of Bank Hydraulic Geometry		
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	2.8	0.9	1.3
	0.8	1.3	0.9
	1.0	2.1	1.8
	0.4	2.7	0.9
	1.8	2.6	4.7
	2.5	2.2	5.8
	1.8	1.2	3.1
	2.0	0.5	1.6
	1.2		0.3
TOTALS	14.2		20.4

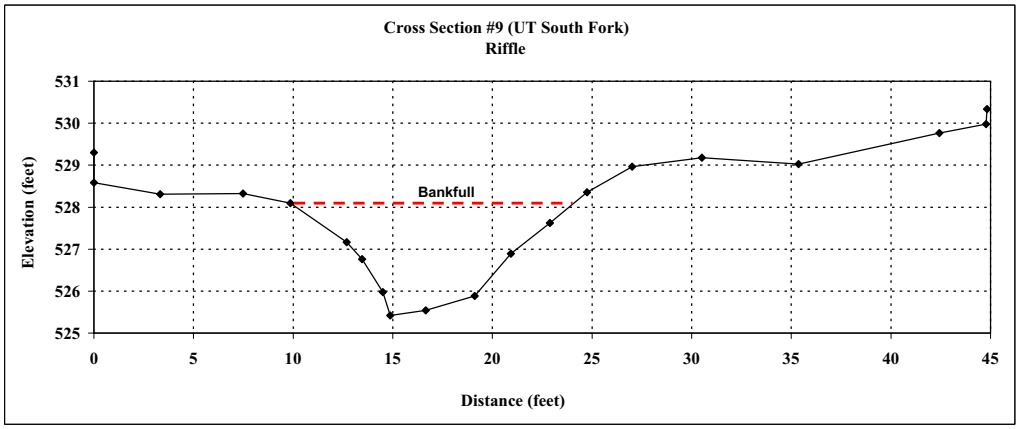
	Top of Bank Hydraulic Geometry		
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	2.4	0.2	0.3
	2.8	1.2	1.9
	0.8	1.6	1.0
	1.0	2.3	2.0
	0.4	2.9	1.0
	1.8	2.8	5.1
	2.5	2.4	6.4
	1.8	1.4	3.5
	2.0	0.7	2.1
	1.8		0.6
TOTALS	17.2		24.0

SUMMARY DATA (BANKFULL)

A(BKF)	20.4	W(FPA)	45+
W(BKF)	14.2	Slope	0.005
Max d	2.7		
Mean d	1.4	Area=	A
W/D	9.9	Width=	W
Entrenchment	3.2+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

SUMMARY DATA (TOB)

A	24.0
W	17.2
Max d	2.9
Mean d	1.4

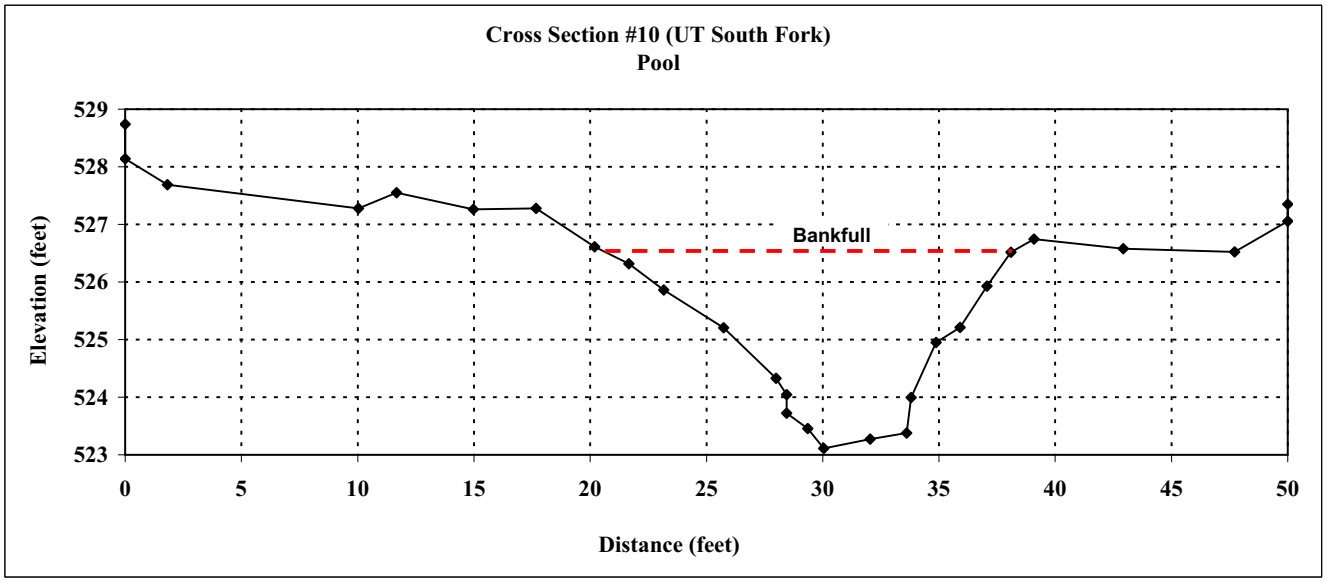


Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	528.74	
0.00	528.14	
1.82	527.69	
10.04	527.28	
11.68	527.55	
14.98	527.26	TOB
17.67	527.28	
20.19	526.61	
21.66	526.32	
23.17	525.86	
25.74	525.21	
28.00	524.33	
28.45	524.05	LEOW
28.45	523.72	
29.36	523.46	
30.04	523.11	TW
32.05	523.27	
33.61	523.38	
33.81	523.99	REOW
34.88	524.95	
35.91	525.21	
37.07	525.93	
38.09	526.52	BKF
39.09	526.75	TOB
42.93	526.58	
47.72	526.52	
50.00	527.06	
50.00	527.35	

	Bankfull Hydraulic Geometry		
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	1.0	0.2	0.1
	1.5	0.7	0.6
	2.6	1.3	2.5
	2.3	2.2	4.0
	0.5	2.5	1.1
	0.0	2.8	0.0
	0.9	3.1	2.7
	0.7	3.4	2.2
	2.0	3.2	6.7
	1.6	3.1	5.0
	0.2	2.5	0.6
	1.1	1.6	2.2
	1.0	1.3	1.5
	1.2	0.6	1.1
	1.0	0.0	0.3
TOTALS	17.4		30.5

SUMMARY DATA	
A(BKF)	30.5
W(BKF)	17.4
Max d	3.4
Mean d	1.7



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

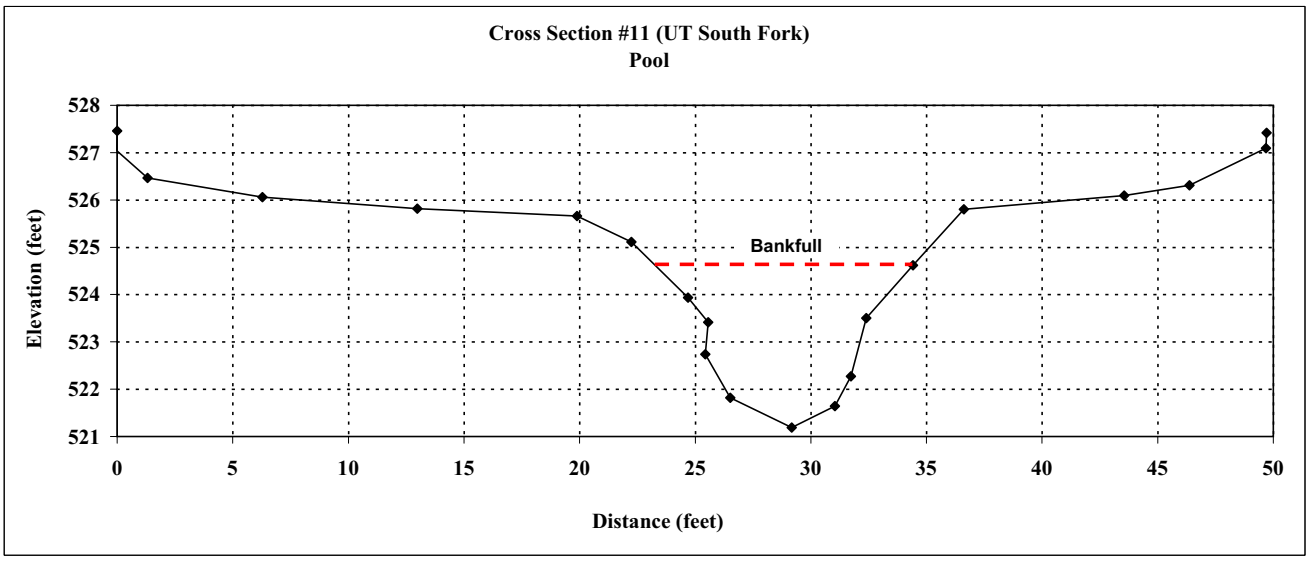
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	527.46	
-0.01	527.04	
1.31	526.46	
6.28	526.06	
12.98	525.82	
19.88	525.66	TOB
22.24	525.11	
24.69	523.93	
25.56	523.41	LEW
25.44	522.74	
26.52	521.82	
29.17	521.19	TW
31.05	521.64	
31.74	522.27	
32.39	523.50	REW
34.41	524.62	BKF
36.62	525.81	TOB
43.55	526.09	
46.37	526.31	
49.69	527.09	
49.71	527.42	

Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	1.5	0.7	0.5
	0.9	1.2	0.8
	-0.1	1.9	-0.2
	1.1	2.8	2.5
	2.7	3.4	8.3
	1.9	3.0	6.0
	0.7	2.3	1.8
	0.7	1.1	1.1
	2.0	0.0	1.1
TOTALS	11.2		22.0

SUMMARY DATA

A(BKF)	22.0
W(BKF)	11.2
Max d	3.4
Mean d	2.0



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Jan-07
Monitoring Year	2

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	527.77	
0.07	527.25	
3.57	526.61	
8.78	526.15	
17.93	525.97	
19.85	525.77	TOB
21.91	525.42	BKF
24.62	524.23	
25.87	523.62	
26.94	523.22	LEW
28.42	523.06	
28.78	522.79	
29.64	522.76	TW
30.63	522.94	
31.01	523.23	REW
31.19	523.73	
34.15	524.89	
35.52	525.35	
37.41	525.57	TOB
41.58	525.51	
43.99	525.74	
45.05	525.98	
45.19	526.45	

	Bankfull Hydraulic Geometry		
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	2.7	1.2	1.6
	1.3	1.8	1.9
	1.1	2.2	2.1
	1.5	2.4	3.4
	0.4	2.6	0.9
	0.9	2.7	2.3
	1.0	2.5	2.5
	0.4	2.2	0.9
	0.2	1.7	0.4
	3.0	0.5	3.3
	1.4	0.1	0.4
	0.8		0.0
TOTALS	14.4		19.7

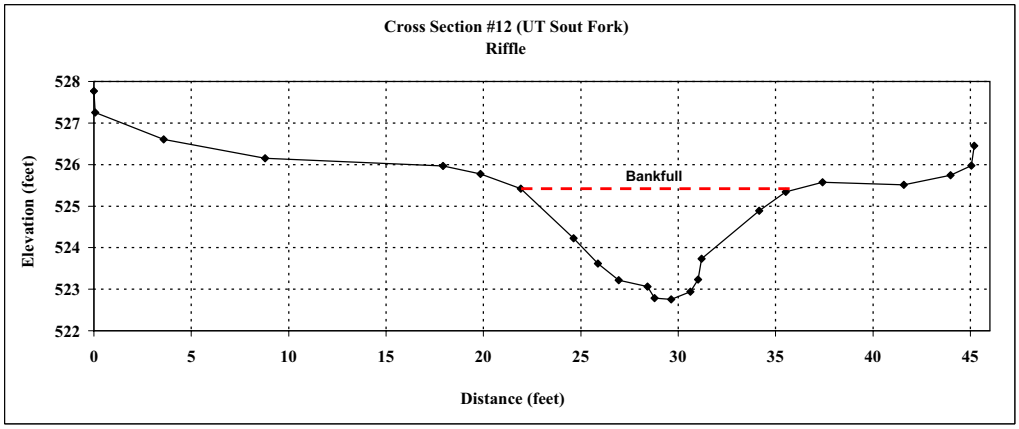
	Top of Bank Hydraulic Geometry		
	Width (Feet)	Depth (Feet)	Area (Sq. Ft.)
	0.0	0.0	0.0
	0.8	0.1	0.1
	2.7	1.3	2.0
	1.3	2.0	2.1
	1.1	2.4	2.3
	1.5	2.5	3.6
	0.4	2.8	1.0
	0.9	2.8	2.4
	1.0	2.6	2.7
	0.4	2.3	0.9
	0.2	1.8	0.4
	3.0	0.7	3.7
	1.4	0.2	0.6
	1.9	0.0	0.2
TOTALS	16.3		22.0

SUMMARY DATA (BANKFULL)

A(BKF)	19.7	W(FPA)	45+
W(BKF)	14.4	Slope	0.005
Max d	2.7		
Mean d	1.4	Area=	A
W/D	10.5	Width=	W
Entrenchment	3.1+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

SUMMARY DATA (TOB)

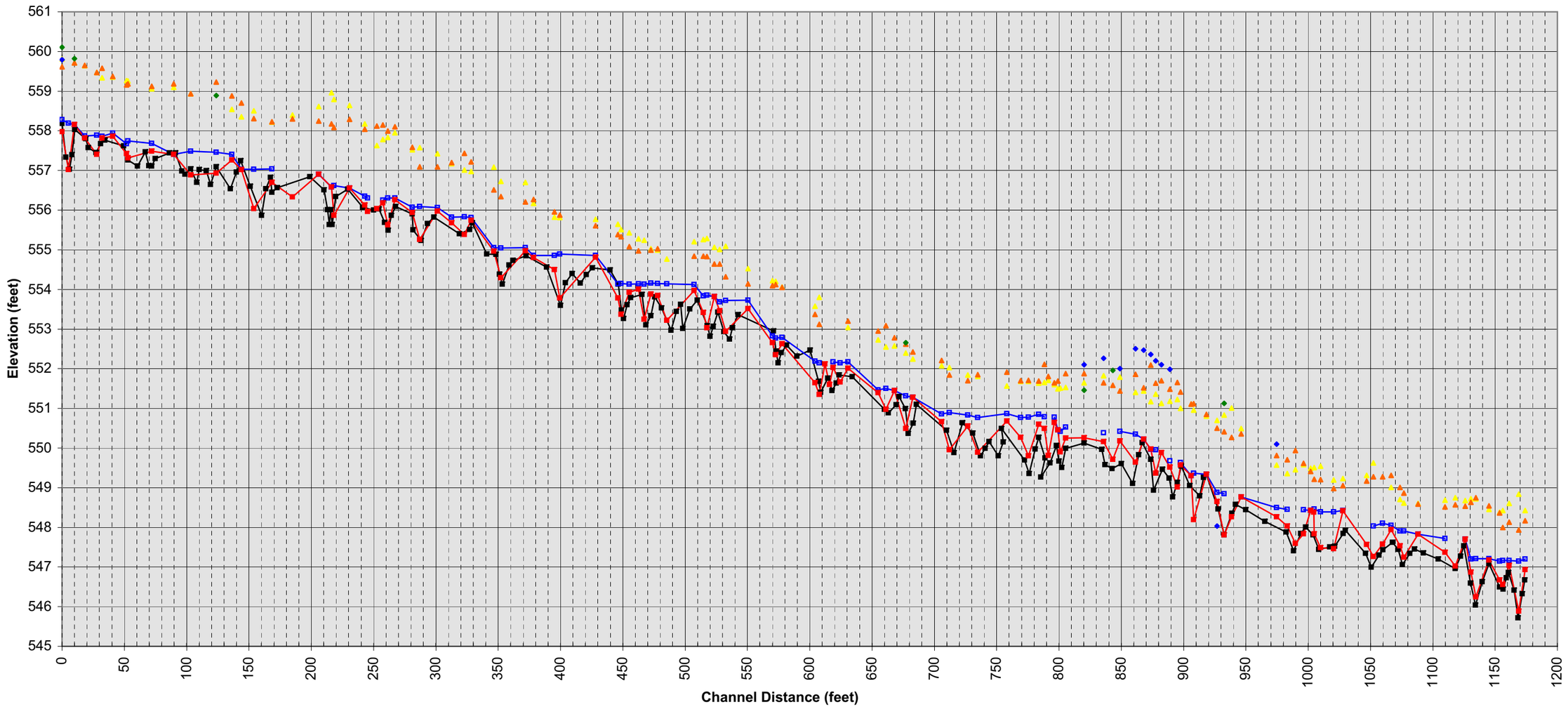
A	22.0
W	16.3
Max d	2.8
Mean d	1.3



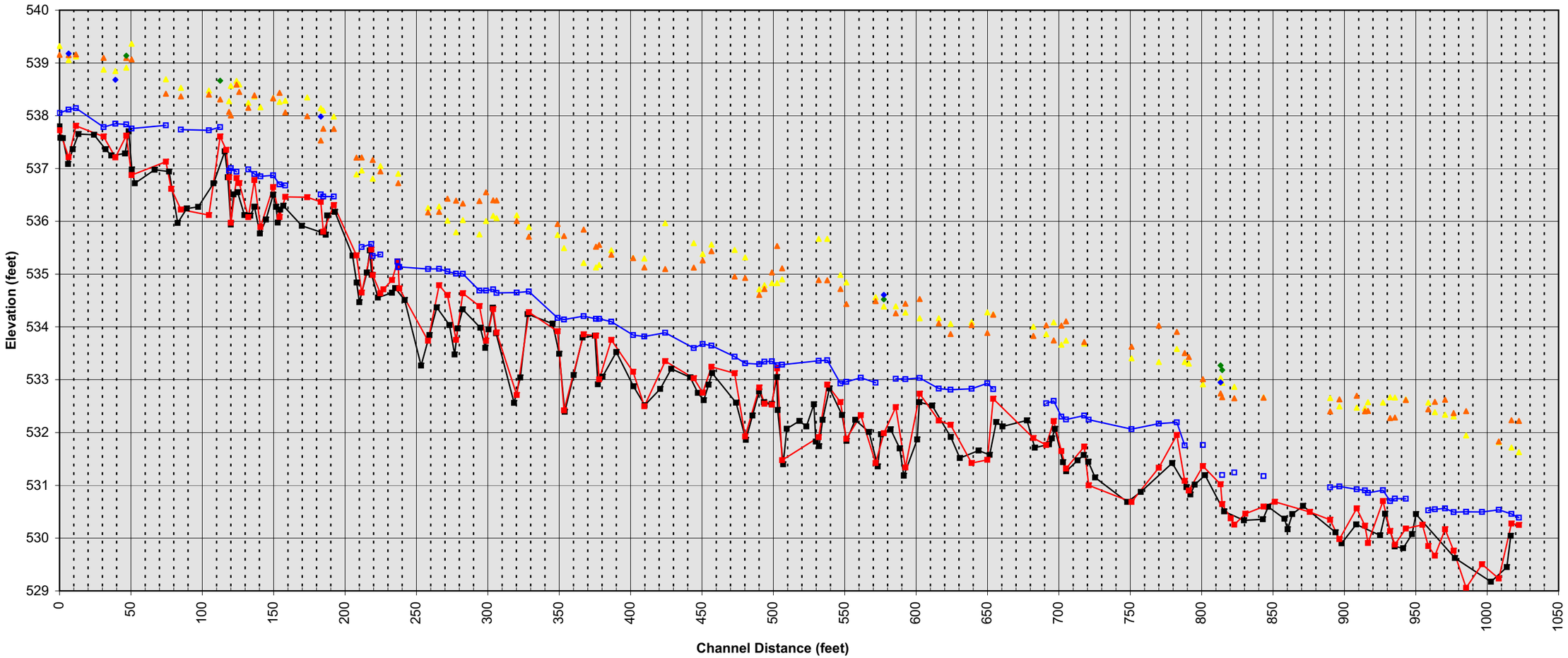
Appendix B5

Stream Longitudinal Profile

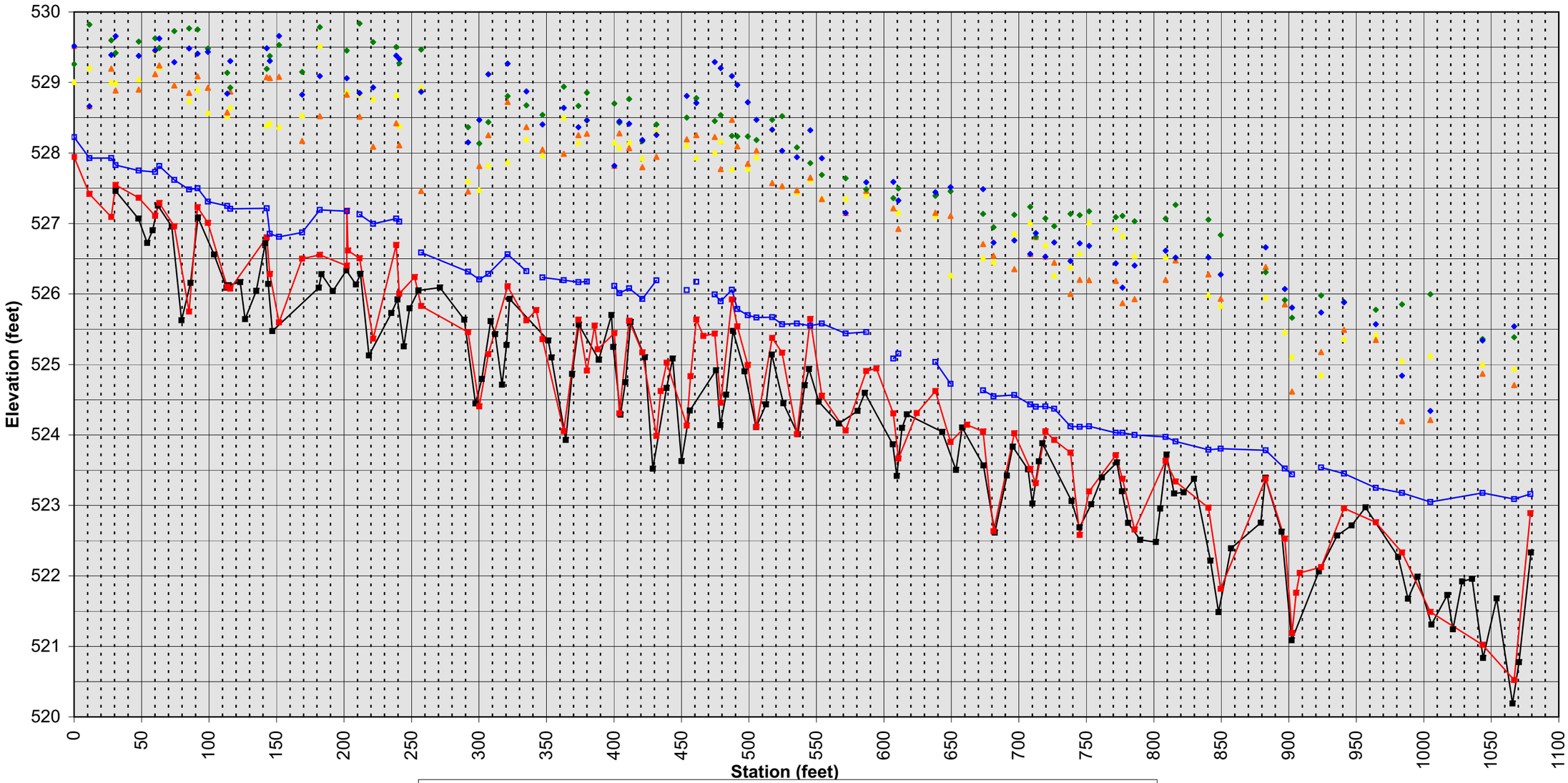
Longitudinal Profile Overlay (Years 1 & 2)
UT to South Fork - Reach 1



Longitudinal Profile Overlay (Years 1 & 2)
UT to South Fork - Reach 2



Longitudinal Profile Overlay (Years 1 & 2)
UT to South Fork - Reach 3



Appendix B6

Stream Pebble Counts

PEBBLE COUNT

Site: UT South Fork

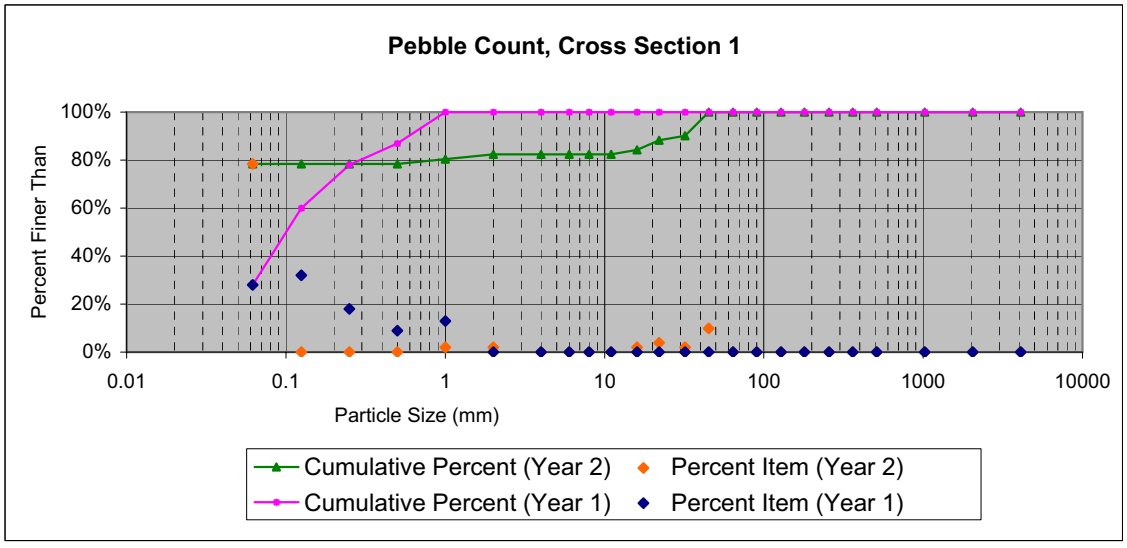
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 1	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	40	40	78%	78%
	Very Fine	.062-.125	SAND		0	0%	78%
	Fine	.125-.25	SAND		0	0%	78%
	Medium	.25-.50	SAND		0	0%	78%
	Coarse	.50-1.0	SAND	1	1	2%	80%
.04-.08	Very Coarse	1.0-2	SAND	1	1	2%	82%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	82%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	82%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	82%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	82%
.44-.63	Medium	11.3-16	GRAVEL	1	1	2%	84%
.63-.89	Coarse	16-22.6	GRAVEL	2	2	4%	88%
.89-1.26	Coarse	22.6-32	GRAVEL	1	1	2%	90%
1.26-1.77	Very Coarse	32-45	GRAVEL	5	5	10%	100%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128	COBBLE		0	0%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

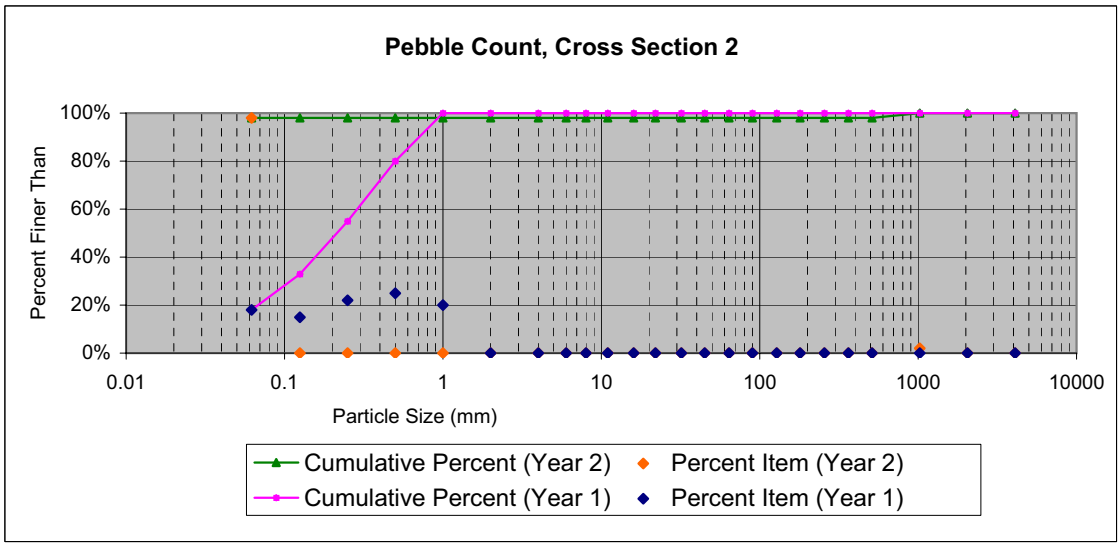
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 2	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	49	49	98%	98%
	Very Fine	.062-.125	SAND		0	0%	98%
	Fine	.125-.25			0	0%	98%
	Medium	.25-.50			0	0%	98%
	Coarse	.50-1.0			0	0%	98%
.04-.08	Very Coarse	1.0-2			0	0%	98%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	98%
.16-.22	Fine	4-5.7			0	0%	98%
.22-.31	Fine	5.7-8			0	0%	98%
.31-.44	Medium	8-11.3			0	0%	98%
.44-.63	Medium	11.3-16			0	0%	98%
.63-.89	Coarse	16-22.6			0	0%	98%
.89-1.26	Coarse	22.6-32			0	0%	98%
1.26-1.77	Very Coarse	32-45			0	0%	98%
1.77-2.5	Very Coarse	45-64			0	0%	98%
2.5-3.5	Small	64-90	COBBLE		0	0%	98%
3.5-5.0	Small	90-128			0	0%	98%
5.0-7.1	Large	128-180			0	0%	98%
7.1-10.1	Large	180-256			0	0%	98%
10.1-14.3	Small	256-362	BOULDER		0	0%	98%
14.3-20	Small	362-512			0	0%	98%
20-40	Medium	512-1024		1	1	2%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

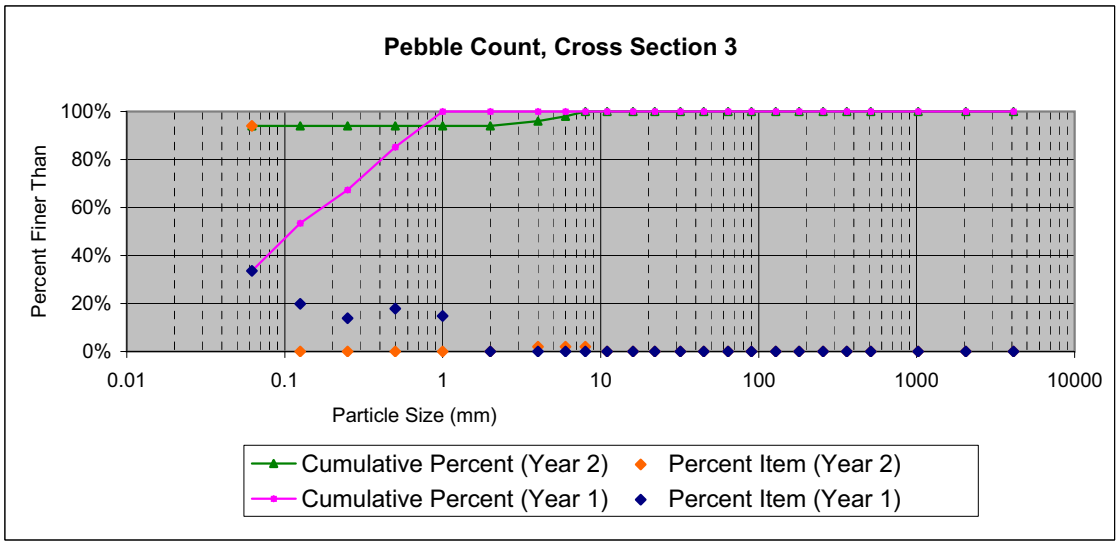
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 3	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	47	47	94%	94%
	Very Fine	.062-.125	SAND		0	0%	94%
	Fine	.125-.25	SAND		0	0%	94%
	Medium	.25-.50	SAND		0	0%	94%
	Coarse	.50-1.0	SAND		0	0%	94%
.04-.08	Very Coarse	1.0-2	SAND		0	0%	94%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	96%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	98%
.22-.31	Fine	5.7-8	GRAVEL	1	1	2%	100%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	100%
.44-.63	Medium	11.3-16	GRAVEL		0	0%	100%
.63-.89	Coarse	16-22.6	GRAVEL		0	0%	100%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	100%
1.26-1.77	Very Coarse	32-45	GRAVEL		0	0%	100%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128	COBBLE		0	0%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

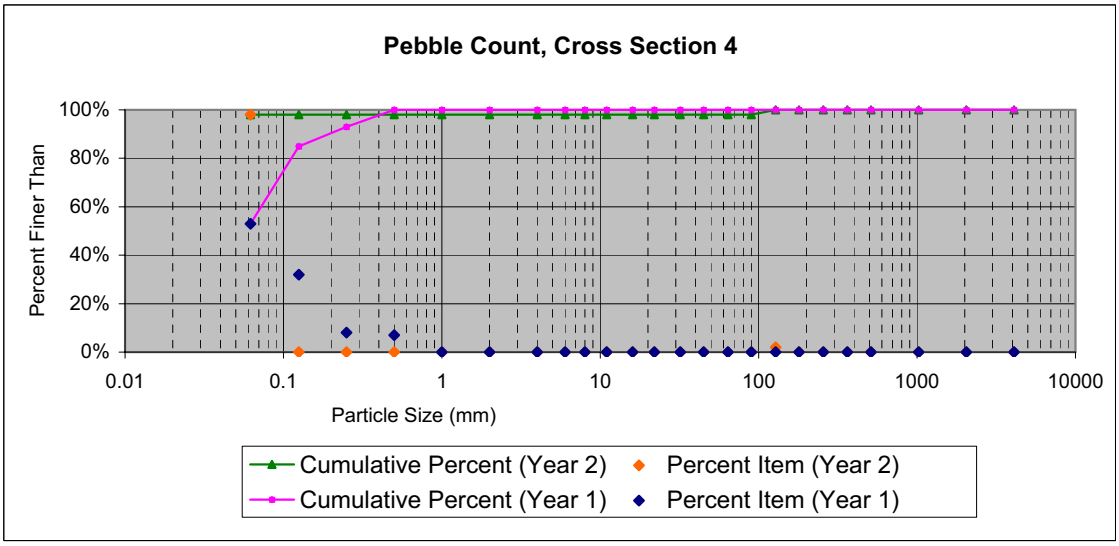
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 4	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	50	50	98%	98%
	Very Fine	.062-.125	SAND		0	0%	98%
	Fine	.125-.25			0	0%	98%
	Medium	.25-.50			0	0%	98%
	Coarse	.50-1.0			0	0%	98%
.04-.08	Very Coarse	1.0-2			0	0%	98%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	98%
.16-.22	Fine	4-5.7			0	0%	98%
.22-.31	Fine	5.7-8			0	0%	98%
.31-.44	Medium	8-11.3			0	0%	98%
.44-.63	Medium	11.3-16			0	0%	98%
.63-.89	Coarse	16-22.6			0	0%	98%
.89-1.26	Coarse	22.6-32			0	0%	98%
1.26-1.77	Very Coarse	32-45			0	0%	98%
1.77-2.5	Very Coarse	45-64			0	0%	98%
2.5-3.5	Small	64-90	COBBLE		0	0%	98%
3.5-5.0	Small	90-128		1	1	2%	100%
5.0-7.1	Large	128-180			0	0%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

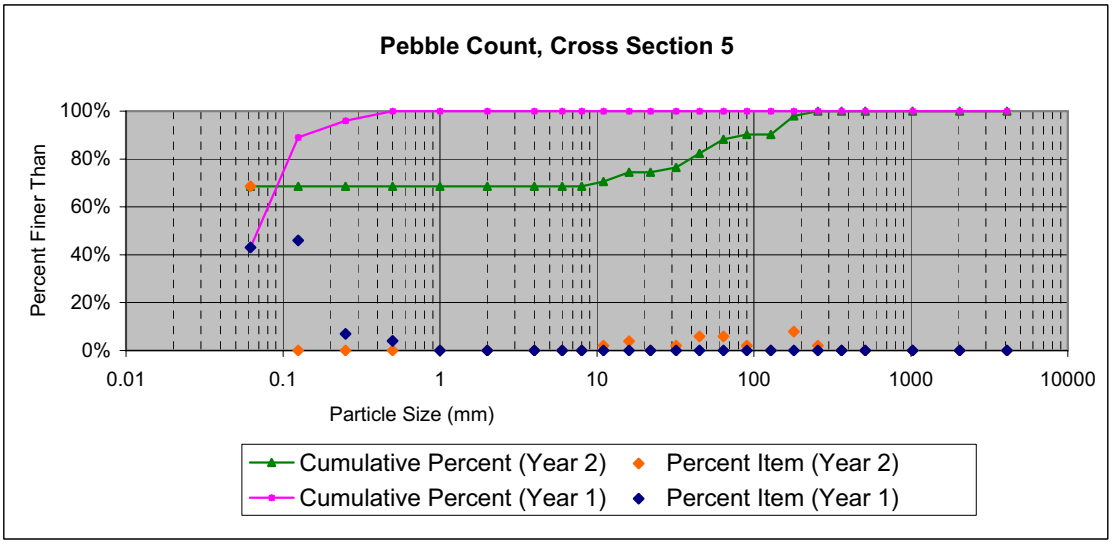
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 5	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	35	35	69%	69%
	Very Fine	.062-.125	SAND		0	0%	69%
	Fine	.125-.25			0	0%	69%
	Medium	.25-.50			0	0%	69%
	Coarse	.50-1.0			0	0%	69%
.04-.08	Very Coarse	1.0-2			0	0%	69%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	69%
.16-.22	Fine	4-5.7			0	0%	69%
.22-.31	Fine	5.7-8			0	0%	69%
.31-.44	Medium	8-11.3		1	1	2%	71%
.44-.63	Medium	11.3-16		2	2	4%	75%
.63-.89	Coarse	16-22.6			0	0%	75%
.89-1.26	Coarse	22.6-32		1	1	2%	76%
1.26-1.77	Very Coarse	32-45		3	3	6%	82%
1.77-2.5	Very Coarse	45-64		3	3	6%	88%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	90%
3.5-5.0	Small	90-128			0	0%	90%
5.0-7.1	Large	128-180		4	4	8%	98%
7.1-10.1	Large	180-256		1	1	2%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

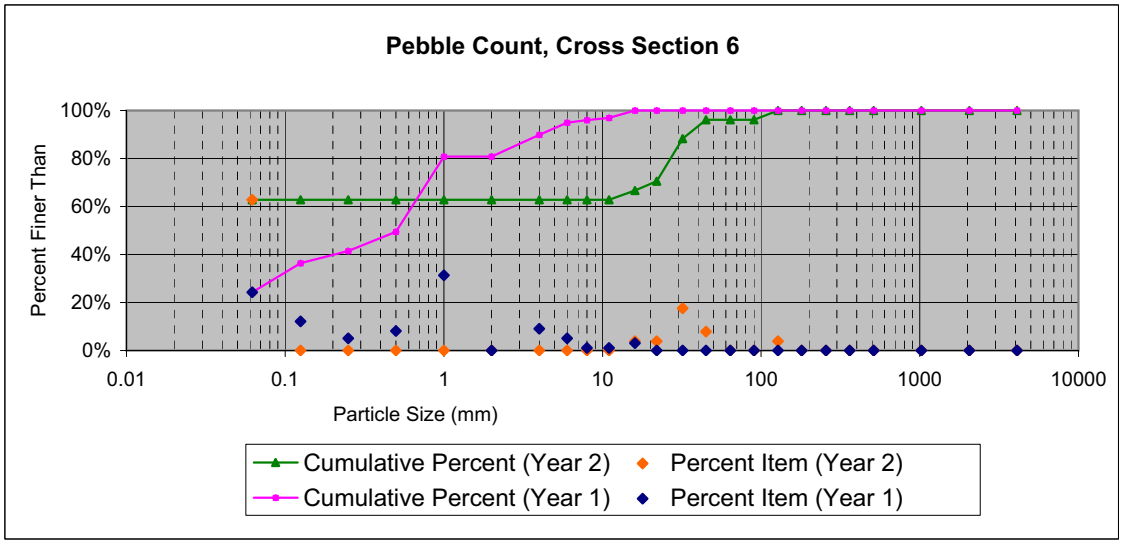
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 6	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	32	32	63%	63%
	Very Fine	.062-.125	SAND		0	0%	63%
	Fine	.125-.25	SAND		0	0%	63%
	Medium	.25-.50	SAND		0	0%	63%
	Coarse	.50-1.0	SAND		0	0%	63%
.04-.08	Very Coarse	1.0-2	SAND		0	0%	63%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	63%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	63%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	63%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	63%
.44-.63	Medium	11.3-16	GRAVEL	2	2	4%	67%
.63-.89	Coarse	16-22.6	GRAVEL	2	2	4%	71%
.89-1.26	Coarse	22.6-32	GRAVEL	9	9	18%	88%
1.26-1.77	Very Coarse	32-45	GRAVEL	4	4	8%	96%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	96%
2.5-3.5	Small	64-90			0	0%	96%
3.5-5.0	Small	90-128	COBBLE	2	2	4%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362			0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

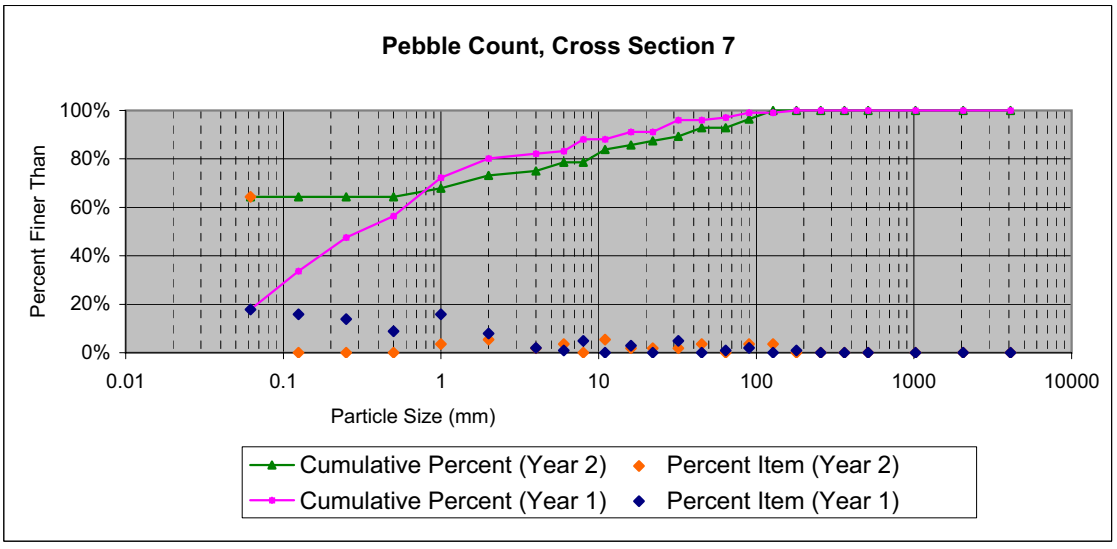
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 7	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	36	36	64%	64%
	Very Fine	.062-.125	SAND		0	0%	64%
	Fine	.125-.25	SAND		0	0%	64%
	Medium	.25-.50	SAND		0	0%	64%
	Coarse	.50-1.0	SAND	2	2	4%	68%
.04-.08	Very Coarse	1.0-2	SAND	3	3	5%	73%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	75%
.16-.22	Fine	4-5.7	GRAVEL	2	2	4%	79%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	79%
.31-.44	Medium	8-11.3	GRAVEL	3	3	5%	84%
.44-.63	Medium	11.3-16	GRAVEL	1	1	2%	86%
.63-.89	Coarse	16-22.6	GRAVEL	1	1	2%	88%
.89-1.26	Coarse	22.6-32	GRAVEL	1	1	2%	89%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	93%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	93%
2.5-3.5	Small	64-90	COBBLE	2	2	4%	96%
3.5-5.0	Small	90-128	COBBLE	2	2	4%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	56	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

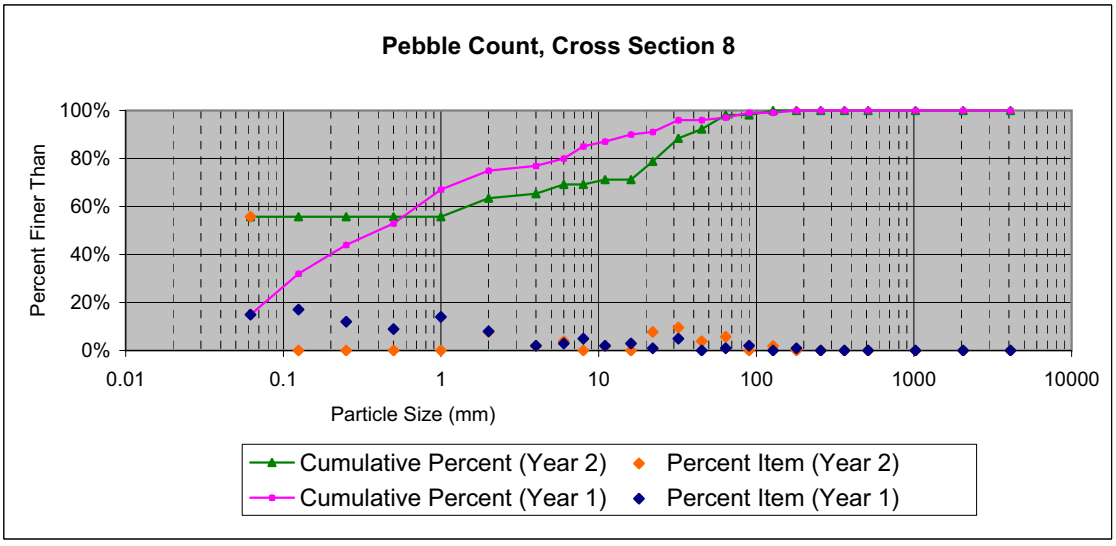
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 8	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	29	29	56%	56%
	Very Fine	.062-.125	SAND		0	0%	56%
	Fine	.125-.25	SAND		0	0%	56%
	Medium	.25-.50	SAND		0	0%	56%
	Coarse	.50-1.0	SAND		0	0%	56%
.04-.08	Very Coarse	1.0-2	SAND	4	4	8%	63%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	65%
.16-.22	Fine	4-5.7	GRAVEL	2	2	4%	69%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	69%
.31-.44	Medium	8-11.3	GRAVEL	1	1	2%	71%
.44-.63	Medium	11.3-16	GRAVEL		0	0%	71%
.63-.89	Coarse	16-22.6	GRAVEL	4	4	8%	79%
.89-1.26	Coarse	22.6-32	GRAVEL	5	5	10%	88%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	92%
1.77-2.5	Very Coarse	45-64	GRAVEL	3	3	6%	98%
2.5-3.5	Small	64-90			0	0%	98%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362			0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	52	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

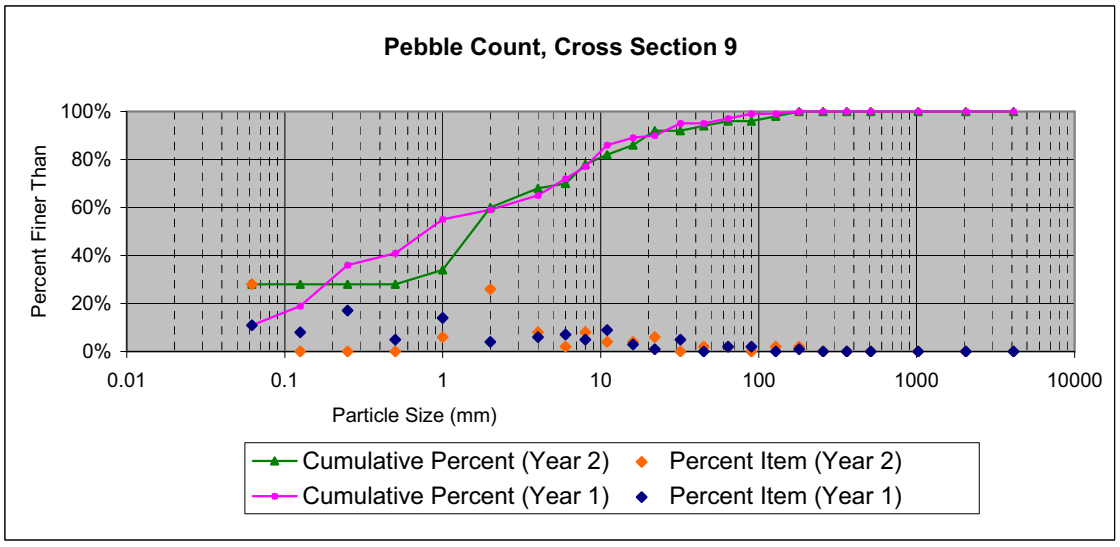
Party: IPJ & PDB

Date: 10/15/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 9	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	14	14	28%	28%
	Very Fine	.062-.125	SAND		0	0%	28%
	Fine	.125-.25	SAND		0	0%	28%
	Medium	.25-.50	SAND		0	0%	28%
	Coarse	.50-1.0	SAND	3	3	6%	34%
.04-.08	Very Coarse	1.0-2	SAND	13	13	26%	60%
.08-.16	Very Fine	2.0-4.0	GRAVEL	4	4	8%	68%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	70%
.22-.31	Fine	5.7-8	GRAVEL	4	4	8%	78%
.31-.44	Medium	8-11.3	GRAVEL	2	2	4%	82%
.44-.63	Medium	11.3-16	GRAVEL	2	2	4%	86%
.63-.89	Coarse	16-22.6	GRAVEL	3	3	6%	92%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	92%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	94%
1.77-2.5	Very Coarse	45-64	GRAVEL	1	1	2%	96%
2.5-3.5	Small	64-90			0	0%	96%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	98%
5.0-7.1	Large	128-180	COBBLE	1	1	2%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362			0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

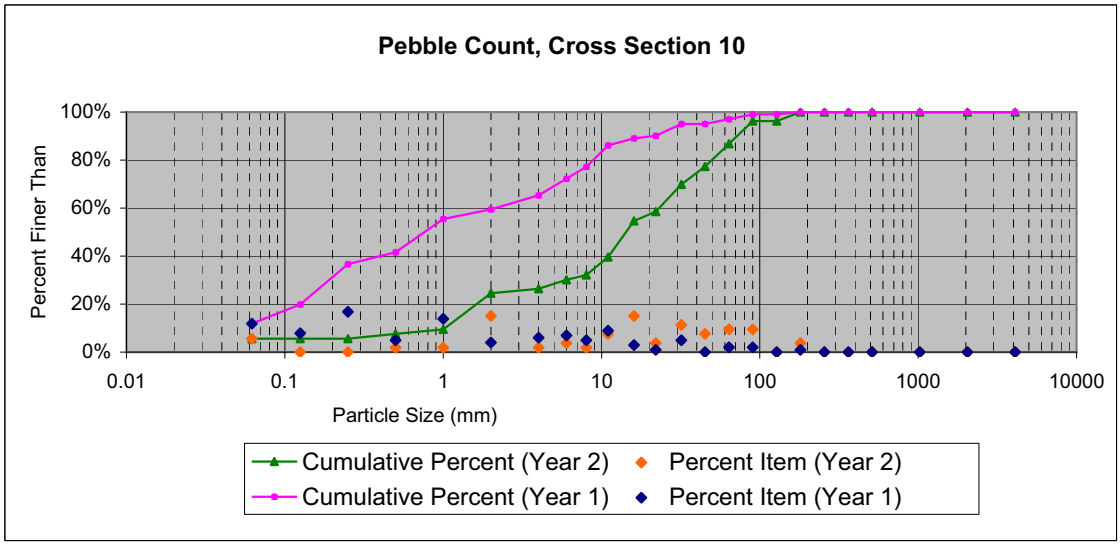
Party: IPJ & PDB

Date: 10/16/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 10	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	3	3	6%	6%
	Very Fine	.062-.125	SAND		0	0%	6%
	Fine	.125-.25	SAND		0	0%	6%
	Medium	.25-.50	SAND	1	1	2%	8%
	Coarse	.50-1.0	SAND	1	1	2%	9%
.04-.08	Very Coarse	1.0-2	SAND	8	8	15%	25%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	26%
.16-.22	Fine	4-5.7	GRAVEL	2	2	4%	30%
.22-.31	Fine	5.7-8	GRAVEL	1	1	2%	32%
.31-.44	Medium	8-11.3	GRAVEL	4	4	8%	40%
.44-.63	Medium	11.3-16	GRAVEL	8	8	15%	55%
.63-.89	Coarse	16-22.6	GRAVEL	2	2	4%	58%
.89-1.26	Coarse	22.6-32	GRAVEL	6	6	11%	70%
1.26-1.77	Very Coarse	32-45	GRAVEL	4	4	8%	77%
1.77-2.5	Very Coarse	45-64	GRAVEL	5	5	9%	87%
2.5-3.5	Small	64-90	COBBLE	5	5	9%	96%
3.5-5.0	Small	90-128	COBBLE		0	0%	96%
5.0-7.1	Large	128-180	COBBLE	2	2	4%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	53	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

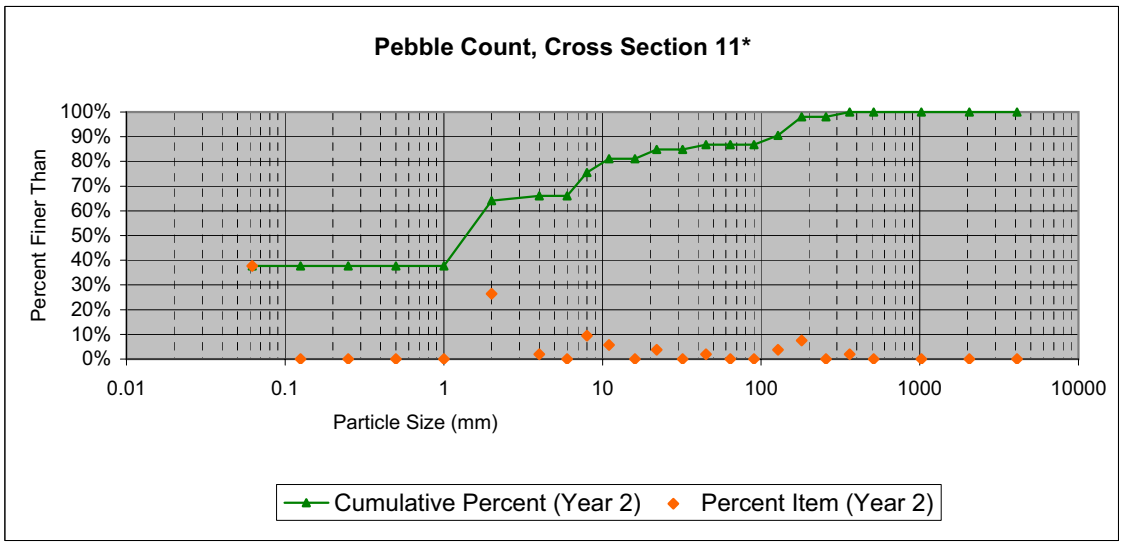
Party: IPJ & PDB

Date: 10/16/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 11	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	20	20	38%	38%
	Very Fine	.062-.125	SAND		0	0%	38%
	Fine	.125-.25	SAND		0	0%	38%
	Medium	.25-.50	SAND		0	0%	38%
	Coarse	.50-1.0	SAND		0	0%	38%
.04-.08	Very Coarse	1.0-2	SAND	14	14	26%	64%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	66%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	66%
.22-.31	Fine	5.7-8	GRAVEL	5	5	9%	75%
.31-.44	Medium	8-11.3	GRAVEL	3	3	6%	81%
.44-.63	Medium	11.3-16	GRAVEL		0	0%	81%
.63-.89	Coarse	16-22.6	GRAVEL	2	2	4%	85%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	85%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	87%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	87%
2.5-3.5	Small	64-90	COBBLE		0	0%	87%
3.5-5.0	Small	90-128	COBBLE	2	2	4%	91%
5.0-7.1	Large	128-180	COBBLE	4	4	8%	98%
7.1-10.1	Large	180-256	COBBLE		0	0%	98%
10.1-14.3	Small	256-362	BOULDER	1	1	2%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	53	**100%**	**100%**



*Year 1 data not available.

PEBBLE COUNT

Site: UT South Fork

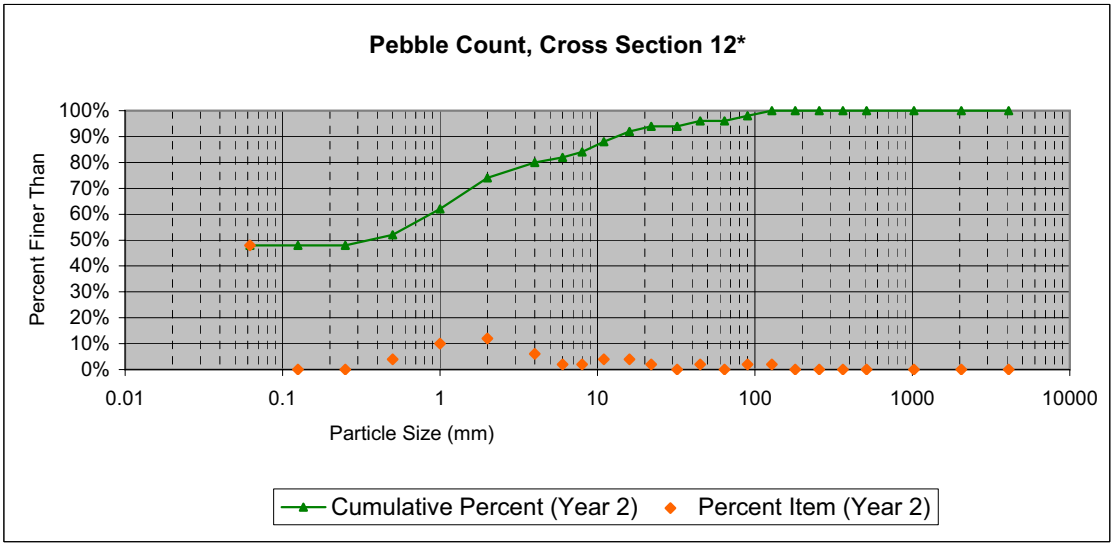
Party: IPJ & PDB

Date: 10/16/07

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 12	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	24	24	48%	48%
	Very Fine	.062-.125	SAND		0	0%	48%
	Fine	.125-.25	SAND		0	0%	48%
	Medium	.25-.50	SAND	2	2	4%	52%
	Coarse	.50-1.0	SAND	5	5	10%	62%
.04-.08	Very Coarse	1.0-2	SAND	6	6	12%	74%
.08-.16	Very Fine	2.0-4.0	GRAVEL	3	3	6%	80%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	82%
.22-.31	Fine	5.7-8	GRAVEL	1	1	2%	84%
.31-.44	Medium	8-11.3	GRAVEL	2	2	4%	88%
.44-.63	Medium	11.3-16	GRAVEL	2	2	4%	92%
.63-.89	Coarse	16-22.6	GRAVEL	1	1	2%	94%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	94%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	96%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	96%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	98%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



*Year 1 data not available.

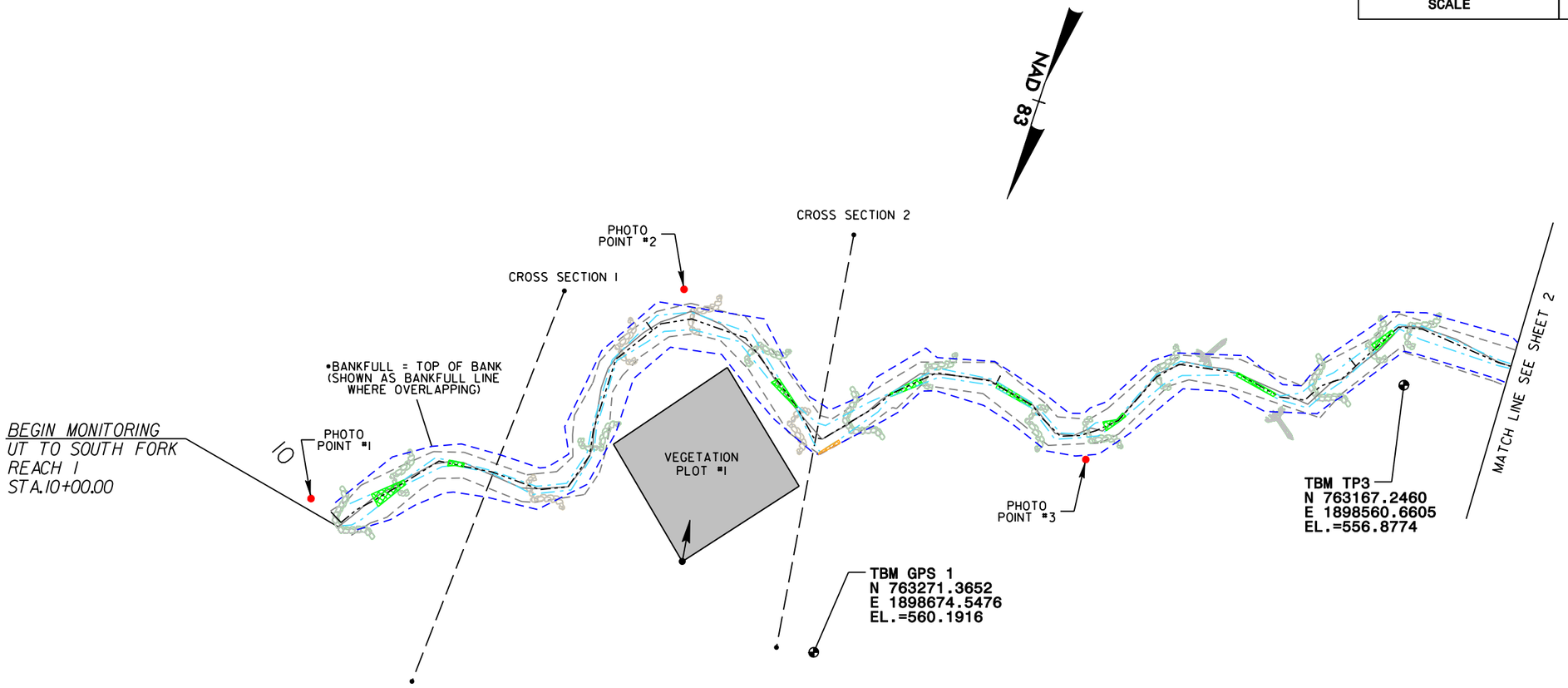
Appendix C

Plan View Sheets

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	1
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 1 LEFT	763207.9909	1898757.6600	559.5123
XSC 1 RIGHT	763307.6006	1898763.3135	561.2426
XSC 2 LEFT	763173.9086	1898696.2853	559.6677
XSC 2 RIGHT	763272.9699	1898683.3090	560.9459

UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

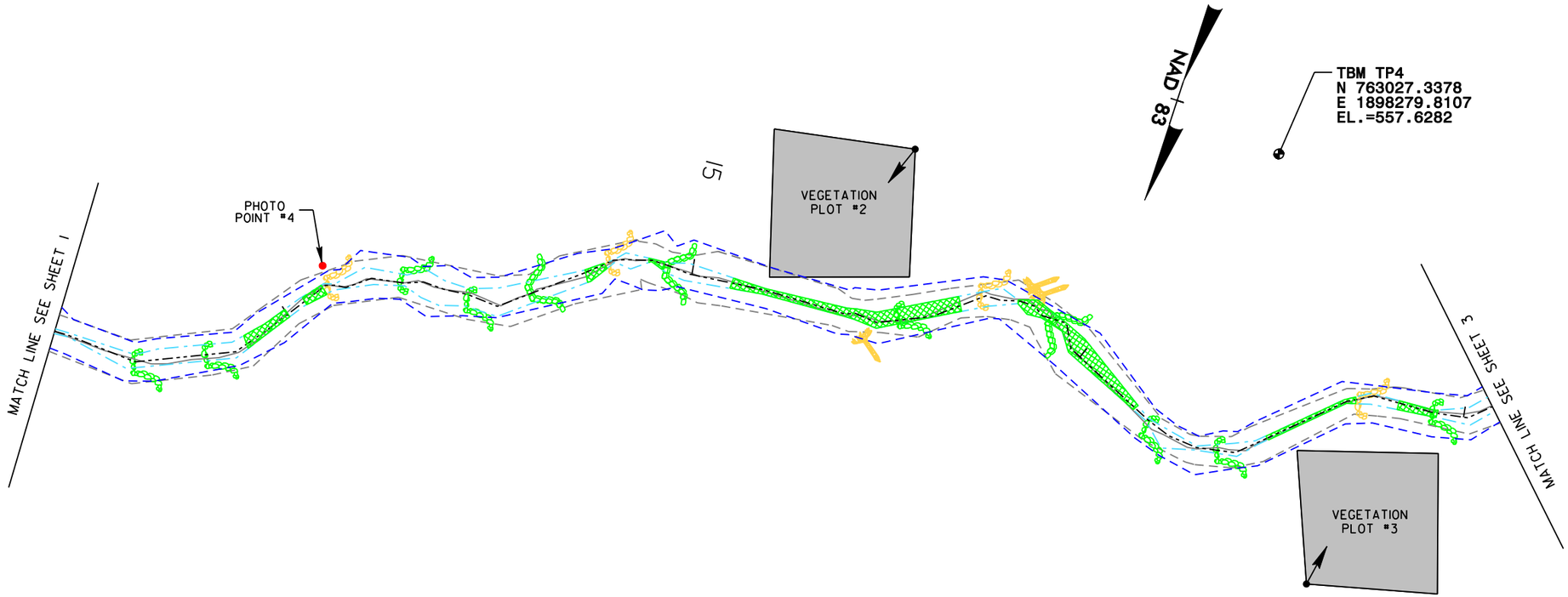
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	2
PROJECT ENGINEER	

10 0 30
SCALE



UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS

- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES

- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

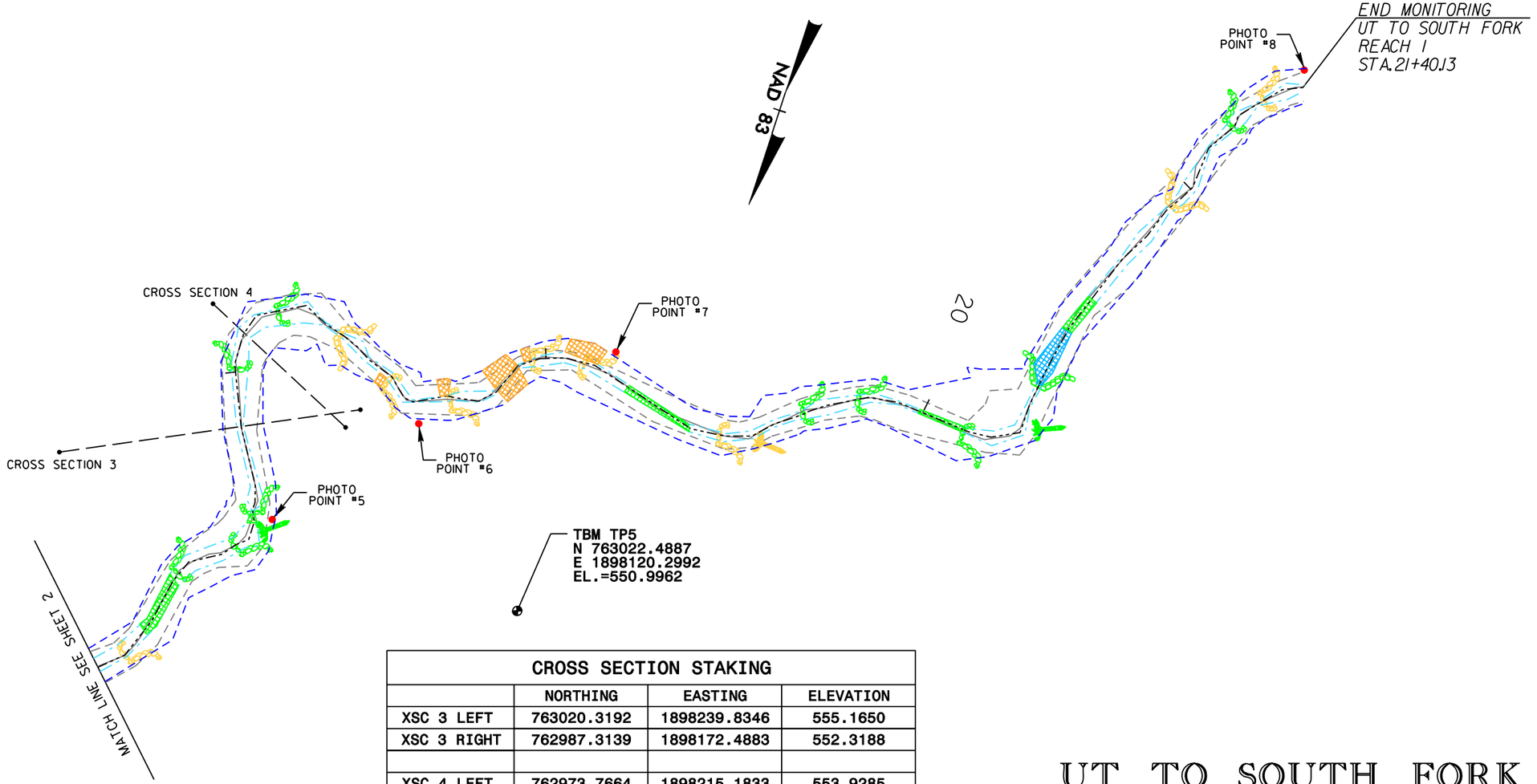
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 3 LEFT	763020.3192	1898239.8346	555.1650
XSC 3 RIGHT	762987.3139	1898172.4883	552.3188
XSC 4 LEFT	762973.7664	1898215.1833	553.9285
XSC 4 RIGHT	762992.5881	1898174.6097	552.4553

UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

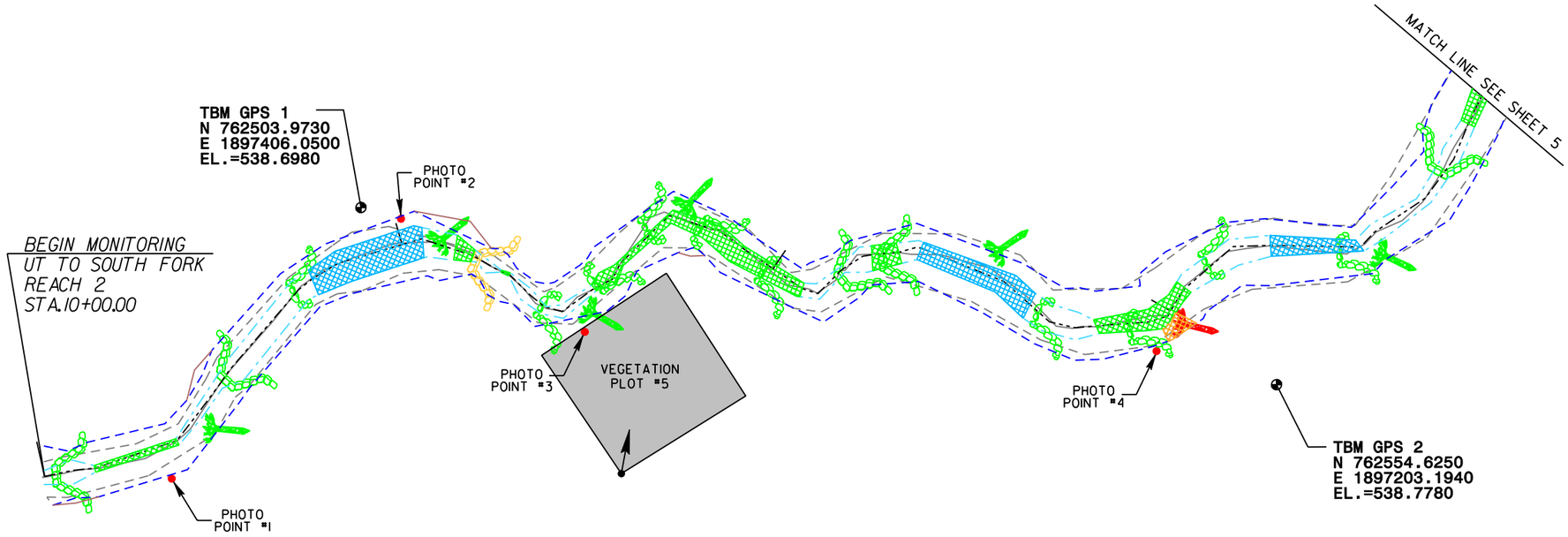
Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP	PROJECT REFERENCE NO.	SHEET NO.
1025 WADE AVENUE RALEIGH, NC 27605 TEL: 919-789-9977 FAX: 789-9591	435	4
10 0 30 SCALE	PROJECT ENGINEER	

NAD 83



UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS

- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES

- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

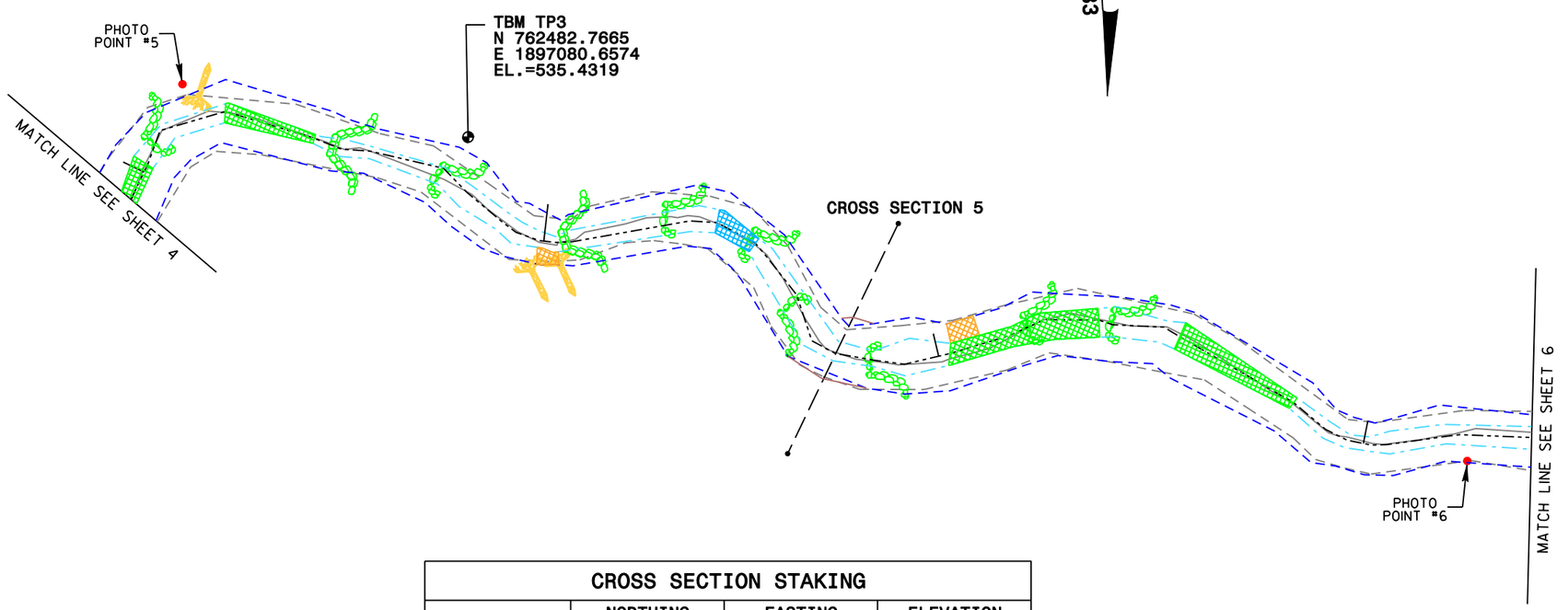
LOCATION:	UT TO SOUTH FORK CREEK STREAM MONITORING - YEAR 2
PROJ #: 435	COUNTY: ALAMANCE
PREPARED BY:	IPJ
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP	PROJECT REFERENCE NO.	SHEET NO.
1025 WADE AVENUE RALEIGH, NC 27605 TEL: 919-789-9977 FAX: 789-9591	435	5
	PROJECT ENGINEER	

10 0 30
SCALE

15

NAD 83



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 5 LEFT	762506.3940	1896989.2978	536.3557
XSC 5 RIGHT	762554.5778	1897015.7169	535.6841

UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES

- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

LOCATION: UT TO SOUTH FORK CREEK STREAM MONITORING - YEAR 2	
PROJ #: 435	COUNTY: ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

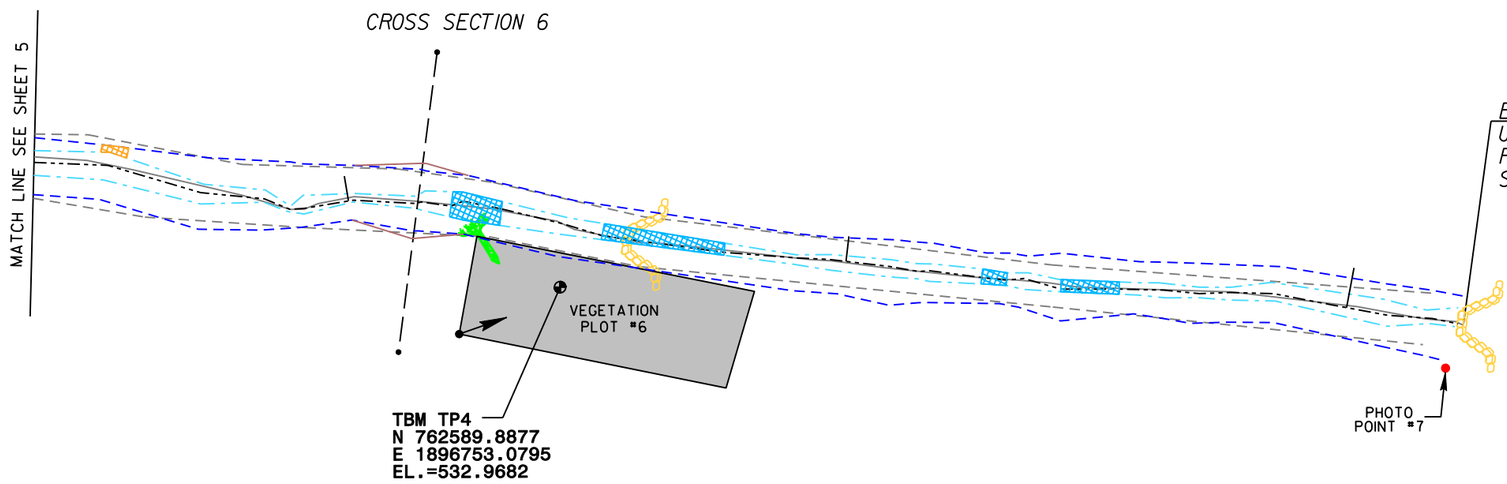
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83

20



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 6 LEFT	762542.1251	1896774.9056	534.7193
XSC 6 RIGHT	762601.0118	1896785.7229	534.8382

UT TO SOUTH FORK REACH 2

LEGEND

THALWEG 2006
BANKFULL 2006
THALWEG 2007
EDGE OF WATER 2007
BANKFULL 2007
TOP OF BANK 2007
CROSS-SECTIONS

BANK EROSION
SEVERE BANK EROSION
AGGRADATION (GRASSES)
AGGRADATON (CATTAILS)

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

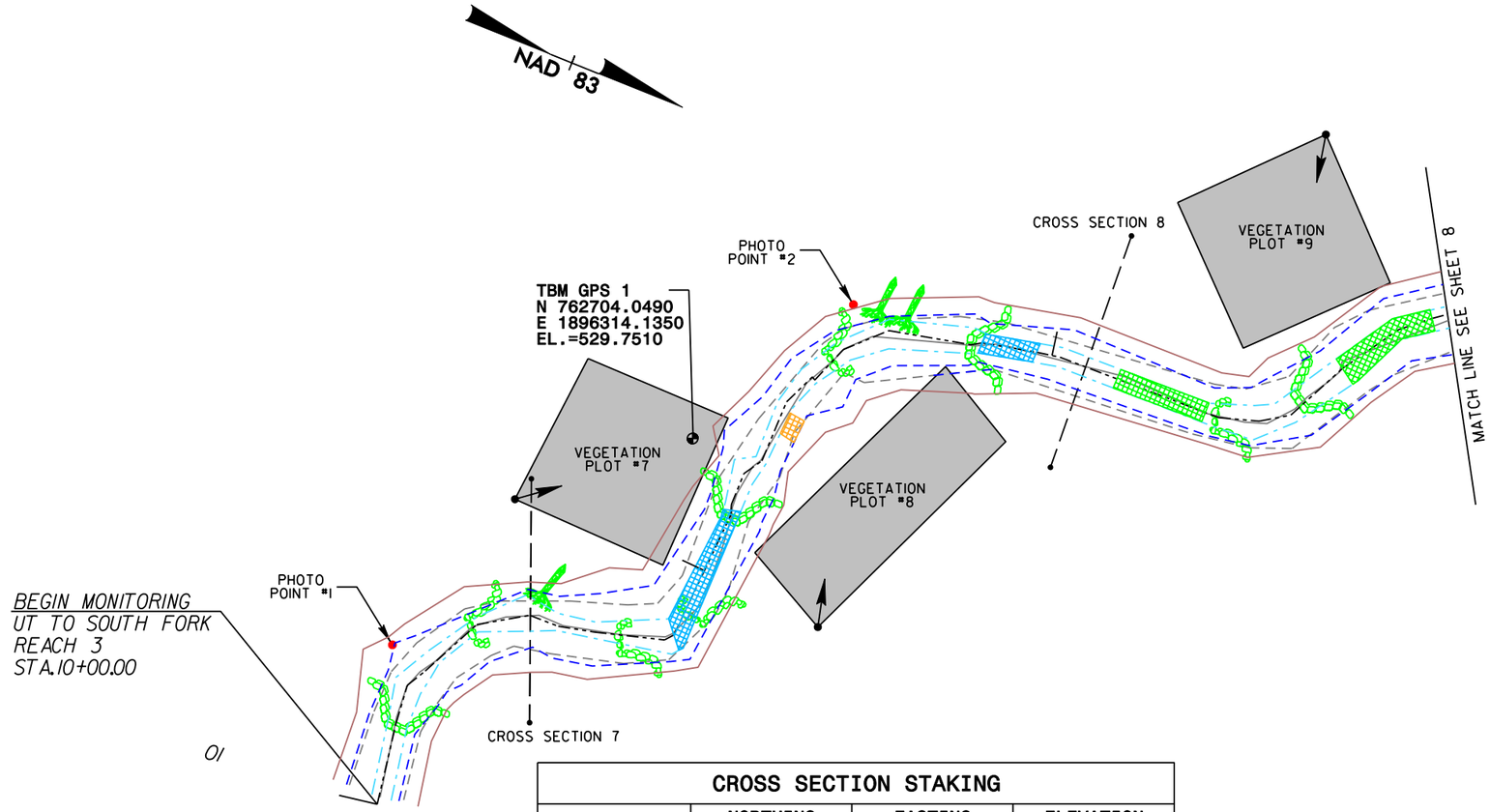
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 7 LEFT	762676.4689	1896334.1190	530.1153
XSC 7 RIGHT	762694.7446	1896380.6050	531.6672
XSC 8 LEFT	762771.9483	1896242.1450	531.2732
XSC 8 RIGHT	762774.2250	1896292.2990	531.0435

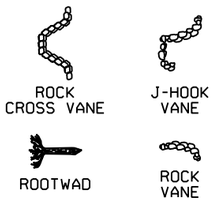
UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS

- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES



COLOR CODE FOR STRUCTURES

- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

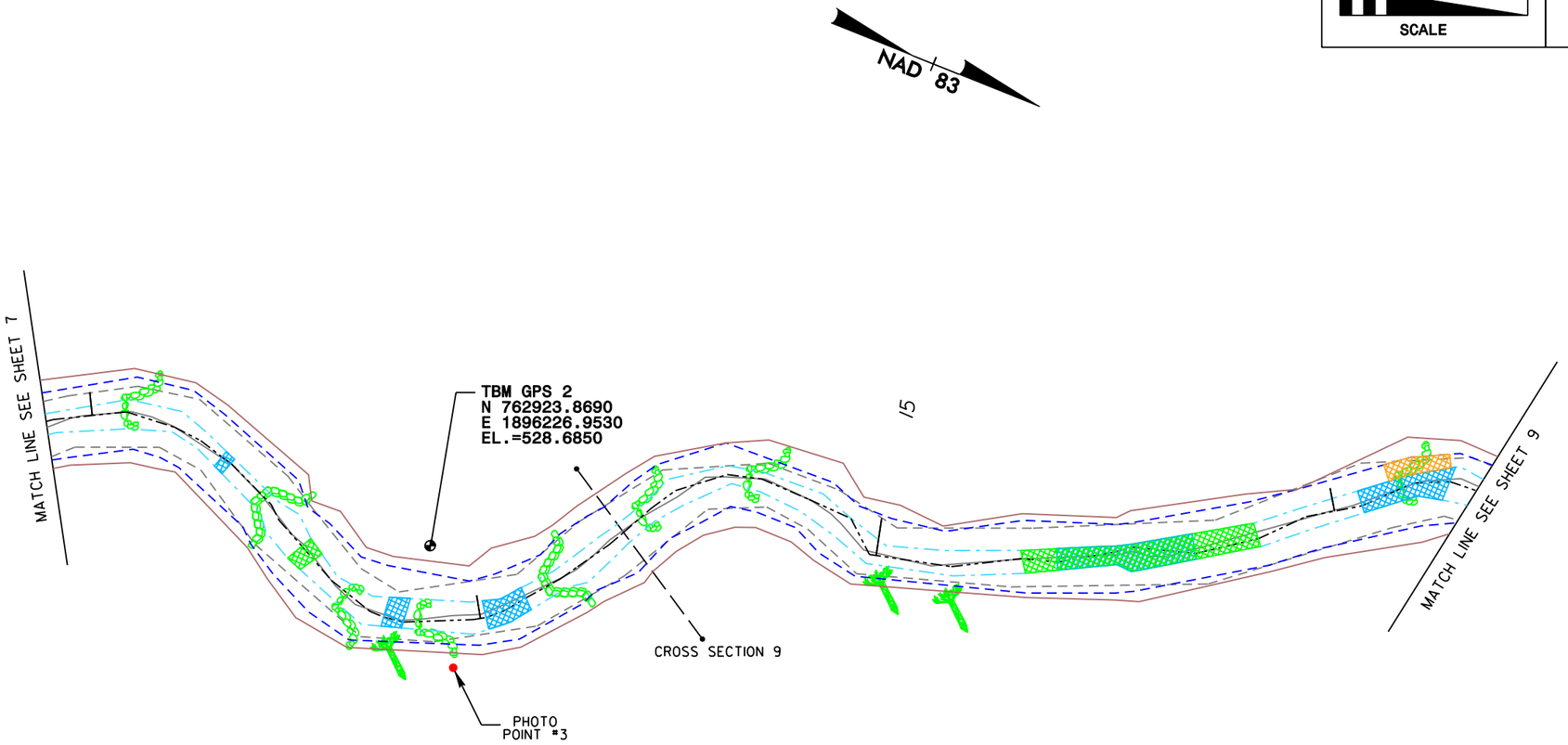
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 3/30/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 9 LEFT	762946.7210	1896200.1180	529.2745
XSC 9 RIGHT	762985.1716	1896223.8140	530.1599

UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 3/05/07

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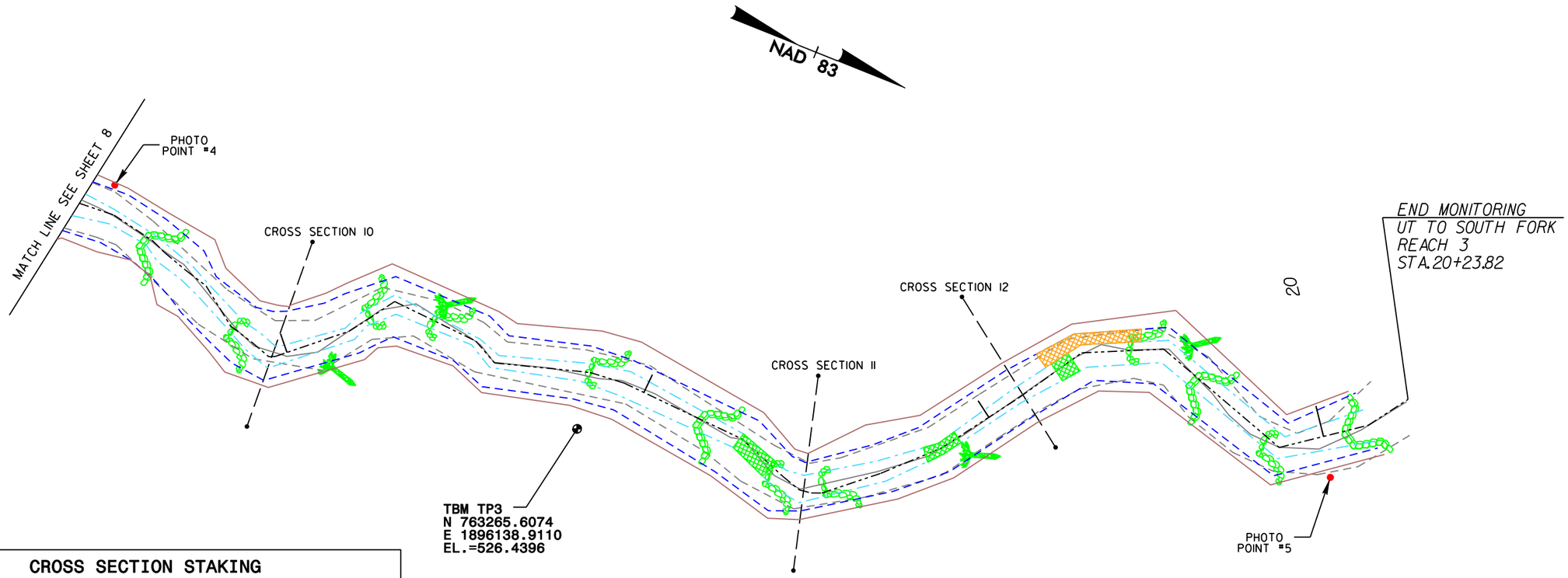
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 10 LEFT	763185.3049	1896119.8830	528.6611
XSC 10 RIGHT	763187.3395	1896169.7620	527.3895
XSC 11 LEFT	763317.5403	1896103.5160	527.4576
XSC 11 RIGHT	763330.1768	1896151.9130	527.3963
XSC 12 LEFT	763344.0200	1896071.2010	527.7327
XSC 12 RIGHT	763380.4412	1896097.9050	526.4052

UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2006
- BANKFULL 2006
- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION (GRASSES)
- AGGRADATON (CATTAILS)

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

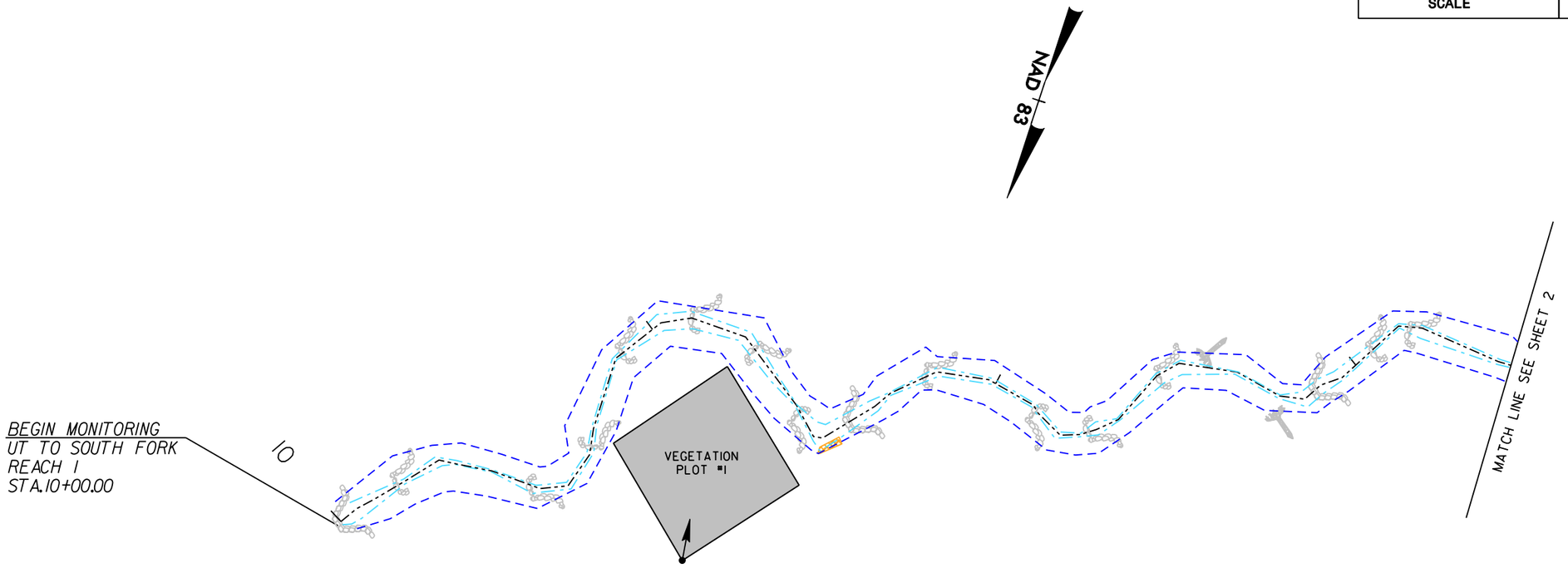
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 4/02/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	1
PROJECT ENGINEER	

10 0 30
SCALE



UT TO SOUTH FORK
REACH 1

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

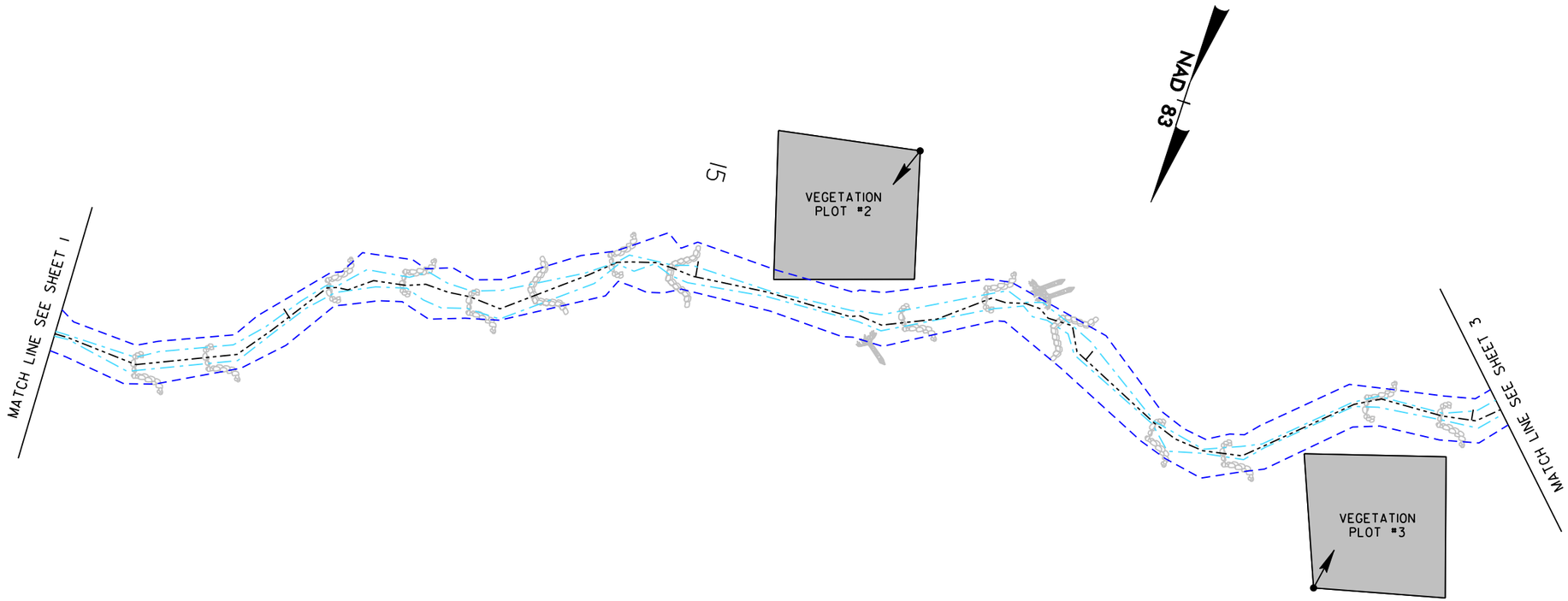
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	2
PROJECT ENGINEER	

10 0 30
SCALE



UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
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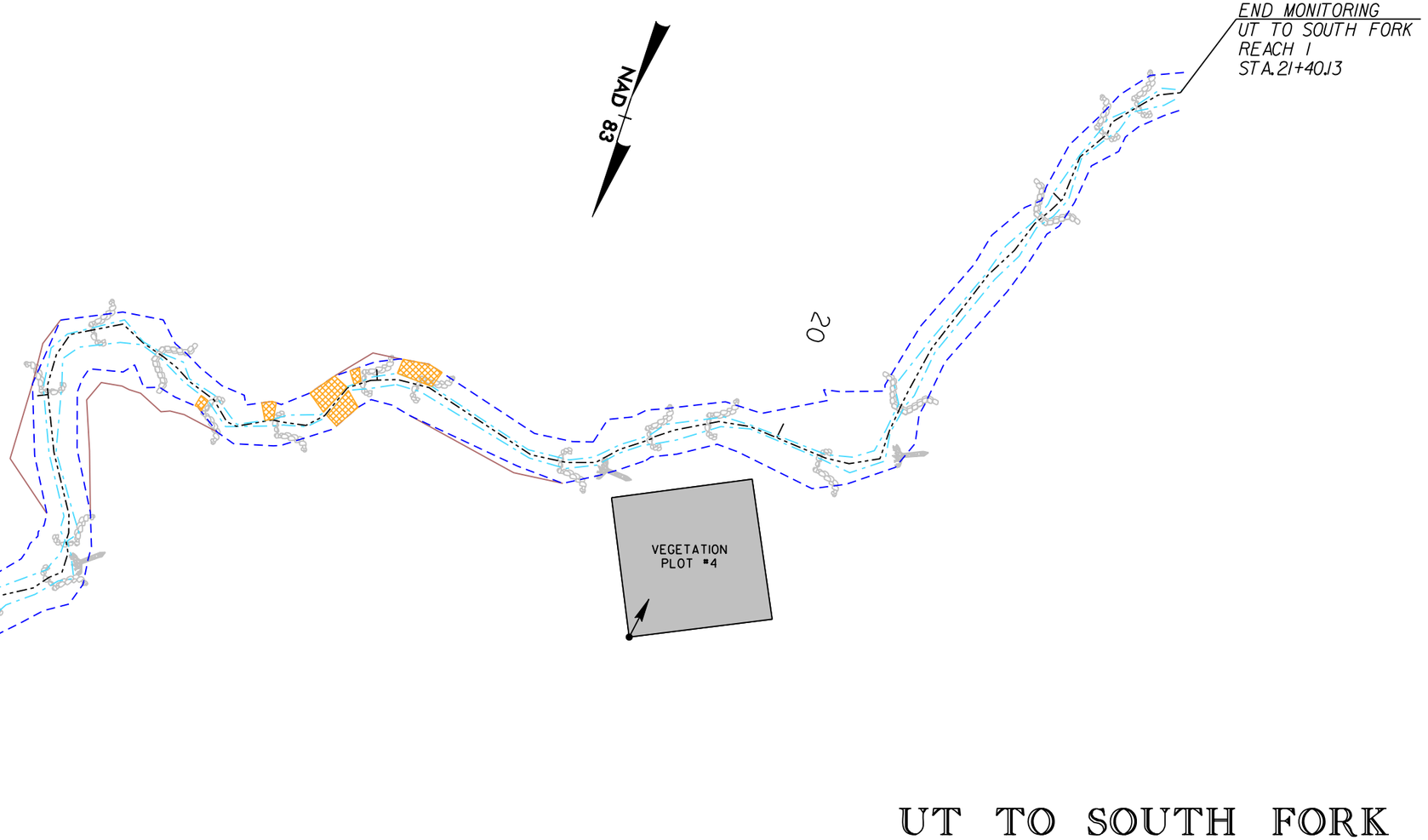
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	

10 0 30
SCALE



UT TO SOUTH FORK
REACH 1

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

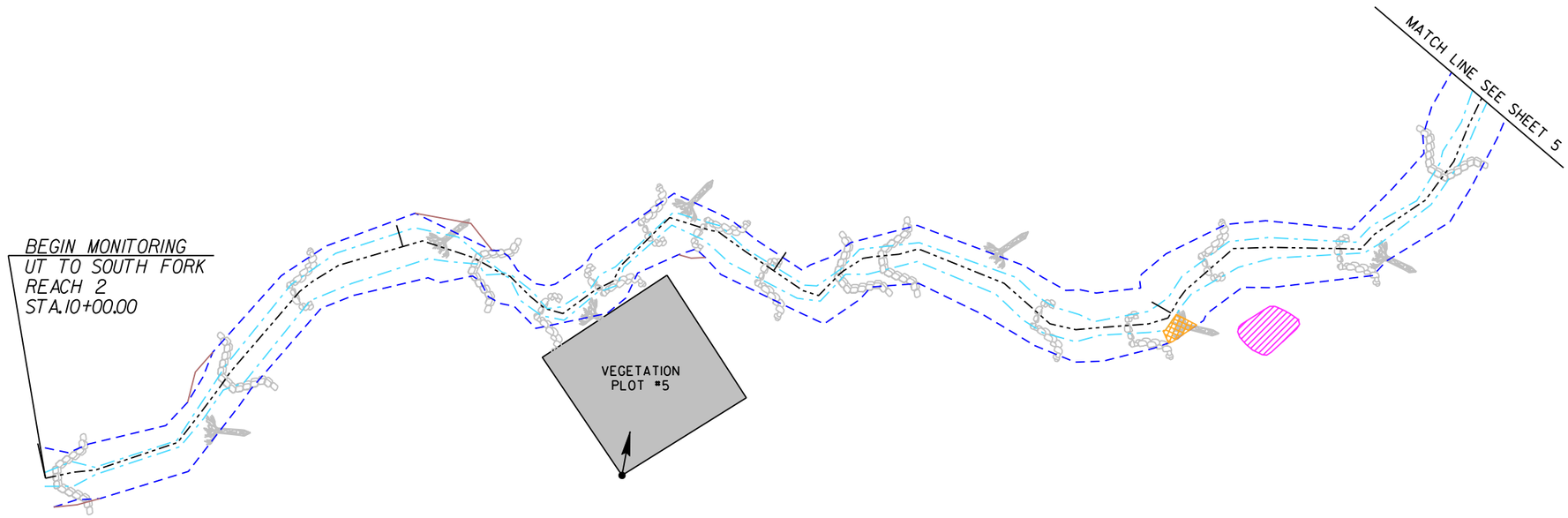
PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	4
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

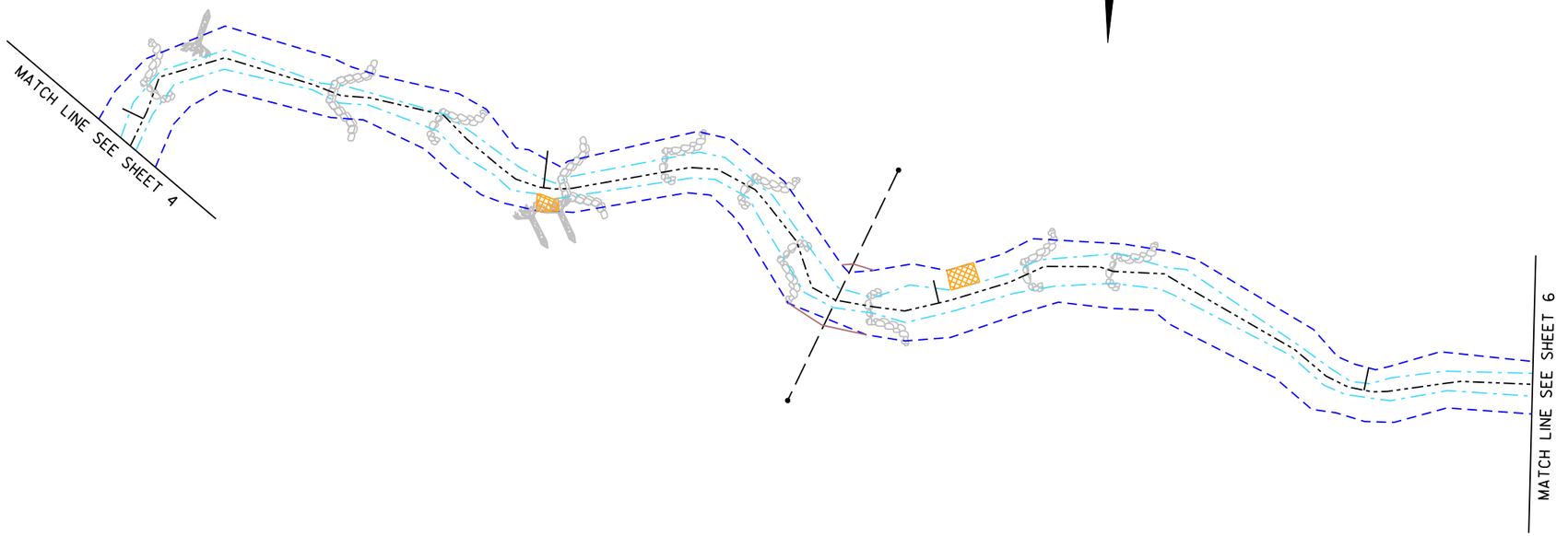
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	5
PROJECT ENGINEER	

10 0 30
SCALE

15

NAD 83



UT TO SOUTH FORK REACH 2

LEGEND

THALWEG 2007
EDGE OF WATER 2007
BANKFULL 2007
TOP OF BANK 2007
CROSS-SECTIONS
PHOTO POINT

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BANK - MODERATE
BARE BANK - SEVERE
BARE BENCH
BARE FLOODPLAIN
INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

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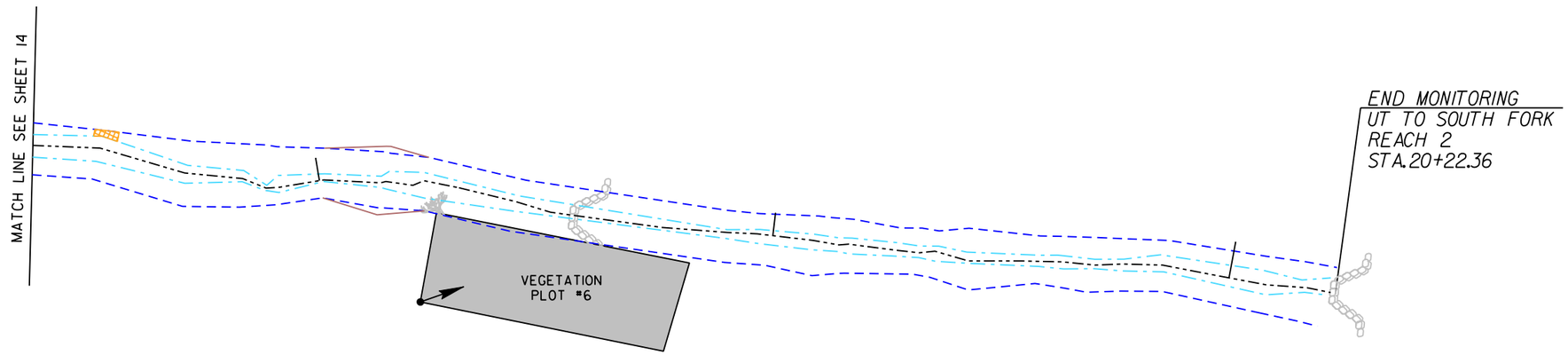
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83

20



UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

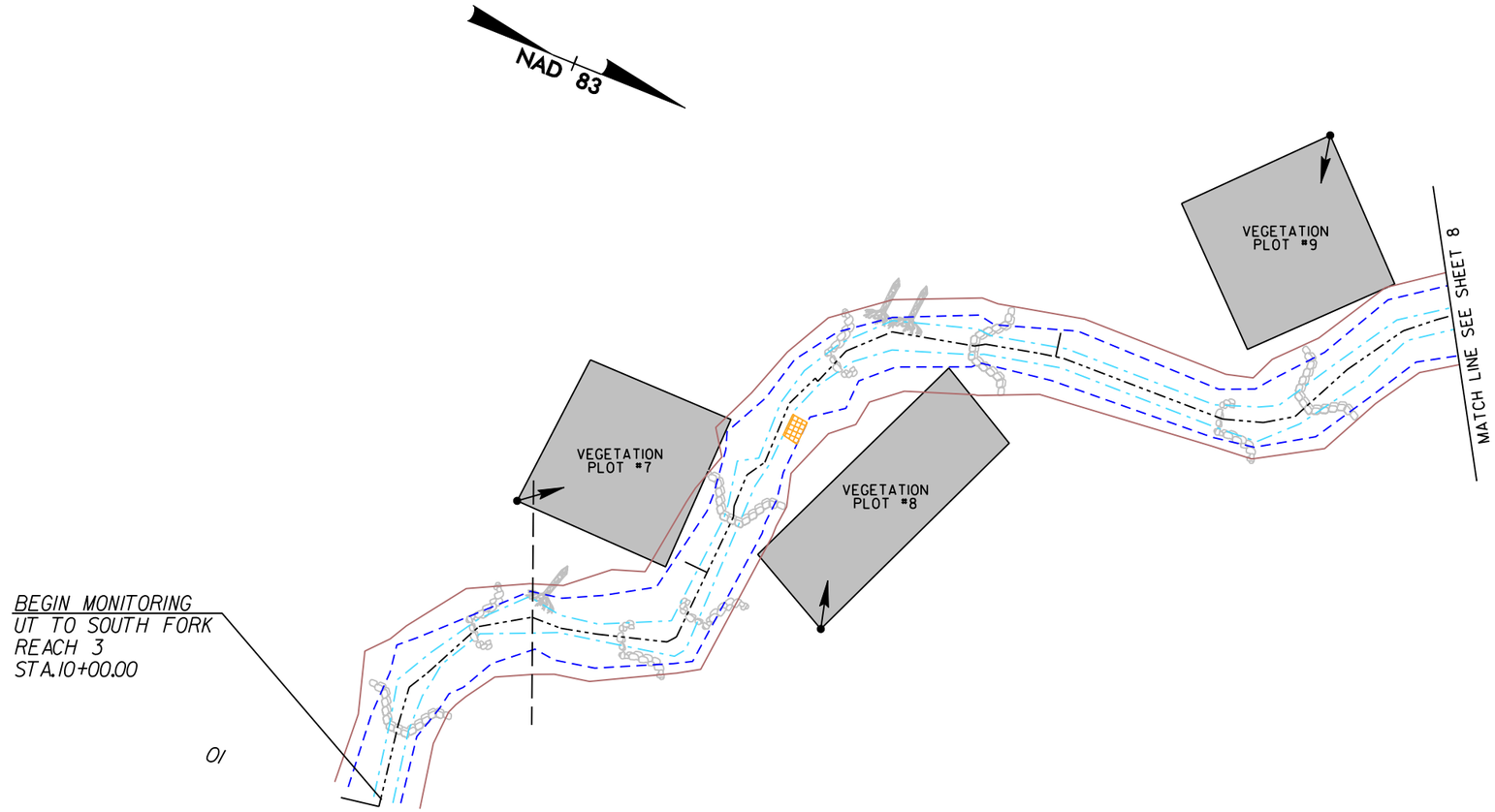
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

10 0 30
SCALE



UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

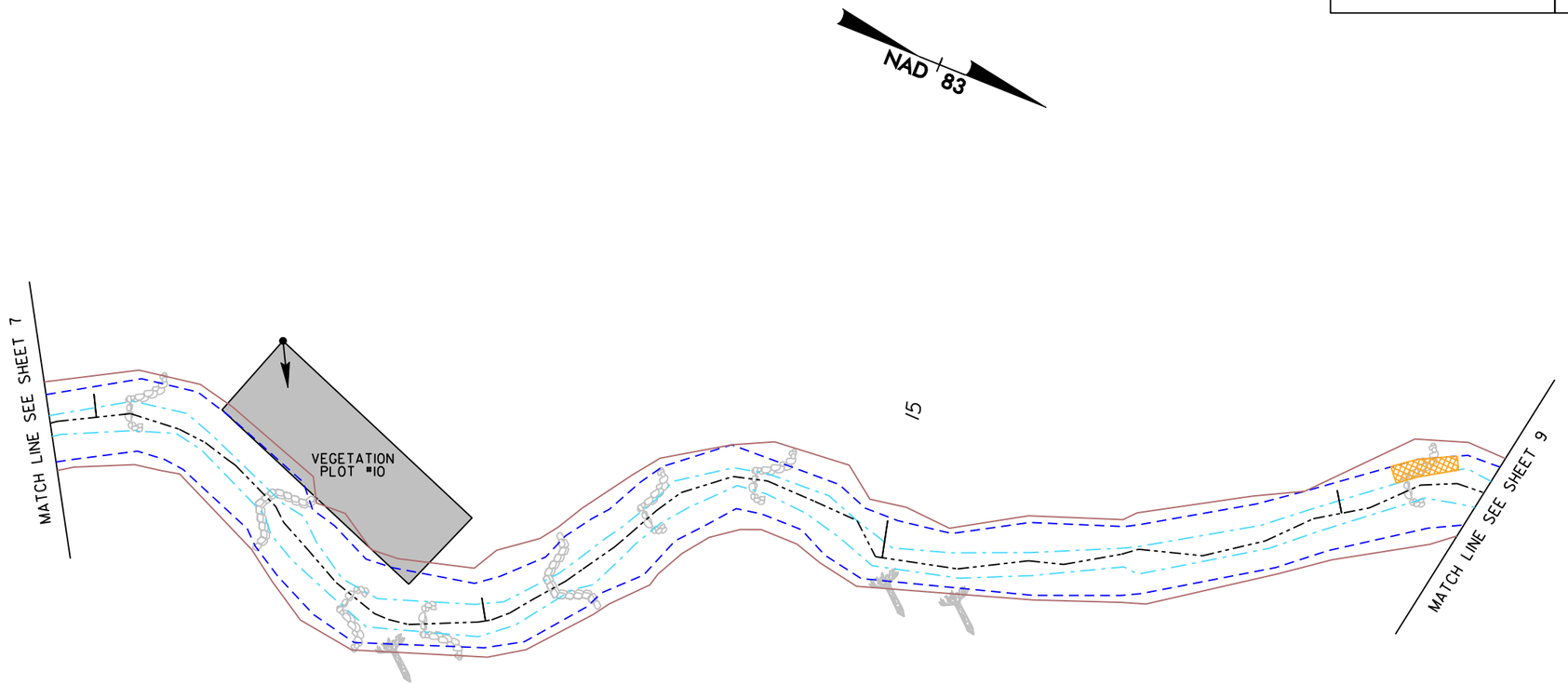
PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07

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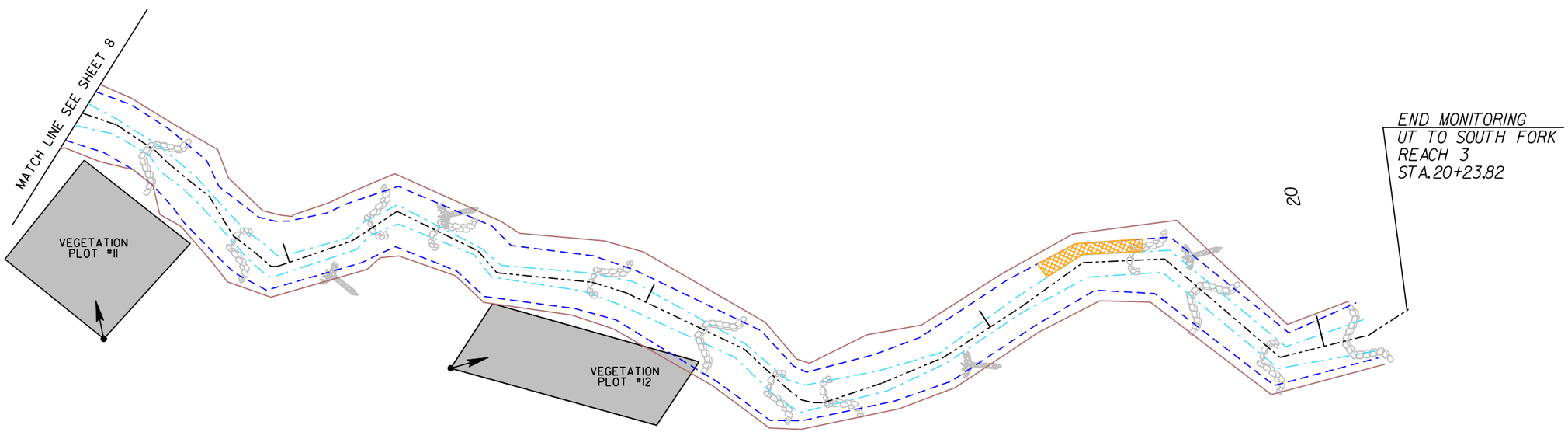
PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



LEGEND

- THALWEG 2007
- EDGE OF WATER 2007
- BANKFULL 2007
- TOP OF BANK 2007
- CROSS-SECTIONS
- PHOTO POINT

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BANK - MODERATE
- BARE BANK - SEVERE
- BARE BENCH
- BARE FLOODPLAIN
- INVASIVE/EXOTIC (MICROSTEGIUM)

UT TO SOUTH FORK REACH 3

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 2

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 4/25/07