UT to Barnes Creek
Stream and Wetland Restoration Project
Project No. 397
2010 Monitoring Report: Year 5 of 5

April 2011

Prepared for: NCDENR-EEP
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Ecosystem Enhancement PROGRAM

NCDENR

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EXECUTIVE SUMMARY

SECTION 1
EXECUTIVE SUMMARY

The Unnamed Tributary (UT) to Barnes Creek Stream and Wetland Restoration Project (Site) is located north of the Town of Troy in Montgomery County, North Carolina (Appendix 1.1). The Site is located within the Carolina Slate Belt Ecoregion of the Piedmont physiographic region in the Yadkin River Basin (USGS HUC 03040103). The stream enhancement/restoration plan was designed by Baker Engineering and constructed by North State Environmental, Inc. Construction activities were completed in December 2005. The first annual monitoring activities were conducted in October 2006. This report serves as year five of the five year monitoring plan for the Site.

1.1 Goals and Objectives

Prior to restoration, wetland, stream, and buffer functions on the site were impaired as a result of agricultural conversion. Streams flowing through the site were channelized many years ago to reduce flooding and provide drainage for adjacent farm fields. According to the mitigation plan, the Site was restored by relocating 3,916 linear feet (lf) of stream (Priority 1 and 2) and enhancing 4.44 acres (ac) of wetlands. The Site's riparian areas were planted to improve habitat and stabilize streambanks. The following specific goals were established for the Site (The lf and ac listed in the project goals below are not the same as the final as-built lf and ac for stream and wetland restoration/enhancement work completed).

1. Restore 4,063 lf of channel dimension, pattern, and profile (as built conditions included restoration of 3,916 lf).
2. Enhance 3.14 ac of existing wetlands by planting vegetation in previous grazed wetland areas.
3. Restore wetland hydrology to 1.38 ac of wetland by raising the water table, restoring over bank flooding, and increasing surface storage.
4. Create 0.39 acres of wetland as ephemeral pools in the existing stream bed after construction for the proposed meandering channel.
5. Improve floodplain functionality by matching floodplain elevations with the bankfull stage.
6. Establish native streambank and floodplain vegetation in the buffer.
7. Improve the water quality in the Barnes Creek watershed by fencing cattle out of the stream and reducing bank erosion.
8. Improve in-stream and riparian habitat by creating deeper pools, areas of re-aeration, planting a riparian buffer, and reducing bank erosion.

UT to Barnes stream channels were designed and constructed as C-type channels. In-stream structures, such as rootwads, log vanes, cross vanes, rock vanes, rock weirs, and log weirs were used to control streambed grade, reduce stress on streambanks, and promote bed form sequences and habitat diversity. Where grade control was a consideration, constructed riffles or rock weirs were installed to provide long-term stability. Streambanks were stabilized using a combination of erosion control matting, bare-root plantings, brush mattresses, and transplants. The Site was

planted with native riparian vegetation and the permanent conservation easement was fenced. Wetland restoration on the Site consisted of raising the local water table and restoring a natural flooding regime. Drainage ditches within the restoration areas were filled to decrease surface and subsurface drainage and raise the local water table.

Beaver were identified along the main channel and its tributary in the 2010 monitoring year. Multiple control efforts have been implemented over the last 2 years to control beaver activity. Beaver dams on the main channel and the tributary were removed in December 2010. Appendix 2 provides detailed project activity, history, contact information, and more in-depth watershed/site background for the project.

1.2 Vegetative Assessment

JJG conducted the 2010 (year 5 of 5) vegetative assessment and vegetative plot analysis in January 2011. Four vegetation monitoring plots 100 m^2 (10m x 10m) in size were previously established on site by Baker Engineering. Vegetation assessments were conducted following the NCDOT Stem Counting Protocol which consists of counting woody stems within the established vegetation plots. Vegetation success criteria, as defined in the mitigation plan, specifies that woody planted stems from vegetation monitoring plots should display a surviving tree density of at least 320 trees per acre at the end of the third year of monitoring, and a surviving tree density of at least 260 five year-old trees per acre at the end of the five year monitoring period.

The 2010 vegetation monitoring indicated an average survivability of 395 stems per acre, which is greater than the required vegetation survival criteria of 260 stems per acre at the end of the five year monitoring period. Based on the survival rates illustrated over the years and the number of volunteer species found within the plots, JJG foresees the plant growth to continue to improve and meet the success requirements in the future. Volunteer species improve the average stem per acre from 395 to 658 for monitoring year five. Based on the previous statement, all four plots have met the success criteria for year five. The monitoring data indicate an average of 17 planted stems per plot.

In conclusion, the riparian restoration project meets the requirements per the vegetative success criterion for the 2010 monitoring year. Refer to Appendix 3 for more detailed vegetation data and photos.

1.3 Stream Assessment

Stream dimension, pattern, profile, and substrate were evaluated within 3,916 linear feet of the Site. Results from the 2010 stream monitoring effort indicate that stream pattern, profile, and dimension of UT Barnes and its tributary are maintaining vertical and lateral stability with minimal problem areas. A few problem areas were observed, such as moderate bank erosion, in-stream vegetation, beaver dams, and inundation/back water areas. The beaver dams on the main channel and the tributary were removed in December 2010. In areas where beaver have not impacted the hydrology and the channel was visible, the pattern, profile, and dimension of the restored main channel and its tributary appear stable.

Main Channel

Overall, the present stream dimensions in the main channel appear to be stable. The average bankfull width (18.5 ft) of the surveyed cross-sections is similar to the proposed 18.8 ft, and the average surveyed mean bankfull depth is 1.6 ft compared to the proposed 1.4 ft. The surveyed bankfull widths and depths lead to an average Width/Depth ratio of 12.8, which typifies a Rosgen C-type stream. The channel appears to be functioning properly, and it appears that beaver activity has not impacted the channel hydrology.

The reach appears to be maintaining vertical and lateral stability with minimal bank erosion. The main channel's bank stability rating is 100%. The streambank areas noted with minimal bank erosion do not appear to be impacting the channel's stability. The bank erosion is occurring in small, localized areas and is considered to be normal. Areas with in-stream vegetation growth could potentially result in localized areas of aggradation; therefore leading to lateral and/or vertical shifts in the stream, but this has not resulted in significant adjustments in the bed features and channel thalweg over the 5 years of annual monitoring. The thalweg profile appears to be stable, and was characterized by well-defined riffle and pool features. The average water surface slope and the average bankfull slope were very similar for the surveyed reach, 0.0052 ft/ft and 0.0048 ft/ft, respectively. From the 2010 monitoring year, the substrate analysis illustrates minimal shifting in bed materials. Generally the d50 and d84 is coarsening in riffle cross-sections, which is indicative of the fines being flushed out that most likely deposited due to the back water conditions resulting from recurring beaver activity within the restoration site in the previous monitoring years.

Tributary

The channel has been impacted by beaver activity over the recent monitoring years but is free-flowing at this time. The average bankfull width (10.1 ft) of the surveyed cross-sections is lower than the proposed 14.4 ft, and the average surveyed mean bankfull depth is 1.0 ft compared to the proposed 0.7 ft. The surveyed bankfull widths and depths lead to an average Width/Depth ratio of 10.5, which is smaller than in previous monitoring years. This shift to a narrower channel with a smaller W/D ratio is probably due to the establishment of vegetation and the removal of beaver dams. The channel is stable and is functioning appropriately with its current dimension. The average water surface slope and the average bankfull slope were very similar for the surveyed reach, 0.0094 ft/ft and 0.0090 ft/ft, respectively.

The substrate analysis illustrates a shift in bed materials to a coarser substrate composition. Compared to last year's data, the substrate has become coarser. This shift is most likely due to the fines which were deposited because of the back water created by the beaver dams being flushed from the system.

Two crest gauges are located within the project site. No bankfull events were recorded within the restoration project during the 2010 monitoring year due to the malfunction of both gauges. However, visual observation indicates at least one bankfull event probably occurred within the 2010 monitoring year. The on-site crest gauge documented the occurrence of two bankfull

events during the first year (2006) of the post-construction monitoring period. No bankfull events were recorded or observed during the 2007 monitoring, which was conducted from August through November 2007. Other indicators such as old wrack lines and staining were observed at the bankfull and greater elevations within the restoration site as well. The Site has met the hydrologic success criteria with two bankfull events occurring in two separate monitoring years.

Overall, the main channel appears to be maintaining grade with stable structures and minimal bank erosion and has met the year five success criteria. The tributary appears to be maintaining vertical and lateral stability; and the stream has narrowed up and has a smaller W/D ratio, most likely due to vegetation establishment stabilizing the streambanks and retaining sediment. Due to beaver activity throughout the 5 year monitoring period, time will be needed for this stream to function as a fluvial system under conditions more similar to a normal flow regime before reaching its full designed potential. The tributary has met the year five success criteria. Please refer to Appendix 4 for more detailed stream data tables and plots and Appendix 1.2 for the location of the longitudinal profile stations, cross-section stations, vegetation plots, photo points, gauges, and problem areas noted.

1.4 Wetland Assessment

Eight groundwater gauges were installed across the restored site during 2006 and 2008 to document water table hydrology in the required monitoring locations. The groundwater gauges are programmed to download groundwater levels daily and were downloaded monthly from March to November in order to capture hydrological data during the growing season. The target wetland hydrological success criterion is saturation or inundation for at least 12.5 percent of the growing season in the lower landscape (floodplain) positions. To achieve the above hydrologic success criterion, groundwater levels must be within 12-inches of the ground surface for 30 consecutive days, which is 12.5 percent of the March 19 to November 16 (243 days) growing season.

The general success of hydrology within the wetland restoration zones is adequate to meet success requirements. Four of the eight groundwater gauges achieved the wetland success criterion of soil saturation within the upper 12 inches for 30 consecutive days during MY5. Three gauges did not meet the success criteria, and one gauge (MW2) was found to be malfunctioning and has been replaced. Surface inundation to ground saturation was observed throughout the site; therefore, appropriate hydrological condition for the wetland zones appears to be present. Over the past five years of monitoring, indications are that the wetland zones are generally functioning as anticipated.

With the exception of the previous beaver activity and their possible impact on the water inundation levels within the wetland areas in some monitoring years, no problem areas were observed within the wetland restoration zones for the Site. Hydrophytic vegetation consists of a thick herbaceous layer of sedge species (*Carex sp.*), rush species (*Juncus sp.*), and smartweed species (*Polygonum sp.*). The planted woody stem species throughout the wetland areas are meeting the required success criteria; however, mortality of woody stems due to beaver chews has been observed. It is suspected that the mortality of planted stems may also be subject to the

planting technique or the soil conditions prior to planting. Please refer to Appendix 5 for wetland raw data tables and plots.

1.5 Annual Monitoring Summary

Overall, the Site appears to be stable and has met stream, vegetation, wetland, and hydrologic mitigation goals for monitoring year 5. Planted and naturally recruited vegetation is doing well at the site, although some minor vegetation problems were noted due to the severe drought experienced during the 2007 growing season and the on-going beaver activity. The pattern, profile, and dimension of the main channel and tributary appear to be maintaining vertical and lateral stability with stable structures and minimal bank erosion. A final closeout report for the UT Barnes Stream and Wetland Restoration will be prepared within 30 days of this report.

The following general observations were noted in Monitoring Year 2010:

Stream Restoration

Moderate bank scour has occurred over the past 5 years along the main channel (approximate stationing 26+25), but does not appear to be advancing.
One log-vane has bank scour occurring behind the root ball of the log (approximate stationing 27+00), but this does not appear to be advancing.
Upstream from the old beaver dam (approximate station 5+25), there is heavy sediment deposition along the tributary.

Riparian and Wetland Areas

The following general observations were noted regarding the riparian area and associated vegetation.

Herbaceous seeding appears to provide adequate soil cover.
Briars and multiflora rose are a dominant species along the creek, which has crowded out some of the planted species.

The background information provided in this report is referenced from the mitigation plan and previous monitoring reports prepared by Baker Engineering (2007) and RK&K (2008). Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

SECTION 2
METHODOLOGY

SECTION 2
METHODOLOGY

2.1 Methodology

Methods employed for the UT Barnes Stream Restoration Project were a combination of those established by standard regulatory guidance and procedure documents as well as previous monitoring reports completed by Baker Engineering and RK&K, LLP. Geomorphic and stream assessments were performed following guidelines outlined in the Stream Channel Reference Sites: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in the Stream Restoration a Natural Channel Design Handbook (Doll et al, 2003). Vegetation assessments were conducted following the NCDOT protocol which consists of counting woody stems within the established vegetation plots. JJG used the *Flora of the Carolinas, Virginia, Georgia, and surrounding areas* by Alan S. Weakley as the taxonomic standard for vegetation nomenclature for this report. Precipitation data for the hydrographs was obtained from both on-site and off-site resources. Off-site daily precipitation was obtained from Weather Underground for the Albemarle, NC weather station (the nearest offering daily precipitation data) through the following URL.

http://waterdata.usgs.gov/nwis/dv?cb_00060=on&cb_00065=on&cb_00045=on&format=html&begin_date=2008-01-01&end_date=2009-12-31&site_no=02118500&referred_module=sw.

SECTION 3
REFERENCES

SECTION 3
REFERENCES

Baker Engineering. 2007. UT Barnes Stream and Wetland Restoration 2007 Annual Monitoring Report (Year 1). Charlotte, NC.

Doll, B.A., Grabow, G.L., Hall, K.A., Halley, J., Harman, W.A., Jennings, G.D., and Wise, D.E., 2003. Stream Restoration A Natural Channel Design Handbook.

Harrelson, Cheryl C; Rawlins, C.L.; Potyondy, John P. 1994. *Stream Channel Reference Sites: An Illustrated Guide to Field Technique.* Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

Rosgen, D L. 1996. Applied River Morphology. Wildland Hydrology Books, Pagosa Springs, CO.

Rummel, Klepper & Kahl, LLP. 2008. UT Barnes Stream and Wetland Restoration 2007 Annual Monitoring Report (Year 2). Raleigh, NC.

Weakley, A.S. 2008. *Flora of the Carolinas, Virginia, Georgia, Northern Florida, and Surrounding Areas* (Draft April 2008). University of North Carolina at Chapel Hill: Chapel Hill, NC.

SECTION 4
APPENDICES

Appendix 1 - General Figures and Plan Views

Appendix 2 - General Project Tables

Appendix 3 - Vegetation Assessment Data

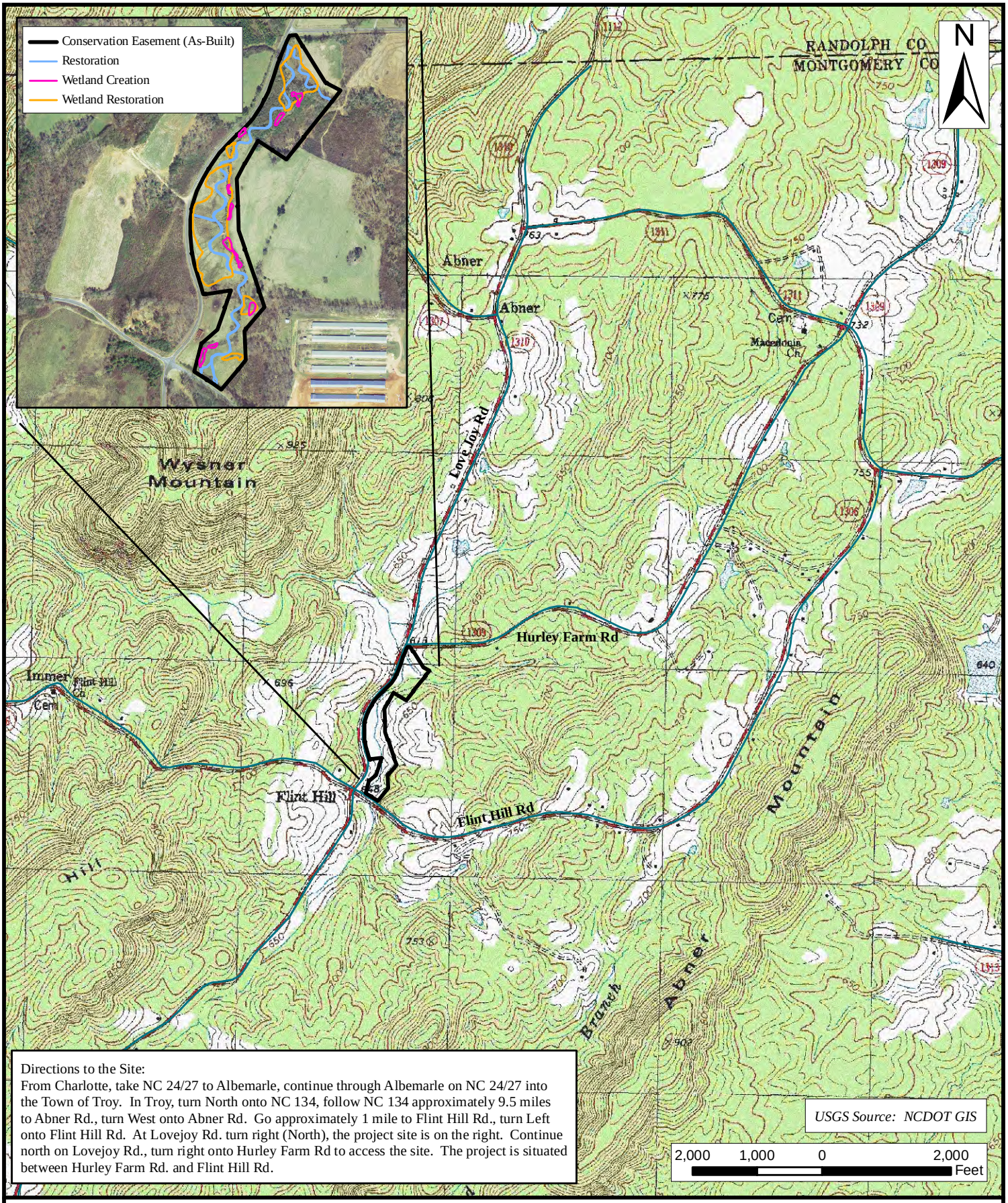
Appendix 4 – Stream Assessment Data

Appendix 5 – Wetland Assessment Data

APPENDIX 1
GENERAL FIGURES AND PLAN VIEWS

1. Project Location Map

2. Current Condition Plan View



Appendix 1.1 Project Vicinity Map
UT to Barnes Stream and Wetland Restoration/EEP Project No. 397
Montgomery County, NC
Monitoring Year 5 of 5
Submittal Date: April 2011

Ecosystem Enhancement PROGRAM

NOTES:
1. GENERAL SITE DATA PROVIDED BY NCEEP.
2. ALL LOCATIONS ARE APPROXIMATE.
3. AERIAL IMAGE FROM NCDOT 1995

PROJECT NO. 397
MONTGOMERY COUNTY
NORTH CAROLINA
MONITORING
YEAR 5 of 5

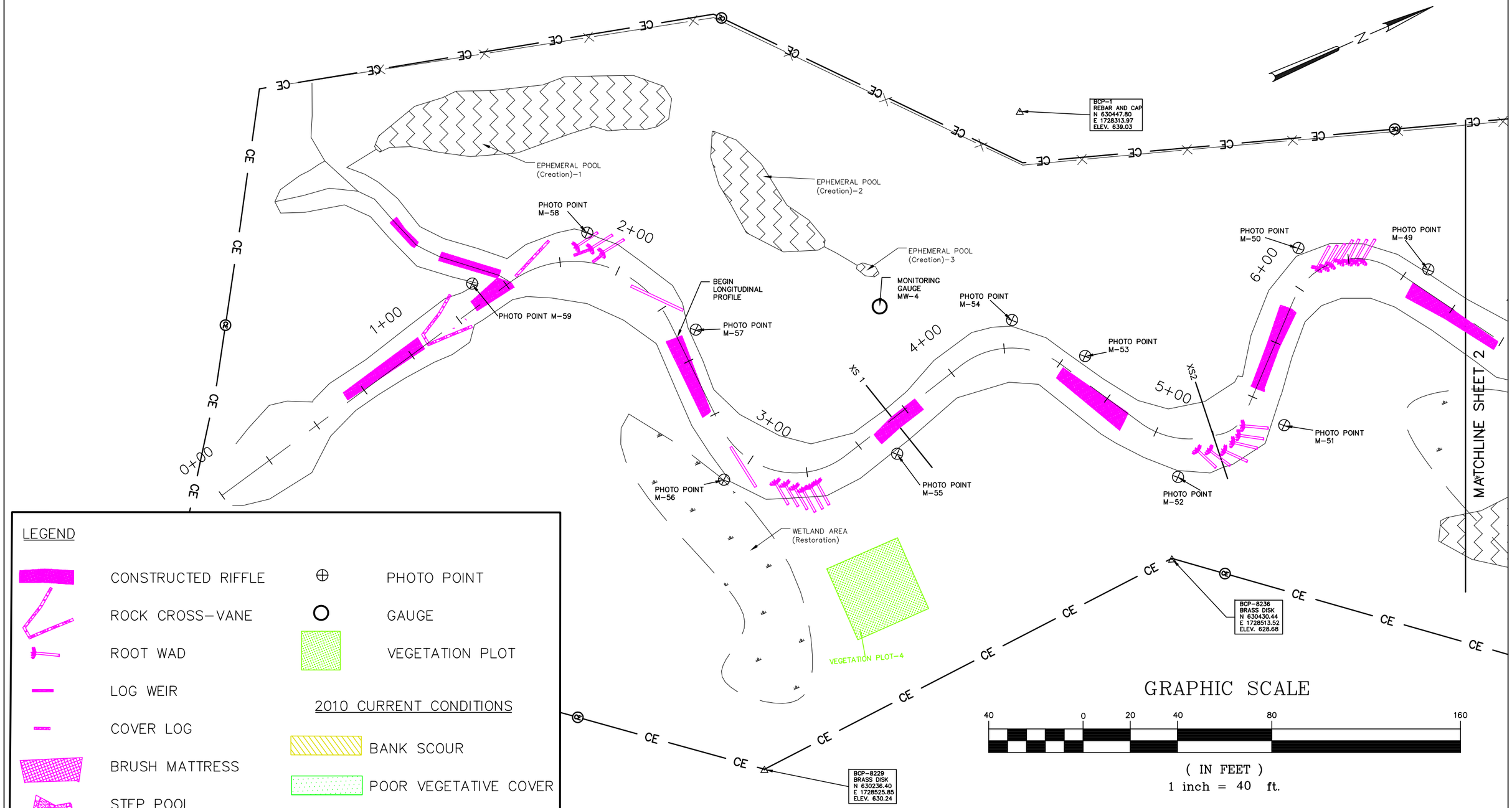
JACOBS JJG

NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"= 200'
JOB NO.: JJX31100

FIGURE KEY



LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATIVE COVER

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

NOTES:
1. GENERAL SITE DATA PROVIDED BY NCEEP.
2. ALL LOCATIONS ARE APPROXIMATE.

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MONTGOMERY COUNTY
NORTH CAROLINA
MONITORING
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NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 1 OF 6

LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATIVE COVER

MATCHLINE SHEET 1

MATCHLINE SHEET 3

CE

7+00

8+00

9+00

10+00

11+00

12+00

13+00

MONITORING GAUGE MW-3

MONITORING GAUGE MW-2

RAIN GAUGE

PHOTO POINT M-48

PHOTO POINT M-47

PHOTO POINT M-46

PHOTO POINT M-45

PHOTO POINT M-44

PHOTO POINT M-43

PHOTO POINT M-42

PHOTO POINT M-41

PHOTO POINT M-40

PHOTO POINT M-39

PHOTO POINT M-38

PHOTO POINT M-37

VEGETATION PLOT-3

WETLAND AREA (Restoration)

EPHEMERAL POOL (Creation)-4

EPHEMERAL POOL (Creation)-5

BCP-633
REBAR AND CAP
N 631058.60
E 1728464.87
ELEV. 619.89

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

NOTES:
1. GENERAL SITE DATA PROVIDED BY NCEEP.
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PROJECT NO. 397
MONTGOMERY COUNTY
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MONITORING
YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 2 OF 6

EXISTING FEATURES LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATIVE COVER

PHOTO POINT M-38
PHOTO POINT M-37
AUTOMATIC GAUGE AW-4
WETLAND AREA (Restoration)
PHOTO POINT M-34
PHOTO POINT M-33
MONITORING GAUGE MW-1
PHOTO POINT M-29
AUTOMATIC WELL AW-3
PHOTO POINT M-28
PHOTO POINT M-25
PHOTO POINT M-24
PHOTO POINT M-26
PHOTO POINT M-27
PHOTO POINT M-23
PHOTO POINT M-21
PHOTO POINT M-22
PHOTO POINT M-35
PHOTO POINT M-36
PHOTO POINT M-32
PHOTO POINT M-30
PHOTO POINT M-31
EPHEMERAL POOL (Creation)-5
EPHEMERAL POOL (Creation)-6
EPHEMERAL POOL (Creation)-7
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
XS 3
XS 4
MATCHLINE SHEET 2
MATCHLINE SHEET 4
CE

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTES:
1. GENERAL SITE DATA PROVIDED BY NCEEP.
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PROJECT NO. 397
MONTGOMERY COUNTY
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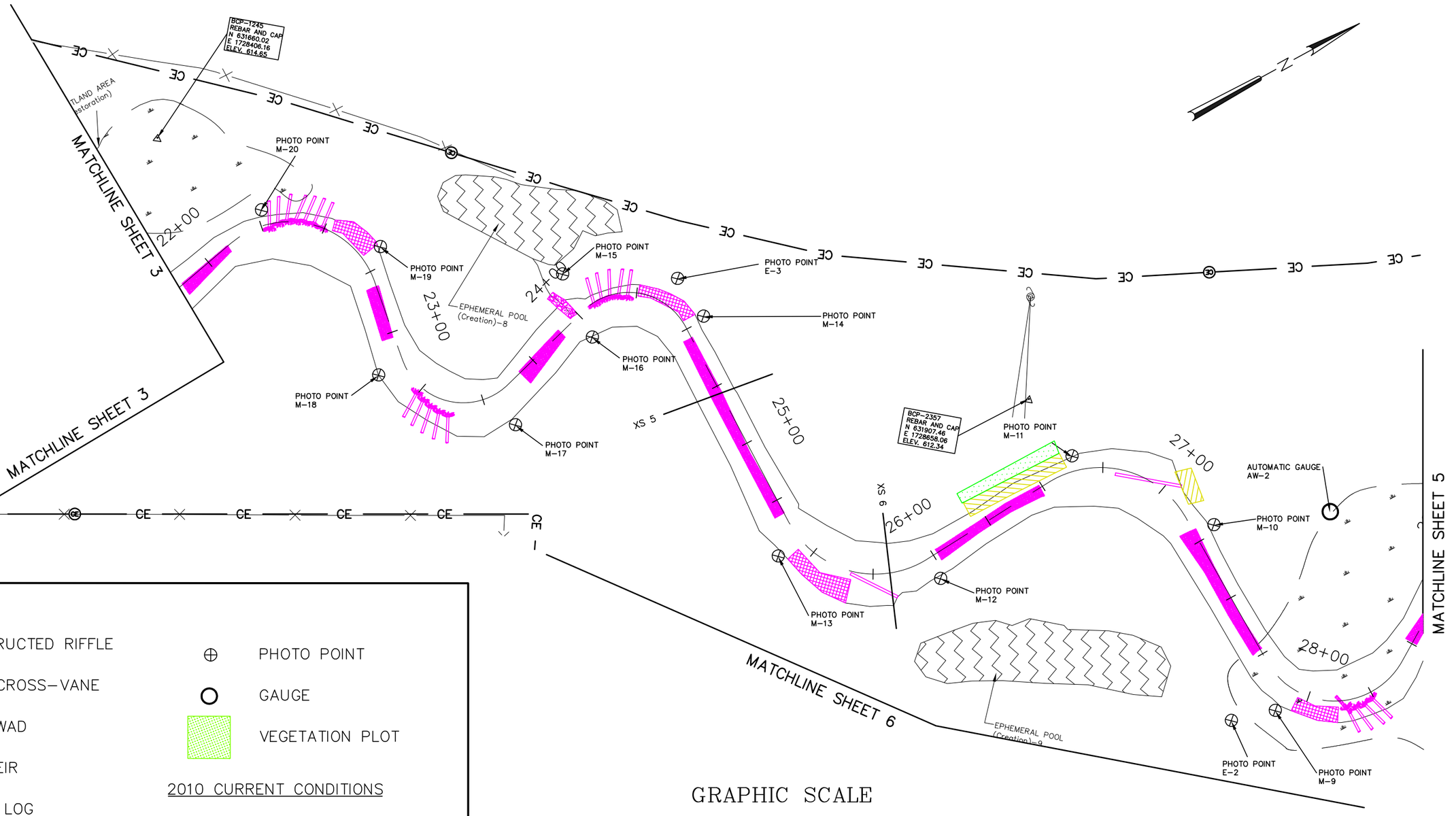
NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 3 OF 6



LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATION COVER

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

NOTES:
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PROJECT NO. 397
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YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

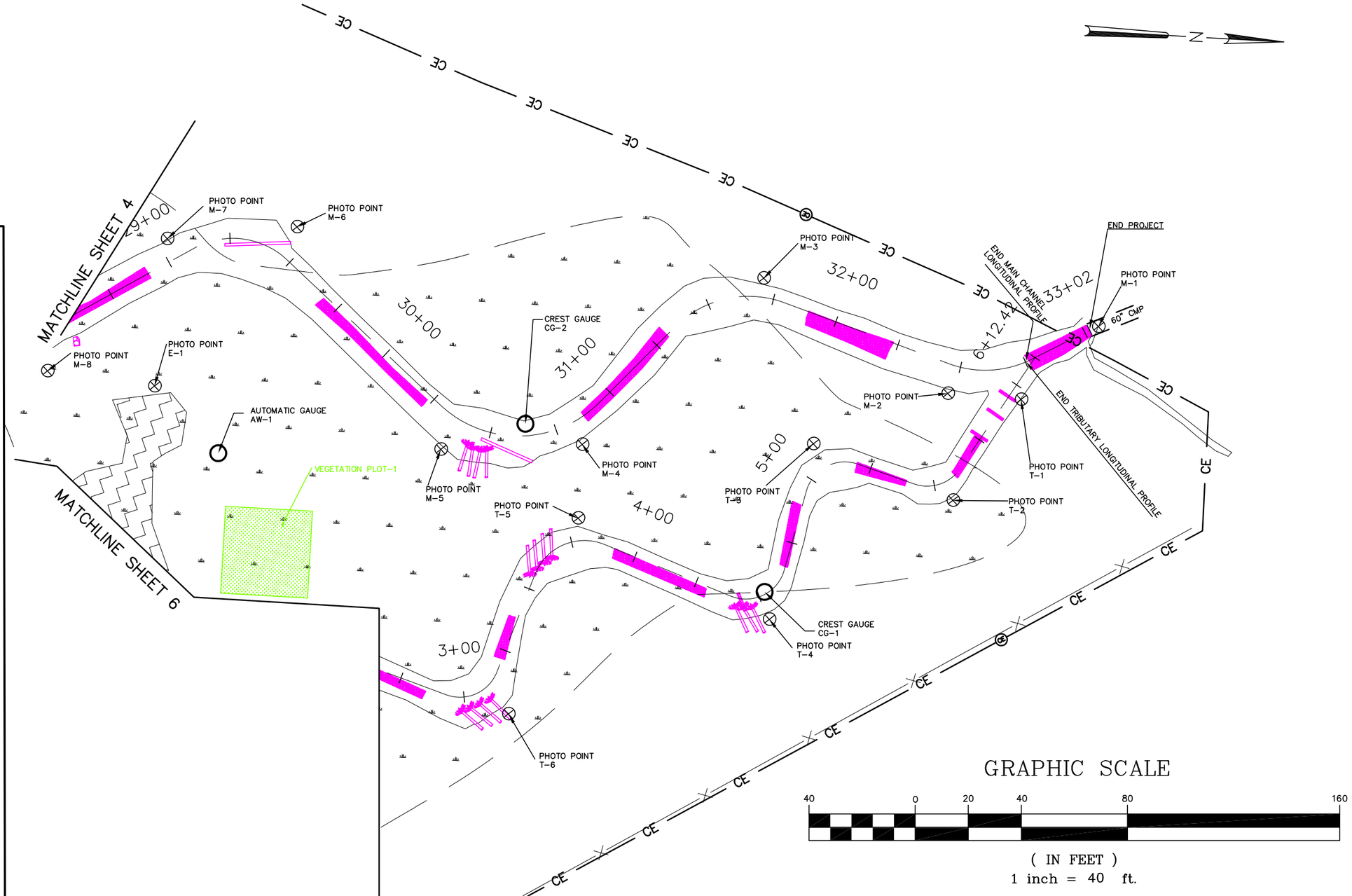
FIGURE 4 OF 6

EXISTING FEATURES LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATION COVER



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

NOTES:
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PROJECT NO. 397
MONTGOMERY COUNTY
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NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 5 OF 6

LEGEND

- CONSTRUCTED RIFFLE
- ROCK CROSS-VANE
- ROOT WAD
- LOG WEIR
- COVER LOG
- BRUSH MATTRESS
- STEP POOL
- PHOTO POINT
- GAUGE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- POOR VEGETATION COVER

N

MATCHLINE SHEET 4

MATCHLINE SHEET 5

EPHEMERAL POOL (Creation)-10

WETLAND AREA (Restoration)

PHOTO POINT T-7

PHOTO POINT T-8

PHOTO POINT T-9

PHOTO POINT T-10

PHOTO POINT T-11

2+00

1+00

0+00

XS 8

XS 7

BEGIN TRIBUTARY LONGITUDINAL PROFILE

VEGETATION PLOT-2

CE

BCP-16ST
REBAR AND CAP
E 532072.39
N 179074.96
ELEV. 616.18

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
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NC ECOSYSTEM ENHANCEMENT PROGRAM
UT BARNES STREAM AND WETLAND RESTORATION

CURRENT CONDITION PLAN VIEW

DATE : APRIL 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 6 OF 6

APPENDIX 2
GENERAL PROJECT TABLES

2.1. Project Mitigation Structure and Objectives

2.2. Project Activity and Reporting History

2.3. Project Contacts

2.4. Project Attribute Table

Table 2.1 Project Mitigation Structures and Objectives
UT to Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

Segment/Reach	Mitigation Type	Approach	Linear Footage or Acres	Stationing (ft)	Comments
Main Channel	R	P1/ P2	3,305 lf	0+00-33+05	Channel restoration, relocation with use of grade control and bank protection structures.
Tributary	R	P2	611 lf	0+00-6+11	Channel restoration, relocation with use of grade control and bank protection structures.
Wetland Enhancement	E	---	4.44 ac	---	Enhancement of jurisdictional wetland.

Component Summations						
		Wetland (ac)				
Restoration Level	Stream (lf)	Riparian	Non-Riparian	Upland (ac)	Buffer (ac)	BMP
Restoration (R)	3,916	N/A	N/A	N/A	N/A	N/A
Enhancement (E)	N/A	4.44	N/A	N/A	N/A	N/A
Enahncement I (E)	N/A	N/A	N/A	N/A	N/A	N/A
Enhancement II (E)	N/A	N/A	N/A	N/A	N/A	N/A
Creation (C)	N/A	N/A	N/A	N/A	N/A	N/A
Preservation (P)	N/A	N/A	N/A	N/A	N/A	N/A
HQ Preservation (P)	N/A	N/A	N/A	N/A	N/A	N/A
Totals	**3,916**	**4.44**	**N/A**	**N/A**	**N/A**	**N/A**

*The final linear footage and acreage listed above is based on the as-built values constructed on-site.

Table 2.2 Project Activity and Reporting History
UT Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

Elapsed Time Since Grading Complete	**4 yrs 11 months**
Elapsed Time Since Planting Complete	**4 yrs 11 months**
Number of Reporting Years	**5**

Activity or Report	Data Collection Completed	Actual Completion or Delivery
Restoration Plan	NA	N/A
Final Design-90%	NA	Jul-05
Construction	NA	Mar-06
Temporary S&E mix applied to entire project area*	NA	Mar-06
Permanent seed mix applied to entire project area	NA	Mar-06
Planting of live stakes and bare root trees	NA	Mar-06
Mitigation Plan/ As-Built (Year 0 Monitoring)	Jun-06	Jul-06
Year 1 Monitoring	Oct-06	Mar-07
Year 2 Monitoring	Nov-07	Mar-08
Year 3 Monitoring	May-08	Mar-09
Year 4 Monitoring	Aug-09	Dec-09
Year 5 Monitoring	Jun10-Feb11	Feb-11

*Seed and mulch is added as each section of construction is completed.

Table 2.3 Project Contacts Table
UT Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

Designer	Baker Engineering 1447 South Tryon, Suite 200 Charlotte, NC 28203
Construction	North State Environmental, Inc. 2889 Lowery Street Winston-Salem, NC 27101
Planting Contractor	North State Environmental, Inc.
Seeding Contractor	
Monitoring Performers	
Year 1	Baker Engineering 1447 South Tryon, Suite 200 Charlotte, NC 28203
Year 2	Rummel, Klepper & Kahl, LLP 900 Ridgefield Drive Suite 350 Raleigh, NC 27609
Year 3-Present	Jordan, Jones & Goulding 9101 Southern Pine Blvd., Suite 160 Charlotte, NC 28273
Stream Monitoring, POC	Alison Nichols, 704-527-4106 ext.227
Vegetation Monitoring, POC	
Wetland Monitoring, POC	

Table 2.4 Project Attribute Table
UT Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

Project County	Montgomery County, North Carolina
Drainage Area:	
UT to Barnes (Main Channel)	2.0 sq.mi.
Tributary	0.18 sq.mi.
Drainage impervious cover estimate:	
UT to Barnes (Main Channel)	<5%
Tributary	<5%
Stream Order:	
UT to Barnes (Main Channel)	2nd
Tributary	1st
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Rosgen Classification of As-built:	
UT to Barnes (Main Channel)	C
Tributary	C
Cowardin Classification	Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel
Dominant Soil Types:	
UT to Barnes (Main Channel)	Chenneby Silt Loam and Herndon Silt Loam
Tributary	Chenneby Silt Loam
Reference site ID	Spencer Creek and UT to Spencer Creek
USGS HUC for Project	304010305
NCDWQ Sub-basin for Project and Reference	03-07-09
NCDWQ classification for Project and Reference	C
Any portion of any project segment 303d list?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reason for 303d listing or stressor?	N/A
% of project easement fenced?	1

APPENDIX 3
VEGETATION ASSESSMENT DATA

3.1. Vegetation Plot Mitigation Success

3.2. Vegetation Monitoring Plot Photos

3.3. Vegetation Plot Summary Data Table

3.3. Vegetation Condition Assessment

Appendix 3.1 Vegetation Plot Mitigation Success
UT Barnes Stream and Wetland Restoration/EEP
Monitoring Year 5 of 5

Vegetation Plot ID	Vegetation Survival Threshold Met
	(Y/N)
Plot 1	Y
Plot 2	Y
Plot 3	Y
Plot 4	Y

Vegetation Plot 1
(1/2011)

Vegetation Plot 2
(1/2011)

Vegetation Plot 3
(1/2011)

Vegetation Plot 4
(1/2011)

Prepared For:

Ecosystem Enhancement Program

Appendix 3.2 Vegetation Monitoring Plot Photos
UT to Barnes Stream and Wetland Restoration/EEP Project No. 397
Monitoring Year 5 of 5
Submittal Date: April 2011

Prepared by:

JJG

Appendix 3.3 Vegetation Plot Summary Data Table
UT Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

			Current Data (MY5-2010)								Annual Means									
			Plot 1		Plot 2		Plot 3		Plot 4		Current Mean		MY1 - 2006		MY2 - 2007		MY3 - 2008		MY4 - 2009	
Species	Common Name	Type	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
Acer rubrum	Red maple	T			2	2	1	1			**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
Betula nigra	River birch	T	1	1	2	2	2	2	4	5	**2**	**3**	**5**	**5**	**2**	**2**	**2**	**2**	**2**	**3**
Carya cordiformis	Bitternut hickory	T				2					**N/A**	**2**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Cornus amomum	Silky dogwood	S	1	1		3				2	**1**	**2**	**2**	**2**	**3**	**3**	**1**	**1**	**1**	**2**
Carpinus caroliniana	Ironwood	T/S							1	1	**1**	**1**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**
Lindera benzoin	Spicebush	T/S							1	1	**1**	**1**	**2**	**2**	**3**	**3**	**1**	**1**	**1**	**1**
Liquidambar styraciflua	Sweetgum	T				12					**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Liriodendron tulipifera	tuliptree	T			4						**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Nyssa sylvatica	Blackgum	T					1	1			**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Pinus sp.	Pine tree	T				3					**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Platanus occidentalis	Sycamore	T	3	3		3	2	2	4	4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Quercus falcata	Southern red oak	T			3	3					**3**	**3**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
Quercus lyrata	Overcup oak	T					1	1			**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Quercus sp	Oak species	T	1	2	1	1			1	3	**1**	**2**	**4**	**4**	**3**	**3**	**1**	**1**	**1**	**2**
Salix nigra	Black willow	T		1		1					**N/A**	**1**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**1**
Sambucus canadensis	Elderberry	T/S				1					**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**1**
Unknown	unknown species	T	2	1	1						**2**	**1**	**1**	**1**	**3**	**3**	**2**	**2**	**2**	**1**
		Plot Area (acres)	**0.0247**																	
		Species Count	**5**	**6**	**6**	**11**	**5**	**5**	**5**	**6**	**11**	**13**	**6**		**5**		**5**	**6**	**11**	**12**
		Stem Count	**8**	**9**	**13**	**33**	**7**	**7**	**11**	**16**	**17**	**22**	**14**		**11**		**9**	**12**	**17.25**	**19.5**
		Stems per Acre	**324**	**364**	**526**	**1336**	**283**	**283**	**445**	**648**	**395**	**658**	**567**		**445**		**354**	**486**	**354.3**	**516.2**

Appendix 3.4 Vegetation Condition Assessment
UT Barnes Stream and Wetland Restoration/EEP Project 397
Monitoring Year 5 of 5

Planted Acreage **10.2**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage*
Bare Areas	Very limited cover of both woody and herbaceous material.	0.1	0	0	0.00%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	0	0.00	0%
		Total	**0**	**0**	**0%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.				

Easement Acreage **16.8**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1000	0	0	0%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

APPENDIX 4
STREAM ASSESSMENT DATA

4.1. Stream Station and Cross-Section Photos

4.2. Qualitative Visual Stability Assessment

4.3. Verification of Bankfull Events

4.4. Cross-Section Plots and Raw Data Tables*

4.5. Longitudinal Plots and Raw Data Tables*

4.6. Pebble Count Plots and Raw Data Tables*

*Raw data tables have been provided electronically.

M-1 View Upstream
Main Channel (2/2011)

M-1 View Downstream
Main Channel (2/2011)

M-2 View Upstream
Main Channel (2/2011)

M-2 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-3 View Upstream
Main Channel (2/2011)

M-3 View Downstream
Main Channel (2/2011)

M-4 View Upstream
Main Channel (2/2011)

M-4 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-5 View Upstream
Main Channel (2/2011)

M-5 View Downstream
Main Channel (2/2011)

M-6 View Upstream
Main Channel (2/2011)

M-6 View Downstream
Main Channel (2/2011)

Prepared For: Ecosystem Enhancement Program	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	JJG

M-7 View Upstream
Main Channel (2/2011)

M-7 View Downstream
Main Channel (2/2011)

M-8 View Upstream
Main Channel (2/2011)

M-8 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-9 View Upstream
Main Channel (2/2011)

M-9 View Downstream
Main Channel (2/2011)

M-10 View Upstream
Main Channel (2/2011)

M-10 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-11 View Upstream
Main Channel (2/2011)

M-11 View Downstream
Main Channel (2/2011)

M-12 View Upstream
Main Channel (2/2011)

M-12 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-13 View Upstream
Main Channel (2/2011)

M-13 View Downstream
Main Channel (2/2011)

M-14 View Upstream
Main Channel (2/2011)

M-14 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-15 View Upstream
Main Channel (2/2011)

M-15 View Downstream
Main Channel (2/2011)

M-16 View Upstream
Main Channel (2/2011)

M-16 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-17 View Upstream
Main Channel (2/2011)

M-17 View Downstream
Main Channel (2/2011)

M-18 View Upstream
Main Channel (2/2011)

M-18 View Downstream
Main Channel (2/2011)

M-19 View Upstream
Main Channel (2/2011)

M-19 View Downstream
Main Channel (2/2011)

M-20 View Upstream
Main Channel (2/2011)

M-20 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-21 View Upstream
Main Channel (2/2011)

M-21 View Downstream
Main Channel (2/2011)

M-22 View Upstream
Main Channel (2/2011)

M-22 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-23 View Upstream
Main Channel (2/2011)

M-23 View Downstream
Main Channel (2/2011)

M-24 View Upstream
Main Channel (2/2011)

M-24 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-25 View Upstream
Main Channel (2/2011)

M-25 View Downstream
Main Channel (2/2011)

M-26 View Upstream
Main Channel (2/2011)

M-26 View Downstream
Main Channel (2/2011)

M-27 View Upstream
Main Channel (2/2011)

M-27 View Downstream
Main Channel (2/2011)

M-28 View Upstream
Main Channel (2/2011)

M-28 View Downstream
Main Channel (2/2011)

M-29 View Upstream
Main Channel (2/2011)

M-29 View Downstream
Main Channel (2/2011)

M-31 View Upstream
Main Channel (2/2011)

M-31 View Downstream
Main Channel (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

M-32 View Upstream
Main Channel (2/2011)

M-32 View Downstream
Main Channel (2/2011)

M-33 View Upstream
Main Channel (2/2011)

M-33 View Downstream
Main Channel (2/2011)

M-34 View Upstream
Main Channel (2/2011)

M-34 View Downstream
Main Channel (2/2011)

M-35 View Upstream
Main Channel (2/2011)

M-35 View Downstream
Main Channel (2/2011)

M-36 View Upstream
Main Channel (2/2011)

M-36 View Downstream
Main Channel (2/2011)

M-37 View Upstream
Main Channel (2/2011)

M-37 View Downstream
Main Channel (2/2011)

M-38 View Upstream
Main Channel (2/2011)

M-38 View Downstream
Main Channel (2/2011)

M-39 View Upstream
Main Channel (2/2011)

M-39 View Downstream
Main Channel (2/2011)

M-40 View Upstream
Main Channel (2/2011)

M-40 View Downstream
Main Channel (2/2011)

M-41 View Upstream
Main Channel (2/2011)

M-41 View Downstream
Main Channel (2/2011)

M-42 View Upstream
Main Channel (2/2011)

M-42 View Downstream
Main Channel (2/2011)

M-43 View Upstream
Main Channel (2/2011)

M-43 View Downstream
Main Channel (2/2011)

M-44 View Upstream
Main Channel (2/2011)

M-44 View Downstream
Main Channel (2/2011)

M-45 View Upstream
Main Channel (2/2011)

M-45 View Downstream
Main Channel (2/2011)

M-46 View Upstream
Main Channel (2/2011)

M-46 View Downstream
Main Channel (2/2011)

M-47 View Upstream
Main Channel (2/2011)

M-47 View Downstream
Main Channel (2/2011)

M-48 View Upstream
Main Channel (2/2011)

M-48 View Downstream
Main Channel (2/2011)

M-49 View Upstream
Main Channel (2/2011)

M-49 View Downstream
Main Channel (2/2011)

M-50 View Upstream
Main Channel (2/2011)

M-50 View Downstream
Main Channel (2/2011)

M-51 View Upstream
Main Channel (2/2011)

M-51 View Downstream
Main Channel (2/2011)

M-52 View Upstream
Main Channel (2/2011)

M-52 View Downstream
Main Channel (2/2011)

M-53 View Upstream
Main Channel (2/2011)

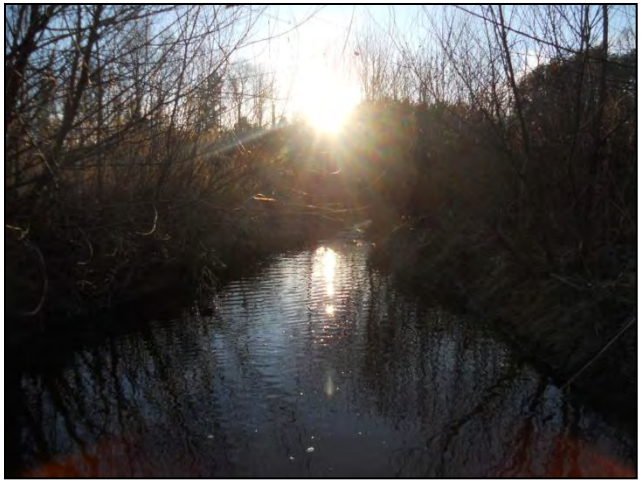
M-53 View Downstream
Main Channel (2/2011)

M-54 View Upstream
Main Channel (2/2011)

M-54 View Downstream
Main Channel (2/2011)

M-55 View Upstream
Main Channel (2/2011)

M-55 View Downstream
Main Channel (2/2011)



M-56 View Upstream
Main Channel (2/2011)

M-56 View Downstream
Main Channel (2/2011)

M-57 View Upstream
Main Channel (2/2011)

M-57 View Downstream
Main Channel (2/2011)

M-58 View Upstream
Main Channel (2/2011)

M-58 View Downstream
Main Channel (2/2011)

M-59 View Upstream
Main Channel (2/2011)

M-59 View Downstream
Main Channel (2/2011)

T-1 View Downstream
Tributary (2/2011)

T-1 View Upstream
Tributary (2/2011)

T-2 View Downstream
Tributary (2/2011)

T-2 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

T-3 View Downstream
Tributary (2/2011)

T-3 View Upstream
Tributary (2/2011)

T-4 View Downstream
Tributary (2/2011)

T-4 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

T-5 View Downstream
Tributary (2/2011)

T-5 View Upstream
Tributary (2/2011)

T-6 View Downstream
Tributary (2/2011)

T-6 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

T-6 View Downstream
Tributary (2/2011)

T-6 View Upstream
Tributary (2/2011)

T-7 View Downstream
Tributary (2/2011)

T-7 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

T-8 View Downstream
Tributary (2/2011)

T-8 View Upstream
Tributary (2/2011)

T-9 View Downstream
Tributary (2/2011)

T-9 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

T-10 View Downstream
Tributary (2/2011)

T-10 View Upstream
Tributary (2/2011)

T-11 View Downstream
Tributary (2/2011)

T-11 View Upstream
Tributary (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

E-1 View East (2/2011)

E-1 View West (2/2011)

E-1 View South (2/2011)

E-1 View North (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

E-2 View East (2/2011)

E-2 View West (2/2011)

E-2 View South (2/2011)

E-2 View North (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

E-3 View East (2/2011)

E-3 View West (2/2011)

E-3 View South (2/2011)

E-3 View North (2/2011)

Prepared For:	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Station Photos	

Cross-Section 1-View Upstream (2/2011)

Cross-Section 1-View Downstream (2/2011)

Cross-Section 2-View Upstream (2/2011)

Cross-Section 2-View Downstream (2/2011)

Prepared For: Ecosystem Enhancement Program	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Cross-Section Photos	JJG

Cross-Section 3-View Upstream (2/2011)

Cross-Section 3-View Downstream (2/2011)

Cross-Section 4-View Upstream (2/2011)

Cross-Section 4-View Downstream (2/2011)

Prepared For: Ecosystem Enhancement Program	UT to Barnes Stream and Wetland Restoration Monitoring Year 5	Date: April 2011 EEP Project No.: 397
	Appendix 4.1 Stream Cross-Section Photos	JJG

Cross-Section 5-View Upstream (2/2011)

Cross-Section 5-View Downstream (2/2011)

Cross-Section 6-View Upstream (2/2011)

Cross-Section 6-View Downstream (2/2011)

Cross-Section 7-View Downstream (2/2011)

Cross-Section 8-View Upstream (2/2011)

Appendix 4.2 Qualitative Visual Stability Assessment
Main Channel (3,305 lf)
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Monitoring Year 5 of 5

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability (Riffle and Run units)**	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	30	30			100%			
	3. Meander Pool Condition	Depth Sufficient	29	29			100%			
		Lenth Appropriate	29	29			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	N/A	N/A			N/A			
		Thalweg centering at downstream of meander bend (Glide)	N/A	N/A			N/A			
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	N/A
				Totals	0	0	100%	0	0	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.	21	21			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	21	21			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	21	21			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	21	21			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	21	21			100%			

Appendix 4.2 Qualitative Visual Stability Assessment
Tributary (611 lf)
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Monitoring Year 5 of 5

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability (Riffle and Run units)**	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	10	10			100%			
	3. Meander Pool Condition	Depth Sufficient	9	9			100%			
		Lenth Appropriate	9	9			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	N/A	N/A			N/A			
		Thalweg centering at downstream of meander bend (Glide)	N/A	N/A			N/A			
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	N/A
				Totals	0	0	100%	0	0	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.	N/A	N/A			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	N/A	N/A			N/A			

Appendix 4.3 - Verification of Bankfull Events
UT To Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Monitoring Year 5 of 5

Date of Collection	Date of Occurrence	Method	Photo # (if available)
7/13/2006	6/24/2006	CG 1	N/A
7/13/2006	6/24/2006	CG 2	N/A
9/29/2006	8/31/2006	CG 1	N/A
9/29/2006	8/31/2006	CG2	N/A
8/2008	Unknown	CG1/CG2	N/A
11/18/2009	11/11/2009-	CG1/CG2	N/A

Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

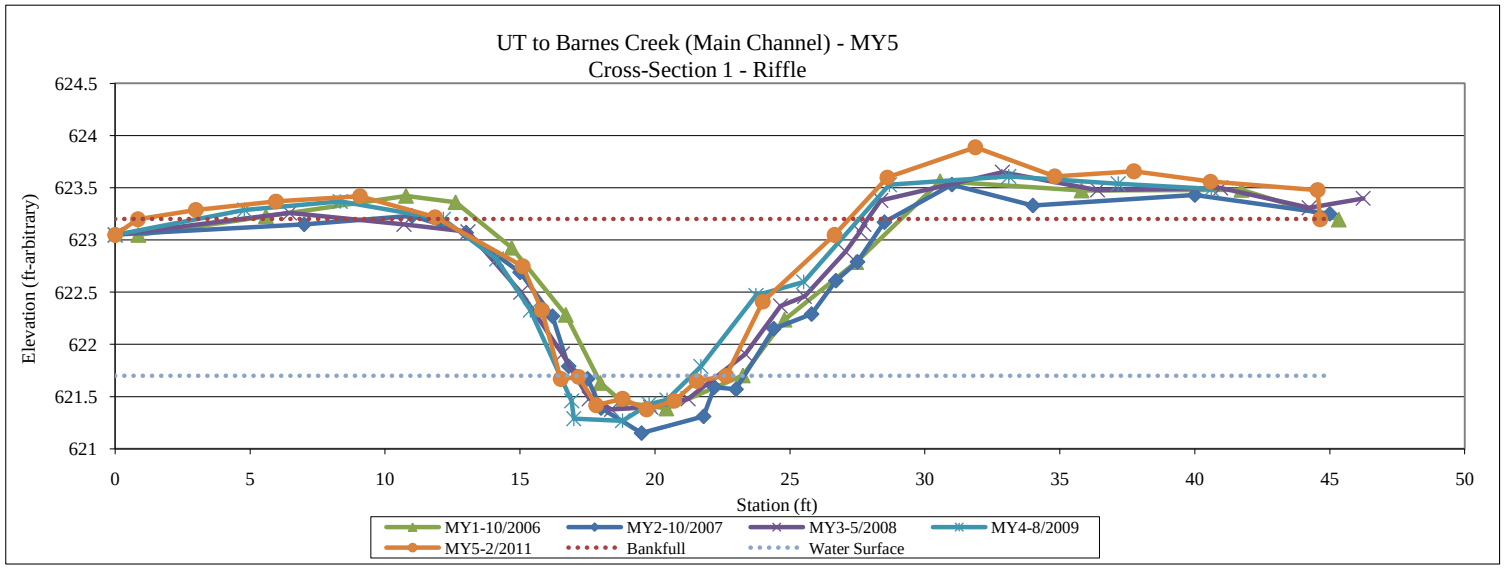
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-1, Riffle, 3+25**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	623.20
Bankfull Cross-Sectional Area (ft^2)	15.13
Bankfull Width (ft)	16.04
Flood Prone Area Elevation (ft)	625.02
Flood Prone Width (ft)	44.64
Bankfull Mean Depth (ft)	0.94
Bankfull Max Depth (ft)	1.82
W/D Ratio	17.06
Entrenchment Ratio	2.78
Bank Height Ratio	1.00

XS-1: View Upstream

XS-1: View Downstream

Station	Elevation	Notes
0	623.05	xs1-lpt
0.84	623.20	xs1
2.99	623.29	xs1
5.96	623.37	xs1
9.07	623.42	xs1
11.85	623.22	xs1
15.1	622.75	xs1-lb
15.81	622.33	xs1
16.51	621.67	xs2
17.17	621.69	xs1-lew
17.82	621.42	xs1
18.8	621.48	xs1
19.69	621.38	xs1
20.71	621.46	xs1
21.55	621.65	xs1
22.64	621.70	xs1-rew
23.99	622.41	xs1-rb
26.65	623.05	xs1
28.61	623.60	xs1
31.87	623.89	xs1
34.81	623.61	xs1
37.74	623.66	xs1
40.58	623.56	xs1
44.55	623.48	xs1
44.64	623.20	xs1-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

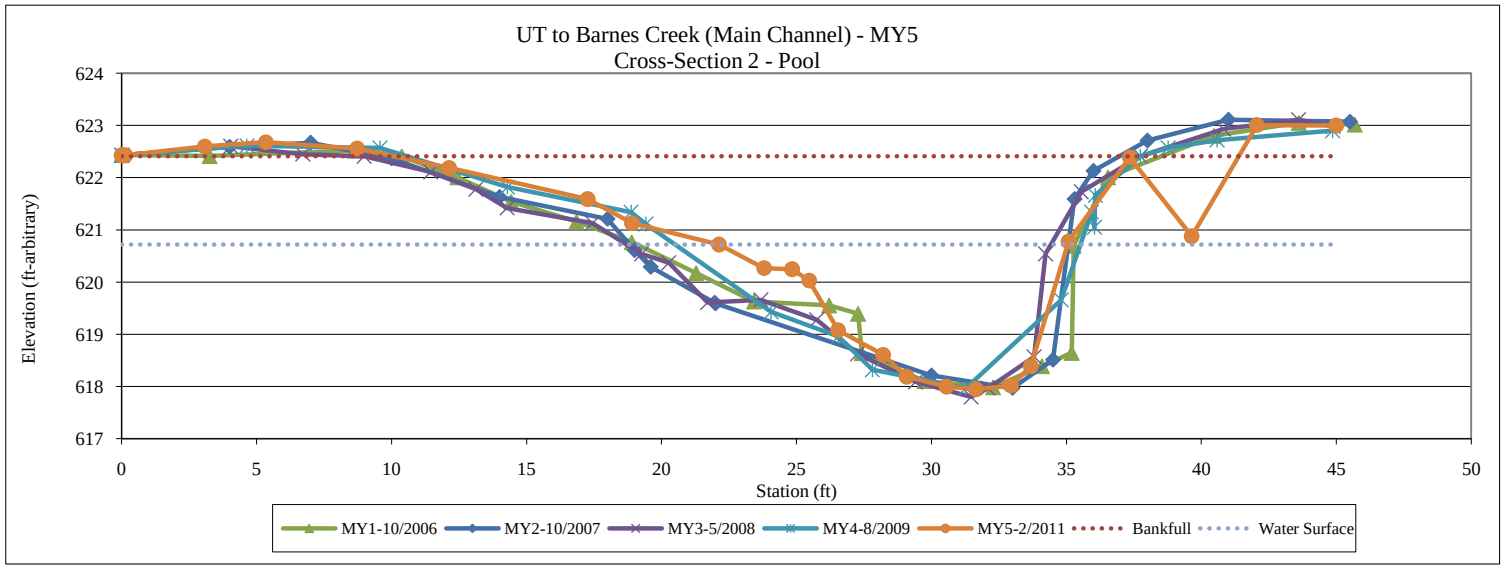
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-2, Pool 4+81**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	622.41
Bankfull Cross-Sectional Area (ft^2)	54.63
Bankfull Width (ft)	27.17
Flood Prone Area Elevation (ft)	626.87
Flood Prone Width (ft)	44.99
Bankfull Mean Depth (ft)	2.01
Bankfull Max Depth (ft)	4.46
W/D Ratio	13.52
Entrenchment Ratio	1.66
Bank Height Ratio	1.00

XS-2: View Upstream

XS-2: View Downstream

Station	Elevation	Notes
0	622.43	xs2-lpt
0.13	622.43	xs2
3.08	622.60	xs2
5.34	622.68	xs2
8.72	622.56	xs2
12.13	622.19	xs2
17.26	621.59	xs2
18.91	621.13	xs2-lb
22.13	620.72	xs2-lew
23.8	620.27	xs2-lew
24.84	620.25	xs2
25.47	620.03	xs2
26.54	619.08	xs2
28.21	618.61	xs2
29.08	618.19	xs2
30.56	618.00	xs2
31.65	617.95	xs2
32.95	618.02	xs2
33.68	618.39	xs2
35.08	620.78	xs2-rew
37.35	622.39	xs2-rb
39.64	620.88	xs2
42.06	623.01	xs2
44.99	623.00	xs2-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

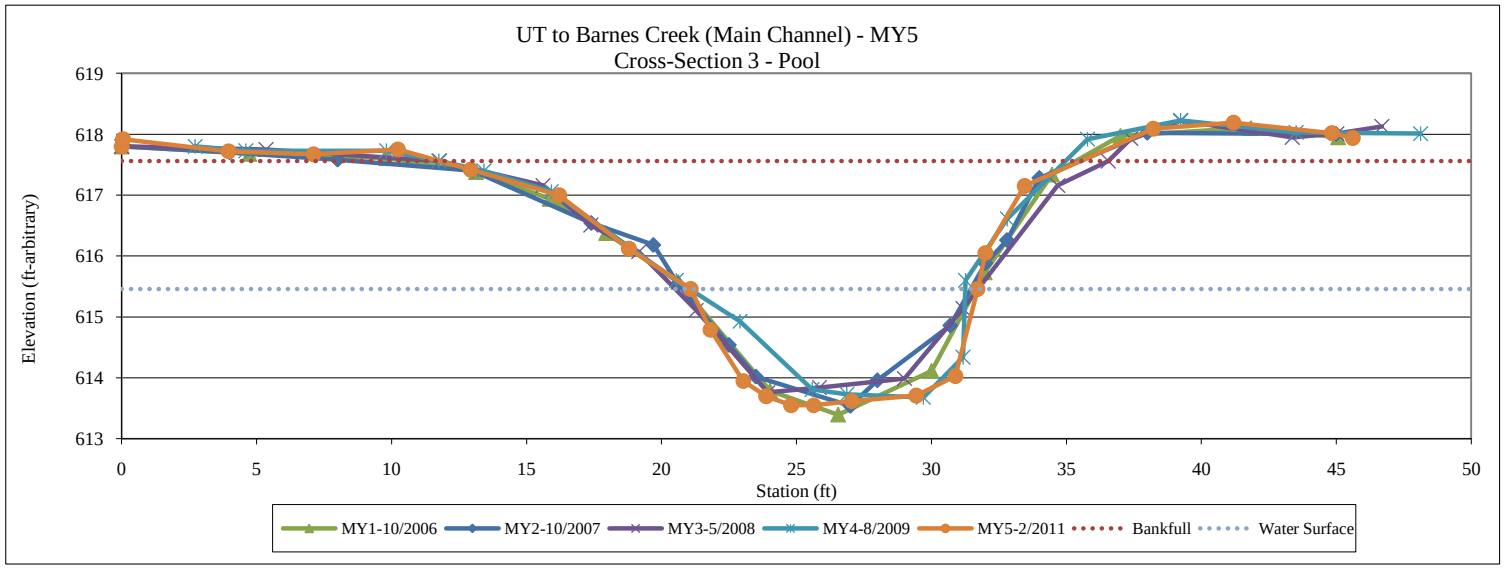
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-3, Pool 14+06**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	617.56
Bankfull Cross-Sectional Area (ft^2)	48.65
Bankfull Width (ft)	23.77
Flood Prone Area Elevation (ft)	621.57
Flood Prone Width (ft)	45.61
Bankfull Mean Depth (ft)	2.05
Bankfull Max Depth (ft)	4.01
W/D Ratio	11.60
Entrenchment Ratio	1.92
Bank Height Ratio	1.00

XS-3: View Upstream

XS-3: View Downstream

Station	Elevation	Notes
0	617.80	xs3-rpt
0.05	617.92	xs3
3.96	617.72	xs3
7.11	617.67	xs3
10.24	617.75	xs3
12.93	617.42	xs3
16.21	617.00	xs3
18.79	616.12	xs3-rb
21.08	615.46	xs3-rew
21.81	614.79	xs3
23.03	613.95	xs3
23.88	613.70	xs3
24.8	613.55	xs3
25.64	613.55	xs3
27.05	613.62	xs3
29.44	613.71	xs3
30.89	614.03	xs3
31.71	615.46	xs3-lew
32	616.05	xs3-lb
33.45	617.15	xs3
38.22	618.09	xs3
41.19	618.19	xs3
44.84	618.02	xs3
45.61	617.94	xs3-lpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

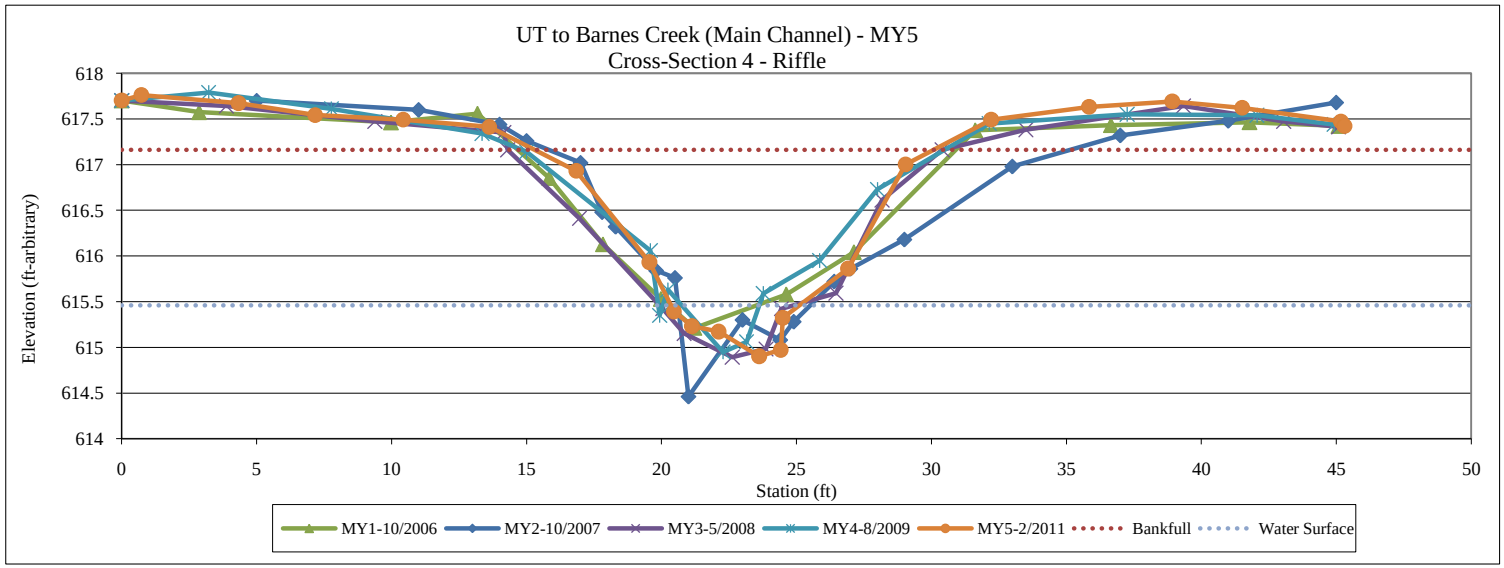
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-4, Riffle 14+67**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	617.16
Bankfull Cross-Sectional Area (ft^2)	17.25
Bankfull Width (ft)	14.78
Flood Prone Area Elevation (ft)	619.42
Flood Prone Width (ft)	45.30
Bankfull Mean Depth (ft)	1.17
Bankfull Max Depth (ft)	2.26
W/D Ratio	12.63
Entrenchment Ratio	3.07
Bank Height Ratio	1.00

XS-4: View Upstream

XS-4: View Downstream

Station	Elevation	Notes
0	617.70238	xs4-lpt
0.73	617.76238	xs4
4.33	617.67238	xs4
7.17	617.54238	xs4
10.43	617.49238	xs4
13.62	617.41238	xs4
16.84	616.93238	xs4
19.55	615.93238	xs4-lb
20.46	615.39238	xs4-lew
21.13	615.23238	xs4
22.12	615.17238	xs4
23.62	614.90238	xs4
24.42	614.97238	xs4
24.49	615.32238	xs4-rew
26.91	615.86238	xs4-rb
29.04	617.00238	xs4
32.21	617.49238	xs4
35.84	617.63238	xs4
38.92	617.69238	xs4
41.51	617.62238	xs4
45.17	617.47238	xs4
45.3	617.42238	xs4-lpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

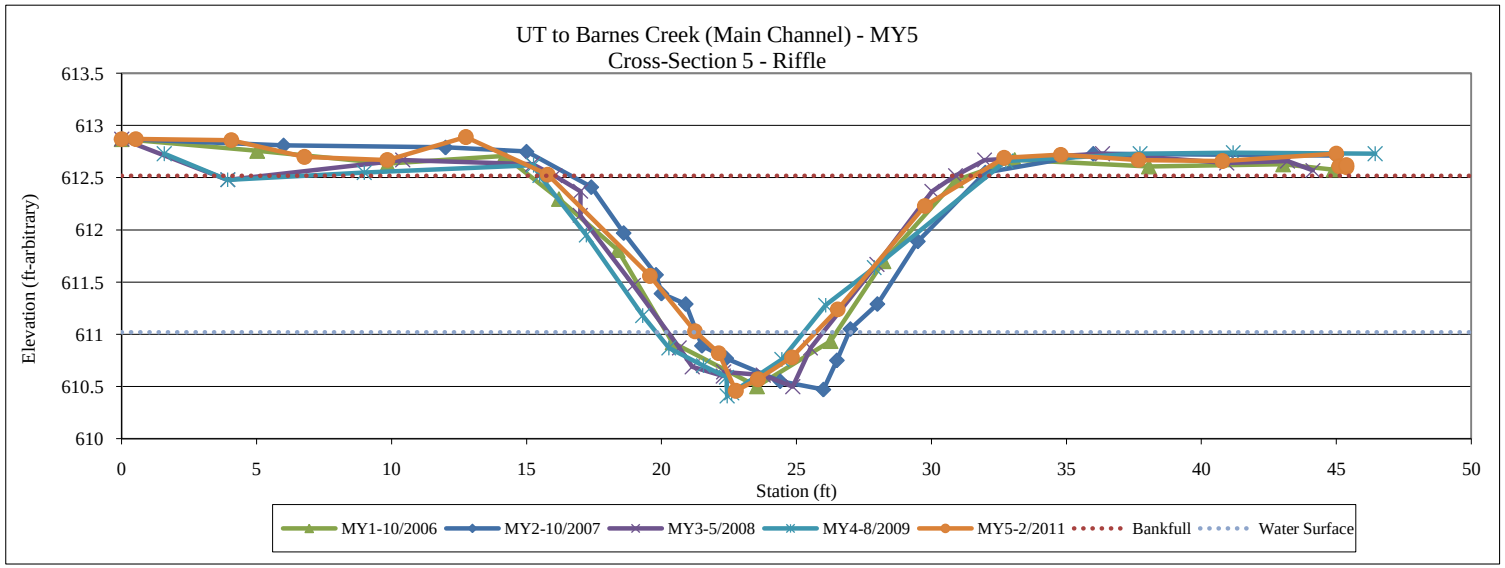
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-5, Riffle 24+33**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	612.52
Bankfull Cross-Sectional Area (ft^2)	15.78
Bankfull Width (ft)	15.79
Flood Prone Area Elevation (ft)	614.58
Flood Prone Width (ft)	45.38
Bankfull Mean Depth (ft)	1.00
Bankfull Max Depth (ft)	2.06
W/D Ratio	15.79
Entrenchment Ratio	2.87
Bank Height Ratio	1.00

XS-5: View Upstream

XS-5: View Downstream

Station	Elevation	Notes
0	612.86944	xs5-lpt
0.52	612.86944	xs5
4.06	612.85944	xs5
6.77	612.69944	xs5
9.84	612.66944	xs5
12.75	612.88944	xs5
15.78	612.52944	xs5
19.57	611.55944	xs5-lb
21.24	611.02944	xs5-lew
22.12	610.81944	xs5
22.75	610.45944	xs5
23.57	610.56944	xs5
24.83	610.77944	xs5-rew
26.53	611.23944	xs5-rb
29.76	612.22944	xs5
32.69	612.68944	xs5
34.79	612.71944	xs5
37.67	612.66944	xs5
40.78	612.65944	xs5
45	612.72944	xs5
45.11	612.60944	xs5-rpt
45.38	612.59944	xs5-rpt
45.37	612.62	xs5-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

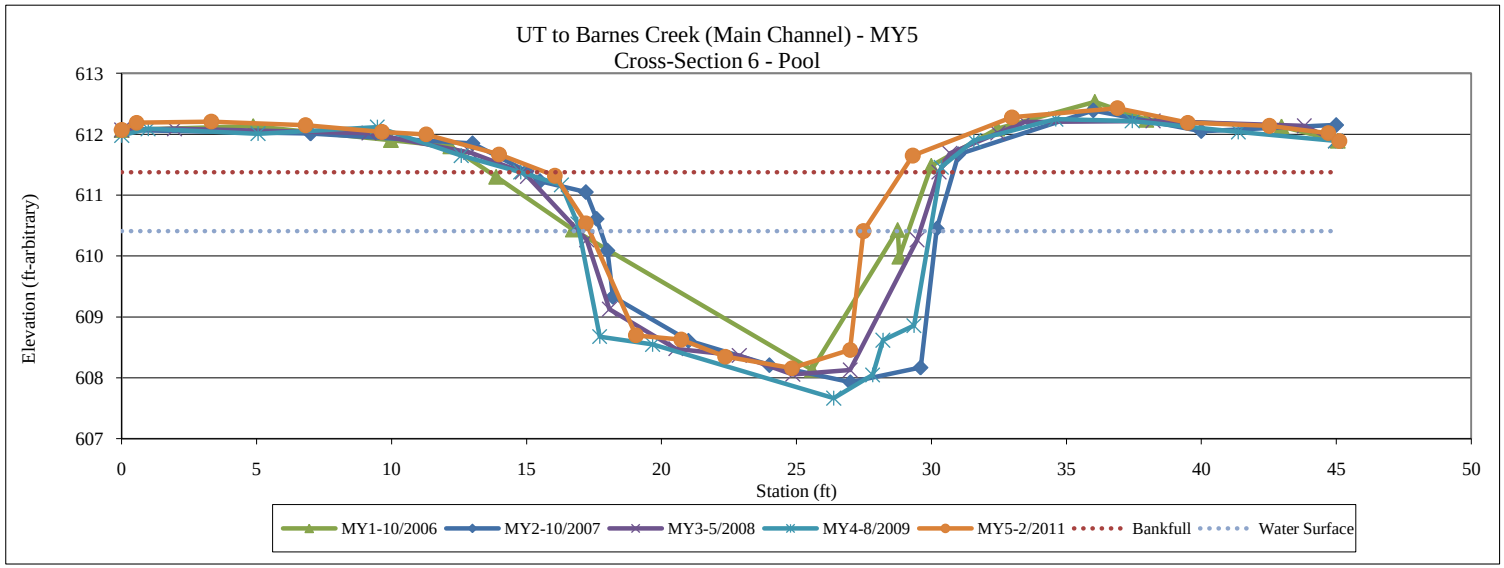
Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-6, Pool 25+37**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	611.38
Bankfull Cross-Sectional Area (ft^2)	29.05
Bankfull Width (ft)	13.22
Flood Prone Area Elevation (ft)	614.60
Flood Prone Width (ft)	45.11
Bankfull Mean Depth (ft)	2.20
Bankfull Max Depth (ft)	3.22
W/D Ratio	6.01
Entrenchment Ratio	3.41
Bank Height Ratio	1.00

XS-6: View Upstream

XS-6: View Downstream

Station	Elevation	Notes
0	612.07	xs6-lpt
0.55	612.19	xs6
3.32	612.21	xs6
6.81	612.15	xs6
9.64	612.04	xs6-lb
11.28	612.00	xs6
13.98	611.67	xs6
16.05	611.32	xs6
17.2	610.54	xs6-lew
19.05	608.70	xs6
20.73	608.63	xs6
22.36	608.35	xs6
24.83	608.16	xs6
26.99	608.46	xs6
27.48	610.41	xs6-rew
29.31	611.65	xs6
32.98	612.28	xs6
36.89	612.43	xs6-rb
39.5	612.19	xs6
42.52	612.14	xs6
44.7	612.02	xs6
45.11	611.89	xs6-rpt



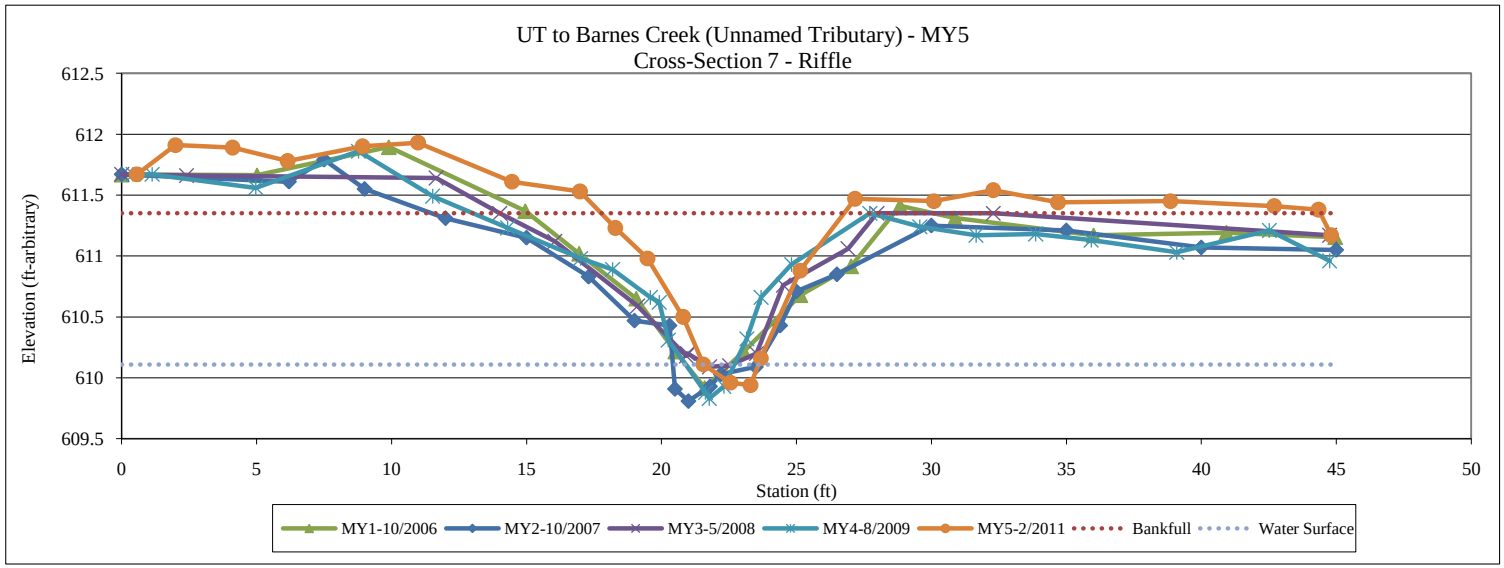
Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-7, Riffle 0+88**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	611.35
Bankfull Cross-Sectional Area (ft^2)	6.44
Bankfull Width (ft)	8.87
Flood Prone Area Elevation (ft)	612.76
Flood Prone Width (ft)	44.81
Bankfull Mean Depth (ft)	0.73
Bankfull Max Depth (ft)	1.41
W/D Ratio	12.15
Entrenchment Ratio	5.05
Bank Height Ratio	1.00

XS-7: View Downstream

Station	Elevation	Notes
0	611.67	xs7-lpt
0.56	611.91	xs7
1.99	611.89	xs7
4.11	611.78	xs7
6.15	611.9	xs7
8.92	611.93	xs7
10.98	611.61	xs7
14.46	611.53	xs7-lb
16.98	611.23	xs7
18.29	610.98	xs7
19.48	610.5	xs7
20.8	610.11	xs7-lew
21.55	609.96	xs7
22.55	609.94	xs7
23.3	610.16	xs7-rew
23.68	610.88	xs7
25.14	611.47	xs7
27.17	611.45	xs7
30.09	611.54	xs7-rb
32.29	611.44	xs7
34.69	611.45	xs7
38.86	611.41	xs7
42.7	611.38	xs7
44.34	611.17	xs7
44.81	611.17	xs7-rpt



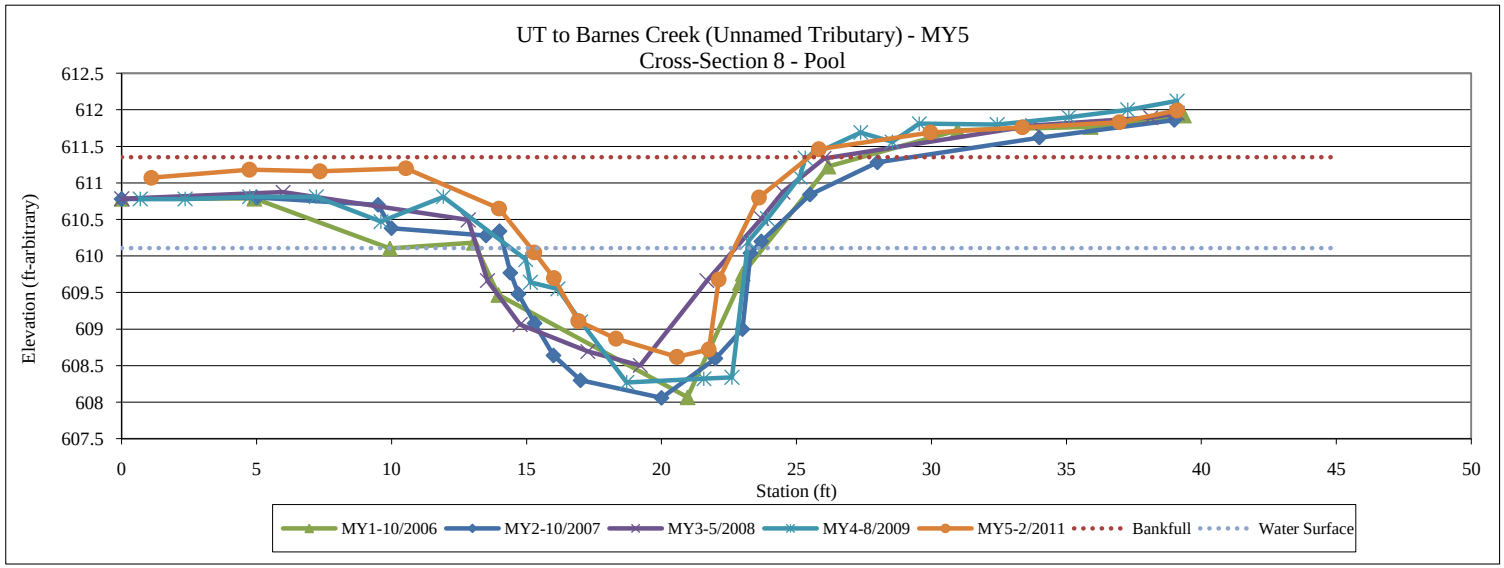
Appendix 4.4 Cross-Section Plots and Raw Data Tables
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name	**UT to Barnes Creek**
EEP Project Number	**397**
Cross-Section ID	**XS-8, Pool 1+33**
Survey Date	**2/2011**

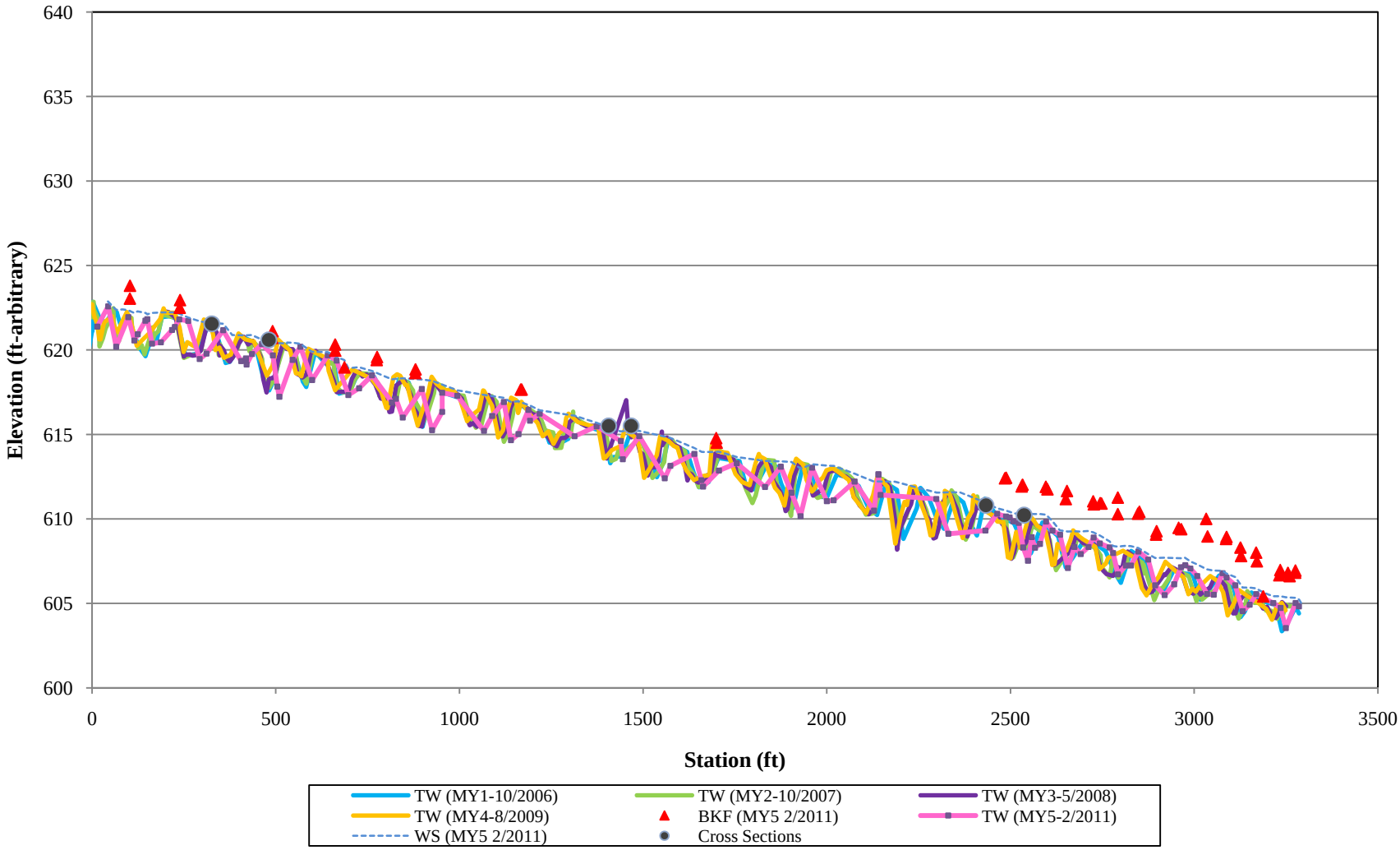
SUMMARY DATA	
Bankfull Elevation (ft)	610.87
Bankfull Cross-Sectional Area (ft^2)	14.46
Bankfull Width (ft)	11.25
Flood Prone Area Elevation (ft)	613.12
Flood Prone Width (ft)	38.00
Bankfull Mean Depth (ft)	1.29
Bankfull Max Depth (ft)	2.25
W/D Ratio	8.72
Entrenchment Ratio	3.38
Bank Height Ratio	1.00

XS-8: View Upstream

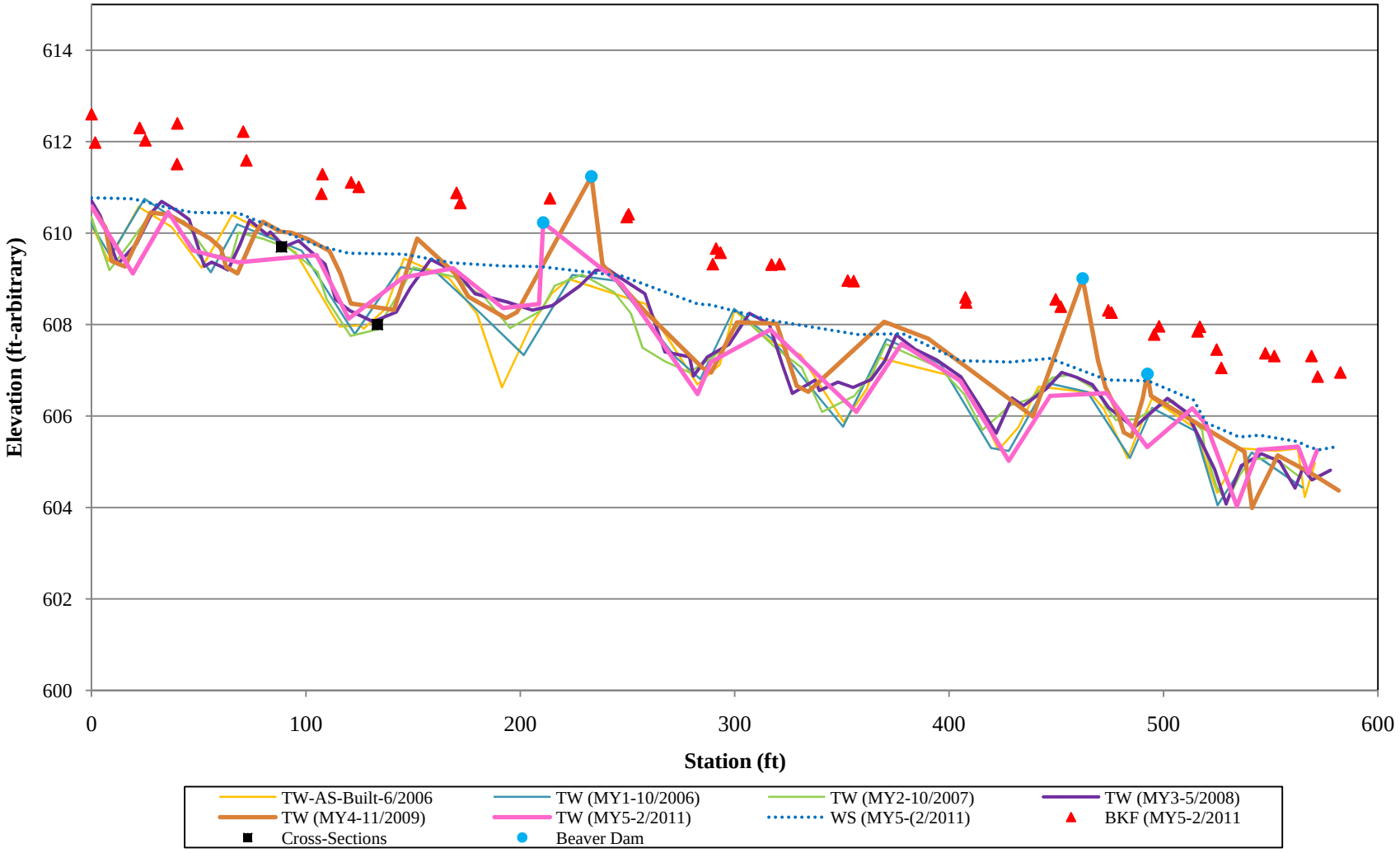
Station	Elevation	Notes
-0.43	610.78	xs8-lpt
-0.27	610.79	xs8
1.1	611.07	xs8
4.73	611.18	xs8
7.34	611.16	xs8
10.53	611.2	xs8-lb
13.98	610.65	xs8
15.28	610.05	xs8
16.01	609.7	xs8-lew
16.92	609.11	xs8
18.31	608.87	xs8
20.57	608.62	xs8
21.75	608.72	xs8
22.12	609.68	xs8-rew
23.61	610.8	xs8
25.83	611.46	xs8-rb
29.96	611.69	xs8
33.37	611.76	xs8
36.96	611.83	xs8
39.1	611.99	xs8-rpt



Appendix 4.5 Longitudinal Plots
UT to Barnes Creek Stream and Wetland Restoration /EEP Project No. 397
Main Channel - Longitudinal Profile
2010 Monitoring Year
MY 5 of 5



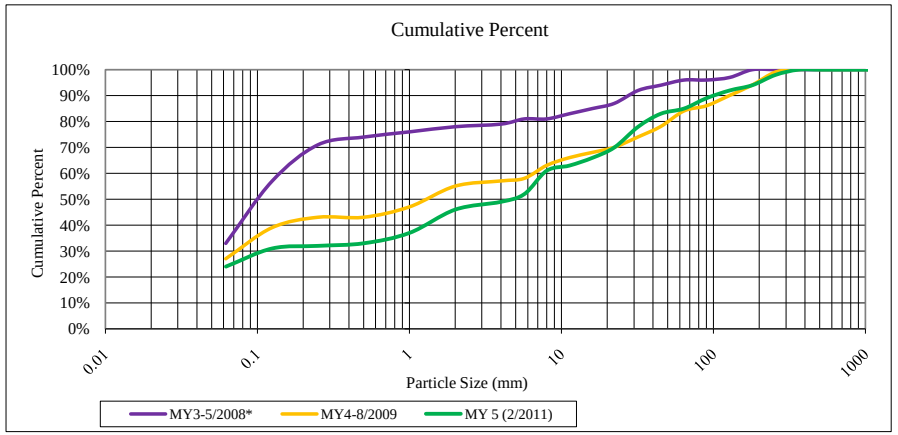
Appendix 4.5 Longitudinal Plots
UT to Barnes Creek Stream and Wetland Restoration/EEP Project No. 397
Tributary - Longitudinal Profile
2010 Monitoring Year
MY 5 of 5

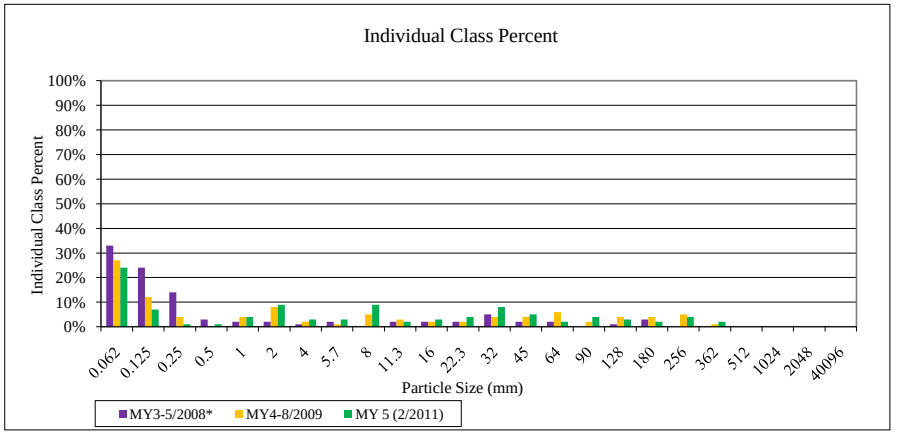


Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 1					
Feature: Riffle					
			MY 5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	24	24%	24%
Sand	very fine sand	0.125	7	7%	31%
	fine sand	0.250	1	1%	32%
	medium sand	0.50	1	1%	33%
	coarse sand	1.00	4	4%	37%
	very coarse sand	2.0	9	9%	46%
Gravel	very fine gravel	4.0	3	3%	49%
	fine gravel	5.7	3	3%	52%
	fine gravel	8.0	9	9%	61%
	medium gravel	11.3	2	2%	63%
	medium gravel	16.0	3	3%	66%
	course gravel	22.3	4	4%	70%
	course gravel	32.0	8	8%	78%
	very coarse gravel	45	5	5%	83%
	very coarse gravel	64	2	2%	85%
Cobble	small cobble	90	4	4%	89%
	medium cobble	128	3	3%	92%
	large cobble	180	2	2%	94%
	very large cobble	256	4	4%	98%
Boulder	small boulder	362	2	2%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	4.57
D84	54.50
D95	199.00





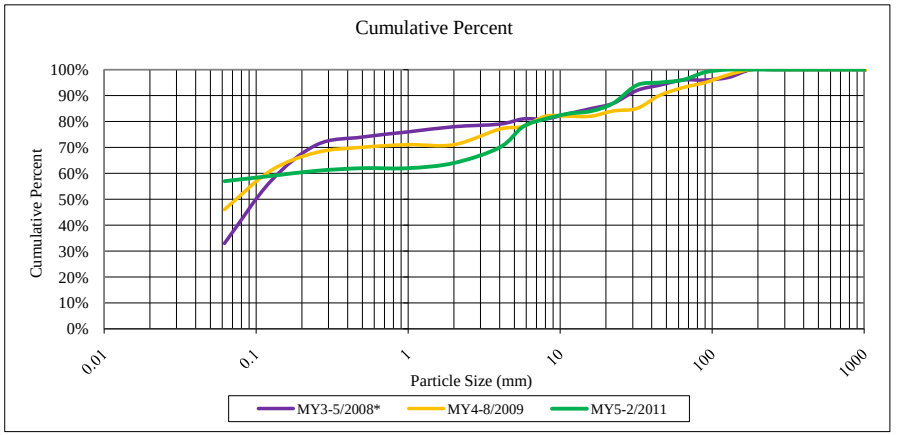
*Data reported based on reachwide pebble count

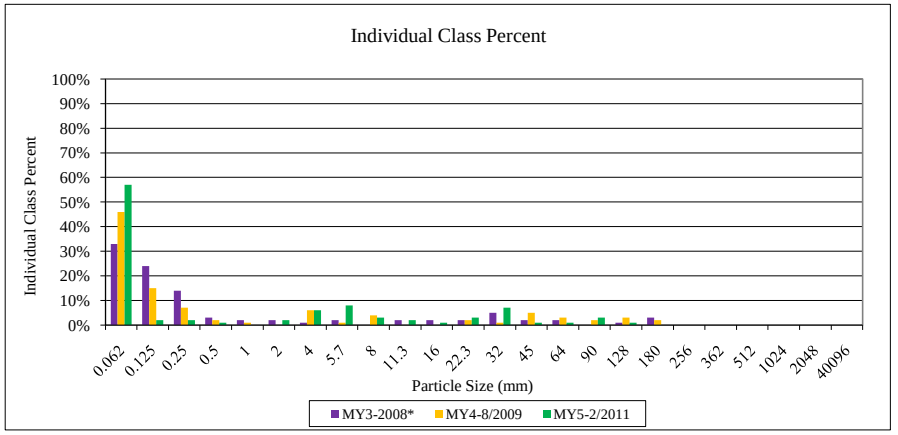
Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 2					
Feature: Pool					
			MY5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	57	57%	57%
Sand	very fine sand	0.125	2	2%	59%
	fine sand	0.250	2	2%	61%
	medium sand	0.50	1	1%	62%
	coarse sand	1.00	0	0%	62%
	very coarse sand	2.0	2	2%	64%
Gravel	very fine gravel	4.0	6	6%	70%
	fine gravel	5.7	8	8%	78%
	fine gravel	8.0	3	3%	81%
	medium gravel	11.3	2	2%	83%
	medium gravel	16.0	1	1%	84%
	course gravel	22.3	3	3%	87%
	course gravel	32.0	7	7%	94%
	very coarse gravel	45	1	1%	95%
	very coarse gravel	64	1	1%	96%
Cobble	small cobble	90	3	3%	99%
	medium cobble	128	1	1%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	16
D95	45

D50 was not calculated due to particle size.





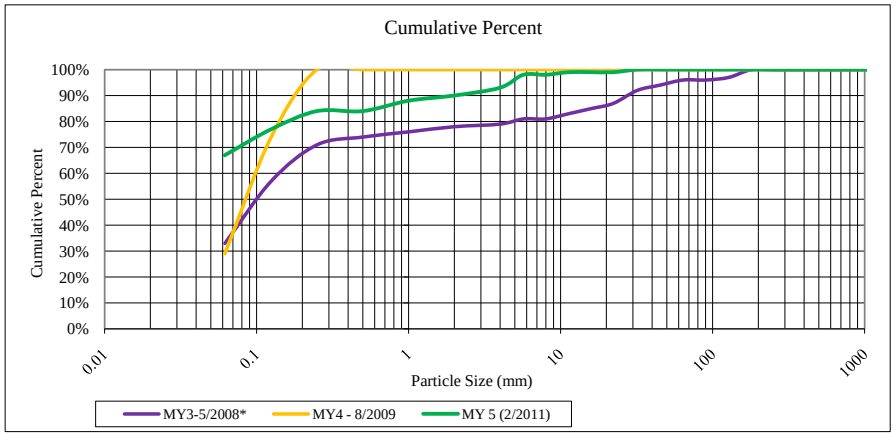
*Data reported based on reachwide pebble count

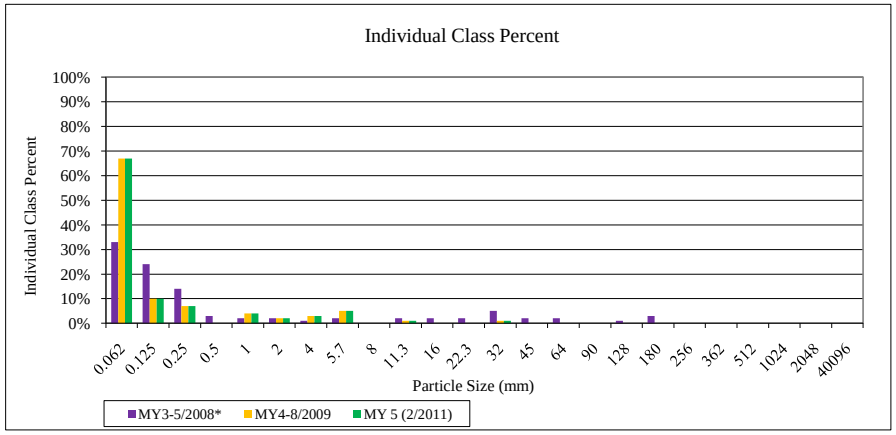
Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 3					
Feature: Pool					
			MY 5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	67	67%	67%
Sand	very fine sand	0.125	10	10%	77%
	fine sand	0.250	7	7%	84%
	medium sand	0.50	0	0%	84%
	coarse sand	1.00	4	4%	88%
	very coarse sand	2.0	2	2%	90%
Gravel	very fine gravel	4.0	3	3%	93%
	fine gravel	5.7	5	5%	98%
	fine gravel	8.0	0	0%	98%
	medium gravel	11.3	1	1%	99%
	medium gravel	16.0	0	0%	99%
	course gravel	22.3	0	0%	99%
	course gravel	32.0	1	1%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	0.25
D95	4.68

D50 was not calculated due to particle size.



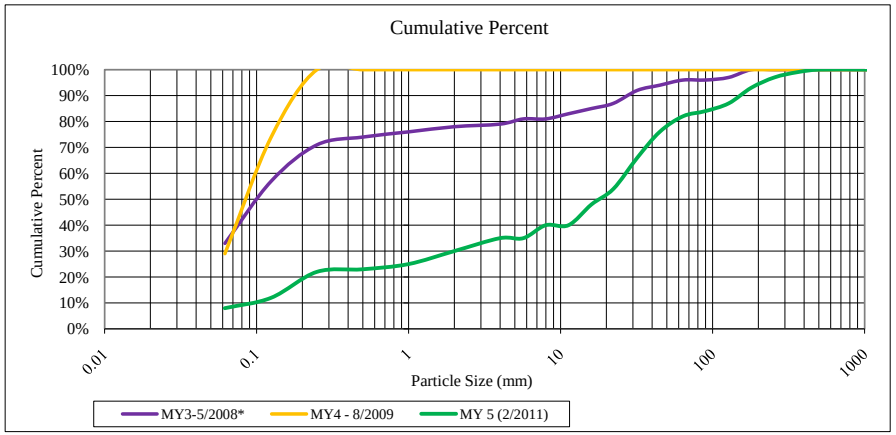


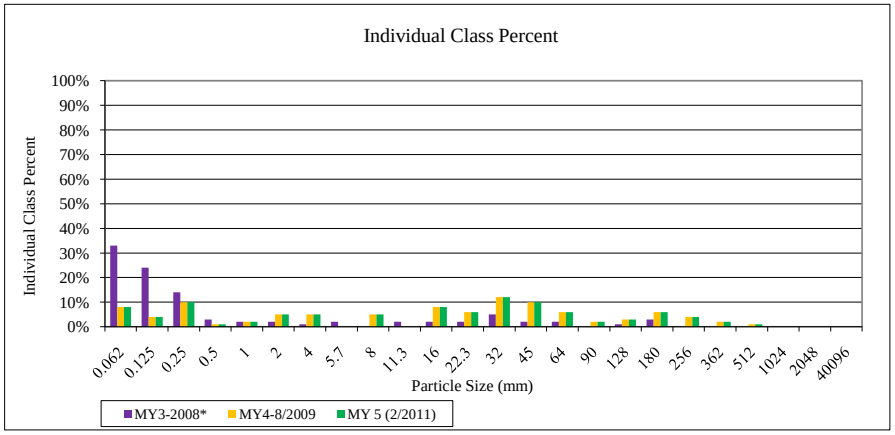
*Data reported based on reachwide pebble count

Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 4					
Feature: Riffle					
			MY 5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	8	8%	8%
Sand	very fine sand	0.125	4	4%	12%
	fine sand	0.250	10	10%	22%
	medium sand	0.50	1	1%	23%
	coarse sand	1.00	2	2%	25%
	very coarse sand	2.0	5	5%	30%
Gravel	very fine gravel	4.0	5	5%	35%
	fine gravel	5.7	0	0%	35%
	fine gravel	8.0	5	5%	40%
	medium gravel	11.3	0	0%	40%
	medium gravel	16.0	8	8%	48%
	course gravel	22.3	6	6%	54%
	course gravel	32.0	12	12%	66%
	very coarse gravel	45	10	10%	76%
	very coarse gravel	64	6	6%	82%
Cobble	small cobble	90	2	2%	84%
	medium cobble	128	3	3%	87%
	large cobble	180	6	6%	93%
	very large cobble	256	4	4%	97%
Boulder	small boulder	362	2	2%	99%
	small boulder	512	1	1%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
Bedrock	bedrock	40096		0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	18.1
D84	90
D95	218.00



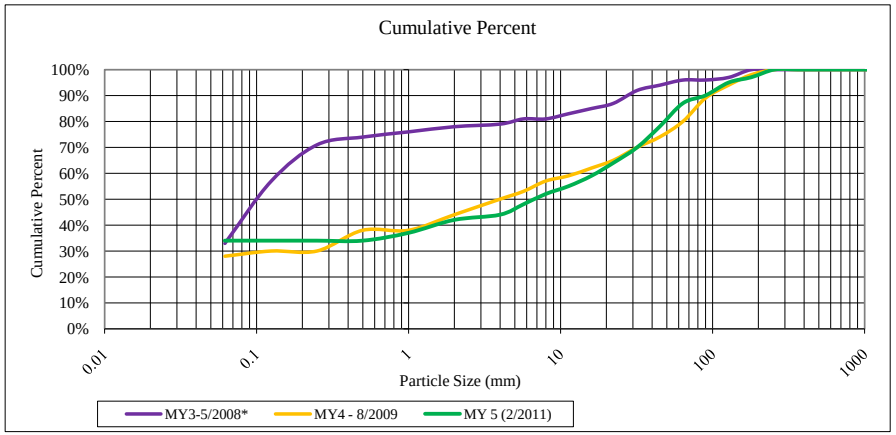


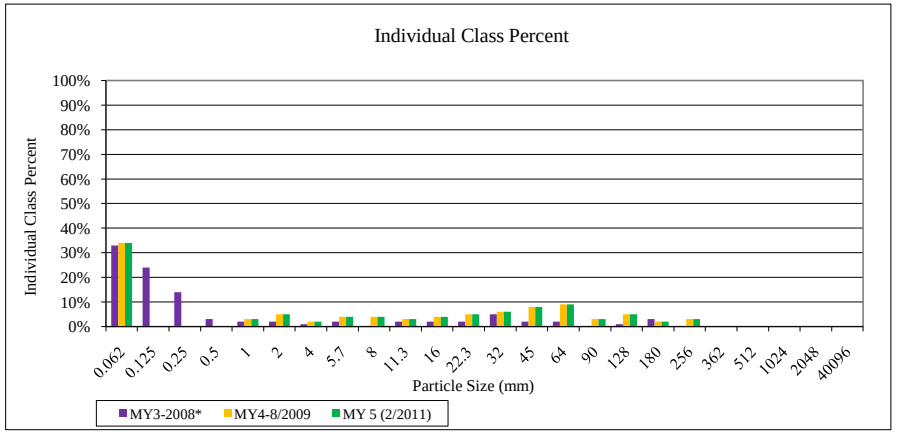
*Data reported based on reachwide pebble count

Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 5					
Feature: Riffle					
			MY 5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	34	34%	34%
Sand	very fine sand	0.125	0	0%	34%
	fine sand	0.250	0	0%	34%
	medium sand	0.50	0	0%	34%
	coarse sand	1.00	3	3%	37%
	very coarse sand	2.0	5	5%	42%
Gravel	very fine gravel	4.0	2	2%	44%
	fine gravel	5.7	4	4%	48%
	fine gravel	8.0	4	4%	52%
	medium gravel	11.3	3	3%	55%
	medium gravel	16.0	4	4%	59%
	course gravel	22.3	5	5%	64%
	course gravel	32.0	6	6%	70%
	very coarse gravel	45	8	8%	78%
	very coarse gravel	64	9	9%	87%
Cobble	small cobble	90	3	3%	90%
	medium cobble	128	5	5%	95%
	large cobble	180	2	2%	97%
	very large cobble	256	3	3%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	6.85
D84	57.67
D95	128





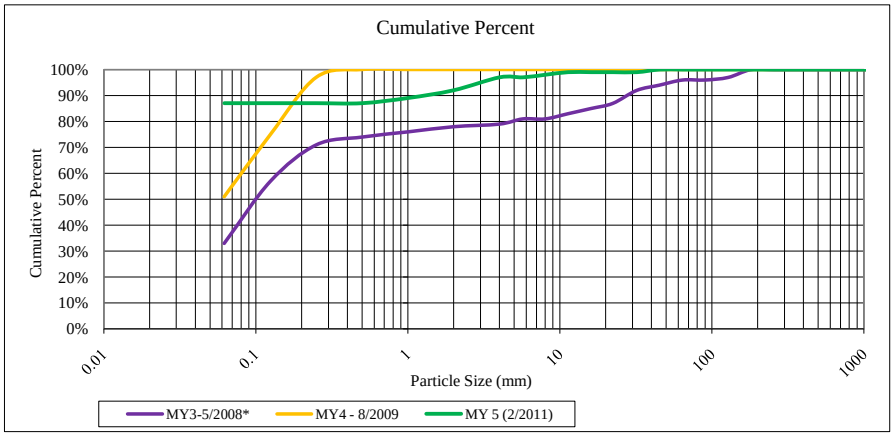
*Data reported based on reachwide pebble count

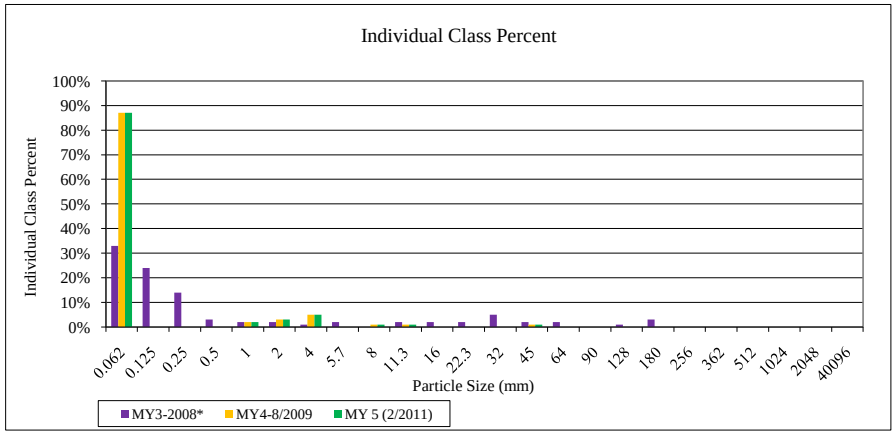
Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 6					
Feature: Pool					
			MY 5 (2/2011)		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	87	87%	87%
Sand	very fine sand	0.125	0	0%	87%
	fine sand	0.250	0	0%	87%
	medium sand	0.50	0	0%	87%
	coarse sand	1.00	2	2%	89%
	very coarse sand	2.0	3	3%	92%
Gravel	very fine gravel	4.0	5	5%	97%
	fine gravel	5.7	0	0%	97%
	fine gravel	8.0	1	1%	98%
	medium gravel	11.3	1	1%	99%
	medium gravel	16.0	0	0%	99%
	course gravel	22.3	0	0%	99%
	course gravel	32.0	0	0%	99%
	very coarse gravel	45	1	1%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	
D95	3.2

D50 and D 84 was not calculated due to particle size.





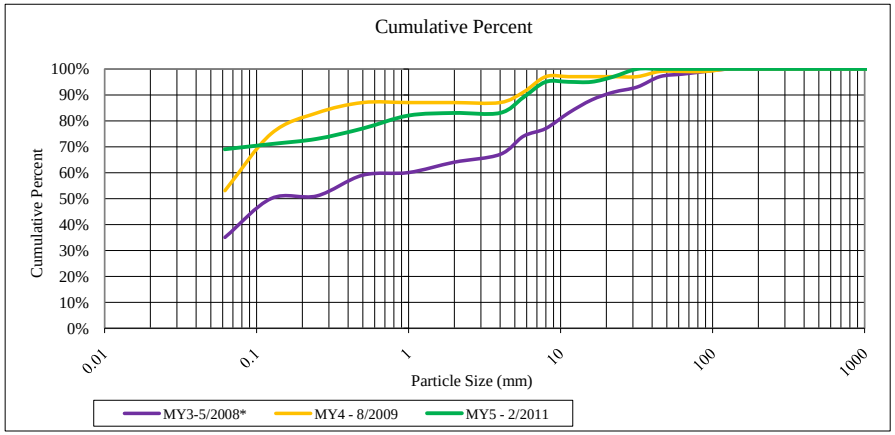
*Data reported based on reachwide pebble count

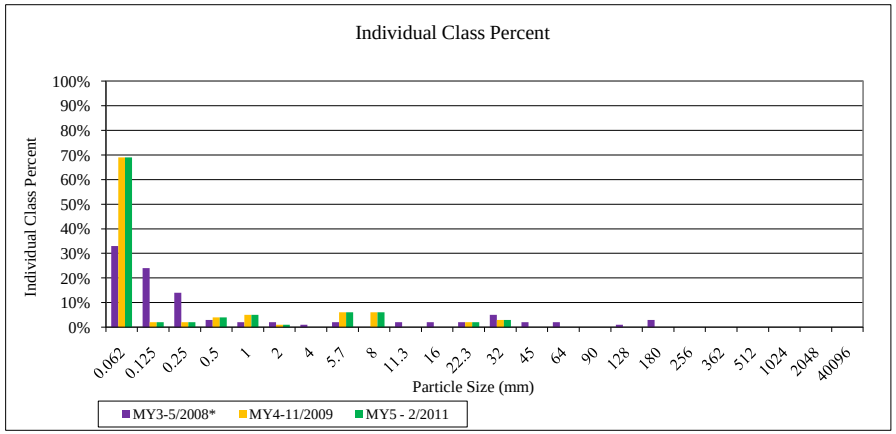
Appendix 4.6 Pebble Count Plots and Raw Data Tables
UT to Barnes Creek Stream Restoration/EEP Project No. 397
Unnamed Tributary to Barnes Creek
Monitoring Year 5 of 5

Project Name: UT to Barnes Creek					
Cross-Section: 7					
Feature: Riffle					
			MY5 - 2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	69	69%	69%
Sand	very fine sand	0.125	2	2%	71%
	fine sand	0.250	2	2%	73%
	medium sand	0.50	4	4%	77%
	coarse sand	1.00	5	5%	82%
	very coarse sand	2.0	1	1%	83%
Gravel	very fine gravel	4.0	0	0%	83%
	fine gravel	5.7	6	6%	89%
	fine gravel	8.0	6	6%	95%
	medium gravel	11.3	0	0%	95%
	medium gravel	16.0	0	0%	95%
	course gravel	22.3	2	2%	97%
	course gravel	32.0	3	3%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	4.28
D95	8.00

D50 was not calculated due to particle size.





*Data reported based on reachwide pebble count

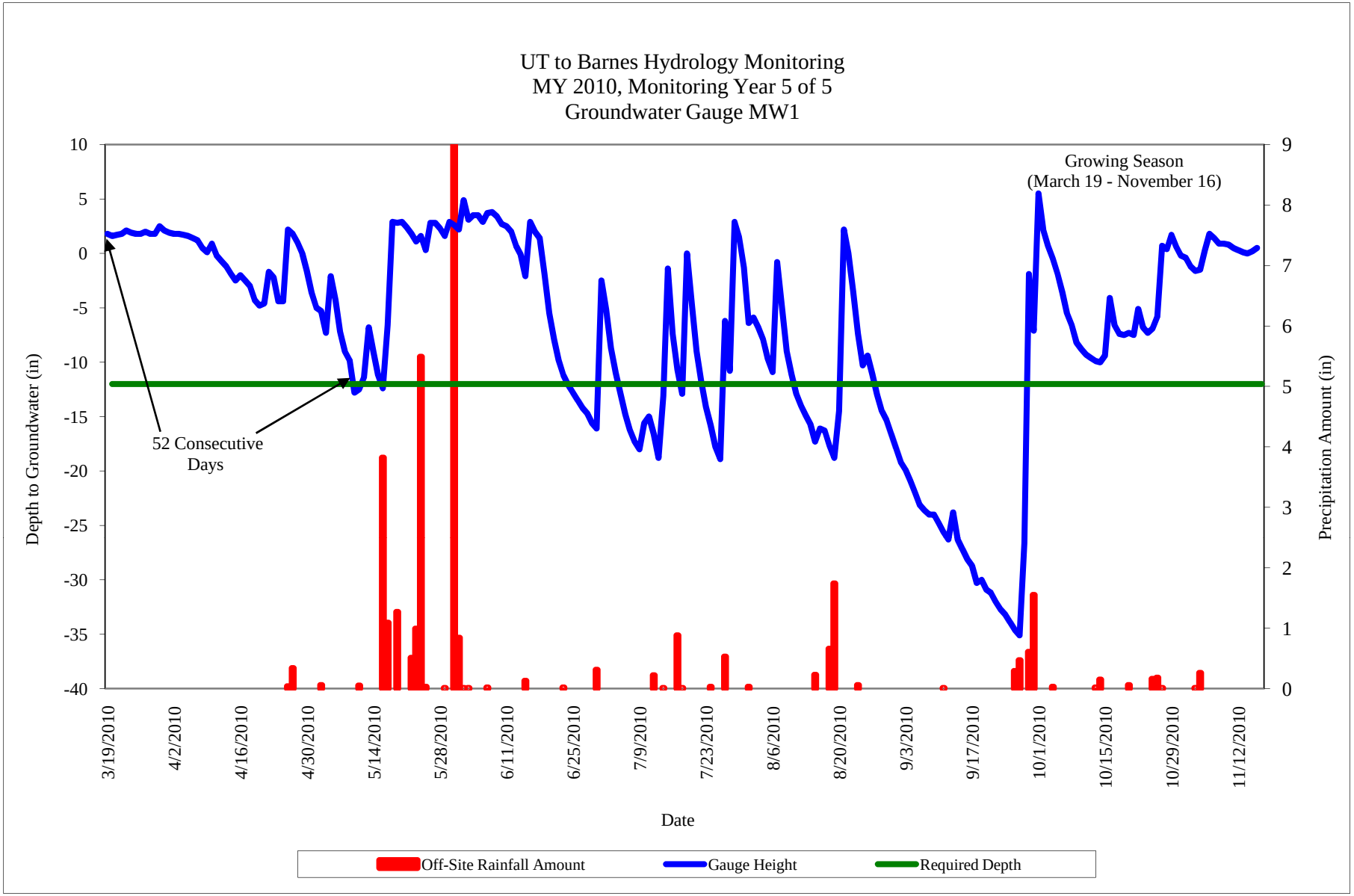
APPENDIX 5
WETLAND DATA ASSESSMENT

1. Precipitation – Water Level Plots for Gauges*

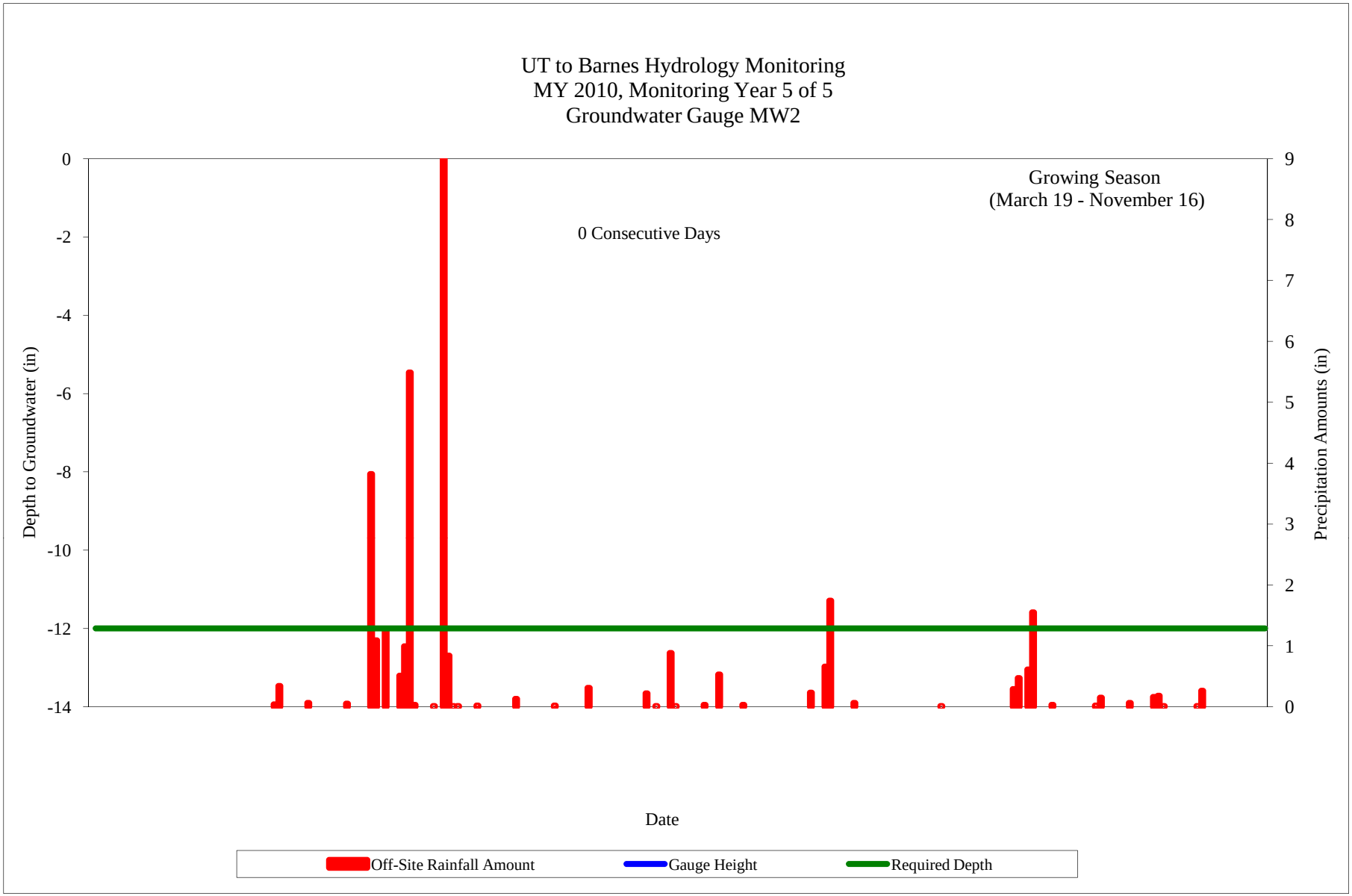
2. Wetland Criteria Attainment

*Raw data tables have been provided electronically.

Appendix 5.1 Precipitation - Water Level Plots for Gauges
UT to Barnes Stream and Wetland Restoration

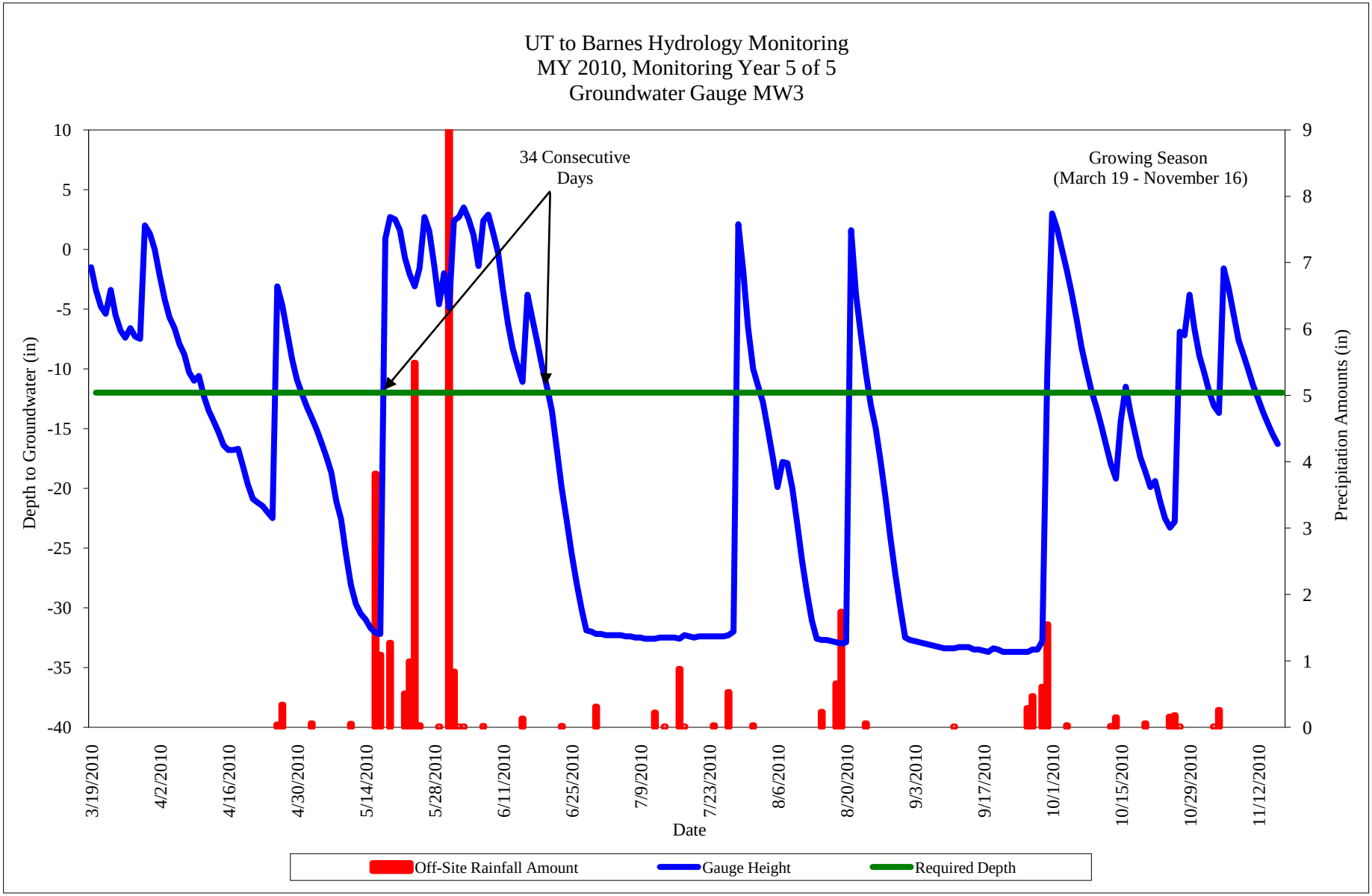


Appendix 5.1 Precipitation - Water Level Plots for Gauges
UT to Barnes Stream and Wetland Restoration



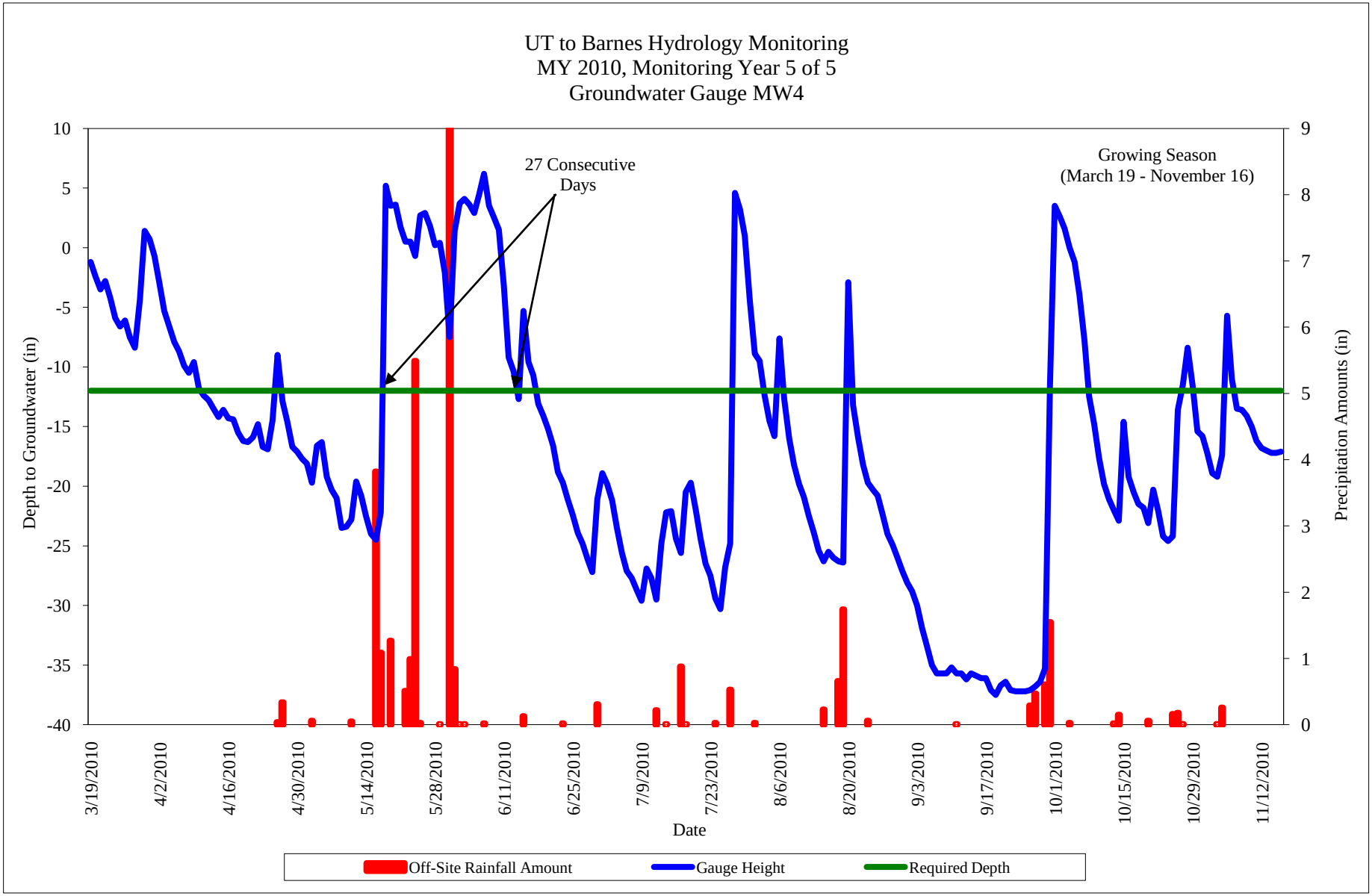
Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



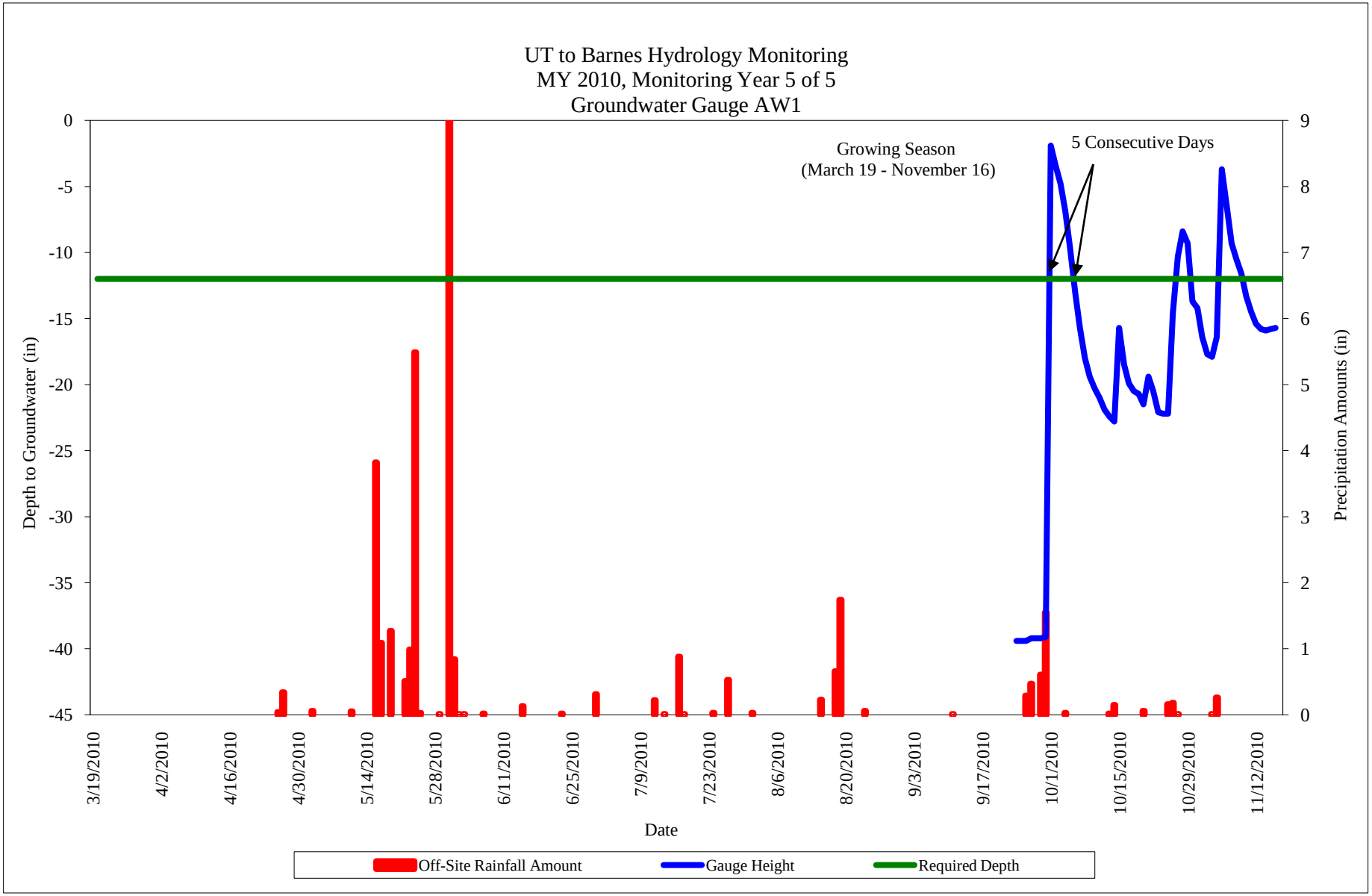
Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



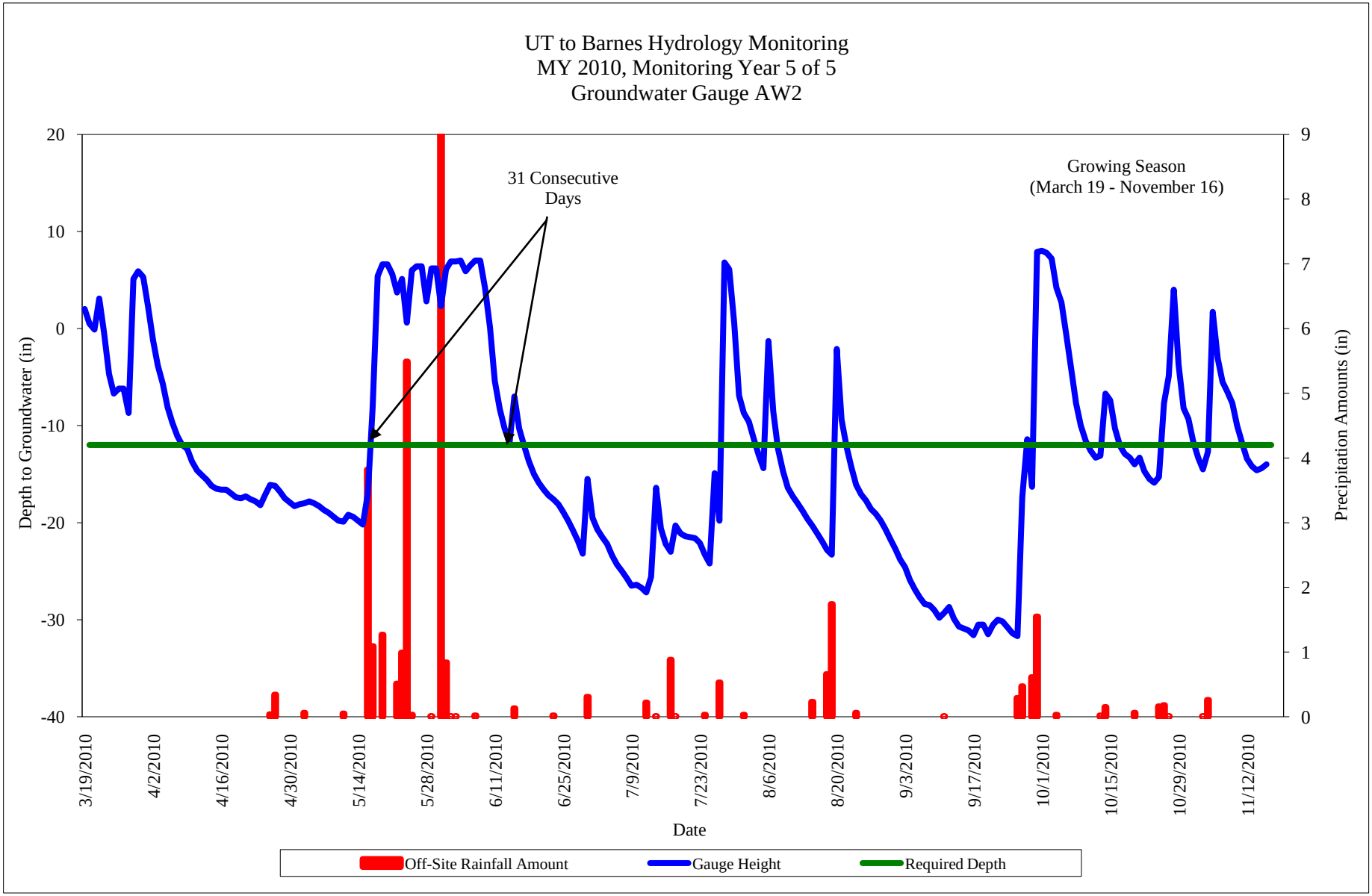
Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



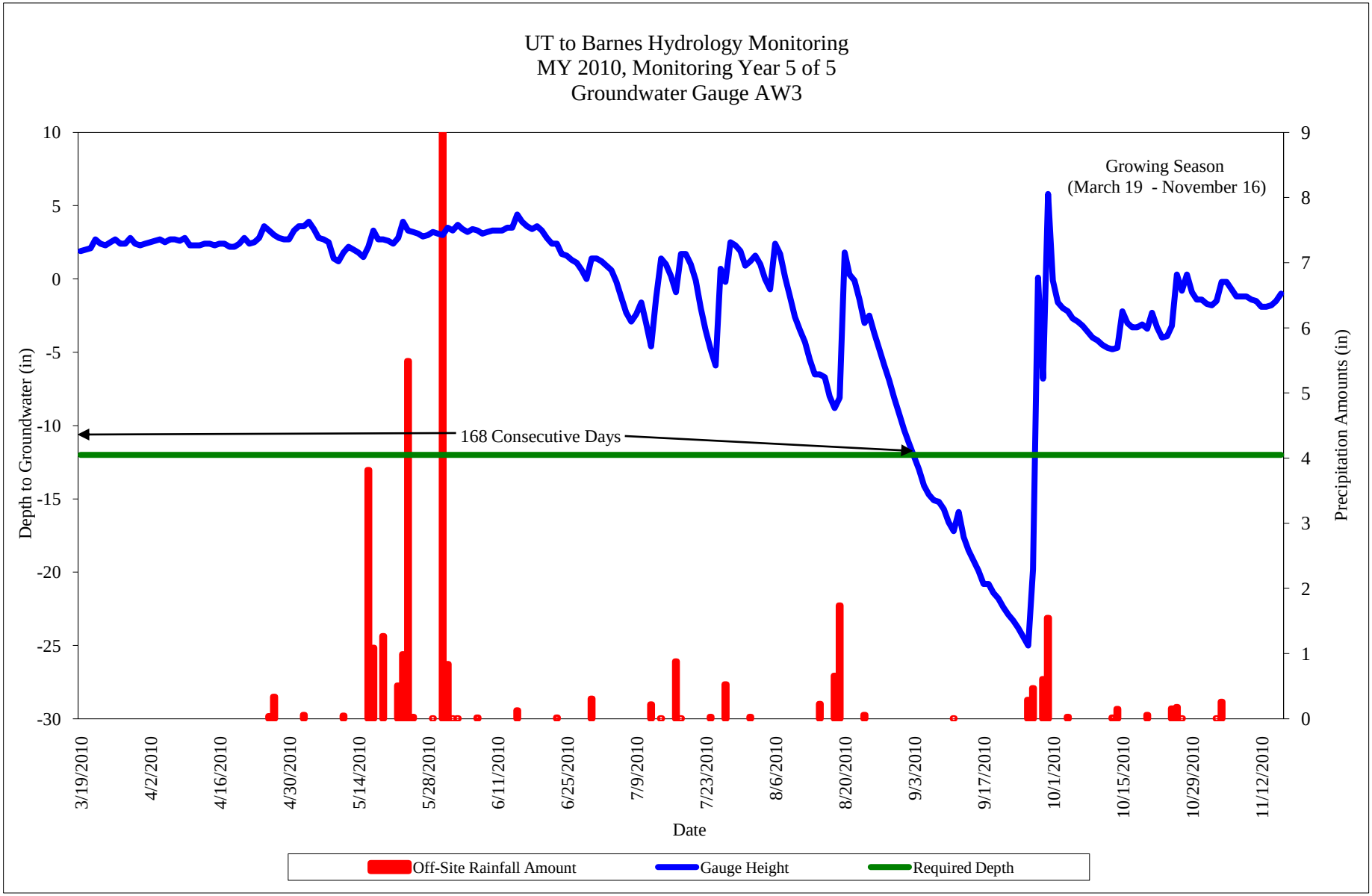
Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



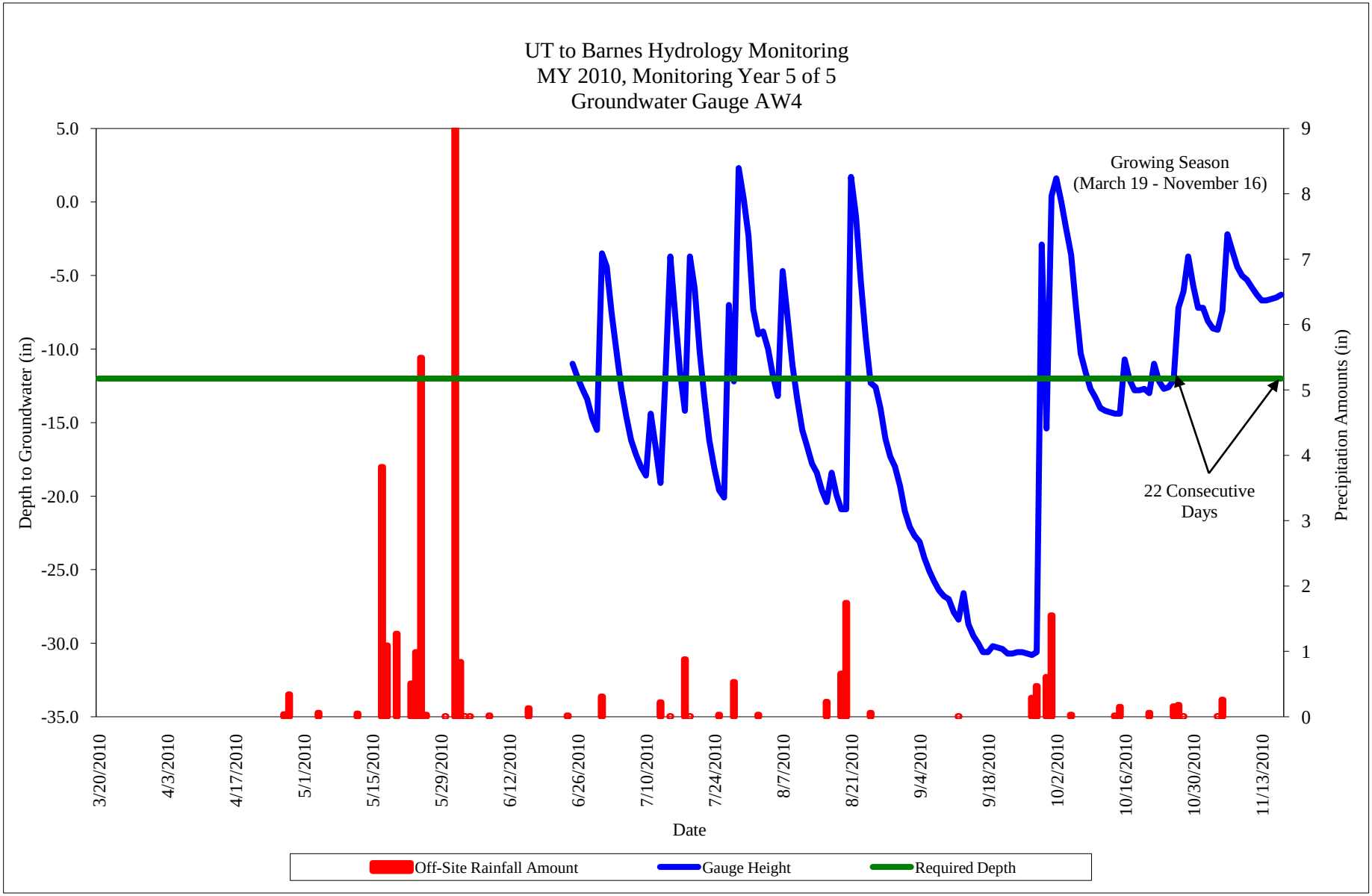
Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



Appendix 5.1 Precipitation - Water Level Plots for Gauges

UT to Barnes Stream and Wetland Restoration/EEP Project No. 397



Appendix 5.2: Wetland Criteria Attainment
UT to Barnes Stream and Wetland Restoration/EEP Project No. 397
Monitoring Year 5 of 5

Summary of Groundwater Gauge Results for Years 1 through 5					
Gauge	**Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)**				
	Year 1 (2006)	**Year 2 (2007)^**	**Year 3 (2008)**	**Year 4 (2009)**	**Year 5 (2010)**
AW1	Yes/10 Days (4%)	Yes/93 Days (38%)	Yes/75 Days (31%)	Yes/114 Days (47%)	No/5 Days (2%)
AW2	Yes/13 Days (5%)	Yes/166 Days (68%)	Yes/77 Days (32%)	Yes/40 Days (17%)	Yes/31 Days (13%)
AW3	Yes/202 Days (83%)	Yes/12 Days (5%)	Yes/143 Days (59%)	Yes/243 Days (100%)	Yes/168 Days (69%)
AW4	Yes/130 Days (53%)	Yes/37 Days (15%)	Yes/108 Days (44%)	Yes/215 Days (89%)	No/22 Days (9%)
MW1*	> 75%	N/A	Yes/89 Days (37%)	Yes/111 Days (46%)	Yes/52 Days (21%)
MW2*	< 50%	N/A	Yes/77 Days (32%)	Yes/103 Days (42%)	
MW3*	< 50%	N/A	No/14 Days (6%)	Yes/129 Days (53%)	Yes/34 Days (14%)
MW4*	< 30%	N/A	Yes/138 Days (57%)	Yes/115 Days (47%)	No/27 Days (11%)

*Four Ecotone monitoring gauges were installed to replace the original manual gauges for the 2008 monitoring year

N/A-2007 monitoring did not commence until August 2007

^Percentages were not calculated by previous monitoring firm