NORTH FORK MOUNTAIN CREEK
STREAM AND WETLAND RESTORATION

FINAL BASELINE MONITORING DOCUMENT AND AS-BUILT BASELINE REPORT

Catawba County, North Carolina
EEP Project No. 94151

Prepared for:

Environmental Banc and Exchange, LLC
909 Capability Drive, Suite 3100
Raleigh, NC 27606

NC Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699

Status of Plan: Final
Data Collection Period: May – June 2012
Submission Date: August 2012

Prepared by:

Stantec Consulting Services, Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

EXECUTIVE SUMMARY

The As-Built/Baseline Monitoring Report presented here includes the monitoring plan success criteria, methodology, and baseline conditions for North Fork Mountain Creek Stream and Wetland Restoration Site. This southern Catawba County, North Carolina site is located approximately 6 miles south of Catawba and lies in southeastern Catawba County. North Fork Mountain Creek flows from southwest to northeast, and the tributaries flow from northwest to southeast through the permanent conservation easement.

The overall goal of the North Fork restoration project was to improve water quality and wildlife habitat by restoring a stable stream and riparian buffer system to the project site. The objectives of the project were to restore stream stability and improve aquatic habitat, restore riparian buffer along the stream channels, restore and create wetlands, and establish native vegetation within the permanent conservation easement. The project site is in the full delivery service area and outside of the applicable excluded zones of the Catawba River Basin. The ongoing livestock operations in combination with past land use practices have resulted in highly degraded stream systems and present an opportunity for substantial water quality and riparian ecosystem improvements.

The stream and wetland project will provide numerous ecological and water quality benefits within the Catawba River Basin. While many of these benefits are limited to the project area, others, such as pollutant removal and improved aquatic and terrestrial habitat, have more far-reaching effects. Restoration of the stream channels and riparian buffers using the principles of natural channel design will greatly benefit the stream system by improving biological integrity, increasing dissolved oxygen, and moderating the pH level and water temperature.

During construction, unforeseen conditions led to field changes in the construction of the project as compared to the design presented within the mitigation plan. These conditions provided both opportunities and challenges and allowed the project to better incorporate bedrock, more efficiently balance cut and fill and basically function better within the existing landscape. Despite these changes, the project is still in compliance with the objectives of the mitigation plan and adheres to the mitigation needs and intent of the project. The project also continues to comply with the guidelines of the 401/404 permit. For the purposes of this report, the adjusted field design was used for all mentions and depictions of design data.

As per guidance at the time of permitting, the stream, wetlands and vegetative community will be monitored for seven years or until success criteria are met. All four stream reaches will be visually monitored at least twice per year. Twenty-six permanent cross-sections will be surveyed in years 1, 2, 3, 5 and 7 on all stream reaches to assess stability of the system. Two crest gauges will be observed each monitoring visit; one is located on the downstream end of Reach 2 and the other is located on the downstream end of Reach 4. At least two bankfull events must occur during the seven year monitoring period with the events occurring in different years. Restored and created wetlands will be visually assessed at least twice each monitoring year. Groundwater within typical wetlands of each type will be monitored using ten automated groundwater gauges. Based on data collected onsite, an 8% hydroperiod during the growing season will be used as success criteria for this project. Restored wetland hydrology will also be compared to the reference wetland hydrology.

Vegetative sample plots will be quantitatively monitored in the fall of monitoring years 1, 2, 3, 5 and 7. Fourteen vegetation plots will be monitored using the Carolina Vegetation Survey methodology version 4.2 (Lee 2008). The plots will be monitored until monitoring year 7 or longer if success criteria are not met. The vegetative success of the restoration site will be evaluated based on species density and survival rates. Vegetation monitoring will be considered successful if at least 210 stems/acre (trees and shrubs) are surviving at the end of seven years.

Table of Contents

Executive Summary i
1.0 Project Goals, Background and Attributes 1
1.1 Location and Setting 1
1.2 Project Goals and Objectives 1
1.3 Project Structure, Restoration TYPE, and Approach 2
1.3.1 Project Structure 2
1.3.2 Restoration Type and Approach 2
1.4 Project History, Contacts, and Attribute Data 3
2.0 Success Criteria 5
2.1 Morphologic Parameters and Channel Stability 5
2.1.1 Dimension 5
2.1.2 Pattern and Profile 5
2.1.3 Substrate 5
2.1.4 Sediment Transport 5
2.2 Vegetation 5
2.3 Hydrology 6
2.3.1 Streams 6
2.3.2 Wetlands 6
3.0 Monitoring Plan Guidelines 7
3.1 Hydrology 7
3.1.1 Wetland 7
3.1.2 Stream 7
3.2 Stream Channel Stability And Geomorphology 7
3.2.1 Dimension 7
3.2.2 Profile 8
3.2.3 Pattern 8
3.2.4 Substrate 8
3.2.5 Visual Assessment 8
3.2.6 Bank Stability Assessments 8
3.3 Vegetation 8
3.4 Photo Stations 9
3.5 Watershed 9
3.6 Monitoring Plan View 9
4.0 Maintenance and Contingency Plans 10
5.0 As-Built Conditions / Baseline 11
5.1 As-Built/Record Drawings 11
5.2 Baseline Data (Year 0) 11
5.2.1 Channel Morphology 11
5.2.2 Verification of Plantings 12
5.2.3 Photo Documentation 12
5.2.4 Hydrology 12
6.0 References 13
7.0 Appendices 15
Appendix A General Tables and Figures
Appendix B Morphological Summary Data and Plots
Appendix C Vegetation Data
Appendix D As-Built Plan Sheets
Appendix E Final Conservation Easement

This page intentionally left blank for double sided printing.

1.0 Project Goals, Background and Attributes

1.1 LOCATION AND SETTING

The North Fork Mountain Creek Restoration Site is located approximately 6 miles south of Catawba, North Carolina and lies in southeastern Catawba County (Figure 1, Appendix A). The project stream is a section of North Fork Mountain Creek (Reach 4) and an Unnamed Tributary (UT) of North Fork Mountain Creek (Reach 1, Reach 2, and Reach 3). The project is located within the piedmont region of the Catawba River Basin (NCDWQ Sub-basin 03-08-32) and is within the United States Geological Survey (USGS) 14-digit Hydrologic Unit Code 03050101150030. The reaches are all perennial streams and are located within an easement owned by the State of North Carolina on property owned by Hunsucker Farms, LLC. The land surrounding the project is primarily cattle pasture with forested areas to the south and west.

1.2 PROJECT GOALS AND OBJECTIVES

The goals of the North Fork Mountain Creek Stream Restoration Project include restoration of stream channel dimension, pattern, and profile, and wetland restoration. Restoration of stream morphology and subsequent connectivity of the stream channel to its adjacent floodplain and riparian zone will reduce sediment-related water quality impacts and reduce scour and incision. Construction of in-stream structures and riffle-pool sequences will improve aquatic habitat diversity. Restoration of floodplain wetlands will improve water quality and provide important habitat. Planting of native riparian vegetation will restore wetland and riparian buffer function as well as stabilize the banks. Restoration of full ecological potential will create stream and wetland mitigation credit in the Catawba River Basin.

The objective of a Priority I project is to replace the incised channel with a new, stable stream at a higher elevation. This is accomplished by excavating a new channel with the appropriate dimension, pattern and profile (based on reference-reach data) to fit the watershed and valley type (NCSRI 2004). The reconnection of the channel to its original floodplain will raise the water table at the site and likely restore hydrology to additional wetland areas.

Some reaches were restored using a combination of Priority I and Priority II natural channel design. The objective of a Priority II project is to create a new, stable stream and floodplain at the existing channel-bed elevation. This is accomplished by excavating a new floodplain and stream channel at the elevation of the existing incised stream. The new channel is designed with the appropriate dimension, pattern and profile (based on reference reach data) to fit the floodplain (NCSRI 2004).

The specific restoration goals below address water quality, habitat, and hydrology.

Goals	*Objectives*
Improve stream stability	Restore 5,299 linear feet of stream through Priority I and II natural channel design
Improve water quality both locally and in downstream waters	Reduce sediment load by reducing bank erosion using natural channel design Expand the riparian buffer by planting native hardwood trees and protecting at least 50 linear feet on each side of the new channel. Fence cattle out of the proposed easement area
Improve the riparian vegetative community and terrestrial habitat	Convert pastureland to native forest by planting native riparian hardwood trees and seed
Restore and create riparian wetlands onsite	Improve the hydrology by increasing groundwater recharge, groundwater and surface water storage, and groundwater/surface water interaction by lowering the floodplain and raising the water table
Improve the aquatic habitat onsite	Coarsen the stream bed and provide structure and shade to the stream

1.3 PROJECT STRUCTURE, RESTORATION TYPE, AND APPROACH

1.3.1 Project Structure

More than 5,299 linear feet of stream were restored, and 4.44 acres of wetland were restored or created in the North Fork Mountain Creek restoration project. Segmenting the project into individual components resulted in four distinct restoration reaches. These reaches were determined based on existing stream order, stream type, restoration level (Rosgen Priority I, Priority II), existing and design stream Rosgen classification (e.g. B4, C4), and several other design considerations.

The restoration areas are outlined in the Project Components Table (Table 1) and are also depicted in the Project Asset Maps (Figures 2A and 2B).

1.3.2 Restoration Type and Approach

The restored stream channels were designed using Rosgen's Natural Channel Design Methodology (Rosgen 1996). Bankfull cross-sectional areas observed in the field were used as the basis for the design. Where bankfull indicators were not present, Piedmont regional curves were used. Bed roughness was assumed to be equal for all reaches within the design process. Manning's equation was applied to calculate mean velocities and then multiplied by channel area to estimate design discharges for the restoration reaches. While channel roughness may vary slightly from point to point within and among these channels, the overriding similarity between substrate and overbank properties warranted the use of common values. Shear stress and stream power were design constraints; flow velocity was set to a maximum of 3 to 5 ft/s in all reaches. Typical morphological characteristics from stable reference reaches were also used in determining design dimension, pattern, and profile parameters. Additionally, all design

reach parameters (geomorphology, slopes, etc.) were determined with cut/fill balance in mind, and then verified with hydraulic analysis for shear stress, stream power, and flood hydraulics.

A combination of Priority I (PI) and Priority II (PII) restoration techniques were implemented on the restoration reaches in order to work with existing valley confinements in addition to optimizing cut/fill requirements and reducing construction costs. In general, three channel types have been used for the design of the restoration reaches: B4, B4c, and C4. Structures have been placed throughout the reaches to provide grade control, bank stability, redirection of flows, and stream habitat improvement. Primary structures include woody debris toe sod mats, log step pools, constructed log/rock riffles, rock cross vanes, brush mattresses and J-hooks.

Wetlands on the North Fork Mountain Creek project site were significantly increased through the restoration and creation of riverine floodplain wetlands along the restored stream channel and the enhancement of existing wetland areas through the selective planting of hardwood species. Additionally, the entire floodplain of North Fork Mountain Creek and its tributaries is protected by a permanent conservation easement, increasing the functional uplift of the entire system. Re-connecting the stream channel to its floodplain by raising the stream bed elevation allows more frequent overbank flooding to occur within the stream valley. This overbank flooding along with natural seeps provides the hydrology needed to support the wetland community within the project area. A few existing swales were removed and the site was graded such that water will be allowed to pool in the floodplain.

As previously discussed, the target vegetative community is a Piedmont/Low Mountain Alluvial Forest along the restored stream channel and Mesic Mixed Hardwood Forest on the side slopes as described by Schafale and Weakley's Classification of the Natural Communities of North Carolina (1990). Based on the grading plans, site elevations, predicted flooding, stream type, local seed source and best professional judgment, the North Fork Mountain Creek Site has been divided into four planting zones. The planting plan is presented within the design sheets in the As-built Plan Set in Appendix D.

1.4 PROJECT HISTORY, CONTACTS, AND ATTRIBUTE DATA

The 960-acre project watershed is located in the western-most portion of the Piedmont Physiographic Province. Elevations on the NFMC Site range from approximately 870 to 1,065 feet above mean sea level. The soil survey for Catawba County (USDA-NRCS, 2010) indicates that the riparian corridor of the entire project area is underlain by Chewacla loam (ChA). Chewacla is listed as Hydric B, a soil map unit with hydric inclusions, by the Natural Resource Conservation Service (NRCS) and is identified as a somewhat poorly drained soil that occurs in floodplains.

Historic aerial photos (1961, 1976, 1983, 1993, and 2006) were reviewed. Historically the area was used almost exclusively for agriculture as it continues to be today. One of the more destructive present day agricultural practices to watersheds is livestock foraging in the stream channels, which causes hoof shear to the beds and banks.

Today approximately 50% of the watershed consists of agricultural pasture/hay, and approximately 40% is comprised of mixed forest. The remaining area is comprised of scattered single-family homes, herbaceous land, and two-lane roadways. Buffalo Shoals Road (SR 1003) borders the watershed to the west while Little Mountain Road (SR 1815) borders the watershed to the south. In general, the

surrounding land use creates desirable restoration conditions due to the low amount of impervious surfaces and the unlikelihood of future development in the watershed as described below.

This portion of Catawba County is zoned 'R – 40' which is intended to accommodate low-density single-family detached dwellings and duplexes, at a maximum density of one dwelling unit per acre. Agricultural activities are also allowed within this zone (Catawba County 2007). The Hunsucker Farms, LLC parcel is also listed as participating in the Voluntary Agricultural District Program (Catawba County 2010). Given the high level of agricultural activity in the area, land use within the watershed is not expected to change, and development is not expected to increase enough to cause significant changes in the stream hydrograph. If development does occur in the future, the streams will be protected to some degree by the restored buffers onsite.

Refer to Tables 2-4 in Appendix A for additional project details.

2.0 Success Criteria

2.1 MORPHOLOGIC PARAMETERS AND CHANNEL STABILITY

Success criteria pertain to the stability of the restored channel's dimension, pattern, and sediment transport. The restored channel must demonstrate the general maintenance of a stable cross-section and have hydrologic access to the floodplain over the monitoring period. The restoration reach should mimic reference reach conditions and the channel will be considered stable if there are little or insignificant changes from the as-built dimensions. Some change in stream dimension is natural and expected.

2.1.1 Dimension

Physical success of a restored stream (in the context of dimension) is conventionally determined by assessment of bed and bank stability. Thorough investigation of stability requires monitoring changes in dimensions of the channel over time as compared to known stable conditions (design and/or reference reach). Channel dimension changes should be compared to the range of values seen in the reference reach and design approach. Significant departure from these design/reference parameters (dimensionless ratios) would cause concern about the stability of the system. Please see the morphological table provided as Table 5 in Appendix B for a summary of these parameters.

2.1.2 Pattern and Profile

As per the recent guidance, pattern and profile data were only collected during the baseline survey.

2.1.3 Substrate

Following construction, the channel will experience a range of flows with associated sediment loads (size and volume) and will subsequently naturalize. Once the constructed channel naturalizes, then the particle size distribution for each reach should remain consistent throughout the monitoring period and thereafter.

2.1.4 Sediment Transport

In terms of sediment transport, no significant aggradation or depositional trends should occur over the monitoring period. Subsequent monitoring (following as-built conditions) may account for a greater range of events and more accurately reflect success of sediment transport.

2.2 VEGETATION

The vegetative success of the Piedmont/Low Mountain Alluvial Forest and the Mesic Mixed Hardwood Forest will be evaluated based on the species density and survival rates. As per the 404 permit special conditions, vegetation monitoring will be considered successful if at least 210 planted woody stems/acre are surviving at the end of seven years.

2.3 HYDROLOGY

2.3.1 Streams

A minimum of two-bankfull events must be documented by the crest gages within the seven year monitoring period. Qualifying events may not occur within the same monitoring year.

2.3.2 Wetlands

As per USACE guidelines, wetlands exhibiting water within 12 inches of the surface consecutively between 5% and 12.5% of the growing season in most years may be considered wetlands. The most recent 30 years of climate station (growing season) data for Catawba County is not available; therefore data from the previous 30 year interval (1961-1990) was used to determine growing season dates (March 21 to November 11) (Gregory 2002). Based on data collected onsite, an 8% hydroperiod during the hydroperiod will be used as success criteria for this project. Restored wetland hydrology will also be compared to the reference wetland hydrology (USACE 1987 and 1992).

3.0 Monitoring Plan Guidelines

3.1 HYDROLOGY

3.1.1 Wetland

The wetland restoration and creation areas will be monitored annually for seven years following construction or longer until success criteria are met. Groundwater within typical wetlands of each type will be monitored using ten automated groundwater gauges. Refer to the Project Asset Map in Appendix A for the locations of the automated groundwater gauges.

3.1.2 Stream

Two crest gages were installed on the site post-restoration. The crest gages will be monitored to verify that at least two bankfull events occur over the 7 year monitoring period. In order for the monitoring to be considered complete, the two verification events must occur in separate monitoring years. One gauge was placed near the downstream end of Reach 2, and the other was placed near the downstream end of Reach 4.

3.2 STREAM CHANNEL STABILITY AND GEOMORPHOLOGY

The stability of the stream channel will be monitored for seven years or until success criteria are met. A visual assessment of stream stability will be conducted along all reaches yearly. Visual assessment will include observations of problem areas, documented by photos and location display on aerial photos.

The entire project will be monitored in depth for dimension and pattern as detailed below. Cross-sections were established on the reaches to monitor stream dimensions. Cross sectional surveys and pebble counts will occur in years 1, 2, 3, 5, and 7. As vegetation establishes and the channels stabilize, the channels' cross-sections are expected to tighten slightly; however, the cross-sections should not indicate down-cutting or widening. Monitoring efforts will evaluate any changes by overlaying each year's cross-sections with the previous years' for comparison.

3.2.1 Dimension

After construction, permanent cross-sections were established. Cross-sections were established in 14 riffles and 12 pools. Cross-sectional surveys will occur in years 1, 2, 3, 5, and 7. Data collected will include, at a minimum, cross-sectional area, bankfull width, bankfull mean depth, bankfull max depth, flood-prone width, width-to-depth ratio, and entrenchment ratio. Stream type will be determined in riffle cross-sections only.

3.2.2 Profile

As per the recent guidance, longitudinal profile will only be collected during the baseline survey. Instead, extra cross-sections will continue to be monitored for the 7-year monitoring period.

3.2.3 Pattern

As per the recent guidance, pattern will not be monitored. Extra cross-sections will instead be monitored.

3.2.4 Substrate

Reach-wide pebble counts and pebble counts in the riffle cross-sections will be completed in monitoring years 1, 2, 3, 5 and 7. Counts will be conducted using the modified Wolman Pebble Count Procedure (Rosgen 1994). Data reported will include the d50 and d84 particle sizes.

3.2.5 Visual Assessment

A visual assessment of stream stability will be conducted along all reaches yearly. Visual assessments will include observations of problem areas, documented by photos and location display on aerial photos.

3.2.6 Bank Stability Assessments

Post-restoration, BEHI and near bank stress will not be monitored.

3.3 VEGETATION

Vegetative sample plots will be quantitatively monitored during September of monitoring years 1, 2, 3, 5 and 7. Vegetation will be monitored as per the CVS-EEP Protocol for Recording Vegetation, version 4.2 (CVS-EEP 2008) and includes analysis of species composition, density, and survival. Visual assessments will be performed in monitoring years 4 and 6. The plots will be monitored until monitoring year 7 or longer if success criteria are not met. Fourteen $100m^2$ plots were established within the project area. In each plot, four plot corners were permanently located with conduit and are included in the monitoring plan sheets. Planted vegetation (Level 1) will be recorded for the baseline monitoring and Monitoring Year 1, while both planted vegetation and natural volunteers (Level 2) will be recorded for Monitoring Years 2, 3, 5 and 7. Baseline monitoring data is provided in the Appendix C data tables. Refer to the Project Asset Maps in Appendix A for the locations of the Vegetation Plots.

Any stream and/or vegetative problem areas in the project will be noted and reported in each subsequent monitoring report. Stream problem areas include beaver activity, bank stability, structure function, and channel stability. Vegetative problem areas include areas that either lack vegetation or include populations of exotic vegetation.

3.4 PHOTO STATIONS

Representative photo reference points have been identified and located using a Global Positioning System. The stations are shown on the Project Asset Maps in Appendix A. Photos will be taken at each location at approximately the same time each year. Stream photos will be taken during the annual stream survey events. Stream station photos for the baseline monitoring year are provided in Appendix B. Vegetation plot photos will be taken during the annual vegetation monitoring events. Vegetation station photos for the baseline monitoring year are provided in Appendix C.

3.5 WATERSHED

Due to the rural nature of the area, major land use changes are not anticipated to take place in the watershed. If problems with the stream begin to occur, the land use within watershed will be assessed. Relevant items, including changes in impervious surface percentage, will be analyzed and taken into account during any potential repairs.

3.6 MONITORING PLAN VIEW

A plan view of the monitoring scheme is presented in the As-Built Plan Sheets in Appendix D.

4.0 Maintenance and Contingency Plans

Any maintenance needs will be determined during monitoring visits. During the baseline monitoring year upon completion of construction, the contractor must address any issues under their warranty. In subsequent monitoring years, the monitoring firm will determine maintenance needs. Small maintenance tasks that can be completed by hand may be performed by the monitoring firm while any large maintenance items will be coordinated with NCEEP to determine the appropriate course of action.

The monitoring firm will visually assess the site to verify that the stream and wetland are functioning as needed and note any adjustments that may be necessary. It is not anticipated that invasive plant species will be a significant problem onsite. During the monitoring, any invasive species problems will be noted and specific management options will be proposed.

5.0 As-Built Conditions / Baseline

5.1 AS-BUILT/RECORD DRAWINGS

Site grading was completed in May 2012. The as-built survey was completed by Stantec Consulting Services, Inc. on June 29th, 2012. The As-Built Plan Sheets are located in Appendix D. Planting was completed on May 21st and the baseline vegetation data collection was performed by Equinox Environmental Consultation and Design, Inc. on May 25, 2012.

5.2 BASELINE DATA (YEAR 0)

5.2.1 Channel Morphology

5.2.1.1. Profile

The entire lengths of the North Fork Mountain Creek restoration reaches were surveyed by Stantec staff using survey-grade GPS to assess baseline conditions. Multiple parameters were located including top of bank, thalweg, and water surface. The longitudinal profile is shown in Appendix B. Comparison of the as-built data with the design data indicates that construction is consistent and within the acceptable design range. Field changes led to adjustments in the thalweg elevation near the downstream end of the project to encourage the most appropriate and stable channel for the system. At the end of construction, the channel was stable.

5.2.1.2. Dimension

In general, the As-Built survey demonstrates that the project overall was built in accordance to the design specifications. Twenty-six cross sections on the restoration reaches were surveyed by Stantec staff. Baseline morphological data is presented in Table 5 and 6 in Appendix B, along with the cross-sectional data at the twenty-six permanent cross sections. Comparison of the As-Built data with the design data indicates that, in general, the constructed cross sections are consistent with the design. The bankfull area is consistent with design. As a result, the channel will have the ability to naturally adjust toward the intended B and C-type channels.

5.2.1.3. Pattern

The pattern of the restoration reaches was picked up during both the As-Built and the baseline morphology survey. The location is shown on both the component map in Appendix A as well as in the As-Built plan sheets in Appendix D. Morphological calculations are included in Table 5 in Appendix B. The pattern values lie within the design parameters for a stable channel.

5.2.2 Verification of Plantings

Equinox staff completed the As-Built vegetation monitoring on May 25, 2012. Throughout the project site, it was found that many of the plants had survived and are exhibiting robust growth. Approximately 15% of the plants sampled were dead or unlikely to survive, and the remaining 85% of plants are healthy and are likely to survive. *Platanus occidentalis* and *Fraxinus pennsylvanica* showed the most vigor out of the planted species. All of the vegetation plots exhibited more than sufficient viable plant density. Most of the livestakes were alive and had sprouted new stems since planting.

The May 2012 baseline vegetation monitoring was completed using CVS-EEP Protocol for Recording Vegetation, version 4.2 (CVS-EEP 2008) in fourteen plots; two along Reach 1, five along Reach 2, two along Reach 3, and five along Reach 4. According to the data collected, the average plant density is 989 stems/acre, and the highest densities occurred along Reach 2. The original planting plan specified 681 stems/acre.

5.2.3 Photo Documentation

Photo stations were established in 52 locations along the project and include stream cross-section photos and vegetation plot photos, among others. The location of the stations can be seen on the Project Asset Maps in Appendix A. Baseline station photos for the veg plots were taken on May 25, 2012 during the baseline vegetation monitoring. Baseline station photos for the stream were taken on June 27, 2012 during the As-Built survey data collection.

5.2.4 Hydrology

Two crest gauges were installed onsite on May 25, 2012; one on the downstream end of Reach 2 and one on the downstream end of Reach 4. At the time of the baseline monitoring, no bankfull events had occurred since construction. The gauge will be used in future monitoring to verify occurrences of bankfull events.

6.0 References

Catawba County 2007. Catawba County Unified Development Ordinance. Hickory, NC. http://www.catawbacountync.gov/depts/planning/udo/default1.asp

Catawba County 2010. Catawba County GIS Real Estate Search (Online GIS). Accessed October 4, 2010. http:www.gis.catawba.nc.us/website/Parcel/parcel_main.asp

Gregory, James D. 2002. Hydric Soils and Growing Season: Wetland Delineation Data for North Carolina. Department of Forestry, NC State University, Raleigh, NC.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

NCEEP. 2007. Catawba River Basin Priorities 2007. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, NC.

NCEEP. 2010a. Procedural Guidance and Content Requirements for EEP Monitoring Reports. North Carolina Department of Environment and Natural Resources, Ecosystems Enhancement Program. Raleigh, NC. Version 1.3, January 15, 2010.

NCEEP. 2010b. Baseline Monitoring Document Format, Data Requirements, and Content Guidance. North Carolina Department of Environment and Natural Resources, Ecosystems Enhancement Program. Raleigh, NC. Version 2.0, October 14, 2010.

NCEEP 2011. Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. North Carolina Department of Environment and Natural Resources, Ecosystems Enhancement Program. Raleigh, NC. November 7, 2011.

NCSRI 2004. Stream Restoration: A Natural Channel Design Handbook. North Carolina Stream Restoration Institute and North Carolina Sea Grant.
http://www.bae.ncsu.edu/programs/extension/wqg/srp/sr_guidebook.pdf

Rosgen, D. 1994. A Classification of Natural Rivers. *Catena* 22:169-199. Elsevier, Amsterdam.

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

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina Third Approximation. North Carolina Natural Heritage Program, Raleigh, NC.

USACE 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. US Army Corps of Engineers, Washington, DC.

USACE 1992. Clarification and Interpretation of the 1987 Manual. Memo to USACE districts from Headquarters, US Army Corps of Engineers, Washington, DC, March 6, 1992; signed by MG Arthur E. Williams, Directorate of Civil Works.

USDA-NRCS 2010. Web Soil Survey for Catawba County. http://www.websoilsurvey.nrcs.usda.gov. Accessed October 4, 2010.

7.0 Appendices

Appendix A – General Tables and Figures

Appendix B – Morphological Summary Data and Plots

Appendix C – Vegetation Data

Appendix D – As-Built Plan Sheets

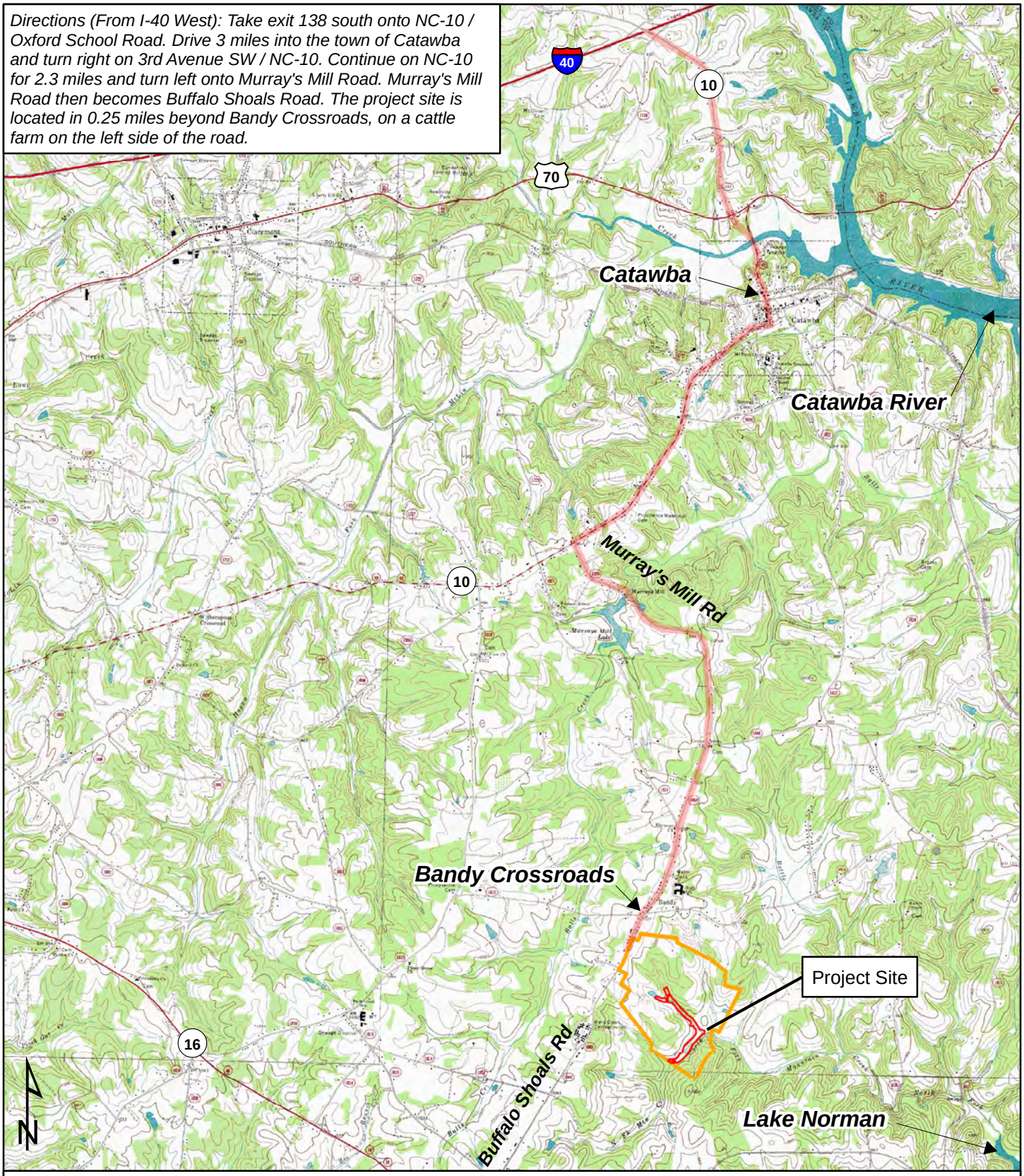
Appendix E – Final Conservation Easement

This page intentionally left blank for double sided printing.

Appendix A - General Tables and Figures

This page intentionally left blank for double sided printing.

Directions (From I-40 West): Take exit 138 south onto NC-10 / Oxford School Road. Drive 3 miles into the town of Catawba and turn right on 3rd Avenue SW / NC-10. Continue on NC-10 for 2.3 miles and turn left onto Murray's Mill Road. Murray's Mill Road then becomes Buffalo Shoals Road. The project site is located in 0.25 miles beyond Bandy Crossroads, on a cattle farm on the left side of the road.



Easement

Property boundary

0 0.5 1 2 Miles

Figure 1 - Vicinity Map
North Fork Mountain Creek
Stream and Wetland Project
Catawba County, NC

USGS 7.5 Min Quadragles:
Denver, Catawba, Newton, Maiden

Stantec

EBX

(This page intentionally left blank)

This map is not a certified survey and has not been reviewed by a local government agency for compliance with any applicable land development regulations.

- Crest gauges
- Groundwater monitoring wells (Well 1-10)
- Photo points (S = Stream, V = Veg)
- As-built bankfull MY0
- As-built stream restoration centerline (MY0)
- Stream cross-section surveys (XS 1-26)
- Easement boundary
- Vegetation monitoring plots (VP 1-14)

Wetland Type

- Creation
- Existing
- Restoration
- Culverts
- Rock ford crossing
- Property boundary

Drawn by: AEB 7/6/2012
Checked by: KLW 7/6/2012

Stantec

Figure 2 - Asset Map A
North Fork Mountain Creek Stream and Wetland Project
Catawba County, NC
July 2012

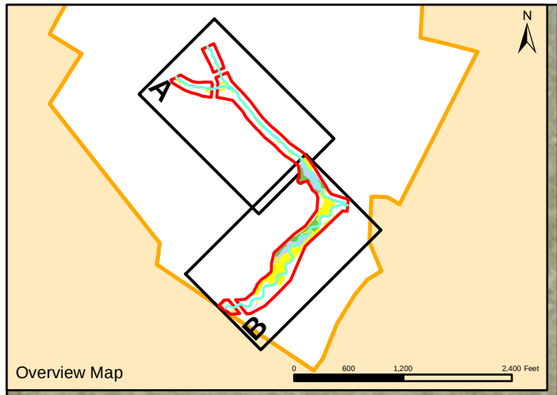
Cross-section Pins	Latitude	Longitude
XS1 Left	35.633861	-81.086923
XS1 Right	35.633762	-81.087018
XS2 Left	35.633667	-81.086849
XS2 Right	35.633653	-81.08698
XS3 Left	35.632551	-81.085912
XS3 Right	35.632507	-81.085971
XS4 Left	35.632492	-81.085831
XS4 Right	35.632455	-81.085892
XS5 Left	35.631634	-81.084767
XS5 Right	35.631541	-81.084897
XS6 Left	35.631605	-81.084726
XS6 Right	35.631522	-81.084843
XS7 Left	35.631169	-81.084151
XS7 Right	35.631094	-81.084273
XS8 Left	35.63107	-81.084045
XS8 Right	35.630973	-81.084106
XS9 Left	35.630521	-81.083355
XS9 Right	35.630489	-81.083479
XS10 Left	35.630416	-81.08325
XS10 Right	35.630369	-81.08332
XS11 Left	35.629911	-81.082912
XS11 Right	35.629871	-81.082948
XS12 Left	35.6329	-81.087216
XS12 Right	35.632822	-81.087209
XS13 Left	35.6329	-81.087101
XS13 Right	35.632816	-81.087147

Cross-section Pins	Latitude	Longitude
XS14 Left	35.626329	-81.086024
XS14 Right	35.626168	-81.085978
XS15 Left	35.626401	-81.085605
XS15 Right	35.626216	-81.085691
XS16 Left	35.62641	-81.085486
XS16 Right	35.626345	-81.085316
XS17 Left	35.626992	-81.08471
XS17 Right	35.626853	-81.084708
XS18 Left	35.627017	-81.084577
XS18 Right	35.626929	-81.084434
XS19 Left	35.627814	-81.084017
XS19 Right	35.627887	-81.083868
XS20 Left	35.628122	-81.08406
XS20 Right	35.628038	-81.083902
XS21 Left	35.628514	-81.083671
XS21 Right	35.628394	-81.083562
XS22 Left	35.628527	-81.083437
XS22 Right	35.628378	-81.083441
XS23 Left	35.628804	-81.083058
XS23 Right	35.628696	-81.083056
XS24 Left	35.62881	-81.082974
XS24 Right	35.628739	-81.082861
XS25 Left	35.629145	-81.082593
XS25 Right	35.629058	-81.082462
XS26 Left	35.629236	-81.082591
XS26 Right	35.62922	-81.082424

Groundwater Wells	Latitude	Longitude
GW1	35.627081	-81.084303
GW2	35.627631	-81.084237
GW3	35.628104	-81.084146
GW4	35.627948	-81.083701
GW5	35.628218	-81.083594
GW6	35.629399	-81.082645
GW7	35.629999	-81.08314
GW8	35.630117	-81.082953
GW9	35.630254	-81.083528
GW10	35.630503	-81.083339
Crest Gauge Reach 2	35.629633	-81.082609
Crest Gauge Reach 4	35.629343	-81.082404

Veg Plot Origin	Latitude	Longitude
VP1	35.63386	-81.086839
VP2	35.633073	-81.087811
VP3	35.632816	-81.087297
VP4	35.632746	-81.086128
VP5	35.632069	-81.085214
VP6	35.631071	-81.084512
VP7	35.630945	-81.083743
VP8	35.630286	-81.083264
VP9	35.629878	-81.0831
VP10	35.628932	-81.082835
VP11	35.628261	-81.083536
VP12	35.62771	-81.084096
VP13	35.626654	-81.084639
VP14	35.62655	-81.085144

(This page intentionally left blank for two-sided printing)

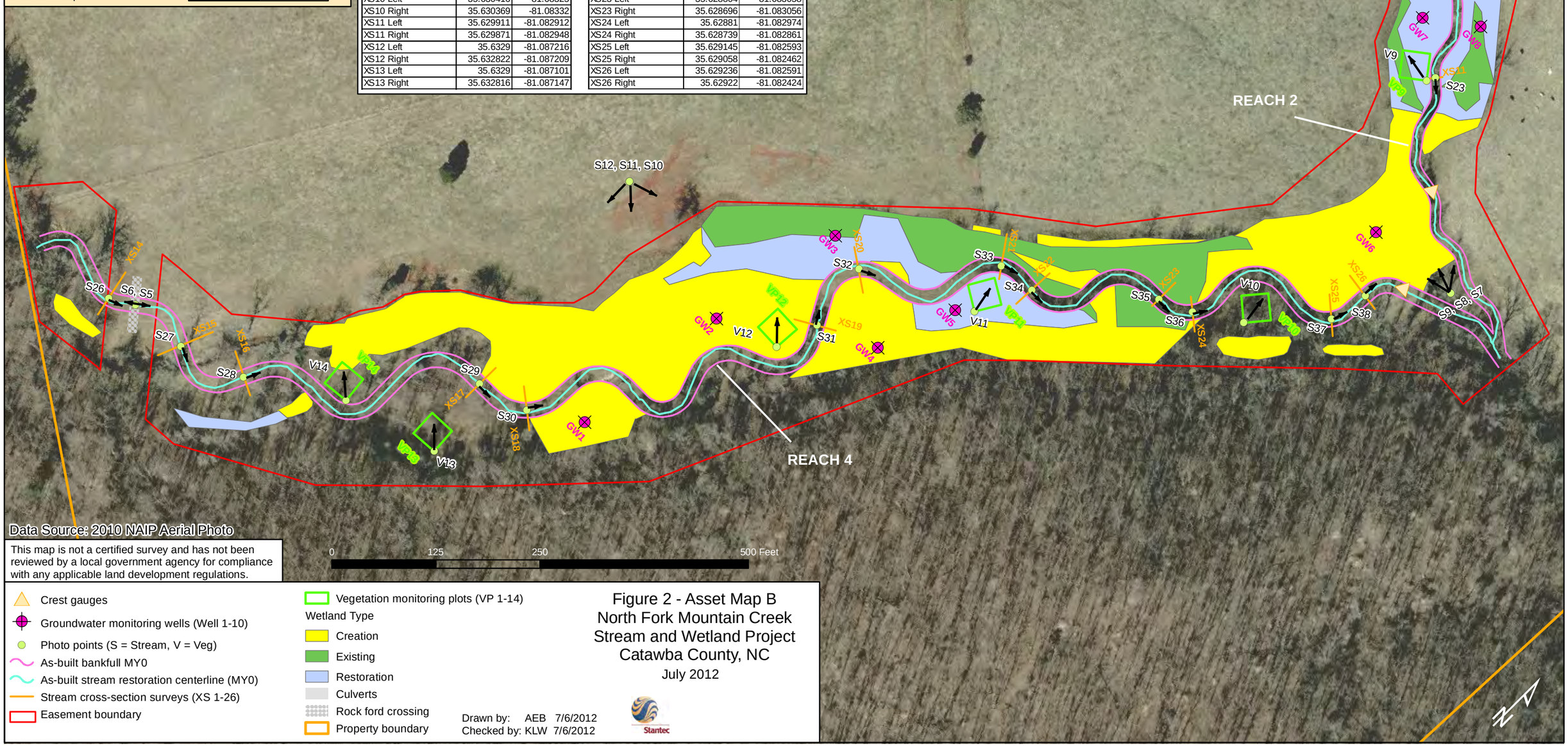


Cross-section Pins	Latitude	Longitude
XS1 Left	35.633861	-81.086923
XS1 Right	35.633762	-81.087018
XS2 Left	35.633667	-81.086849
XS2 Right	35.633653	-81.08698
XS3 Left	35.632551	-81.085912
XS3 Right	35.632507	-81.085971
XS4 Left	35.632492	-81.085831
XS4 Right	35.632455	-81.085892
XS5 Left	35.631634	-81.084767
XS5 Right	35.631541	-81.084897
XS6 Left	35.631605	-81.084726
XS6 Right	35.631522	-81.084843
XS7 Left	35.631169	-81.084151
XS7 Right	35.631094	-81.084273
XS8 Left	35.63107	-81.084045
XS8 Right	35.630973	-81.084106
XS9 Left	35.630521	-81.083355
XS9 Right	35.630489	-81.083479
XS10 Left	35.630416	-81.08325
XS10 Right	35.630369	-81.08332
XS11 Left	35.629911	-81.082912
XS11 Right	35.629871	-81.082948
XS12 Left	35.6329	-81.087216
XS12 Right	35.632822	-81.087209
XS13 Left	35.6329	-81.087101
XS13 Right	35.632816	-81.087147

Cross-section Pins	Latitude	Longitude
XS14 Left	35.626329	-81.086024
XS14 Right	35.626168	-81.085978
XS15 Left	35.626401	-81.085605
XS15 Right	35.626216	-81.085691
XS16 Left	35.62641	-81.085486
XS16 Right	35.626345	-81.085316
XS17 Left	35.626992	-81.08471
XS17 Right	35.626853	-81.084708
XS18 Left	35.627017	-81.084577
XS18 Right	35.626929	-81.084434
XS19 Left	35.627814	-81.084017
XS19 Right	35.627887	-81.083868
XS20 Left	35.628122	-81.08406
XS20 Right	35.628038	-81.083902
XS21 Left	35.628514	-81.083671
XS21 Right	35.628394	-81.083562
XS22 Left	35.628527	-81.083437
XS22 Right	35.628378	-81.083441
XS23 Left	35.628804	-81.083058
XS23 Right	35.628696	-81.083056
XS24 Left	35.62881	-81.082974
XS24 Right	35.628739	-81.082861
XS25 Left	35.629145	-81.082593
XS25 Right	35.629058	-81.082462
XS26 Left	35.629236	-81.082591
XS26 Right	35.62922	-81.082424

Groundwater Wells	Latitude	Longitude
GW1	35.627081	-81.084303
GW2	35.627631	-81.084237
GW3	35.628104	-81.084146
GW4	35.627948	-81.083701
GW5	35.628218	-81.083594
GW6	35.629399	-81.082645
GW7	35.629999	-81.08314
GW8	35.630117	-81.082953
GW9	35.630254	-81.083528
GW10	35.630503	-81.083339
Crest Gauge Reach 2	35.629633	-81.082609
Crest Gauge Reach 4	35.629343	-81.082404

Veg Plot Origin	Latitude	Longitude
VP1	35.63386	-81.086839
VP2	35.633073	-81.087811
VP3	35.632816	-81.087297
VP4	35.632746	-81.086128
VP5	35.632069	-81.085214
VP6	35.631071	-81.084512
VP7	35.630945	-81.083743
VP8	35.630286	-81.083264
VP9	35.629878	-81.0831
VP10	35.628932	-81.082835
VP11	35.628261	-81.083536
VP12	35.62771	-81.084096
VP13	35.626654	-81.084639
VP14	35.62655	-81.085144



This map is not a certified survey and has not been reviewed by a local government agency for compliance with any applicable land development regulations.

- Crest gauges
- Groundwater monitoring wells (Well 1-10)
- Photo points (S = Stream, V = Veg)
- As-built bankfull MY0
- As-built stream restoration centerline (MY0)
- Stream cross-section surveys (XS 1-26)
- Easement boundary
- Vegetation monitoring plots (VP 1-14)

Wetland Type

- Creation
- Existing
- Restoration
- Culverts
- Rock ford crossing
- Property boundary

Figure 2 - Asset Map B
North Fork Mountain Creek
Stream and Wetland Project
Catawba County, NC
July 2012

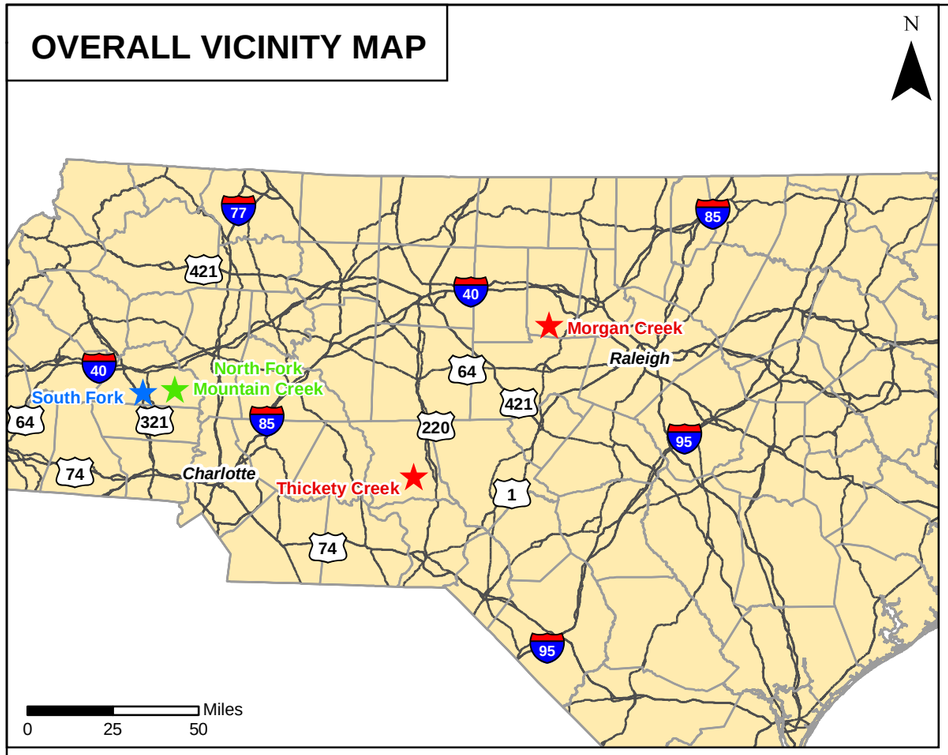
Drawn by: AEB 7/6/2012
Checked by: KLW 7/6/2012

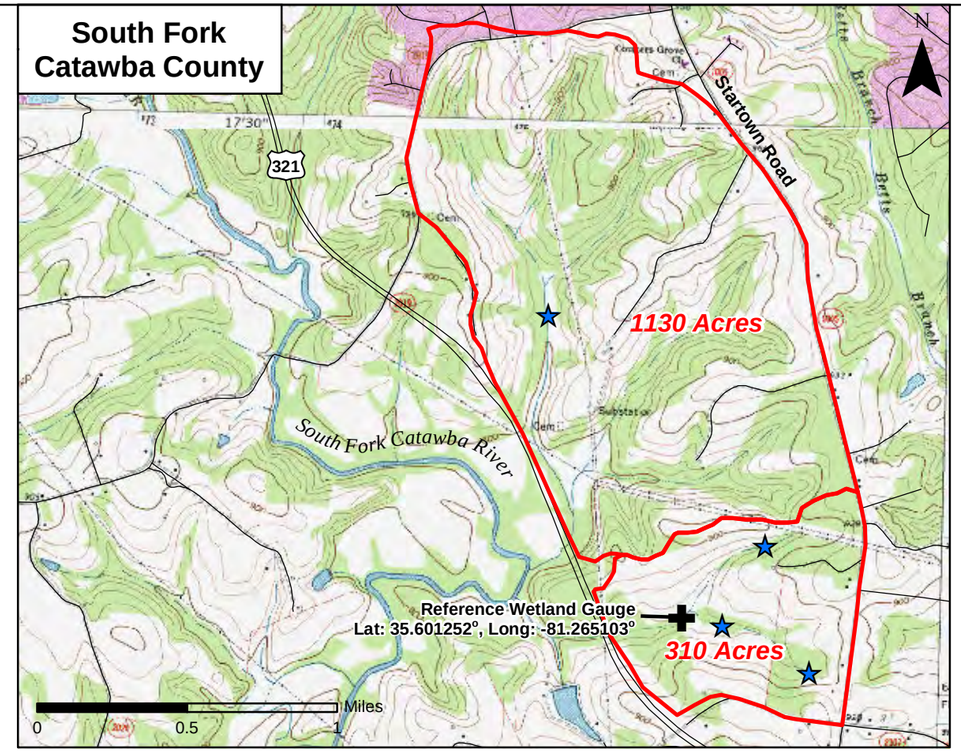
Stantec

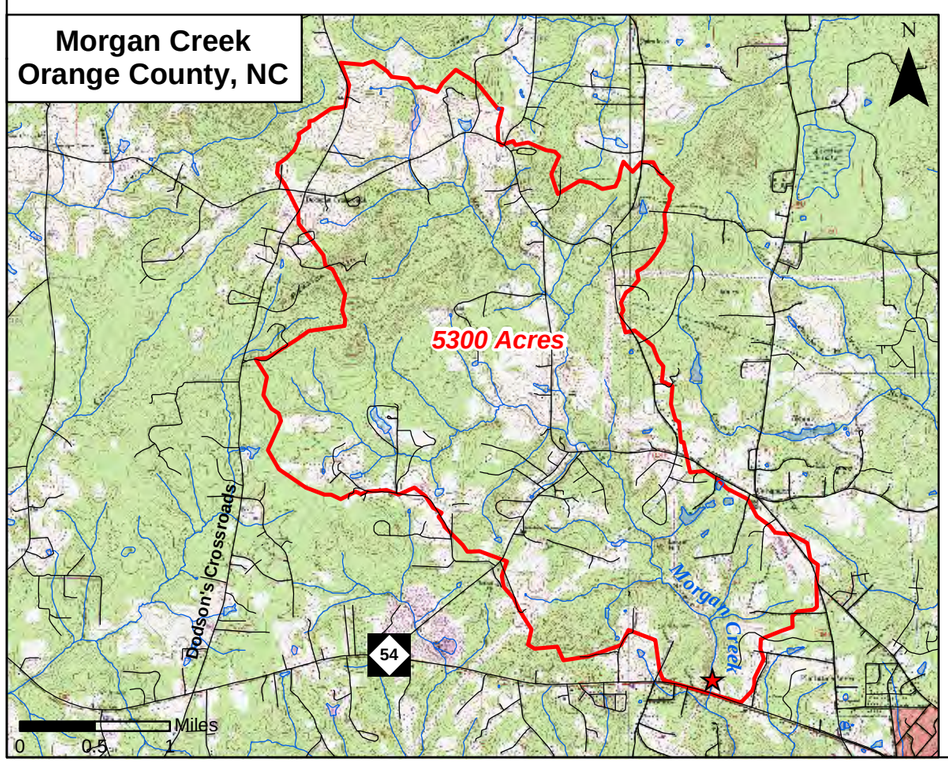
(This page intentionally left blank for two-sided printing)

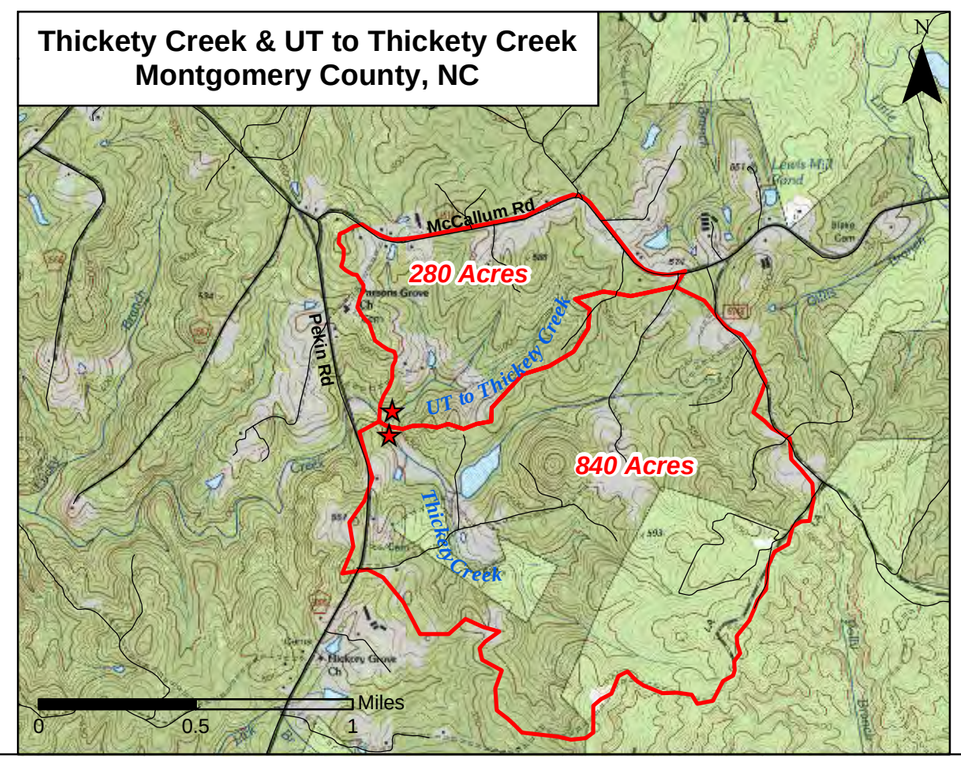
Figure 3 - Reference Sites Vicinity & Watershed Map

North Fork Mountain Creek
Stream and Wetland Project
Catawba County, NC









Overall Vicinity Map

- County Boundaries
- Roads
- Project Site

Reference Area Maps

- Reference Wetland Gauge
- Roads
- Reference Watersheds
- Reference Streams
- Reference Wetlands

USGS 7.5' Topographic Quadrangles

South Fork: Hickory, Reepsville
Morgan Creek: White Cross, Chapel Hill
Thickety Creek: Biscoe

Stantec

(This page intentionally left blank for two-sided printing)

Table 1 - Project Components

North Fork Mountain Creek Stream and Wetland Restoration (EEP# 94151)

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	5,299		1.17	1.64					

Project Components

Project Component or Reach ID	Stationing/Location	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	Comment
Reach 1	Upper end of Unnamed Tributary 1 (UT1)	698	R(P1)	R	698	1:1	Restoration - Stream channel was elevated to reconnect with floodplain, a 60' wide stream crossing was subtracted from the total length.
Reach 2	Downstream portion of UT1, flows into Reach 4	1,542	R(P1)	R	1,756	1:1	Restoration - Stream channel was elevated to reconnect with floodplain.
Reach 3	Small stream (UT2) draining from onsite farm pond, flows into Reach 1	598	R(P1)	R	614	1:1	Restoration - Stream channel was elevated to reconnect with floodplain, a 60' wide stream crossing was subtracted from the total length.
Reach 4	North Fork Mountain Creek main channel	2,245	R(P1 and P2)	R	2,231	1:1	Restoration - Stream channel was elevated to reconnect with floodplain, a 60' wide ford crossing was subtracted from the total length.
Wetland Restoration	Along Reaches 1, 2, 3, and 4		R	R	1.17	1:1	Restoration - Stream channels have been elevated to reconnect with floodplain, and all areas have been planted.
Wetland Creation	Along Reaches 2 and 4		C	RE	3.27	2:1[+]	Creation - Areas that lacked hydric soil characteristics, but were in similar landscape positons as the restored wetlands. These areas were planted throughout.

Component Summations

Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Riparian Wetland (Ac)	Buffer (Ac)	Upland (Ac)
		Riverine	Non-Riverine			
Restoration	5,299	1.17				
Enhancement						
Enhancement						
Enhancement I						
Enhancement II						
Creation		3.27				
Preservation						
HQ Preservation						

BMP Elements

Element	Location	Purpose/Function	Notes

R = Restoration, RE = Restoration Equivalent, C = Creation, P1 = Priority 1, P2 = Priority 2

=Not Applicable

Existing wetlands were not included in the mitigation summary above because wetland preservation was not an allowable mitigation credit as per the RFP.

[+] Wetland creation mitigation ratio was agreed upon by USACE during the 401/404 permitting process.

Table 2 - Project Activity and Reporting History North Fork Mountain Creek Stream and Wetland Restoration (EEP# 94151)		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Restoration Plan	July, 2011	July, 2011
Final Design - Construction Plans	N/A	October, 2011
Construction	N/A	May, 2012
Temporary S&E mix applied to entire project	N/A	May, 2012
Permanent seed mix applied to Reach	N/A	May, 2012
Mitigation Plan / As-Built (Year 0 Monitoring - baseline)	June, 2012	August, 2012
Supplemental Planting	N/A	N/A
Year 1 Monitoring	N/A	N/A
Year 2 Monitoring	N/A	N/A
Year 3 Monitoring	N/A	N/A
Year 4 Monitoring	N/A	N/A
Year 5 Monitoring	N/A	N/A
Year 6 Monitoring	N/A	N/A
Year 7 Monitoring	N/A	N/A

Table 3 - Project Contact Table North Fork Mountain Creek Stream and Wetland Restoration (EEP# 94151)	
Designer Primary Project Design POC	Stantec Consulting, Inc. 801 Jones Franklin Rd. Suite 300 Raleigh, NC 27606 David Bidelspach (919) 218-0864
Construction Contractor Construction Contractor POC	North State Environmental, Inc. 2889 Lowery St. Winston-Salem, NC 27101 Darrell Westmoreland (336) 725-2010 Nate Martin (336) 725-2010
Planting Contractor 1 Planting Contractor POC	New Forest Services 313 Condon Road Manistee, MI 49660 Brian Jarvinen (231) 590-9198
Planting Contractor 2 Planting Contractor POC	Strader Farms, LLC Kenneth Strader
Seed Mix Sources	Green Resource 5204 Highgreen Court Colfax, NC 27235
Nursery Stock Suppliers	ArborGen (Trees and Livestakes) Blenheim, SC Strader Farms (Livestakes)
Baseline Monitoring Performers (Year 0) Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Stantec Consulting Services, Inc. 801 Jones Franklin Rd Suite 300 Raleigh, NC 27606 Tim Taylor (704) 329-0900 N/A N/A
Baseline Monitoring Performers (Year 0-7) Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Equinox Environmental Consultation and Design, Inc. 37 Haywood St. Suite 100 Asheville, NC 28801 N/A Win Taylor (828) 253-6856 Win Taylor (828) 253-6856

Table 4 - Project Attribute Table				
North Fork Mountain Creek Stream and Wetland Restoration (EEP# 94151)				
Project Information				
Project County	Catawba			
Project Area (acres)	17.12			
Project Coordinates (latitude and longitude)	35.630286, -81.083264			
Project Watershed Summary Information				
Physiographic Region	Piedmont			
River Basin	Catawba			
USGS HUC for Project (14 Digit)	03050101150030			
NCDWQ Sub-basin for Project	03-08-32			
Project Drainage Area (sq mi)	1.22			
Project Drainage Area % Impervious	<1%			
CGIA Landuse Classification	Residential, Ag-Livestock, and Forrested			
Reach Summary Information				
Parameters	**Reach 1**	**Reach 2**	**Reach 3**	**Reach 4**
Length of reach (linear feet)	698	1542	598	2245
Valley Classification	II	II/VIII	II	VIII
Drainage Area (Ac)	136.4	177.1	36.1	778.1
NCDWQ stream identification score	35.25	35.25	31	39.25
NCDWQ classification	Perennial			
Morphological description (stream type)	G	E/F	G	E/F
Evolutionary trend	B4	B4/C4	B4	C4
Underlying mapped soils	Chewacla			
Drainage class	Somewhat poorly drained			
Soil hydric status	Hydric B (a soil map unit with hydric inclusions)			
Slope	0-2%			
FEMA classification	Zone X			
Native vegetation community	Piedmont/Low Mountain Alluvial Forest			
Percent composition of exotic invasive vegetation	0%	0%	0%	0%
Wetland Summary Information				
Parameters	**Wetland Restoration**		**Wetland Creation**	
Size of Wetland (acres)	1.17		3.27	
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Riparian Riverine			
Mapped Soil Series	Chewacla			
Drainage class	Somewhat poorly drained			
Soil Hydric Status	Hydric B (a soil map unit with hydric inclusions)			
Source of Hydrology	Overbank flooding and groundwater			
Hydrologic impairment	None			
Native vegetation community	Piedmont/Low Mountain Alluvial Forest			
Percent composition of exotic invasive vegetation	0%		0%	
Regulatory Considerations				
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**	
Waters of the United States - Section 404	Yes	Yes	USACE 404 Permit	
Waters of the United States - Section 401	Yes	Yes	NCDWQ 401 Permit	
Endangered Species Act	No	N/A	N/A	
Historic Preservation Act	No	N/A	N/A	
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A	
FEMA Floodplain Compliance	No	N/A	N/A	

Appendix B – Morphological Summary Data and Plots

This page intentionally left blank for double sided printing.

Table 5A. Baseline Stream Data Summary
North Fork Mountain Creek Stream and Wetland Restoration - Reach 1 (EEP #94151)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)				5.26	-	9.3	-	-	-	1	-	30.7	-	-	-	-	-	10.0	-		7.80			-	1
Floodprone Width (ft)					-	11.0	-	-	-	1	-	86.0	-	-	-	-	-	18.0	-		50.00			-	1
Bankfull Mean Depth (ft)				0.82	-	1.3	-	-	-	1	-	1.9	-	-	-	-	-	0.6	-		0.61			-	1
[1]Bankfull Max Depth (ft)					-	1.5	-	-	-	1	-	2.5	-	-	-	-	-	0.8	-		0.92			-	1
Bankfull Cross Sectional Area (ft^2)				5.9	-	12.0	-	-	-	1	-	57.4	-	-	-	-	-	6.2	-		4.74			-	1
Width/Depth Ratio					-	7.1	-	-	-	1	-	16.4	-	-	-	-	-	16.0	-		12.8			-	1
Entrenchment Ratio					-	1.1	-	-	-	1	-	2.8	-	-	-	-	-	1.8	-		6.40			-	1
[1]Bank Height Ratio					1.20	-	-	>2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Profile																									
Riffle Length (ft)					-	-	-	-	-	-	-	-	-	-	-	-	8.14	20.55	24.66	8.68	20.3	20.45	32.84	8.4	11
Riffle Slope (ft/ft)					-	-	-	-	-	-	-	-	-	-	-	-	0.019	0.033	0.058	0.017	0.049	0.049	0.084	0.04	11
Pool Length (ft)					-	-	-	-	-	-	-	-	-	-	-	-	6.74	15.69	24.22	5.59	19.35	21.66	34.45	9.916	12
Pool Max depth (ft)					-	-	-	-	-	-	-	-	-	-	-	-		1.6		1.74	2.3	2.385	2.79	0.315	12
Pool Spacing (ft)					-	-	-	-	-	-	-	224	-	-	-	-	13.79	32.0	45.47	26.46	40.48	42.05	52.95	8.995	12
Pattern																									
Channel Beltwidth (ft)					-	-	-	-	-	-	-	105	-	-	-	-	11.2	18.5	25.6	11.09	21.60	22.28	28.74	6.14	10
Radius of Curvature (ft)					-	-	-	-	-	-	76.7	-	-	133.8	-	-	30	35.0	58.87	18.69	29.93	26.29	56.01	10.66	16
Rc:Bankfull width (ft/ft)					-	-	-	-	-	-	2.5	-	-	4.4	-	-	1.89	2.30	2.68	2.40	3.84	3.37	7.18	1.37	16
Meander Wavelength (ft)					-	-	-	-	-	-	-	350	-	-	-	-	40.6	63.8	90	56.93	73.14	64.68	95.78	15.37	13
Meander Width Ratio					-	-	-	-	-	-	-	3.4	-	-	-	-	1.12	1.85	2.56	1.42	2.77	2.86	3.68	0.79	10

Transport parameters					
Reach Shear Stress (competency) lb/f^2	-	-	0.4	2.7	1.3	1.3
Max part size (mm) mobilized at bankfull	-	-	77.1	317.9	182.7	184.6
Unit Stream Power (transport capacity) lbs/ft/s per unit width[6]	-	-	-	-	-	-
Additional Reach Parameters						
Rosgen Classification			G	C4b	B4	C4b
Bankfull Velocity (fps)		- - 3.851	8.1			
Bankfull Discharge (cfs)		- - 22.72	23.8			
Valley length (ft)			686	-		
Channel Thalweg length (ft)			698	-	720	702
Sinuosity (ft)			1.02	-	1.08	1.06
Water Surface Slope (Channel) (ft/ft)			0.0049	0.023	-	-
BF slope (ft/ft)			**-**	**-**	**0.0343**	**0.0342**
[3]Bankfull Floodplain Area (acres)			**-**	**-**	**-**	**-**
[4]% of Reach with Eroding Banks			**-**	**-**		
Channel Stability or Habitat Metric			**-**	**-**		
Biological or Other			**-**	**-**		

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3; 6. Units changed from W/m^2 to reflect those provided in original design.

Table 5B. Baseline Stream Data Summary
North Fork Mountain Creek Stream and Wetland Restoration - Reach 2 (EEP #94151)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		4	16.5	7.88	-	8.7	-	-	-	1	-	30.7	-	-	-	-	-	12.2	-	7.8	12.0	12.0	15.4	2.7	5
Floodprone Width (ft)					-	21.0	-	-	-	1	-	86.0	-	-	-	-	-	23.0	-	22.5	38.5	40.0	50.0	12.2	5
Bankfull Mean Depth (ft)		0.6	1.7	0.99	-	1.4	-	-	-	1	-	1.9	-	-	-	-	-	0.6	-	0.5	0.7	0.7	0.9	0.1	5
[1]Bankfull Max Depth (ft)					-	1.7	-	-	-	1	-	2.5	-	-	-	-	-	1.2	-	1.1	1.4	1.6	1.6	0.2	5
Bankfull Cross Sectional Area (ft^2)		4.2	19	8.94	-	11.9	-	-	-	1	-	57.4	-	-	-	-	-	9.3	-	7.4	8.9	8.7	10.2	1.2	5
Width/Depth Ratio					-	6.3	-	-	-	1	-	16.4	-	-	-	-	-	16.0	-	13.9	18.5	16.6	29.0	6.0	5
Entrenchment Ratio					-	2.4	-	-	-	1	-	2.8	-	-	-	-	-	1.9	-	1.8	3.8	3.8	6.4	1.8	5
[1]Bank Height Ratio					1.30	-	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profile																									
Riffle Length (ft)					-	-	-	-	-	-	-	-	-	-	-	-	9	21.18	29	7.49	20.38	18.09	34.11	7.705	24
Riffle Slope (ft/ft)					-	-	-	-	-	-	-	-	-	-	-	-	0.016	0.03	0.049	0.012	0.065	0.033	0.675	0.135	24
Pool Length (ft)					-	-	-	-	-	-	-	-	-	-	-	-	16	23	31	11.58	19.8	17.71	36.99	7.5	27
Pool Max depth (ft)					-	-	-	-	-	-	-	-	-	-	-	-		2.1		1.95	2.51	2.46	3.05	0.3	27
Pool Spacing (ft)					-	-	-	-	-	-	-	224	-	-	-	-	32	46.0	55	24.37	40.63	41.8	60.68	12.51	27
Pattern																									
Channel Beltwidth (ft)					-	-	-	-	-	-	-	105	-	-	-	-	14.6	20.6	34.5	14.27	21.10	20.57	32.41	4.54	30.00
Radius of Curvature (ft)					-	-	-	-	-	-	76.7	-	-	133.8	-	-	29.82	61.9	124.4	14.18	26.48	22.61	66.62	13.21	33.00
Rc:Bankfull width (ft/ft)					-	-	-	-	-	-	2.5	-	-	4.4	-	-	2.04	3.01	3.61	1.18	2.21	1.88	5.55	1.10	33.00
Meander Wavelength (ft)					-	-	-	-	-	-	-	350	-	-	-	-	63.63	88.1	117.4	76.24	91.58	92.01	107.14	7.53	27.00
Meander Width Ratio					-	-	-	-	-	-	-	3.4	-	-	-	-	1.20	1.69	2.83	1.19	1.76	1.71	2.70	0.38	30.00
Transport parameters																									
Reach Shear Stress (competency) lb/f^2		-			1.2						2.7						0.6			0.7					
Max part size (mm) mobilized at bankfull		-			170.7						317.9						100.9			117.9					
Unit Stream Power (transport capacity) lbs/ft/s per unit width[6]		-			-						-						-			-					
Additional Reach Parameters																									
Rosgen Classification					E/F						C4b						B4c			C4					
Bankfull Velocity (fps)		1.3	12.2	3.9	8												-			-					
Bankfull Discharge (cfs)		12	110	35.3	36.8																				
Valley length (ft)					1700						-														
Channel Thalweg length (ft)					1760						-						1700			1700					
Sinuosity (ft)					1.04						-						1.03			1.03					
Water Surface Slope (Channel) (ft/ft)					0.0134						0.023						-			-					
BF slope (ft/ft)					-						-						**0.0153**			**0.0162**					
[3]Bankfull Floodplain Area (acres)					-						-						-			-					
[4]% of Reach with Eroding Banks					-						-														
Channel Stability or Habitat Metric					-						-														
Biological or Other					-						-														

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3; 6. Units changed from W/m^2 to reflect those provided in original design.

Table 5C. Baseline Stream Data Summary
North Fork Mountain Creek Stream and Wetland Restoration - Reach 3 (EEP #94151)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)				3.55	-	4.1	-	-	-	1	-	12.0	-	-	-	-	-	7.0	-		7.23			-	1
Floodprone Width (ft)					-	6.0	-	-	-	1	-	30.0	-	-	-	-	-	12.0	-		22.80			-	1
Bankfull Mean Depth (ft)				0.61	-	0.5	-	-	-	1	-	1.2	-	-	-	-	-	0.3	-		0.58			-	1
[1]Bankfull Max Depth (ft)					-	0.8	-	-	-	1	-	2.0	-	-	-	-	-	0.7	-		1.00			-	1
Bankfull Cross Sectional Area (ft^2)				6.39	-	2.1	-	-	-	1	-	14.3	-	-	-	-	-	3.5	-		4.20			-	1
Width/Depth Ratio					-	8.1	-	-	-	1	-	10.1	-	-	-	-	-	14.0	-		12.5			-	1
Entrenchment Ratio					-	1.5	-	-	-	1	-	2.5	-	-	-	-	-	1.7	-		3.20			-	1
[1]Bank Height Ratio					1.20	-	-	1.60	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Profile																									
Riffle Length (ft)					-	-	-	-	-	-	-	18	-	-	-	-	4.15	9.88	20.93	5.89	16.88	16.95	27.77	7.051	13
Riffle Slope (ft/ft)					-	-	-	-	-	-	-	0.03	-	-	-	-	0.031	0.052	0.111	0.009	0.05	0.053	0.089	0.026	13
Pool Length (ft)					-	-	-	-	-	-	-	18	-	-	-	-	9.12	14.21	22.72	7.48	12.33	10.59	26.49	5.2	13
Pool Max depth (ft)					-	-	-	-	-	-	-	-	-	-	-	-		1.6		1.14	2.003	1.87	2.85	0.483	13
Pool Spacing (ft)					-	-	-	-	-	-	-	36	-	-	-	-	20.59	24.8	33.56	22.28	30.29	29.34	44.22	6.805	13
Pattern																									
Channel Beltwidth (ft)					-	-	-	-	-	-	-	31.2	-	-	-	-	9.9	11.6	14.7	7.66	13.53	12.81	18.12	2.61	15
Radius of Curvature (ft)					-	-	-	-	-	-	-	42	-	-	-	-	19.61	33.5	48	17.03	29.11	26.34	50.06	10.13	19
Rc:Bankfull width (ft/ft)					-	-	-	-	-	-	-	3.5	-	-	-	-	1.98	2.89	3.27	2.36	4.03	3.64	6.92	1.40	19
Meander Wavelength (ft)					-	-	-	-	-	-	-	-	-	-	-	-	43.1	49.5	59.1	20.09	60.77	59.35	97.59	18.47	16
Meander Width Ratio					-	-	-	-	-	-	-	2.6	-	-	-	-	1.41	1.66	2.10	1.06	1.87	1.77	2.51	0.36	15
Transport parameters																									
Reach Shear Stress (competency) lb/f^2	-	-			1.56						1.5						0.7			1.5					
Max part size (mm) mobilized at bankfull	-	-			210.8						204.6						119.7			203.9					
Unit Stream Power (transport capacity) lbs/ft/s per unit width[6]	-	-			5.5						-						-			-					
Additional Reach Parameters																									
Rosgen Classification					G						B3c						B4			C4b					
Bankfull Velocity (fps)				1.9	3.5																				
Bankfull Discharge (cfs)				12.4	13.1																				
Valley length (ft)					573						-														
Channel Thalweg length (ft)					598						-						670			610					
Sinuosity (ft)					1.04						-						1.04			1.02					
Water Surface Slope (Channel) (ft/ft)					0.05						0.02						-			-					
BF slope (ft/ft)					**-**						**-**						**0.0386**			**0.0412**					
[3]Bankfull Floodplain Area (acres)					**-**						**-**						**-**			**-**					
[4]% of Reach with Eroding Banks					**-**						**-**														
Channel Stability or Habitat Metric					**-**						**-**														
Biological or Other					**-**						**-**														

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3; 6. Units changed from W/m^2 to reflect those provided in original design.

Table 5D. Baseline Stream Data Summary
North Fork Mountain Creek Stream and Wetland Restoration - Reach 4 (EEP #94151)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		7	28	12.86	-	15.9	-	-	-	1	45.2	46.7	-	48.2	-	2	-	18.0	-	17.0	18.6	18.6	21.7	1.6	7
Floodprone Width (ft)					-	180.0	-	-	-	1	88.8	94.1	-	99.4	-	2	190.0	-	281.0	>100	>100	>100	>100	0.0	7
Bankfull Mean Depth (ft)		0.95	2.5	1.6	-	1.6	-	-	-	1	2.0	2.0	-	2.1	-	2	-	1.8	-	1.0	1.2	1.2	1.4	0.1	7
[1]Bankfull Max Depth (ft)					-	2.9	-	-	-	1	3.1	3.3	-	3.5	-	2	-	2.1	-	1.7	2.1	2.2	2.4	0.2	7
Bankfull Cross Sectional Area (ft^2)		10	42	24.26	-	25.3	-	-	-	1	94.5	95.2	-	95.9	-	2	-	24.0	-	18.8	22.3	22.7	25.8	2.8	7
Width/Depth Ratio					-	9.9	-	-	-	1	21.3	23.0	-	24.6	-	2	-	13.5	-	12.7	15.7	15.2	18.3	2.0	7
Entrenchment Ratio					-	11.4	-	-	-	1	1.8	2.0	-	2.2	-	2	8.0	-	12.0	4.6	5.4	5.4	5.9	0.5	7
[1]Bank Height Ratio					1.40	-	-	1.60	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-
Profile																									
Riffle Length (ft)					16	-	-	70	-	-	18.4	33.6	-	55.3	-	4	11.83	33.74	90.99	13.82	51.49	53.03	92.66	21.68	22
Riffle Slope (ft/ft)					0.01	-	-	0.02	-	-	0.004	0.017	-	0.04	-	4	0.140	0.023	0.061	0.004	0.019	0.0178	0.043	0.011	22
Pool Length (ft)					12	-	-	30	-	-	18.4	33.6	-	55.3	-	3	34.33	63.56	87.12	21.23	49.53	49.49	80.26	15.64	21
Pool Max depth (ft)					-	-	-	-	-	-	4.21	4.4	-	4.72	-	4		3.8		2.85	3.437	3.43	4.18	0.407	21
Pool Spacing (ft)					-	80	-	-	-	-	98.5	126.8	-	151.9	-	3	76.98	99.2	142.6	62.18	99.37	98.91	147.2	21.26	21
Pattern																									
Channel Beltwidth (ft)					40.3	61.5	52.3	130.7	26.2	13	42.5	51.2	-	59.9	-	-	45.2	64.7	87.5	46.13	70.30	67.24	93.89	12.34	19
Radius of Curvature (ft)					12.8	29.9	23.6	75.4	18.5	16	130.3	171.7	-	236.1	-	-	36.5	54.0	76	28.20	39.70	37.60	54.20	6.90	22
Rc:Bankfull width (ft/ft)					0.81	1.88	1.48	4.74	-	-	2.789	3.675	-	5.053	-	-	0.81	0.83	0.87	1.52	2.13	2.02	2.91	0.37	22
Meander Wavelength (ft)					-	-	-	-	-	-	-	-	-	-	-	-	156.1	196.4	252.7	121.67	218.08	209.50	331.59	48.48	19
Meander Width Ratio					2.53	3.87	3.29	8.22	-	-	0.91	1.096	-	1.282	-	-	2.51	3.59	4.86	2.48	3.78	3.62	5.05	0.66	19
Transport parameters																									
Reach Shear Stress (competency) lb/f^2		-			0.7						0.9						1.0			0.6					
Max part size (mm) mobilized at bankfull		-			116.8						137.6						145.0			105.2					
Unit Stream Power (transport capacity) lbs/ft/s per unit width[6]		-			5.32						-						-			-					
Additional Reach Parameters																									
Rosgen Classification					E/F						C4						C4			C4					
Bankfull Velocity (fps)		1.2	11.1	4.2	7.6																				
Bankfull Discharge (cfs)		30	270	102.4	105.1																				
Valley length (ft)					1811						-														
Channel Thalweg length (ft)					2306						-						2195			2135					
Sinuosity (ft)					1.27						1.07						1.24			1.25					
Water Surface Slope (Channel) (ft/ft)					0.007						0.0075						-			-					
BF slope (ft/ft)					**-**						**0.007**						**0.00851**			**0.0081**					
[3]Bankfull Floodplain Area (acres)					**-**						**-**						**-**			**-**					
[4]% of Reach with Eroding Banks					**-**						**-**														
Channel Stability or Habitat Metric					**-**						**-**														
Biological or Other					**-**						**-**														

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3; 6. Units changed from W/m^2 to reflect those provided in original design.

Table 6 - Morphology and Hydraulic Monitoring Summary (Dimensional Parameters - Cross Section)
North Fork Mountain Creek Stream and Wetland Restoration Project (EEP #:94151)

	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)							Cross Section 4 (Pool)							Cross Section 5 (Riffle)							Cross Section 6 (Riffle)							Cross Section 7 (Pool)						
	Reach 1 STA 101+45							Reach 1 STA 102+04							Reach 2 STA 107+28							Reach 2 STA 107+60							Reach 2 STA 112+05							Reach 2 STA 112+22							Reach 2 STA 114+55						
Dimension and Substrate (Riffle)	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+
Bankfull Width (ft)	7.8							7.1							12.8							10.9							9.6							12.0							15.0						
Flood Prone Width (ft)	50.0							34.2							22.5							22.2							50.9							45.8							45.4						
BF Mean Depth (ft)	0.6							1.5							0.8							0.8							1.2							0.7							0.9						
BF Max Depth (ft)	0.9							2.1							1.6							1.6							2.3							1.6							2.6						
BF Cross Sectional Area (ft^2)	4.7							10.6							10.1							9.2							11.0							8.7							13.7						
Width/Depth Ratio	12.8							4.8							16.2							13.0							8.3							16.6							16.5						
Entrenchment Ratio	6.4							4.8							1.8							2.0							5.3							3.8							3.0						
Bank Height Ratio	1.0							1.0							1.0							1.0							1.0							1.0							1.0						
Based on current/developing bankfull feature																																																	
Bankfull Width (ft)																																																	
Flood Prone Width (ft)																																																	
BF Mean Depth (ft)																																																	
BF Max Depth (ft)																																																	
BF Cross Sectional Area (ft^2)																																																	
Width/Depth Ratio																																																	
Entrenchment Ratio																																																	
Bank Height Ratio																																																	
Cross Sectional Area between end pins (ft^2)																																																	
d50 (mm)																																																	

	Cross Section 8 (Riffle)							Cross Section 9 (Riffle)							Cross Section 10 (Pool)							Cross Section 11 (Riffle)							Cross Section 12 (Riffle)							Cross Section 13 (Pool)						
	Reach 2 STA 115+16							Reach 2 STA 117+94							Reach 2 STA 118+53							Reach 2 STA 120+73							Reach 3 STA 203+75							Reach 3 STA 204+01						
Dimension and Substrate (Riffle)	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+
Bankfull Width (ft)	11.9							15.4							13.7							11.3							7.2							8.1						
Flood Prone Width (ft)	50.0							40.0							30.0							30.0							22.8							33.2						
BF Mean Depth (ft)	0.9							0.5							0.6							0.7							0.6							1.1						
BF Max Depth (ft)	1.6							1.1							1.9							1.2							1.0							2.2						
BF Cross Sectional Area (ft^2)	10.2							8.1							8.8							7.4							4.2							9.1						
Width/Depth Ratio	13.9							29.0							21.3							17.1							12.5							7.2						
Entrenchment Ratio	4.2							2.6							2.2							2.7							3.2							4.1						
Bank Height Ratio	1.0							1.0							1.0							1.0							1.0							1.1						
Based on current/developing bankfull feature																																										
Bankfull Width (ft)																																										
Flood Prone Width (ft)																																										
BF Mean Depth (ft)																																										
BF Max Depth (ft)																																										
BF Cross Sectional Area (ft^2)																																										
Width/Depth Ratio																																										
Entrenchment Ratio																																										
Bank Height Ratio																																										
Cross Sectional Area between end pins (ft^2)																																										
d50 (mm)																																										

Table 6 (continued) - Morphology and Hydraulic Monitoring Summary (Dimensional Parameters - Cross Section)
North Fork Mountain Creek Stream and Wetland Restoration Project (EEP #:94151)

	Cross Section 14 (Pool)							Cross Section 15 (Riffle)							Cross Section 16 (Riffle)							Cross Section 17 (Riffle)							Cross Section 18 (Pool)							Cross Section 19 (Riffle)							Cross Section 20 (Pool)						
	Reach 4 STA 301+18							Reach 4 STA 302+33							Reach 4 STA 303+38							Reach 4 STA 306+69							Reach 4 STA 307+35							Reach 4 STA 311+76							Reach 4 STA 312+64						
Dimension and Substrate (Riffle)	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+
Bankfull Width (ft)	20.6							17.3							19.3							17.5							25.8							21.7							25.3						
Flood Prone Width (ft)	59.3							100.0							55.7							50.3							53.3							100.0							56.1						
BF Mean Depth (ft)	1.2							1.2							1.3							1.4							1.4							1.2							1.5						
BF Max Depth (ft)	3.1							2.2							2.3							2.3							3.4							2.1							3.3						
BF Cross Sectional Area (ft^2)	25.6							19.9							25.4							23.9							35.1							25.8							36.7						
Width/Depth Ratio	16.6							15.1							14.8							12.7							19.0							18.2							17.4						
Entrenchment Ratio	2.9							5.8							2.9							2.9							2.1							4.6							2.2						
Bank Height Ratio	1.0							1.0							1.0							1.0							1.0							1.0							1.0						
Based on current/developing bankfull feature																																																	
Bankfull Width (ft)																																																	
Flood Prone Width (ft)																																																	
BF Mean Depth (ft)																																																	
BF Max Depth (ft)																																																	
BF Cross Sectional Area (ft^2)																																																	
Width/Depth Ratio																																																	
Entrenchment Ratio																																																	
Bank Height Ratio																																																	
Cross Sectional Area between end pins (ft^2)																																																	
d50 (mm)																																																	

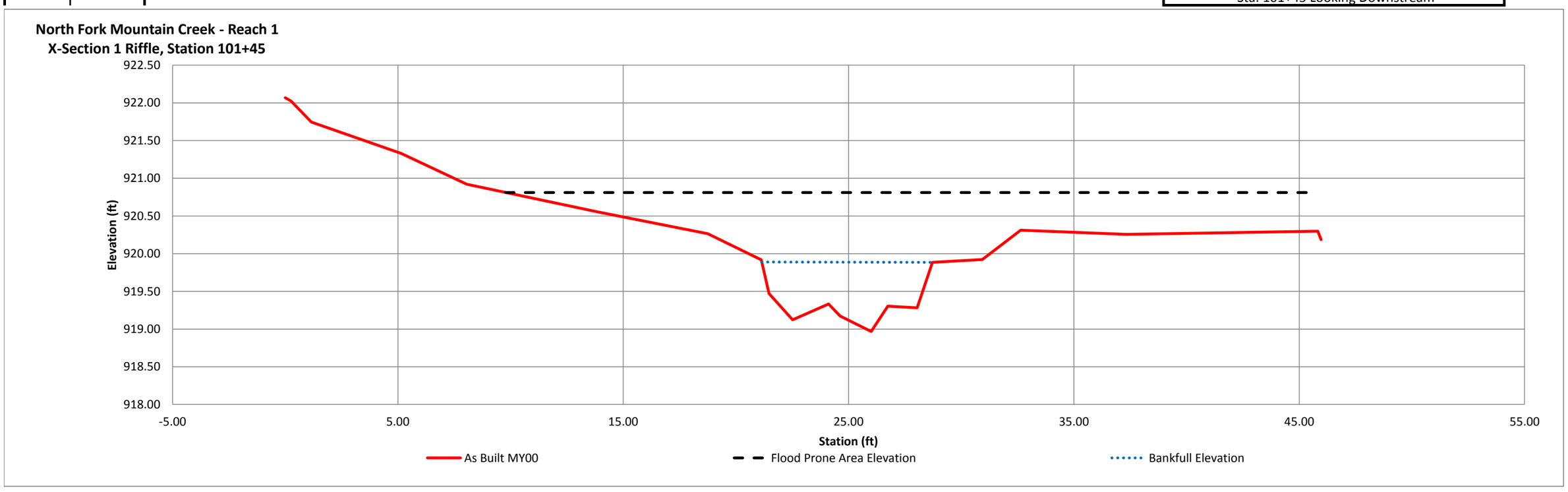
	Cross Section 21 (Pool)							Cross Section 22 (Riffle)							Cross Section 23 (Riffle)							Cross Section 24 (Pool)							Cross Section 25 (Pool)							Cross Section 26 (Riffle)						
	Reach 4 STA 314+59							Reach 4 STA 315+07							Reach 4 STA 316+83							Reach 4 STA 317+28							Reach 4 STA 319+29							Reach 4 STA 319+82						
Dimension and Substrate (Riffle)	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+	Base	MY1	MY2	MY3	MY5	MY7	My+
Bankfull Width (ft)	23.0							20.7							18.6							18.6							18.7							18.8						
Flood Prone Width (ft)	54.5							54.0							39.5							42.3							50.3							50.1						
BF Mean Depth (ft)	1.5							1.1							1.2							1.1							1.4							1.0						
BF Max Depth (ft)	3.4							2.2							2.4							2.5							3.0							1.6						
BF Cross Sectional Area (ft^2)	34.2							22.0							22.7							21.2							26.2							19.4						
Width/Depth Ratio	15.5							19.6							15.2							16.3							13.3							18.2						
Entrenchment Ratio	2.4							2.6							2.1							2.3							2.7							2.7						
Bank Height Ratio	1.0							1.0							1.0							1.0							1.0							1.0						
Based on current/developing bankfull feature																																										
Bankfull Width (ft)																																										
Flood Prone Width (ft)																																										
BF Mean Depth (ft)																																										
BF Max Depth (ft)																																										
BF Cross Sectional Area (ft^2)																																										
Width/Depth Ratio																																										
Entrenchment Ratio																																										
Bank Height Ratio																																										
Cross Sectional Area between end pins (ft^2)																																										
d50 (mm)																																										

River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-1, Riffle, STA 101+45
Drainage Area(sq. mi.)	0.21
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	922.07
0.25	922.03
1.16	921.75
5.14	921.33
8.05	920.92
13.86	920.55
18.75	920.27
21.13	919.92
21.47	919.47
22.52	919.12
24.11	919.33
24.62	919.18
26.00	918.97
26.74	919.31
28.04	919.28
28.72	919.89
30.94	919.92
32.64	920.31
37.32	920.26
45.82	920.30
45.97	920.19

SUMARY DATA	MY00
Bankfull Elevation	919.9
Bankfull Cross-Sectional Area	4.7
Bankfull Width	7.8
Flood Prone Area Elevation	920.8
Flood Prone Width	50
Max Depth at Bankfull	0.9
Mean Depth at Bankfull	0.6
W/D Ratio	12.8
Entrenchment Ratio	6.4
Bank Height Ratio	1.0
Stream Type	C

Sta. 101+45 Looking Downstream



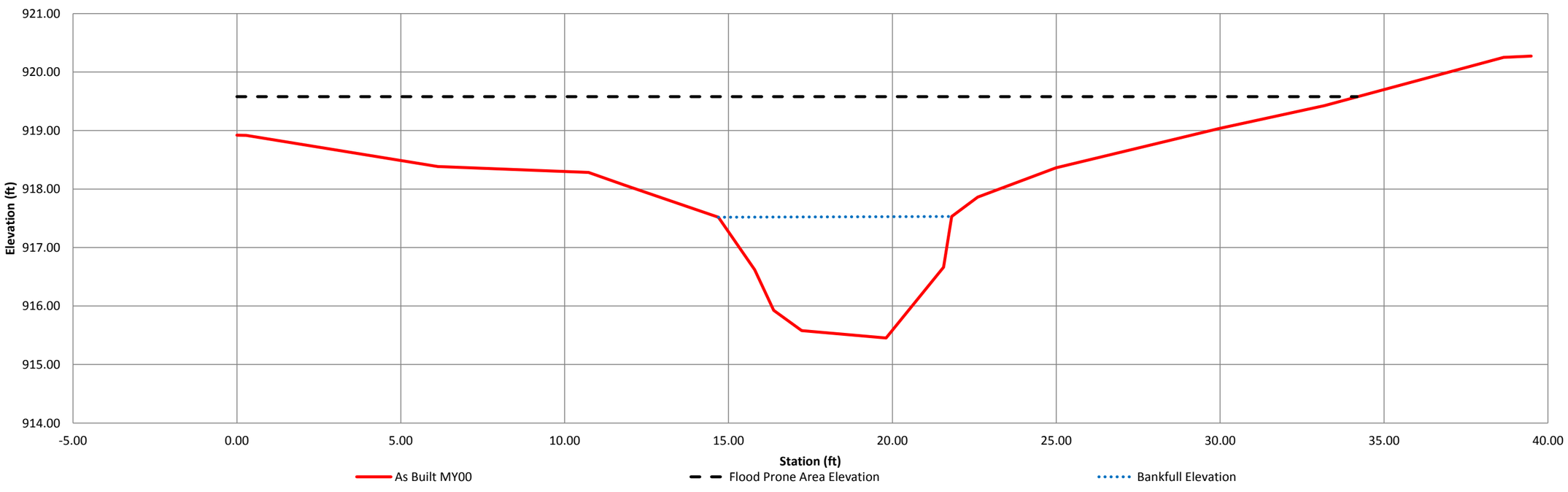
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-2, Pool, STA 102+04
Drainage Area(sq. mi.)	0.21
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	918.92
0.28	918.92
6.13	918.39
10.73	918.28
11.83	918.07
14.69	917.52
15.80	916.62
16.38	915.93
17.23	915.58
19.81	915.46
21.56	916.66
21.81	917.53
22.60	917.86
24.99	918.36
29.99	919.04
33.18	919.43
38.65	920.25
39.49	920.27

SUMARY DATA	MY00
Bankfull Elevation	917.5
Bankfull Cross-Sectional Area	10.6
Bankfull Width	7.1
Flood Prone Area Elevation	919.6
Flood Prone Width	34.2
Max Depth at Bankfull	2.1
Mean Depth at Bankfull	1.5
W/D Ratio	4.8
Entrenchment Ratio	4.8
Bank Height Ratio	1.0
Stream Type	C

Sta. 102+04 Looking Downstream

North Fork Mountain Creek - Reach 1
X-Section 2 Pool, Station 102+04



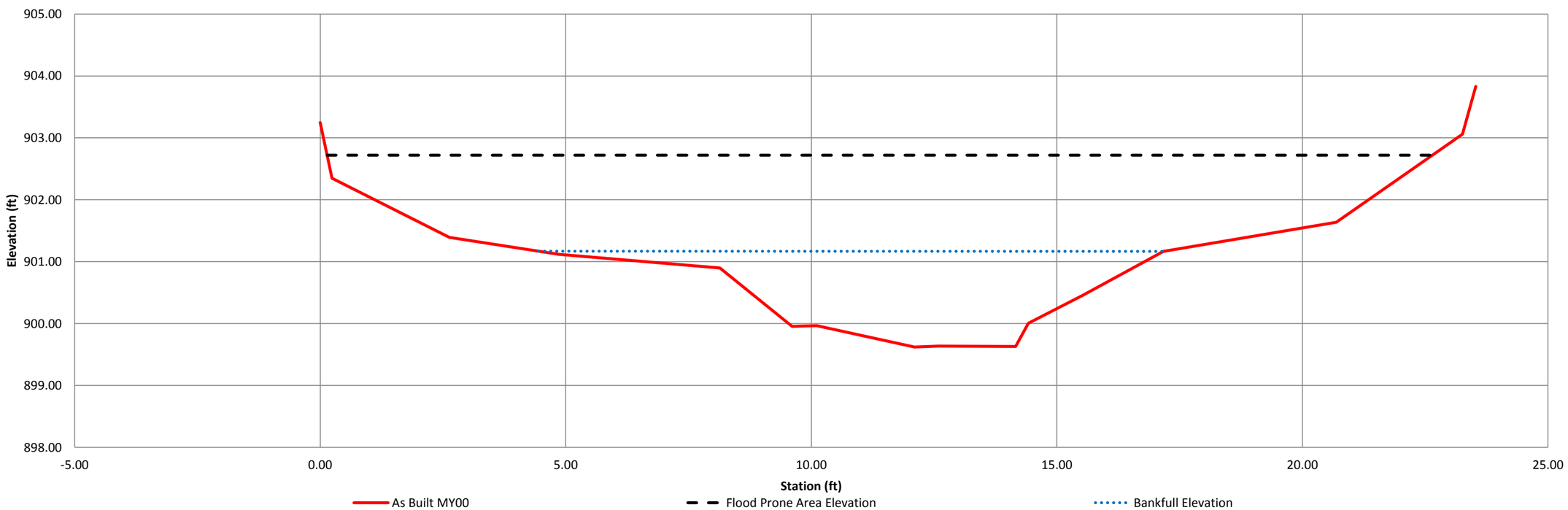
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-3, Riffle, STA 107+28
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	903.25
0.24	902.35
2.63	901.39
4.86	901.12
8.14	900.90
9.61	899.96
10.11	899.97
12.10	899.62
12.59	899.64
14.16	899.63
14.42	900.01
15.53	900.46
17.17	901.17
20.69	901.64
23.26	903.06
23.53	903.83

SUMARY DATA	MY00
Bankfull Elevation	901.2
Bankfull Cross-Sectional Area	10.1
Bankfull Width	12.8
Flood Prone Area Elevation	902.7
Flood Prone Width	23
Max Depth at Bankfull	1.6
Mean Depth at Bankfull	0.8
W/D Ratio	16.2
Entrenchment Ratio	1.8
Bank Height Ratio	1.0
Stream Type	C

Sta. 107+28 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 3 Riffle, Station 107+28

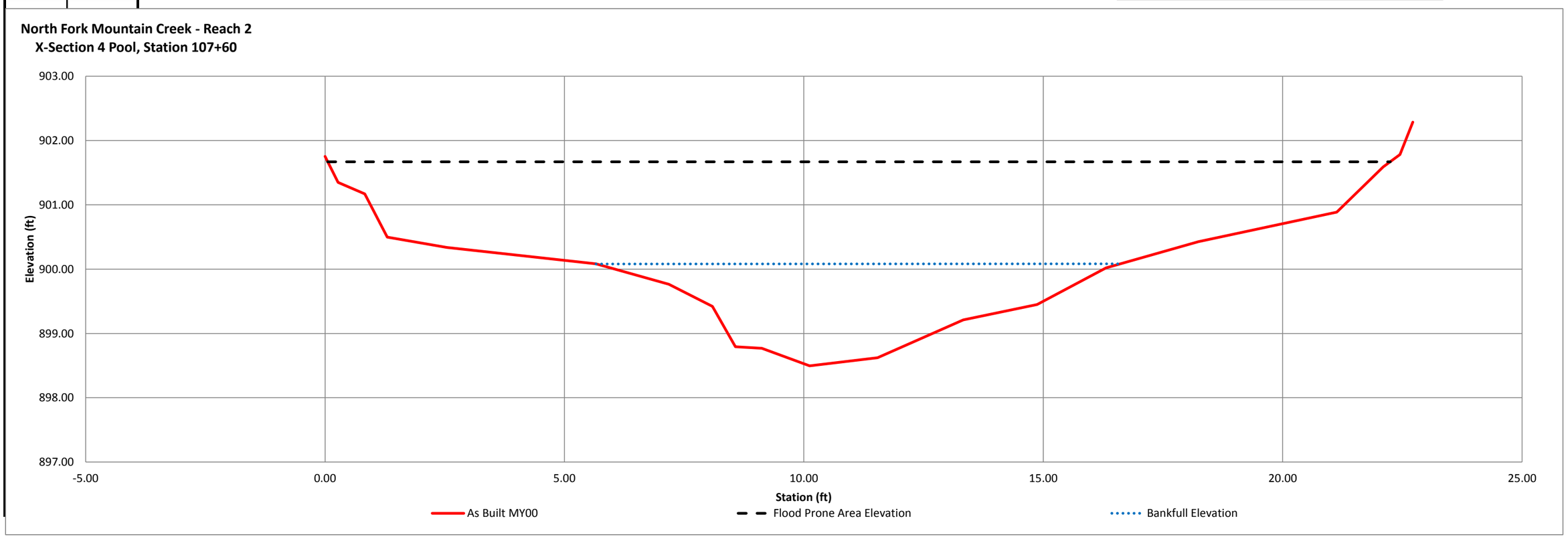


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-4, Pool, STA 107+60
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	901.75
0.27	901.35
0.83	901.17
1.30	900.50
2.54	900.34
5.66	900.08
7.18	899.77
8.09	899.42
8.57	898.79
9.12	898.77
10.12	898.50
11.54	898.62
13.33	899.21
14.87	899.45
16.31	900.02
18.24	900.43
21.13	900.89
22.10	901.59
22.45	901.78
22.72	902.29

SUMARY DATA	MY00
Bankfull Elevation	900.1
Bankfull Cross-Sectional Area	9.2
Bankfull Width	10.9
Flood Prone Area Elevation	901.7
Flood Prone Width	22
Max Depth at Bankfull	1.6
Mean Depth at Bankfull	0.8
W/D Ratio	13.0
Entrenchment Ratio	2.0
Bank Height Ratio	1.0
Stream Type	C

Sta. 107+60 Looking Downstream



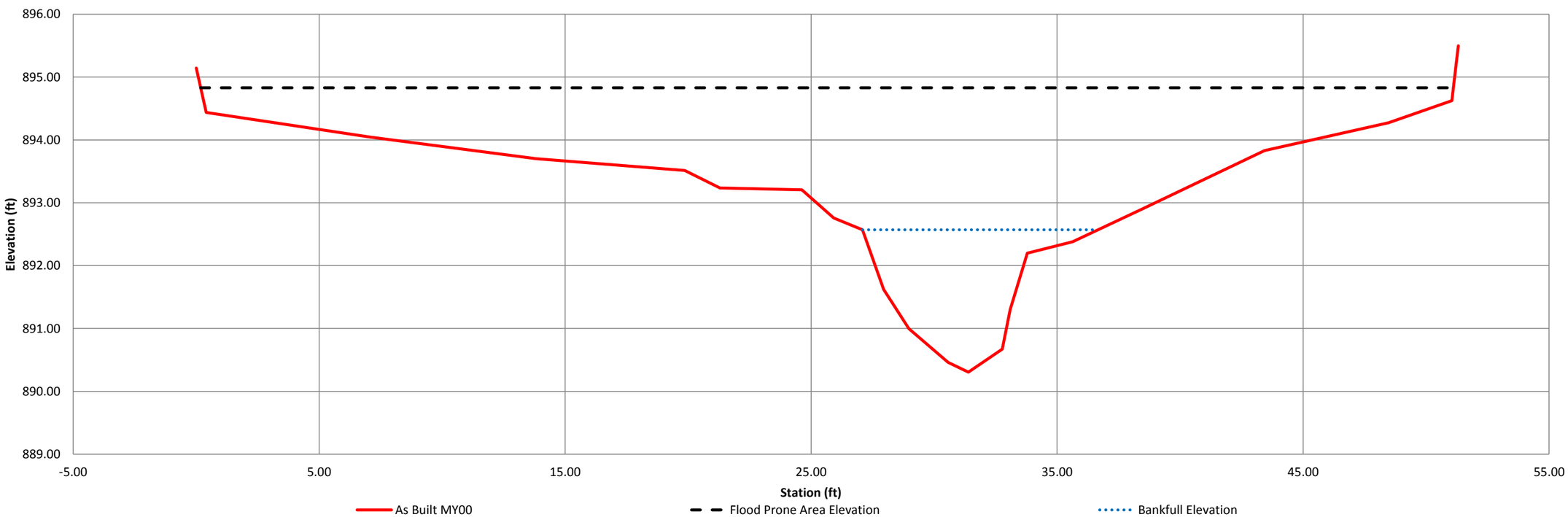
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-5, Pool, STA 112+05
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	895.14
0.41	894.44
7.09	894.04
13.82	893.70
19.86	893.51
21.29	893.23
24.62	893.21
25.92	892.76
27.09	892.57
27.95	891.62
28.97	891.00
30.57	890.46
31.39	890.31
32.77	890.67
33.09	891.30
33.79	892.20
35.63	892.38
38.43	892.90
43.43	893.83
48.47	894.27
51.05	894.63
51.31	895.50

SUMARY DATA	MY00
Bankfull Elevation	892.6
Bankfull Cross-Sectional Area	11.0
Bankfull Width	9.6
Flood Prone Area Elevation	894.8
Flood Prone Width	51
Max Depth at Bankfull	2.3
Mean Depth at Bankfull	1.2
W/D Ratio	8.3
Entrenchment Ratio	5.3
Bank Height Ratio	1.0
Stream Type	C

Sta. 112+05 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 5 Pool, Station 112+05



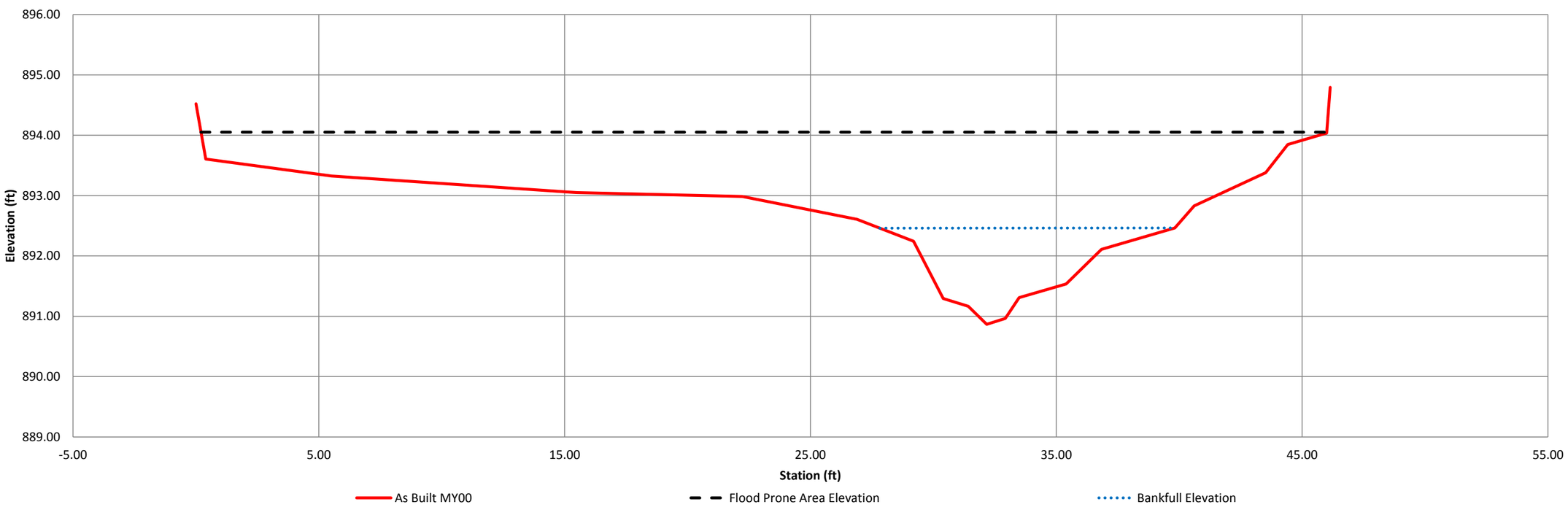
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-6, Riffle, STA 112+22
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	894.52
0.40	893.61
5.52	893.33
15.49	893.05
22.22	892.98
26.89	892.61
29.19	892.24
30.40	891.30
31.42	891.17
32.17	890.87
32.93	890.96
33.49	891.31
35.40	891.54
36.84	892.11
39.82	892.46
40.61	892.83
43.52	893.38
44.42	893.85
46.00	894.04
46.14	894.79

SUMARY DATA	MY00
Bankfull Elevation	892.5
Bankfull Cross-Sectional Area	8.7
Bankfull Width	12.0
Flood Prone Area Elevation	894.1
Flood Prone Width	46
Max Depth at Bankfull	1.6
Mean Depth at Bankfull	0.7
W/D Ratio	16.6
Entrenchment Ratio	3.8
Bank Height Ratio	1.0
Stream Type	C

Sta. 112+22 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 6 Riffle, Station 112+22



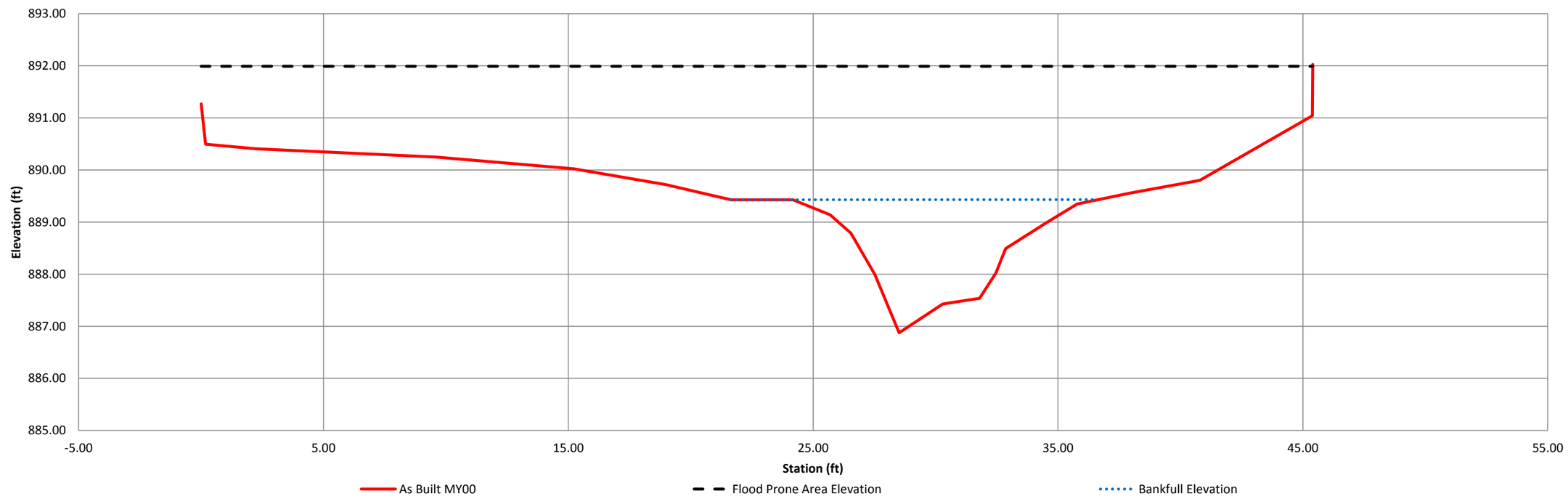
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-7, Pool, STA 114+55
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	891.27
0.18	890.49
2.25	890.41
9.59	890.25
15.22	890.02
18.97	889.72
21.64	889.43
24.17	889.43
25.69	889.14
26.54	888.79
27.51	888.00
28.51	886.87
30.29	887.43
31.80	887.54
32.46	888.02
32.86	888.49
34.54	888.99
35.78	889.35
37.96	889.56
40.79	889.80
45.39	891.04
45.40	892.03

SUMARY DATA	MY00
Bankfull Elevation	889.4
Bankfull Cross-Sectional Area	13.7
Bankfull Width	15.0
Flood Prone Area Elevation	892.0
Flood Prone Width	45
Max Depth at Bankfull	2.6
Mean Depth at Bankfull	0.9
W/D Ratio	16.5
Entrenchment Ratio	3.0
Bank Height Ratio	1.0
Stream Type	C

Sta. 114+55 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 7 Pool, Station 114+55

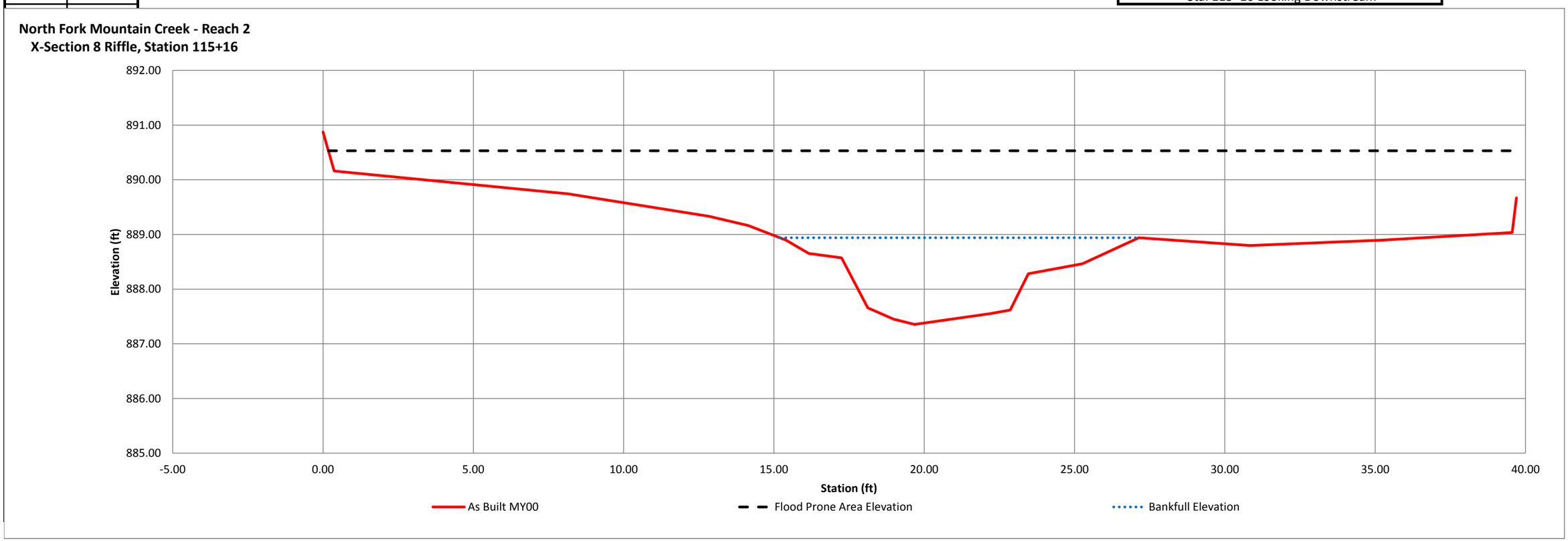


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-8, Riffle, STA 115+16
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	890.87
0.37	890.16
8.15	889.74
12.84	889.33
14.15	889.16
15.40	888.90
16.16	888.65
17.25	888.57
18.12	887.66
18.98	887.45
19.68	887.35
22.17	887.55
22.86	887.62
23.46	888.28
25.26	888.46
27.14	888.94
30.84	888.80
35.24	888.90
39.56	889.04
39.70	889.67

SUMARY DATA	MY00
Bankfull Elevation	888.9
Bankfull Cross-Sectional Area	10.2
Bankfull Width	11.9
Flood Prone Area Elevation	890.5
Flood Prone Width	50
Max Depth at Bankfull	1.6
Mean Depth at Bankfull	0.9
W/D Ratio	13.9
Entrenchment Ratio	4.2
Bank Height Ratio	1.0
Stream Type	C

Sta. 115+16 Looking Downstream



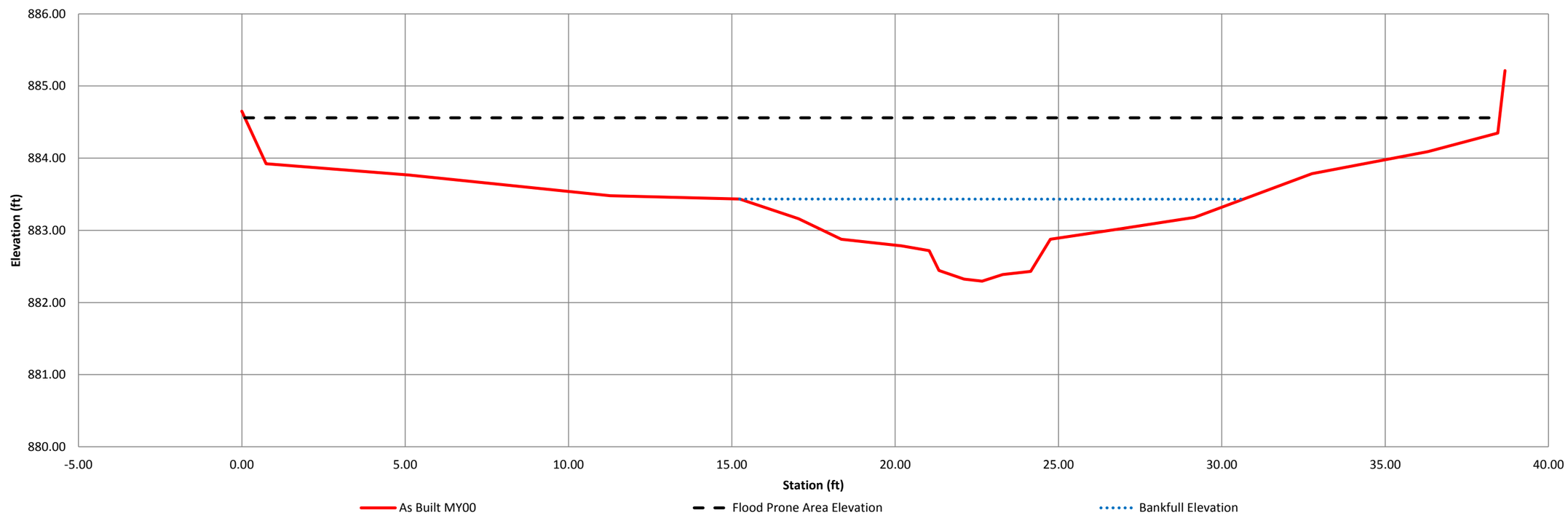
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-9, Riffle, STA 117+94
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	884.65
0.74	883.92
5.09	883.77
11.27	883.48
15.24	883.43
17.04	883.16
18.35	882.88
20.20	882.79
21.04	882.72
21.34	882.44
22.11	882.32
22.66	882.30
23.29	882.39
24.15	882.43
24.75	882.88
26.79	883.01
29.16	883.18
32.76	883.79
36.31	884.09
38.45	884.35
38.67	885.21

SUMARY DATA	MY00
Bankfull Elevation	883.4
Bankfull Cross-Sectional Area	8.1
Bankfull Width	15.4
Flood Prone Area Elevation	884.6
Flood Prone Width	40
Max Depth at Bankfull	1.1
Mean Depth at Bankfull	0.5
W/D Ratio	29.0
Entrenchment Ratio	2.6
Bank Height Ratio	1.0
Stream Type	C

Sta. 117+94 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 9 Riffle, Station 117+94



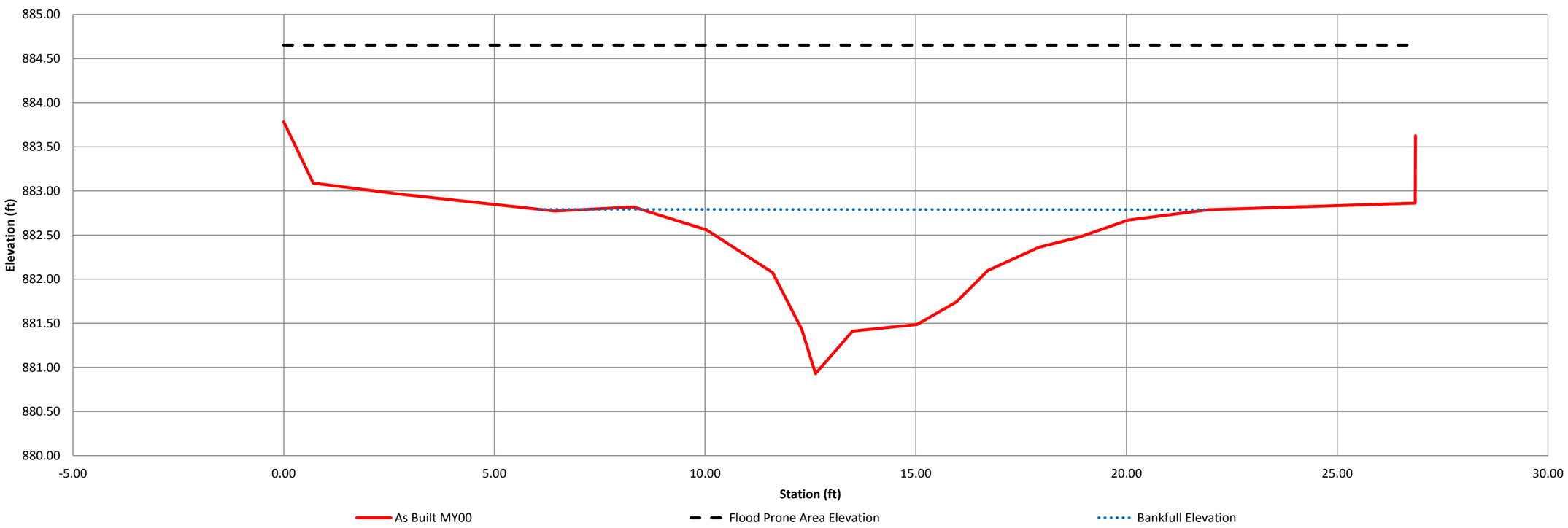
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-10, Pool, STA 118+53
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	883.78
0.70	883.09
2.82	882.96
6.43	882.77
8.30	882.82
10.03	882.56
11.60	882.08
12.29	881.43
12.62	880.93
13.50	881.41
15.03	881.49
15.96	881.74
16.71	882.10
17.92	882.36
18.89	882.48
20.04	882.67
21.95	882.79
26.85	882.86
26.86	883.63

SUMARY DATA	MY00
Bankfull Elevation	882.8
Bankfull Cross-Sectional Area	8.8
Bankfull Width	13.7
Flood Prone Area Elevation	884.7
Flood Prone Width	30
Max Depth at Bankfull	1.9
Mean Depth at Bankfull	0.6
W/D Ratio	21.3
Entrenchment Ratio	2.2
Bank Height Ratio	1.0
Stream Type	C

Sta. 118+53 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 10 Pool, Station 118+53



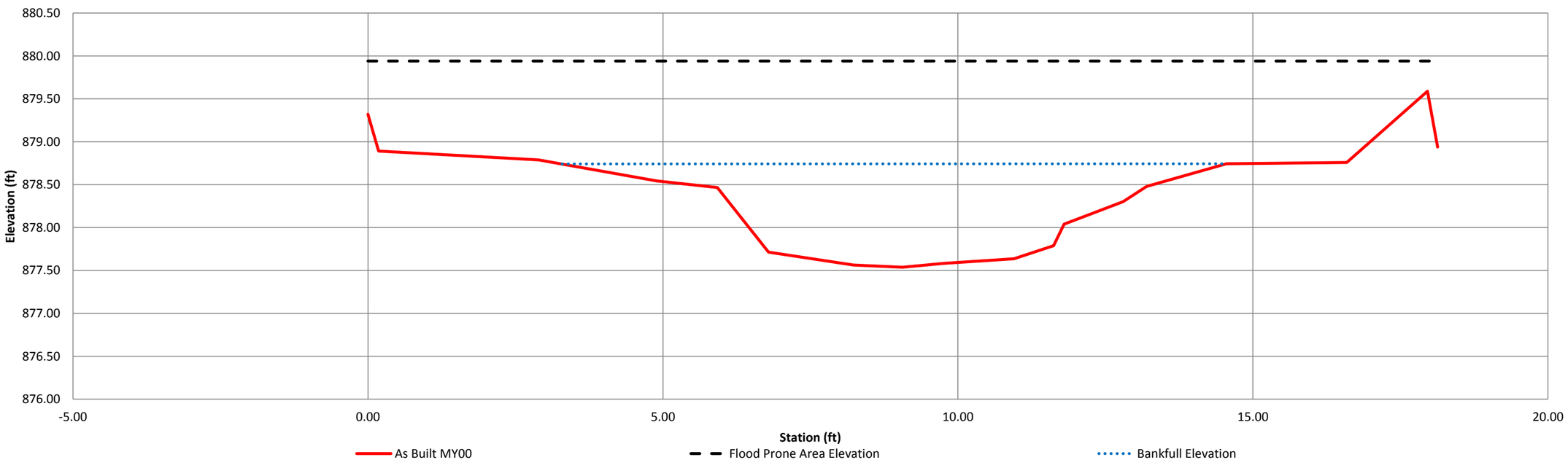
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-11, Riffle, STA 120+73
Drainage Area(sq. mi.)	0.28
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	879.32
0.18	878.89
2.89	878.79
4.89	878.54
5.92	878.47
6.79	877.71
8.23	877.56
9.06	877.54
9.76	877.58
10.95	877.64
11.62	877.79
11.80	878.04
12.80	878.30
13.20	878.48
14.55	878.74
16.59	878.76
17.96	879.59
18.13	878.94

SUMARY DATA	MY00
Bankfull Elevation	878.7
Bankfull Cross-Sectional Area	7.4
Bankfull Width	11.3
Flood Prone Area Elevation	879.9
Flood Prone Width	30
Max Depth at Bankfull	1.2
Mean Depth at Bankfull	0.7
W/D Ratio	17.1
Entrenchment Ratio	2.7
Bank Height Ratio	1.0
Stream Type	C

Sta. 120+73 Looking Downstream

North Fork Mountain Creek - Reach 2
X-Section 11 Riffle, Station 120+73

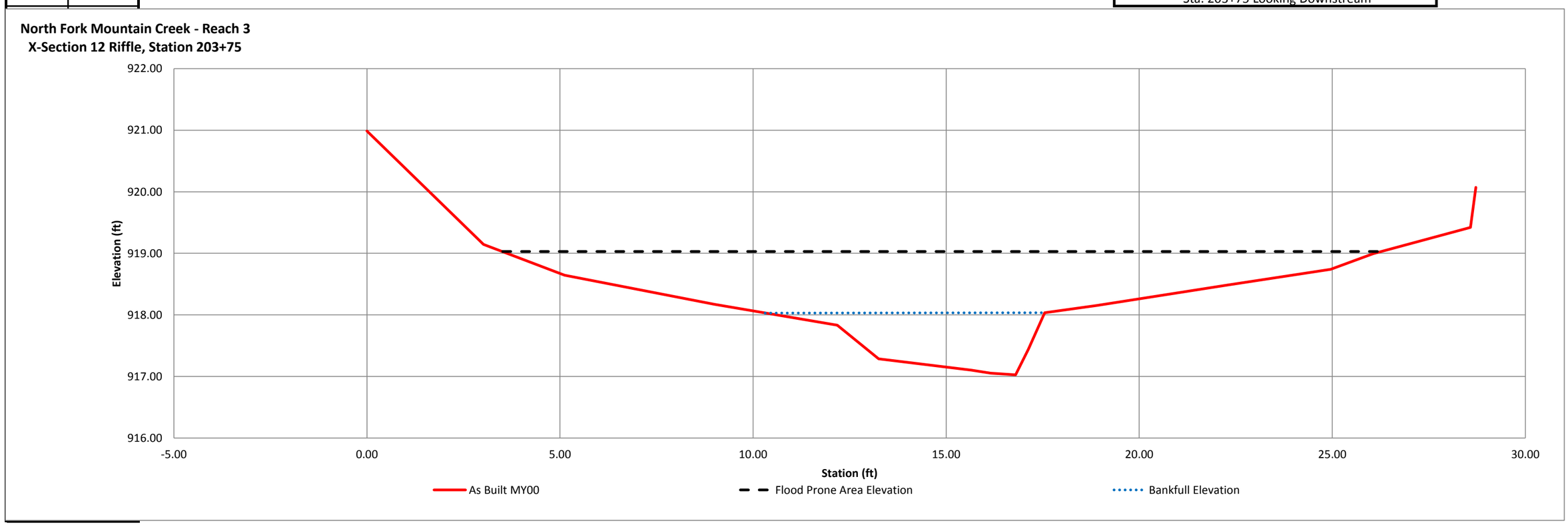


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-12, Riffle, STA 203+75
Drainage Area(sq. mi.)	0.06
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	920.99
3.02	919.15
5.12	918.64
9.00	918.17
12.18	917.83
13.25	917.29
15.65	917.10
16.15	917.05
16.80	917.03
17.13	917.44
17.55	918.03
18.90	918.15
22.27	918.48
24.96	918.74
26.06	918.99
28.58	919.42
28.72	920.07

SUMARY DATA	MY00
Bankfull Elevation	918.0
Bankfull Cross-Sectional Area	4.2
Bankfull Width	7.2
Flood Prone Area Elevation	919.0
Flood Prone Width	23
Max Depth at Bankfull	1.0
Mean Depth at Bankfull	0.6
W/D Ratio	12.5
Entrenchment Ratio	3.2
Bank Height Ratio	1.0
Stream Type	C

Sta. 203+75 Looking Downstream

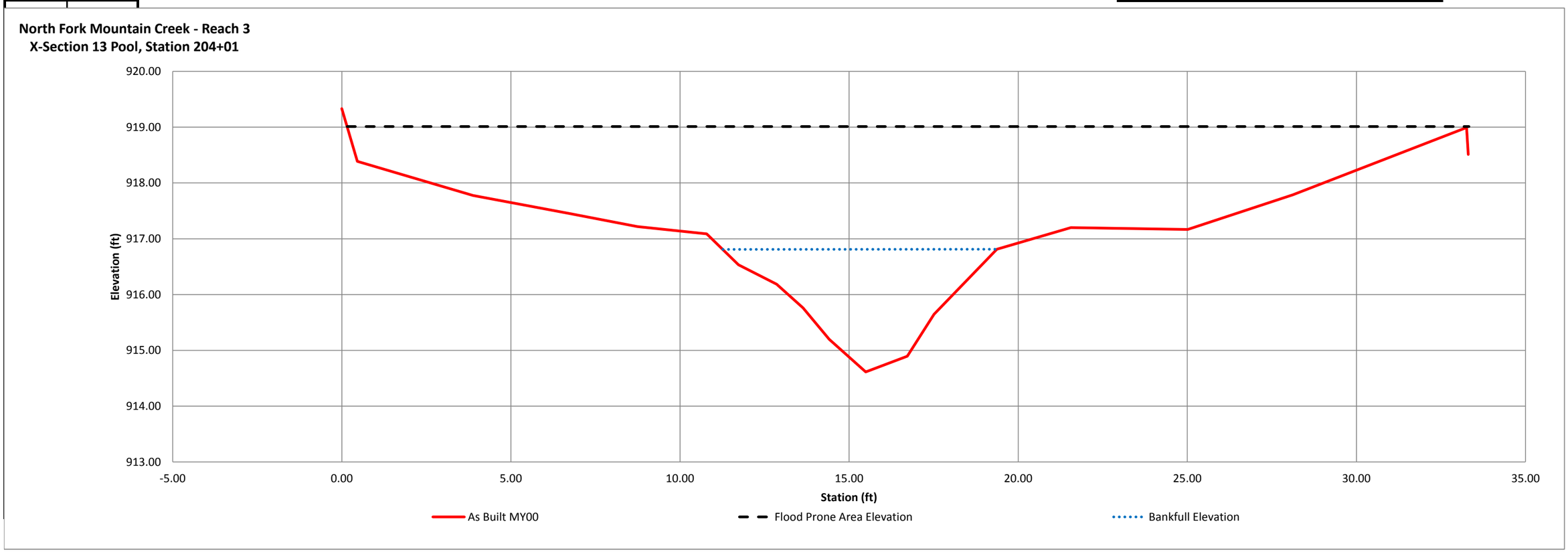


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-13, Pool, STA 204+01
Drainage Area(sq. mi.)	0.06
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	919.33
0.46	918.39
3.88	917.78
6.74	917.45
8.74	917.22
10.79	917.09
11.73	916.54
12.86	916.19
13.64	915.76
14.41	915.20
15.49	914.61
16.72	914.90
17.51	915.65
19.37	916.81
21.56	917.20
25.01	917.17
28.12	917.79
33.26	918.99
33.31	918.51

SUMARY DATA	MY00
Bankfull Elevation	916.8
Bankfull Cross-Sectional Area	9.1
Bankfull Width	8.1
Flood Prone Area Elevation	919.0
Flood Prone Width	33
Max Depth at Bankfull	2.2
Mean Depth at Bankfull	1.1
W/D Ratio	7.2
Entrenchment Ratio	4.1
Bank Height Ratio	1.1
Stream Type	C

Sta. 204+01 Looking Downstream

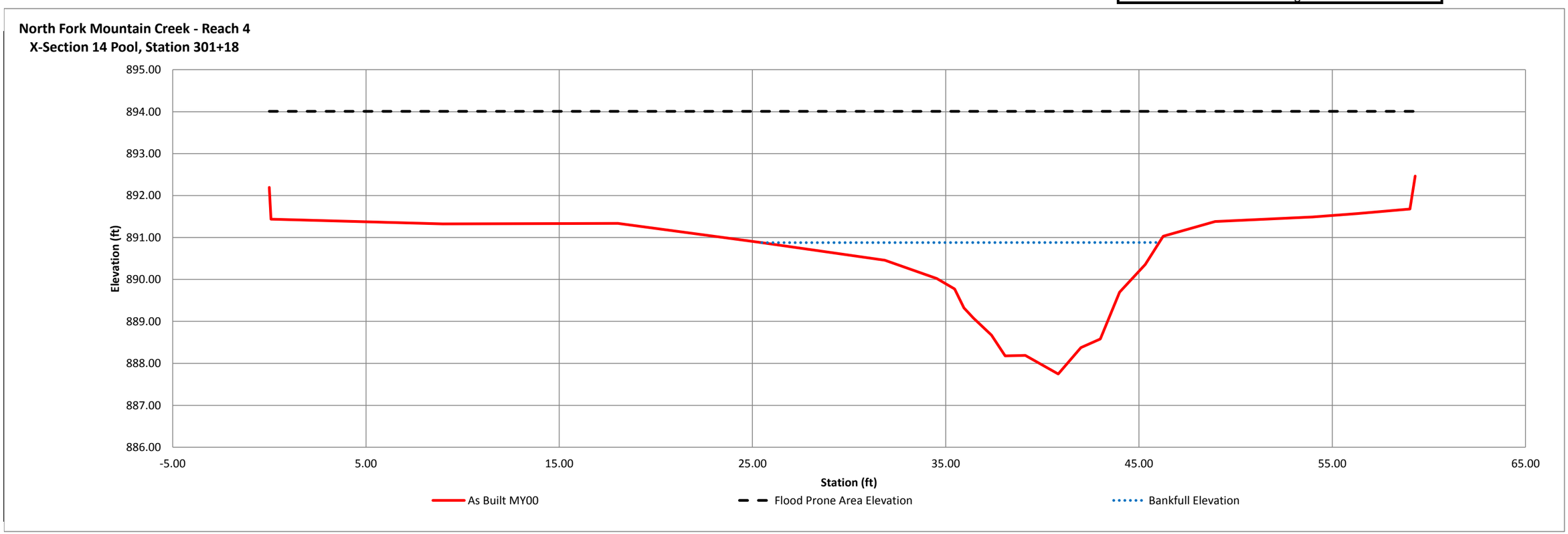


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-14, Pool, STA 301+18
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	892.20	56.30	891.57
0.08	891.44	59.02	891.68
8.97	891.33	59.29	892.47
18.04	891.34		
25.48	890.88		
31.85	890.46		
34.53	890.03		
35.46	889.77		
35.94	889.32		
36.43	889.08		
37.37	888.67		
38.08	888.18		
39.12	888.19		
40.82	887.75		
41.99	888.37		
43.00	888.58		
44.00	889.70		
45.33	890.36		
46.25	891.03		
48.94	891.38		
53.99	891.49		

SUMARY DATA	MY00
Bankfull Elevation	890.9
Bankfull Cross-Sectional Area	25.6
Bankfull Width	20.6
Flood Prone Area Elevation	894.0
Flood Prone Width	59
Max Depth at Bankfull	3.1
Mean Depth at Bankfull	1.2
W/D Ratio	16.6
Entrenchment Ratio	2.9
Bank Height Ratio	1.0
Stream Type	C

Sta. 301+18 Looking Downstream

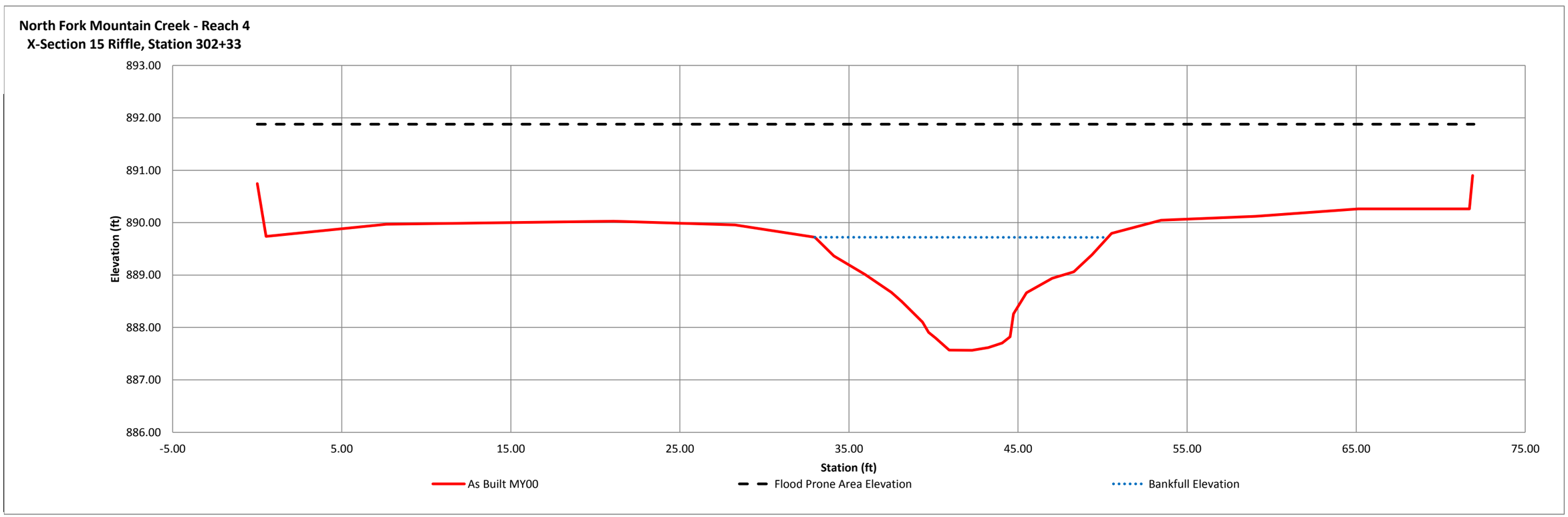


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-15, Riffle, STA 302+33
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	890.75	48.29	889.06
0.52	889.74	49.37	889.39
7.63	889.97	50.53	889.80
21.08	890.03	53.47	890.05
28.26	889.96	59.05	890.12
32.98	889.72	65.12	890.26
34.11	889.37	71.70	890.26
35.95	889.01	71.89	890.90
37.51	888.67		
38.12	888.50		
39.35	888.10		
39.71	887.91		
40.12	887.80		
40.93	887.57		
42.28	887.56		
43.24	887.62		
44.06	887.70		
44.53	887.82		
44.73	888.26		
45.50	888.66		
47.03	888.94		

SUMARY DATA	MY00
Bankfull Elevation	889.7
Bankfull Cross-Sectional Area	19.9
Bankfull Width	17.3
Flood Prone Area Elevation	891.9
Flood Prone Width	100
Max Depth at Bankfull	2.2
Mean Depth at Bankfull	1.2
W/D Ratio	15.1
Entrenchment Ratio	5.8
Bank Height Ratio	1.0
Stream Type	C

Sta. 302+33 Looking Downstream

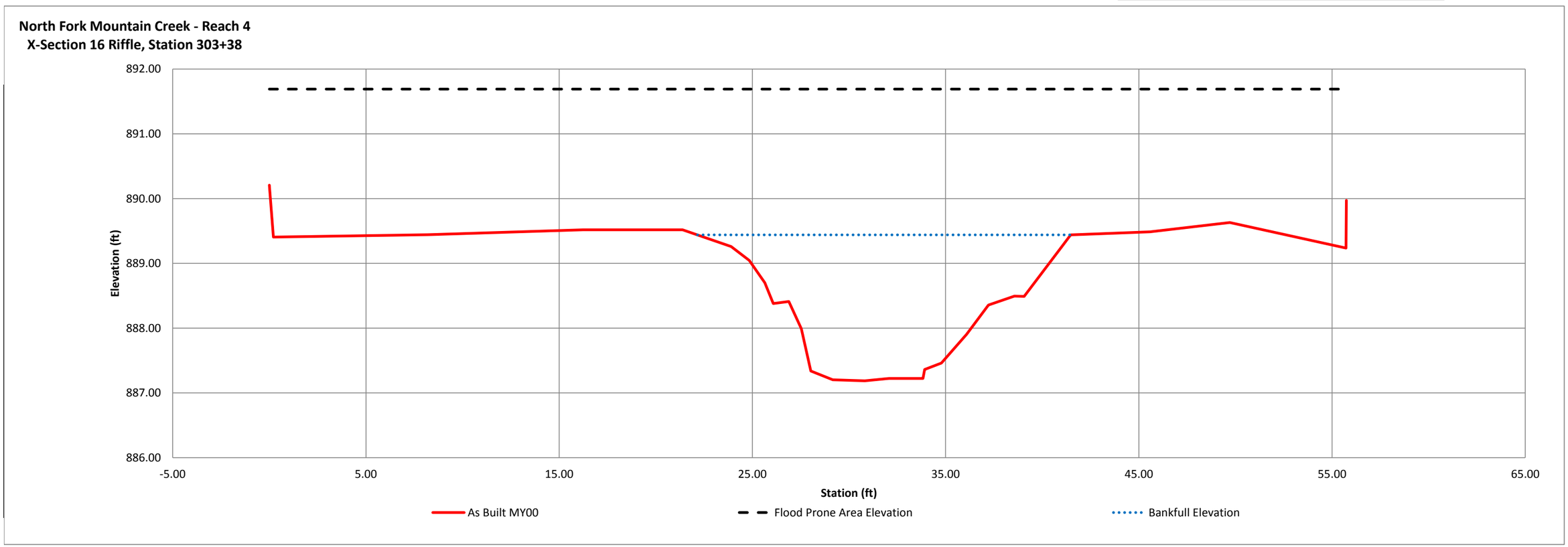


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-16, Riffle, STA 303+38
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	890.21	39.06	888.49
0.21	889.41	41.05	889.27
8.20	889.44	41.47	889.44
16.23	889.52	45.58	889.49
21.39	889.52	49.71	889.63
23.90	889.26	55.72	889.24
24.84	889.05	55.74	889.97
25.64	888.70		
26.08	888.38		
26.89	888.41		
27.53	887.99		
28.02	887.34		
29.16	887.20		
30.82	887.19		
32.07	887.23		
33.83	887.22		
33.92	887.36		
34.78	887.46		
36.09	887.91		
37.22	888.36		
38.56	888.50		

SUMARY DATA	MY00
Bankfull Elevation	889.4
Bankfull Cross-Sectional Area	25.4
Bankfull Width	19.3
Flood Prone Area Elevation	891.7
Flood Prone Width	56
Max Depth at Bankfull	2.3
Mean Depth at Bankfull	1.3
W/D Ratio	14.8
Entrenchment Ratio	2.9
Bank Height Ratio	1.0
Stream Type	C

Sta. 303+38 Looking Downstream



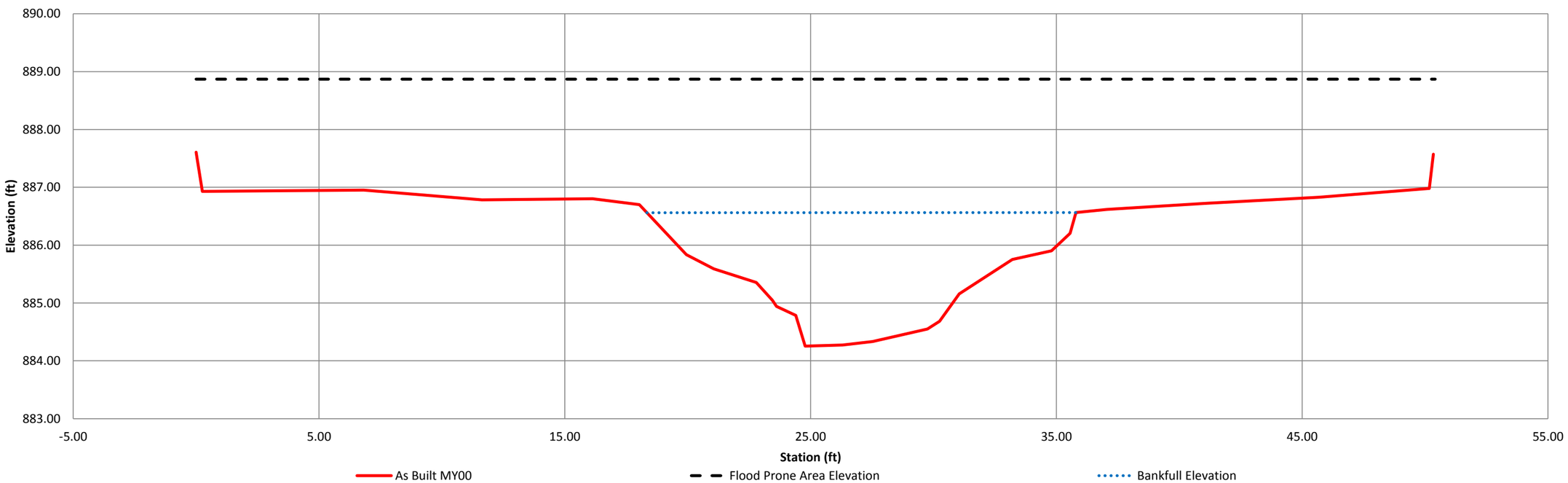
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-17, Riffle, STA 306+69
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	887.61	35.56	886.21
0.25	886.93	35.80	886.56
6.82	886.95	37.06	886.62
11.63	886.78	41.08	886.72
16.13	886.80	45.67	886.83
18.03	886.70	50.17	886.98
19.95	885.84	50.34	887.57
21.06	885.59		
22.79	885.35		
23.45	885.05		
23.61	884.94		
24.40	884.78		
24.78	884.25		
26.30	884.27		
27.52	884.34		
29.75	884.55		
30.25	884.68		
31.05	885.16		
32.34	885.52		
33.21	885.75		
34.80	885.90		

SUMARY DATA	MY00
Bankfull Elevation	886.6
Bankfull Cross-Sectional Area	23.9
Bankfull Width	17.5
Flood Prone Area Elevation	888.9
Flood Prone Width	50
Max Depth at Bankfull	2.3
Mean Depth at Bankfull	1.4
W/D Ratio	12.7
Entrenchment Ratio	2.9
Bank Height Ratio	1.0
Stream Type	C

Sta. 306+69 Looking Downstream

North Fork Mountain Creek - Reach 4
X-Section 17 Riffle, Station 306+69

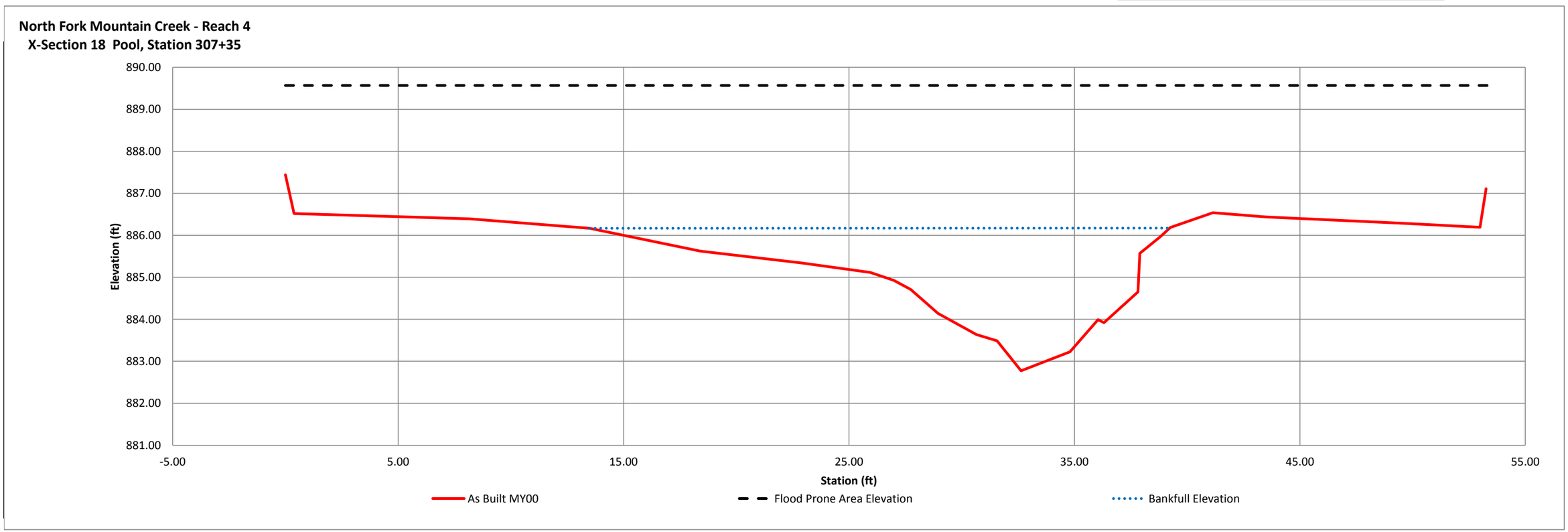


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-18, Pool, STA 307+35
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	887.44	43.49	886.44
0.38	886.52	49.66	886.28
8.15	886.39	52.99	886.19
13.49	886.17	53.26	887.11
18.41	885.63		
22.90	885.34		
25.95	885.12		
26.99	884.93		
27.73	884.71		
28.95	884.14		
30.65	883.64		
31.57	883.49		
32.63	882.77		
34.80	883.23		
36.05	883.99		
36.31	883.92		
37.82	884.65		
37.90	885.57		
38.81	885.97		
39.26	886.19		
41.14	886.54		

SUMARY DATA	MY00
Bankfull Elevation	886.2
Bankfull Cross-Sectional Area	35.1
Bankfull Width	25.8
Flood Prone Area Elevation	889.6
Flood Prone Width	53
Max Depth at Bankfull	3.4
Mean Depth at Bankfull	1.4
W/D Ratio	19.0
Entrenchment Ratio	2.1
Bank Height Ratio	1.0
Stream Type	C

Sta. 307+35 Looking Downstream

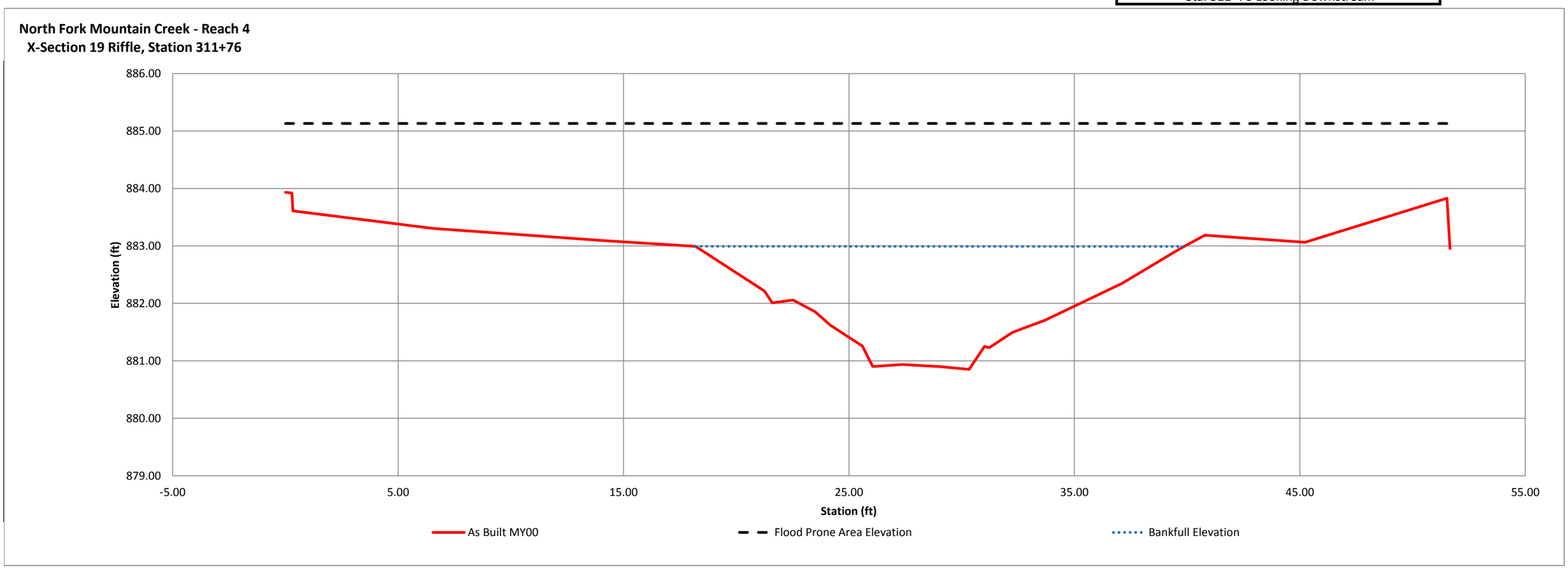


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-19, Riffle, STA 311+76
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	883.93	39.68	882.95
0.29	883.92	40.79	883.19
0.33	883.61	45.23	883.06
6.57	883.31	51.53	883.83
14.23	883.09	51.66	882.96
18.19	882.99		
21.25	882.22		
21.60	882.01		
22.52	882.06		
23.49	881.86		
24.18	881.62		
25.60	881.26		
26.05	880.90		
27.36	880.94		
29.08	880.90		
30.33	880.85		
31.01	881.25		
31.23	881.23		
32.26	881.50		
33.69	881.71		
37.12	882.35		

SUMARY DATA	MY00
Bankfull Elevation	883.0
Bankfull Cross-Sectional Area	25.8
Bankfull Width	21.7
Flood Prone Area Elevation	885.1
Flood Prone Width	100
Max Depth at Bankfull	2.1
Mean Depth at Bankfull	1.2
W/D Ratio	18.2
Entrenchment Ratio	4.6
Bank Height Ratio	1.0
Stream Type	C

Sta. 311+76 Looking Downstream

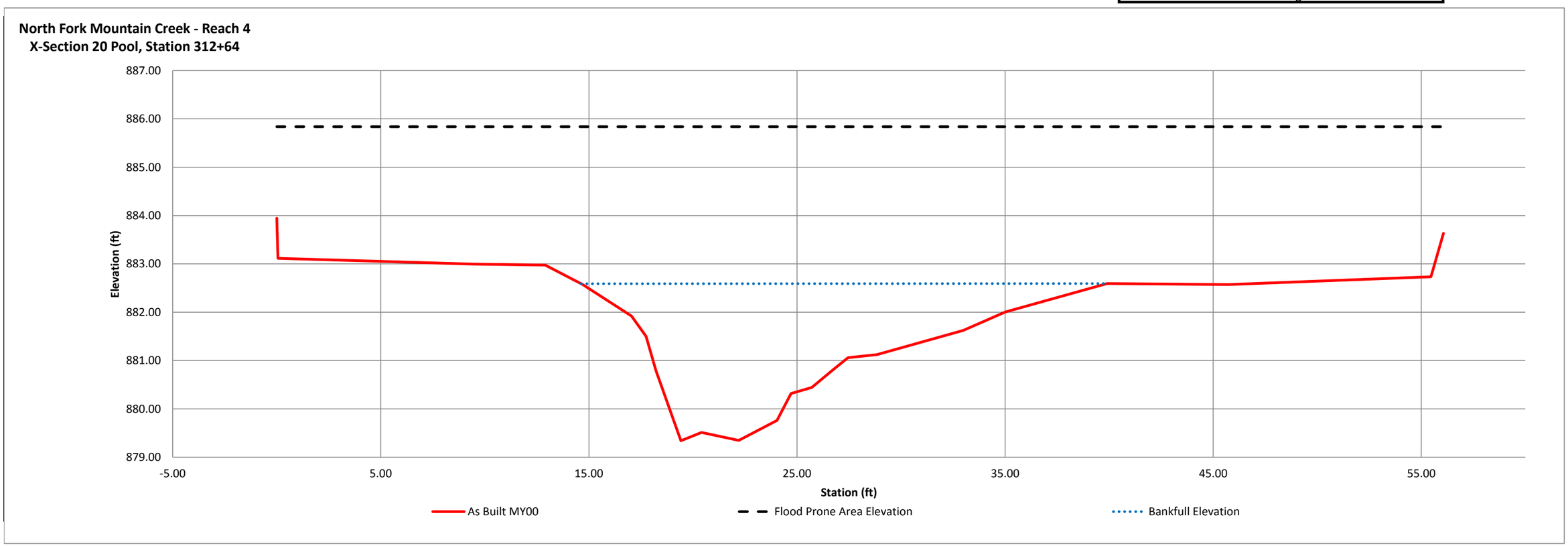


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-20, Pool, STA 312+64
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	883.94	55.47	882.73
0.06	883.12	56.07	883.63
9.44	883.00		
12.90	882.98		
14.69	882.58		
17.05	881.92		
17.75	881.50		
18.23	880.79		
19.42	879.34		
20.41	879.51		
22.20	879.35		
24.04	879.76		
24.71	880.32		
25.71	880.44		
26.73	880.81		
27.45	881.06		
28.84	881.12		
32.99	881.62		
35.01	882.00		
39.91	882.59		
45.73	882.57		

SUMARY DATA	MY00
Bankfull Elevation	882.6
Bankfull Cross-Sectional Area	36.7
Bankfull Width	25.3
Flood Prone Area Elevation	885.8
Flood Prone Width	56
Max Depth at Bankfull	3.3
Mean Depth at Bankfull	1.5
W/D Ratio	17.4
Entrenchment Ratio	2.2
Bank Height Ratio	1.0
Stream Type	C

Sta. 312+64 Looking Downstream

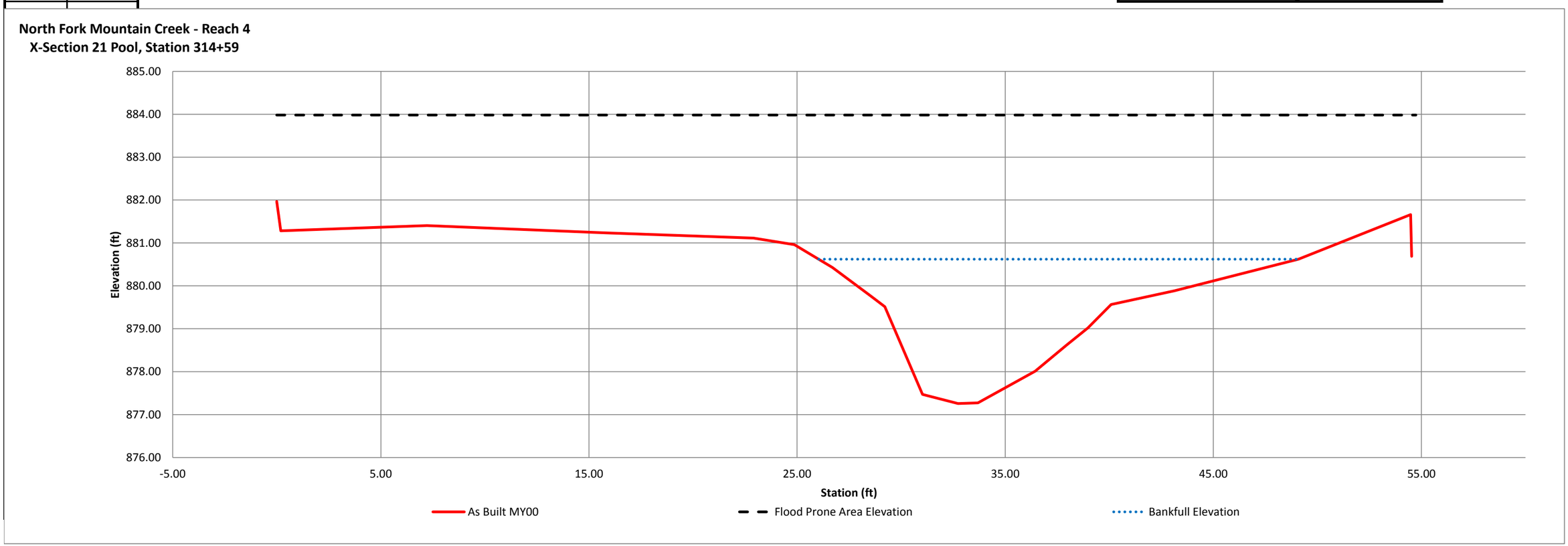


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-21, Pool, STA 314+59
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	881.97
0.19	881.28
7.22	881.40
15.78	881.24
22.91	881.11
24.87	880.96
26.70	880.43
28.51	879.77
29.22	879.51
31.03	877.47
32.73	877.26
33.69	877.27
36.44	878.01
37.97	878.63
38.97	879.02
40.09	879.57
43.13	879.88
49.09	880.62
54.48	881.66
54.53	880.69

SUMARY DATA	MY00
Bankfull Elevation	880.6
Bankfull Cross-Sectional Area	34.2
Bankfull Width	23.0
Flood Prone Area Elevation	884.0
Flood Prone Width	55
Max Depth at Bankfull	3.4
Mean Depth at Bankfull	1.5
W/D Ratio	15.5
Entrenchment Ratio	2.4
Bank Height Ratio	1.0
Stream Type	C

Sta. 314+59 Looking Downstream

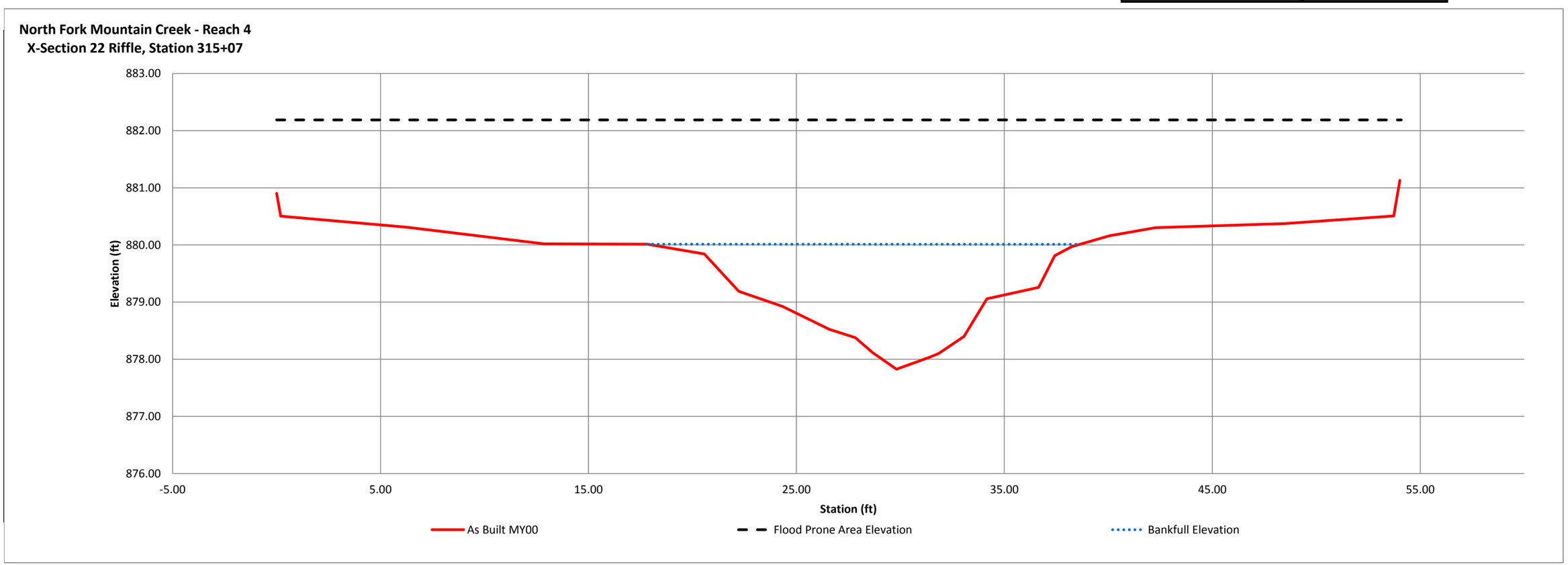


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-22, Riffle, STA 315+07
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	880.90	48.47	880.373
0.20	880.50	53.73	880.507
6.24	880.31	54.02	881.131
12.85	880.02		
17.82	880.01		
20.57	879.84		
22.23	879.19		
24.33	878.92		
26.58	878.52		
27.83	878.38		
28.66	878.12		
29.81	877.83		
31.33	878.03		
31.84	878.10		
33.06	878.40		
34.16	879.06		
36.65	879.26		
37.42	879.81		
38.24	879.97		
40.05	880.16		
42.27	880.30		

SUMARY DATA	MY00
Bankfull Elevation	880.0
Bankfull Cross-Sectional Area	22.0
Bankfull Width	20.7
Flood Prone Area Elevation	882.2
Flood Prone Width	54
Max Depth at Bankfull	2.2
Mean Depth at Bankfull	1.1
W/D Ratio	19.6
Entrenchment Ratio	2.6
Bank Height Ratio	1.0
Stream Type	C

Sta. 315+07 Looking Downstream

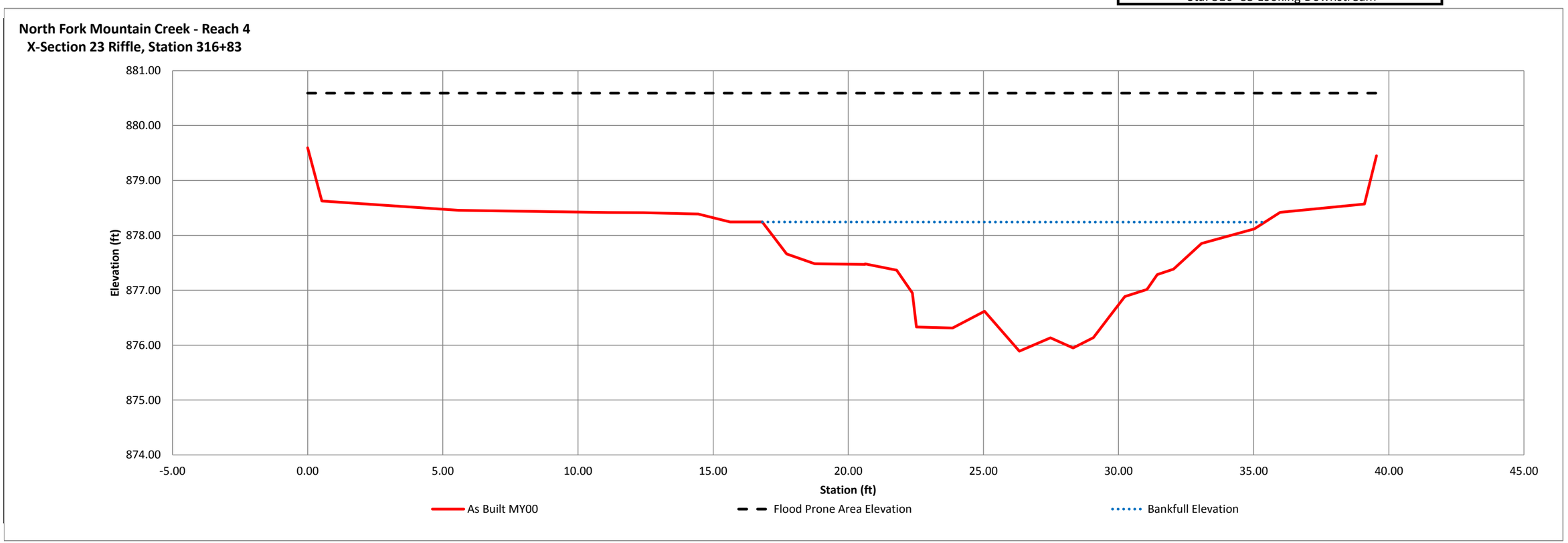


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-23, Riffle, STA 316+83
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation	Station	Elevation
0.00	879.60	29.07	876.136
0.52	878.63	29.65	876.511
5.59	878.46	30.23	876.886
11.12	878.42	31.05	877.014
12.42	878.41	31.43	877.287
14.45	878.39	32.03	877.383
15.63	878.25	33.07	877.853
16.82	878.24	35.02	878.118
17.72	877.66	35.98	878.42
18.76	877.48	39.1	878.57
20.62	877.47	39.54	879.452
20.63	877.48		
21.79	877.37		
22.37	876.95		
22.52	876.33		
22.95	876.33		
23.86	876.31		
25.04	876.62		
26.33	875.89		
27.48	876.13		
28.32	875.95		

SUMARY DATA	MY00
Bankfull Elevation	878.2
Bankfull Cross-Sectional Area	22.7
Bankfull Width	18.6
Flood Prone Area Elevation	880.6
Flood Prone Width	40
Max Depth at Bankfull	2.4
Mean Depth at Bankfull	1.2
W/D Ratio	15.2
Entrenchment Ratio	2.1
Bank Height Ratio	1.0
Stream Type	C

Sta. 316+83 Looking Downstream

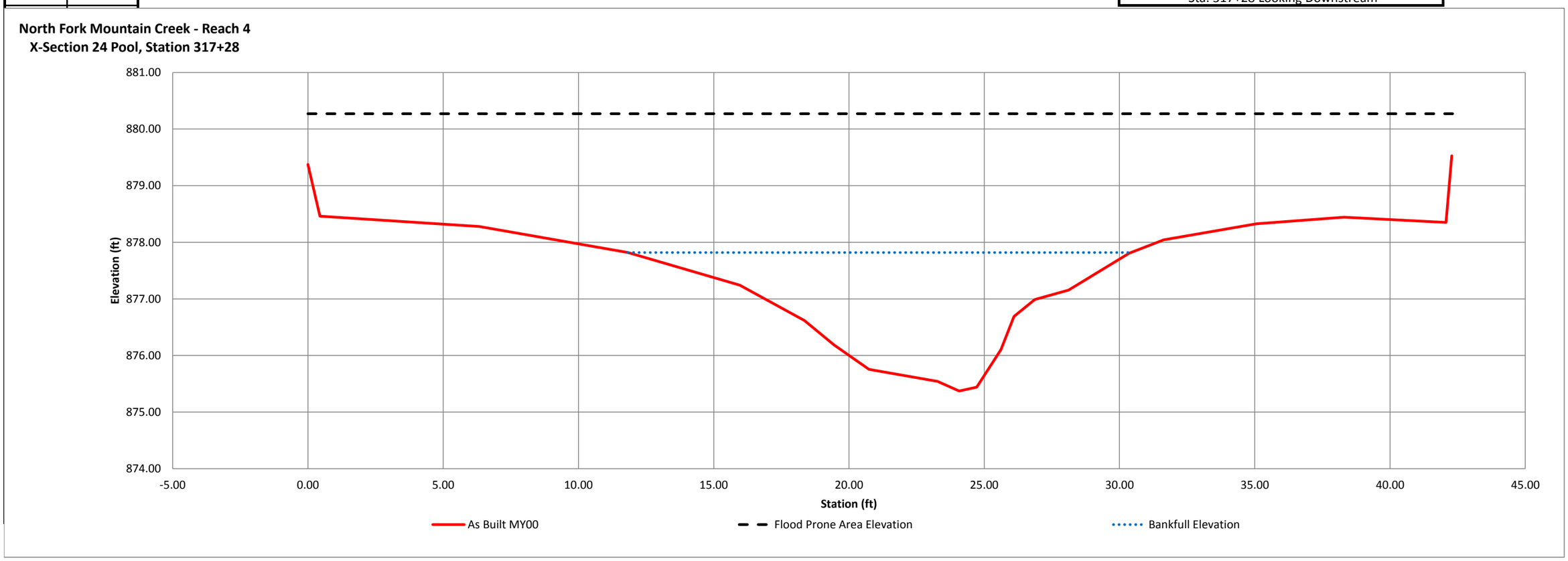


River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-24, Pool, STA 317+28
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	879.37
0.44	878.46
6.33	878.28
11.83	877.82
15.96	877.24
18.35	876.62
19.45	876.19
20.74	875.75
23.27	875.54
24.07	875.37
24.72	875.44
25.62	876.10
26.10	876.69
26.87	876.99
28.12	877.16
30.36	877.81
31.63	878.04
35.06	878.33
38.30	878.44
42.07	878.35
42.28	879.53

SUMARY DATA	MY00
Bankfull Elevation	877.8
Bankfull Cross-Sectional Area	21.2
Bankfull Width	18.6
Flood Prone Area Elevation	880.3
Flood Prone Width	42
Max Depth at Bankfull	2.5
Mean Depth at Bankfull	1.1
W/D Ratio	16.3
Entrenchment Ratio	2.3
Bank Height Ratio	1.0
Stream Type	C

Sta. 317+28 Looking Downstream



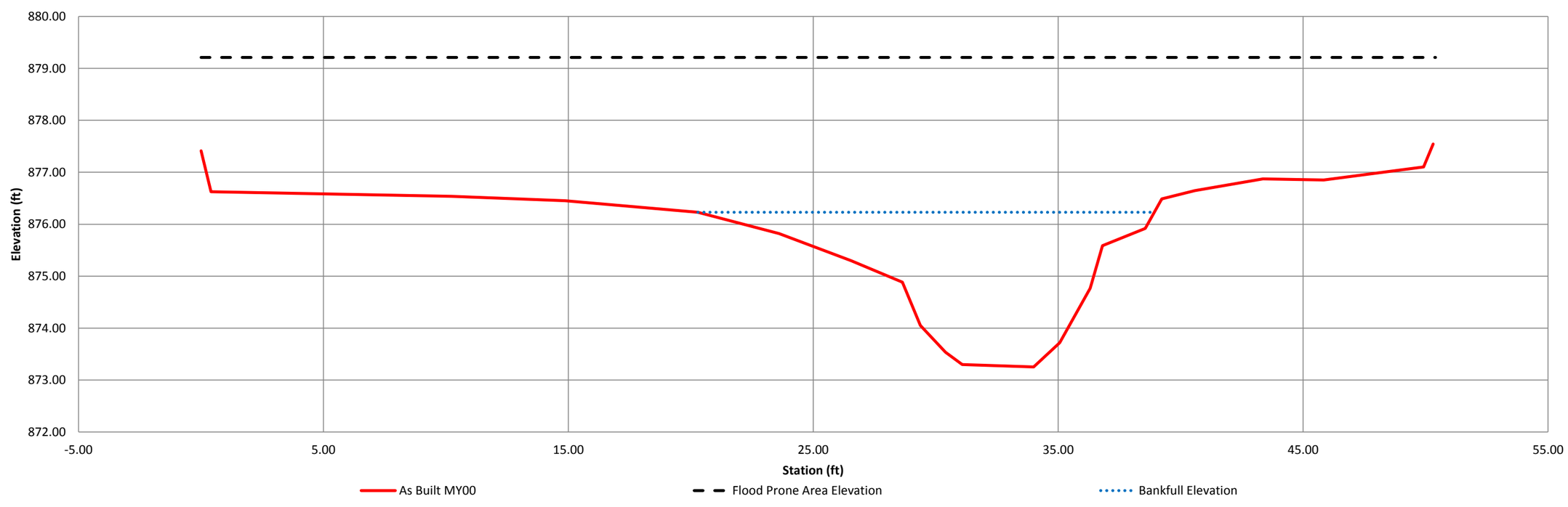
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-25, Pool, STA 319+29
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	877.41
0.41	876.62
10.23	876.54
14.86	876.45
20.29	876.23
23.60	875.82
26.55	875.30
28.64	874.89
29.37	874.05
30.40	873.54
31.08	873.30
34.00	873.25
35.06	873.72
36.31	874.77
36.81	875.59
38.56	875.92
39.23	876.49
40.58	876.65
43.36	876.87
45.84	876.85
49.92	877.10
50.31	877.54

SUMARY DATA	MY00
Bankfull Elevation	876.2
Bankfull Cross-Sectional Area	26.2
Bankfull Width	18.7
Flood Prone Area Elevation	879.2
Flood Prone Width	50
Max Depth at Bankfull	3.0
Mean Depth at Bankfull	1.4
W/D Ratio	13.3
Entrenchment Ratio	2.7
Bank Height Ratio	1.0
Stream Type	C

Sta. 319+29 Looking Downstream

North Fork Mountain Creek - Reach 4
X-Section 25 Pool, Station 319+29



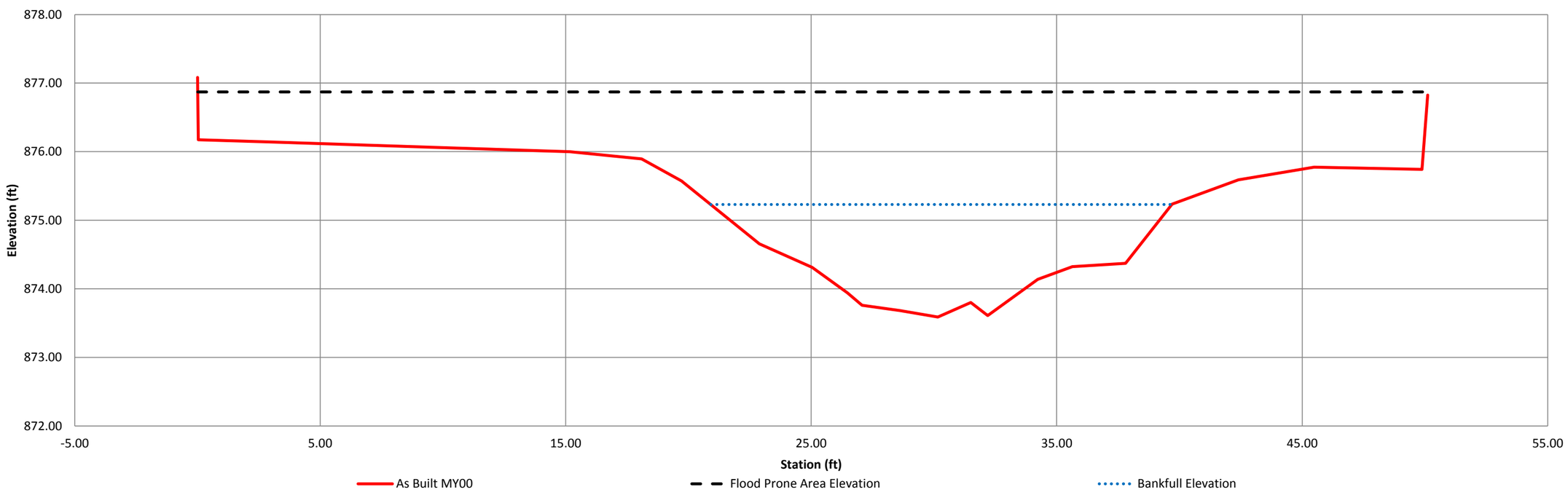
River Basin	Catawba River
Watershed	Lower Lake Norman
XS ID	XS-26, Riffle, STA 319+82
Drainage Area(sq. mi.)	1.22
Date	6/1/2012
Field Crew	

Station	Elevation
0.00	877.08
0.03	876.17
3.20	876.14
10.04	876.06
15.17	876.00
18.09	875.90
19.72	875.57
22.89	874.66
25.04	874.31
26.47	873.94
27.07	873.76
28.62	873.68
30.16	873.59
31.50	873.80
32.19	873.61
34.23	874.14
35.64	874.32
37.80	874.37
39.70	875.24
42.40	875.59
45.49	875.77
49.88	875.74
50.11	876.82

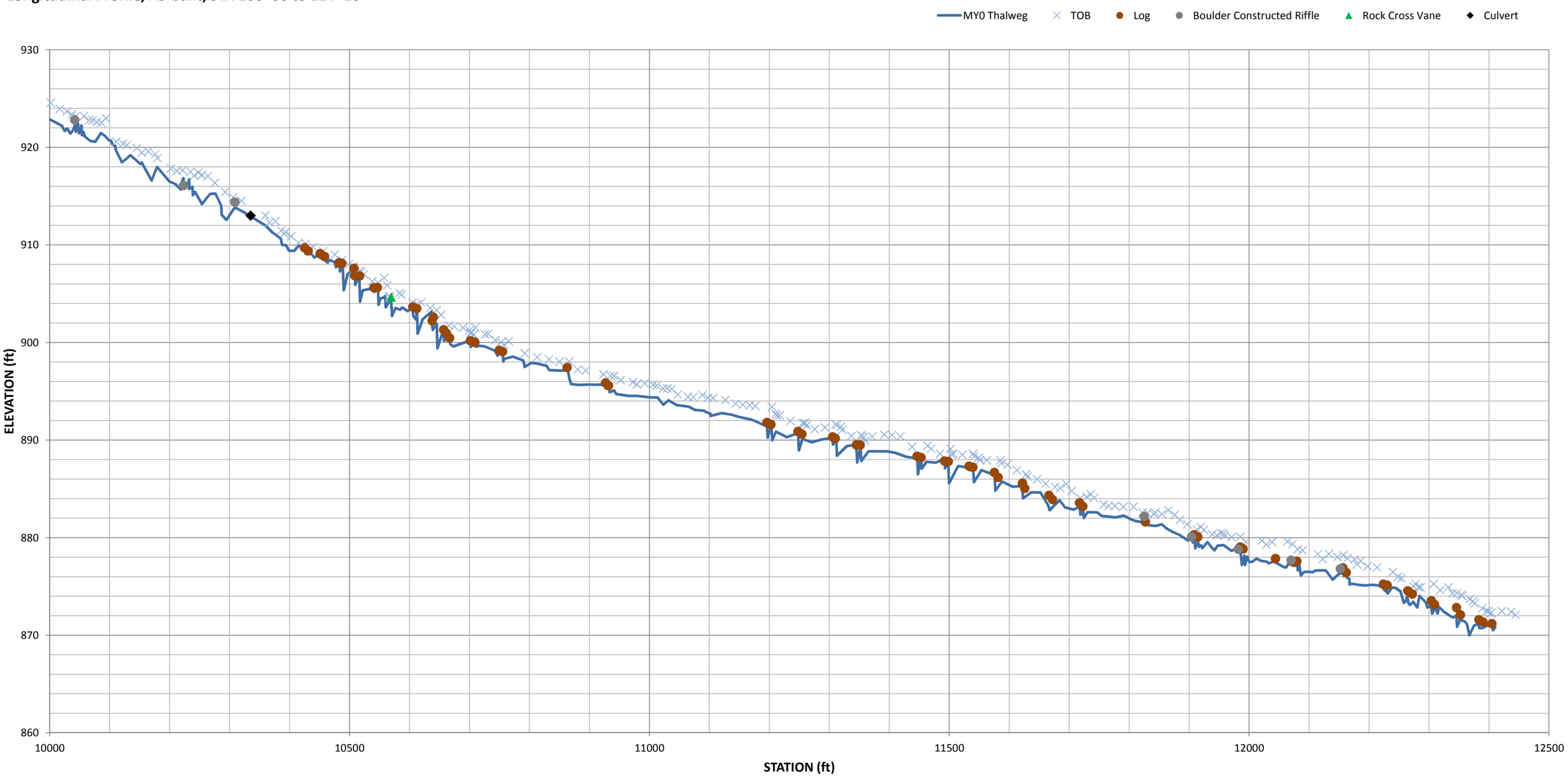
SUMARY DATA	MY00
Bankfull Elevation	875.2
Bankfull Cross-Sectional Area	19.4
Bankfull Width	18.8
Flood Prone Area Elevation	876.9
Flood Prone Width	50
Max Depth at Bankfull	1.6
Mean Depth at Bankfull	1.0
W/D Ratio	18.2
Entrenchment Ratio	2.7
Bank Height Ratio	1.0
Stream Type	C

Sta. 319+82 Looking Downstream

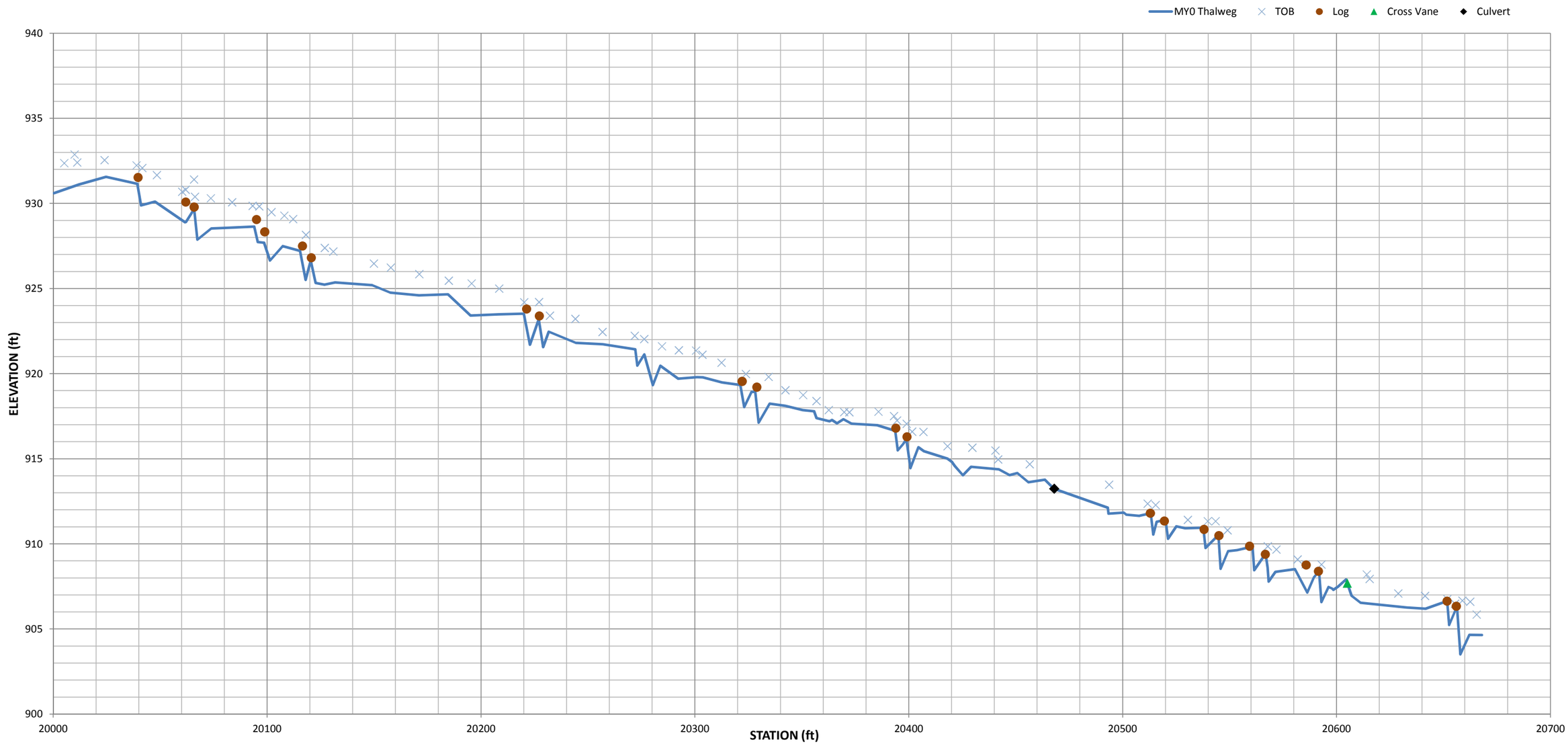
North Fork Mountain Creek - Reach 4
X-Section 26 Riffle, Station 319+82



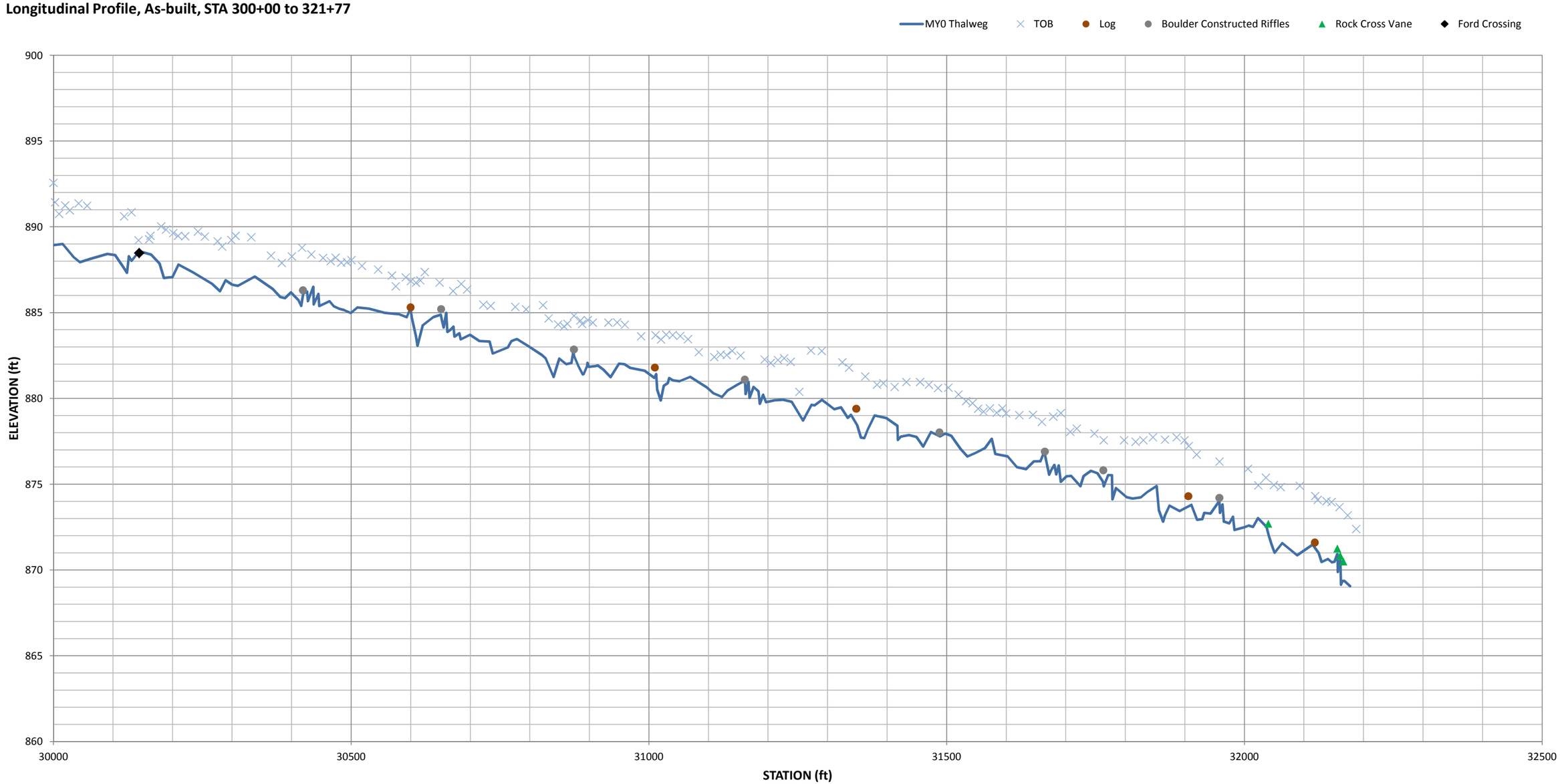
North Fork Mountain Creek, Reaches 1 and 2
Longitudinal Profile, As-built, STA 100+00 to 124+10



North Fork Mountain Creek, Reach 3
Longitudinal Profile, As-Built STA 200+00 to 206+67



North Fork Mountain Creek, Reach 4
Longitudinal Profile, As-built, STA 300+00 to 321+77



(This page intentionally left blank for two-sided printing)

Stream Monitoring Photos

Photo B1 – Photo Station S1 Reach 1 crossing looking downstream (6/27/2012)

Photo B2 – Photo Station S2 Reach 1 crossing looking upstream (6/27/2012)

Photo B3 – Photo Station S3 Reach 3 crossing looking downstream (6/27/2012)

Photo B4 – Photo Station S4 Reach 3 crossing looking upstream (6/27/2012)

Photo B5 – Photo Station S5 Reach 4 crossing looking downstream (6/27/2012)

Photo B6 – Photo Station S6 Reach 4 crossing looking upstream (6/27/2012)

Photo B7 – Photo Station S7 Confluence of Reach 2 and Reach 4 looking northwest (6/27/2012)

Photo B8 – Photo Station S8 Confluence of Reach 2 and Reach 4 looking west (6/27/2012)

Photo B9 – Photo Station S9 Confluence of Reach 2 and Reach 4 looking southwest (6/27/2012)

Photo B10 – Photo Station S10 Above Reach 4 looking east (6/27/2012)

Photo B11 – Photo Station S11 Above Reach 4 looking southeast (6/27/2012)

Photo B12 – Photo Station S12 Above Reach 4 looking south (6/27/2012)

Photo B13 – Photo Station S13 Reach 1 cross-section 1 looking downstream (6/27/2012)

Photo B14 – Photo Station S14 Reach 1 cross-section 2 looking downstream (6/27/2012)

Photo B15 – Photo Station S15 Reach 2 cross-section 3 looking downstream (6/27/2012)

Photo B16 – Photo Station S16 Reach 2 cross-section 4 looking downstream (6/27/2012)

Photo B17 – Photo Station S17 Reach 2 cross-section 5 looking downstream (6/27/2012)

Photo B18 – Photo Station S18 Reach 2 cross-section 6 looking downstream (6/27/2012)

Photo B19 – Photo Station S19 Reach 2 cross-section 7 looking downstream (6/27/2012)

Photo B20 – Photo Station S20 Reach 2 cross-section 8 looking downstream (6/27/2012)

Photo B21 – Photo Station S21 Reach 2 cross-section 9 looking downstream (6/27/2012)

Photo B22 – Photo Station S22 Reach 2 cross-section 10 looking downstream (6/27/2012)

Photo B23 – **Photo Station S23** Reach 2 cross-section 11 looking downstream (6/27/2012)

Photo B24 – **Photo Station S24** Reach 3 cross-section 12 looking downstream (6/27/2012)

Photo B25 – **Photo Station S25** Reach 3 cross-section 13 looking downstream (6/27/2012)

Photo B26 – **Photo Station S26** Reach 4 cross-section 14 looking downstream (6/27/2012)

Photo B27 – **Photo Station S27** Reach 4 cross-section 15 looking downstream (6/27/2012)

Photo B28 – **Photo Station S28** Reach 4 cross-section 16 looking downstream (6/27/2012)

Photo B29 – **Photo Station S29** Reach 4 cross-section 17 looking downstream (6/27/2012)

Photo B30 – **Photo Station S30** Reach 4 cross-section 18 looking downstream (6/27/2012)

Photo B31 – **Photo Station S31** Reach 4 cross-section 19 looking downstream (6/27/2012)

Photo B32 – **Photo Station S32** Reach 4 cross-section 20 looking downstream (6/27/2012)

Photo B33 – **Photo Station S33** Reach 4 cross-section 21 looking downstream (6/27/2012)

Photo B34 – **Photo Station S34** Reach 4 cross-section 22 looking downstream (6/27/2012)

Photo B35 – **Photo Station S35** Reach 4 cross-section 23 looking downstream (6/27/2012)

Photo B36 – **Photo Station S36** Reach 4 cross-section 24 looking downstream (6/27/2012)

Photo B37 – **Photo Station S37** Reach 4 cross-section 25 looking downstream (6/27/2012)

Photo B38 – **Photo Station S38** Reach 4 cross-section 26 looking downstream (6/27/2012)

Photo B39 – Photo Station S39 Crest gauge looking upstream on reach 4 (6/27/2012)

Appendix C - Vegetation Data

This page intentionally left blank for double sided printing.

Table 7 - Stem Count Totals and Planted by Plot and Species North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)																	
			Current Plot Data (MY0 2012)														Annual Means
Scientific Name	**Common Name**	**Species Type**	**171300307-01-0001**	**171300307-01-0002**	**171300307-01-0003**	**171300307-01-0004**	**171300307-01-0005**	**171300307-01-0006**	**171300307-01-0007**	**171300307-01-0008**	**171300307-01-0009**	**171300307-01-0010**	**171300307-01-0011**	**171300307-01-0012**	**171300307-01-0013**	**171300307-01-0014**	**MY0 (2012)**
Alnus serrulata	hazel alder	Shrub												1	2		3
Betula nigra	river birch	Tree								5	4	5		7		4	25
Carpinus caroliniana	American hornbeam	Tree										2	4	2			8
Cephalanthus occidentalis	common buttonbush	Shrub												2	1	1	4
Fraxinus pennsylvanica	green ash	Tree	4	4	1	9		1	4	2	4	2	4	1	1	7	44
Juglans nigra	black walnut	Tree			3	1					1	2	1		1	2	11
Liriodendron tulipifera	tulip-tree	Tree	4	3	5	2	10	6				6	4		5	2	47
Platanus occidentalis	American sycamore	Tree	1	3	2	13	4	1	16	12	16	3	9	8	2	1	91
Quercus	oak	Tree	1		9			4	13	1							28
Quercus phellos	willow oak	Tree		6	1	6	4	4	2	4	7	4	4	3	4		49
Quercus rubra	northern red oak	Tree	13	2	2		8	4	1						1		31
Unknown		unknown			1												1
		Stem count	23	18	24	31	26	20	36	24	32	24	26	24	17	17	342
		size (ares)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
		size (ACRES)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.35
		Species count	5	5	8	5	4	6	5	5	5	7	6	7	8	6	12
		Stems per ACRE	931	728	971	1255	1052	809	1457	971	1295	971	1052	971	688	688	**989**

CVS Table 1 - Vegetation Metadata North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)	
Report Prepared By	kevin mitchell
Date Prepared	6/4/2012 14:40
database name	Equinox_2012_A_NFMC_MY0.mdb
database location	Z:\ES\NRI&M\EBX Monitoring\NF Mountain Creek\NFMC-MY0-2012\Data\Veg
computer name	D16TNK71
file size	49504256
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	171300307
project Name	North Fork Mountain Creek
Description	
River Basin	Catawba
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	14

CVS Table 2 - Vigor by Species North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)									
	Species	**CommonName**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
	Alnus serrulata	hazel alder	3						
	Betula nigra	river birch	2	11	9	3			
	Cephalanthus occidentalis	common buttonbush	2	2					
	Fraxinus pennsylvanica	green ash	19	12	13				
	Juglans nigra	black walnut	5	6					
	Quercus phellos	willow oak	6	14	16	13			
	Carpinus caroliniana	American hornbeam	6	2					
	Quercus	oak		6	15	7			
	Quercus rubra	northern red oak	11	17	2	1			
	Liriodendron tulipifera	tuliptree	7	25	14	1			
	Platanus occidentalis	American sycamore	17	28	26	20			
	Unknown				1		2		
TOT:	**12**	**11**	**78**	**123**	**96**	**45**	**2**		

CVS Table 3 - Vegetation Damage by Species North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)					
	Species	**CommonName**	**Count of Damage Categories**	**(no damage)**	**Deer**
	Alnus serrulata	hazel alder	0	3	
	Betula nigra	river birch	0	25	
	Carpinus caroliniana	American hornbeam	0	8	
	Cephalanthus occidentalis	common buttonbush	0	4	
	Fraxinus pennsylvanica	green ash	0	44	
	Juglans nigra	black walnut	0	11	
	Liriodendron tulipifera	tuliptree	0	47	
	Platanus occidentalis	American sycamore	1	90	1
	Quercus	oak	0	28	
	Quercus phellos	willow oak	0	49	
	Quercus rubra	northern red oak	0	31	
	Unknown		0	3	
TOT:	**12**	**11**	**1**	**343**	**1**

CVS Table 4 - Vegetation Damage by Plot
North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)

	plot	Count of Damage Categories	(no damage)	Deer
	171300307-01-0001	0	24	
	171300307-01-0002	0	18	
	171300307-01-0003	0	25	
	171300307-01-0004	1	30	1
	171300307-01-0005	0	26	
	171300307-01-0006	0	20	
	171300307-01-0007	0	36	
	171300307-01-0008	0	24	
	171300307-01-0009	0	32	
	171300307-01-0010	0	24	
	171300307-01-0011	0	26	
	171300307-01-0012	0	24	
	171300307-01-0013	0	17	
	171300307-01-0014	0	17	
TOT:	**14**	**1**	**343**	**1**

CVS Table 5 - Planted Stems by Plot and Species
North Fork Mountain Creek Stream and Wetland Restoration (EEP #94151)

	Comment	Species	CommonName	Total Planted Stems	# plots	avg# stems	plot 171300307-01-0001	plot 171300307-01-0002	plot 171300307-01-0003	plot 171300307-01-0004	plot 171300307-01-0005	plot 171300307-01-0006	plot 171300307-01-0007	plot 171300307-01-0008	plot 171300307-01-0009	plot 171300307-01-0010	plot 171300307-01-0011	plot 171300307-01-0012	plot 171300307-01-0013	plot 171300307-01-0014
		Alnus serrulata	hazel alder	3	2	1.5												1	2	
		Betula nigra	river birch	25	5	5								5	4	5		7		4
		Carpinus caroliniana	American hornbeam	8	3	2.67										2	4	2		
		Cephalanthus occidentalis	common buttonbush	4	3	1.33												2	1	1
		Fraxinus pennsylvanica	green ash	44	13	3.38	4	4	1	9		1	4	2	4	2	4	1	1	7
		Juglans nigra	black walnut	11	7	1.57			3	1					1	2	1		1	2
		Liriodendron tulipifera	tuliptree	47	10	4.7	4	3	5	2	10	6				6	4		5	2
		Platanus occidentalis	American sycamore	91	14	6.5	1	3	2	13	4	1	16	12	16	3	9	8	2	1
		Quercus	oak	28	5	5.6	1		9			4	13	1						
		Quercus phellos	willow oak	49	12	4.08		6	1	6	4	4	2	4	7	4	4	3	4	
		Quercus rubra	northern red oak	31	7	4.43	13	2	2		8	4	1						1	
		Unknown		1	1	1			1											
TOT:	**0**	**12**	**11**	**342**	**12**		**23**	**18**	**24**	**31**	**26**	**20**	**36**	**24**	**32**	**24**	**26**	**24**	**17**	**17**

Vegetation Monitoring Plot Photos

Photo C1 – Photo Station V1 Veg Plot 1 looking across veg plot (5/25/2012 Year 0)

Photo C2 – Photo Station V2 Veg Plot 2 looking across veg plot (5/25/2012 Year 0)

Photo C3 - Photo Station V3 Veg Plot 3 looking across veg plot (5/25/2012 Year 0)

Photo C4 – Photo Station V4 Veg Plot 4 looking across veg plot (5/25/2012 Year 0)

Photo C5 – Photo Station V5 Veg Plot 5 looking across veg plot (5/25/2012 Year 0)

Photo C6 – Photo Station V6 Veg Plot 6 looking across veg plot (5/25/2012 Year 0)

Photo C7 – Photo Station V7 Veg Plot 7 looking across veg plot (5/25/2012 Year 0)

Photo C8 – Photo Station V8 Veg Plot 8 looking across veg plot (5/25/2012 Year 0)

Photo C9 – Photo Station V9 Veg Plot 9 looking across veg plot (5/25/2012 Year 0)

Photo C10 – Photo Station V10 Veg Plot 10 looking across veg plot (5/25/2012 Year 0)

Photo C11 – Photo Station V11 Veg Plot 11 looking across veg plot (5/25/2012 Year 0)

Photo C12 – Photo Station V12 Veg Plot 12 looking across veg plot (5/25/2012 Year 0)

Photo C13 – Photo Station V13 Veg Plot 13 looking across veg plot (5/25/2012 Year 0)

Photo C14 – Photo Station V14 Veg Plot 14 looking across veg plot (5/25/2012 Year 0)

Appendix D - As-Built Plan Sheet

This page intentionally left blank for double sided printing.

Stantec
2127 AYRSLEY TOWN BLVD
SUITE 300
CHARLOTTE, NC 28273
(P) 704-329-0900
(F) 704-329-0905
www.stantec.com
License No. F-0672

CLIENT:

ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DR.
RALEIGH, NC 27606
(P) 919-829-9909

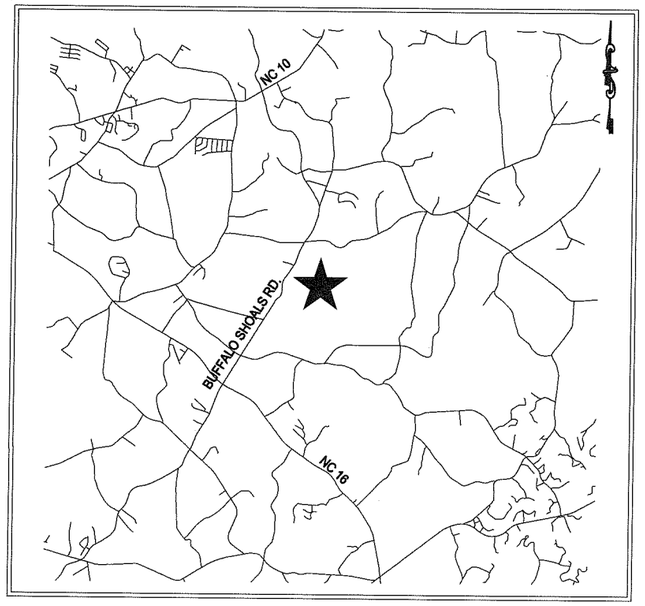
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM AND WETLAND RESTORATION CATAWBA COUNTY, NORTH CAROLINA

ENVIRONMENTAL BANC & EXCHANGE, LLC
RALEIGH, NORTH CAROLINA
JULY 13, 2012
PROJECT NUMBER: 171300307

SHEET DESCRIPTION

0.0	COVER
1.1	LEGEND AND SYMBOLS
2.2	KEY SHEET
3.3 - 3.11	AS-BUILT PLAN SHEETS
4.12 - 4.13	AS-BUILT TYPICAL SECTION SHEETS
5.14 - 5.18	AS-BUILT PROFILE SHEETS
6.19	AS-BUILT PLANTING PLAN

SITE LOCATION



VICINITY MAP NOT TO SCALE

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

NOTES:
THIS IS A SURVEY OF AS-BUILT CONDITIONS ONLY. THIS INCLUDES SITE TOPOGRAPHY, CHANNEL DEFINITION, AND STREAM STRUCTURE LOCATION. THE PLS VERIFIES ONLY THE LOCATION AND ELEVATION OF THE POINTS COLLECTED AND THE CORRESPONDING ACCURACY OF THE CONTOURS TO DEFINE THE PREVIOUSLY MENTIONED FEATURES.

ALL WETLAND AND VEGETATION INFORMATION HAS BEEN PROVIDED BY THE DESIGNER.

THE AS-BUILT SURVEY WAS CONDUCTED WITH NAVD88 DATUM IN NORTH CAROLINA STATE PLANE (FT) COORDINATE SYSTEM.

CONSERVATION EASEMENT WAS PROVIDED BY OTHERS.

PRE-EXISTING CONTOURS WERE PROVIDED BY OTHERS.

SaveDate: 2012/07/13 1:53 PM Login: Petty, Richard
\\vn1226-f01\pwrd_projects\171300307\civil\drawing\sheet_files\as_built_set\13007g-000-svr.dwg

CONVENTIONAL SYMBOLS

BOULDER CONSTRUCTED RIFFLE

LOG STEP POOL

LOG VANE W/
ROCK J-HOOK

WOODY DEBRIS / BRUSH
TOE PROTECTION / MATTRESS

BOULDER CROSS-VANE

BOULDER CROSS-VANE
W/ STEP

WOOD AND GRAVEL RIFFLE

FORD CROSSING

EXISTING WETLAND

PROPOSED WETLAND
CREATION

PROPOSED WETLAND
RESTORATION

VEGETATION
MONITORING PLOT

BANKFULL

CONSERVATION EASEMENT

EXISTING INDEX CONTOUR

EXISTING INTERIM CONTOUR

880 INDEX CONTOUR

INTERIM CONTOUR

302+00 THALWEG

RIPRAP

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

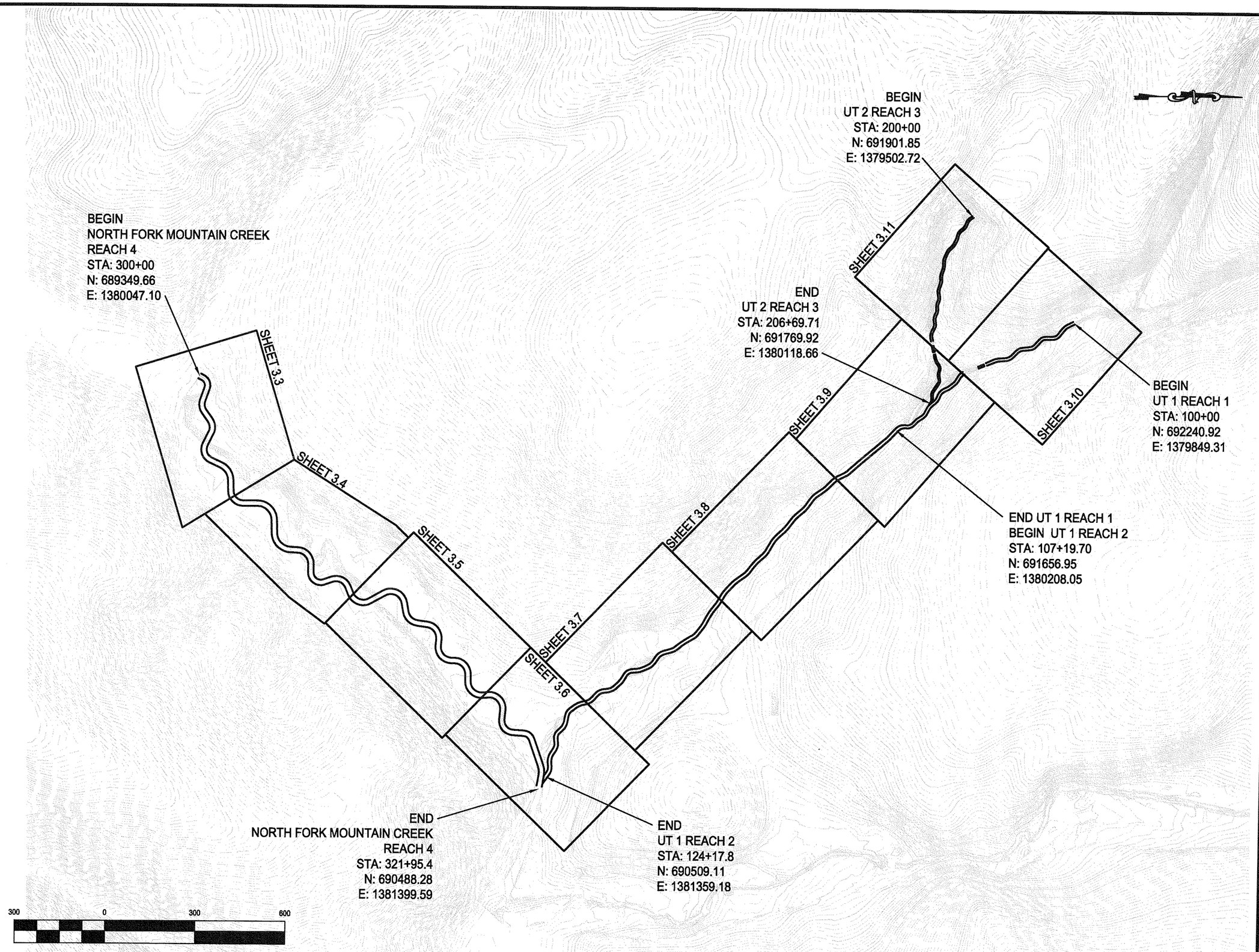
DRAWING TITLE
LEGEND AND SYMBOLS

CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

SHEET NO. 1.1

SaveDate: 2012/07/13 3:57 PM Login: Petty, Richard
\\us1225-f01\shared_projects\175583007\cad\drawing\sheet_files\cs_built_set\13007g-001-lgd.dwg



Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved
The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purposes other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

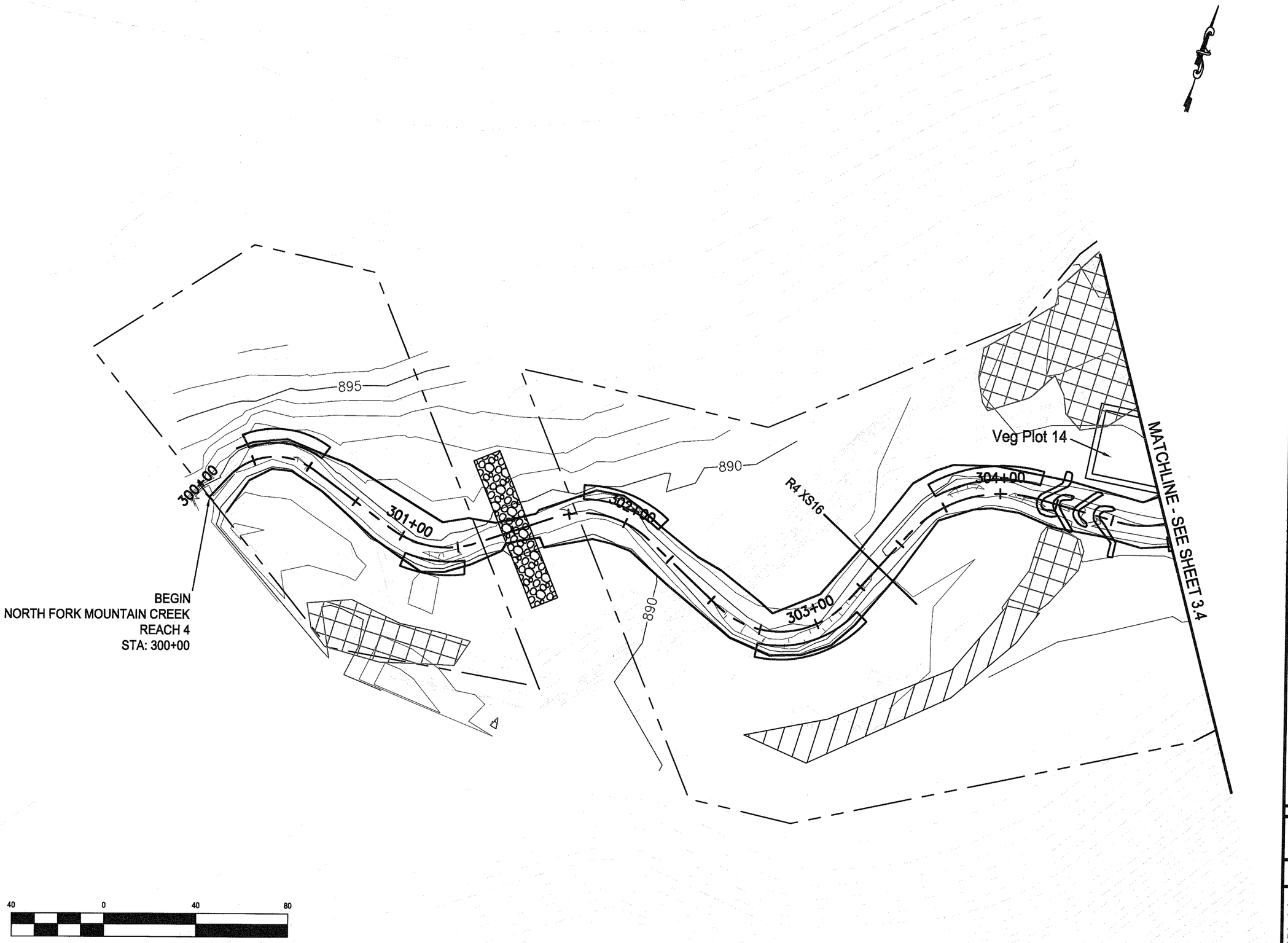
DRAWING TITLE
KEY SHEET

CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

SHEET NO. 2.2

SaveDate: 2012/07/13 1:59 PM Login: Petty, Richard
\\us1225-f01\shared_projects\175613077\civil\drawing\sheet_files\as_built_set\13077-002-cvr.dwg



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME

AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE

AS-BUILT PLAN SHEET

CADD PLOT:

VOID PLOT:

RELEASED TO CONSTRUCTION

SCALE: N/A

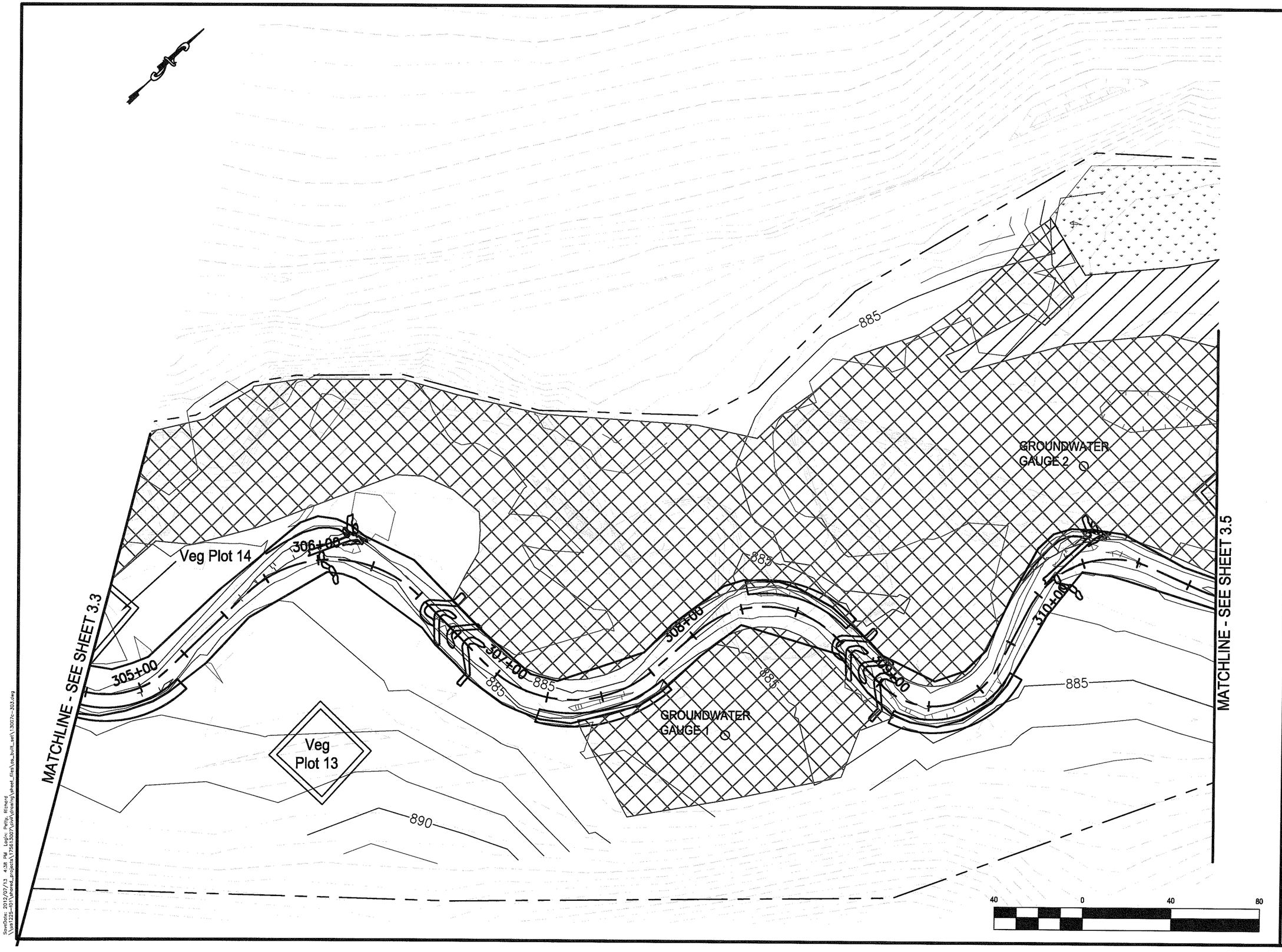
DRAWN BY: R.R.P.

DATE: 07-13-12

REVIEWED BY: T.T.

SHEET NO. 3.3

CivilPlate 2012/07/13 4:38 PM Login: Petty, Richard
\\ws1225-f01\Projects_projects\75610001\Civil\Drawing\sheet_files\as_built_set\13072-303.dwg



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

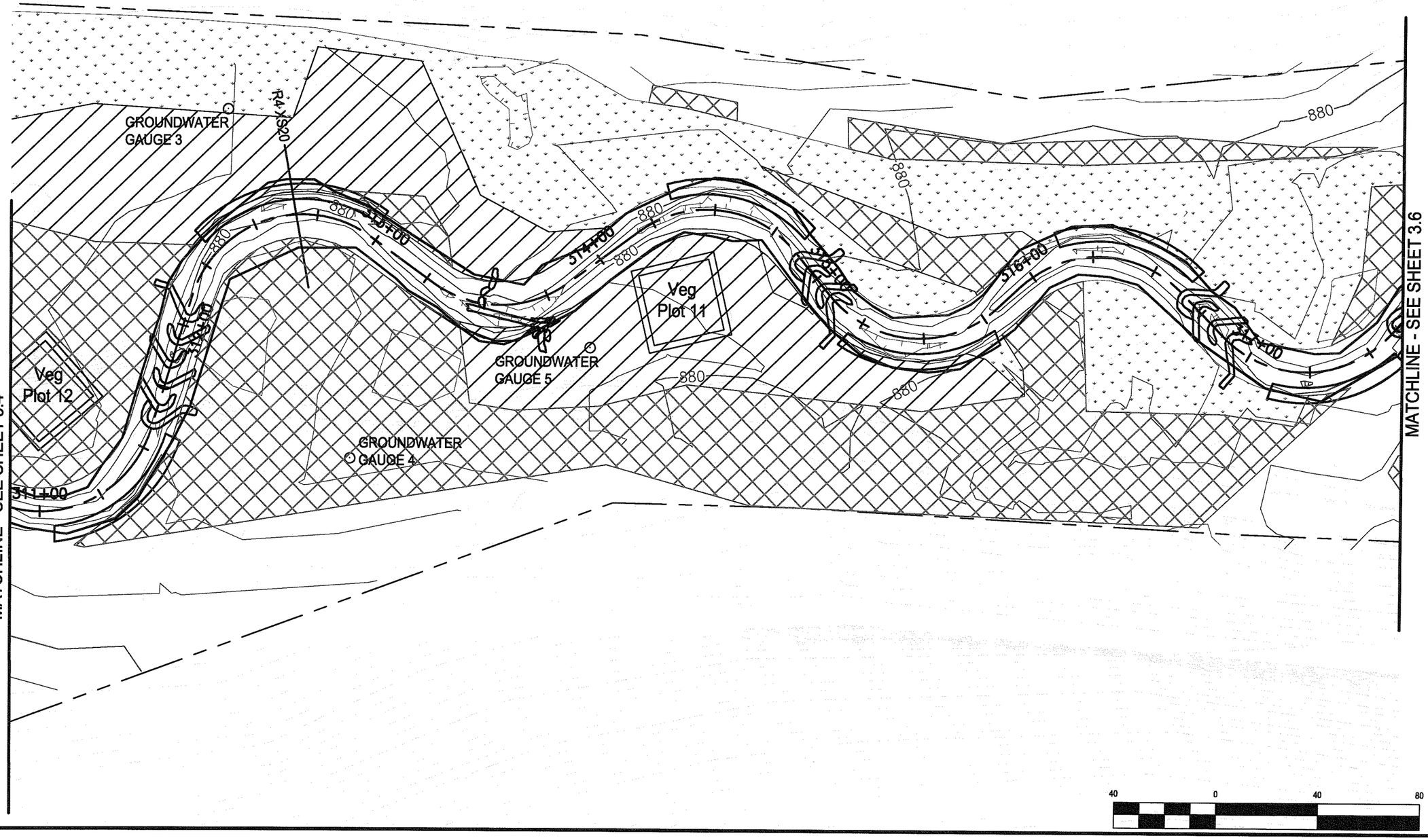
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY FOR NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.4
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\ust2224-f01\Shared_Projects\175815007\civil\drawing\Sheet_Files\as_built_set\13007e-303.dwg



Stantec
Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved
The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

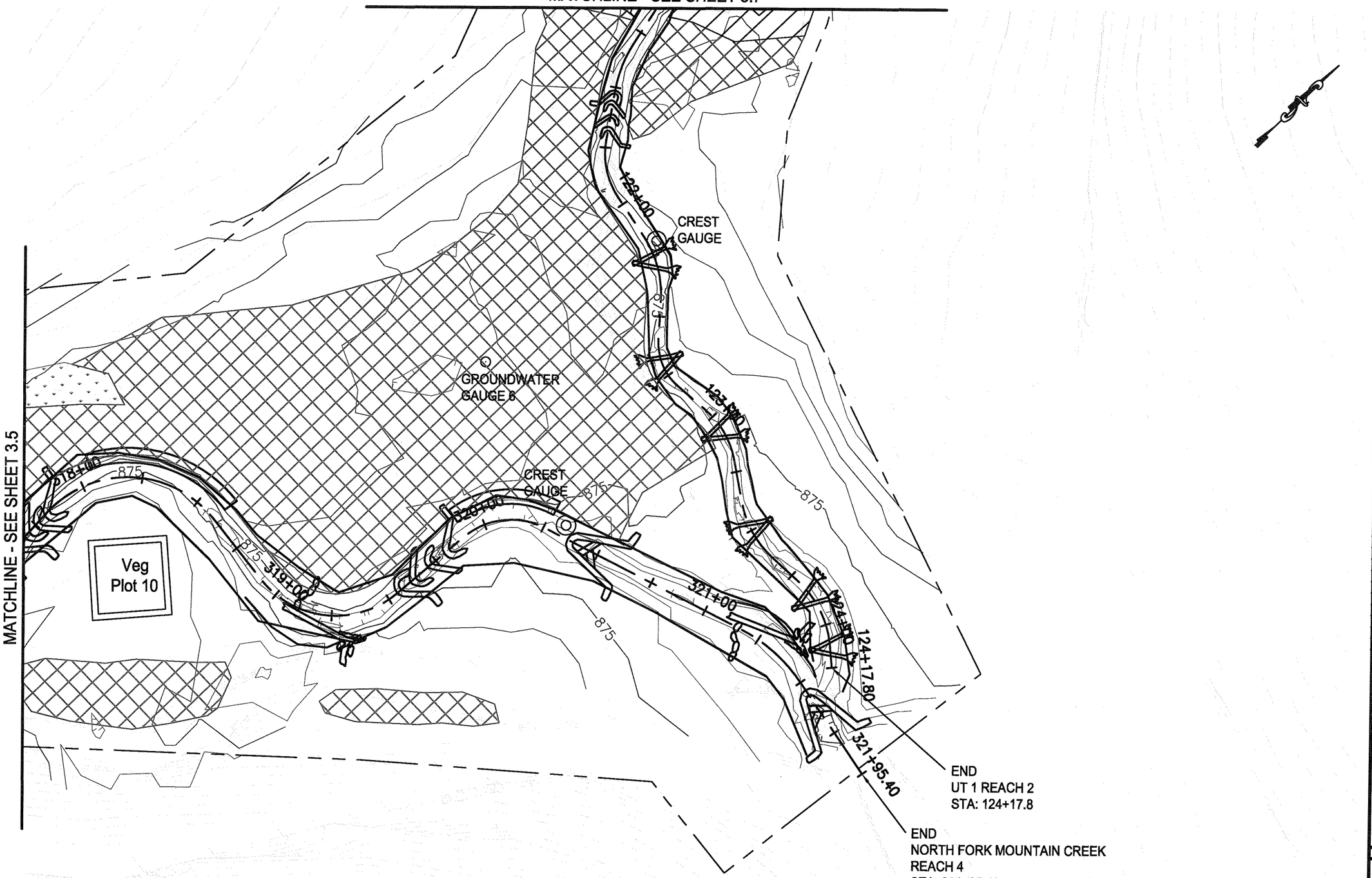
SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

SHEET NO. 3.5

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\us1235-f01\Internal_projects\175813007\civil\drawing\sheet_files\as_built_set\13007c-303.dwg

MATCHLINE - SEE SHEET 3.7

MATCHLINE - SEE SHEET 3.5



40 0 40 80

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

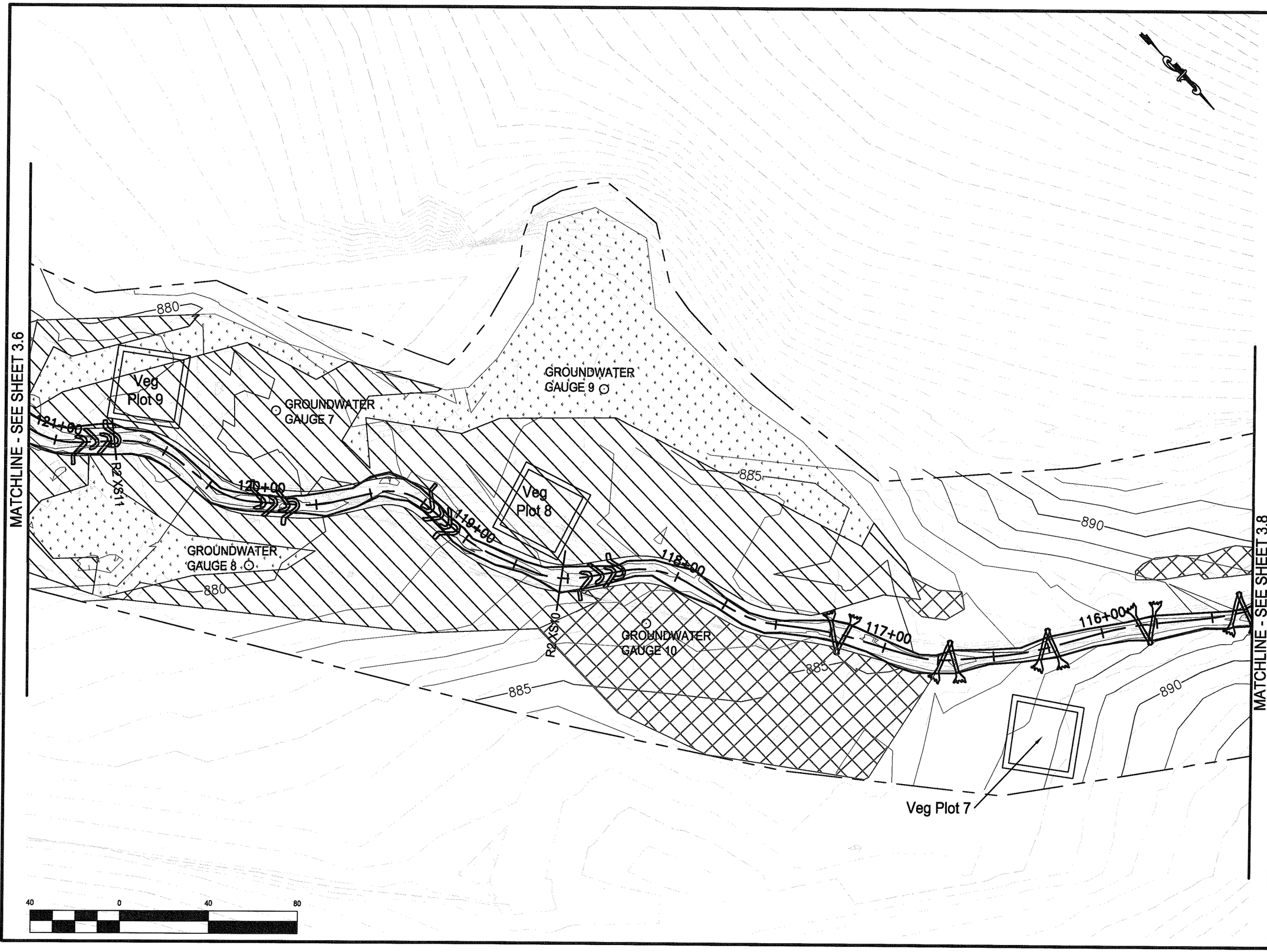
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.6
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\wi1222-001\Drives\Projects\1285120070\Drawing\sheet_files\as_built_set\13007c-303.dwg



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

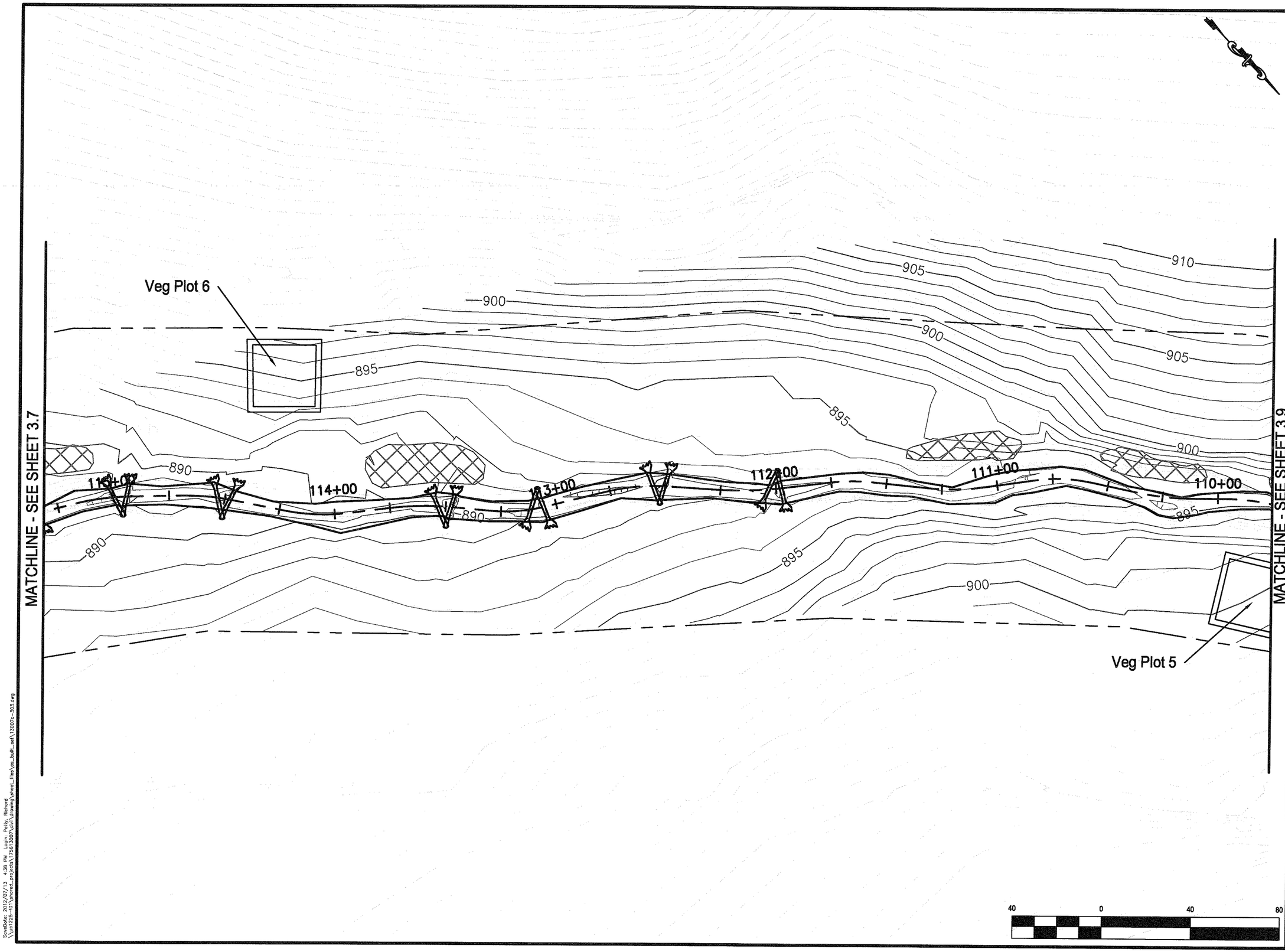
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.7
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\us1225-001\proeng_projects\215513207\Civil\Drawing sheets_files\as_built_set\13207c-303.dwg



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

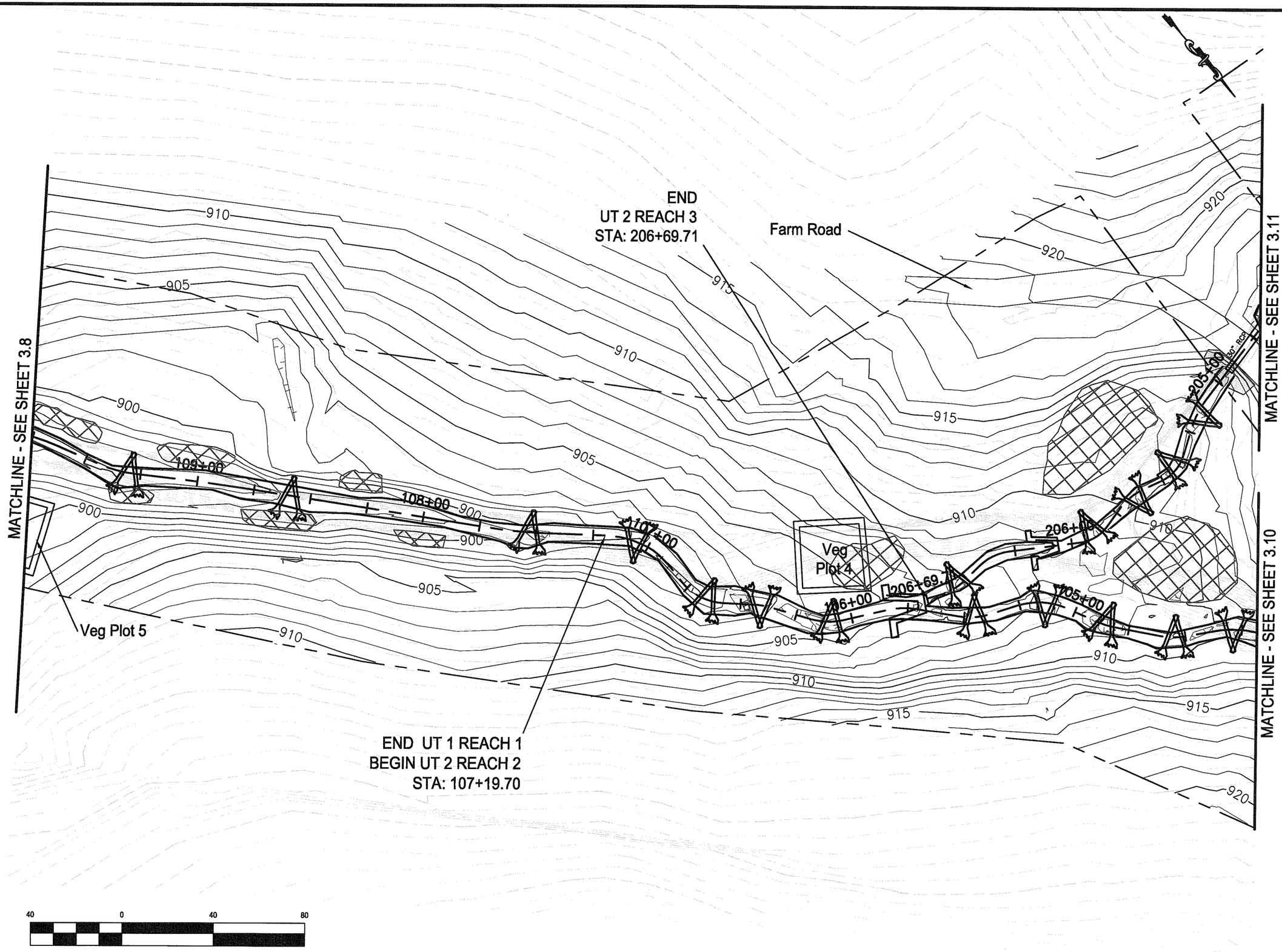
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.8
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\us1225-f01\proved_projects\75613007\civil\drawing\sheet_files\as_built_set\13007c-303.dwg



Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

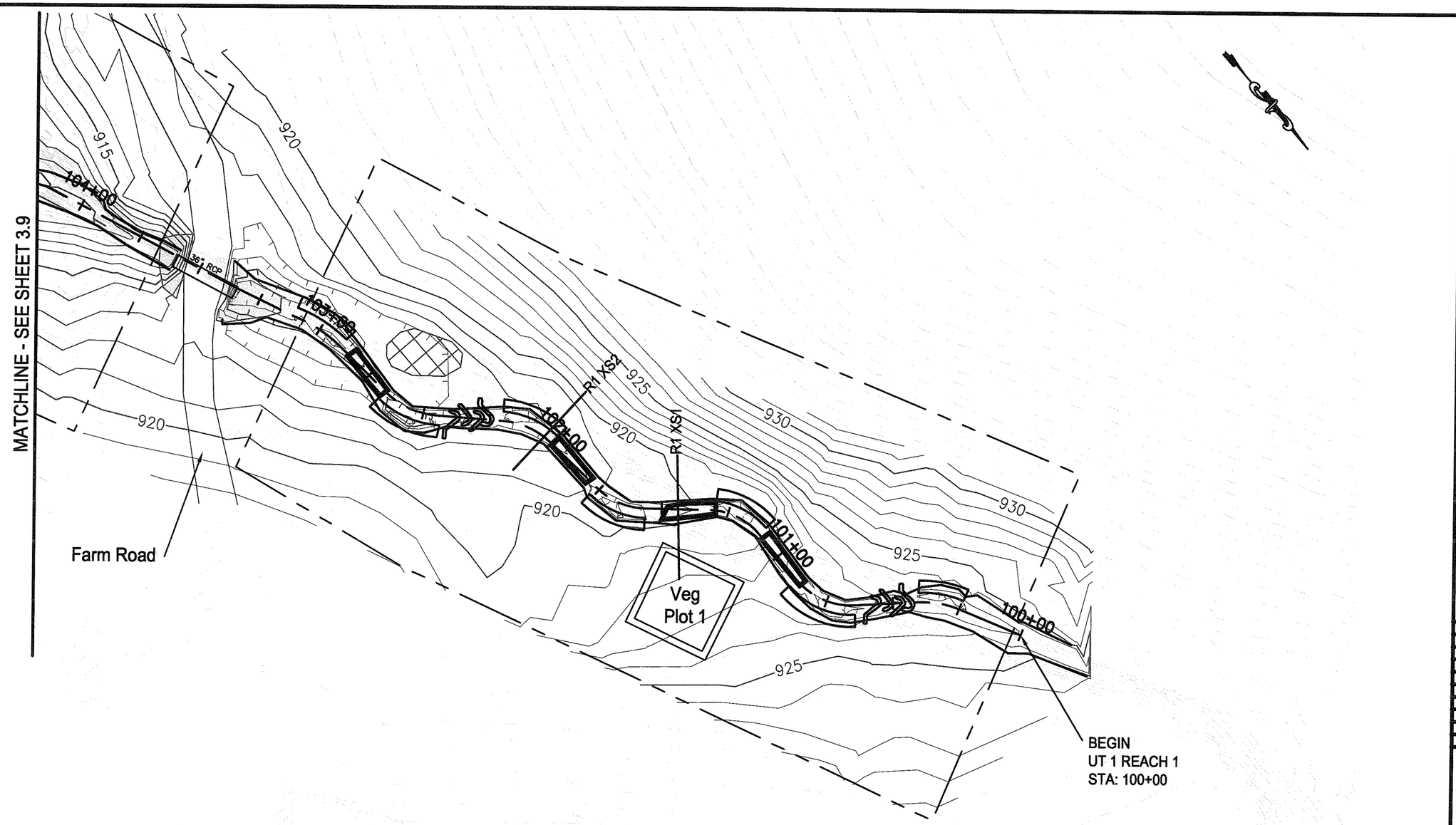
DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

SHEET NO. 3.9

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
X:\Ual225-01\Shared_projects\175613007\Civil\Drawing\Sheet_Files\as_built_set\30076-303.dwg



40 0 40 80

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.10
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\us1223-f01\shared_projects\175613007\civil\drawing\sheet_files\as_built_set\13007c-303.dwg

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

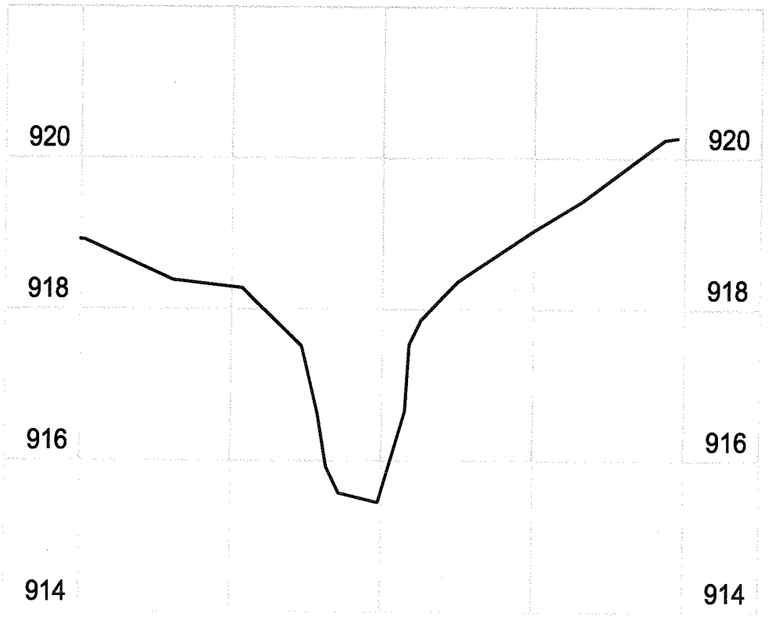
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLAN SHEET

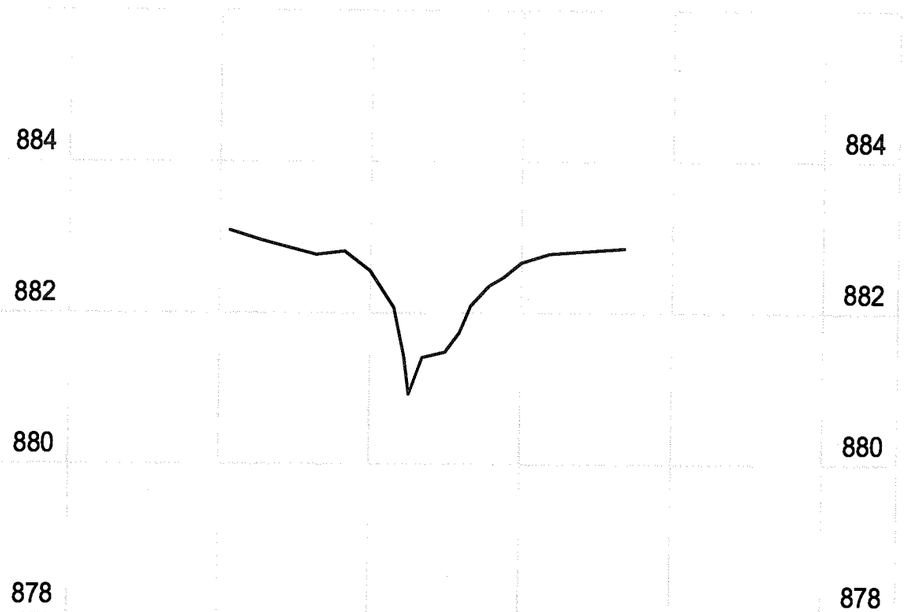
CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	3.11
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 4:38 PM Login: Petty, Richard
\\us1225-f01\shared_projects\175513207\cad\drawing\sheet_files\as_built_set\13007a-303.dwg

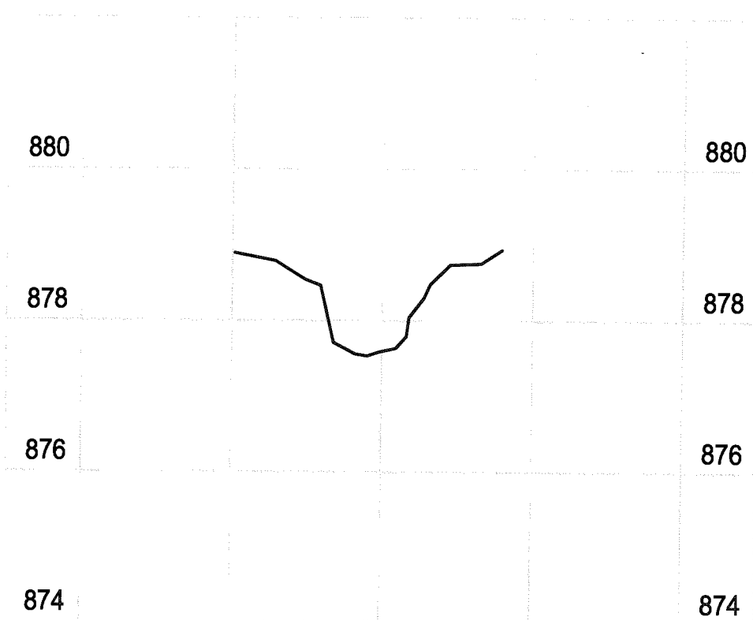


REACH 1 - XS2 - POOL

REACH 1 - XS1 - RIFFLE



REACH 2 - XS10 - POOL



REACH 2 - XS11 - RIFFLE

SCALE: 1"=10' HORZ.
1"= 2' VERT.

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

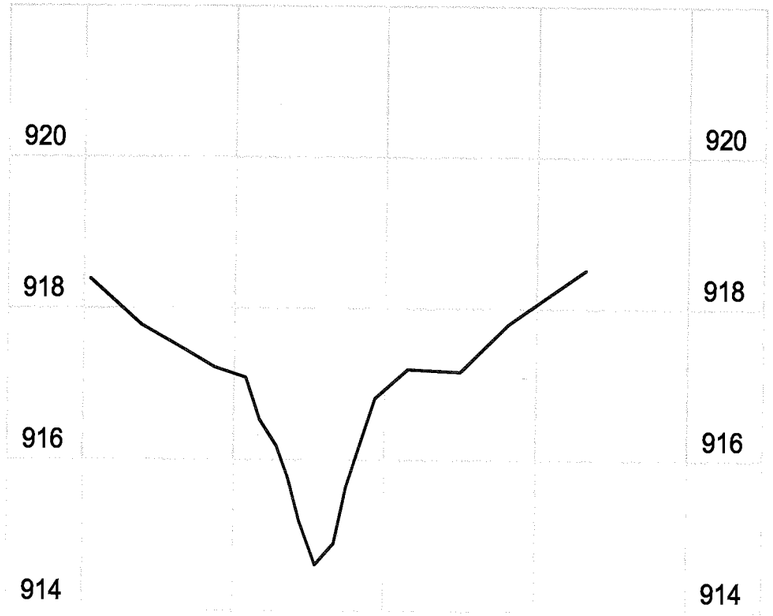
AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

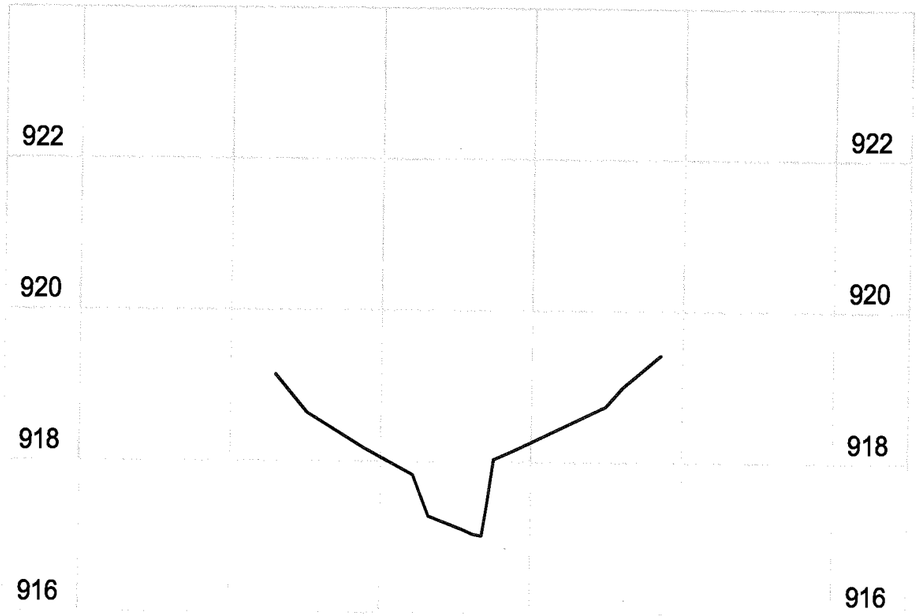
DRAWING TITLE
AS-BUILT TYPICAL SECTION SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	4.12
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

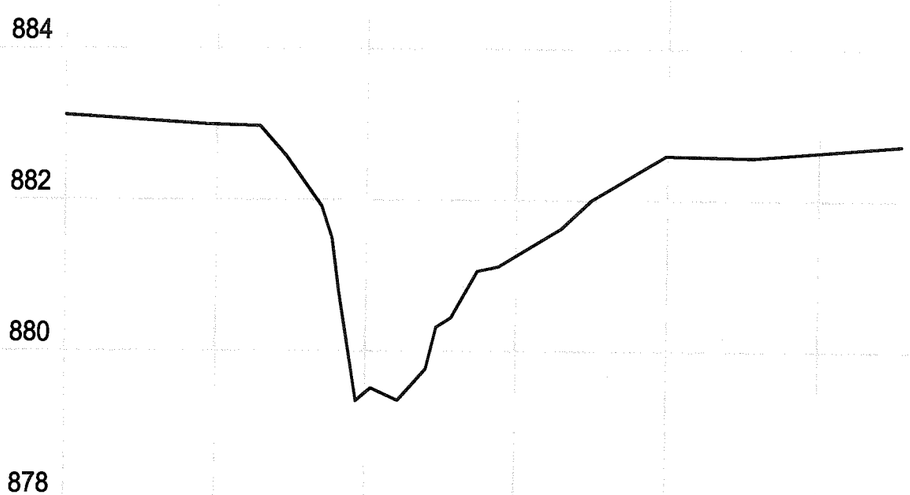
SaveDate: 2012/07/16 2:28 PM LogIn: Tesly, Richard
\\var225-001\wrmd_projects\1795150070\cad\drawings\Sheet_Files\as_built_set\130070-412.dwg



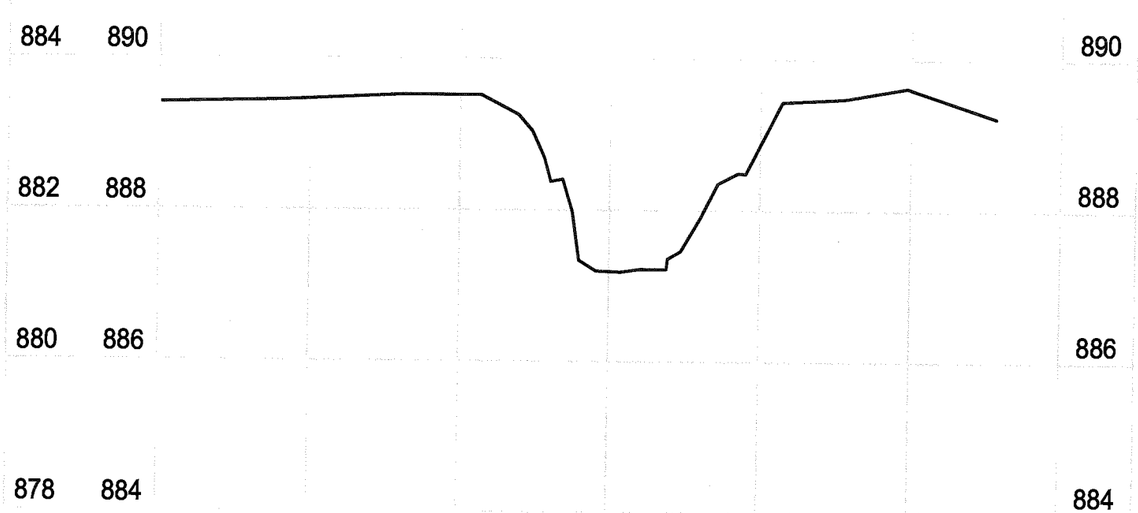
REACH 3 - XS13 - POOL



REACH 3 - XS12 - RIFFLE



REACH 4 - XS20 - POOL



REACH 4 - XS16 - RIFFLE

SCALE: 1"=10' HORZ.
1"= 2' VERT.

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT TYPICAL SECTION SHEET

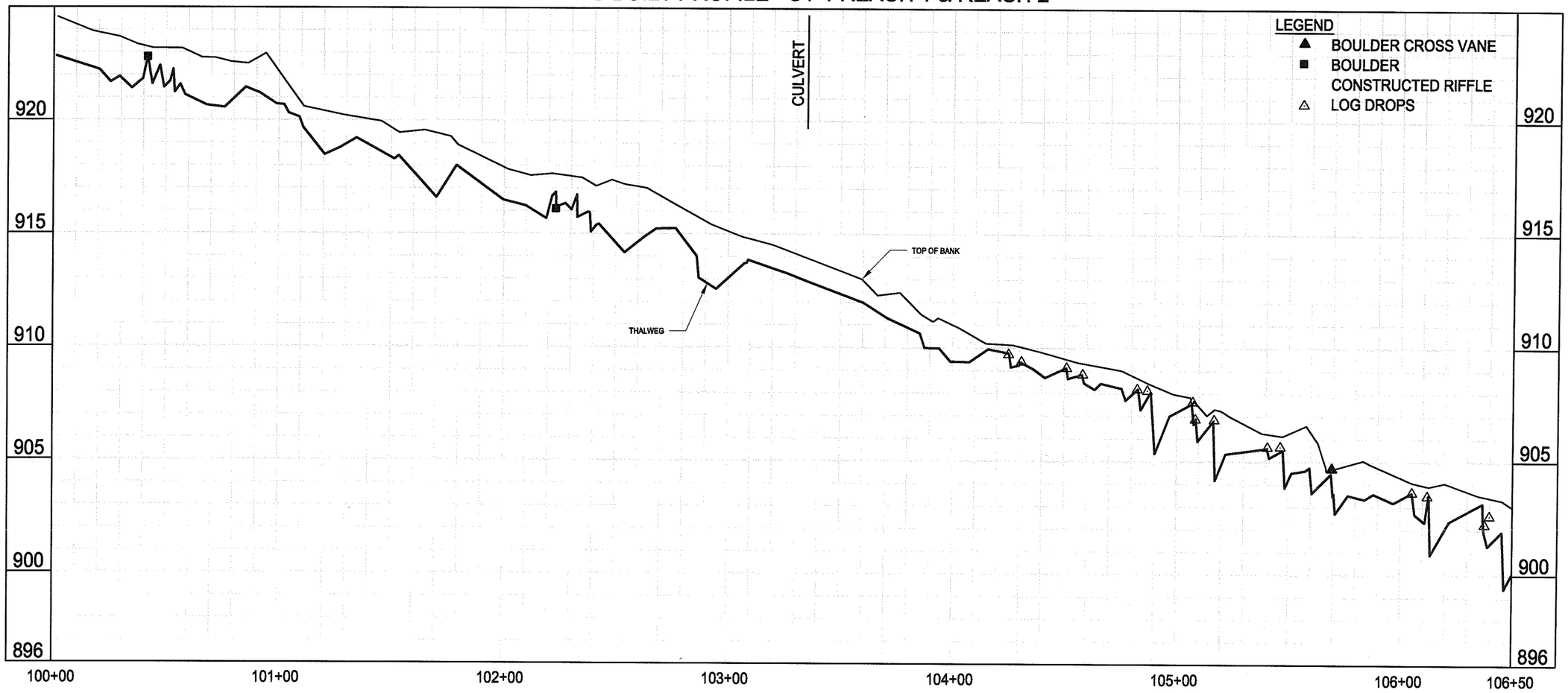
CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

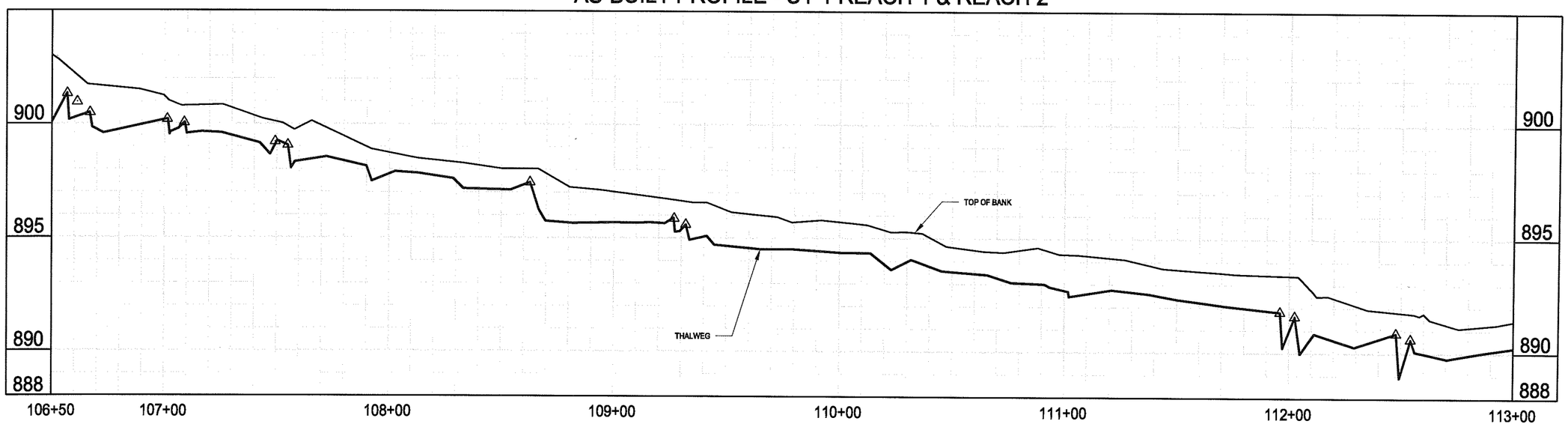
SHEET NO. 4.13

SaveDate: 2012/07/13 2:28 PM Login: Petty, Richard
\\sa1225-101\shared_projects\175613007\civil\drawing\sheet_files\as_built_set\13007c-412.dwg

AS-BUILT PROFILE - UT 1 REACH 1 & REACH 2



AS-BUILT PROFILE - UT 1 REACH 1 & REACH 2



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

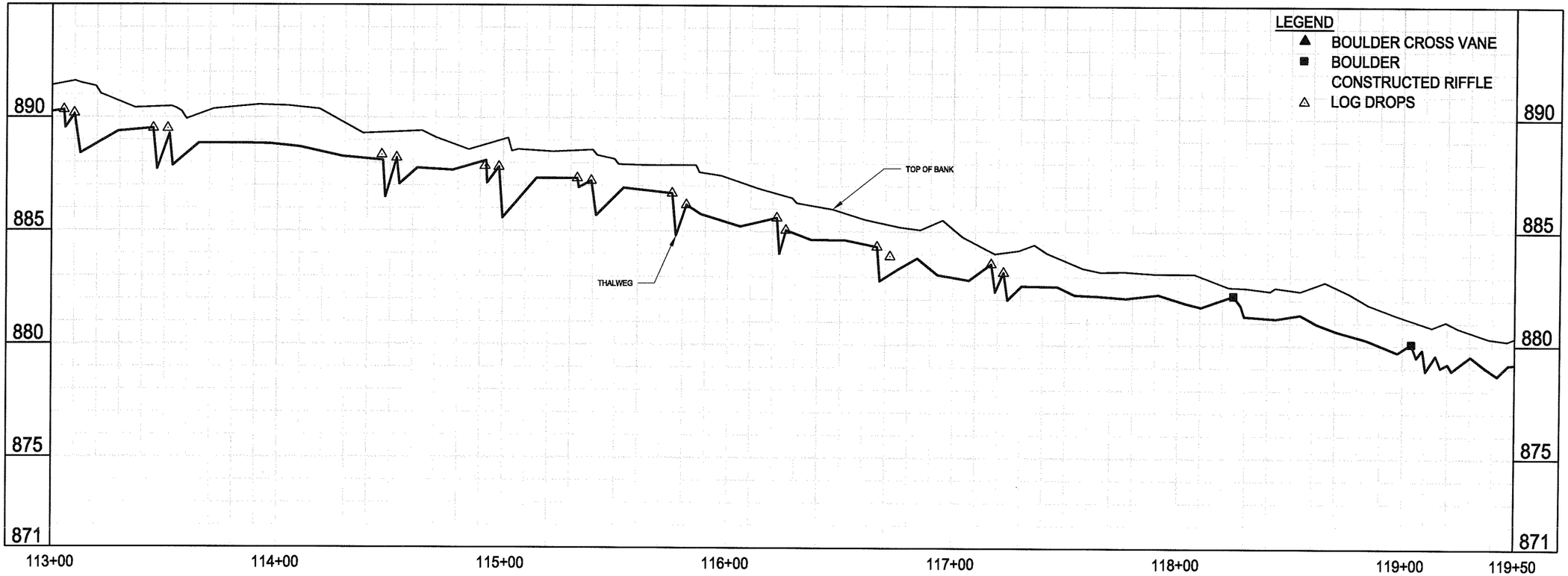
PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PROFILE SHEET

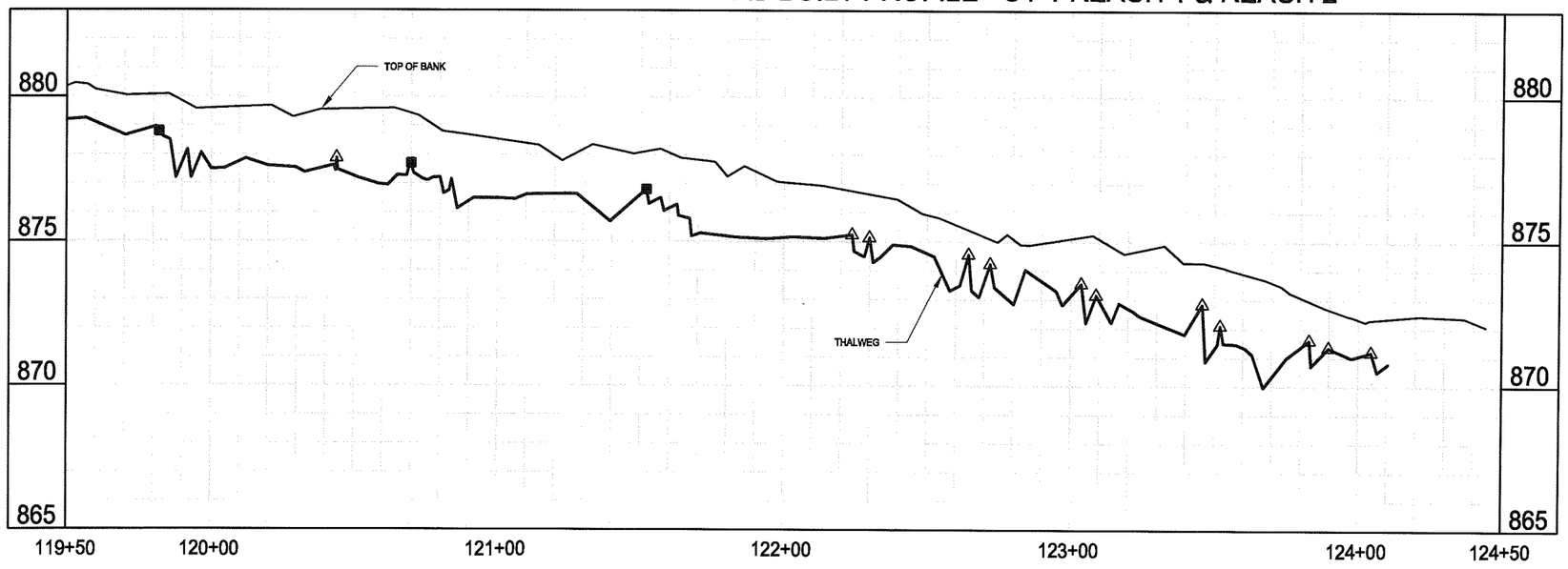
CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	5.14
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 2:25 PM Login: Petty, Richard
\\us1225-f01\shared_projects\175613007\civil\drawing\sheet_files\as_built_set\13007c-514.dwg

AS-BUILT PROFILE - UT 1 REACH 1 & REACH 2



AS-BUILT PROFILE - UT 1 REACH 1 & REACH 2



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

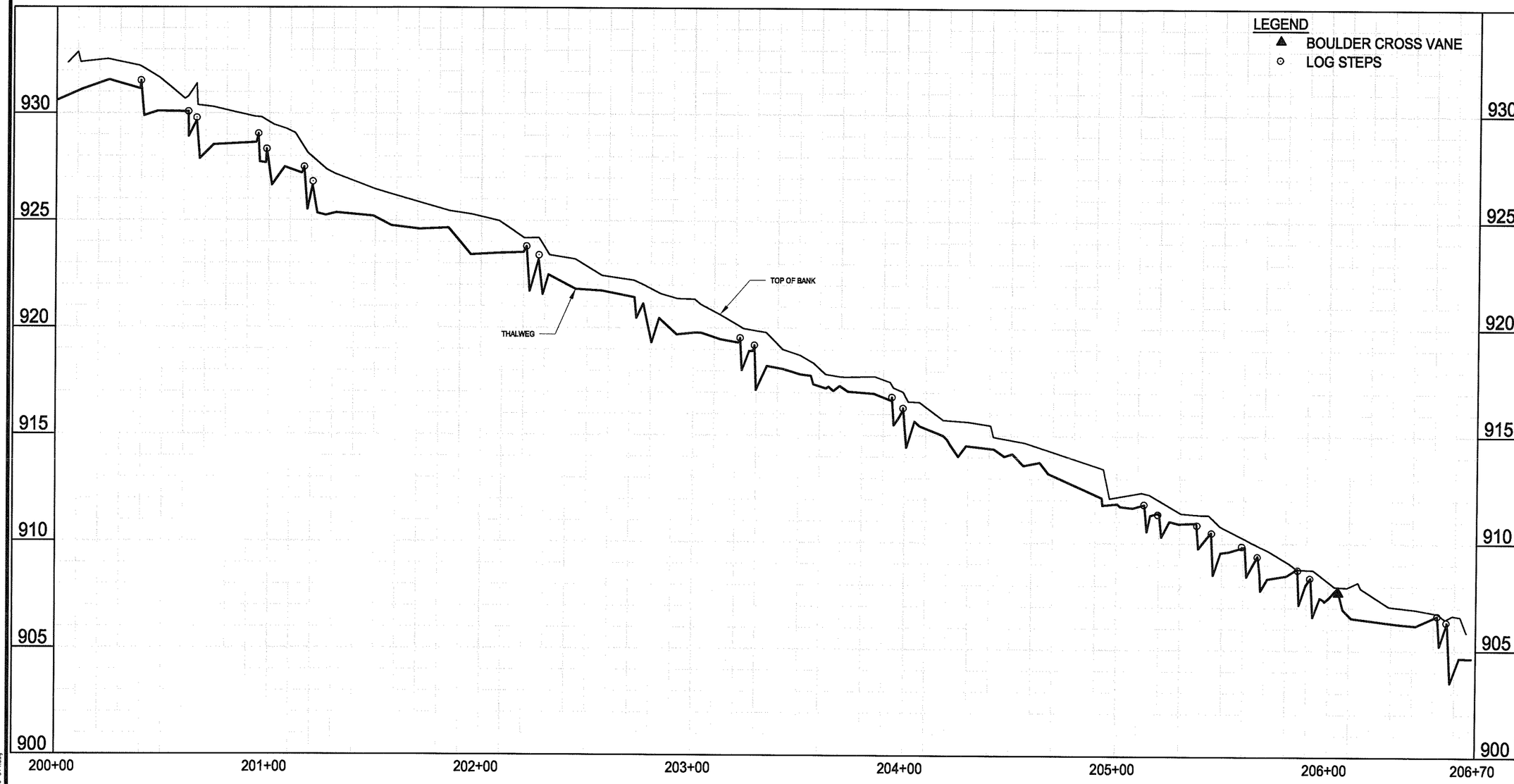
PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PROFILE SHEET

CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	5.15
RELEASED TO CONSTRUCTION	DATE: 07-13-12	
	REVIEWED BY: T.T.	

SaveDate: 2012/07/13 2:25 PM Login: Petty, Richard
\\us1225-f01\shared_projects\175613007\civil\drawing\sheet_files\as_built_set\13007c-S14.dwg

AS-BUILT PROFILE - UT 2 REACH 3



Stantec
Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved
The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER
7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK
MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PROFILE SHEET

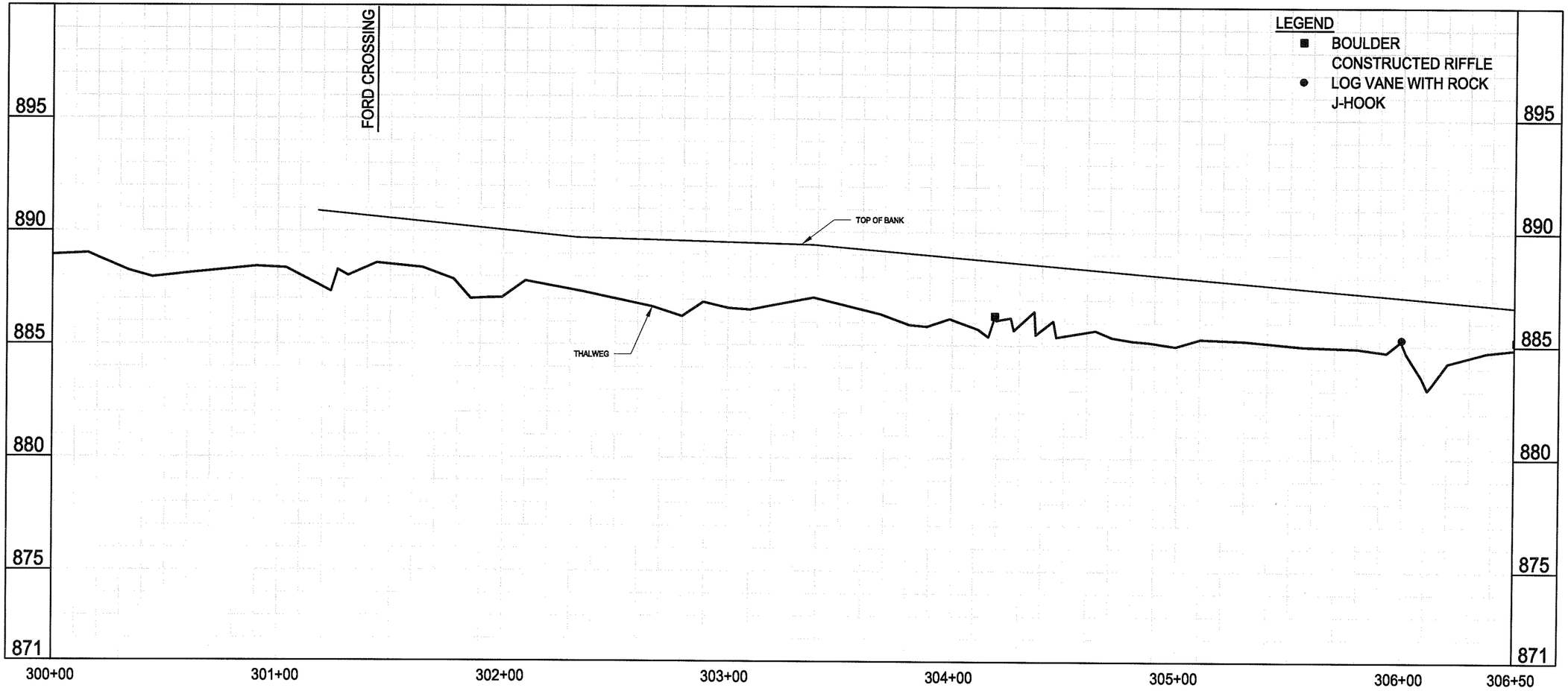
CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

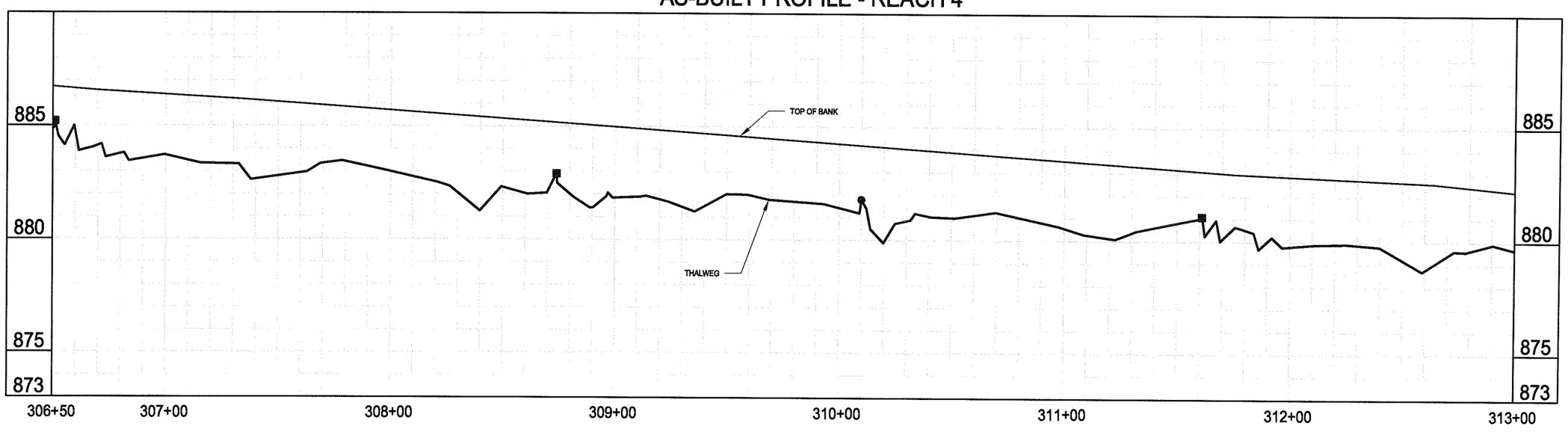
SHEET NO. 5.16

SaveDate: 2012/07/13 2:25 PM Login: Petty, Richard
\\us1225-fc1\shared_projects\175613007\civil\drawing\sheet_files\as_built_set\13007c-514.dwg

AS-BUILT PROFILE - REACH 4



AS-BUILT PROFILE - REACH 4



Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

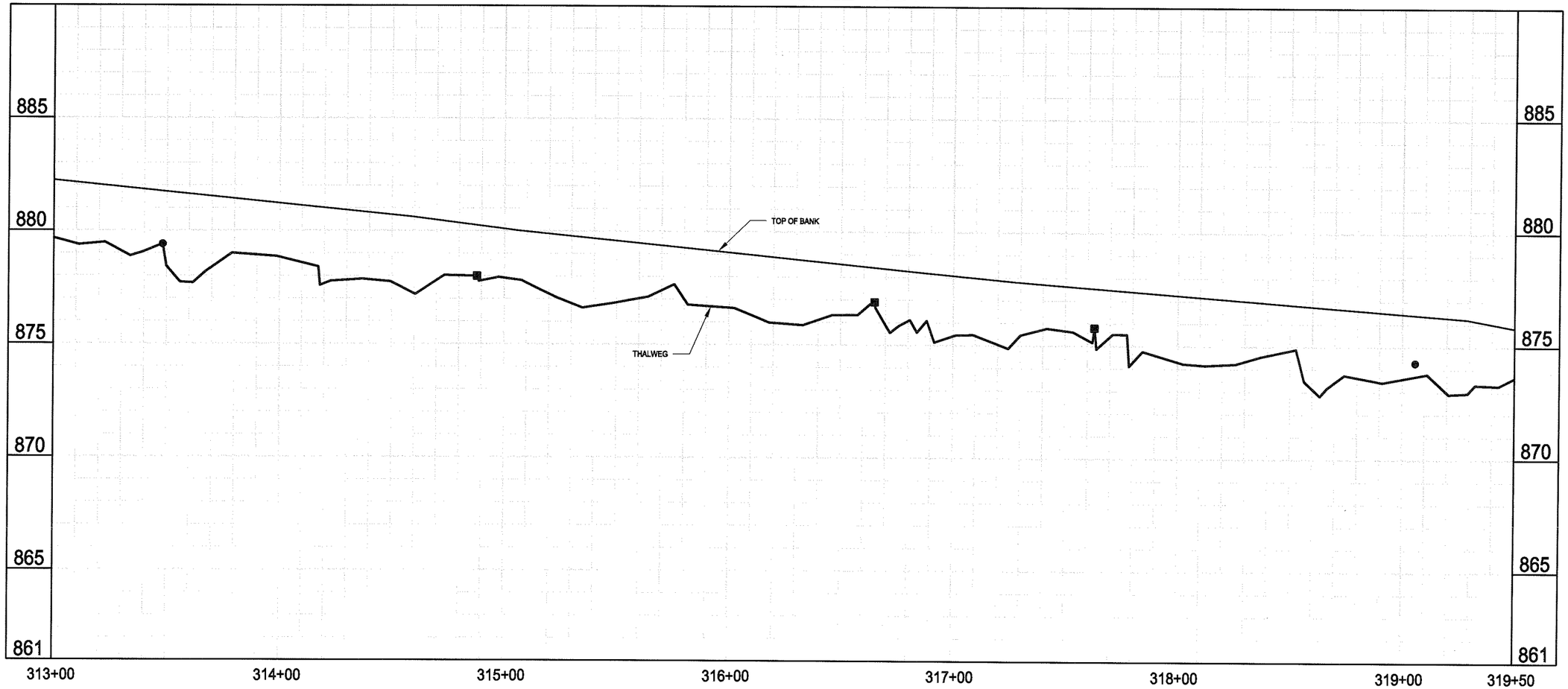
PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PROFILE SHEET

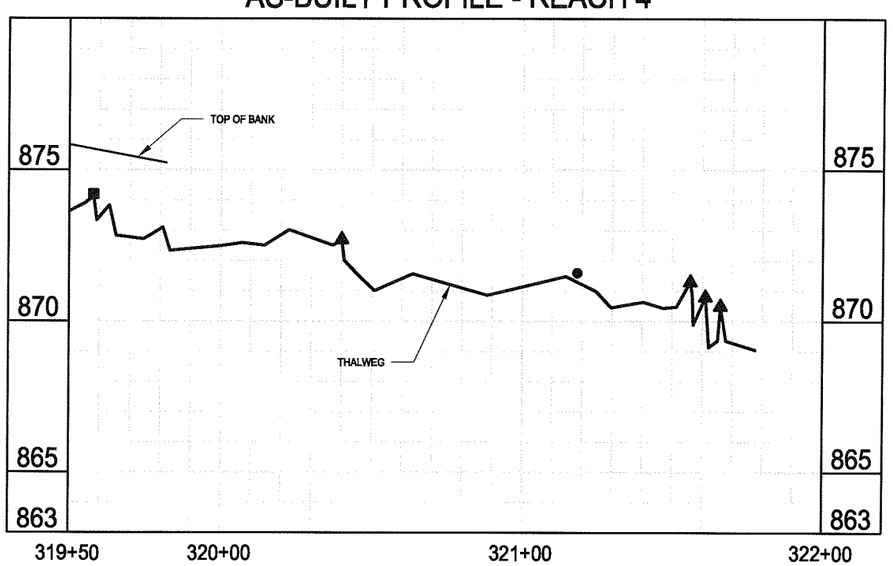
CADD PLOT:	SCALE: N/A	SHEET NO.
VOID PLOT:	DRAWN BY: R.R.P.	5.17
RELEASED TO CONSTRUCTION	DATE: 07-13-12 REVIEWED BY: T.T.	

SaveDate: 2012/07/13 2:25 PM Login: Petty, Richard
\\us1225-fs1\shared_projects\175813007\civil\drawing\sheet_files\as_built_set\13007c-514.dwg

AS-BUILT PROFILE - REACH 4



AS-BUILT PROFILE - REACH 4



LEGEND

- ▲ BOULDER CROSS VANE
- ■ BOULDER CONSTRUCTED RIFFLE
- ● LOG VANE WITH ROCK J-HOOK

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

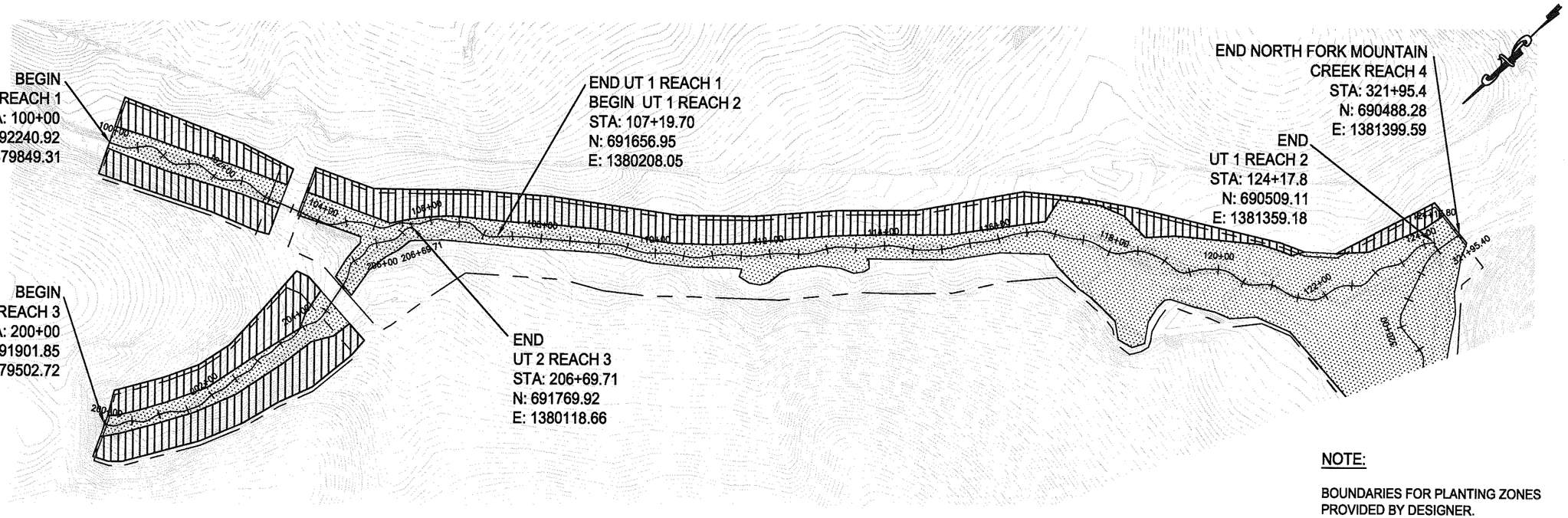
DRAWING TITLE
AS-BUILT PROFILE SHEET

CADD PLOT:
VOID PLOT:
RELEASED TO CONSTRUCTION

SCALE: N/A
DRAWN BY: R.R.P.
DATE: 07-13-12
REVIEWED BY: T.T.

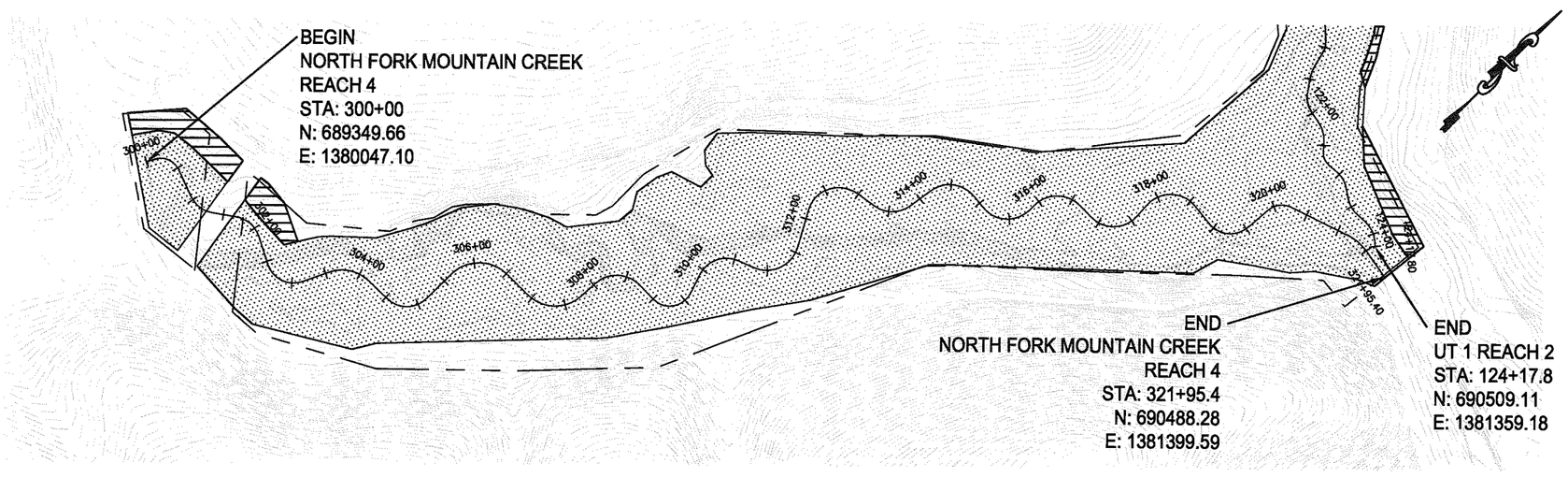
SHEET NO. 5.18

SaveDate: 2012/07/13 2:25 PM Login: Petty, Richard
\\ps1226-f01\Work_projects\1795\13007\Civil\Drawing\Present_Plan\As_Built_set\13007c-514.dwg



NOTE:

BOUNDARIES FOR PLANTING ZONES PROVIDED BY DESIGNER.



LEGEND

UPLAND ZONE

FLOODPLAIN ZONE

200 0 200 400

Stantec

Stantec Consulting Services Inc.
2127 Ayrsley Town Blvd., Suite 300
Charlotte NC U.S.A.
28273
Tel. 704.329.0900
Fax. 704.329.0905
www.stantec.com
License No. F-0672

Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purposes other than that authorized by Stantec is forbidden.

NORTH CAROLINA PROFESSIONAL SEAL L-4609 LAND SURVEYOR TONY D. CARPENTER

7/13/12

REVISIONS

NO.	DATE	BY	DESCRIPTION

CERTIFICATION AND SEAL

AS-BUILT

PROJECT NAME
AS-BUILT SURVEY OF NORTH FORK MOUNTAIN CREEK STREAM RESTORATION
CATAWBA COUNTY, NORTH CAROLINA

DRAWING TITLE
AS-BUILT PLANTING PLAN

CADD PLOT:

VOID PLOT:

RELEASED TO CONSTRUCTION

SCALE: N/A

DRAWN BY: R.R.P.

DATE: 07-13-12

REVIEWED BY: T.T.

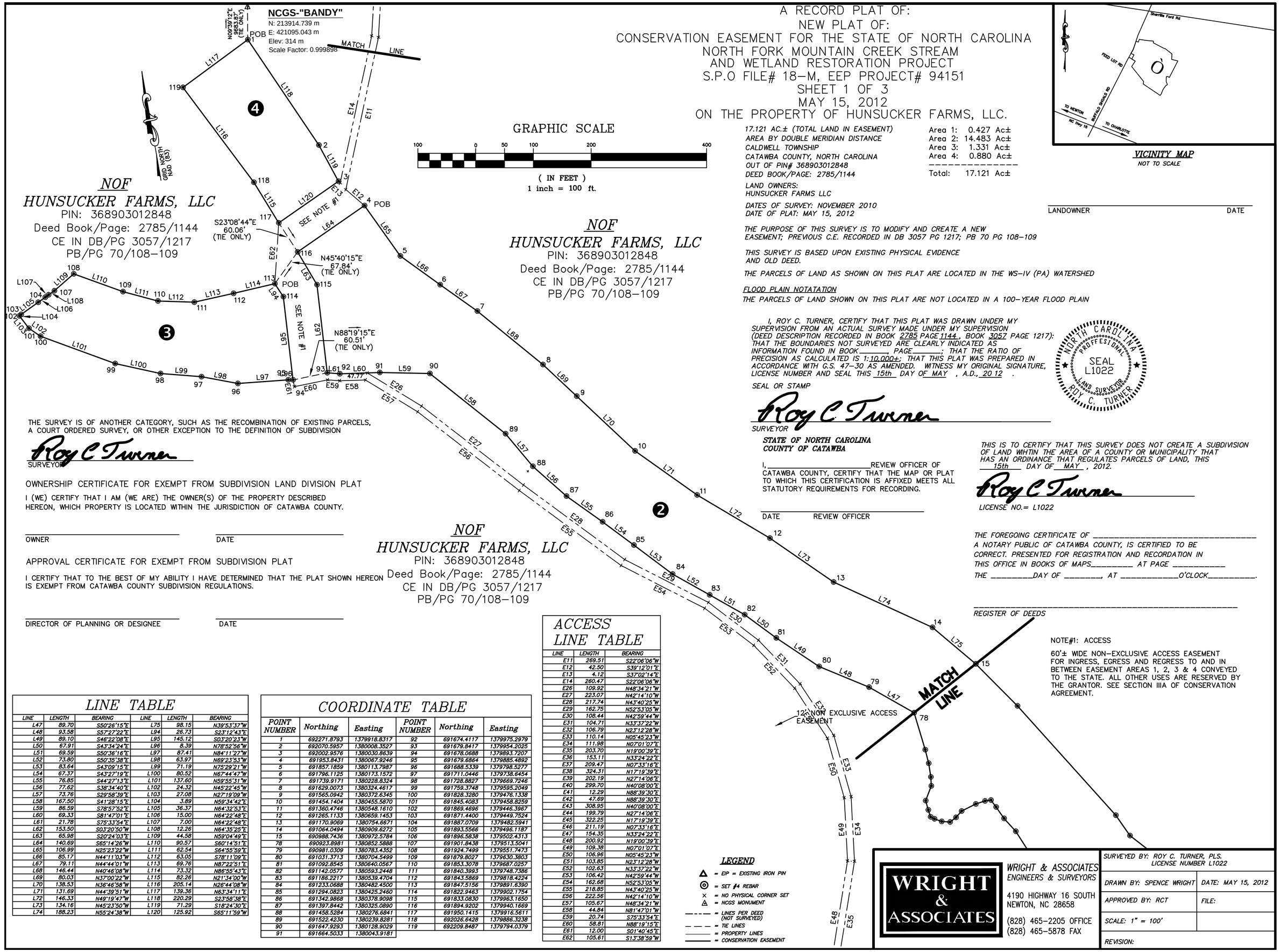
SHEET NO. 6.19

SaveDate: 2012/07/13 11:08 AM Login: Patty, Richard
\\us1225-f01\shared_projects\175613207\cad\drawing\sheet_files\as_built_set\130276-619.dwg

Appendix E – Final Conservation Easement

This page intentionally left blank for double sided printing.

A RECORD PLAT OF:
NEW PLAT OF:
CONSERVATION EASEMENT FOR THE STATE OF NORTH CAROLINA
NORTH FORK MOUNTAIN CREEK STREAM
AND WETLAND RESTORATION PROJECT
S.P.O FILE# 18-M, EEP PROJECT# 94151
SHEET 1 OF 3
MAY 15, 2012
ON THE PROPERTY OF HUNSUCKER FARMS, LLC.



VICINITY MAP
NOT TO SCALE

17.121 AC.± (TOTAL LAND IN EASEMENT)
AREA BY DOUBLE MERIDIAN DISTANCE
CALDWELL TOWNSHIP
CATAWBA COUNTY, NORTH CAROLINA
OUT OF PIN# 368903012848
DEED BOOK/PAGE: 2785/1144

Area 1:	0.427 Ac±
Area 2:	14.483 Ac±
Area 3:	1.331 Ac±
Area 4:	0.880 Ac±
Total:	17.121 Ac±

LAND OWNERS:
HUNSUCKER FARMS LLC

DATES OF SURVEY: NOVEMBER 2010
DATE OF PLAT: MAY 15, 2012

THE PURPOSE OF THIS SURVEY IS TO MODIFY AND CREATE A NEW EASEMENT; PREVIOUS C.E. RECORDED IN DB 3057 PG 1217; PB 70 PG 108-109

THIS SURVEY IS BASED UPON EXISTING PHYSICAL EVIDENCE AND OLD DEED.

THE PARCELS OF LAND AS SHOWN ON THIS PLAT ARE LOCATED IN THE WS-IV (PA) WATERSHED

FLOOD PLAIN NOTATATION
THE PARCELS OF LAND SHOWN ON THIS PLAT ARE NOT LOCATED IN A 100-YEAR FLOOD PLAIN

LANDOWNER DATE

I, ROY C. TURNER, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 2785 PAGE 1144, BOOK 3057 PAGE 1217): THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS INFORMATION FOUND IN BOOK_____, PAGE_____; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000±; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER AND SEAL THIS 15th DAY OF MAY, A.D., 2012.

SEAL OR STAMP

NORTH CAROLINA PROFFESIONAL SEAL L1022 LAND SURVEYOR ROY C. TURNER

Roy C Turner
SURVEYOR

THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION

Roy C Turner
SURVEYOR

OWNERSHIP CERTIFICATE FOR EXEMPT FROM SUBDIVISION LAND DIVISION PLAT

I (WE) CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY DESCRIBED HEREON, WHICH PROPERTY IS LOCATED WITHIN THE JURISDICTION OF CATAWBA COUNTY.

OWNER DATE

APPROVAL CERTIFICATE FOR EXEMPT FROM SUBDIVISION PLAT

I CERTIFY THAT TO THE BEST OF MY ABILITY I HAVE DETERMINED THAT THE PLAT SHOWN HEREON IS EXEMPT FROM CATAWBA COUNTY SUBDIVISION REGULATIONS.

DIRECTOR OF PLANNING OR DESIGNEE DATE

STATE OF NORTH CAROLINA
COUNTY OF CATAWBA

I,_____REVIEW OFFICER OF CATAWBA COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

DATE REVIEW OFFICER

THIS IS TO CERTIFY THAT THIS SURVEY DOES NOT CREATE A SUBDIVISION OF LAND WIHTIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND, THIS 15th DAY OF MAY, 2012.

Roy C Turner
LICENSE NO.= L1022

THE FOREGOING CERTIFICATE OF _____ A NOTARY PUBLIC OF CATAWBA COUNTY, IS CERTIFIED TO BE CORRECT. PRESENTED FOR REGISTRATION AND RECORDATION IN THIS OFFICE IN BOOKS OF MAPS_____ AT PAGE _____ THE _____DAY OF _____, AT _____O'CLOCK_____.

REGISTER OF DEEDS

NOTE#1: ACCESS

60'± WIDE NON-EXCLUSIVE ACCESS EASEMENT FOR INGRESS, EGRESS AND REGRESS TO AND IN BETWEEN EASEMENT AREAS 1, 2, 3 & 4 CONVEYED TO THE STATE. ALL OTHER USES ARE RESERVED BY THE GRANTOR. SEE SECTION IIIA OF CONSERVATION AGREEMENT.

LINE TABLE

LINE	LENGTH	BEARING	LINE	LENGTH	BEARING
L47	89.70	S50°26'15"E	L75	98.15	N39°53'37"W
L48	93.58	S57°27'22"E	L94	26.73	S23°12'43"E
L49	89.10	S46°22'08"E	L95	145.12	S03°20'23"W
L50	67.91	S43°34'24"E	L96	8.39	N78°52'56"W
L51	69.59	S50°36'16"E	L97	87.41	N84°11'27"W
L52	73.80	S50°35'38"E	L98	63.97	N69°23'53"W
L53	83.64	S43°09'15"E	L99	71.19	N75°29'21"W
L54	67.37	S43°27'19"E	L100	80.52	N67°44'47"W
L55	76.85	S44°27'13"E	L101	137.60	N59°55'31"W
L56	77.62	S38°34'40"E	L102	24.32	N45°22'45"W
L57	73.76	S29°58'39"E	L103	27.08	N27°19'09"W
L58	167.50	S41°28'15"E	L104	3.89	N59°34'42"E
L59	86.59	S78°57'52"E	L105	36.37	N64°32'53"E
L60	69.33	S81°47'01"E	L106	15.00	N64°22'48"E
L61	21.78	S75°33'54"E	L107	7.00	N64°22'48"E
L62	153.50	S03°20'50"W	L108	12.26	N64°35'25"E
L63	65.98	S20°24'03"E	L109	44.58	N59°04'49"E
L64	140.69	S65°14'26"W	L110	90.57	S60°14'51"E
L65	106.99	N25°23'22"W	L111	62.54	S64°55'59"E
L66	85.17	N44°11'03"W	L112	63.05	S78°11'09"E
L67	79.11	N44°44'01"W	L113	69.76	N87°22'51"E
L68	146.44	N40°46'08"W	L114	73.32	N86°55'43"E
L69	80.03	N37°00'22"W	L115	82.26	N21°34'00"W
L70	138.53	N36°46'58"W	L116	205.14	N26°44'08"W
L71	131.69	N44°39'51"W	L117	139.36	N63°34'11"E
L72	146.33	N49°19'47"W	L118	220.29	S23°58'38"E
L73	134.16	N45°23'50"W	L119	71.29	S18°24'30"E
L74	188.23	N55°24'38"W	L120	125.92	S85°11'59"W

COORDINATE TABLE

POINT NUMBER	Northing	Easting	POINT NUMBER	Northing	Easting
1	692271.8793	1379918.8317	92	691674.4117	1379975.2979
2	692070.5957	1380008.3527	93	691679.8417	1379954.2025
3	692002.9576	1380030.8639	94	691678.0688	1379893.7207
4	691953.8431	1380067.9246	95	691679.6864	1379885.4892
5	691857.1859	1380113.7987	96	691688.5339	1379798.5277
6	691796.1125	1380173.1572	97	691711.0446	1379738.6454
7	691739.9171	1380228.8324	98	691728.8827	1379669.7246
8	691629.0073	1380324.4617	99	691759.3748	1379595.2049
9	691565.0942	1380372.6345	100	691828.3280	1379476.1338
10	691454.1404	1380455.5870	101	691845.4083	1379458.8259
11	691360.4746	1380548.1610	102	691869.4696	1379446.3967
12	691265.1133	1380659.1453	103	691871.4400	1379449.7524
13	691170.9069	1380754.6671	104	691887.0709	1379482.5941
14	691064.0494	1380909.6272	105	691893.5566	1379496.1187
15	690988.7436	1380972.5784	106	691896.5838	1379502.4313
78	690923.8981	1380852.5888	107	691901.8438	1379513.5041
79	690981.0309	1380783.4352	108	691924.7499	1379551.7473
80	691031.3713	1380704.5499	109	691879.8027	1379630.3803
81	691092.8545	1380640.0567	110	691853.3078	1379687.0257
82	691142.0577	1380593.2448	111	691840.3993	1379748.7386
83	691186.2217	1380539.4704	112	691843.5869	1379818.4224
84	691233.0688	1380482.4500	113	691847.5156	1379891.6390
85	691294.0823	1380425.2460	114	691822.9463	1379902.1754
86	691342.9868	1380378.9098	115	691833.0830	1379963.1650
87	691397.8442	1380325.0890	116	691894.9202	1379940.1669
88	691458.5284	1380276.6841	117	691950.1415	1379916.5611
89	691522.4230	1380239.8281	118	692026.6428	1379886.3238
90	691647.9293	1380128.9029	119	692209.8487	1379794.0379
91	691664.5033	1380043.9181			

ACCESS LINE TABLE

LINE	LENGTH	BEARING
E11	269.51	S22°06'06"W
E12	42.50	S39°12'01"E
E13	4.12	S37°02'14"E
E14	260.47	S22°06'06"W
E26	109.92	N48°34'21"W
E27	223.07	N42°14'10"W
E28	217.74	N43°40'25"W
E29	162.75	N52°53'05"W
E30	108.44	N42°59'44"W
E31	104.71	N33°37'22"W
E32	106.79	N23°12'28"W
E33	110.14	N05°45'23"W
E34	111.98	N07°01'07"E
E35	203.70	N19°00'39"E
E36	153.11	N33°24'22"E
E37	209.47	N07°33'16"E
E38	324.31	N17°19'39"E
E39	202.19	N27°14'06"E
E40	299.70	N40°08'00"E
E41	12.29	N88°39'30"E
E42	47.69	N88°39'30"E
E43	308.95	N40°08'00"E
E44	199.79	N27°14'06"E
E45	322.25	N17°19'39"E
E46	211.19	N07°33'16"E
E47	154.35	N33°24'22"E
E48	200.92	N19°00'39"E
E49	109.38	N07°01'07"E
E50	106.96	N05°45'23"W
E51	103.85	N23°12'28"W
E52	102.63	N33°37'22"W
E53	106.42	N42°59'44"W
E54	162.68	N52°53'05"W
E55	218.85	N43°40'25"W
E56	222.56	N42°14'10"W
E57	105.67	N48°34'21"W
E58	44.84	N81°47'01"W
E59	20.74	S75°33'54"E
E60	58.81	N88°19'15"E
E61	12.00	S01°40'45"E
E62	105.61	S13°38'59"W

LEGEND

- △ = EIP = EXISTING IRON PIN
- ⊙ = SET #4 REBAR
- × = NO PHYSICAL CORNER SET
- △ = NCGS MONUMENT
- = LINES PER DEED (NOT SURVEYED)
- = TIE LINES
- = PROPERTY LINES
- = CONSERVATION EASEMENT

WRIGHT & ASSOCIATES
ENGINEERS & SURVEYORS
4190 HIGHWAY 16 SOUTH
NEWTON, NC 28658
(828) 465-2205 OFFICE
(828) 465-5878 FAX

SURVEYED BY: ROY C. TURNER, PLS. LICENSE NUMBER L1022	
DRAWN BY: SPENCE WRIGHT	DATE: MAY 15, 2012
APPROVED BY: RCT	FILE:
SCALE: 1" = 100'	
REVISION:	

A RECORD PLAT OF:
NEW PLAT OF:
CONSERVATION EASEMENT FOR THE STATE OF NORTH CAROLINA
NORTH FORK MOUNTAIN CREEK STREAM AND WETLAND RESTORATION PROJECT
S.P.O FILE# 18-M, EEP PROJECT# 94151
SHEET 2 OF 3
MAY 15, 2012
ON THE PROPERTY OF HUNSUCKER FARMS, LLC.

17.121 AC.± (TOTAL LAND IN EASEMENT)
AREA BY DOUBLE MERIDIAN DISTANCE
CALDWELL TOWNSHIP
CATAWBA COUNTY, NORTH CAROLINA
OUT OF PIN# 368903012848
DEED BOOK/PAGE: 2785/1144

Area 1: 0.427 Ac±
Area 2: 14.483 Ac±
Area 3: 1.331 Ac±
Area 4: 0.880 Ac±
Total: 17.121 Ac±

LAND OWNERS:
HUNSUCKER FARMS LLC

DATES OF SURVEY: NOVEMBER 2010
DATE OF REVISED PLAT: MAY 15, 2012

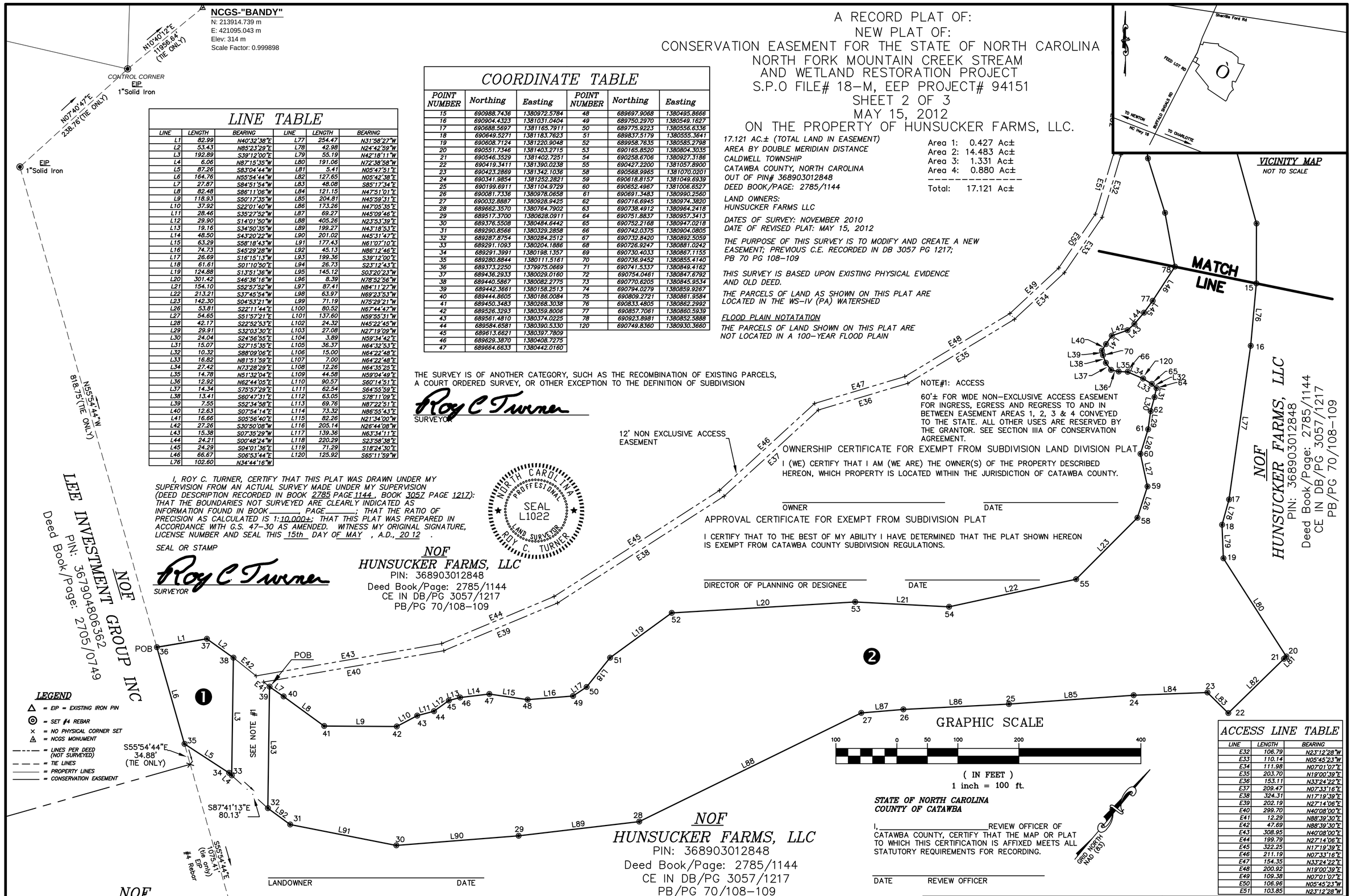
THE PURPOSE OF THIS SURVEY IS TO MODIFY AND CREATE A NEW EASEMENT; PREVIOUS C.E. RECORDED IN DB 3057 PG 1217; PB 70 PG 108-109

THIS SURVEY IS BASED UPON EXISTING PHYSICAL EVIDENCE AND OLD DEED.

THE PARCELS OF LAND AS SHOWN ON THIS PLAT ARE LOCATED IN THE WS-IV (PA) WATERSHED

FLOOD PLAIN NOTATATION

THE PARCELS OF LAND SHOWN ON THIS PLAT ARE NOT LOCATED IN A 100-YEAR FLOOD PLAIN



COORDINATE TABLE

POINT NUMBER	Northing	Easting	POINT NUMBER	Northing	Easting
15	690988.7436	1380972.5784	48	689697.9068	1380495.8666
16	690904.4323	1381031.0404	49	689750.2970	1380549.1627
17	690688.5697	1381165.7911	50	689775.9223	1380556.8336
18	690649.5271	1381183.7623	51	689837.5179	1380555.3641
19	690608.7124	1381220.9048	52	689958.7635	1380585.2798
20	690551.7346	1381403.2715	53	690165.8520	1380804.3035
21	690546.3529	1381402.7251	54	690258.6706	1380927.3186
22	690419.3411	1381390.0238	55	690427.2200	1381057.8900
23	690423.2869	1381342.1036	58	690568.9965	1381070.0201
24	690341.9854	1381252.2821	59	690618.8157	1381049.6939
25	690199.6911	1381104.9729	60	690652.4967	1381006.6527
26	690081.7336	1380978.0658	61	690691.3483	1380990.2560
27	690032.8887	1380928.9425	62	690716.6945	1380974.3820
28	689662.3570	1380784.7902	63	690738.4912	1380984.2418
29	689517.3700	1380628.0911	64	690751.8837	1380957.3413
30	689378.5508	1380484.6442	65	690752.2168	1380947.0218
31	689290.8566	1380329.2858	66	690742.0375	1380904.0805
32	689287.8754	1380284.2512	67	690732.8420	1380892.5059
33	689291.1093	1380204.1886	68	690726.9247	1380881.0242
34	689291.3991	1380198.1357	69	690730.4033	1380867.1155
35	689280.8844	1380111.5161	70	690736.9452	1380855.4140
36	689373.2250	1379975.0669	71	690741.5337	1380849.4162
37	689436.2933	1380029.0160	72	690754.0461	1380847.6792
38	689440.5867	1380082.2775	73	690770.6205	1380845.9534
39	689442.3661	1380158.2513	74	690794.0279	1380859.9267
40	689444.8605	1380186.0084	75	690809.2721	1380861.9584
41	689450.3483	1380268.3038	76	690833.4805	1380862.2992
42	689526.3293	1380359.8006	77	690857.7061	1380860.5939
43	689561.4810	1380374.0225	78	690923.8981	1380852.5888
44	689584.6581	1380390.5330	120	690749.8360	1380930.3660
45	689613.6621	1380397.7809			
46	689629.3870	1380408.7275			
47	689664.6633	1380442.0160			

LINE TABLE

LINE	LENGTH	BEARING	LINE	LENGTH	BEARING
L1	82.99	N40°32'38"E	L77	254.47	N31°58'27"W
L2	53.43	N85°23'29"E	L78	42.98	N24°42'59"W
L3	192.89	S39°12'00"E	L79	55.19	N42°18'11"W
L4	6.06	N87°15'35"W	L80	191.06	N72°38'58"W
L5	87.26	S83°04'44"W	L81	5.41	N05°47'51"E
L6	164.76	N55°54'44"W	L82	127.65	N05°42'38"E
L7	27.87	S84°51'54"W	L83	48.08	S85°17'34"E
L8	82.48	S86°11'06"W	L84	121.15	N47°51'01"E
L9	118.93	S50°17'35"W	L85	204.81	N45°59'31"E
L10	37.92	S22°01'40"W	L86	173.26	N47°05'35"E
L11	28.46	S35°27'52"W	L87	69.27	N45°09'46"E
L12	29.90	S14°01'50"W	L88	405.26	N23°53'39"E
L13	19.16	S34°50'35"W	L89	199.27	N43°18'53"E
L14	48.50	S43°20'22"W	L90	201.02	N45°31'47"E
L15	63.29	S58°18'43"W	L91	177.43	N61°07'10"E
L16	74.73	S45°29'28"W	L92	45.13	N86°12'46"E
L17	26.69	S16°15'13"W	L93	199.36	S39°12'00"E
L18	61.61	S01°10'50"E	L94	26.73	S23°12'43"E
L19	124.88	S13°51'36"W	L95	145.12	S03°20'23"W
L20	301.42	S46°36'16"W	L96	8.39	N78°52'56"W
L21	154.10	S52°57'52"W	L97	87.41	N84°11'27"W
L22	213.21	S37°45'54"W	L98	63.97	N69°23'53"W
L23	142.30	S04°53'21"W	L99	71.19	N75°29'21"W
L26	53.81	S22°11'44"E	L100	80.52	N67°44'47"W
L27	54.65	S51°57'21"E	L101	137.60	N59°55'31"W
L28	42.17	S22°52'53"E	L102	24.32	N45°22'45"W
L29	29.91	S32°03'30"E	L103	27.08	N27°19'09"W
L30	24.04	S24°56'55"E	L104	3.89	N59°34'42"E
L31	15.07	S27°15'35"E	L105	36.37	N64°32'53"E
L32	10.32	S88°09'06"E	L106	15.00	N64°22'48"E
L33	16.82	N81°51'59"E	L107	7.00	N64°22'48"E
L34	27.42	N73°28'29"E	L108	12.26	N64°35'25"E
L35	14.78	N51°32'04"E	L109	44.58	N59°04'49"E
L36	12.92	N62°44'05"E	L110	90.57	S80°14'51"E
L37	14.34	S75°57'29"E	L111	62.54	S64°55'59"E
L38	13.41	S60°47'31"E	L112	63.05	S78°11'09"E
L39	7.55	S52°34'58"E	L113	69.76	N87°22'51"E
L40	12.63	S07°54'14"E	L114	73.32	N86°55'43"E
L41	16.66	S05°56'40"E	L115	82.26	N21°34'00"W
L42	27.26	S30°50'08"W	L116	205.14	N26°44'08"W
L43	15.38	S07°35'29"W	L117	139.36	N63°34'11"E
L44	24.21	S00°48'24"W	L118	220.29	S23°58'38"E
L45	24.29	S04°01'36"E	L119	71.29	S18°24'30"E
L46	66.67	S06°53'44"E	L120	125.92	S85°11'59"W
L76	102.60	N34°44'16"W			

I, ROY C. TURNER, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 2785 PAGE 1144 , BOOK 3057 PAGE 1217): THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS INFORMATION FOUND IN BOOK_____, PAGE_____; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000±; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER AND SEAL THIS 15th DAY OF MAY , A.D., 20 12 .

SEAL OR STAMP

Roy C Turner
SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L1022 LAND SURVEYOR ROY C. TURNER

THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION

Roy C Turner
SURVEYOR

12' NON EXCLUSIVE ACCESS EASEMENT

NOTE#1: ACCESS

60'± FOR WIDE NON-EXCLUSIVE ACCESS EASEMENT FOR INGRESS, EGRESS AND REGRESS TO AND IN BETWEEN EASEMENT AREAS 1, 2, 3 & 4 CONVEYED TO THE STATE. ALL OTHER USES ARE RESERVED BY THE GRANTOR. SEE SECTION IIIA OF CONSERVATION AGREEMENT.

OWNERSHIP CERTIFICATE FOR EXEMPT FROM SUBDIVISION LAND DIVISION PLAT

I (WE) CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY DESCRIBED HEREON, WHICH PROPERTY IS LOCATED WITHIN THE JURISDICTION OF CATAWBA COUNTY.

OWNER _____ DATE _____

APPROVAL CERTIFICATE FOR EXEMPT FROM SUBDIVISION PLAT

I CERTIFY THAT TO THE BEST OF MY ABILITY I HAVE DETERMINED THAT THE PLAT SHOWN HEREON IS EXEMPT FROM CATAWBA COUNTY SUBDIVISION REGULATIONS.

DIRECTOR OF PLANNING OR DESIGNEE _____ DATE _____

ACCESS LINE TABLE

LINE	LENGTH	BEARING
E32	106.79	N23°12'28"W
E33	110.14	N05°45'23"W
E34	111.98	N07°01'07"E
E35	203.70	N19°00'39"E
E36	153.11	N33°24'22"E
E37	209.47	N07°33'16"E
E38	324.31	N17°19'39"E
E39	202.19	N27°14'06"E
E40	299.70	N40°08'00"E
E41	12.29	N88°39'30"E
E42	47.69	N88°39'30"E
E43	308.95	N40°08'00"E
E44	199.79	N27°14'06"E
E45	322.25	N17°19'39"E
E46	211.19	N07°33'16"E
E47	154.35	N33°24'22"E
E48	200.92	N19°00'39"E
E49	109.38	N07°01'07"E
E50	106.96	N05°45'23"W
E51	103.85	N23°12'28"W

STATE OF NORTH CAROLINA
COUNTY OF CATAWBA

I, _____REVIEW OFFICER OF CATAWBA COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

DATE _____ REVIEW OFFICER _____

LANDOWNER _____ DATE _____

THIS IS TO CERTIFY THAT THIS SURVEY DOES NOT CREATE A SUBDIVISION OF LAND WIHTIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND, THIS 15th DAY OF MAY , 2012.

Roy C Turner
LICENSE NO.= L1022

THE FOREGOING CERTIFICATE OF _____ A NOTARY PUBLIC OF CATAWBA COUNTY, IS CERTIFIED TO BE CORRECT. PRESENTED FOR REGISTRATION AND RECORDATION IN THIS OFFICE IN BOOKS OF MAPS_____ AT PAGE _____ THE _____DAY OF _____, AT _____O'CLOCK_____.

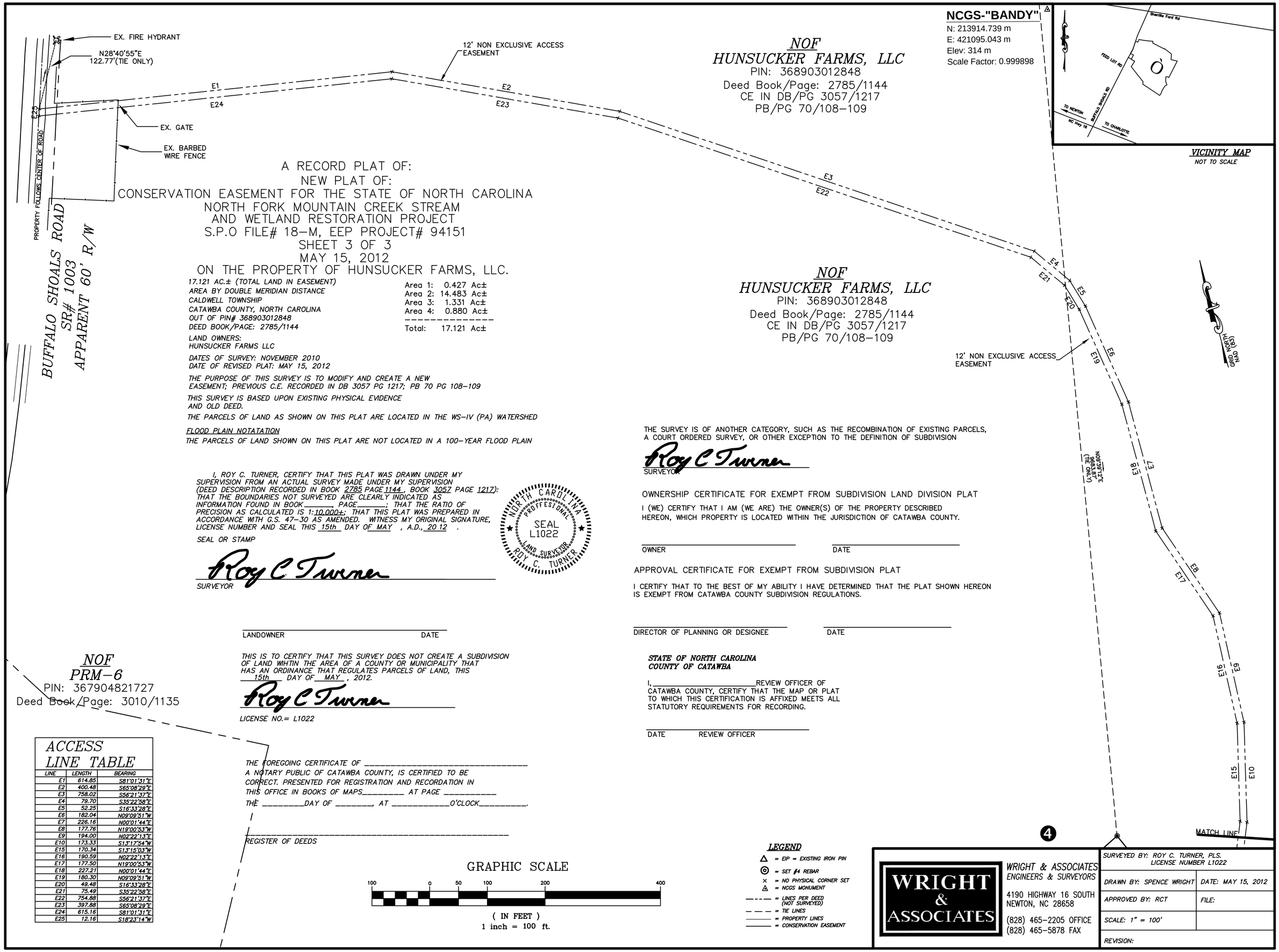
_____
REGISTER OF DEEDS

NOF
LEE INVESTMENT GROUP INC
PIN: 368801083676
Deed Book/Page: 2705/0749

NOF
HUNSUCKER FARMS, LLC
PIN: 368903012848
Deed Book/Page: 2785/1144
CE IN DB/PG 3057/1217
PB/PG 70/108-109

WRIGHT & ASSOCIATES
ENGINEERS & SURVEYORS
4190 HIGHWAY 16 SOUTH
NEWTON, NC 28658
(828) 465-2205 OFFICE
(828) 465-5878 FAX

SURVEYED BY: ROY C. TURNER, PLS. LICENSE NUMBER L1022	
DRAWN BY: SPENCE WRIGHT	DATE: MAY 15, 2012
APPROVED BY: RCT	FILE:
SCALE: 1" = 100'	
REVISION:	



NOF
HUNSUCKER FARMS, LLC
PIN: 368903012848
Deed Book/Page: 2785/1144
CE IN DB/PG 3057/1217
PB/PG 70/108–109

NOF
HUNSUCKER FARMS, LLC
PIN: 368903012848
Deed Book/Page: 2785/1144
CE IN DB/PG 3057/1217
PB/PG 70/108–109

A RECORD PLAT OF:
NEW PLAT OF:
CONSERVATION EASEMENT FOR THE STATE OF NORTH CAROLINA
NORTH FORK MOUNTAIN CREEK STREAM
AND WETLAND RESTORATION PROJECT
S.P.O FILE# 18–M, EEP PROJECT# 94151
SHEET 3 OF 3
MAY 15, 2012
ON THE PROPERTY OF HUNSUCKER FARMS, LLC.

17.121 AC.± (TOTAL LAND IN EASEMENT)
AREA BY DOUBLE MERIDIAN DISTANCE
CALDWELL TOWNSHIP
CATAWBA COUNTY, NORTH CAROLINA
OUT OF PIN# 368903012848
DEED BOOK/PAGE: 2785/1144

Area 1:	0.427 Ac±
Area 2:	14.483 Ac±
Area 3:	1.331 Ac±
Area 4:	0.880 Ac±
Total:	17.121 Ac±

LAND OWNERS:
HUNSUCKER FARMS LLC

DATES OF SURVEY: NOVEMBER 2010
DATE OF REVISED PLAT: MAY 15, 2012

THE PURPOSE OF THIS SURVEY IS TO MODIFY AND CREATE A NEW EASEMENT; PREVIOUS C.E. RECORDED IN DB 3057 PG 1217; PB 70 PG 108–109

THIS SURVEY IS BASED UPON EXISTING PHYSICAL EVIDENCE AND OLD DEED.

THE PARCELS OF LAND AS SHOWN ON THIS PLAT ARE LOCATED IN THE WS–IV (PA) WATERSHED

FLOOD PLAIN NOTATATION

THE PARCELS OF LAND SHOWN ON THIS PLAT ARE NOT LOCATED IN A 100–YEAR FLOOD PLAIN

I, ROY C. TURNER, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 2785 PAGE 1144, BOOK 3057 PAGE 1217): THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS INFORMATION FOUND IN BOOK _____, PAGE_____; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000±; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47–30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER AND SEAL THIS 15th DAY OF MAY, A.D., 2012.

SEAL OR STAMP

NORTH CAROLINA PROFESSIONAL SEAL L1022 LAND SURVEYOR ROY C. TURNER

Roy C Turner
SURVEYOR

LANDOWNER DATE

THIS IS TO CERTIFY THAT THIS SURVEY DOES NOT CREATE A SUBDIVISION OF LAND WHITIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND, THIS 15th DAY OF MAY, 2012.

Roy C Turner

LICENSE NO.= L1022

THE FOREGOING CERTIFICATE OF _____ A NOTARY PUBLIC OF CATAWBA COUNTY, IS CERTIFIED TO BE CORRECT. PRESENTED FOR REGISTRATION AND RECORDATION IN THIS OFFICE IN BOOKS OF MAPS_____ AT PAGE _____ THE _____DAY OF _____, AT _____O'CLOCK_____.

_____
REGISTER OF DEEDS

THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION

Roy C Turner
SURVEYOR

OWNERSHIP CERTIFICATE FOR EXEMPT FROM SUBDIVISION LAND DIVISION PLAT

I (WE) CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY DESCRIBED HEREON, WHICH PROPERTY IS LOCATED WITHIN THE JURISDICTION OF CATAWBA COUNTY.

OWNER DATE

APPROVAL CERTIFICATE FOR EXEMPT FROM SUBDIVISION PLAT

I CERTIFY THAT TO THE BEST OF MY ABILITY I HAVE DETERMINED THAT THE PLAT SHOWN HEREON IS EXEMPT FROM CATAWBA COUNTY SUBDIVISION REGULATIONS.

DIRECTOR OF PLANNING OR DESIGNEE DATE

STATE OF NORTH CAROLINA
COUNTY OF CATAWBA

I,_____REVIEW OFFICER OF CATAWBA COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

DATE REVIEW OFFICER

NOF
PRM–6
PIN: 367904821727
Deed Book/Page: 3010/1135

ACCESS LINE TABLE

LINE	LENGTH	BEARING
E1	614.85	S81°01'31"E
E2	400.48	S65°08'29"E
E3	758.02	S56°21'37"E
E4	79.70	S35°22'58"E
E5	52.25	S16°33'28"E
E6	182.04	N09°09'51"W
E7	226.16	N00°01'44"E
E8	177.76	N19°00'53"W
E9	194.00	N02°22'13"E
E10	173.33	S13°17'54"W
E15	170.34	S13°15'03"W
E16	190.59	N02°22'13"E
E17	177.50	N19°00'53"W
E18	227.21	N00°01'44"E
E19	180.30	N09°09'51"W
E20	49.48	S16°33'28"E
E21	75.49	S35°22'58"E
E22	754.88	S56°21'37"E
E23	397.88	S65°08'29"E
E24	615.16	S81°01'31"E
E25	12.16	S18°23'14"W

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- △ = EIP = EXISTING IRON PIN
- ◎ = SET #4 REBAR
- × = NO PHYSICAL CORNER SET
- △ = NCGS MONUMENT
- = LINES PER DEED (NOT SURVEYED)
- = TIE LINES
- = PROPERTY LINES
- = CONSERVATION EASEMENT

WRIGHT & ASSOCIATES

WRIGHT & ASSOCIATES
ENGINEERS & SURVEYORS
4190 HIGHWAY 16 SOUTH
NEWTON, NC 28658
(828) 465–2205 OFFICE
(828) 465–5878 FAX

SURVEYED BY: ROY C. TURNER, PLS. LICENSE NUMBER L1022	
DRAWN BY: SPENCE WRIGHT	DATE: MAY 15, 2012
APPROVED BY: RCT	FILE:
SCALE: 1" = 100'	
REVISION:	