

Baseline Monitoring Document and As-Built Baseline Report

FINAL

Pee Dee Stream Restoration Site
NCDMS Contract No. 004644
NCDMS Project No. 95350
Montgomery County, North Carolina
Data Collected: 3/23 – 4/23/2015
Date Submitted: July 10, 2015



Submitted to:

North Carolina Division of Mitigation Services
NCDENR-DMS, 1652 Mail Service Center Raleigh NC 27699-1652

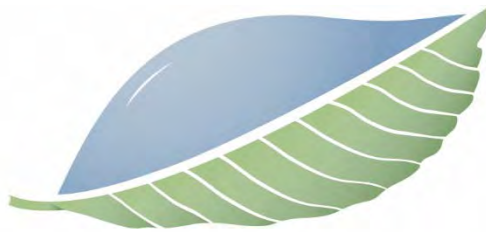
Prepared for:



Resource
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Executive Summary

The Pee Dee Stream Restoration Site (Site) is located in the Yadkin River Watershed (NCDWQ sub-basin 03-07-10 and HUC 03040104020020) approximately 1 mile south of the town of Pee Dee, NC in Montgomery County at Latitude 35.255572° N and Longitude 80.028665° W. The Site encompasses approximately 18.6 acres of predominately agricultural land and includes three tributaries to Clarks Creek – Thompson Creek, Dale Branch and Jerry Branch.

Through the North Carolina Division of Mitigation Services full-delivery process, Resource Environmental Solutions, LLC, generated a total of 6,504 stream mitigation units through Priority I Restoration and Enhancement of the above listed streams. The goal of the project was to address stressors identified in the Targeted Local Watershed Plan such as improving water quality, aquatic and terrestrial habitat, and flood flow attenuation. The goals were addressed by restoring stable channel morphology and sediment transport capacity, improving stream bed form and habitat, improving stream bank stabilization, and providing riparian buffer restoration by re-establishing a native plant community within the easement.

Historic land use at the Site has consisted primarily of livestock grazing and dairy farm operations. Additional land use practices, including the maintenance and removal of riparian vegetation and the relocating, dredging, and straightening of on-site streams have contributed to unstable channel characteristics and degraded water quality.

The project site was delineated into four components totaling 6,710 linear feet: Thompson Creek 1 (243 feet), Thompson Creek 1-2 (1,349 feet), Dale Branch 1 (375 feet), Dale Branch 2-5 (2,993 feet), Jerry Branch (1,691 feet), Hudson Branch (59 feet). Dale Branch 1 and Thompson Creek 1 received Enhancement I while the remaining components received Priority I Restoration. The installation of brush, rock, and wood structures were utilized throughout the restored reaches to provide bed and bank stability as well as aquatic habitat. On Thompson 1, the pond outlet was lowered enough to allow the reformation of a channel in the pond bottom. On Dale 1, the breach in the dam was stabilized in order to prevent degradation of the wetland that formed in the abandoned pond bottom. All components were designed as Type B4 or B5 streams. These channel configurations provide a stable pattern and natural form based on the Type II colluvial valleys where the streams are found.

A baseline stream and topographic survey was performed between March 23 and April 23, 2015 to document baseline conditions at the site. In general, stream pattern, profile, and dimension were similar to those values outlined in the design. The survey revealed that Thompson Branch was built 0.5 feet lower in elevation than designed; however, the deviation was maintained throughout the length of Thompson Creek. The channel and associated slopes were constructed as designed and the error, occurring during construction stakeout, should not affect stream stability.

A vegetation survey at the Site was conducted on April 14, 2015. Results from the initial survey indicate that planted stem density ranged between 810 and 1,139 stems per acre with the mean density of 922 stems per acre across all plots for MY0. A total of nine species were documented across all plots with species diversity within the plots ranging between 2 and 8. At the time of vegetation data collection, herbaceous vegetation had begun to establish. Additionally, good recruitment from woody vegetation is expected due to the presence of mature trees within the easement.

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1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTE

1.1. Location and Setting

The Pee Dee Stream Restoration Site (Site) encompasses approximately 18.6 acres of predominately agricultural land and includes three tributaries to Clarks Creek – Thompson Creek, Dale Branch and Jerry Branch. The Site is located in the Yadkin River Watershed (NCDWQ sub-basin 03-07-10 and HUC 03040104020020) approximately 1 mile south of the town of Pee Dee, NC in Montgomery County (Figure 1). Clarks Creek is listed as a Class C water (NCDWR) and flows into the Pee Dee River. The Site is located within a NCDMS targeted local watershed.

The project area is located in the Carolina Slate Belt Level IV ecoregion, comprised of mineral rich metavolcanic and metasedimentary rocks with slaty clavage. All three project reaches lay within Type II colluvial valleys with structurally influenced valley morphology. Historic land use at the Site has consisted primarily of livestock grazing and dairy farm operations. Additional land use practices, including the maintenance and removal of riparian vegetation and the relocating, dredging, and straightening of on-site streams have contributed to unstable channel characteristics and degraded water quality.

1.2. Project Goals and Objectives

The project goals address stressors identified in the TLW and include the following:

- Improve water quality within the restored channel reaches and downstream watercourses by reducing sediment and nutrient inputs and increasing dissolved oxygen levels
- Improve local aquatic and terrestrial ecological function via stream shading, habitat complexities, and organic/woody material introduction
- Improve aquatic and benthic macroinvertebrate habitat and associated stream bed form
- Improve site hydrology and attenuate flood flows on-site and downstream
- Provide approximately 18.6 acres of riparian area restoration with a native plant community
- Protect stream and riparian improvements with livestock best management practices
- Protect the site in perpetuity with a permanent conservation easement

The project goals will be addressed through the following project objectives:

- Implement Priority I or II restoration of 5,992 feet of stream and enhancement of 625 feet of stream
- Implement appropriate changes in dimension, pattern and/or profile to create geomorphologically stable conditions along project area reaches
- Modify degraded stream channels to enable proper sediment transport capacity and improved stream bed character
- Construct a floodplain bench that is accessible at the proposed bankfull channel elevation.
- Remove a major impoundment
- Integrate in-stream structures and native bank vegetation

- Plant native woody and herbaceous riparian vegetation with a minimum width of 50 feet from the edge of the restored channels
- Eradicate invasive, exotic or undesirable plant species
- Install cattle exclusion fencing, two new wells, two new cattle drinking stations, and upgrade eight existing cattle drinking stations

1.3. Project Structure, Restoration Type and Approach

1.3.1. Project Structure

Construction of the Pee Dee Stream Restoration Project produced a total of 6,092 feet of restoration and 618 feet of enhancement, as outlined in Table 1 and depicted in Figure 2. The project site was delineated into four components totaling 6,710 linear feet: Thompson Creek 1(243 feet), Thompson Creek 1-2 (1,349 feet), Dale Branch 1 (375 feet), Dale Branch 2-5 (2,993 feet), Jerry Branch (1,691 feet), Hudson Branch (59 feet).

1.3.2. Restoration Type and Approach

Thompson Creek

Thompson Creek is divided into three main reaches; Reach 1 is located upstream of the old pond dam, Reach 2 extends from the pond down to the existing pipe crossing, Reach 3 is downstream of the existing pipe crossing.

Reach 1 was constructed as a semi-passive restoration of a Type B5c stream through the pond bottom. The earthen dam was breached in stages to drain the remaining surface water and expose the pond bottom sediments. The pond outlet was lowered just enough to permit the reformation of a channel in the pond bottom but not to the extent that stored sediments are eroded from the old pond. Log sill structures were installed in strategic locations especially near the upstream end of the pond in order to stabilize the bed profile. Channel reconstruction was not performed in this reach since construction access into the pond bottom would be difficult if not impossible. By breaching the dam, Thompson Creek is reconnected as a stream corridor. This restores stream functions such as floodplain connectivity and sediment transport, as well as improve aquatic habitat. By removing a stagnant agricultural pond and restoring Thompson Creek back to a stable stream corridor an overall functional uplift has occurred.

Reach 2 used a Priority I approach and was constructed as a Type B4 stream with moderate sinuosity and an average channel slope of 2.2%. Consideration was given to restoring the channel on its current grade since the stream is now running on bedrock in many locations and as a result the profile has stabilized. However, the presence of mature vegetation on the floodplain and the extent of grading and removal of topsoil that would be required dissuaded this approach. Instead the channel was reconnected with its historic floodplain through a combination of lifting in place and complete channel reconstruction. The proposed channel alignment was selected to incorporate existing mature vegetation where possible and to minimize its disturbance.

Thompson Creek is distinguished from Dale and Jerry Branch by the presence of large gravel and cobble bed material. This gravel and cobble was harvested and reused in the proposed channel. The use of this bed material will provide for a self-armored channel with a slope slightly less than the valley slope. The additional grade differential will be made up for through the use of boulder and log step structures.

Dale and Jerry Branch

The restoration approach for Dale and Jerry Branch was to reestablish the conditions that provided for the historic stability of these two streams. This involved reintroduction of extensive wood grade control and removal of livestock access. Due to the extent of degradation this required backfilling of the existing channels and reconstructing the proper channel dimensions. The disparity between the natural low-gradient slopes for streams with small gravel bed material (0.2% to 0.3%) and the moderately steep valley slopes (2% to 4%) was resolved by using logs to create small steps and then having relatively flat channel reaches between each log structure. Since logs were used as grade control the steps will be held to a maximum drop of 0.4 ft. Where site conditions exceeded the slope that can be accommodated within these limitations, a threshold design approach was used to establish an armored reach grade control.

Generally, the channels were restored as Type B4 streams using a Priority I approach which reconnected the channel to the historic floodplain. In some areas this involved filling and reconstructing the channel in its present position in the valley, while in other areas this required reconstructing the channel offset from the existing channel. There are a few locations, particularly upstream of the major headcuts where the stream is more stable and closer to proper position in the valley, where efforts were made to retain as much of the existing alignment as possible. In these areas log sills were used to adjust and stabilize the profile and the channel was raised in place.

Dale Branch

Dale Branch is divided into five reaches, based on significant changes in drainage area. Reach 1 is located at the upstream end; from the seep heads to the abandoned pond dam. Reach 2 extends from the pond to the existing timber crossing. Reach 3 extends from the timber crossing to main ephemeral tributary on the west side. Reach 4 is located downstream of the west tributary to the existing ford crossing and Reach 5 is downstream of the existing ford crossing.

Reach 1 was enhanced by stabilizing existing banks and slopes near the seep heads, removal of invasive species and replanting of the riparian buffer. At the downstream end of Reach 1 the breach in the dam embankment was stabilized to prevent future headcutting and degradation of the wetland feature in the abandoned pond bottom. Reach 2 used a Priority I restoration approach by using a significant portion of the existing channel alignment and raising the channel in place. This reach required some alignment alterations to correct severe meanders or reduce bank scour potential.

Reaches 3, 4 and 5 used a Priority I restoration approach and followed the above described general approach with the exception of a few transitional reaches. One of these reaches is at the downstream end of Reach 5 which flows into the Clarks Creek floodplain. In this area a Priority II approach was required to transition down to the grade of Clarks Creek.

Jerry Branch

Jerry Branch is divided into three reaches; Reach 1 is located above the confluence with Hudson Branch. Reach 2 is located below the confluence with Hudson Branch and Reach 3 is located at the downstream end of the Site. All three reaches used a Priority I restoration approach and follow the above described general approach with the exception of a few transitional reaches. Similar to the downstream end of Dale, the lower end of Reach 3, which flows into the Clarks Creek floodplain, involve a Priority II approach to transition down to the grade of Clarks Creek.

Hudson Branch

Hudson Branch, constructed as a Type B4 stream, was restored using a Priority I approach. Hudson was raised in place using log sills to set the profile grade and backfilling the majority of the existing channel. Some channel reconstruction was required to properly connect Hudson to the restored Jerry Branch.

1.4. Project History, Contacts and Attribute Data

The project was first identified as a full-delivery mitigation project for the North Carolina Ecosystem Enhancement Program by Environmental Banc and Exchange, LLC [now Resource Environmental Solutions, LLC (RES)]. Project planning began in the fall of 2011 with the final mitigation plan completed in December 2013 and the final design and construction plans completed in January 2014. Construction and planting of the site was completed in April 2015. Project activities, reporting dates, project contacts, and background information are outlined in Tables 2-4 (Appendix A).

2.0 SUCCESS CRITERIA

2.1. Morphological Parameters and Channel Stability

Restored and enhanced streams shall be in compliance with the standards set forth in the USACE 2003 Stream Mitigation Guidelines and the “Ecosystem Enhancement Program Monitoring Requirements and Performance Standards for Stream and Wetland Mitigation” dated November 7, 2011. Restored and enhanced streams should demonstrate morphologic stability to be considered successful. Stability does not equate to an absence of change, but rather to sustainable rates of change or stable patterns of variation. Restored streams often demonstrate some level of initial adjustment in the several months that follow construction and some change/variation subsequent to that is also to be expected. However, the observed change should not be unidirectional such that it represents a robust trend. If some trend is evident, it should be very modest or indicate migration to a stable form.

2.1.1. Dimension

Cross-section measurements should indicate little change from the as-built cross-sections. If changes do occur, they will be evaluated to determine whether the adjustments are associated with increased stability or whether they indicate movement towards an unstable condition

2.1.2. Pattern and Profile

Measurements and calculated values should indicate stability with little deviation from as-built conditions and established morphological ranges for the restored stream type. Pool depths may vary from year to year, but the majority should maintain depths sufficient to be observed as distinct features in the profile. The pools should maintain their depth with flatter water surface slopes, while the riffles should remain shallower and steeper. Pattern measurements will not be collected unless conditions seem to indicate that a detectable change appears to have occurred based on profile and/or dimension measurements.

2.1.3. Substrate

Calculated D_{50} and D_{84} values should indicate coarser size class distribution of bed materials in riffles and finer size class distribution in pools. The majority of riffle pebble counts should indicate maintenance or coarsening of substrate distributions. Generally, it is anticipated that the bed material will coarsen over time.

2.1.4. Sediment Transport

Depositional features should be consistent with a stable stream that is effectively managing its sediment load. Point bar and inner berm features, if present, should develop without excessive encroachment of the channel. Isolated development of robust (i.e. comprised of coarse material and/or vegetated actively diverting flow) mid-channel or lateral bars will be acceptable. Likewise, development of a higher number of mid-channel or lateral bars that are minor in terms of their permanency such that profile measurements do not indicate systemic aggradation will be acceptable, but trends in the development of robust mid-channel or alternating bar features will be considered a destabilizing condition and may require intervention or have success implications.

2.2. Surface Water Hydrology

Monitoring of stream surface water stages should indicate recurrence of bankfull flow on average every 1 to 2 years. At a minimum, throughout the monitoring period, the surface water stage should achieve bankfull or greater elevations at least twice. The bankfull events must occur during separate monitoring years.

2.3. Vegetation

Riparian vegetation monitoring shall be conducted for a minimum of seven years to ensure that success criteria are met per USACE guidelines. Accordingly, success criteria will consist of a minimum survival of 320 stems per acre by the end of the Year 3 monitoring period, a minimum of 260 stems per acre at the end of Year 5 and a minimum of 210 stems per acre in Year 7. If monitoring indicates either that the specified survival rate is not being met or the development of detrimental conditions (i.e., invasive species, diseased vegetation), appropriate corrective actions will be developed and implemented.

3.0 MONITORING PLAN

3.1. Stream Channel Stability and Geomorphology

A total of 22 cross-sections, including 11 riffles and 11 pools, were installed upon completion of construction and will be monitored annually. The total number of cross-sections include four on Thompson Creek, eleven on Dale Branch, and seven on Jerry Branch. Data collected from annual monitoring will be compared with the as-built conditions to document the current state of the channel and any trends in the stream profile occurring throughout the monitoring period.

3.2. Stream Hydrology

A total of three crest gauges were installed on site. Crest gauges will be monitored quarterly to document highest stage for the monitoring interval and verify occurrences of bankfull events. In addition, observations of wrack and depositional features in the floodplain will be documented with photos.

3.3. Vegetation

Fourteen vegetation monitoring plots, approximately 0.025 acres individually, were established based on guidance given in the *CVS-EEP Protocol for Recording Vegetation Version 4.2* (Lee et al. 2008). Data was collected using the Level I protocol during initial baseline monitoring to document baseline conditions immediately after construction and planting. Subsequent annual vegetation will use the Level II protocol. Annual monitoring will determine planted vegetative success and the overall trajectory of

woody plant restoration and regeneration at the site. Vegetation monitoring plot corners were marked with t-posts and PVC conduit.

3.4. Permanent Photo Stations

Permanent photo stations were established at each cross-section to digitally document annual conditions of the left and right banks. Each vegetation monitoring plot includes a photo station taken diagonally from the origin towards the opposite plot corner. Additionally, 16 permanent photo stations were established throughout the project area to provide representative digital documentation of stream features and vegetation conditions. Permanent photo stations were marked with labeled wooden stakes and red flagging tape.

3.5. Maintenance and Contingency

RES and Equinox will monitor the site on a regular basis and shall conduct a physical inspection of the site a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following:

- *Stream-* Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting. Management of beaver activity will include removal of nuisance beavers and beaver dams that affect the stream.
- *Vegetation-* Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
- *Site Boundary-* Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis. Boundary markings will comply with requirements of the RFP Addendum titled "Full Delivery Requirement for Completion of Survey for Conservations Easements" dated 7/21/11.
- *Road Crossing-* Road crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.
- *Stormwater Management Device-* Storm water management devices will be monitored and maintained per the protocols and procedures defined by the NC Division of Water Quality Storm Water Best Management Practices Manual.

4.0 BASELINE CONDITIONS

A baseline survey was performed between March 23, 2015 and April 23, 2015 to document baseline conditions at the site. A vegetation survey was conducted on April 14, 2015 to document planted vegetation after construction for future comparison.

Reach summary tables, cross-section summary tables, and cross-section plots related to stream morphology can be found in Appendix B. Generally, the pattern, profile, and dimension were relatively similar to those values outlined in the design. Jerry Branch 1 had a noticeably flatter as-built slope of 0.027 ft/ft than the design slope of 0.037 ft/ft. However, the 0.037 ft/ft slope value listed in the design plans was the steepest in a range of slope values for the reach. The as-built of 0.027 slope falls within the range of 0.015-0.037 ft/ft for the reach.

During construction, several deviations were made from the final plans and approved by the engineer. These included moving one crossing to the top of Jerry Branch 1, shifting the crossing at 228+50 downstream approximately 8 feet, omitting a log sill near 219+75 on Dale branch, and omitting a boulder arch at 228+11.9 and 234+43.0 on Dale Branch. Of note, due to an error during construction stakeout, Thompson Branch was constructed 0.5 feet lower in elevation than designed. However, the 0.5 foot deviation in elevation was maintained throughout the reach and the channel was otherwise constructed as designed. The error should not affect stream stability since the channel and its associated slopes were constructed as designed.

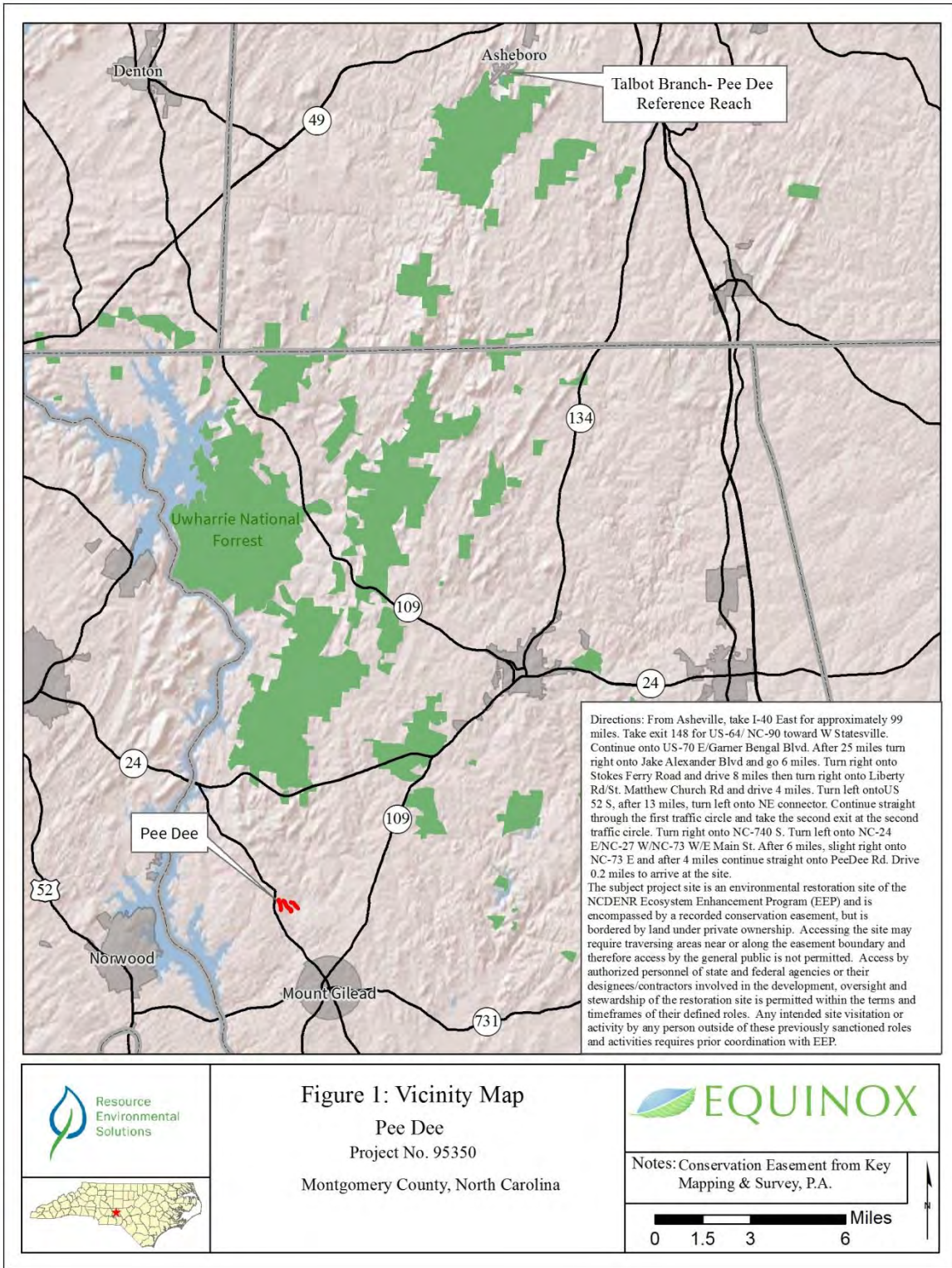
Vegetation data, summary tables, and plot photos are located in Appendix C. Results from the initial survey indicate that planted stem density ranged between 810 and 1,139 stems per acre with a mean density of 922 stems per acre across all plots for MY0. A total of nine species were documented across all plots with species diversity within the plots ranging between 2 and 8. At the time of vegetation data collection, herbaceous vegetation had begun to establish. Additionally, good recruitment from woody vegetation is expected due to the presence of mature trees within the easement.




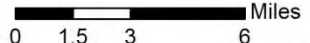

5.0 REFERENCES

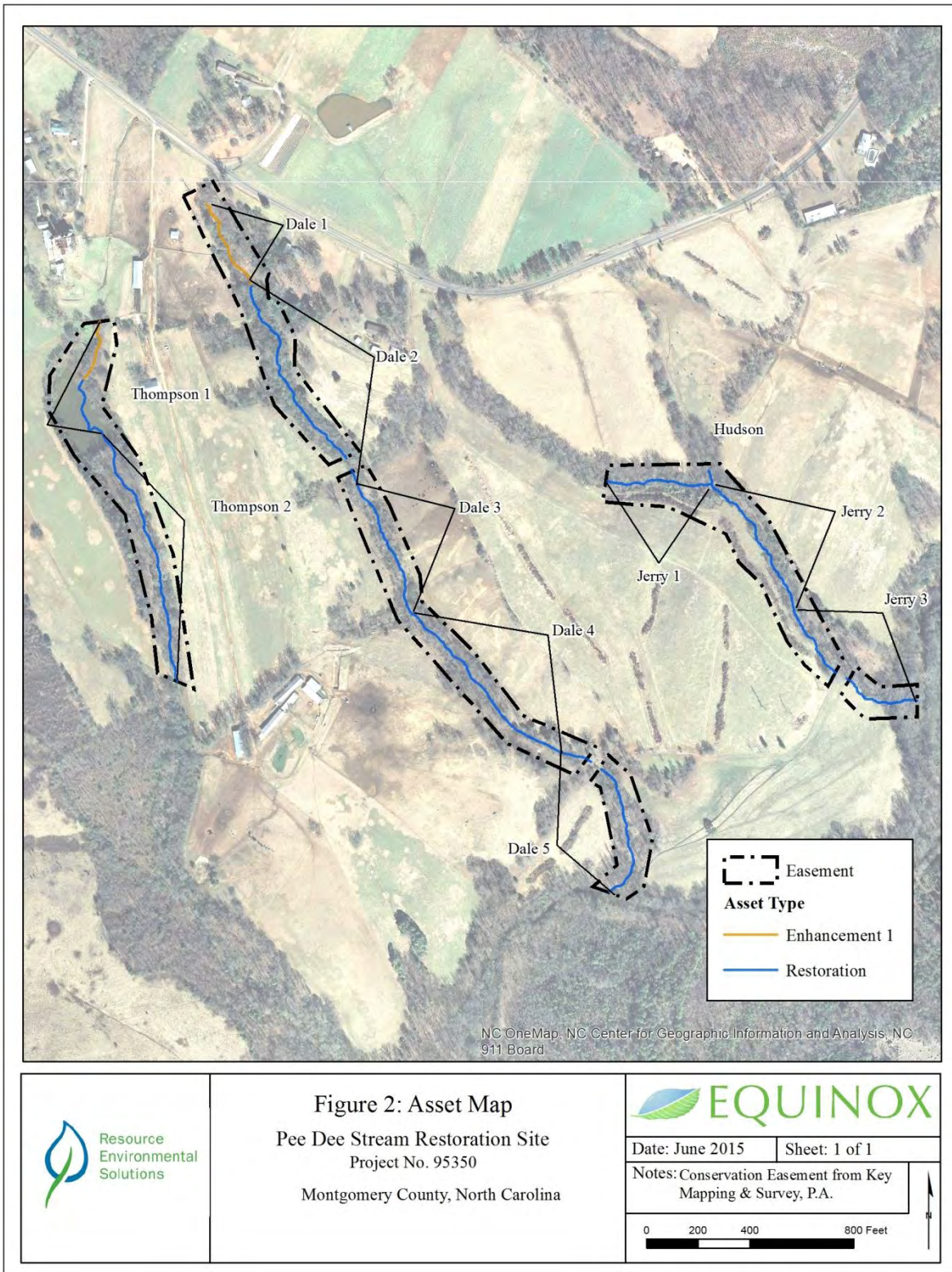
Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (<http://cvs.bio.unc.edu/methods.htm>)

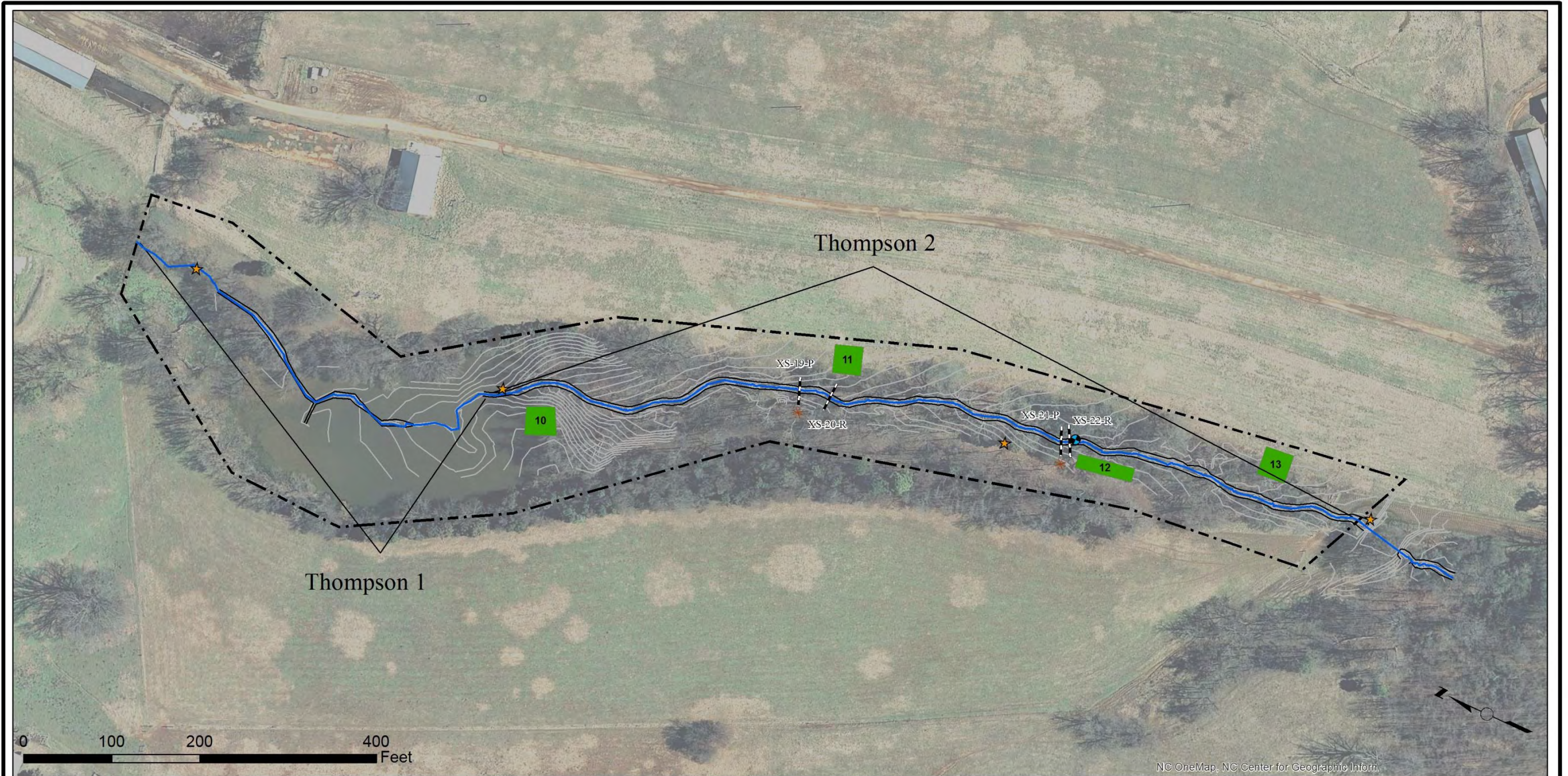
Appendix A

General Tables and Figures













 	<p>Figure 1: Vicinity Map</p> <p>Pee Dee</p> <p>Project No. 95350</p> <p>Montgomery County, North Carolina</p>	 <p>Notes: Conservation Easement from Key Mapping & Survey, P.A.</p>  
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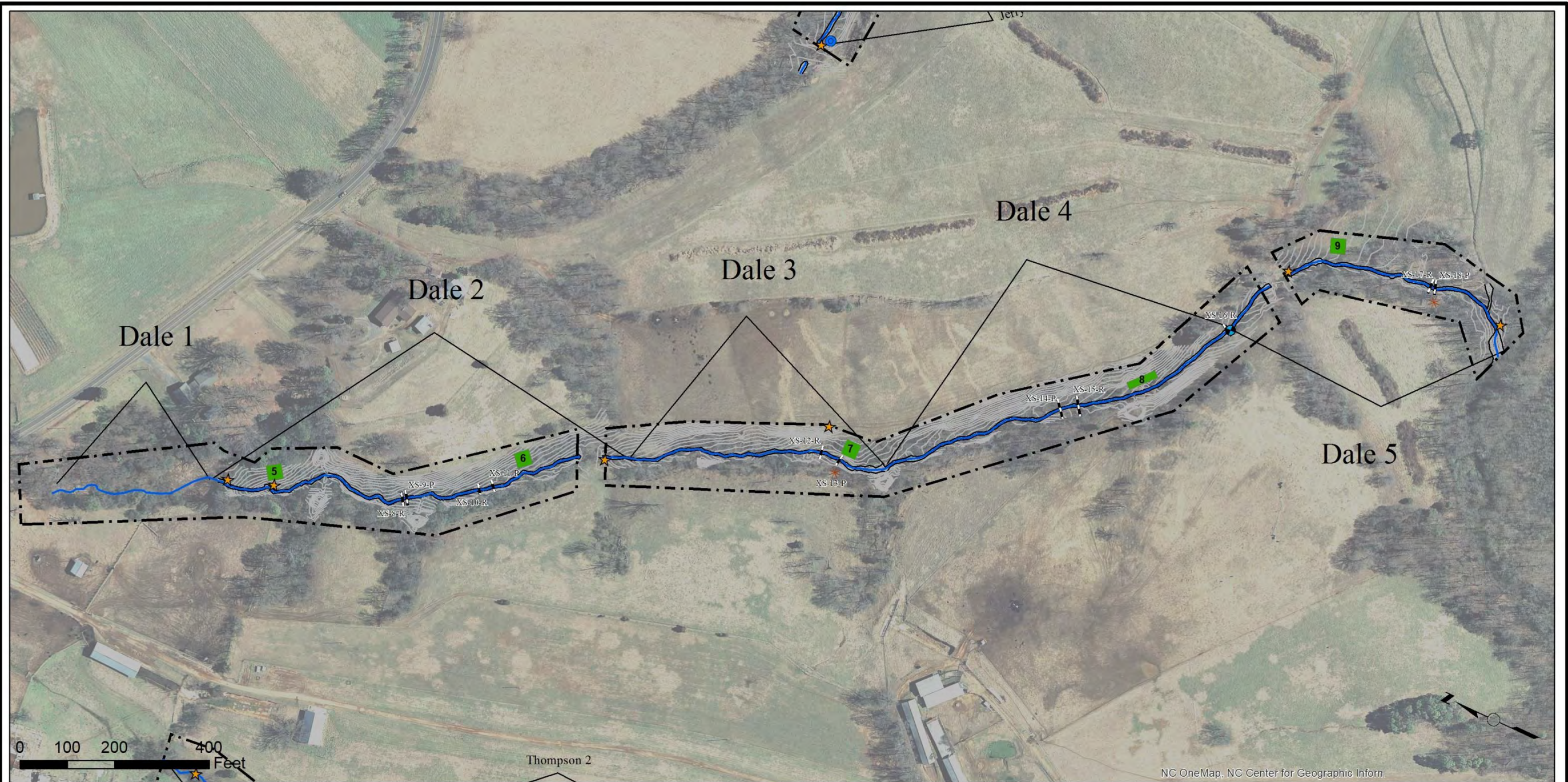
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Figure 3. Baseline Monitoring Features Map (Sheet 1)
 Pee Dee Stream Restoration Project
 Montgomery County, NC
 NCDMS Contract No. 004644
 NCDMS Project No.: 95350
 July 2015

- | | | | |
|---|------------------|---|---------------------|
|  | Crest Gauge |  | As_Built_Centerline |
|  | Rain Gauge |  | Top_of_Bank |
|  | Photo Points |  | Kee_Contours |
|  | Bank Pin Array |  | Easement |
|  | Cross-Section | | |
|  | Vegetation Plots | | |

Notes:
 1) This is not a survey and should not be construed as such.
 2) Baseline Data Provided by Kee Mapping
 3) Orthoimagery provided by NCOneMap (2010)











Prepared by:
 EQUINOX



Prepared for



Figure 3. Baseline Monitoring Features Map (Sheet 2)
 Pee Dee Stream Restoration Project
 Montgomery County, NC
 NCDMS Contract No. 004644
 NCDMS Project No.: 95350
 July 2015

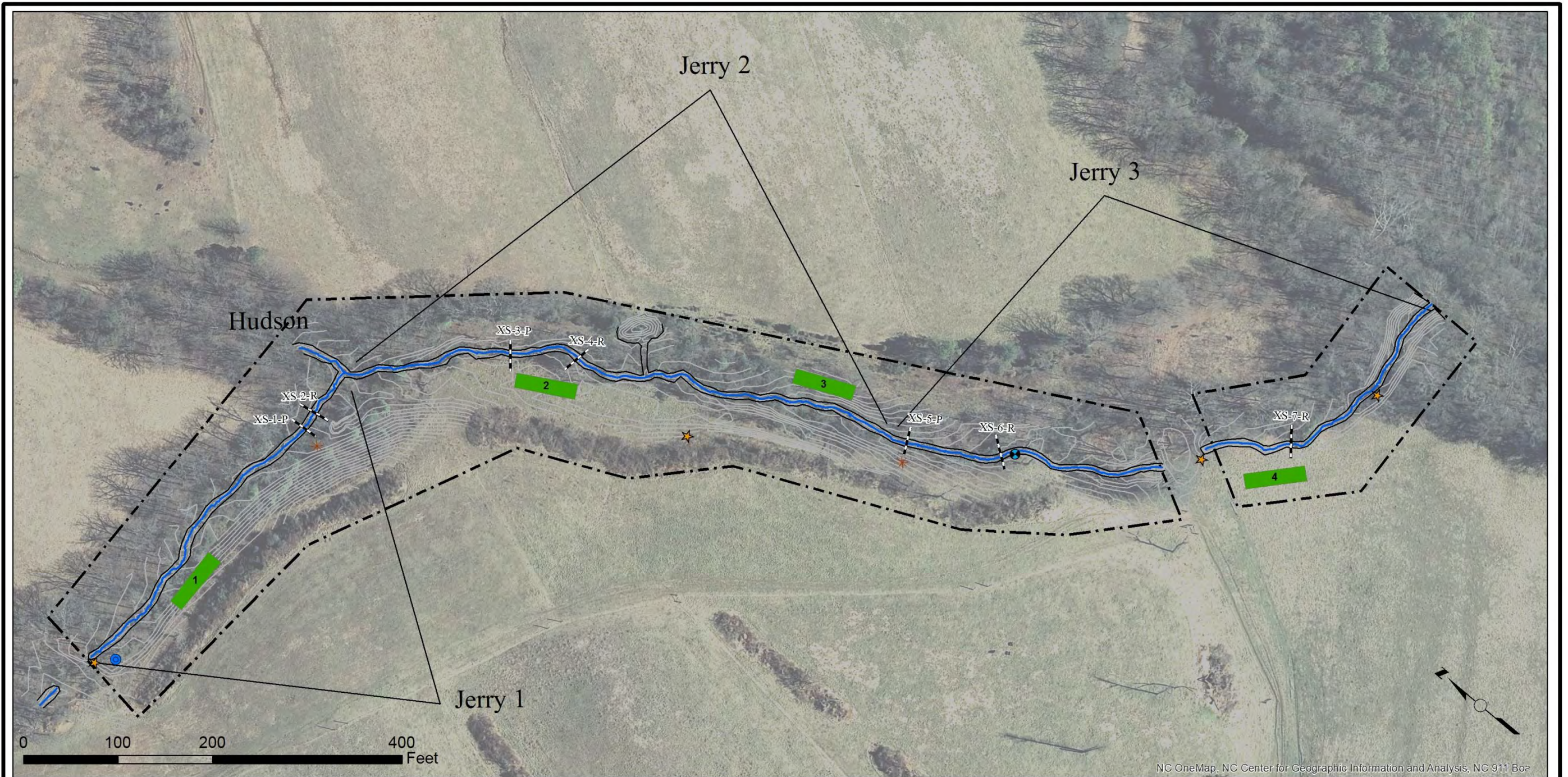
-  Crest Gauge
-  Rain Gauge
-  Photo Points
-  Bank Pin Array
-  Cross-Section
-  Vegetation Plots
-  As_Built_Centerline
-  Top_of_Bank
-  Kee_Contours
-  Easement

Notes:

- 1) This is not a survey and should not be construed as such.
- 2) Baseline Data Provided by Kee Mapping
- 3) Orthoimagery provided by NCOneMap (2010)











Prepared by:





Prepared for
 Resource Environmental Solutions

Figure 3. Baseline Monitoring Features Map (Sheet 3)
 Pee Dee Stream Restoration Project
 Montgomery County, NC
 NCDMS Contract No. 004644
 NCDMS Project No.: 95350
 July 2015

	Crest Gauge		As_Built_Centerline
	Rain Gauge		Top_of_Bank
	Photo Points		Kee_Contours
	Bank Pin Array		Easement
	Cross-Section		
	Vegetation Plots		

Notes:
 1) This is not a survey and should not be construed as such.
 2) Baseline Data Provided by Kee Mapping
 3) Orthoimagery provided by NCOneMap (2010)

Prepared by:
 EQUINOX

Table 1. Project Components and Mitigation Credits									
Pee Dee Stream Restoration Site / Project Number 95350									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen	Phosphorous Nutrient Offset
	R	RE	R	RE	R	RE		Nutrient Offset	
Type									
Totals	6,504						-	-	-
Project Components									
Project Component -or- Reach ID	Stationing/Location			Existing Footage/Acreage		Approach (PI, PII etc.)	Restoration - or- Restoration Equivalent	Restoration Footage or Acreage ¹	Mitigation Ratio
Thompson Creek 1	100+7 - 102 + 50			250		P1	EI	243	1.5
Thompson Creek 1 - 2	102+50 - 117+05			1346		P1	R	1349	1
Dale Branch 1	200+00 - 203+95			375		P1	EI	375	1.5
Dale Branch 2 - 5	203+95 - 234+86			2407		P1	R	2993	1
Jerry Branch	300+74 - 318+15			1832		P1	R	1691	1
Hudson Branch	402+48 - 403+07			53		P1	R	59	1
Component Summation									
Restoration Level	Stream	Riparian Wetland		Non-riparian Wetland		Buffer	Upland		
	(linear feet)	(acres)		(acres)		(square feet)	(acres)		
		Riverine	Non-Riverine						
Restoration	6,092	-	-	-	-	-	-	-	-
Enhancement	-	-	-	-	-	-	-	-	-
Enhancement I	618	-	-	-	-	-	-	-	-
Enhancement II	-	-	-	-	-	-	-	-	-
Creation	-	-	-	-	-	-	-	-	-
Preservation	-	-	-	-	-	-	-	-	-
High Quality Preservation	-	-	-	-	-	-	-	-	-
BMP Elements									
Element ²	Location	Purpose/Function			Notes				
FB	Entire Site	Protect Stream							

¹Restoration footage accounts for crossings and exclusions.

²BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

**Table 2. Project Activity and Reporting History
Pee Dee Stream Restoration Site / Project No 95350**

Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	Dec - 2013	Dec - 2013
Final Design - Construction Plans	N/A	Jan - 2014
Construction	N/A	April - 2015
Temporary S&E Mix Applied to Entire Project Area	N/A	April - 2015
Permanent Seed Mix Applied to Reach/Segments 1 & 2	N/A	April - 2015
Containerized and B&B Plantings for Reach/Segments 1 & 2	N/A	April - 2015
Baseline Monitoring Document (Year 0 Monitoring - Baseline)	April - 2015	July 2015
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contacts	
Pee Dee Stream Restoration Site – NCDMS Project # 95350	
Prime Contractor	Resource Environmental Solutions, LLC 302 Jefferson Street; Suite 110 Raleigh, North Carolina 27605 David Godley (919) 209-1053
Designer	Wolf Creek Engineering 12-1/2 Wall St., Suite C Asheville, North Carolina 28801 Grant Ginn (828) 449-1930 ext 102
Construction Contractor	Northstate Environmental 2889 Lowery Street Winston Salem, North Carolina 27101 Darrell Westmoreland (336) 725-2010
Seeding Contractor	Northstate Environmental 2889 Lowery Street Winston Salem, North Carolina 27101 Darrell Westmoreland (336) 725-2010
Planting Contractor	Resource Environmental Solutions, LLC 302 Jefferson Street; Suite 110 Raleigh, North Carolina 27605 David Godley (919) 209-1053
As-built Surveys	Kee Mapping and Surveying PO Box 2566 Asheville, North Carolina 28802 Phillip B. Key (828) 575-9021
Seeding Mix Source	Green Resource 5204 Highgreen Court Colfax, NC 27235 (336) 855-6363
Bare Root Seedlings	ArborGen Inc. 2011 Broadbank Court Ridgeville, SC 29472 (888) 888-7158
	North Carolina Forest Service 762 Claridge Nursery Road Goldsboro, NC 27350 (888) 628-7337
Live Stakes	Bear Duck Farms, LLC 105 Dobbs Place Goldsboro, NC
Monitoring Performers (Y0)- 2015	Equinox 37 Haywood St. Asheville, North Carolina 28802 Hunter Terrell (828) 253-6856

Table 4. Project Baseline Information and Attributes				
Project Information				
Project Name	Pee Dee Stream Restoration			
County	Montgomery County			
Project Area (acres)	18.6			
Project Coordinates (latitude and longitude)	35°15'26.95" N, 80°01'47.83" W			
Project Watershed Summary Information				
Physiographic Province	Piedmont			
River Basin	Yadkin			
USGS Hydrologic Unit 8-digit	03040104	USGS Hydrologic Unit 14-Digit	03040104020020	
DWQ Sub-basin	03-07-10			
Project Drainage Area (acres)	286			
Project Drainage Area Percentage of Impervious Area	<10%			
CGIA Land Use Classification	2.01.03 Hay and Pasture Land			
Reach Summary Information				
Parameters	Thompson Creek	Dale Branch	Jerry Branch	Hudson Branch
Length of reach (linear feet)	1596	2782	1832	56
Valley classification (Rosgen)	II	II	II	II
Drainage area (acres)	102	58	83	19
NCDWQ stream identification score	30.5	34	30.5	21.5
NCDWQ Water Quality Classification	C	C	C	C
Morphological Description (stream type) (Rosgen)	B4	B4	B4	B4
Evolutionary trend (Rosgen)	IV	IV	IV	IV
Underlying mapped soils	GoE, BeC2, BaC2	GoE, CnA	GoE, BaC2, BaB2	BaC2
Drainage class	Well-drained	Well-drained	Well-drained	Well-drained
Soil Hydric status	Non-Hydric	Non-Hydric	Non-Hydric	Non-Hydric
Slope	2%	2%	2%	2%
FEMA classification	N/A	N/A	N/A	N/A
Native vegetation community	Agricultural	Agricultural	Agricultural	Agricultural
Percent composition of exotic invasive vegetation	5%	5%	5%	5%
Wetland Summary Information				
Parameters	-	-	-	-
Size of Wetland (acres)	-	-	-	-
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	-	-	-	-
Mapped Soil Series	-	-	-	-
Drainage class	-	-	-	-
Soil Hydric Status	-	-	-	-
Source of Hydrology	-	-	-	-
Hydrologic Impairment	-	-	-	-
Native vegetation community	-	-	-	-
Percent composition of exotic invasive vegetation	-	-	-	-
Regulatory Considerations				
Regulation	Applicable?	Resolved?	Supporting Documentation	
Waters of the United States – Section 404	Yes	Yes	NWP	
Waters of the United States – Section 401	Yes	Yes	401 Certification	
Endangered Species Act	N/A		ERTR	
Historic Preservation Act	N/A		ERTR	
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	N/A			
FEMA Floodplain Compliance	N/A			
Essential Fisheries Habitat	N/A		ERTR	

Appendix B
Morphological Summary Data and Plots

Table 5. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Thompson Branch 1 (530 feet)

Parameter	Regional Curve			Pre-Existing Condition					Reference Reach Data					Design			As-Built / Baseline							
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	4.6	-	5.0	-	-	-	1	9.8	11.7	-	13.1	-	-	-	-	8.8	-	-	-	-	-	-
Floodprone Width (ft)				-	20.0	-	-	-	1	16.0	18.0	-	21.0	-	-	-	-	-	-	-	-	-	-	-
Bankfull Mean Depth (ft)	-	-	0.7	-	1.0	-	-	-	1	0.5	0.6	-	0.8	-	-	-	0.48	-	-	-	-	-	-	
Bankfull Max Depth (ft)				-	1.3	-	-	-	1	0.8	0.9	-	1.2	-	-	-	0.73	-	-	-	-	-	-	
Bankfull Cross Sectional Area (ft ²)		4.8		-	4.6	-	-	-	1	5.4	7.3	-	8.0	-	-	-	4.2	-	-	-	-	-	-	
Width/Depth Ratio				-	5.5	-	-	-	1	12.3	18.8	-	19.6	-	-	-	18.6	-	-	-	-	-	-	
Entrenchment Ratio				-	4.0	-	-	-	1	1.4	1.5	-	1.8	-	-	-	3.4	-	-	-	-	-	-	
Bank Height Ratio				-	1.2	-	-	-	1	0.9	1.0	-	1.4	-	-	-	-	-	-	-	-	-	-	
d50 (mm)				-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	44.7	44.7	44.7	44.7	-	1	
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	-	0.006	0.006	0.006	0.006	-	1	
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	9.6	20.6	17.0	35.0	11.6	6	
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	1.1	-	1.6	2.0	1.9	2.3	0.3	7
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	28.6	-	11.0	22.3	18.3	36.5	11.2	6
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	19.0	26.1	22.9	36.4	9.1	3	
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	13.0	-	19.0	12.3	13.1	13.2	13.7	0.7	3
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	1.5	1.5	1.6	0.1	1
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.7	94.7	81.4	155.2	44.0	4	
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	3	-	2.2	3.0	2.6	4.1	1.0	3
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%				-	-	-	-	-	-	-	-	-	-	-	-	-	-	25%	0%	69%	0%	6%	-	-
SC% / Sa% / G% / C% / B% / Be%				-	-	-	-	-	-	-	4%	2%	49%	38%	1%	6%	-	-	-	-	-	-	-	-
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)				-	4	6	8	15	24	-	14	36	52	110	170	-	-	-	-	-	-	-	-	-
Reach Shear Stress (Competency) lb/ft ²				-	-	-	-	-	-	-	-	-	0.562	-	-	-	-	-	-	-	-	-	-	-
Max Part Size (mm) Mobilized at Bankfull				-	-	-	-	-	-	-	-	-	947	-	-	-	37	-	-	-	-	-	-	-
Stream Power (Transport Capacity) W/m ²				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Reach Parameters																								
Drainage Area (mi ²)				-	0.11	-	-	-	-	-	0.42	-	-	-	-	-	-	-	-	-	-	-	-	-
Impervious Cover Estimate (%)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosgen Classification				-	G	-	-	-	-	-	B4c	-	-	-	-	B4	-	B4	-	-	-	-	-	-
Bankfull Velocity (fps)				-	-	-	-	-	-	-	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-
Bankfull Discharge (cfs)		18.2		-	-	-	-	-	-	-	28.0	-	-	-	-	18	-	-	-	-	-	-	-	-
Valley Length (ft)				-	-	-	-	-	-	-	260.0	-	-	-	-	294	-	-	-	-	-	-	-	-
Channel Thalweg Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	511	-	-	-	-	530	-	-	-
Sinuosity				-	-	-	-	-	-	-	1.50	-	-	-	-	1.0	-	-	-	-	1.06	-	-	-
Water Surface Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	0.030	-	-	-	-	0.031	-	-	-
Bankfull Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.030	-	-	-
Bankfull Floodplain Area (acres)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Proportion Over Wide (%)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entrenchment Class (ER Range)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Incision Class (BHR Range)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BEHI				-	30.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel Stability or Habitat Metric				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological or Other				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Information unavailable.
 Non-Applicable.

Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Thompson Branch 2 (1,061 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	5.11	7.0	7.7	7.0	9.0	1.2	3	9.8	11.7	-	13.1	-	-	-	7.5	-	7.5	7.6	7.6	7.6	0.07	2
Floodprone Width (ft)				9.0	14.7	15.0	20.0	5.5	2	16.0	18.0	-	21.0	-	-	-	-	-	31.1	32.7	32.7	34.3	2.26	2
Bankfull Mean Depth (ft)	-	-	0.8	0.9	0.9	0.9	1.0	0.1	3	0.5	0.6	-	0.8	-	-	-	0.6	-	0.6	0.6	0.6	0.6	0	2
Bankfull Max Depth (ft)				1.1	1.1	1.1	1.2	0.1	3	0.8	0.9	-	1.2	-	-	-	0.78	-	1.1	1.2	1.2	1.2	0.07	2
Bankfull Cross Sectional Area (ft ²)			5.6	5.7	6.7	6.0	8.4	1.5	3	5.4	7.3	-	8.0	-	-	-	4.2	-	4.2	4.3	4.3	4.3	0.07	2
Width/Depth Ratio				8.1	8.8	8.5	9.7	0.8	3	12.3	18.8	-	19.6	-	-	-	13.5	-	13.3	13.4	13.4	13.4	0.07	2
Entrenchment Ratio				1.3	2.0	1.7	2.9	0.8	3	1.4	1.5	-	1.8	-	-	-	4.0	-	4.1	4.3	4.3	4.5	0.28	2
Bank Height Ratio				1.4	2.2	2.4	2.9	0.8	3	0.9	1.0	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)				-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	10.0	15.8	15.2	25.4	3.9	32
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.008	-	0.005	0.014	0.013	0.023	0.005	32
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	1.8	5.0	4.6	18.3	3.0	32
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	1.17	-	1.4	2.1	2.0	2.6	0.3	32
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	26.2	-	19.5	27.5	25.9	54.0	7.4	32
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	14.4	22.4	19.5	37.8	8.2	6	
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	-	-	-	-	12.0	-	18.0	10.5	18.3	18.5	25.9	6.7	4	
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	2.4	2.5	3.5	0.9	2	
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.3	48.7	50.5	60.9	9.8	6	
Meander Width Ratio				-	-	-	-	-	-	1.8	-	-	-	-	-	3	-	2.2	3.0	2.6	4.1	1.0	3	
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57%	0%	18%	11%	14%	-
SC% / Sa% / G% / C% / B% / Be%				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)				4	6	8	15	24	-	14	36	52	110	170	-	-	-	-	-	-	-	-	-	-
Reach Shear Stress (Competency) lb/ft ²				-	-	-	-	-	-	0.562	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Max Part Size (mm) Mobilized at Bankfull				-	-	-	-	-	-	-	-	-	947	-	-	-	37	-	-	-	-	-	-	-
Stream Power (Transport Capacity) W/m ²				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Reach Parameters																								
Drainage Area (mi ²)				-	-	-	0.14	-	-	-	-	-	0.42	-	-	-	-	-	-	-	-	-	-	-
Impervious Cover Estimate (%)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosgen Classification				-	-	-	G	-	-	-	-	-	B4c	-	-	-	B4	-	-	-	-	-	-	B4
Bankfull Velocity (fps)				-	-	-	-	-	-	-	-	-	3.8	-	-	-	-	-	-	-	-	-	-	-
Bankfull Discharge (cfs)			21.6	-	-	-	-	-	-	-	-	-	28.0	-	-	-	22	-	-	-	-	-	-	-
Valley Length (ft)				-	-	-	-	-	-	-	-	-	260.0	-	-	-	1,010	-	-	-	-	-	-	-
Channel Thalweg Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	1,150	-	-	-	-	-	-	1,061
Sinuosity				-	-	-	-	-	-	-	-	-	1.50	-	-	-	1.1	-	-	-	-	-	-	1.05
Water Surface Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	0.020	-	-	-	-	-	-	0.020
Bankfull Slope (ft/ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-	-	-	-	-	-	0.022
Bankfull Floodplain Area (acres)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Proportion Over Wide (%)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entrenchment Class (ER Range)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Incision Class (BHR Range)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BEHI				-	-	-	29.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Channel Stability or Habitat Metric				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological or Other				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Information unavailable.

Non-Applicable.

Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Dale Branch 1 (250 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline ¹					
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	2.63	4.8	7.1	8.0	8.5	2.0	3	9.8	11.7	-	13.1	-	-	-	6.3	-						
Floodprone Width (ft)				7.0	15.0	18.0	20.0	7.0	2	16.0	18.0	-	21	-	-	-	-	-						
Bankfull Mean Depth (ft)	-	-	0.49	0.4	0.5	0.5	0.6	0.1	3	0.5	0.62	-	0.8	-	-	-	0.34	-						
Bankfull Max Depth (ft)				0.5	0.6	0.6	0.7	0.1	3	0.8	0.9	-	1.2	-	-	-	0.52	-						
Bankfull Cross Sectional Area (ft ²)	2.0			2.5	2.9	2.9	3.4	0.5	3	5.4	7.3	-	8	-	-	-	2.1	-						
Width/Depth Ratio				8.0	18.4	21.4	25.7	9.2	3	12.3	18.8	-	19.6	-	-	-	18.7	-						
Entrenchment Ratio				1.5	2.0	2.1	2.5	0.5	3	1.4	1.5	-	1.8	-	-	-	5.6	-						
Bank Height Ratio				1.0	1.8	1.2	3.1	1.2	3	0.9	1	-	1.4	-	-	-	-	-						
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-						
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-						
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	-	-						
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-						
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	0.77	-						
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	20.5	-						
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	-						
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	9.0	-	14.0						
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	4	-						
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%																								
SC% / Sa% / G% / C% / B% / Be%																								
d16 / d35 / d50 / d84 / d95 / d _P / d ₈₄ ^P (mm)																								
Reach Shear Stress (Competency) lb/ft ²																								
Max Part Size (mm) Mobilized at Bankfull																								
Stream Power (Transport Capacity) W/m ²																								
Additional Reach Parameters																								
Drainage Area (mi ²)																								
Impervious Cover Estimate (%)																								
Rosgen Classification																								
Bankfull Velocity (fps)																								
Bankfull Discharge (cfs)																								
Valley Length (ft)																								
Channel Thalweg Length (ft)																								
Sinuosity																								
Water Surface Slope (ft/ft)																								
Bankfull Slope (ft/ft)																								
Bankfull Floodplain Area (acres)																								
Proportion Over Wide (%)																								
Entrenchment Class (ER Range)																								
Incision Class (BHR Range)																								
BEHI																								
Channel Stability or Habitat Metric																								
Biological or Other																								

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

¹This reach received minor bank work with no adjustments to profile. No cross-sections set in this reach.

**Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Dale Branch 2 (920 feet)**

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design ¹			As-Built / Baseline					
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	2.98	-	5.0	-	-	-	1	9.8	11.7	-	13.1	-	-	-	5.4	-	6.4	6.7	6.7	7.0	0.42	2
Floodprone Width (ft)				-	7.0	-	-	-	1	16.0	18.0	-	21	-	-	-	-	-	15.1	19.5	19.5	23.9	6.22	2
Bankfull Mean Depth (ft)	-	-	0.54	-	0.6	-	-	-	1	0.5	0.62	-	0.8	-	-	-	0.37	-	0.3	0.3	0.3	0.3	0	2
Bankfull Max Depth (ft)				-	0.7	-	-	-	1	0.8	0.9	-	1.2	-	-	-	0.56	-	0.5	0.6	0.6	0.7	0.14	2
Bankfull Cross Sectional Area (ft ²)	2.4			-	2.8	-	-	-	1	5.4	7.3	-	8	-	-	-	2.0	-	1.8	1.9	1.9	2.0	0.14	2
Width/Depth Ratio				-	9.0	-	-	-	1	12.3	18.8	-	19.6	-	-	-	14.6	-	22.6	23.6	23.6	24.6	1.41	2
Entrenchment Ratio				-	1.4	-	-	-	1	1.4	1.5	-	1.8	-	-	-	8.2	-	2.4	2.9	2.9	3.4	0.71	2
Bank Height Ratio				-	7.9	-	-	-	1	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)				-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	3.2	10.1	9.0	21.3	4.8	28
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.003	-	0.007	0.027	0.027	0.046	0.011	28
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	1.5	3.2	2.9	9.6	1.6	29
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	0.84	-	1.1	1.6	1.4	2.8	0.5	28
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	20.7	-	9.4	19.7	19.3	31.4	4.9	28
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	-	18.0	20.6	19.0	24.4	3.1	5
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	-	-	-	-	10.0	-	15.0	-	8.2	13.8	14.7	16.7	3.4	5
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	2.1	2.2	2.5	0.5	5
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.1	38.9	39.6	41.5	3.1	6
Meander Width Ratio				-	-	-	-	-	-	1.8	-	-	-	-	-	-	4	-	2.7	3.1	2.8	3.6	0.9	6
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%				-						-						50%/ 7%/ 16%/ 10%/ 17%								
SC% / Sa% / G% / C% / B% / Be%				-						4% / 2% / 49% / 38% / 1% / 6%														
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)				--/5/6/11/15						14 / 36 / 52 / 110 / 170 / - / -														
Reach Shear Stress (Competency) lb/ft ²				-						0.562						-								
Max Part Size (mm) Mobilized at Bankfull				-						947						32								
Stream Power (Transport Capacity) W/m ²				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi ²)				0.04						0.42														
Impervious Cover Estimate (%)				-						-														
Rosgen Classification				G						B4c						B4								
Bankfull Velocity (fps)	-			-						3.8						-								
Bankfull Discharge (cfs)	8.77			-						28.0						9								
Valley Length (ft)				-						260.0						896								
Channel Thalweg Length (ft)				-						-						975								
Sinuosity				-						1.50						1.00								
Water Surface Slope (ft/ft)				-						-						0.0420								
Bankfull Slope (ft/ft)				-						-						-								
Bankfull Floodplain Area (acres)				-						-						-								
Proportion Over Wide (%)				-						-						-								
Entrenchment Class (ER Range)				-						-						-								
Incision Class (BHR Range)				-						-						-								
BEHI				25.2						-						-								
Channel Stability or Habitat Metric				-						-						-								
Biological or Other				-						-						-								

¹Based on average design values for Subreaches 2b-2e
- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

**Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Dale Branch 3 (559 feet)**

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	3.28	3.0	3.3	3.3	3.6	0.4	2	9.8	11.7	-	13.1	-	-	-	7.2	-	7.3	7.3	7.3	7.3	-	1
Floodprone Width (ft)				9.0	12.0	12.0	15.0	4.2	2	16.0	18.0	-	21	-	-	-	-	-	18.5	18.5	18.5	18.5	-	1
Bankfull Mean Depth (ft)	-	-	0.58	0.6	0.7	0.7	0.7	0.1	2	0.5	0.62	-	0.8	-	-	-	0.39	-	0.3	0.3	0.3	0.3	-	1
Bankfull Max Depth (ft)				0.7	0.8	0.8	0.9	0.1	2	0.8	0.9	-	1.2	-	-	-	0.59	-	0.7	0.7	0.7	0.7	-	1
Bankfull Cross Sectional Area (ft ²)	2.8			3.0	3.6	3.6	4.1	0.8	2	5.4	7.3	-	8	-	-	-	2.8	-	2.5	2.5	2.5	2.5	-	1
Width/Depth Ratio				8.8	10.4	10.4	11.9	2.2	2	12.3	18.8	-	19.6	-	-	-	18.7	-	21.1	21.1	21.1	21.1	-	1
Entrenchment Ratio				1.5	2.0	2.0	2.5	0.7	2	1.4	1.5	-	1.8	-	-	-	4.2	-	2.5	2.5	2.5	2.5	-	1
Bank Height Ratio				1.6	1.9	1.9	2.2	0.4	2	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	-	1
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	0.5	12.6	10.7	60.6	10.9	24
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.008	-	0.005	0.026	0.025	0.061	0.014	24
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	1.3	3.3	2.9	9.0	1.5	23
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	0.89	-	0.8	1.3	1.3	1.7	0.2	23
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	21.9	-	13.3	21.0	18.5	63.1	10.1	23
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	-	17.8	26.7	27.9	33.4	7.4	4
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	-	-	-	-	11.0	-	16.0	-	8.7	10.2	9.8	12.1	1.4	6
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.4	1.3	1.7	0.2	1
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.6	39.9	37.4	55.7	10.0	6
Meander Width Ratio				-	-	-	-	-	-	1.8	-	-	-	-	-	-	2	-	2.4	3.7	3.8	4.6	1.0	4
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%				-						-						62% / 0% / 16% / 11% / 11%								
SC% / Sa% / G% / C% / B% / Be%				-						4% / 2% / 49% / 38% / 1% / 6%														
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)				--/5/6/11/15						14 / 36 / 52 / 110 / 170 / - / -														
Reach Shear Stress (Competency) lb/ft ²				-						0.562						-								
Max Part Size (mm) Mobilized at Bankfull				-						947						32								
Stream Power (Transport Capacity) W/m ²				-						-						-								
Additional Reach Parameters																								
Drainage Area (mi ²)				0.05						0.42														
Impervious Cover Estimate (%)				-						-														
Rosgen Classification				G						B4c						B4								
Bankfull Velocity (fps)				-						3.8						-								
Bankfull Discharge (cfs)	10.3			-						28.0						10								
Valley Length (ft)				-						260.0						531								
Channel Thalweg Length (ft)				-						-						550								
Sinuosity				-						1.50						1.0								
Water Surface Slope (ft/ft)				-						-						0.027								
Bankfull Slope (ft/ft)				-						-						0.026								
Bankfull Floodplain Area (acres)				-						-						-								
Proportion Over Wide (%)				-						-						-								
Entrenchment Class (ER Range)				-						-						-								
Incision Class (BHR Range)				-						-						-								
BEHI				20.47						-						-								
Channel Stability or Habitat Metric				-						-						-								
Biological or Other				-						-						-								

- Information unavailable.
Non-Applicable.

**Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Dale Branch 4 (835 feet)**

Parameter	Regional Curve			Pre-Existing Condition							Reference Reach Data						Design			As-Built / Baseline					
Dimension & Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N	
Bankfull Width (ft)	-	-	4.01	5.5	6.0	6.0	6.5	0.7	2	9.8	11.7	-	13.1	-	-	-	6.1	-	6.3	6.4	6.4	6.5	0.14	2	
Floodprone Width (ft)				6.5	7.8	7.8	9.0	1.8	2	16.0	18.0	-	21	-	-	-	-	-	22.0	33.1	33.1	44.2	15.7	2	
Bankfull Mean Depth (ft)	-	-	0.67	0.8	0.8	0.8	0.8	0.0	2	0.5	0.62	-	0.8	-	-	-	0.47	-	0.3	0.4	0.4	0.5	0.14	2	
Bankfull Max Depth (ft)				1.0	1.0	1.0	1.0	0.0	2	0.8	0.9	-	1.2	-	-	-	0.67	-	0.7	0.8	0.8	0.9	0.14	2	
Bankfull Cross Sectional Area (ft ²)			3.9	4.1	4.6	4.6	5.0	0.6	2	5.4	7.3	-	8	-	-	-	2.9	-	1.9	2.5	2.5	3.1	0.85	2	
Width/Depth Ratio				7.3	7.9	7.9	8.4	0.8	2	12.3	18.8	-	19.6	-	-	-	13.0	-	13.8	17.4	17.4	21.0	5.09	2	
Entrenchment Ratio				1.2	1.3	1.3	1.4	0.1	2	1.4	1.5	-	1.8	-	-	-	4.1	-	3.5	5.2	5.2	6.8	2.33	2	
Bank Height Ratio				3.3	3.5	3.5	3.7	0.3	2	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2	
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	
Profile																									
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	7.8	17.8	14.5	68.7	12.3	31	
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	-	0.002	-	0.003	0.018	0.016	0.048	0.009	31
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	1.5	3.2	2.9	12.5	2.1	30	
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	-	1.01	-	0.1	1.4	1.4	2.1	0.3	33
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	-	19.6	-	14.4	26.0	22.2	77.4	13.7	31
Pattern																									
Channel Belt Width (ft)				-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	-	16.7	18.7	18.0	22.2	2.5	4	
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	-	-	-	-	-	9.0	-	14.0	9.3	13.1	13.6	16.4	2.9	6	
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	2.1	2.1	2.6	0.5	2	
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.4	45.9	39.9	62.7	12.5	6	
Meander Width Ratio				-	-	-	-	-	-	1.8	-	-	-	-	-	-	2	-	2.6	2.9	2.8	3.5	0.4	4	
Substrate, Bed and Transport Parameters																									
Ri% / Ru% / P% / G% / S%																									
SC% / Sa% / G% / C% / B% / Be%																									
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)																									
Reach Shear Stress (Competency) lb/ft ²																									
Max Part Size (mm) Mobilized at Bankfull																									
Stream Power (Transport Capacity) W/m ²																									
Additional Reach Parameters																									
Drainage Area (mi ²)																									
Impervious Cover Estimate (%)																									
Rosgen Classification																									
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley Length (ft)																									
Channel Thalweg Length (ft)																									
Sinuosity																									
Water Surface Slope (ft/ft)																									
Bankfull Slope (ft/ft)																									
Bankfull Floodplain Area (acres)																									
Proportion Over Wide (%)																									
Entrenchment Class (ER Range)																									
Incision Class (BHR Range)																									
BEHI																									
Channel Stability or Habitat Metric																									
Biological or Other																									

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

**Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Dale Branch 5 (679 feet)**

Parameter	Regional			Pre-Existing Condition							Reference Reach Data							Design ¹			As-Built / Baseline						
Dimension & Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N			
Bankfull Width (ft)	-	-	4.2	-	8.0	-	-	-	1	9.8	11.7	-	13.1	-	-	-	6.4	-	7.1	7.1	7.1	7.1	-	1			
Floodprone Width (ft)				-	9.0	-	-	-	1	16.0	18.0	-	21	-	-	-	-	-	23.9	23.9	23.9	23.9	-	1			
Bankfull Mean Depth (ft)	-	-	0.7	-	0.8	-	-	-	1	0.5	0.62	-	0.8	-	-	-	0.49	-	0.5	0.5	0.5	0.5	-	1			
Bankfull Max Depth (ft)				-	1.0	-	-	-	1	0.8	0.9	-	1.2	-	-	-	0.69	-	0.7	0.7	0.7	0.7	-	1			
Bankfull Cross Sectional Area (ft ²)			4.2	-	5.0	-	-	-	1	5.4	7.3	-	8	-	-	-	-	-	3.3	3.3	3.3	3.3	-	1			
Width/Depth Ratio				-	12.9	-	-	-	1	12.3	18.8	-	19.6	-	-	-	13.1	-	15.2	15.2	15.2	15.2	-	1			
Entrenchment Ratio				-	1.1	-	-	-	1	1.4	1.5	-	1.8	-	-	-	3.1	-	3.4	3.4	3.4	3.4	-	1			
Bank Height Ratio				-	2.6	-	-	-	1	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	-	1			
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-			
Profile																											
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	7.2	18.3	20.3	25.1	6.0	11			
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.002	-	0.005	0.022	0.024	0.044	0.011	11			
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	1.8	3.0	3.1	4.0	0.7	12			
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	1.04	-	1.1	1.5	1.4	2.2	0.4	11			
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	29.9	-	12.1	26.4	28.4	35.2	6.8	11			
Pattern																											
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	13.2	15.3	15.6	17.1	1.9	3			
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	7.0	-	12.0	8.7	14.1	15.6	16.7	3.6	4			
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	2.0	2.2	2.4	0.5	2			
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.9	56.4	54.8	67.7	7.2	6			
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	2	-	1.9	2.2	2.2	2.4	0.3	3			
Substrate, Bed and Transport Parameters																											
Ri% / Ru% / P% / G% / S%																											
SC% / Sa% / G% / C% / B% / Be%																											
d16 / d35 / d50 / d84 / d95 / d ₉₅ ^P / d ₉₅ ⁹⁰ (mm)																											
Reach Shear Stress (Competency) lb/ft ²																											
Max Part Size (mm) Mobilized at Bankfull																											
Stream Power (Transport Capacity) W/m ²																											
Additional Reach Parameters																											
Drainage Area (mi ²)																											
Impervious Cover Estimate (%)																											
Rosgen Classification																											
Bankfull Velocity (fps)																											
Bankfull Discharge (cfs)																											
Valley Length (ft)																											
Channel Thalweg Length (ft)																											
Sinuosity																											
Water Surface Slope (ft/ft)																											
Bankfull Slope (ft/ft)																											
Bankfull Floodplain Area (acres)																											
Proportion Over Wide (%)																											
Entrenchment Class (ER Range)																											
Incision Class (BHR Range)																											
BEHI																											
Channel Stability or Habitat Metric																											
Biological or Other																											

¹Values taken from Subreach 5b

- Information unavailable.

Non-Applicable.

Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Jerry Branch 1 (430 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline						
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N	
Dimension & Substrate - Riffle																									
Bankfull Width (ft)	-	-	3.79	3.5	5.3	5.3	7.0	2.5	2	9.8	11.7	-	13.1	-	-	-	7.9	-	8.1	8.1	8.1	8.1	-	-	1
Floodprone Width (ft)				3.3	6.2	6.2	9.0	4.0	2	16.0	18.0	-	21	-	-	-	-	-	31.8	31.8	31.8	31.8	-	-	1
Bankfull Mean Depth (ft)	-	-	0.64	0.6	0.6	0.6	0.6	0.0	2	0.5	0.62	-	0.8	-	-	-	0.42	-	0.5	0.5	0.5	0.5	-	-	1
Bankfull Max Depth (ft)				0.7	0.8	0.8	0.9	0.1	2	0.8	0.9	-	1.2	-	-	-	0.65	-	1.0	1.0	1.0	1.0	-	-	1
Bankfull Cross Sectional Area (ft ²)			3.5	2.0	2.9	2.9	3.8	1.3	2	5.4	7.3	-	8	-	-	-	3.3	-	3.7	3.7	3.7	3.7	-	-	1
Width/Depth Ratio				6.0	9.4	9.4	12.8	4.8	2	12.3	18.8	-	19.6	-	-	-	18.6	-	17.7	17.7	17.7	17.7	-	-	1
Entrenchment Ratio				0.5	1.6	1.6	2.6	1.5	2	1.4	1.5	-	1.8	-	-	-	2.5	-	3.9	3.9	3.9	3.9	-	-	1
Bank Height Ratio				2.4	7.7	7.7	12.9	7.4	2	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	-	-	1
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profile																									
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	2.6	6.2	6.2	16.4	2.8	26	
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.003	-	0.001	0.010	0.009	0.026	0.008	26	
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	2.3	5.9	5.4	16.0	2.9	26	
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	0.97	-	0.7	1.5	1.5	2.3	0.4	26	
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	22.5	-	6.1	15.0	14.2	27.8	5.1	25	
Pattern																									
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	14.0	19.2	19.2	24.4	7.3	2	
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	12.0	-	17.0	11.6	13.6	13.1	16.5	2.2	4	
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	1.7	1.6	2.0	0.3	2	
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.8	44.4	47.1	55.0	11.9	6	
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	2	-	1.7	2.4	2.4	3.0	0.9	2	
Substrate, Bed and Transport Parameters																									
Ri%/ Ru%/ P%/ G%/ S%																									42% / 0% / 40% / 7% / 11%
SC% / Sa% / G% / C% / B% / Be%																									
d16 / d35 / d50 / d84 / d95 / d _p / d ₉₀ (mm)																									
Reach Shear Stress (Competency) lb/ft ²																									
Max Part Size (mm) Mobilized at Bankfull																									
Stream Power (Transport Capacity) W/m ²																									
Additional Reach Parameters																									
Drainage Area (mi ²)																									
Impervious Cover Estimate (%)																									
Rosgen Classification																									
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)			13.12																						
Valley Length (ft)																									
Channel Thalweg Length (ft)																									
Sinuosity																									
Water Surface Slope (ft/ft)																									
Bankfull Slope (ft/ft)																									
Bankfull Floodplain Area (acres)																									
Proportion Over Wide (%)																									
Entrenchment Class (ER Range)																									
Incision Class (BHR Range)																									
BEHI																									
Channel Stability or Habitat Metric																									
Biological or Other																									

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Jerry Branch 2 (625 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline					
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N
Dimension & Substrate - Riffle																								
Bankfull Width (ft)	-	-	4.78	3.5	6.0	6.6	8.0	2.3	3	9.8	11.7	-	13.1	-	-	-	7.1	-	7.1	7.1	7.1	7.1	-	1
Floodprone Width (ft)				2.5	10.8	15.0	15.0	7.2	2	16.0	18.0	-	21	-	-	-	-	-	16.0	16.0	16.0	16.0	-	1
Bankfull Mean Depth (ft)	-	-	0.76	0.4	0.6	0.7	0.8	0.2	3	0.5	0.62	-	0.8	-	-	-	0.53	-	0.4	0.4	0.4	0.4	-	1
Bankfull Max Depth (ft)				0.5	0.7	0.8	1.0	0.2	3	0.8	0.9	-	1.2	-	-	-	0.75	-	0.7	0.7	0.7	0.7	-	1
Bankfull Cross Sectional Area (ft ²)			5.1	2.4	2.7	2.7	3.0	0.3	3	5.4	7.3	-	8	-	-	-	3.7	-	3.1	3.1	3.1	3.1	-	1
Width/Depth Ratio				4.6	15.2	14.6	26.3	10.9	3	12.3	18.8	-	19.6	-	-	-	13.4	-	16.4	16.4	16.4	16.4	-	1
Entrenchment Ratio				0.7	1.6	1.9	2.3	0.8	3	1.4	1.5	-	1.8	-	-	-	3.5	-	2.3	2.3	2.3	2.3	-	1
Bank Height Ratio				1.0	3.5	1.5	7.9	3.8	3	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	-	1
d50 (mm)				-	-	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	3.1	9.0	8.7	26.5	4.5	29
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.002	-	0.005	0.019	0.018	0.042	0.010	29
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	2.3	4.8	4.7	7.8	1.5	31
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	1.13	-	0.9	1.5	1.5	2.2	0.3	29
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	21.7	-	12.0	18.0	16.8	36.2	5.1	30
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	13.4	20.3	22.4	25.6	5.1	6
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	11.0	-	17.0	12.1	13.4	12.7	16.5	1.8	5
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	1.9	1.8	2.3	0.2	2
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.5	30.0	30.6	38.1	6.6	6
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	2	-	1.9	2.9	3.2	3.6	0.7	6
Substrate, Bed and Transport Parameters																								
Ri% / Ru% / P% / G% / S%																								47% / 0% / 27% / 12% / 14 %
SC% / Sa% / G% / C% / B% / Be%																								
d16 / d35 / d50 / d84 / d95 / d _p / d ₉₀ (mm)																								--/5/6/13/22
Reach Shear Stress (Competency) lb/ft ²																								0.562
Max Part Size (mm) Mobilized at Bankfull																								947
Stream Power (Transport Capacity) W/m ²																								32
Additional Reach Parameters																								
Drainage Area (mi ²)																								0.42
Impervious Cover Estimate (%)																								-
Rosgen Classification																								B4c
Bankfull Velocity (fps)																								3.8
Bankfull Discharge (cfs)																								19
Valley Length (ft)																								260.0
Channel Thalweg Length (ft)																								485
Sinuosity																								625
Water Surface Slope (ft/ft)																								1.29
Bankfull Slope (ft/ft)																								0.024
Bankfull Floodplain Area (acres)																								0.024
Proportion Over Wide (%)																								-
Entrenchment Class (ER Range)																								-
Incision Class (BHR Range)																								-
BEHI																								26.67
Channel Stability or Habitat Metric																								-
Biological or Other																								-

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

**Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Jerry Branch 3 (636 feet)**

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline						
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N	
Dimension & Substrate - Riffle																									
Bankfull Width (ft)	-	-	4.95	-	4.0	-	-	-	1	9.8	11.7	-	13.1	-	-	-	7.3	-	7.2	7.3	7.3	7.4	0.141	2	
Floodprone Width (ft)				-	6.5	-	-	-	1	16.0	18.0	-	21	-	-	-	-	-	24.7	29.3	29.3	33.8	6.435	2	
Bankfull Mean Depth (ft)	-	-	0.78	-	0.9	-	-	-	1	0.5	0.62	-	0.8	-	-	-	0.54	-	0.4	0.4	0.4	0.4	0	2	
Bankfull Max Depth (ft)				-	1.1	-	-	-	1	0.8	0.9	-	1.2	-	-	-	0.77	-	0.8	0.9	0.9	0.9	0.071	2	
Bankfull Cross Sectional Area (ft ²)			5.4	-	3.3	-	-	-	1	5.4	7.3	-	8	-	-	-	4.0	-	3.0	3.2	3.2	3.3	0.212	2	
Width/Depth Ratio				-	4.8	-	-	-	1	12.3	18.8	-	19.6	-	-	-	13.5	-	16.6	17.2	17.2	17.7	0.778	2	
Entrenchment Ratio				-	1.6	-	-	-	1	1.4	1.5	-	1.8	-	-	-	3.4	-	3.4	4.0	4.0	4.6	0.849	2	
Bank Height Ratio				-	2.9	-	-	-	1	0.9	1	-	1.4	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2	
d50 (mm)				-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	
Profile																									
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	-	3.1	9.0	8.7	26.5	4.5	29	
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.002	-	0.005	0.019	0.018	0.042	0.010	29	
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	-	2.3	4.8	4.7	7.8	1.5	31	
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	1.15	-	0.9	1.5	1.5	2.2	0.3	29	
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	23.9	-	12.0	18.0	16.8	36.2	5.1	30	
Pattern																									
Channel Belt Width (ft)				-	-	-	-	-	-	-	21.0	-	-	-	-	-	-	-	20.0	24.2	26.0	26.5	3.6	3	
Radius of Curvature (ft)				-	-	-	-	-	-	-	18.0	-	-	-	-	12.0	-	17.0	9.2	12.1	10.6	17.0	2.8	7	
Re: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	1.7	1.5	2.3	0.4	1	
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.1	43.9	44.8	54.4	8.1	6	
Meander Width Ratio				-	-	-	-	-	-	-	1.8	-	-	-	-	-	2	-	2.7	3.3	3.6	3.6	0.5	3	
Substrate, Bed and Transport Parameters																									
Ri% / Ru% / P% / G% / S%																								60% / 0% / 21% / 10% / 9%	
SC% / Sa% / G% / C% / B% / Be%																									4% / 2% / 49% / 38% / 1% / 6%
d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)																									--/5/6/13/22
Reach Shear Stress (Competency) lb/ft ²																									0.562
Max Part Size (mm) Mobilized at Bankfull																									947
Stream Power (Transport Capacity) W/m ²																									32
Additional Reach Parameters																									
Drainage Area (mi ²)																									0.42
Impervious Cover Estimate (%)																									-
Rosgen Classification																									G
Bankfull Velocity (fps)																									3.8
Bankfull Discharge (cfs)																									20.49
Valley Length (ft)																									260.0
Channel Thalweg Length (ft)																									624
Sinuosity																									1.50
Water Surface Slope (ft/ft)																									1.00
Bankfull Slope (ft/ft)																									0.0240
Bankfull Floodplain Area (acres)																									0.0235
Proportion Over Wide (%)																									-
Entrenchment Class (ER Range)																									-
Incision Class (BHR Range)																									-
BEHI																									21.4
Channel Stability or Habitat Metric																									-
Biological or Other																									-

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 5 cont'd. Baseline Stream Data Summary
Pee Dee / Project No. 95350 - Hudson Branch (59 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			As-Built / Baseline ¹							
	LL	UL	Eq.	Min	Mean	Med	Max	SD	N	Min	Mean	Med	Max	SD	N	Min	Mean	Max	Min	Mean	Med	Max	SD	N		
Dimension & Substrate - Riffle																										
Bankfull Width (ft)	-	-	2.63	-	4.5	-	-	-	1	9.8	11.7	-	13.1	-	-	-	7.3	-								
Floodprone Width (ft)				-	8.0	-	-	-	1	16.0	18.0	-	21	-	-	-	-									
Bankfull Mean Depth (ft)	-	-	0.49	-	0.5	-	-	-	1	0.5	0.62	-	0.8	-	-	-	0.34	-								
Bankfull Max Depth (ft)				-	0.7	-	-	-	1	0.8	0.9	-	1.2	-	-	-	0.52	-								
Bankfull Cross Sectional Area (ft ²)			2.0	-	2.1	-	-	-	1	5.4	7.3	-	8	-	-	-	2.1	-								
Width/Depth Ratio				-	9.5	-	-	-	1	12.3	18.8	-	19.6	-	-	-	18.7	-								
Entrenchment Ratio				-	1.8	-	-	-	1	1.4	1.5	-	1.8	-	-	-	4.8	-								
Bank Height Ratio				-	3.6	-	-	-	1	0.9	1	-	1.4	-	-	-	-	-								
d50 (mm)				-	-	-	-	-	-		52	-	-	-	-	-	-	-								
Profile																										
Riffle Length (ft)				-	-	-	-	-	-	4.0	14.0	-	30.0	-	-	-	-	8.89	10.2	10.2	11.5	1.86	2			
Riffle Slope (ft/ft)				-	-	-	-	-	-	0.017	0.027	-	0.059	-	-	-	0.003	0.017	0.017	0.017	0.018	0.001	2			
Pool Length (ft)				-	-	-	-	-	-	7.0	13.0	-	30.0	-	-	-	-	5.4	7.33	7.1	9.51	2.07	3			
Pool Max Depth (ft)				-	-	-	-	-	-	1.8	1.9	-	2.7	-	-	-	0.77	1.37	1.77	1.82	2.14	0.39	3			
Pool Spacing (ft)				-	-	-	-	-	-	18.0	39.0	-	53.0	-	-	-	15.9	11.5	16.6	16.6	21.8	7.26	2			
Pattern																										
Channel Belt Width (ft)				-	-	-	-	-	-	21.0	-	-	-	-	-	-	10.2	10.2	10.2	10.2	-	-	1			
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	-	-	-	-	9.0	-	14.0	-	-	-	-	-	-			
Rc: Bankfull Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Meander Wavelength (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Meander Width Ratio				-	-	-	-	-	-	1.8	-	-	-	-	-	2	-	1.4	1.4	1.4	1.4	-	1			
Substrate, Bed and Transport Parameters																										
Ri% / Ru% / P% / G% / S%																										
SC% / Sa% / G% / C% / B% / Be%																										
d16 / d35 / d50 / d84 / d95 / d _p / d ₉₀ (mm)																										
Reach Shear Stress (Competency) lb/ft ²																										
Max Part Size (mm) Mobilized at Bankfull																										
Stream Power (Transport Capacity) W/m ²																										
Additional Reach Parameters																										
Drainage Area (mi ²)																										
Impervious Cover Estimate (%)																										
Rosgen Classification																										
Bankfull Velocity (fps)																										
Bankfull Discharge (cfs)																										
Valley Length (ft)																										
Channel Thalweg Length (ft)																										
Sinuosity																										
Water Surface Slope (ft/ft)																										
Bankfull Slope (ft/ft)																										
Bankfull Floodplain Area (acres)																										
Proportion Over Wide (%)																										
Entrenchment Class (ER Range)																										
Incision Class (BHR Range)																										
BEHI																										
Channel Stability or Habitat Metric																										
Biological or Other																										

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

¹This reach limited to visual assessment since it is less than 500 feet

Table 6. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Jerry Branch																									
	Reach 1 Cross-Section 1 Pool						Reach 1 Cross-Section 2 Riffle						Reach 2 Cross-Section 3 Pool						Reach 2 Cross-Section 4 Riffle						
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	
Record Elevation (datum) Used	320.1						319.6						312.9						310.6						
Bankfull Width (ft)	9.1						8.1						7.8						7.1						
Floodprone Width (ft)	>25						>30						>30						>25						
Bankfull Mean Depth (ft)	0.9						0.5						1.1						0.4						
Bankfull Max Depth (ft)	1.7						1.0						2.3						0.7						
Bankfull Cross Sectional Area (ft ²)	8.5						3.7						8.3						3.1						
Bankfull Width/Depth Ratio	9.8						17.7						7.4						16.4						
Bankfull Entrenchment Ratio	>2.5						>3.9						>3.6						>2.3						
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0						
Cross Sectional Area between End Pins (ft ²)	24.1						12.7						32.1						24.8						
d50 (mm)	N/A						N/A						N/A						N/A						

Table 6 cont'd. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Jerry Branch																			
	Reach 3 Cross-Section 5 Pool						Reach 3 Cross-Section 6 Riffle						Reach 3 Cross-Section 7 Riffle						
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	
Record Elevation (datum) Used	301.7						298.8						290.2						
Bankfull Width (ft)	8.1						7.4						7.2						
Floodprone Width (ft)	>25						>30						>25						
Bankfull Mean Depth (ft)	1.0						0.4						0.4						
Bankfull Max Depth (ft)	1.8						0.9						0.8						
Bankfull Cross Sectional Area (ft ²)	7.9						3.3						3.0						
Bankfull Width/Depth Ratio	8.3						16.6						17.7						
Bankfull Entrenchment Ratio	>2.1						>4.6						>3.4						
Bankfull Bank Height Ratio	1.0						1.0						1.0						
Cross Sectional Area between End Pins (ft ²)	18.6						40.4						24.6						
d50 (mm)	N/A						N/A						N/A						

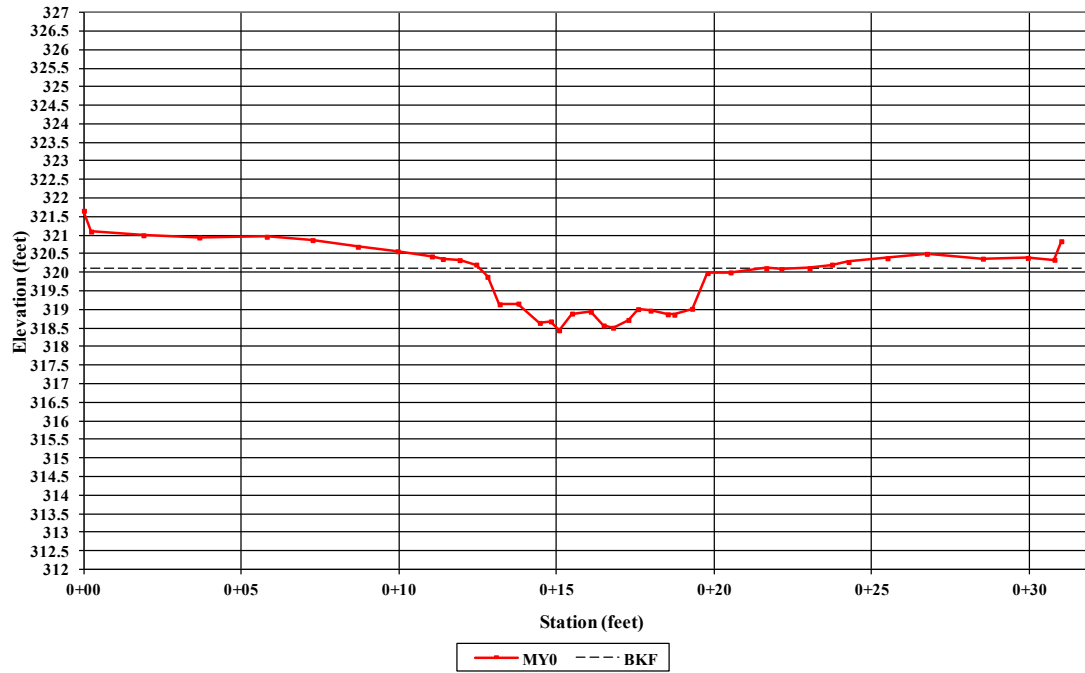
Table 6 cont'd. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Dale Branch																									
	Reach 2 Cross-Section 8 Riffle						Reach 2 Cross-Section 9 Pool						Reach 2 Cross-Section 10 Riffle						Reach 2 Cross-Section 11 Pool						
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	
Record Elevation (datum) Used	354.9						354.7						348.1						347.4						
Bankfull Width (ft)	7.0						7.7						6.4						7.6						
Floodprone Width (ft)	>25						>25						>25						>20						
Bankfull Mean Depth (ft)	0.3						0.6						0.3						0.8						
Bankfull Max Depth (ft)	0.7						1.7						0.5						1.6						
Bankfull Cross Sectional Area (ft ²)	2.0						4.8						1.8						6.1						
Bankfull Width/Depth Ratio	24.6						12.3						22.6						9.5						
Bankfull Entrenchment Ratio	>3.4						>2.7						>2.4						>2.2						
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0						
Cross Sectional Area between End Pins (ft ²)	30.9						28.2						26.0						40.8						
d50 (mm)	N/A						N/A						N/A						N/A						

Table 6 cont'd. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Dale Branch																									
	Reach 3 Cross-Section 12 Riffle						Reach 3 Cross-Section 13 Pool						Reach 4 Cross-Section 14 Pool						Reach 4 Cross-Section 15 Riffle						
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	
Record Elevation (datum) Used	327.8						326.1						315.3						314.1						
Bankfull Width (ft)	7.3						7.8						6.7						6.5						
Floodprone Width (ft)	>20						>20						>30						>40						
Bankfull Mean Depth (ft)	0.3						0.5						0.9						0.5						
Bankfull Max Depth (ft)	0.7						1.3						2.0						0.9						
Bankfull Cross Sectional Area (ft ²)	2.5						3.9						6.2						3.1						
Bankfull Width/Depth Ratio	21.1						15.7						7.1						13.8						
Bankfull Entrenchment Ratio	>2.5						>2.2						>4.7						>6.8						
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0						
Cross Sectional Area between End Pins (ft ²)	39.1						31.9						64.9						17.0						
d50 (mm)	N/A						N/A						N/A						N/A						

Table 6 cont'd. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Dale Branch																		
Dimension	Reach 4 Cross-Section 16 Riffle						Reach 5 Cross-Section 17 Riffle						Reach 5 Cross-Section 18 Pool					
	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Record Elevation (datum) Used	303.5						286.8						286.6					
Bankfull Width (ft)	6.3						7.1						7.2					
Floodprone Width (ft)	>25						>25						>25					
Bankfull Mean Depth (ft)	0.3						0.5						0.8					
Bankfull Max Depth (ft)	0.7						0.7						1.7					
Bankfull Cross Sectional Area (ft ²)	1.9						3.3						5.9					
Bankfull Width/Depth Ratio	21.0						15.2						8.7					
Bankfull Entrenchment Ratio	>3.5						>3.4						>3.1					
Bankfull Bank Height Ratio	1.0						1.0						1.0					
Cross Sectional Area between End Pins (ft ²)	19.6						20.0						24.0					
d50 (mm)	N/A						N/A						N/A					

Table 6 cont'd. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Sections) Pee Dee Stream Restoration Site / Project No. 95350 - Thompson Branch																								
Dimension	Reach 2 Cross-Section 19 Pool						Reach 2 Cross-Section 20 Riffle						Reach 2 Cross-Section 21 Pool						Reach 2 Cross-Section 22 Riffle					
	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Record Elevation (datum) Used	364.1						363.2						356.0						356.0					
Bankfull Width (ft)	8.4						7.5						8.6						7.6					
Floodprone Width (ft)	>30						>30						>30						>30					
Bankfull Mean Depth (ft)	1.0						0.6						1.0						0.6					
Bankfull Max Depth (ft)	2.1						1.2						2.3						1.1					
Bankfull Cross Sectional Area (ft ²)	8.8						4.2						8.5						4.3					
Bankfull Width/Depth Ratio	8.0						13.3						8.7						13.4					
Bankfull Entrenchment Ratio	>4						>4.1						>3.2						>4.5					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					
Cross Sectional Area between End Pins (ft ²)	54.2						35.5						28.2						31.5					
d50 (mm)	N/A						N/A						N/A						N/A					

Pee Dee - Jerry Branch
 Cross Section 1 - Pool
 Station 304+26



Left Descending Bank



Right Descending Bank

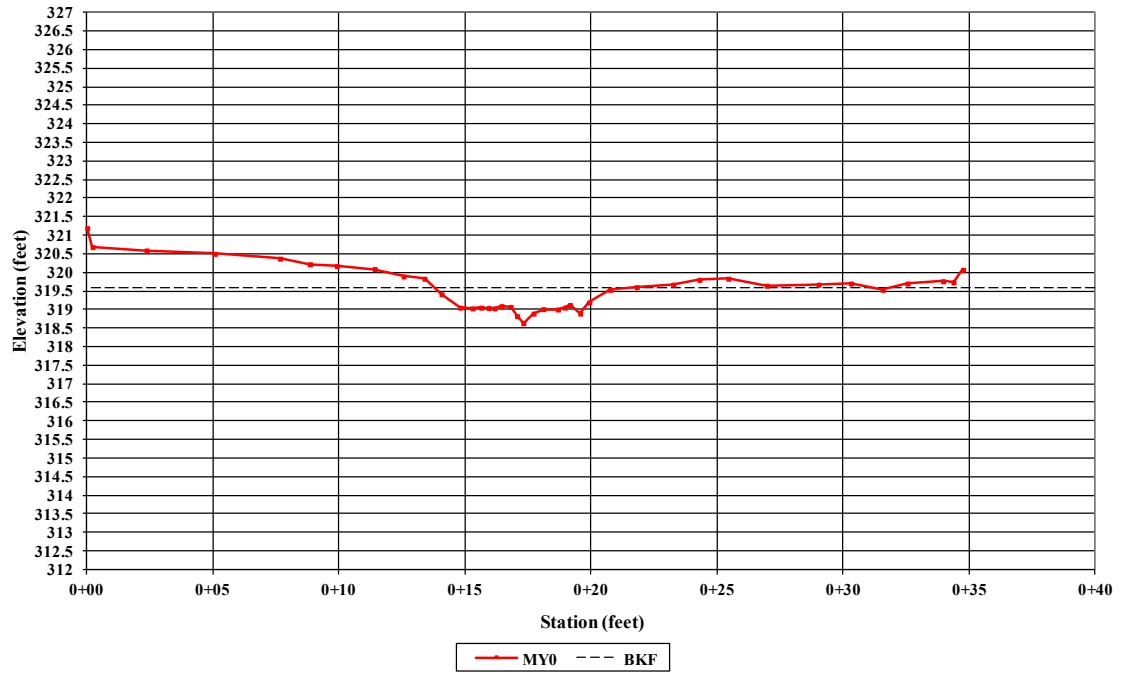


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 2 - Riffle
 Station 304+47



Left Descending Bank



Right Descending Bank

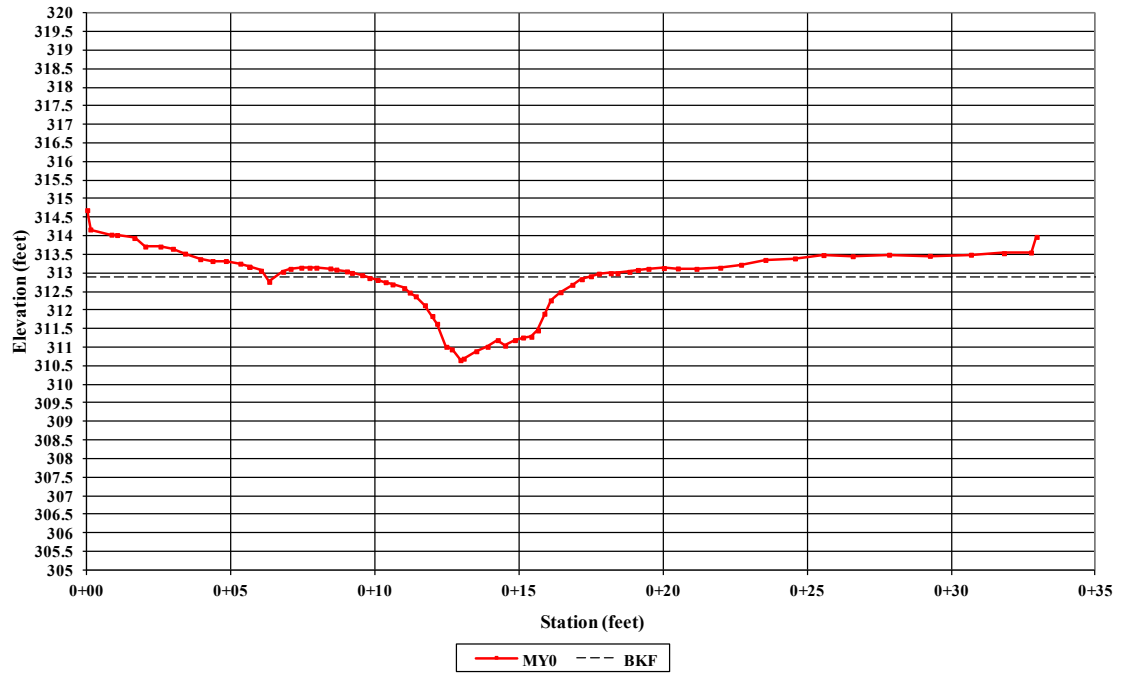


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 3 - Pool
 Station 306+91



Left Descending Bank



Right Descending Bank

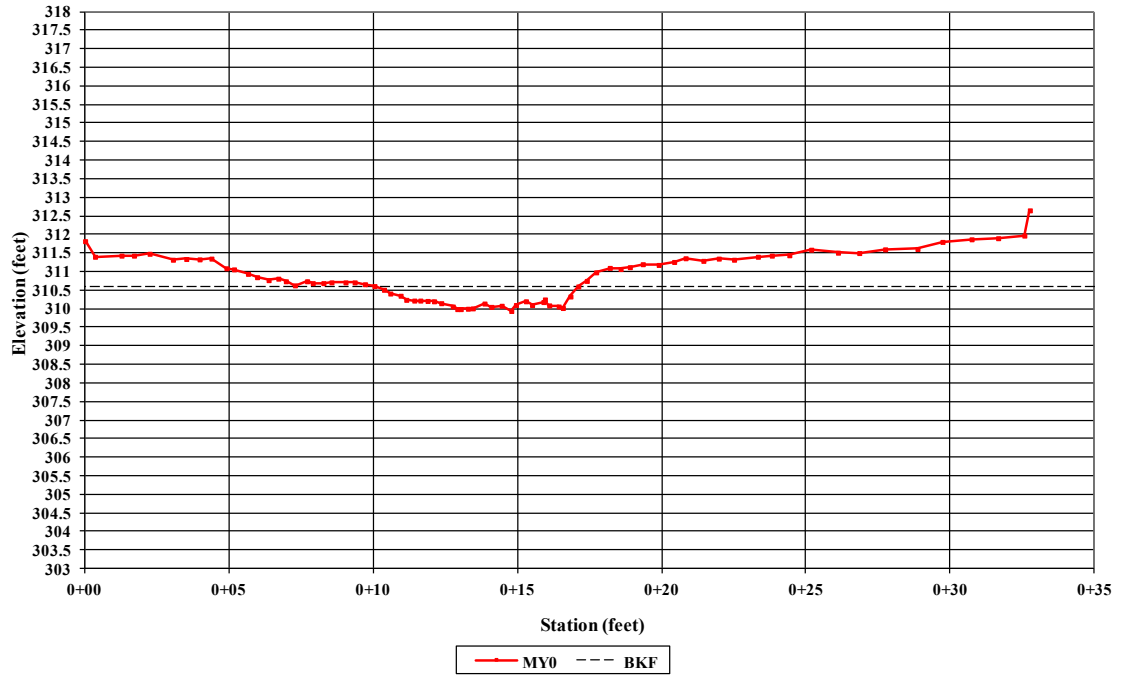


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 4 - Riffle
 Station 307+69



Left Descending Bank



Right Descending Bank

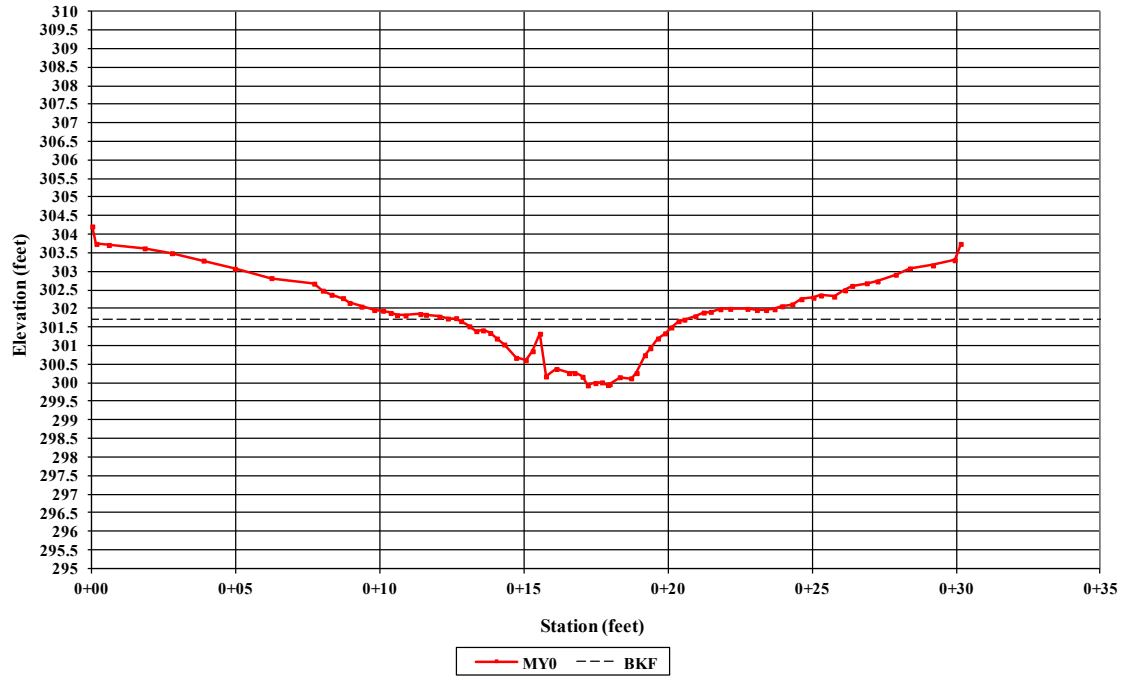


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 5 - Pool
 Station 311+52



Left Descending Bank



Right Descending Bank

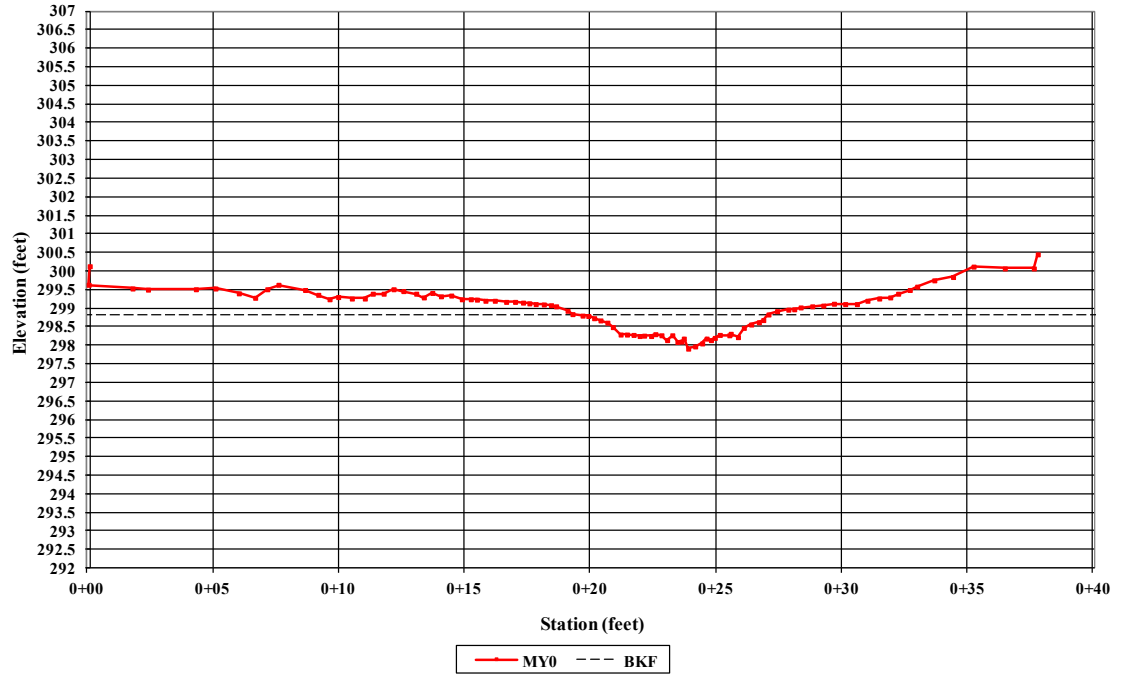


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 6 - Riffle
 Station 312+60



Left Descending Bank



Right Descending Bank

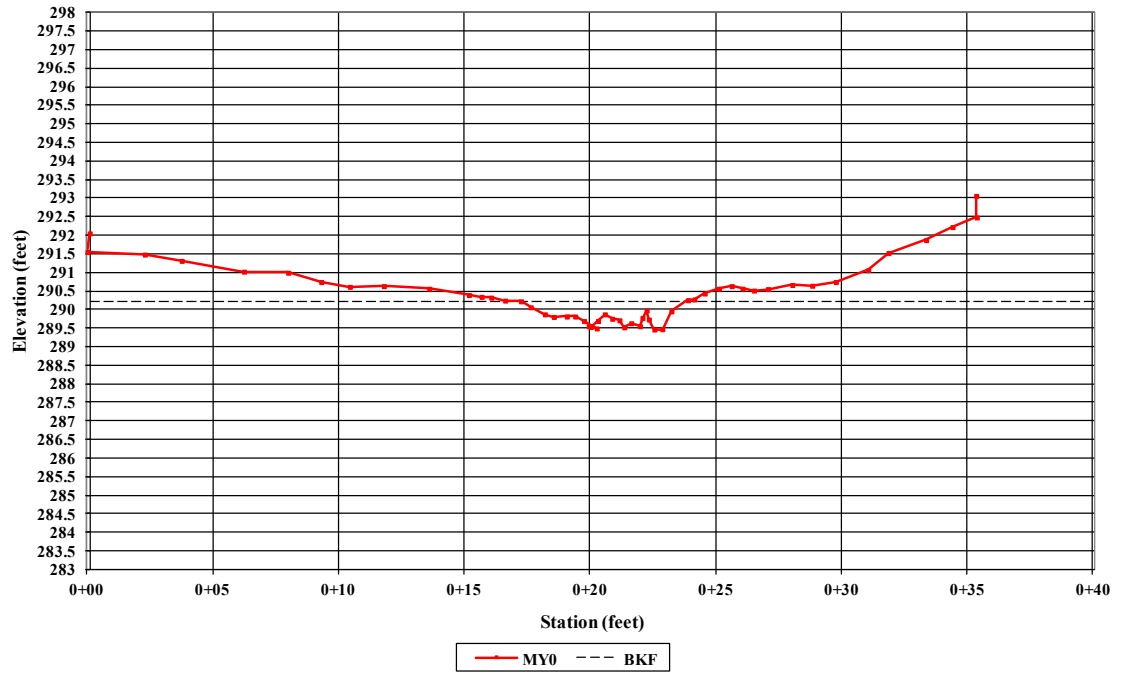


Upstream



Downstream

Pee Dee - Jerry Branch
 Cross Section 7 - Riffle
 Station 315+86



Left Descending Bank



Right Descending Bank

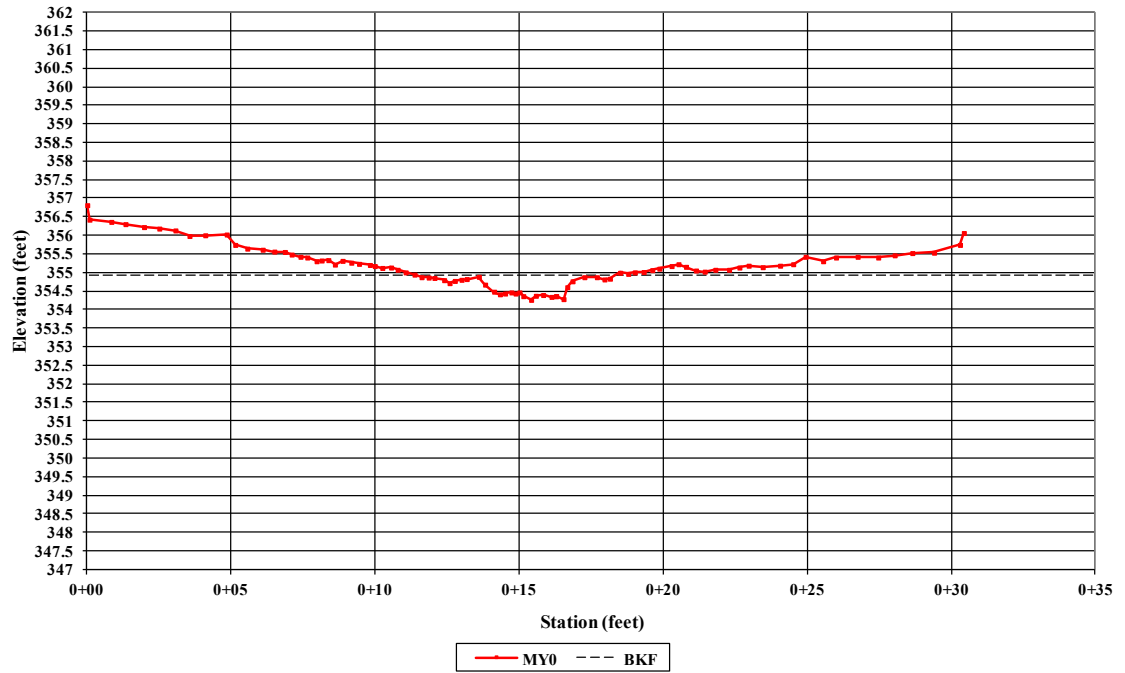


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 8 - Riffle
 Station 208+33



Left Descending Bank



Right Descending Bank

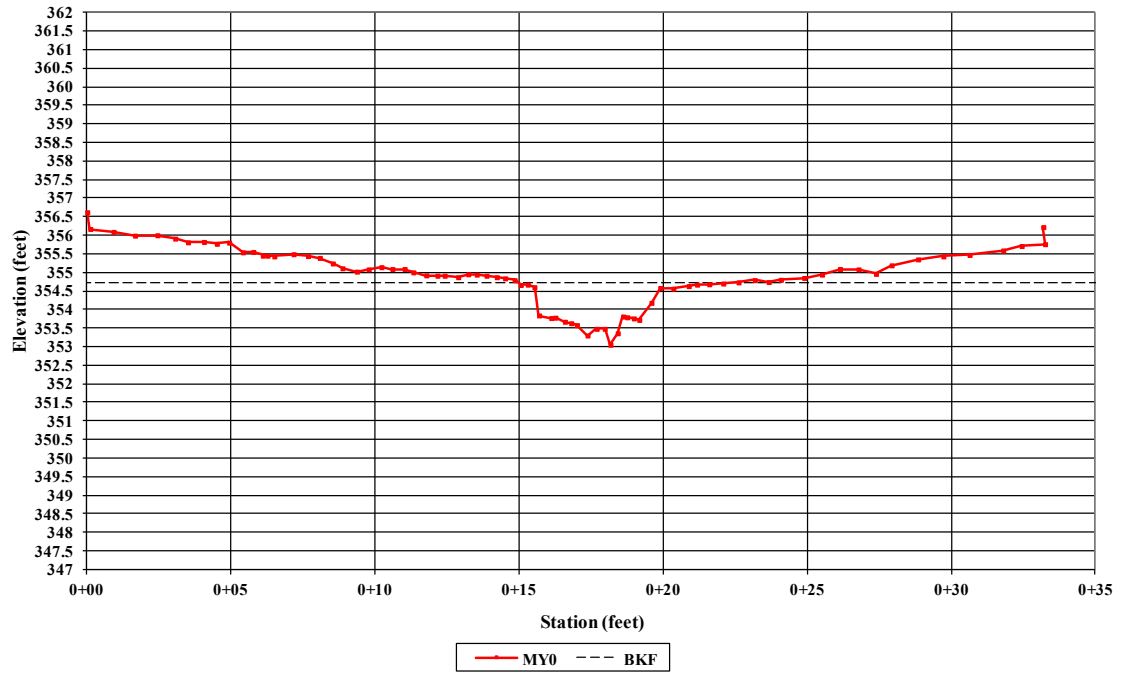


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 9 - Pool
 Station 208+42



Left Descending Bank



Right Descending Bank

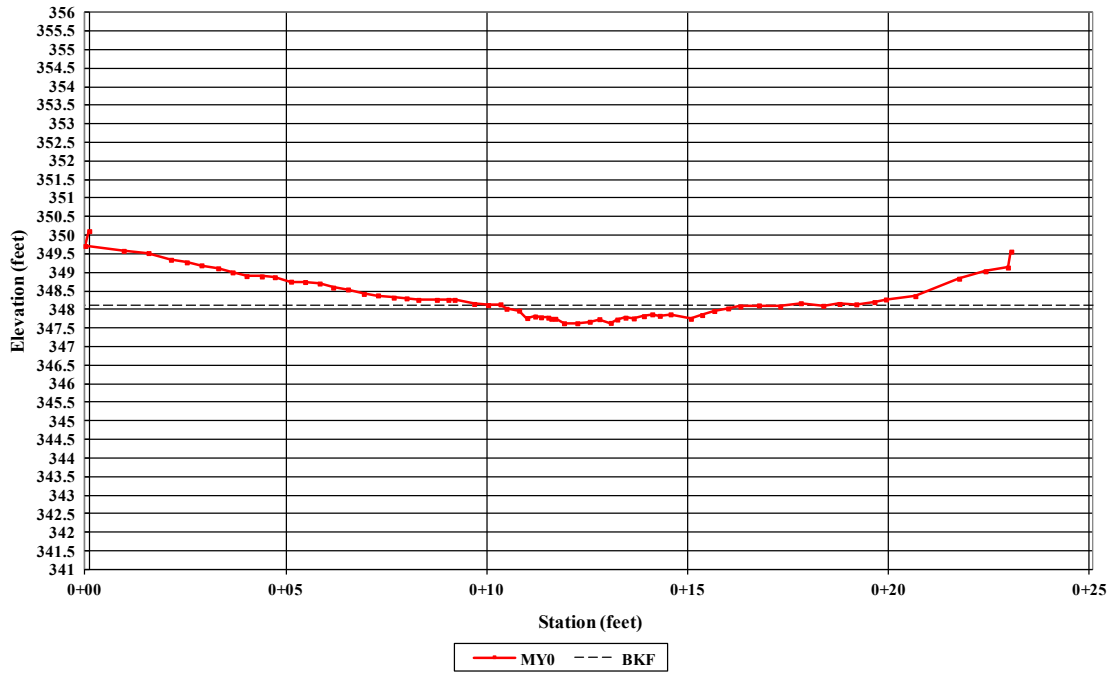


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 10 - Riffle
 Station 210+09



Left Descending Bank



Right Descending Bank

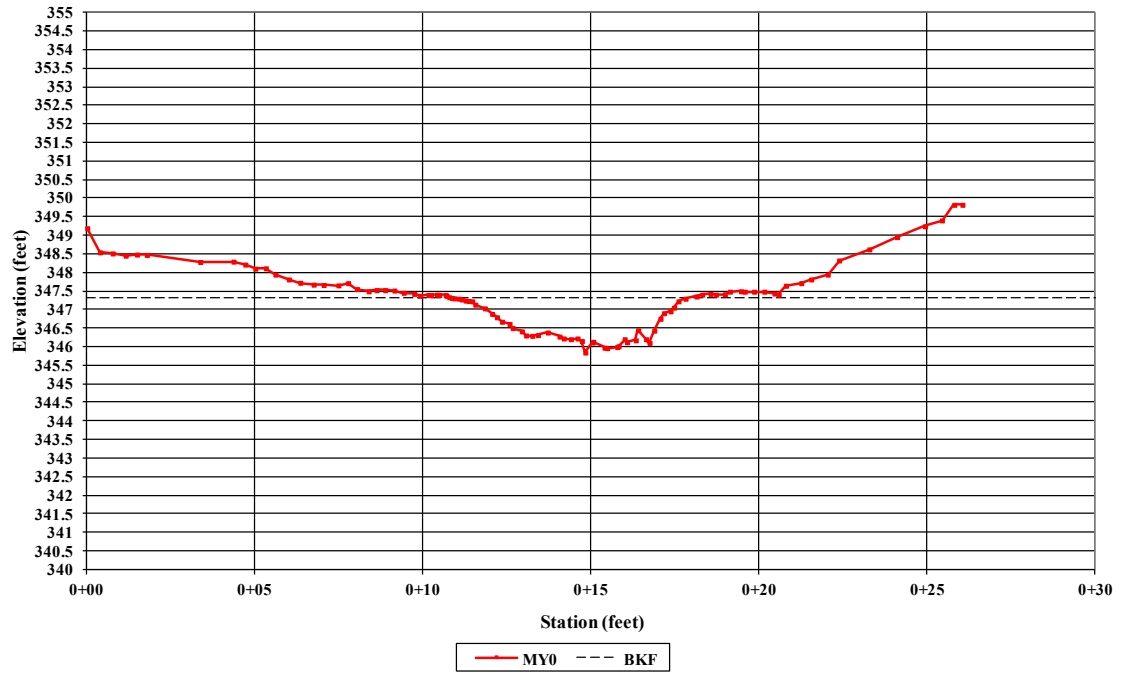


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 11 - Pool
 Station 210+42



Left Descending Bank



Right Descending Bank

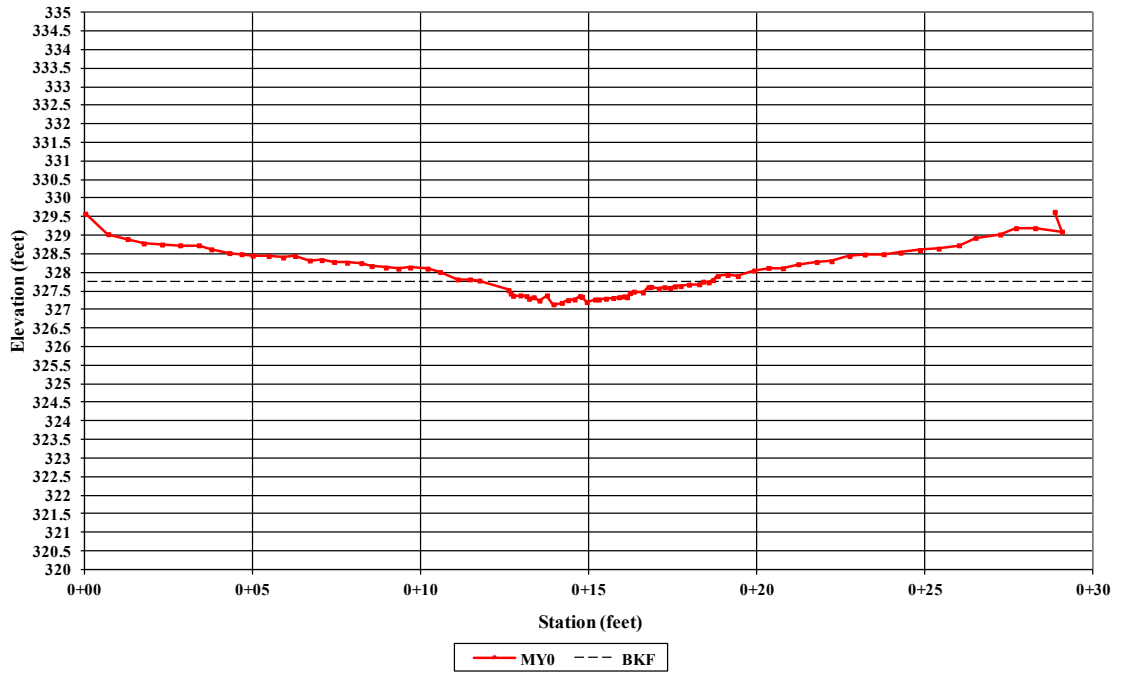


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 12 - Riffle
 Station 217+76



Left Descending Bank



Right Descending Bank

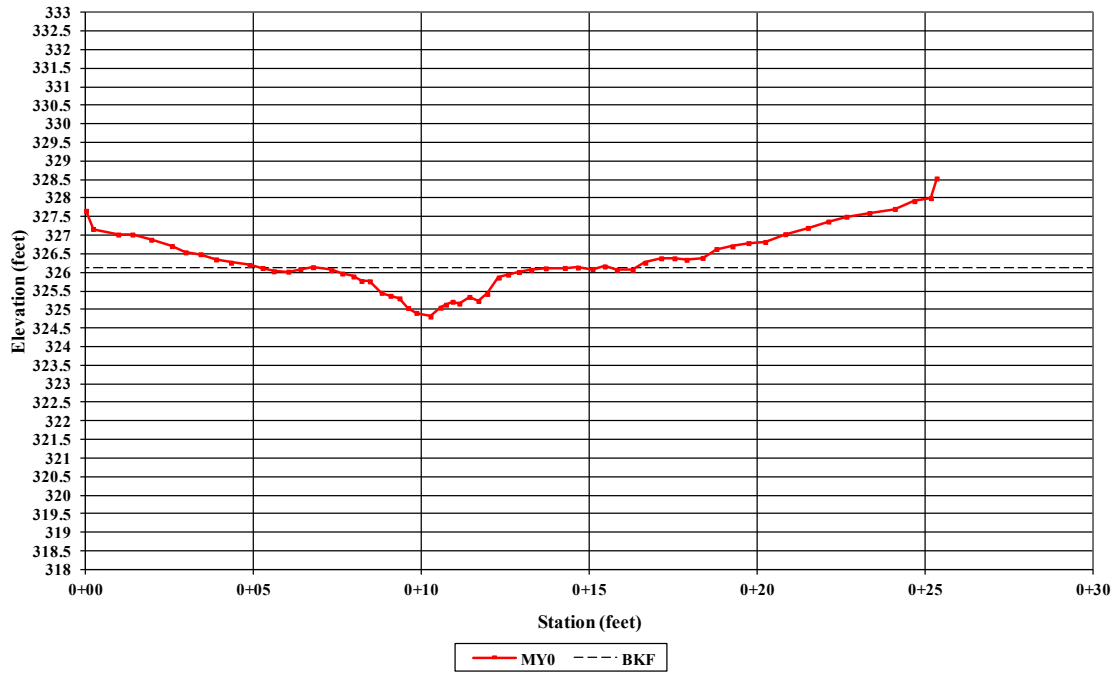


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 13 - Pool
 Station 218+20



Left Descending Bank



Right Descending Bank

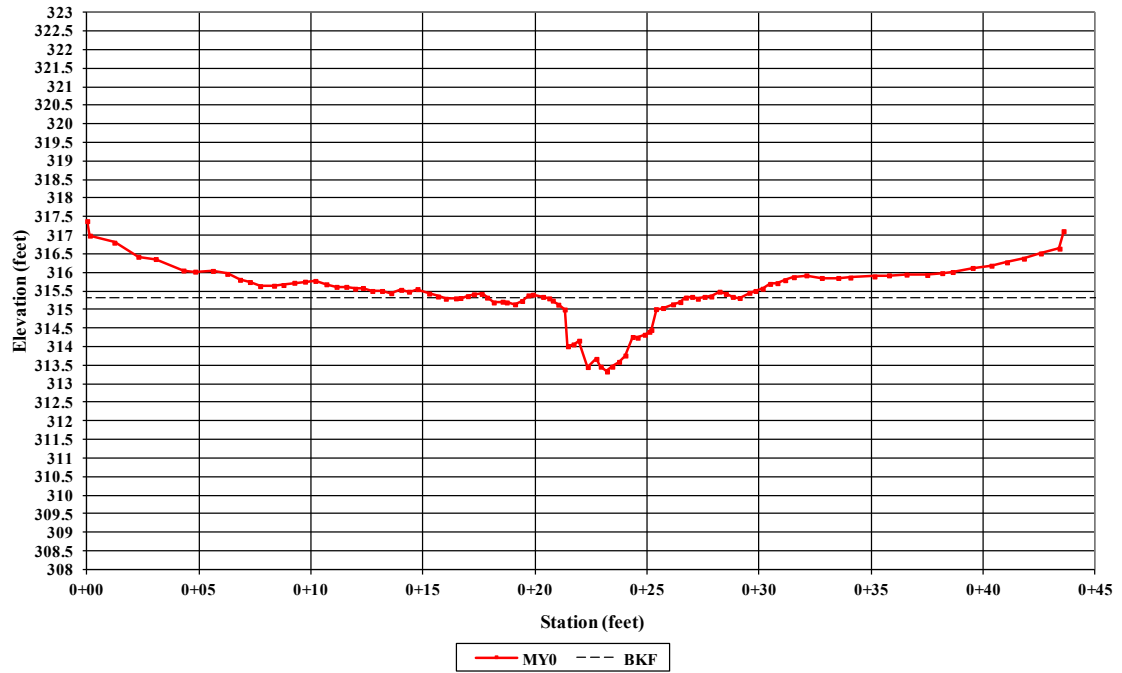


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 14 - Pool
 Station 223+32



Left Descending Bank



Right Descending Bank

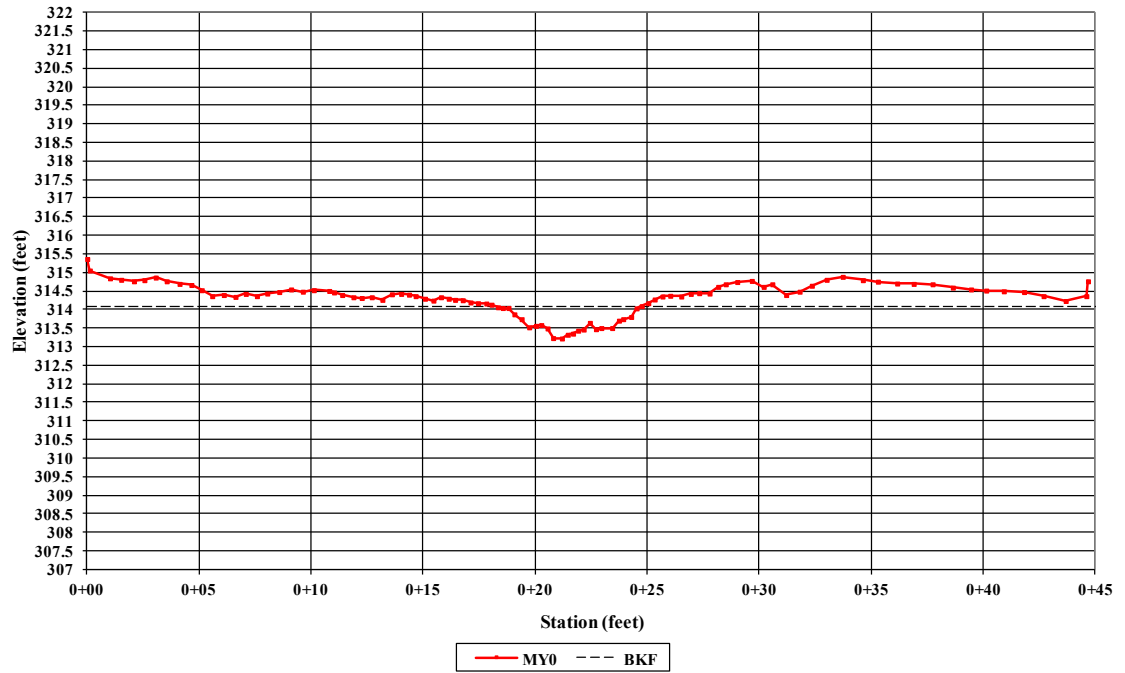


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 15 - Riffle
 Station 223+72



Left Descending Bank



Right Descending Bank

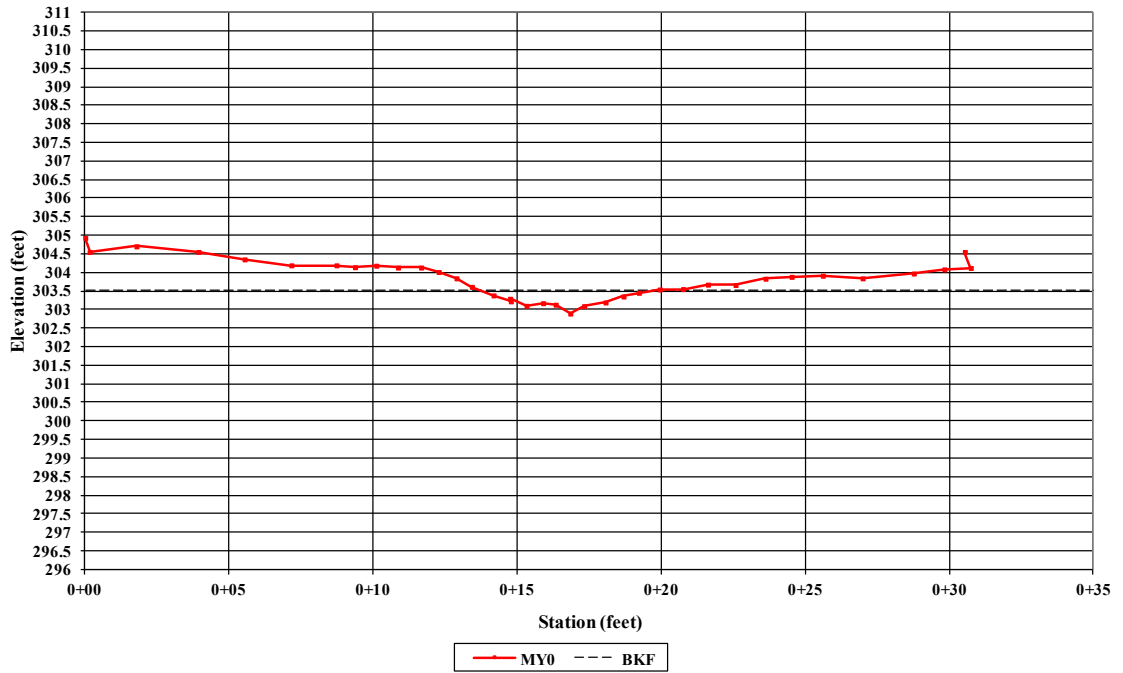


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 16 - Riffle
 Station 227+39



Left Descending Bank



Right Descending Bank

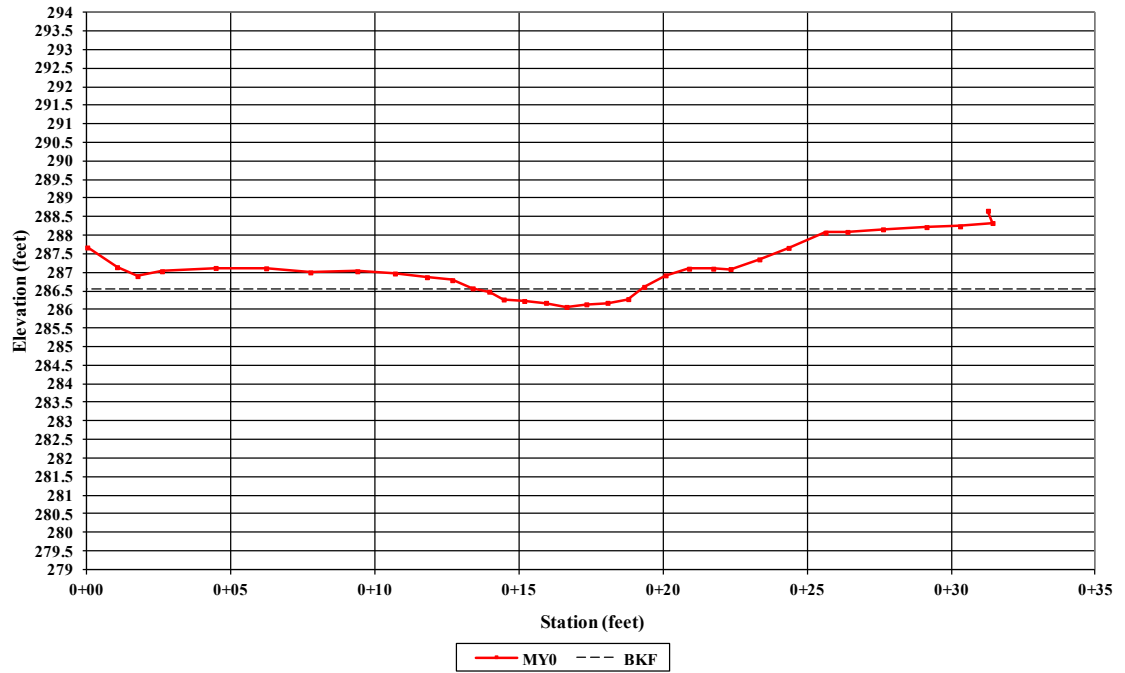


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 17 - Riffle
 Station 232+43



Left Descending Bank



Right Descending Bank

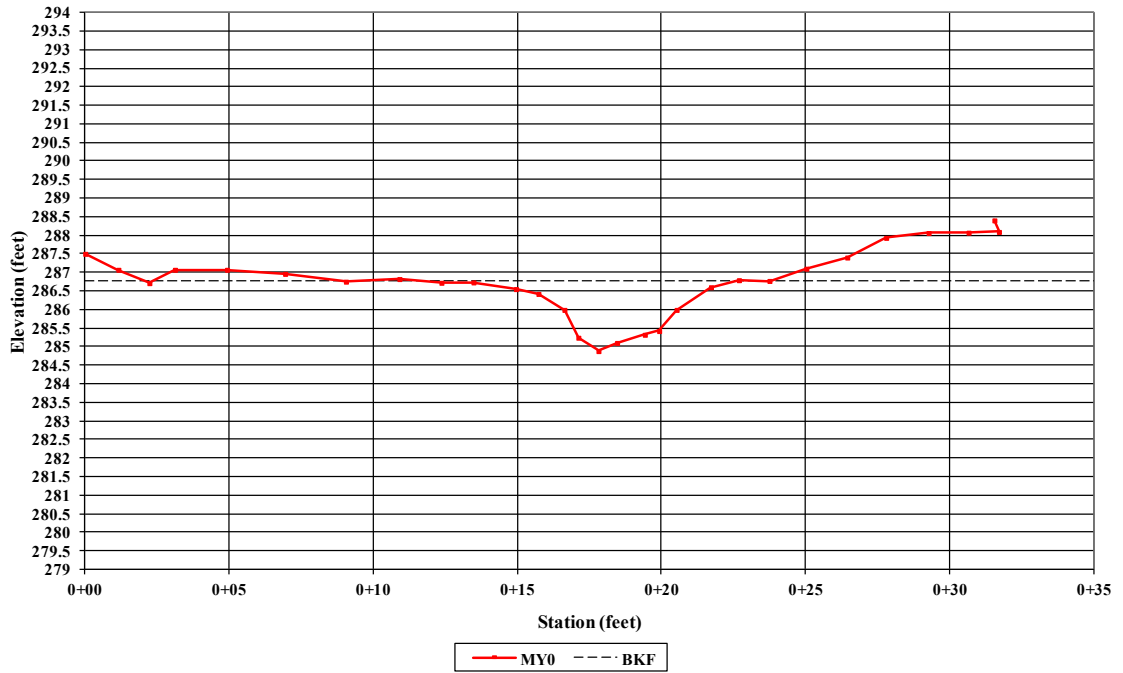


Upstream



Downstream

Pee Dee - Dale Branch
 Cross Section 18 - Pool
 Station 232+54



Left Descending Bank



Right Descending Bank

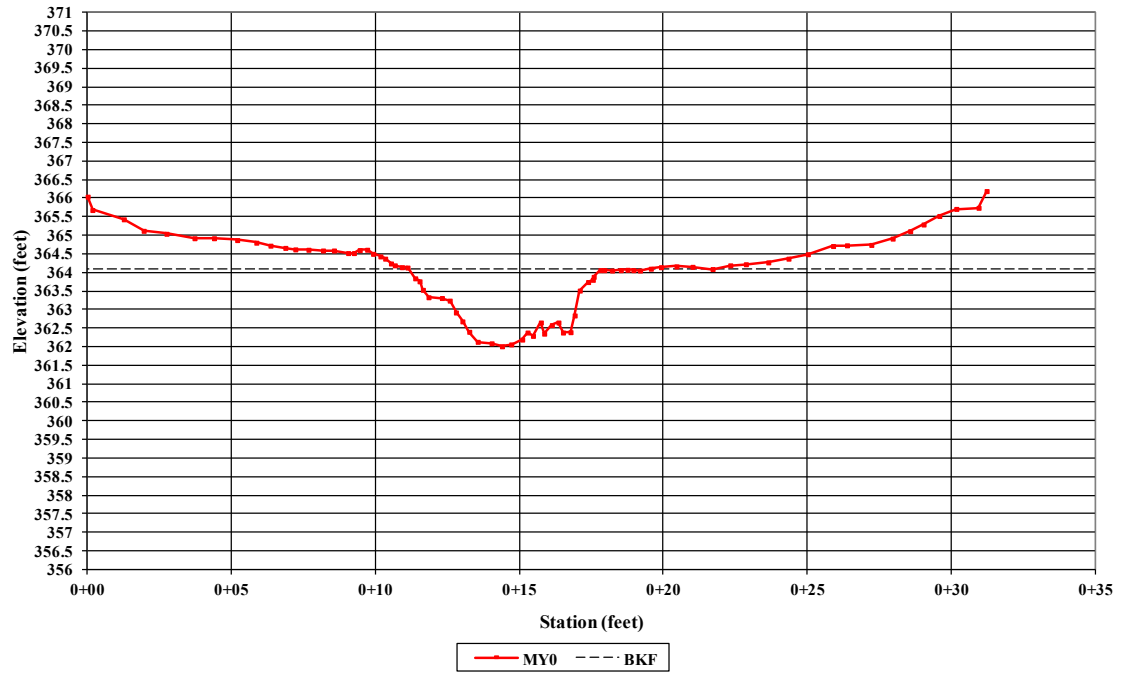


Upstream



Downstream

Pee Dee - Thompson Branch
 Cross Section 19 - Pool
 Station 108+93



Left Descending Bank



Right Descending Bank

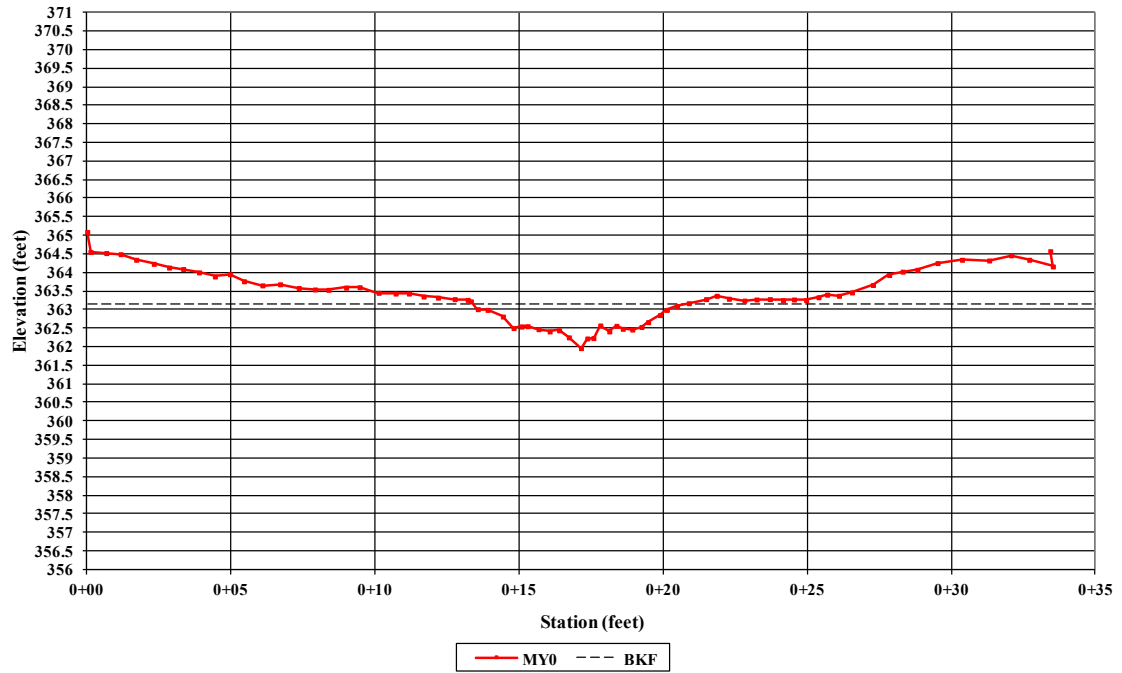


Upstream



Downstream

Pee Dee - Thompson Branch
 Cross Section 20 - Riffle
 Station 109+30



Left Descending Bank



Right Descending Bank

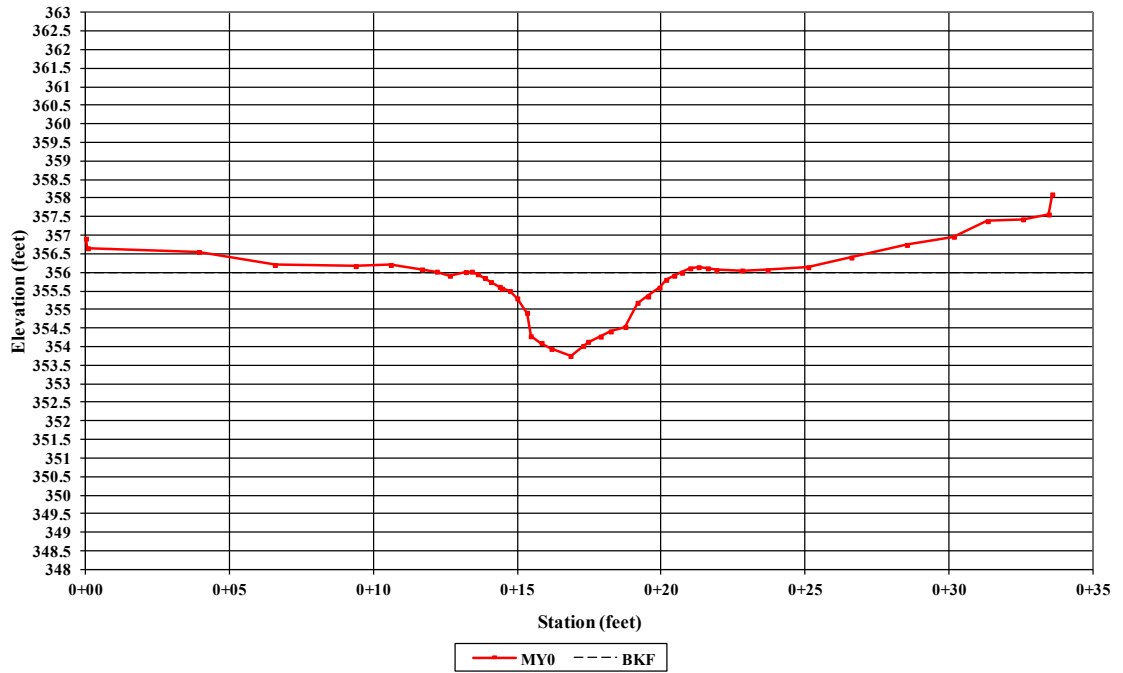


Upstream



Downstream

Pee Dee - Thompson Branch
 Cross Section 21 - Pool
 Station 112+09



Left Descending Bank



Right Descending Bank

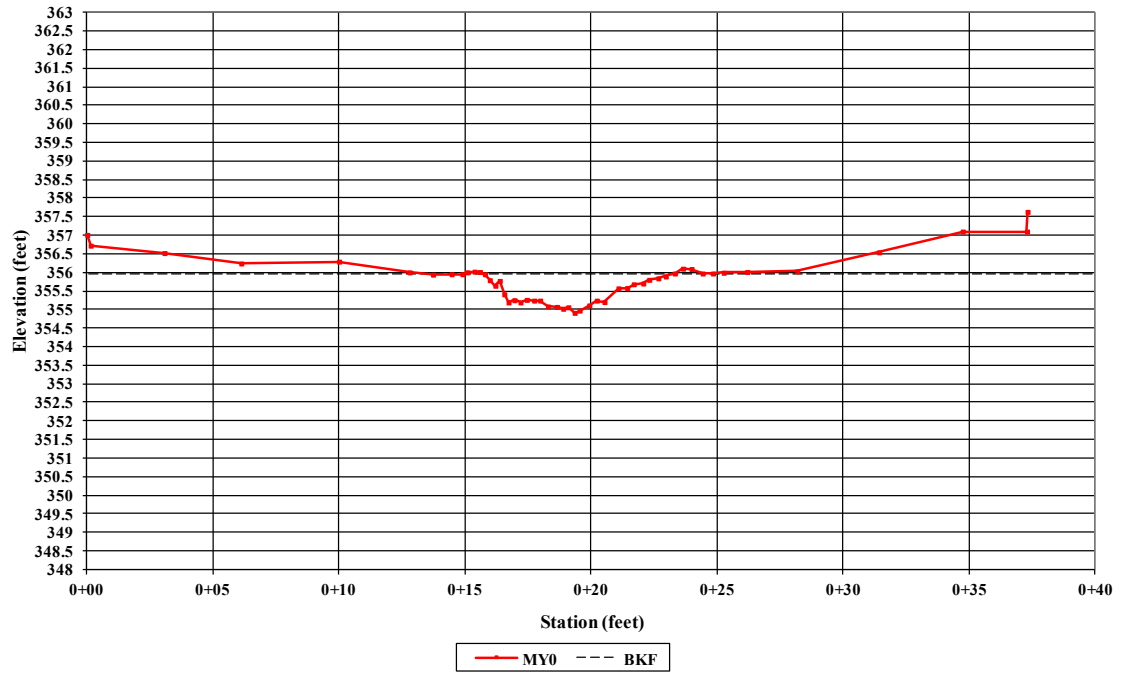


Upstream



Downstream

Pee Dee - Thompson Branch
 Cross Section 22 - Riffle
 Station 112+19



Left Descending Bank



Right Descending Bank



Upstream



Downstream

Appendix C
Vegetation Data

Table 7. MY0 Plot Data (MY0 2015)																
Pee Dee / Project No. 95350																
Scientific Name	Common Name	Species Type	Plot 01		Plot 02		Plot 03		Plot 04		Plot 05		Plot 06		Plot 07	
			P-all	T	P-all	T	P-all	T	P-all	T	P-all	T	P-all	T	P-all	T
<i>Betula nigra</i>	River birch	Tree	9	9	5	5	5	5			6	6	2	2	12	12
<i>Fraxinus pennsylvanica</i>	Green ash	Tree	3	3	1	1	2	2	1	1	4	4	8	8	1	1
<i>Liriodendron tulipifera</i> v	Tulip-tree	Tree	2	2			1	1	3	3						
<i>Platanus occidentalis</i> var	Sycamore	Tree	5	5	10	10	1	1	1	1	3	3	2	2	7	7
<i>Quercus spp.</i>	Oak	Tree	2	2	4	4	7	7	11	11	8	8	2	2	1	1
<i>Quercus michauxii</i>	Swamp chestnut oak	Tree			4	4	3	3	1	1			4	4		
<i>Quercus nigra</i>	Water oak	Tree	4	4			1	1	1	1	3	3	2	2	1	1
<i>Quercus phellos</i>	Willow oak	Tree					8	8	3	3			3	3		
Stem count			25	25	24	24	28	28	21	21	24	24	23	23	22	22
size (ares)			1		1		1		1		1		1		1	
size (ACRES)			0.02		0.02		0.02		0.02		0.02		0.02		0.02	
Species count			6	6	5	5	8	8	7	7	5	5	7	7	5	5
Stems per ACRE			1012	1012	971	971	1133	1133	850	850	971	971	931	931	890	890

Table 7 cont'd. MY0 Data (MY0 2015)																		
Pee Dee / Project No. 95350																		
Scientific Name	Common Name	Species Type	Plot 08		Plot 09		Plot 10		Plot 11		Plot 12		Plot 13		Plot 14		MY0 Annual Mean (2015)	
			P-all	T	P-all	T	P-all	T	P-all	T	P-all	T	P-all	T	P-all	T	P-all	T
<i>Betula nigra</i>	River birch	Tree			6	6					2	2	4	4			51	51
<i>Fraxinus pennsylvanica</i>	Green ash	Tree			6	6	3	3			2	2	1	1	1	1	33	33
<i>Liriodendron tulipifera</i> v	Tulip-tree	Tree			2	2	8	8									16	16
<i>Platanus occidentalis</i> var	Sycamore	Tree			3	3	7	7	17	17	9	9	9	9	13	13	87	87
<i>Quercus spp.</i>	Oak	Tree	18	18	8	8			6	6	4	4	4	4	8	8	83	83
<i>Quercus michauxii</i>	Swamp chestnut oak	Tree											2	2			14	14
<i>Quercus nigra</i>	Water oak	Tree	3	3			2	2									17	17
<i>Quercus phellos</i>	Willow oak	Tree					1	1			3	3					18	18
Stem count			21	21	25	25	21	21	23	23	20	20	20	20	22	22	319	319
size (ares)			1		1		1		1		1		1		1		14	
size (ACRES)			0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.35	
Species count			2	2	5	5	5	5	2	2	5	5	5	5	3	3	8	8
Stems per ACRE			850	850	1012	1012	850	850	931	931	809	809	809	809	890	890	922	922

Table 8. Vegetation Plot Criteria Attainment		
Pee Dee / Project No. 95350		
Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	100%
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	Yes	
11	Yes	
12	Yes	
13	Yes	
14	Yes	



Vegetation Monitoring Plot 1



Vegetation Monitoring Plot 2



Vegetation Monitoring Plot 3



Vegetation Monitoring Plot 4



Vegetation Monitoring Plot 5



Vegetation Monitoring Plot 6



Vegetation Monitoring Plot 7



Vegetation Monitoring Plot 8



Vegetation Monitoring Plot 9



Vegetation Monitoring Plot 10



Vegetation Monitoring Plot 11



Vegetation Monitoring Plot 12



Vegetation Monitoring Plot 13



Vegetation Monitoring Plot 14

Appendix D
Permanent Photo Stations



Jerry Branch – Permanent Photo Station 1
Station 300+25 - Downstream



Jerry Branch – Permanent Photo Station 2
Station 305+04 - Upstream



Jerry Branch – Permanent Photo Station 2
Station 305+04 - Downstream



Hudson Branch – Permanent Photo Station 2
Station 305+04 - Upstream



Jerry Branch – Permanent Photo Station 3
Looking North Northwest/Upstream Jerry Branch



Jerry Branch – Permanent Photo Station 4
Station 304+80 - Upstream



Jerry Branch – Permanent Photo Station 4
Station 304+80 - Downstream



Jerry Branch – Permanent Photo Station 5
Station 316+95 - Upstream



Dale Branch – Permanent Photo Station 6
Station 204+15 - Upstream



Dale Branch – Permanent Photo Station 7
Station 205+15 - Upstream



Dale Branch – Permanent Photo Station 8
Station 212+95 - Upstream



Dale Branch – Permanent Photo Station 8
Station 212+95 - Downstream



Dale Branch – Permanent Photo Station 9
Looking North Northwest – Upstream Dale



Dale Branch – Permanent Photo Station 9
Looking South Southeast- Downstream Dale



Dale Branch – Permanent Photo Station 10
Looking North Northeast – Upstream Dale



Dale Branch – Permanent Photo Station 10
Looking South Southwest – Downstream Dale



Dale Branch – Permanent Photo Station 11
Station 229+20 – Upstream



Dale Branch – Permanent Photo Station 11
Station 229+20 – Downstream



Dale Branch – Permanent Photo Station 12
Station 234+25 – Upstream



Dale Branch – Permanent Photo Station 12
Station 234+25 – Downstream



Thompson Branch – Permanent Photo Station 13
Station 101+15 – Downstream



Thompson Branch – Permanent Photo Station 14
Station 105+25 – Upstream



Thompson Branch – Permanent Photo Station 14
Station 105+25 – Downstream



Thompson Branch – Permanent Photo Station 15
Station 115+50 – Upstream



Thompson Branch – Permanent Photo Station 15
Station 111+50 – Downstream

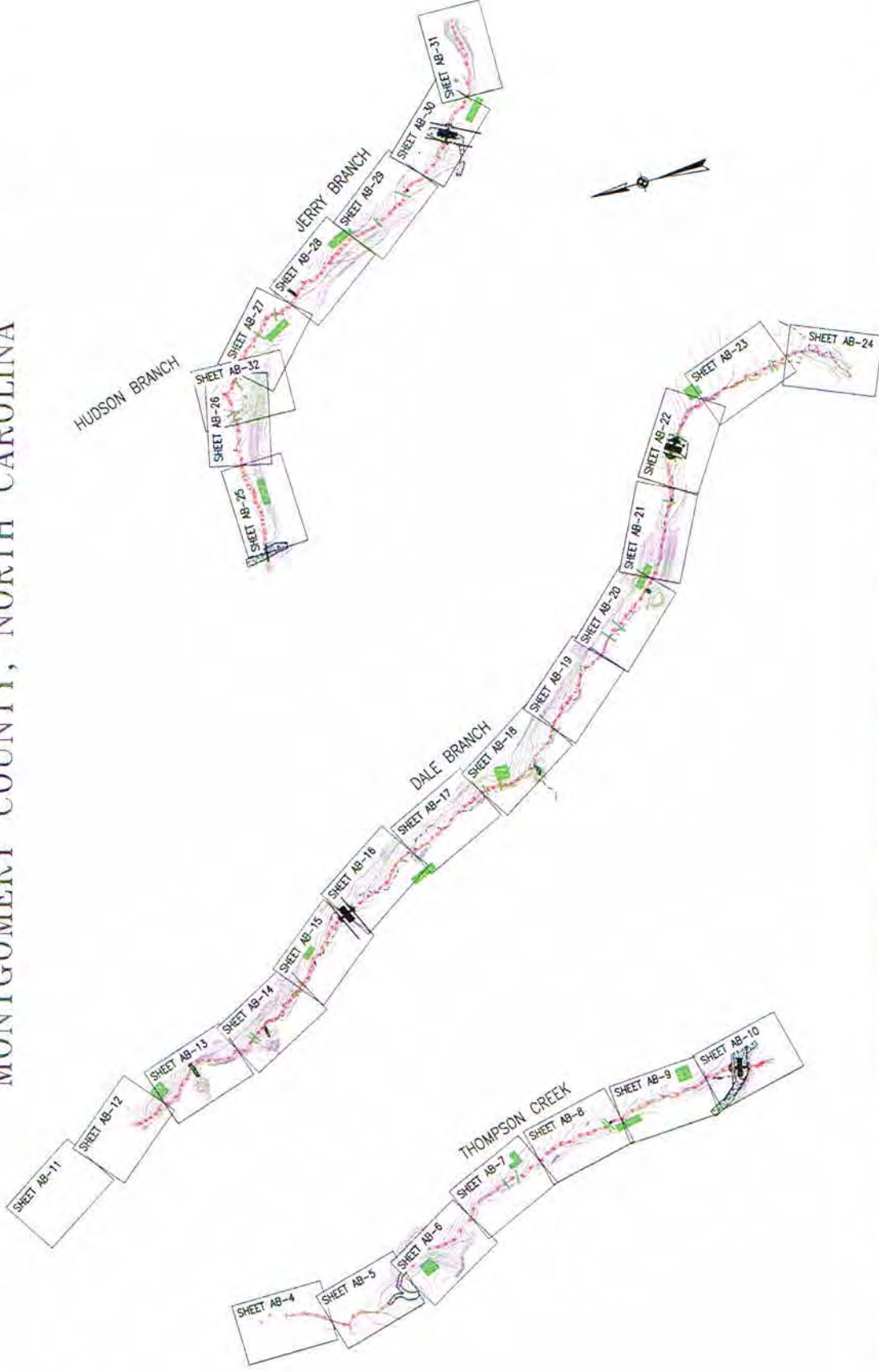
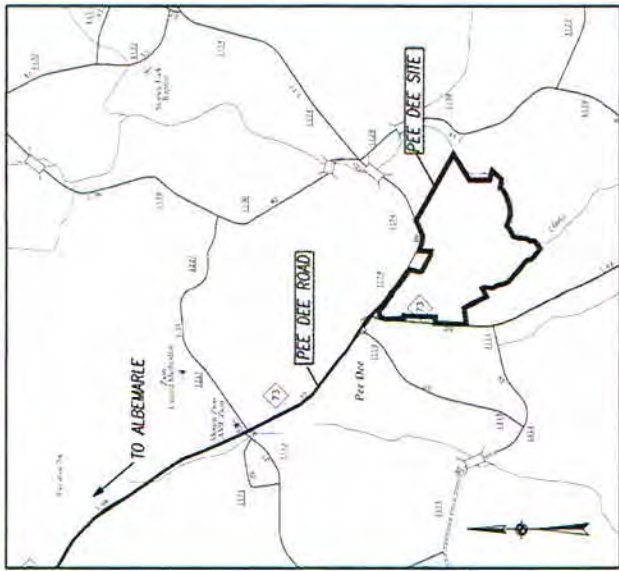


Thompson Branch – Permanent Photo Station 16
Station 115+85 – Upstream

PEE DEE STREAM RESTORATION PROJECT

THOMPSON CREEK, DALE BRANCH, JERRY BRANCH AND HUDSON BRANCH
MONTGOMERY COUNTY, NORTH CAROLINA

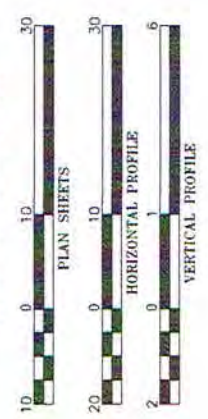
VICINITY MAP
NOT TO SCALE



SHEET INDEX

SHEET NO.	DESCRIPTION
AB-1	TITLE SHEET
AB-4 - AB-32	PLAN AND PROFILE

GRAPHIC SCALES (SCALE IN FEET)



AS-BUILT RESTORATION:	PROJECT LENGTHS
THOMPSON CREEK	= 1,349 FT
DALE BRANCH	= 2,993 FT
JERRY BRANCH	= 1,691 FT
HUDSON BRANCH	= 59 FT
AS-BUILT ENHANCEMENT:	
THOMPSON CREEK	= 243 FT
DALE BRANCH	= 375 FT
TOTAL LENGTH	= 6,710 FT

Prepared by:

 Wolf Creek Engineering, Inc.
 License No. P-0417
 124 Wall St., Suite C
 Asheville, North Carolina 28801
 Phone: 828-449-1850
 www.wolfcreekeng.com

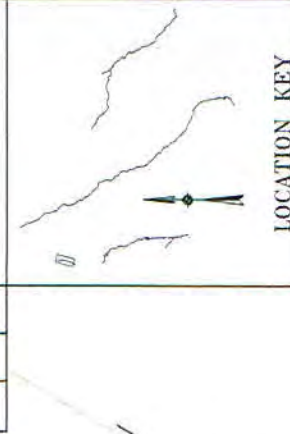
Prepared for:

 PROJECT ENGINEER

RES
 Brian Hockett
 PROJECT MANAGER

RECORD SET

STATE	NC	SHEET NO.	95350	TOTAL SHEETS	30
REVISIONS					
NO.	DATE	DESCRIPTION			
1	1/9/2014	Final Plans			
2	7/7/2015	Record Set			
3	8/9/2015	Record Set - Revision 1			

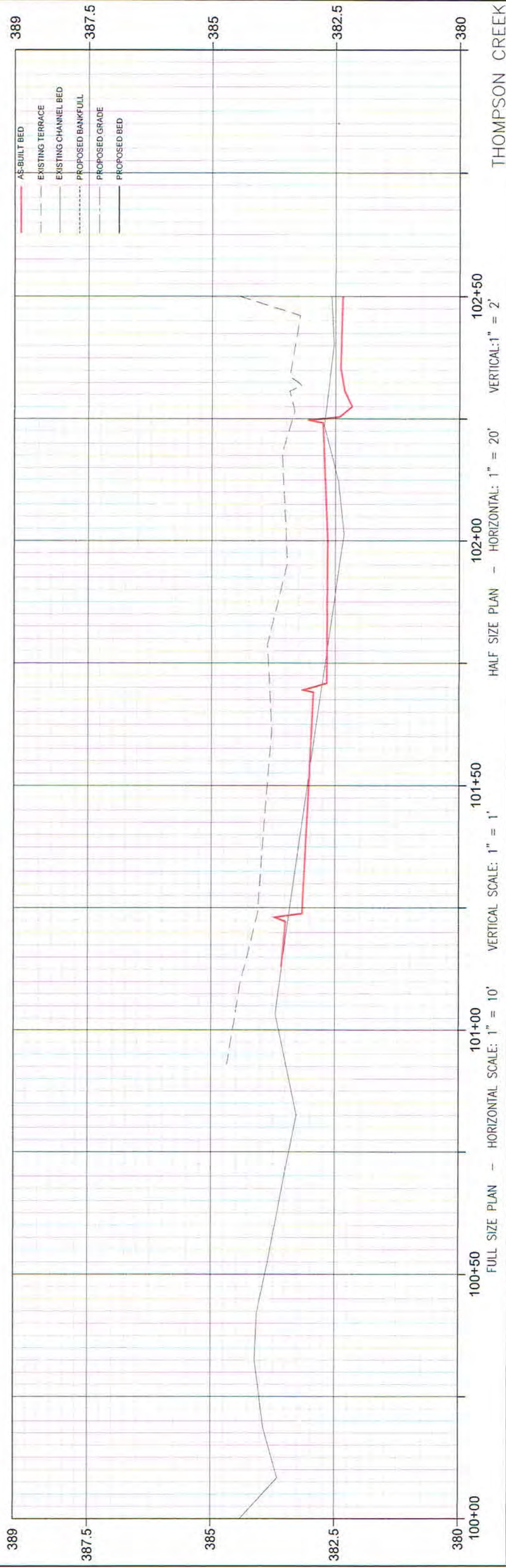
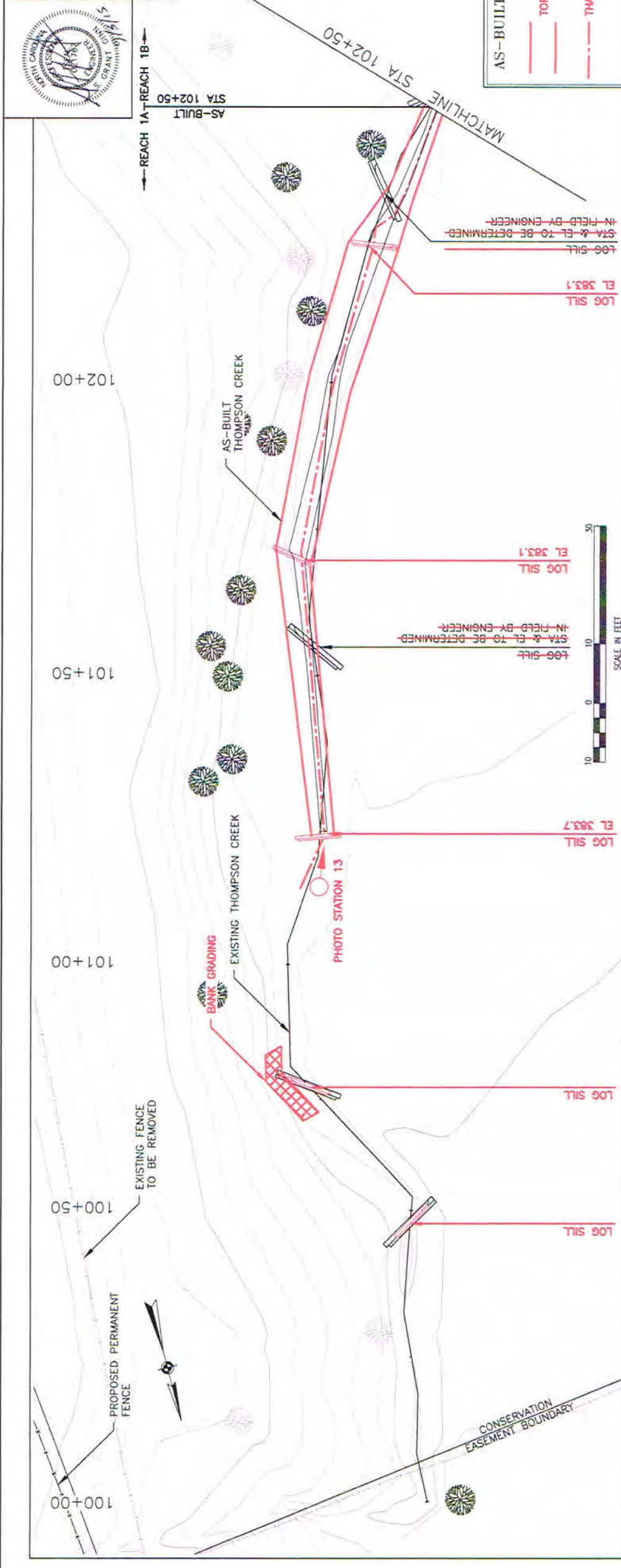


LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

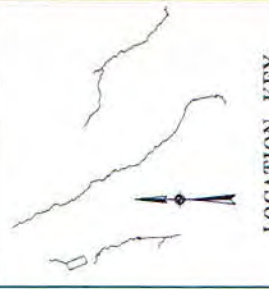
- AS-BUILT BED
- TOP OF BANK
- THALWEG



WolfCreek Engineering
 ENGINEERING & ENVIRONMENTAL CONSULTING
 LICENSE NO. P-0417 Asheville, NC 28801
 12 1/2 Wall St., Suite C PHONE: (828) 448-1900 WWW.WOLFCREEK.COM
 PROJECT PEE DEE STREAM RESTORATION
 WORK RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE BY ZAS	PROJECT NO.	SHEET NUMBER
DATE 7/7/15	DATE BY SGO	1058	AB-5
BY	BY	DESCRIPTION	
DATE	DATE		
BY	BY	TITLE BLOCK	
DATE	DATE		



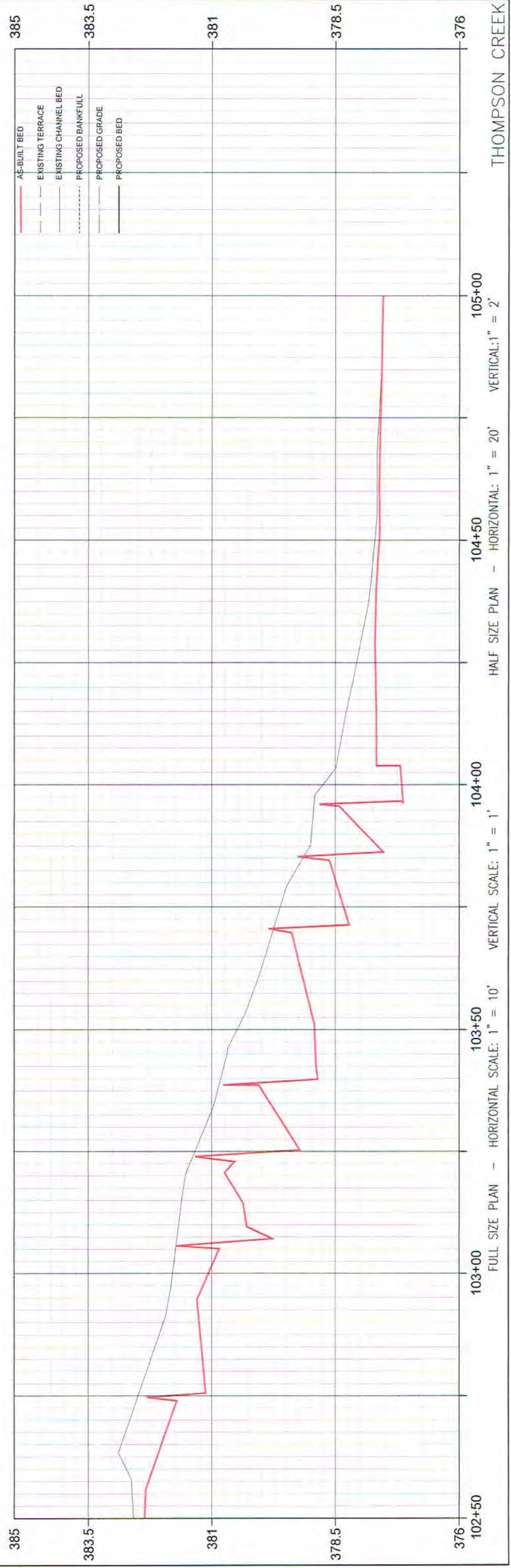
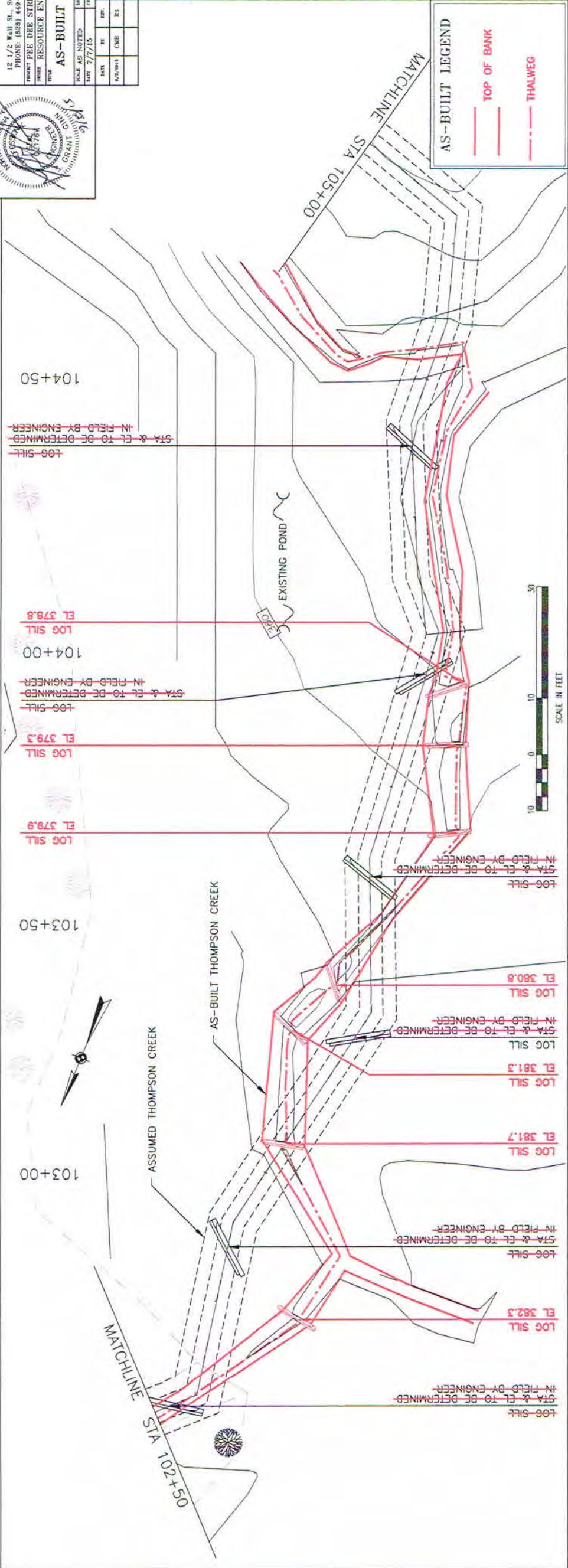
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- TOP OF BANK
- THALWEG



Wolf Creek Engineering
ENGINEERING & ENVIRONMENTAL CONSULTING
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12 1/2 Wall St., Suite C Asheville, NC 28801
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AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE 7/7/15	PROJECT NO. 105B	SHEET NUMBER AB-6
DESIGN BY TSS	CHECK BY SGC	DATE 7/7/15	PROJECT NO. 105B
DATE 7/7/15	DATE 7/7/15	PROJECT NO. 105B	SHEET NUMBER AB-6

THOMPSON CREEK RESTORATION PROJECT
THOMPSON CREEK RESTORATION PROJECT
THOMPSON CREEK RESTORATION PROJECT

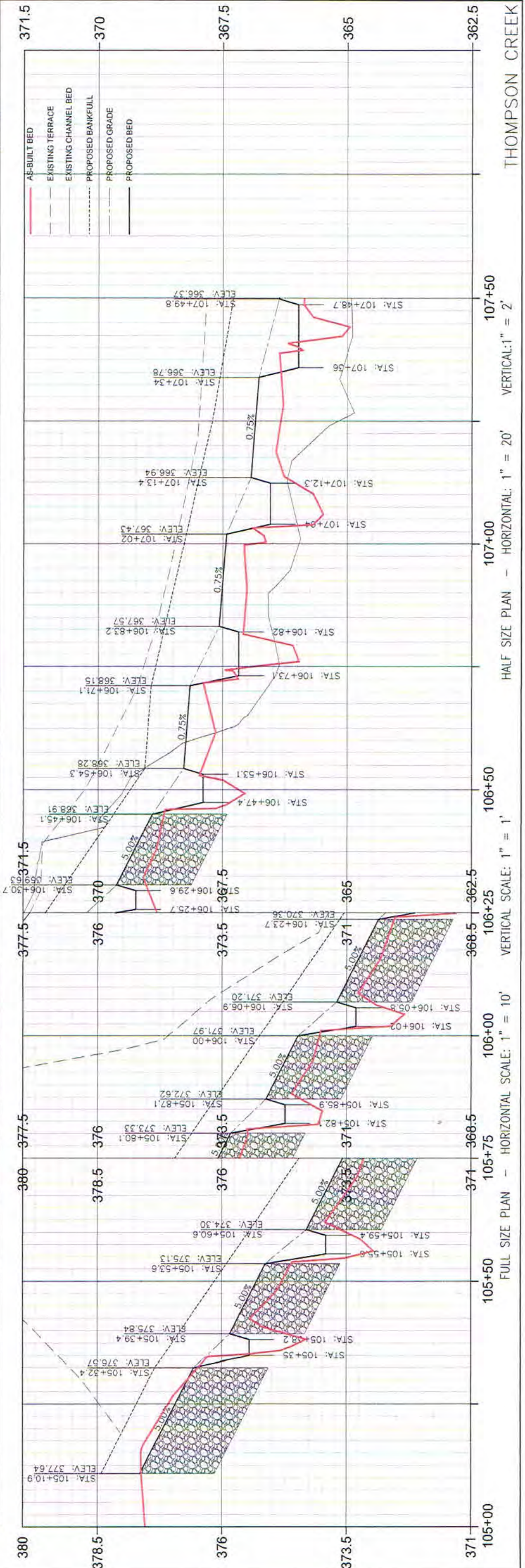
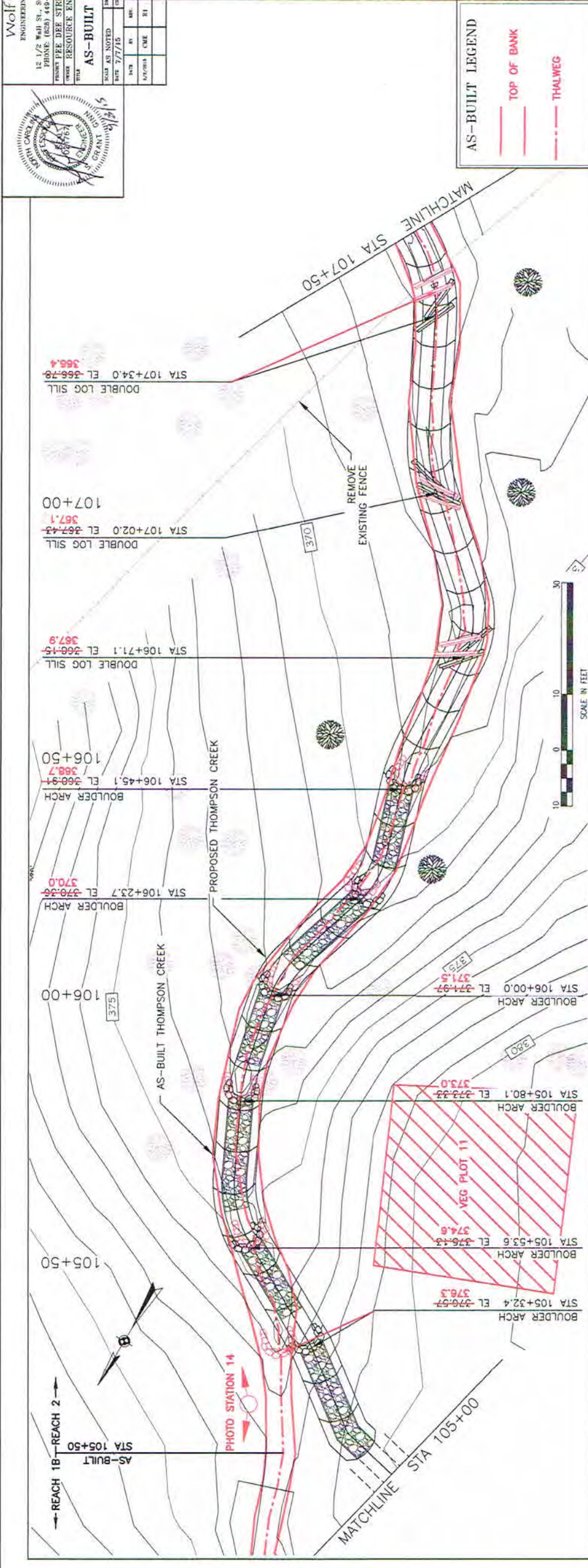
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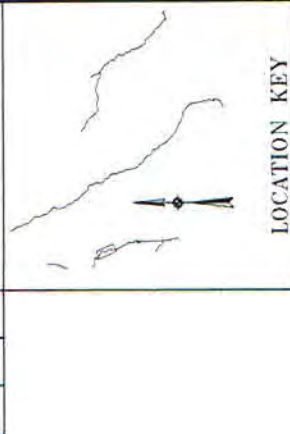
- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT
- TOP OF BANK
- THALWEG



THOMPSON CREEK



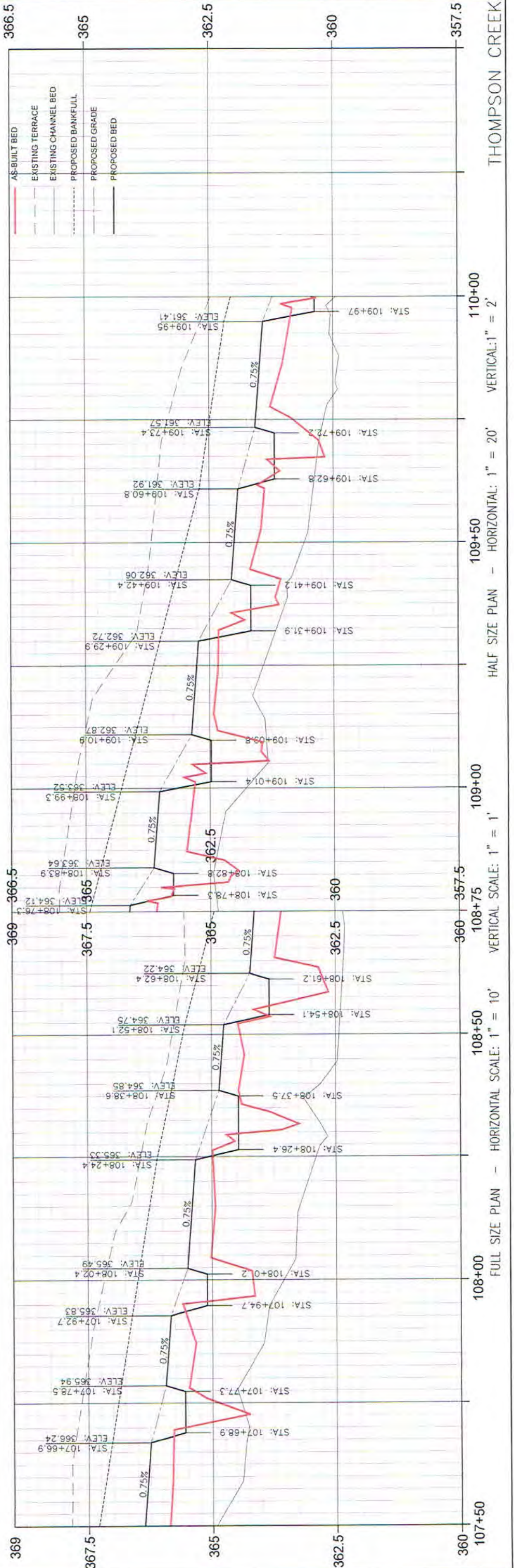
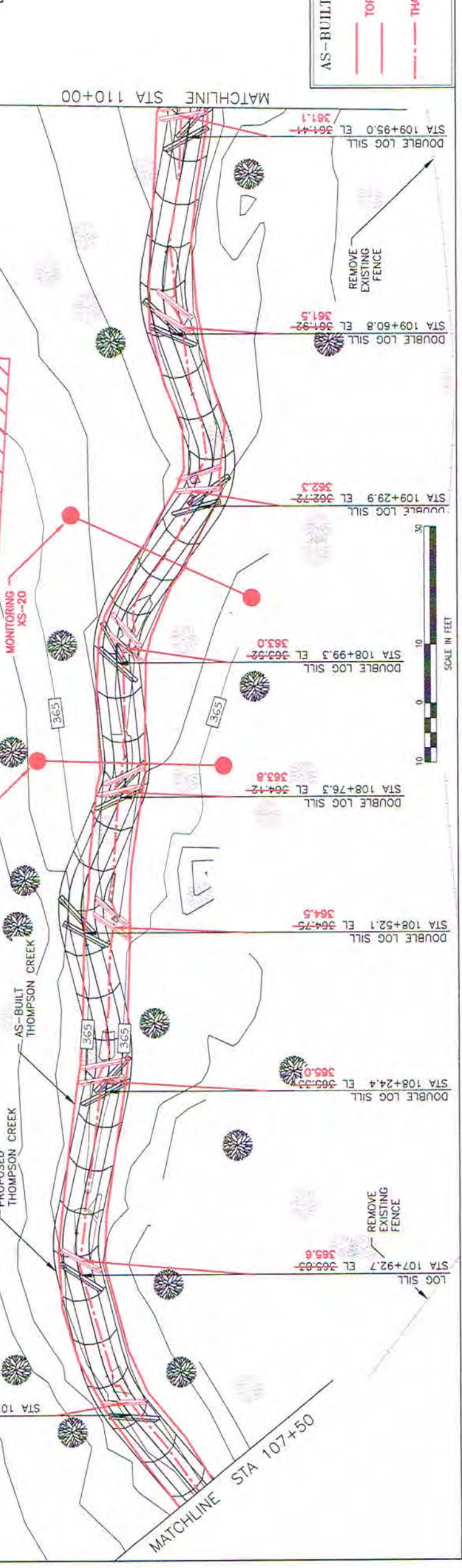
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LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT
- TOP OF BANK
- THALWEG

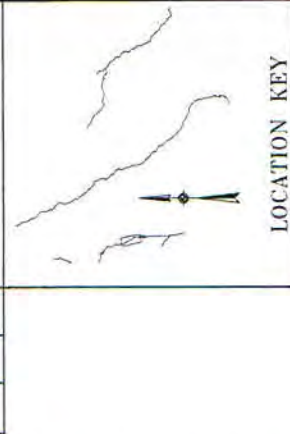


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 12 1/2 Wall St., Suite C
 PHONE: (609) 449-1950
 www.wolfcreekeng.com

REHABILITATE, NC 28001
 PROJECT: PEE DEE STREAM RESTORATION
 CLIENT: RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE	BY	CHKD BY	TITLE BLOCK
7/27/15	JAS	JAS	1056
7/27/15	JAS	JAS	AD-B

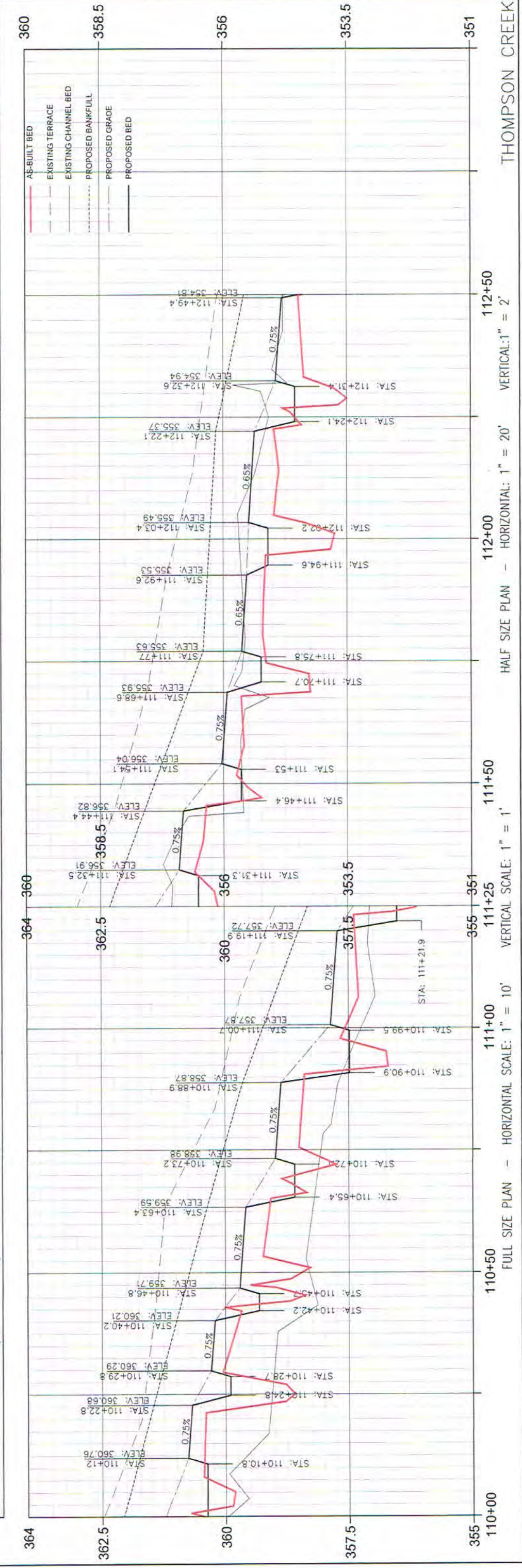
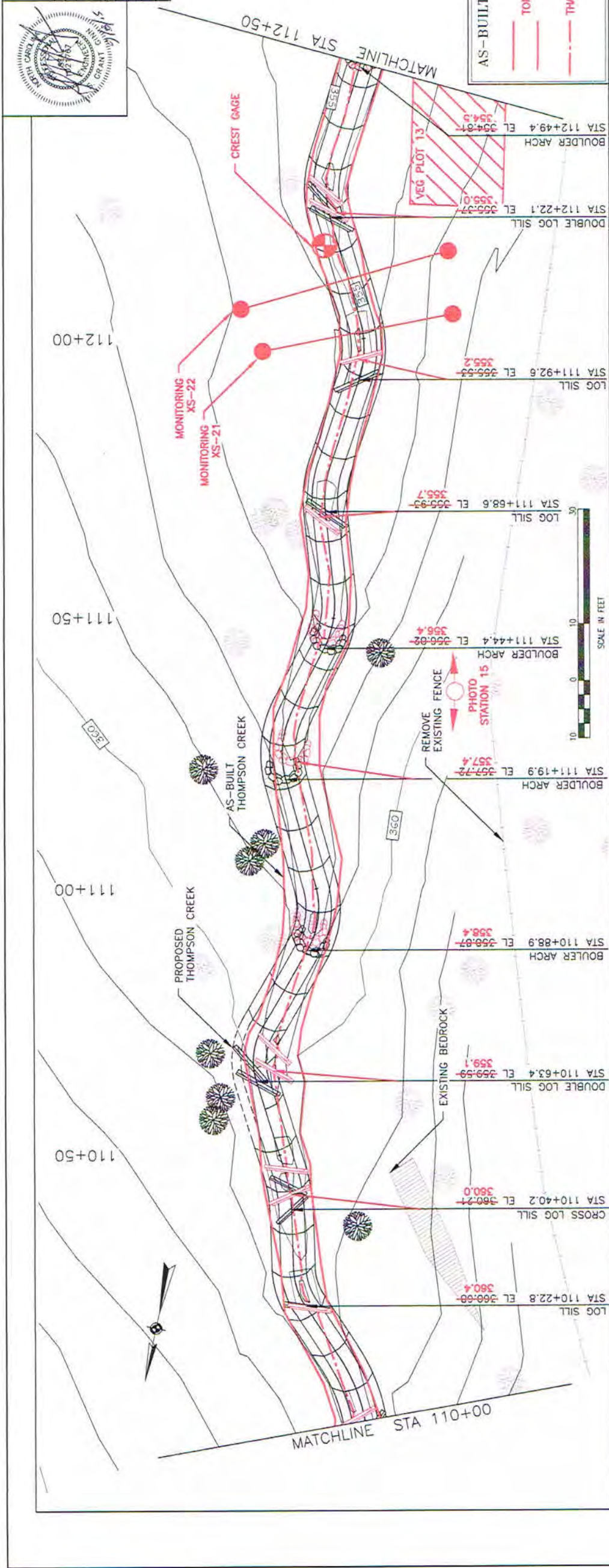


LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

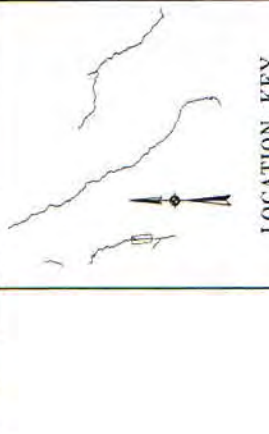
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- THALWEG



THOMPSON CREEK

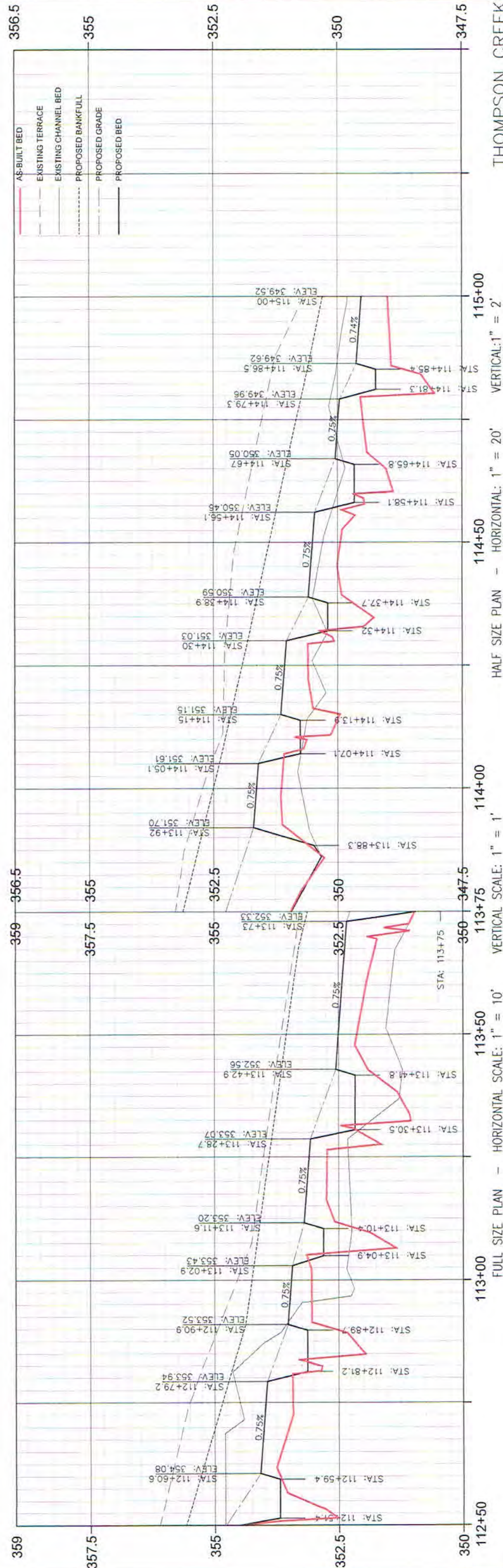
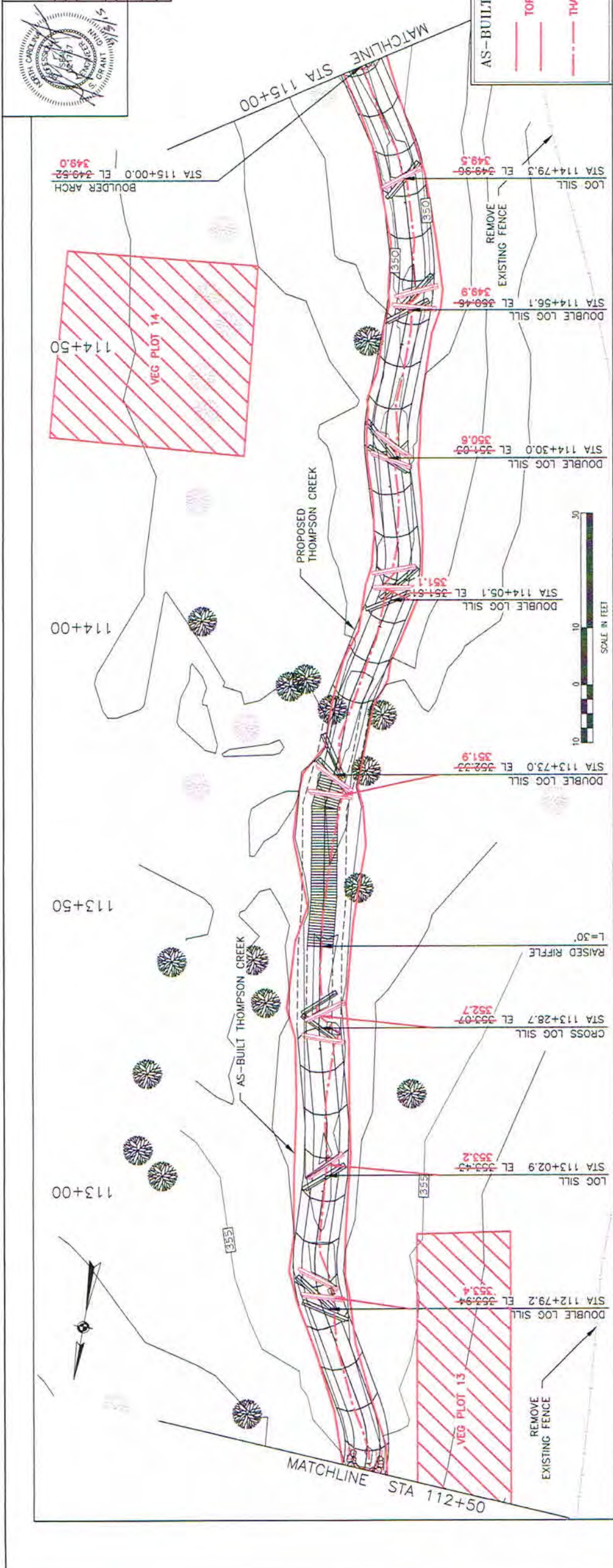
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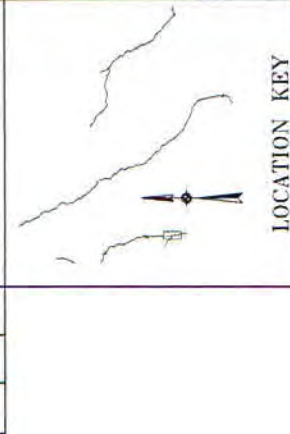
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AS-BUILT LEGEND

- TOP OF BANK
- - - THALWEG



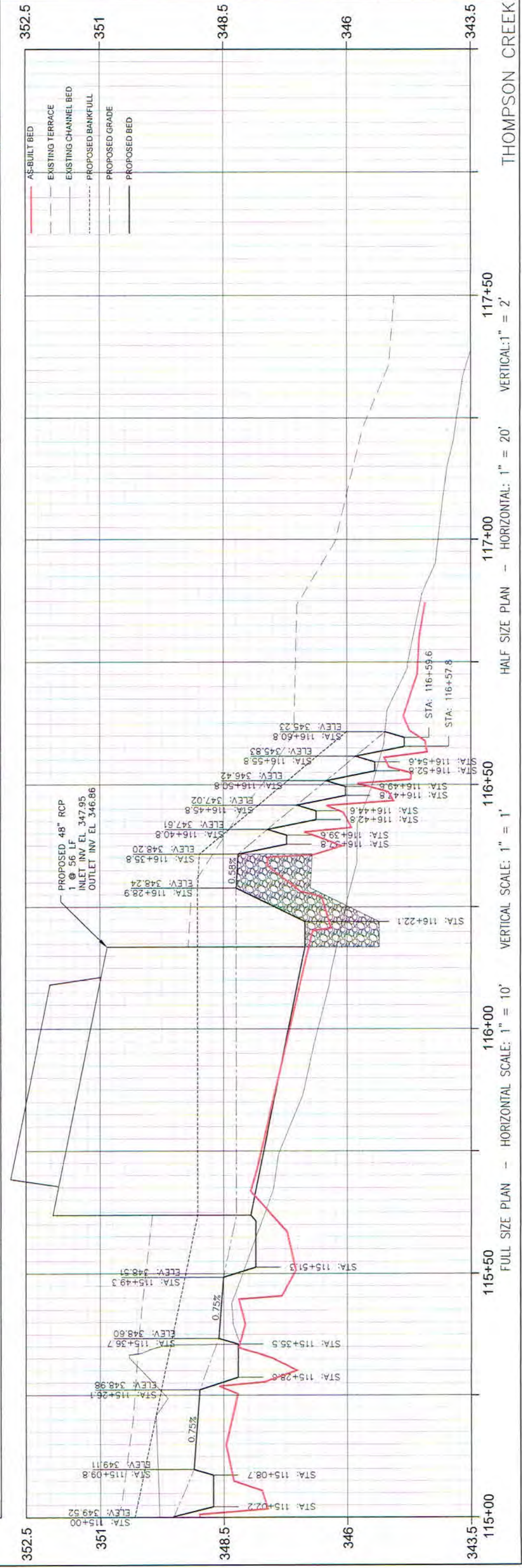
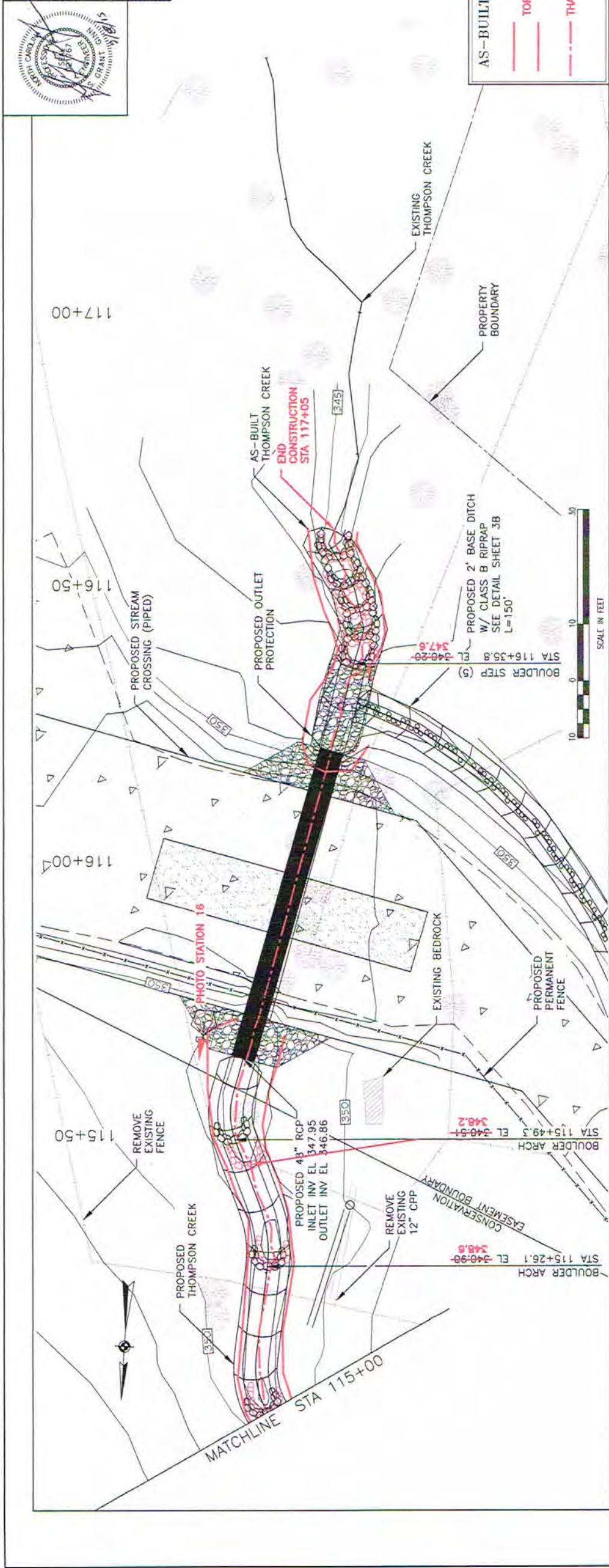


LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- TOP OF BANK
- THALWEG



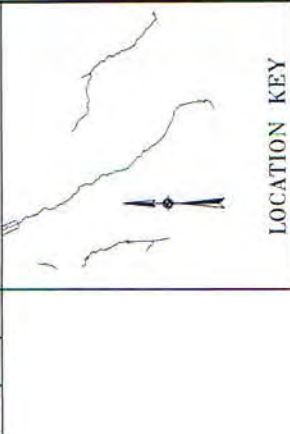
Wolf Creek Engineering
 ENGINEERING & ENVIRONMENTAL CONSULTING
 LICENSE NO. P-0417
 15 1/2 W. H. ST. - SUITE 100 - WAKEFORD, NC 27881
 PHONE (800) 449-1950 WWW.WOLFCKREEK.COM

PROJECT: PEE DEE STREAM RESTORATION
 CLIENT: RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE AS NOTED	DATE BY T&S	PROJECT NO.	DATE
7/7/15	10/5/15	1056	AB-11

NO.	BY	DATE	DESCRIPTION
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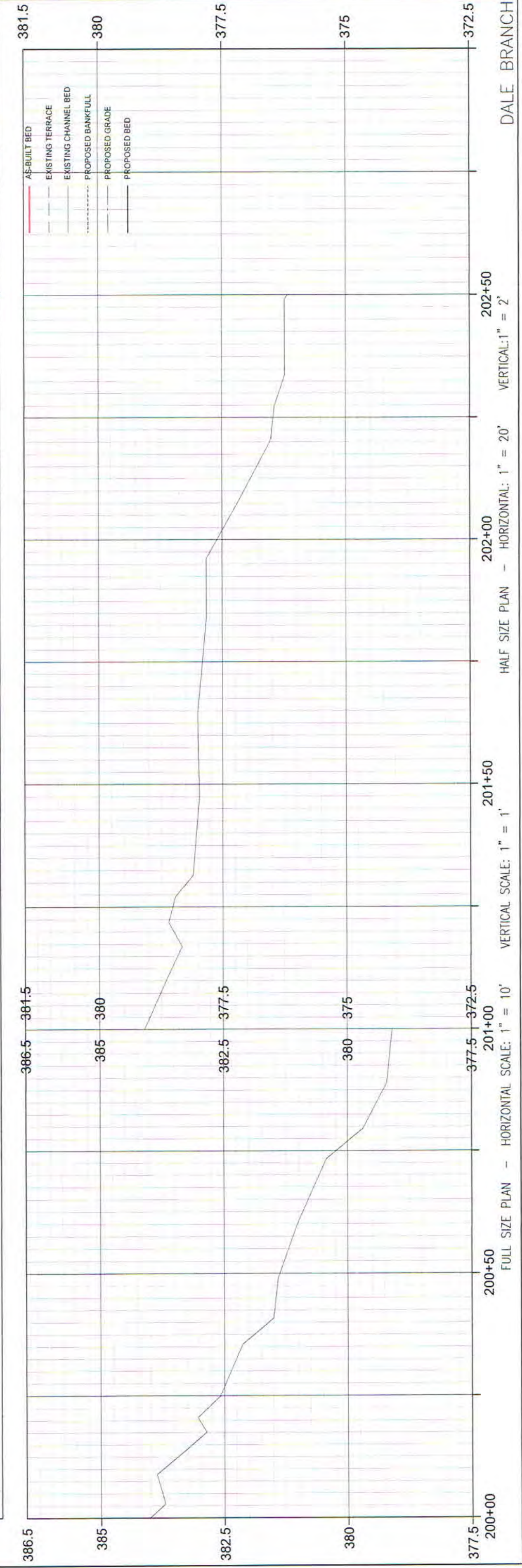
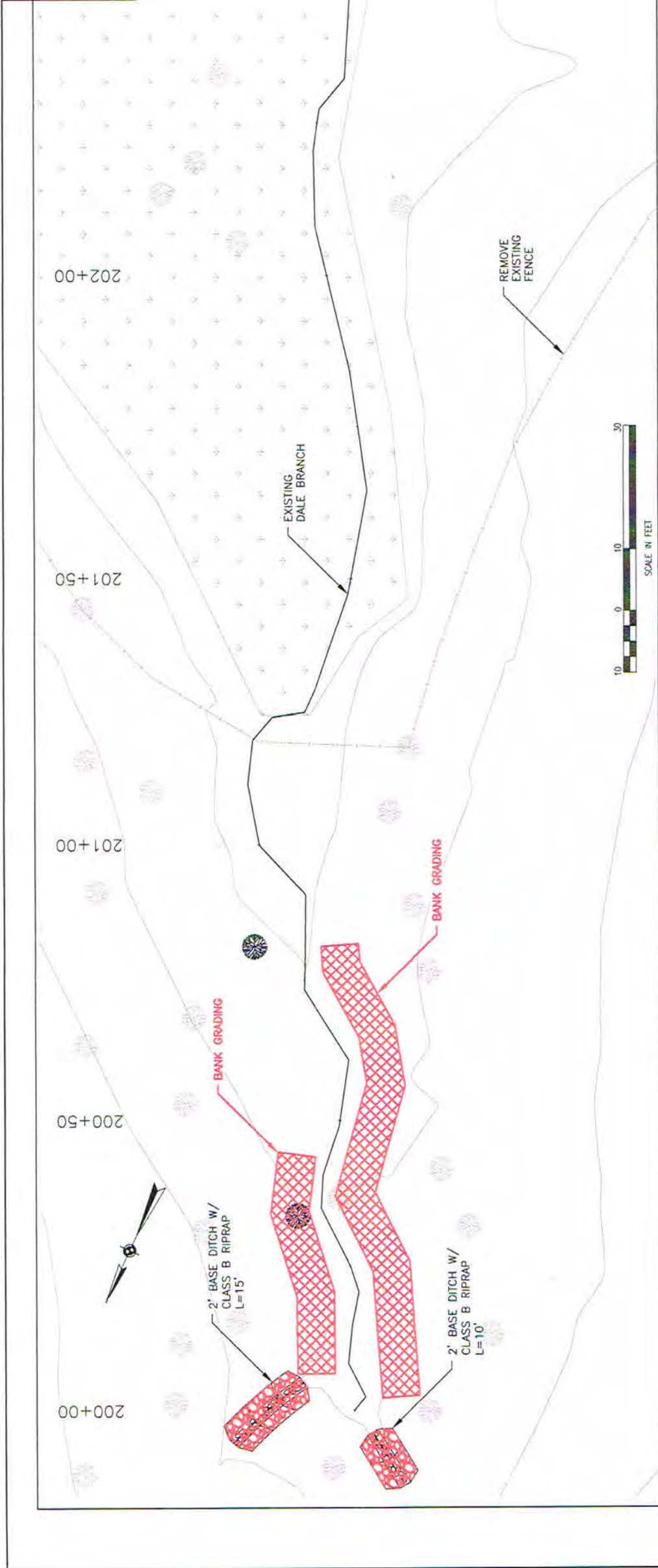
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- TOP OF BANK
- THALWEG



DALE BRANCH

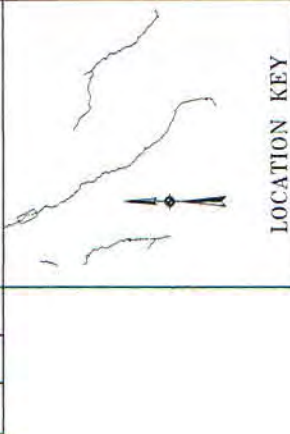
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FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

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 PROJECT PEE DEE STREAM RESTORATION
 RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE	7/27/15	PROJECT NO.	1050	SHEET NO.	AB-12
BY		DATE		SCALE	
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RI					
DESCRIPTION					
TITLE BLOCK					



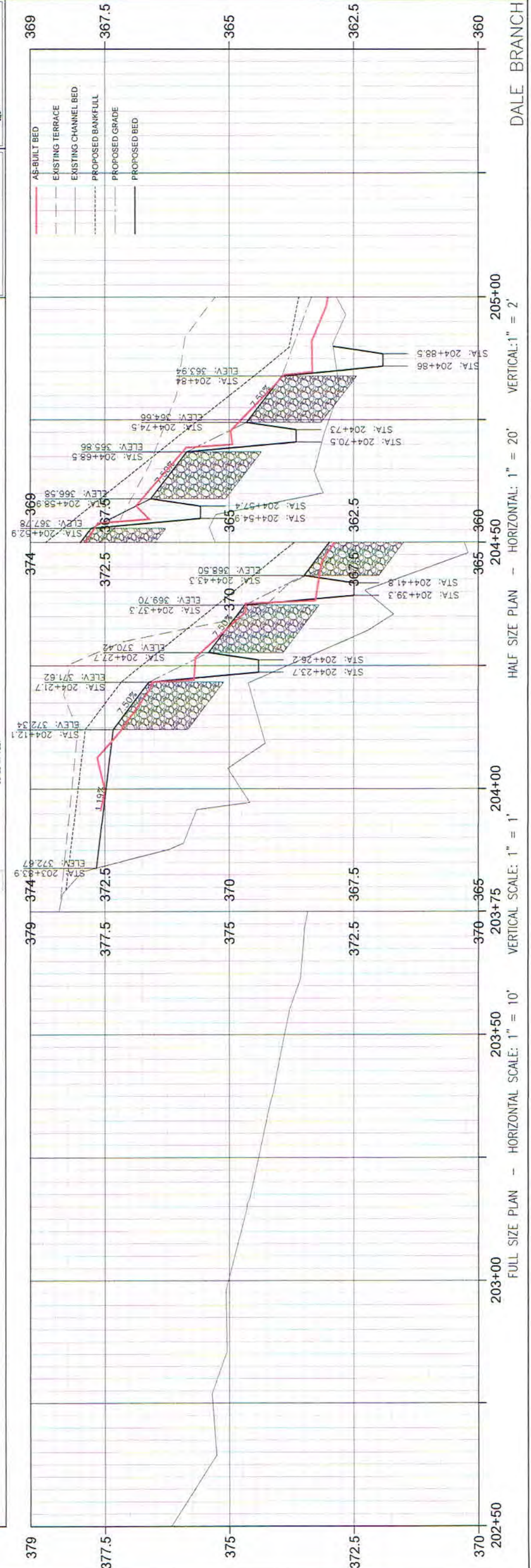
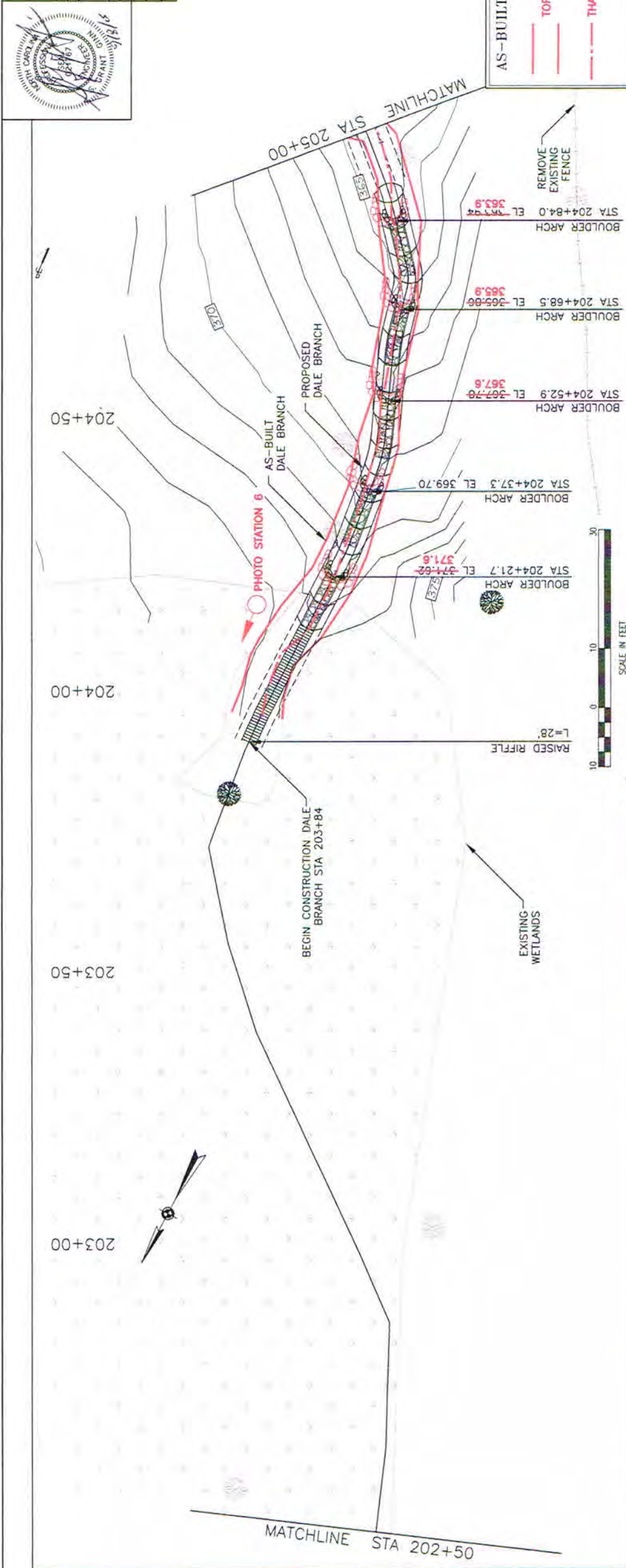
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

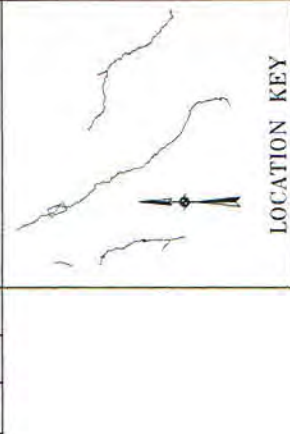
- TOP OF BANK
- THALWEG



DALE BRANCH

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

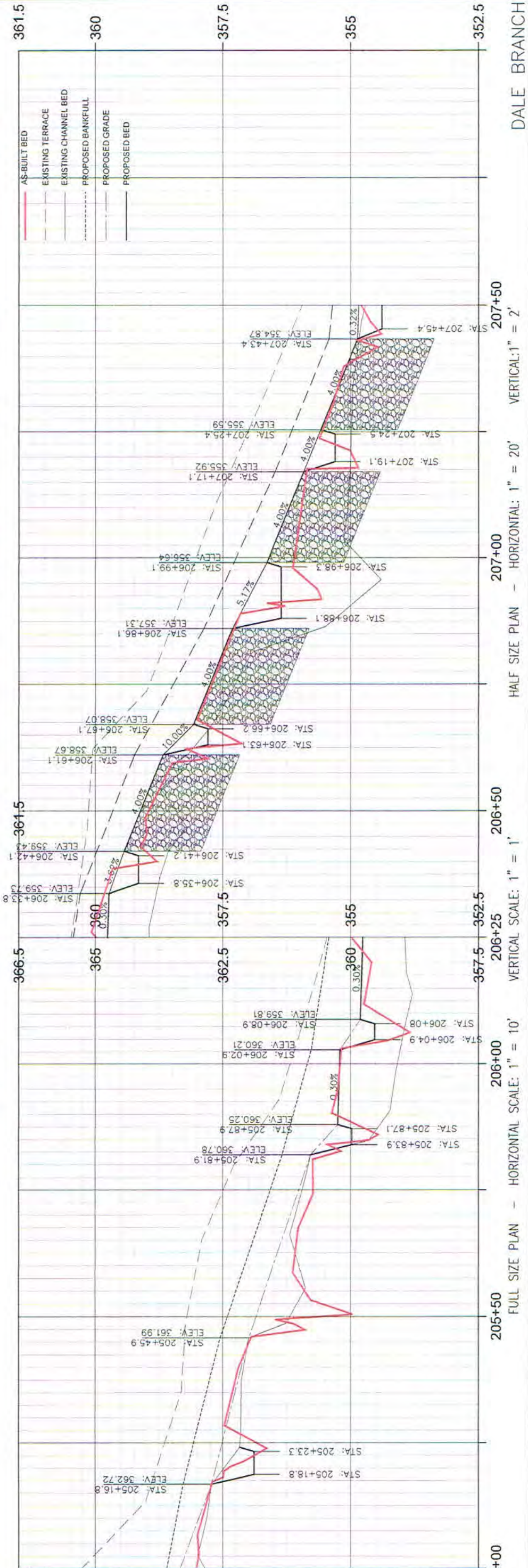
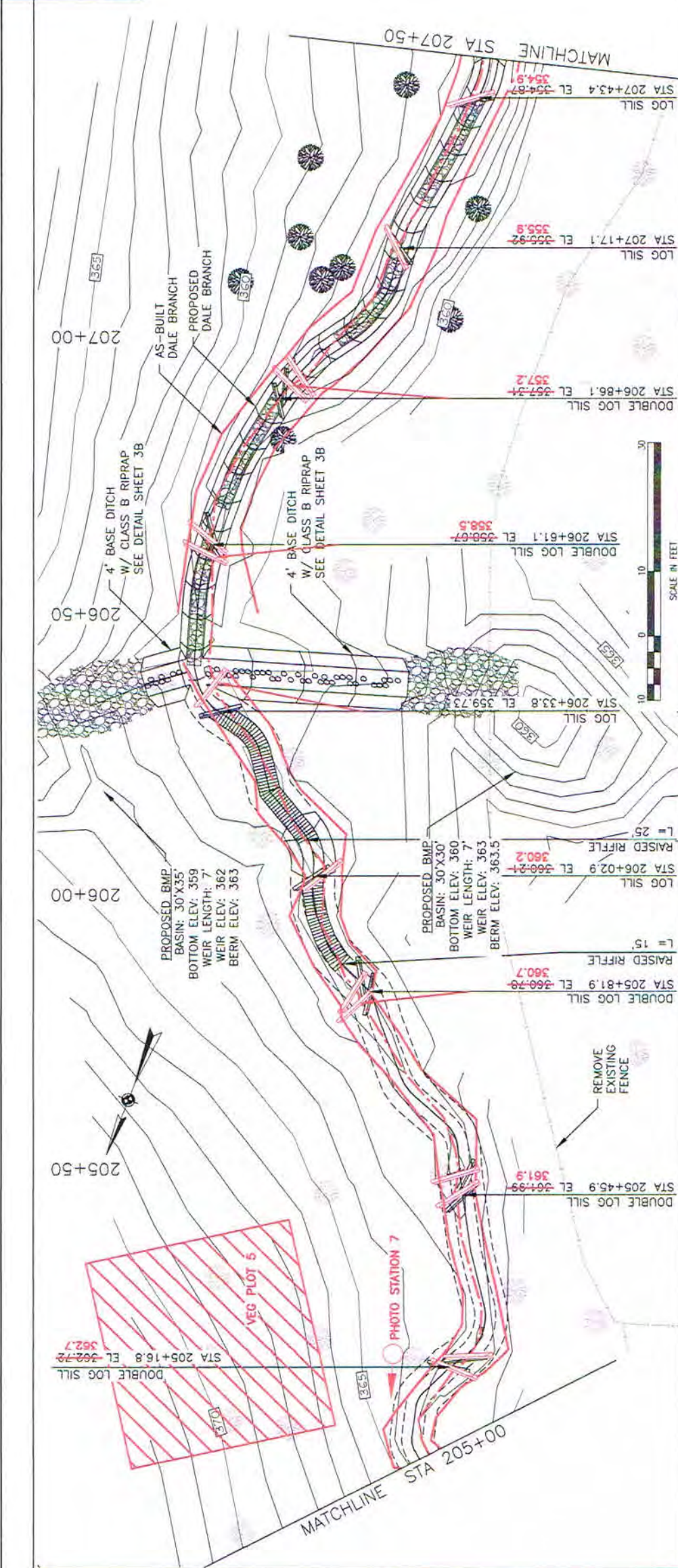
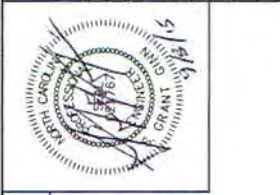


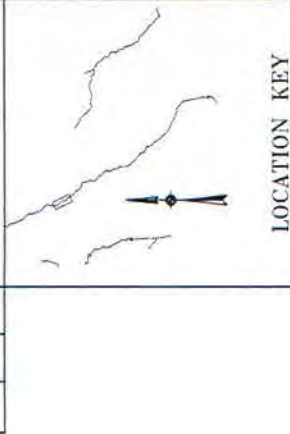
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- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- TOP OF BANK
- THALWEG





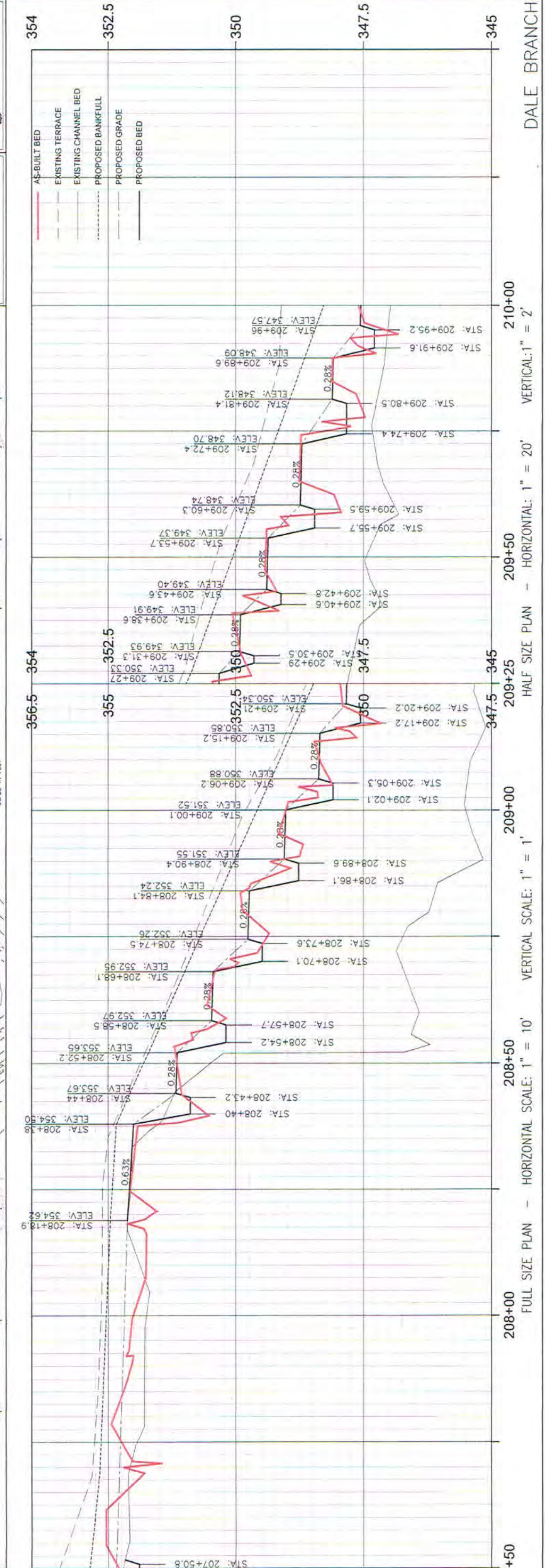
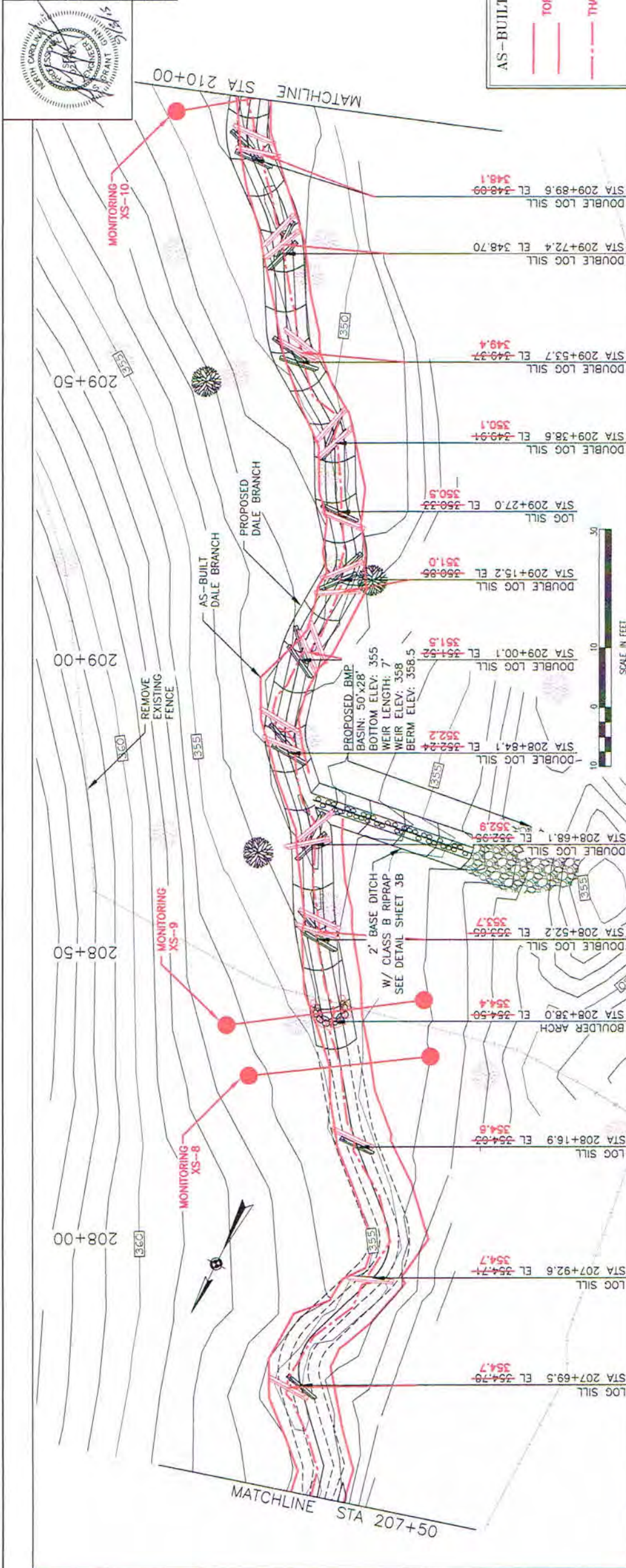
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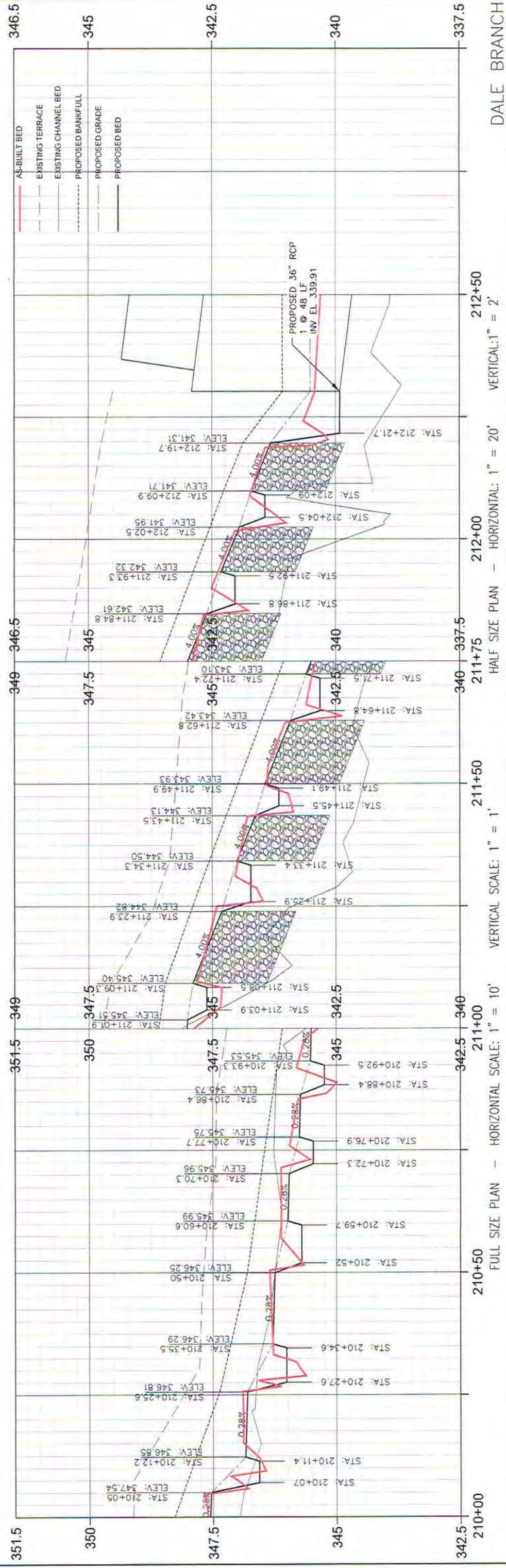
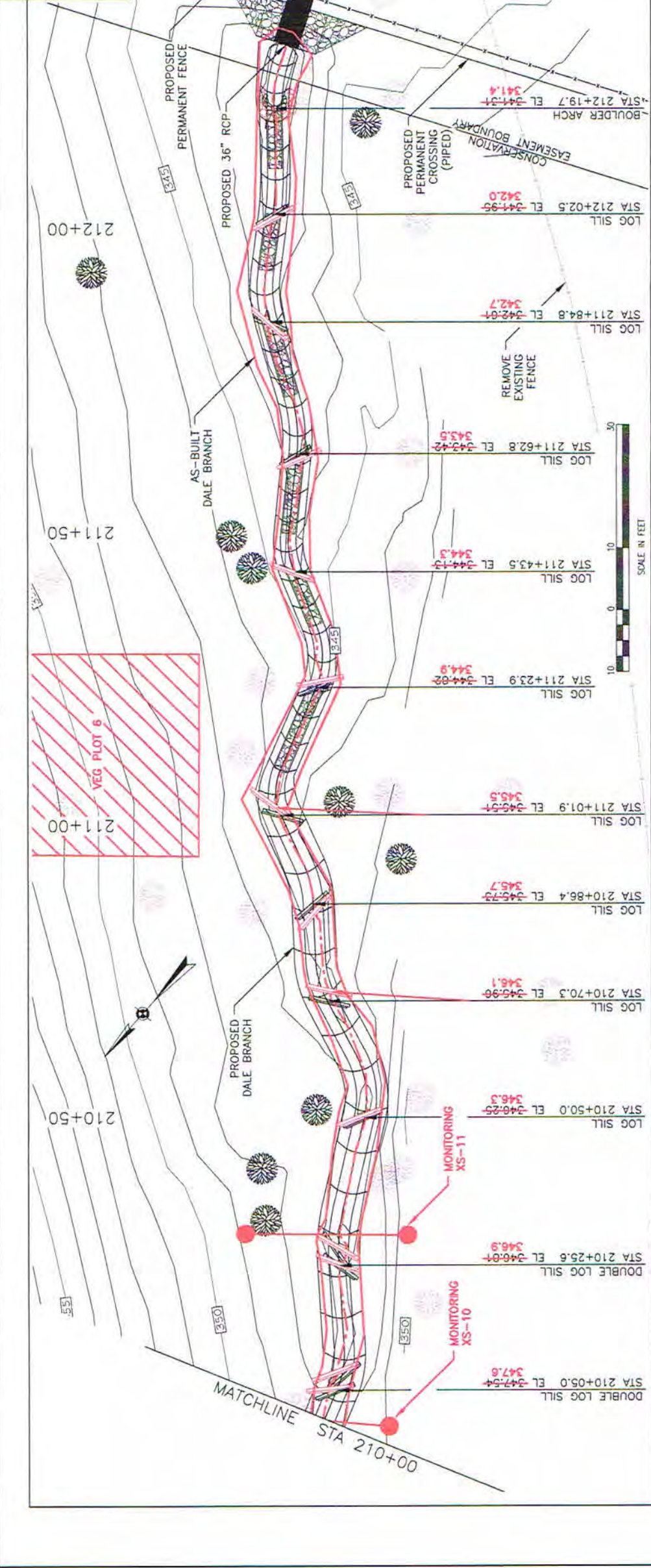
LEGEND

- PROPOSED RESTORATION
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- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT BED
- TOP OF BANK
- THALWEG





DALE BRANCH
 FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'
 HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

AS-BUILT PLAN & PROFILE

DATE	BY	CHKD BY	PROJECT NO.
7/27/15	ONE	BI	1058
TITLE BLOCK			AB-16

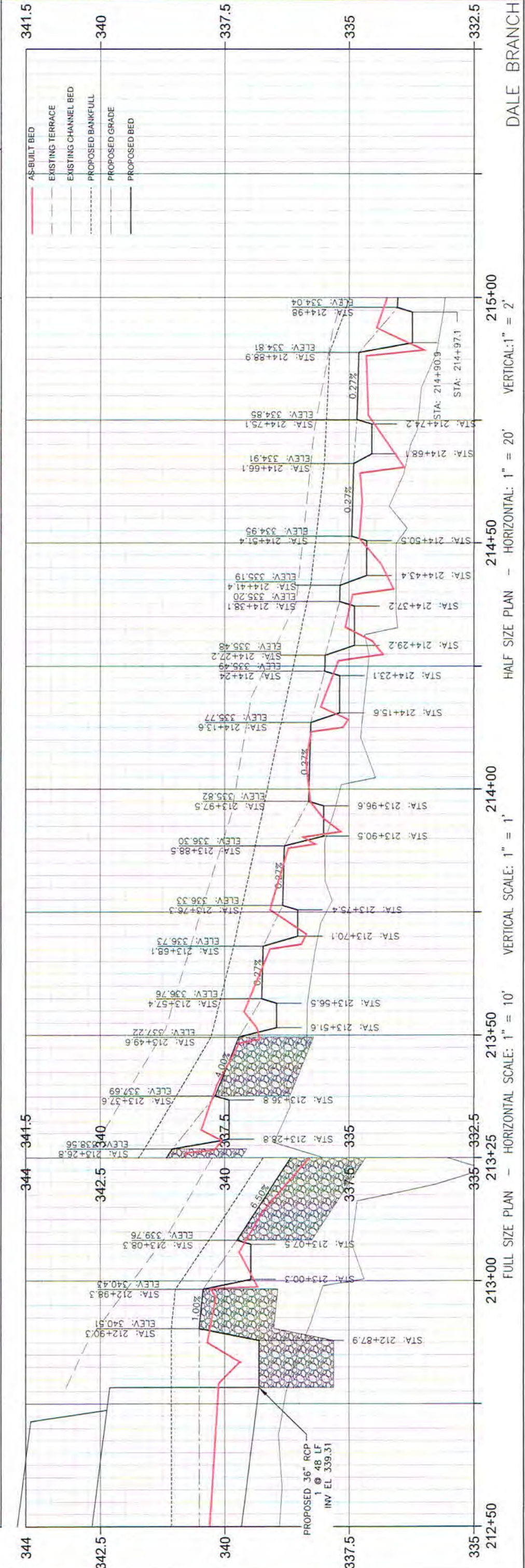
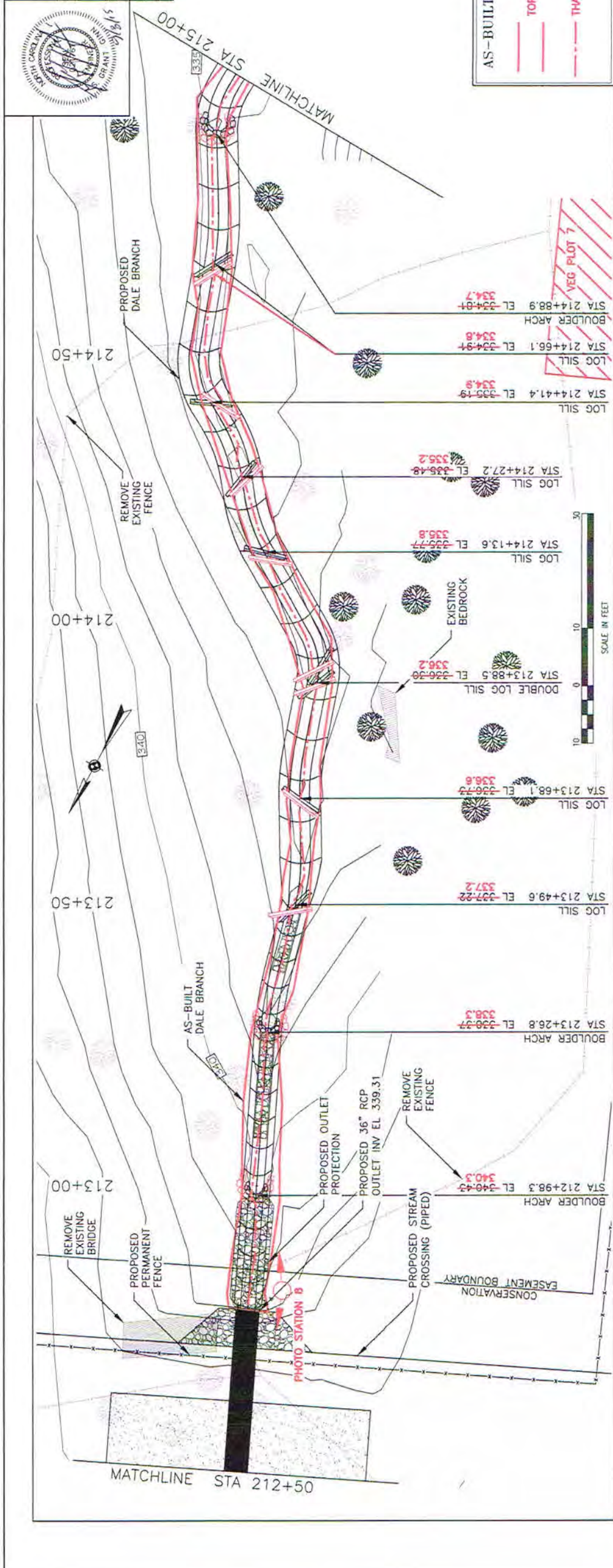
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

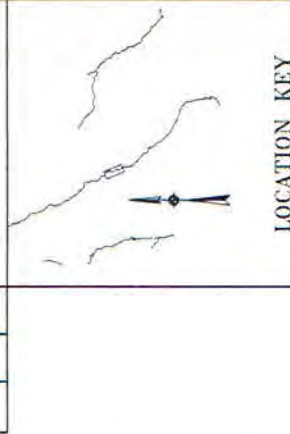
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- THALWEG



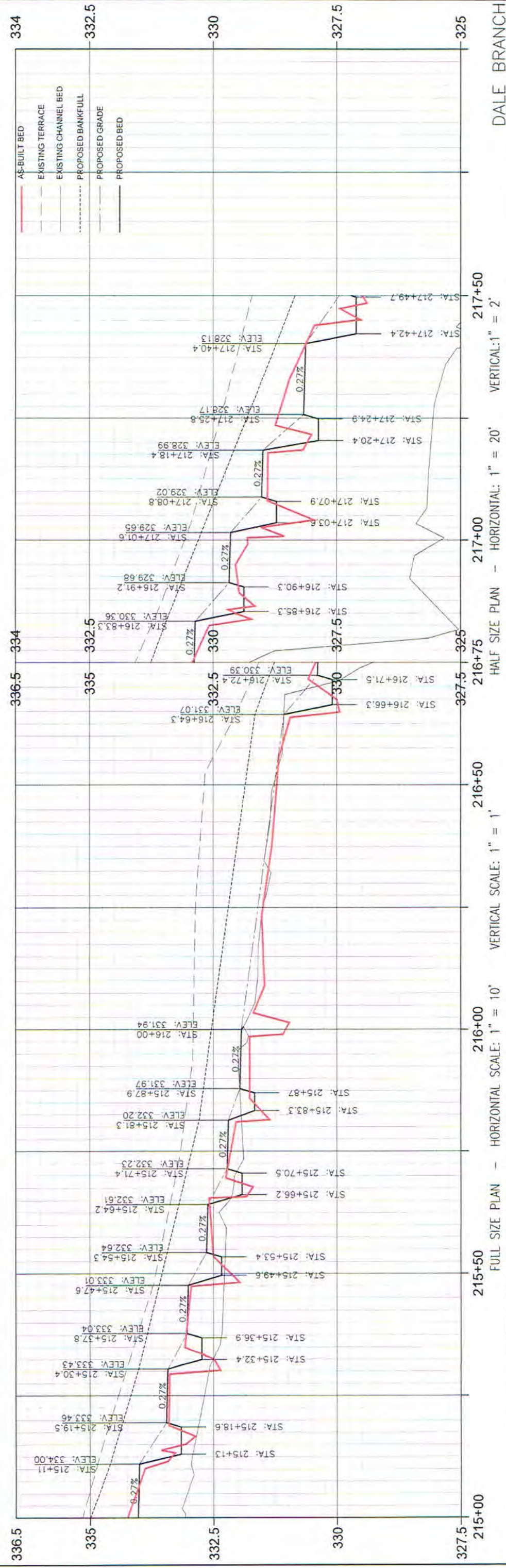
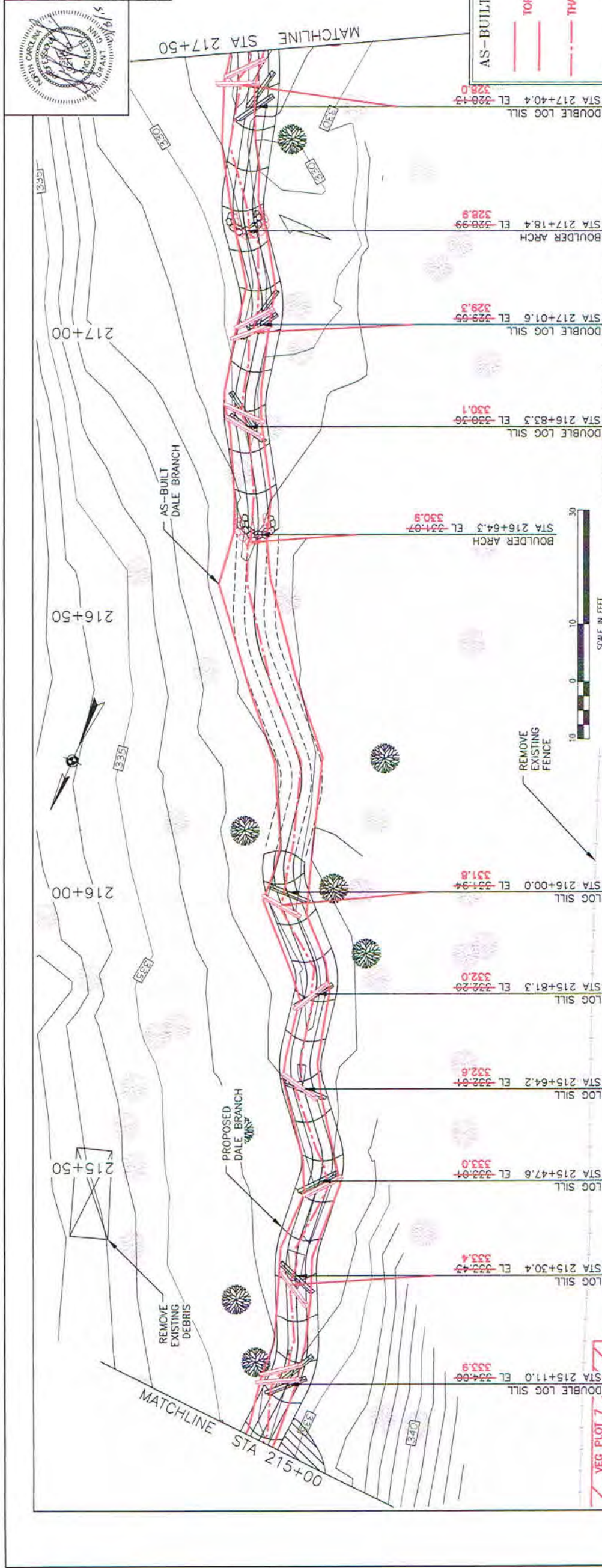
Wolf Creek Engineering
 ENGINEERING & ENVIRONMENTAL CONSULTING
 LICENSE NO. P-0417 Asheville, NC 28601
 12 1/2 Wall St., Suite C PHONE: (828) 449-1000 WWW.WOLFCREEKENG.COM
 PROJECT PEE DEE STREAM RESTORATION
 OWNER RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

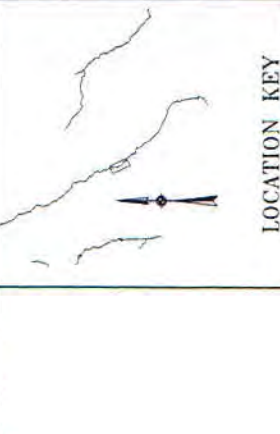
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 DATE 7/7/15 CHECK BY SOG
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 DATE 7/7/15
 SHEET NO. 1056 AB-17
 PROJECT NO. 1056 AB-17
 TITLE BLOCK



- LOCATION KEY**
- PROPOSED RESTORATION
 - IN-LINE RESTORATION
 - PROPOSED ARMORED RIFFLE
 - PROPOSED FILL
 - PROPOSED CUT
 - EXISTING FENCE
 - EXISTING TREE
 - SAVE TREE
- AS-BUILT LEGEND**
- TOP OF BANK
 - THALWEG



DALE BRANCH
 HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'
 FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

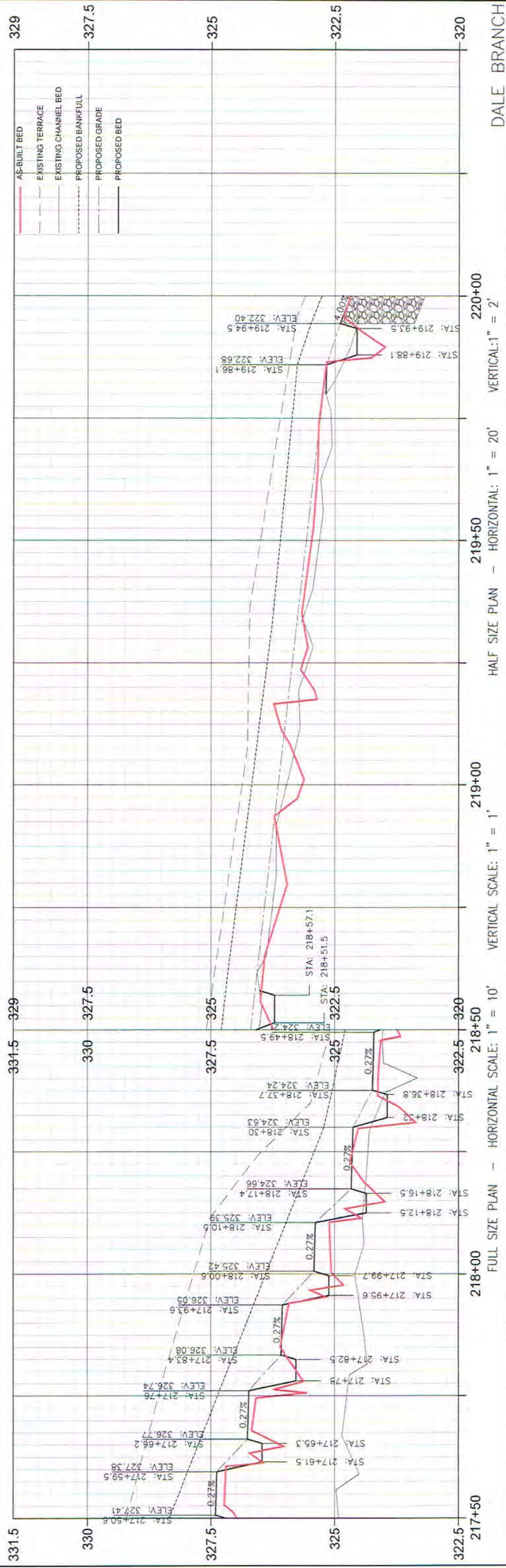
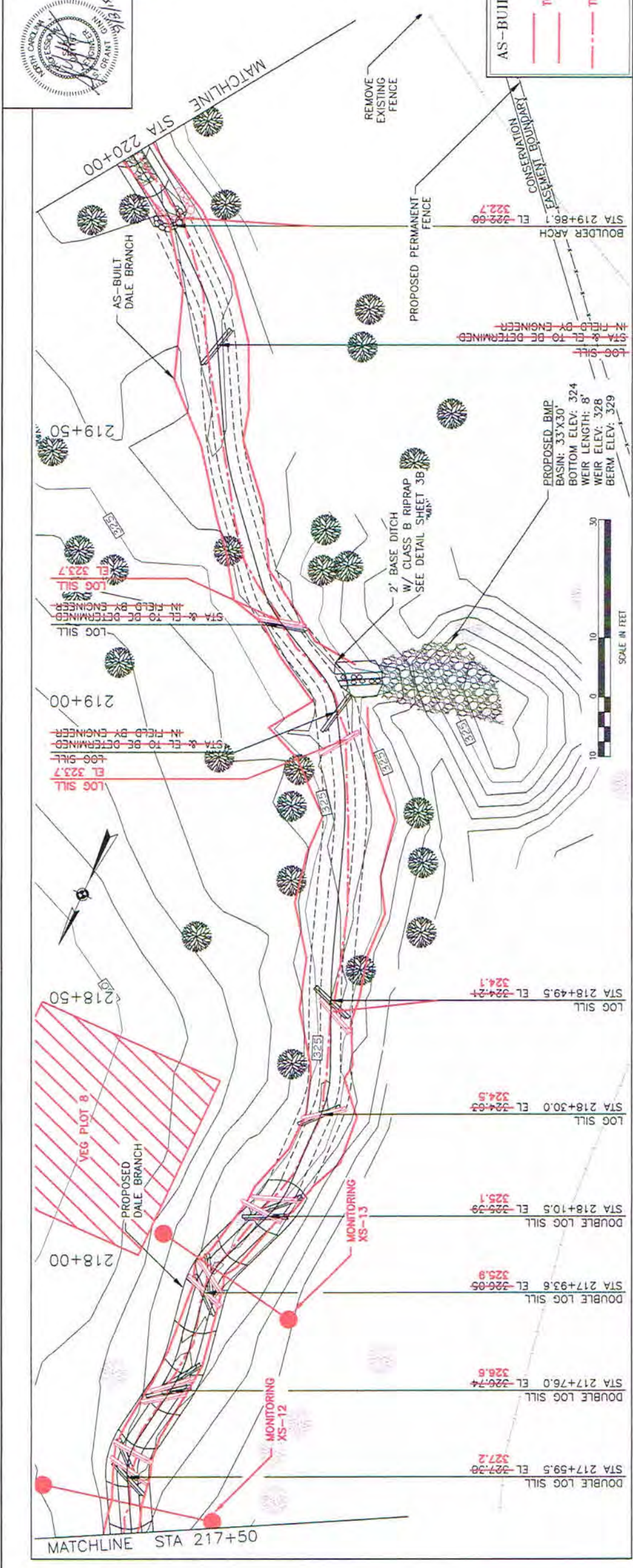


LOCATION KEY

	PROPOSED RESTORATION
	IN-LINE RESTORATION
	PROPOSED ARMORED RIFFLE
	PROPOSED FILL
	PROPOSED CUT
	EXISTING FENCE
	EXISTING TREE
	SAVE TREE

AS-BUILT LEGEND

	TOP OF BANK
	THALWEG

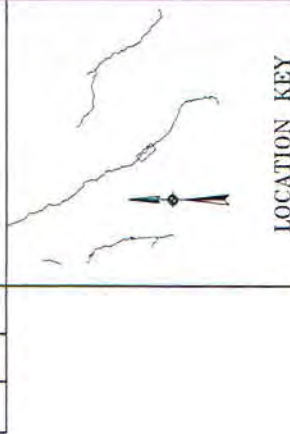


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PROJECT NO. 1056 AB-19
SHEET NUMBER
DATE 7/7/15
DRAWN BY T.A.S.
CHECKED BY S.G.G.
SCALE AS NOTED

AS-BUILT PLAN & PROFILE

PROJECT TITLE
SHEET NUMBER
DATE
DRAWN BY
CHECKED BY
SCALE AS NOTED



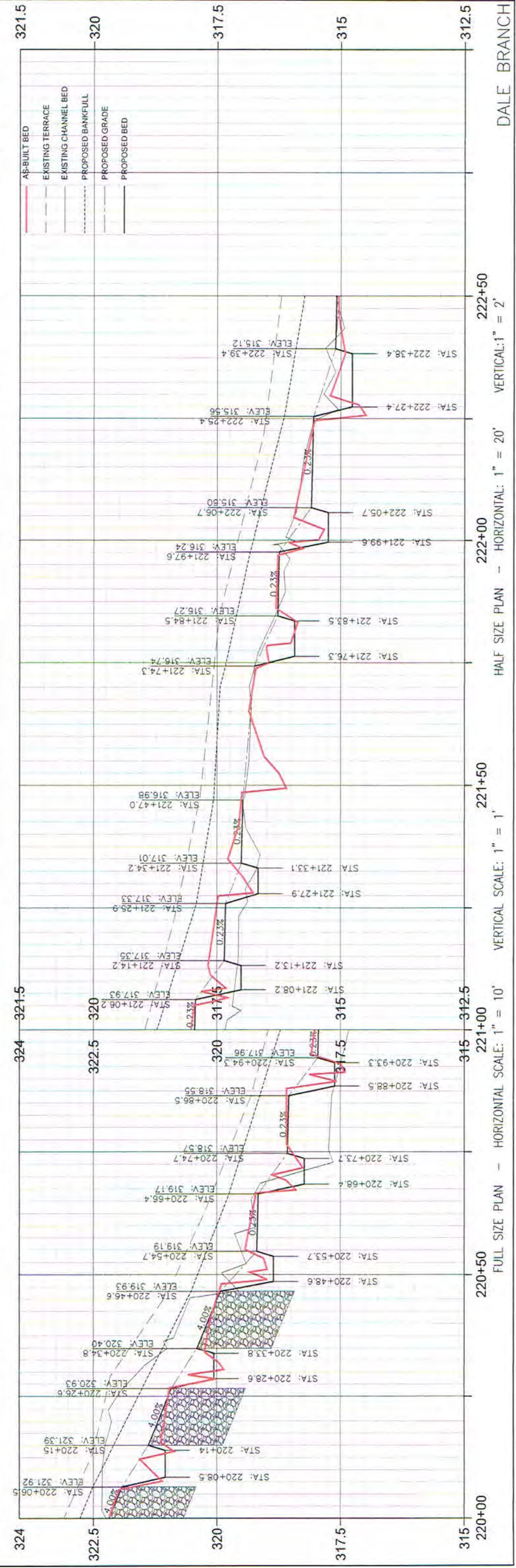
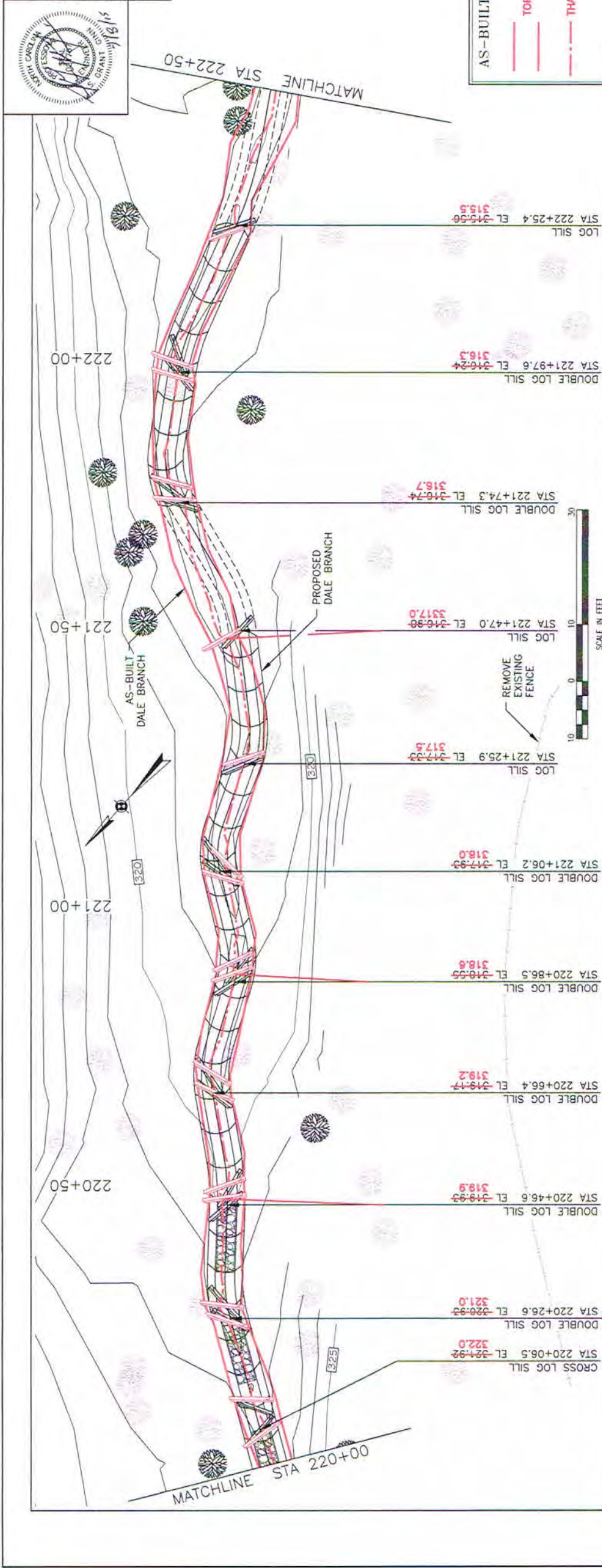
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

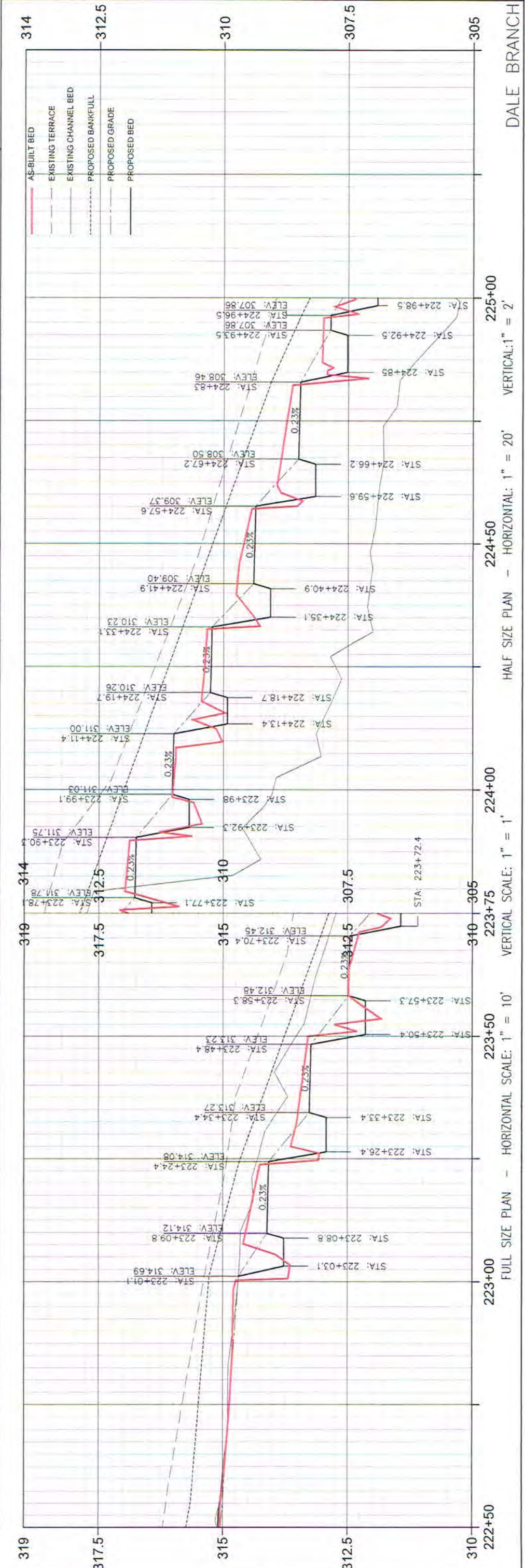
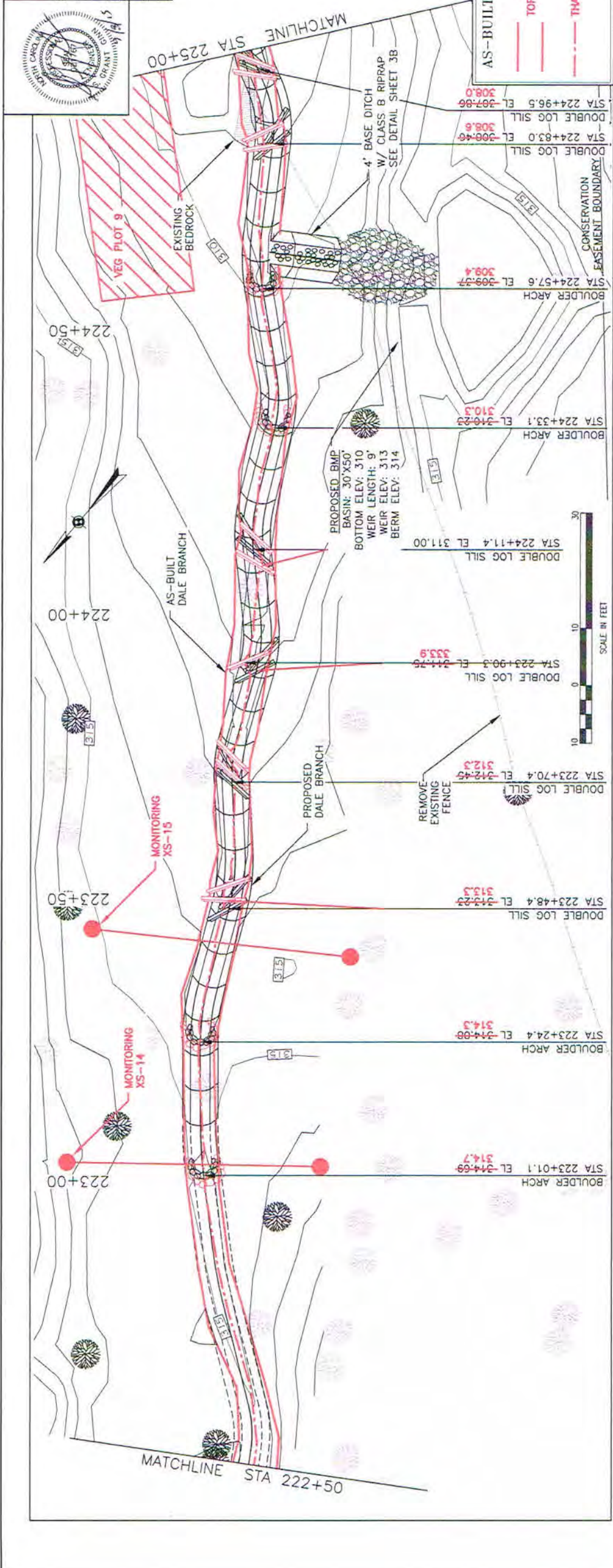
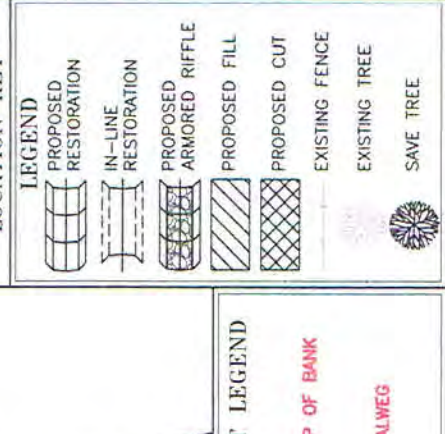
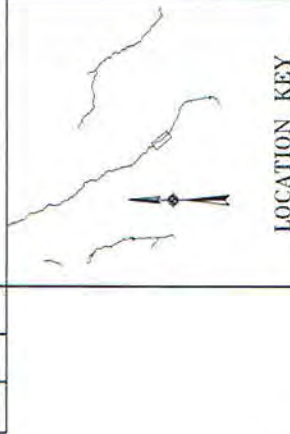
- AS-BUILT BED
- TOP OF BANK
- THALWEG



DALE BRANCH

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

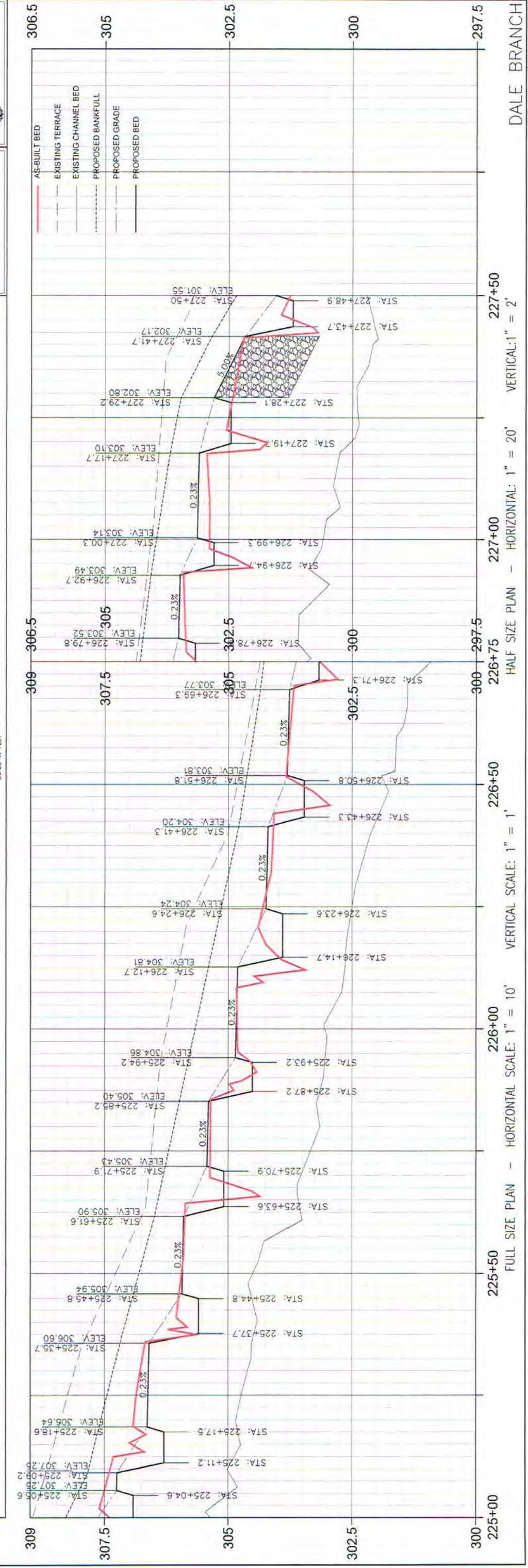
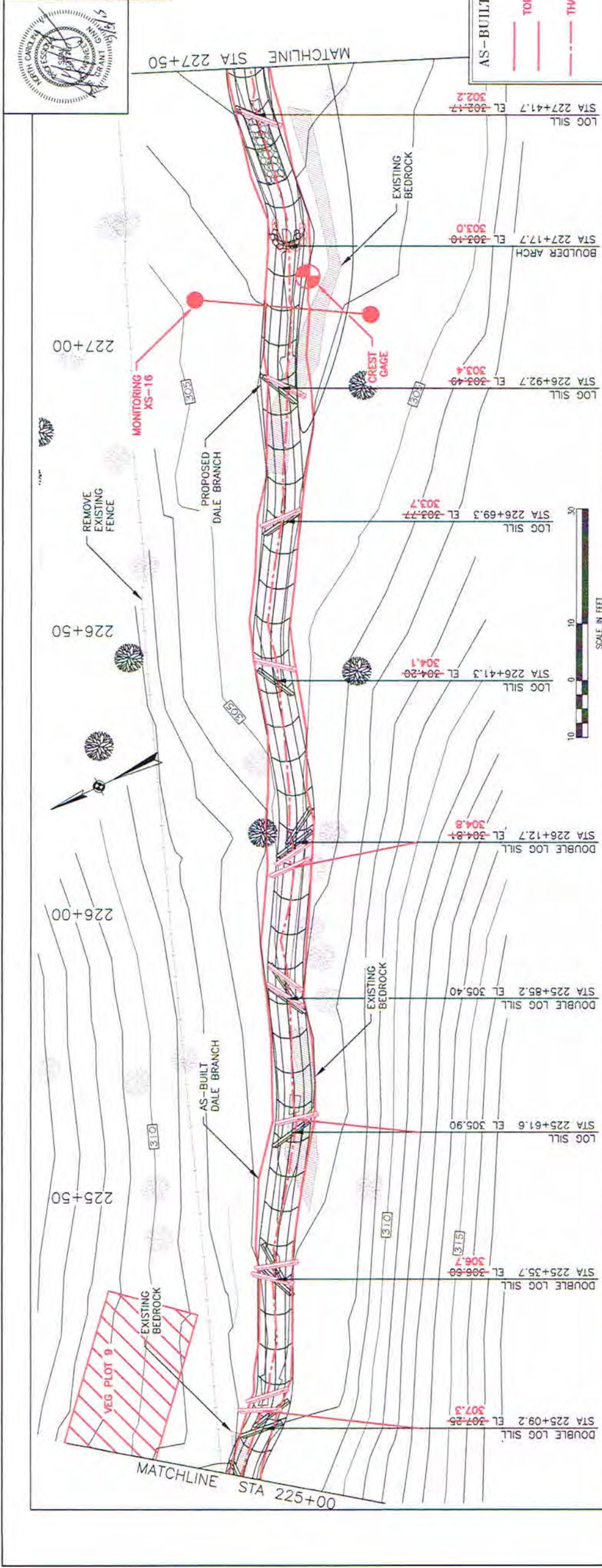
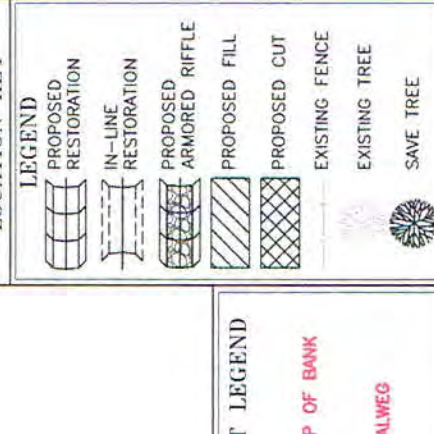
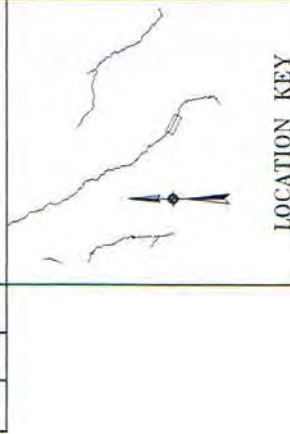


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 LICENSE NO. P-0417 Asheville, NC 28601
 12 1/2 Wall St., Suite C PHONE: (828) 419-1090 WWW.WOLFCREEK.COM
 PROJECT PEE DEE STREAM RESTORATION
 WORK RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE	BY	CHKD BY	REV	DESCRIPTION
7/7/15	MSG	MSG	1	ISSUE FOR PERMIT
7/7/15	MSG	MSG	2	AS-BUILT

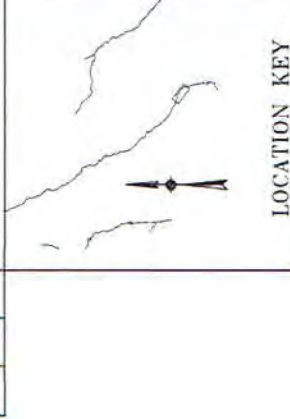
PROJECT NO. 105B
 SHEET NO. AB-21



DALE BRANCH

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FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'



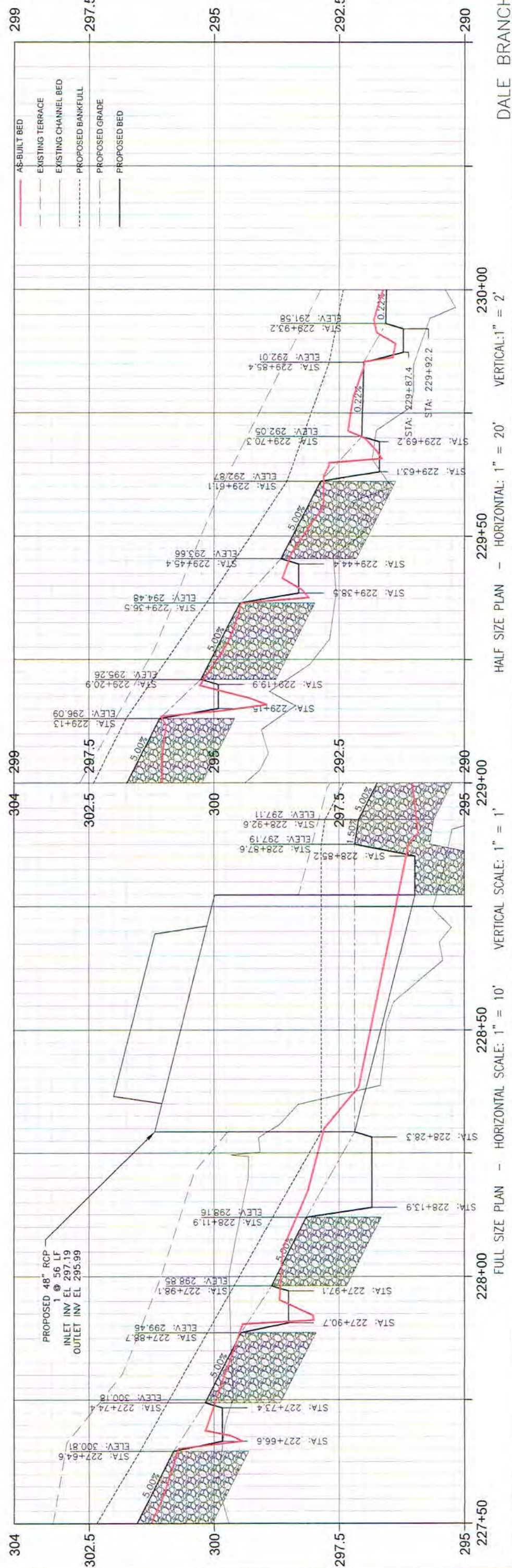
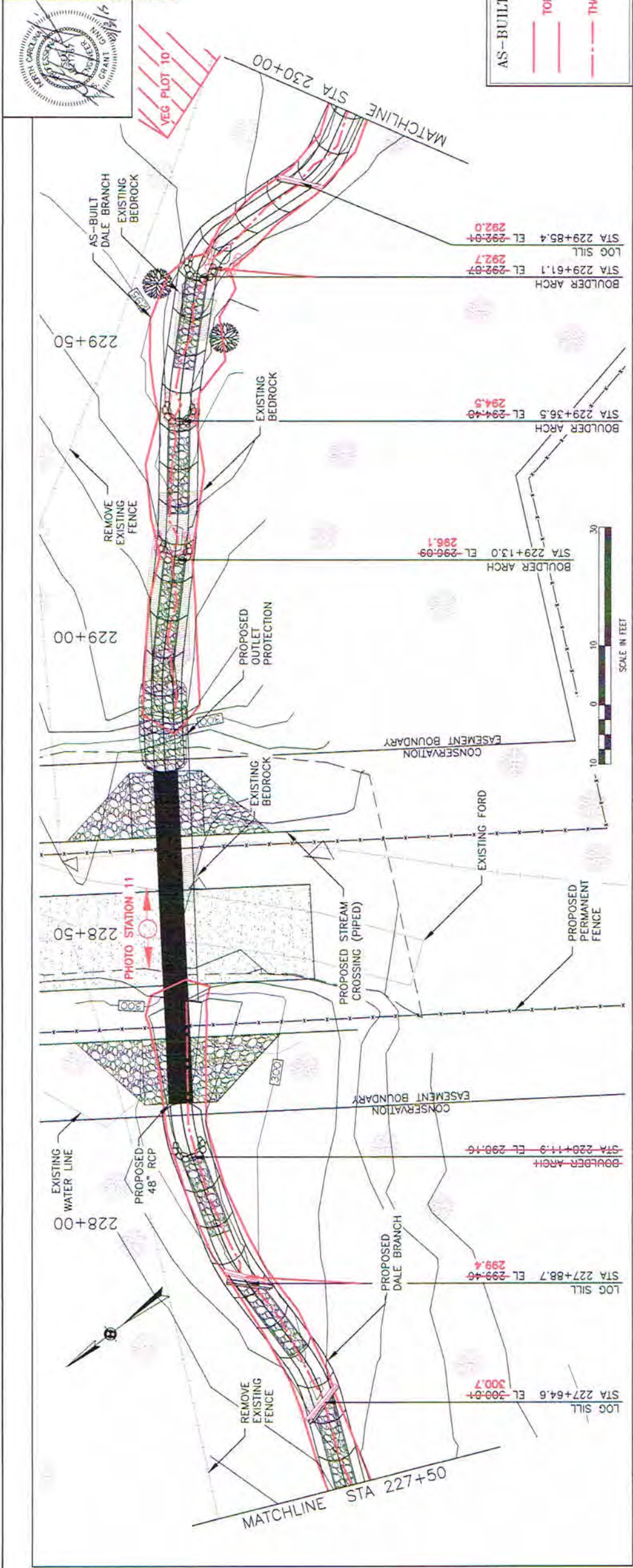
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT BED
- TOP OF BANK
- THALWEG



AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE 7/7/16	PROJECT NO. 1058	SHEET NUMBER AB-23
DATE	BY	CHECK BY	TITLE BLOCK
DATE	BY	CHECK BY	TITLE BLOCK

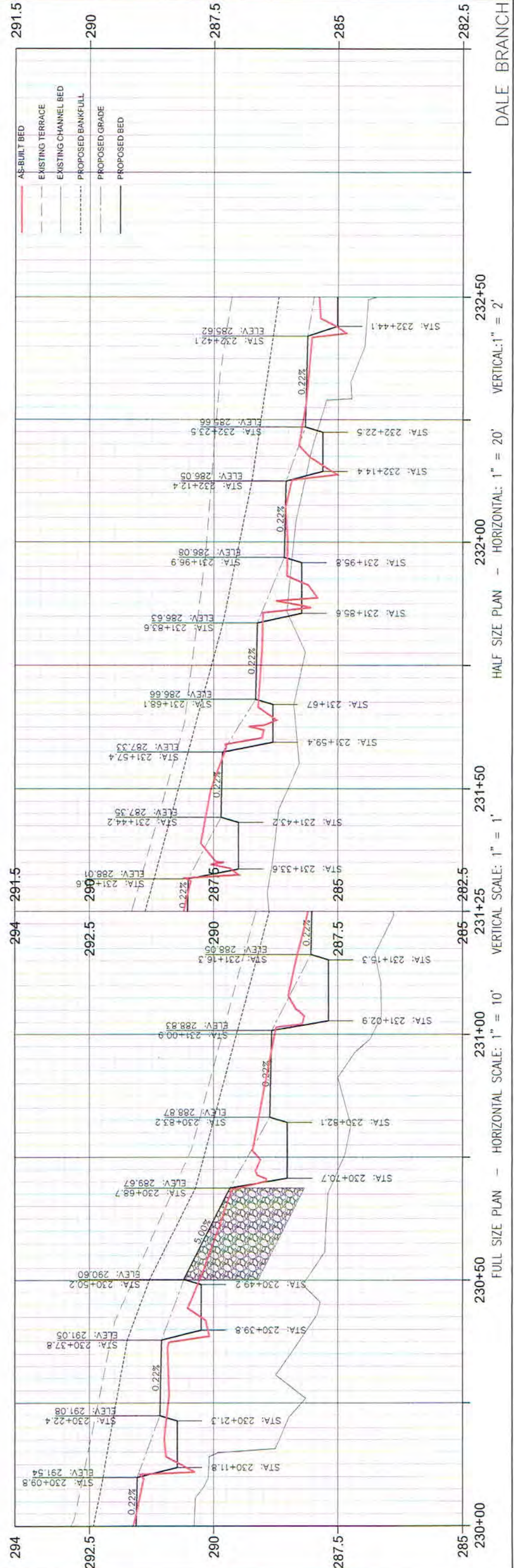
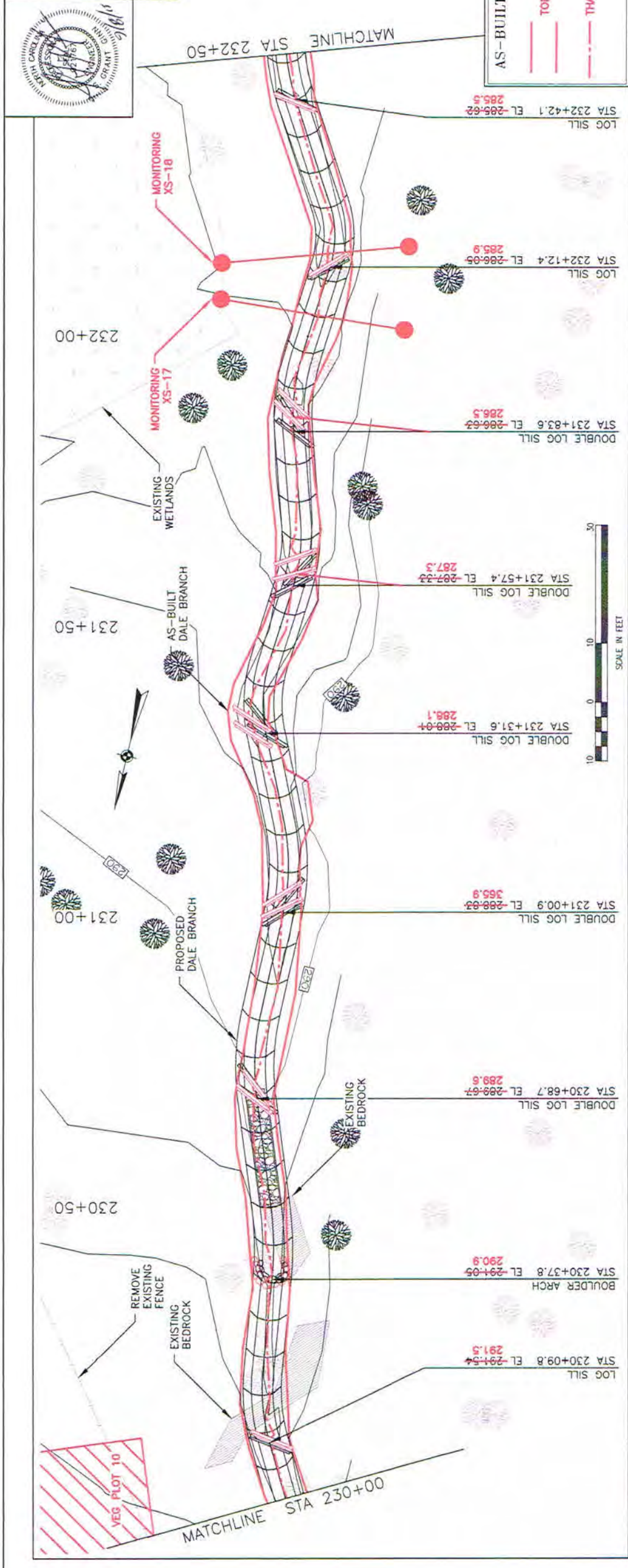
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
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AS-BUILT LEGEND

- TOP OF BANK
- THALWEG





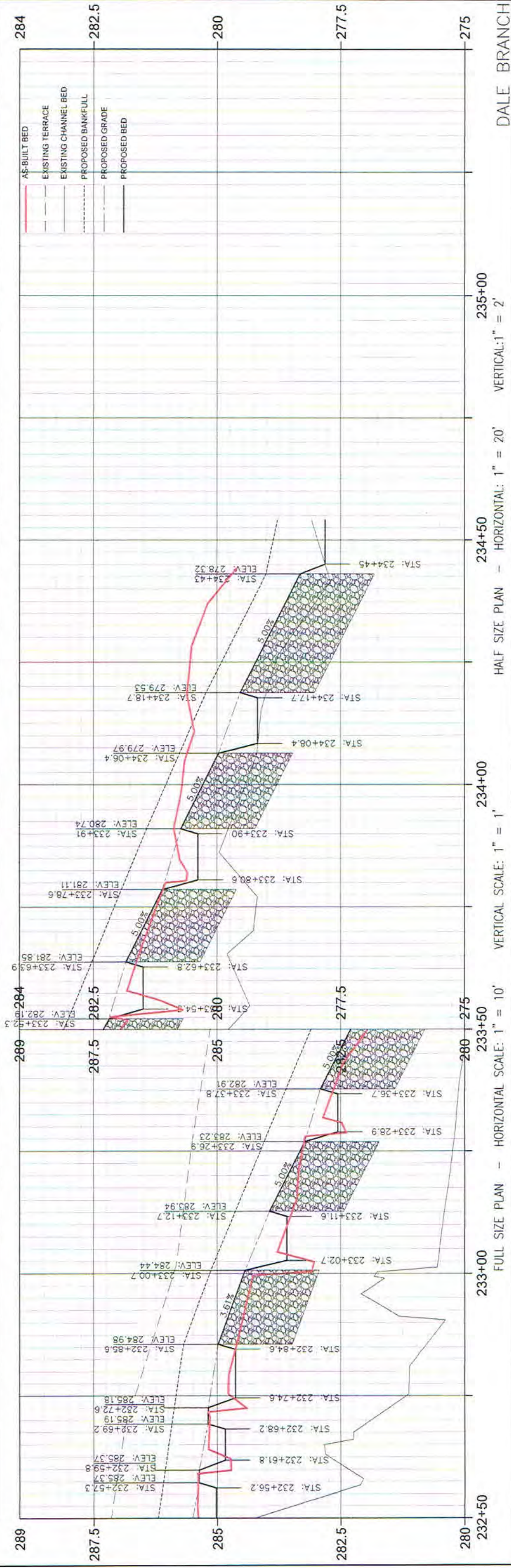
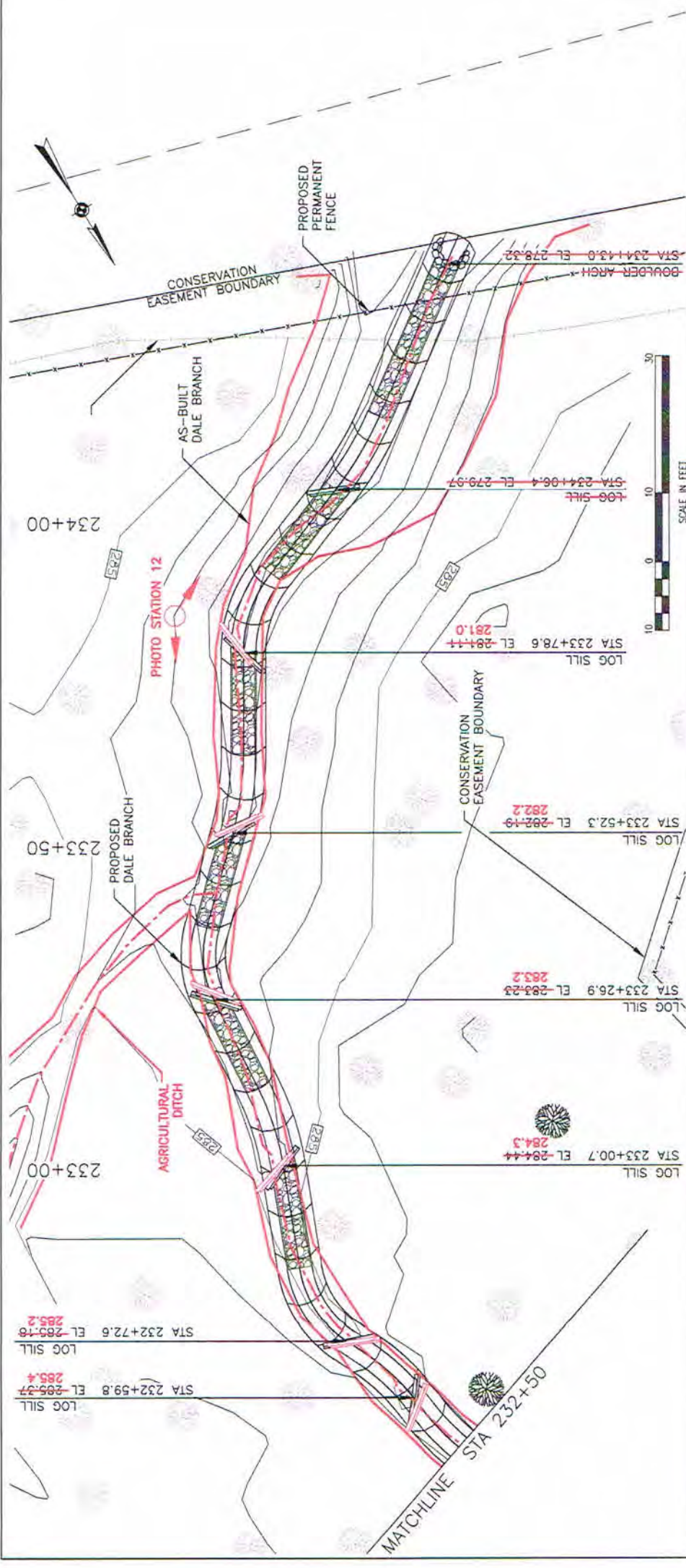
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

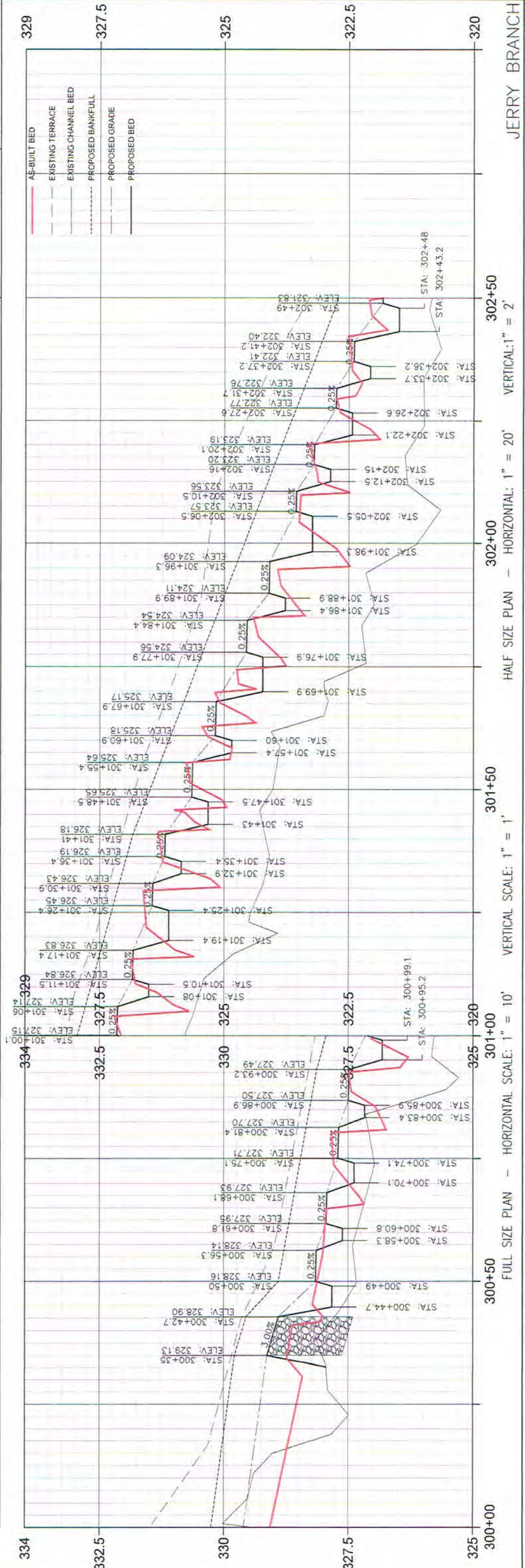
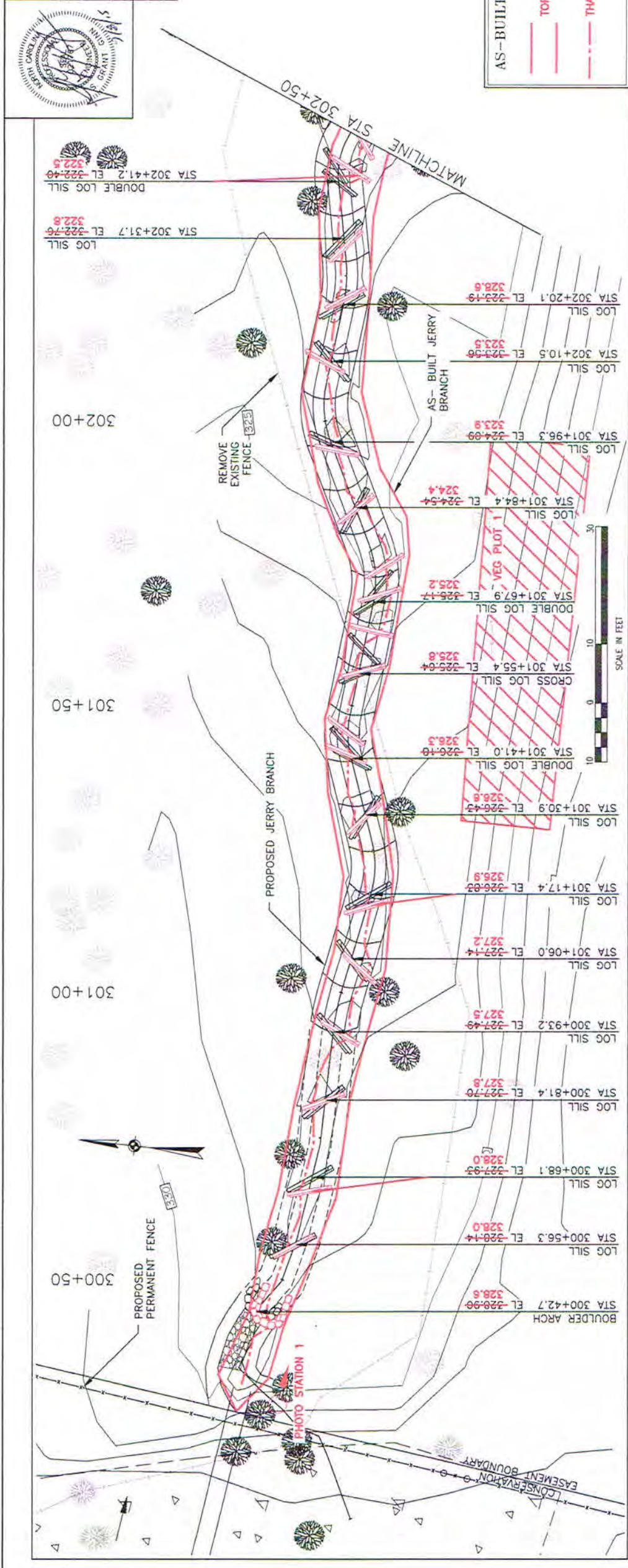
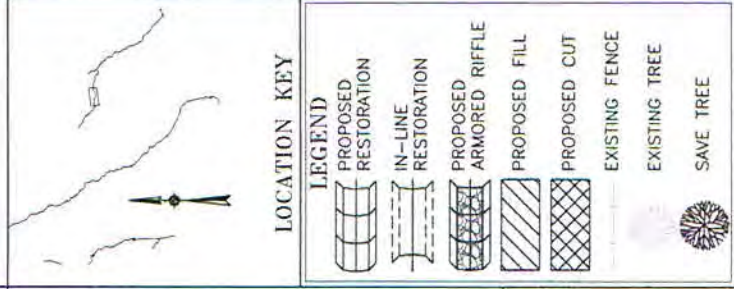
- AS-BUILT BED
- TOP OF BANK
- THALWEG



DALE BRANCH

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'



JERRY BRANCH
 FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'
 HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

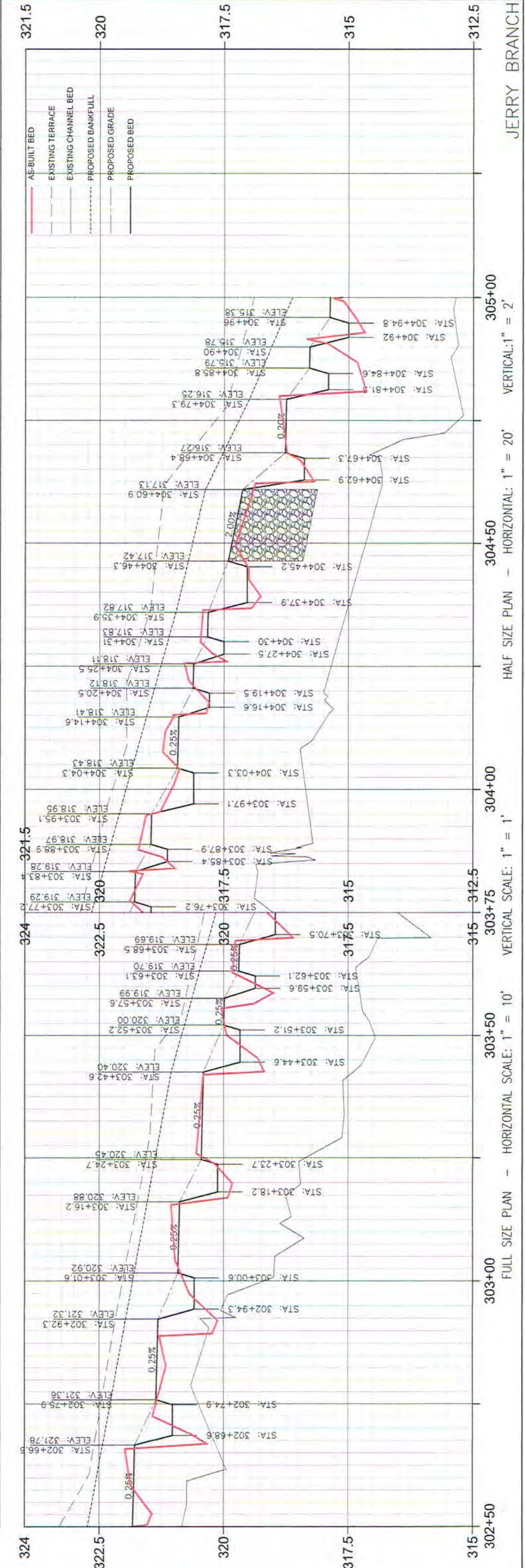
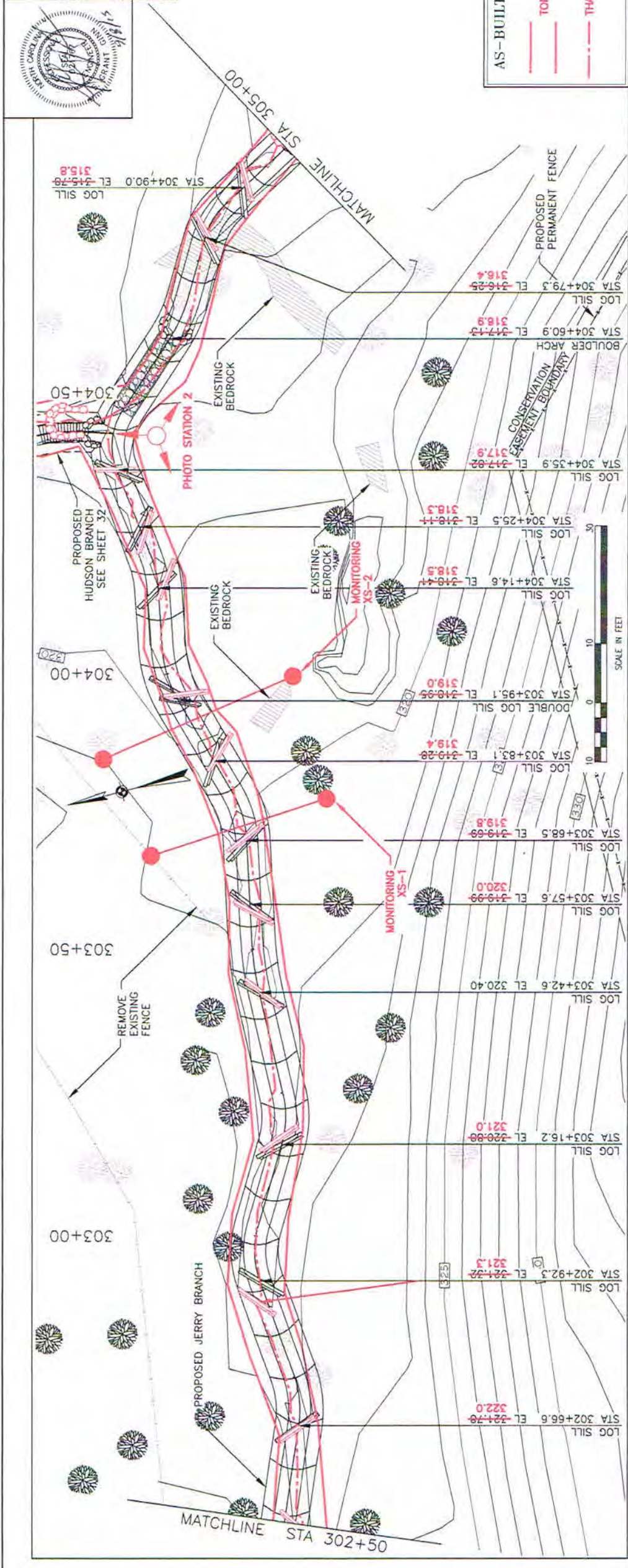
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT BED
- TOP OF BANK
- THALWEG



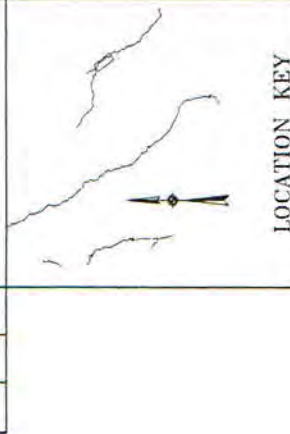
Wolf Creek Engineering
 ENGINEERING & ENVIRONMENTAL CONSULTING
 LICENSE NO. P-0417
 12 1/2 Wall St., Suite C Asheville, NC 28801
 PHONE: (828) 449-1000 WWW.WOLFCREEK.COM

PROJECT: PEE DEE STREAM RESTORATION
 CLIENT: RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE BY TKS	PROJECT NO.	SHEET NUMBER
DATE 7/7/15	DATE BY SOG	105B	AB-27

DATE: 7/7/15
 DRAWN BY: TKS
 CHECKED BY: SOG
 TITLE BLOCK



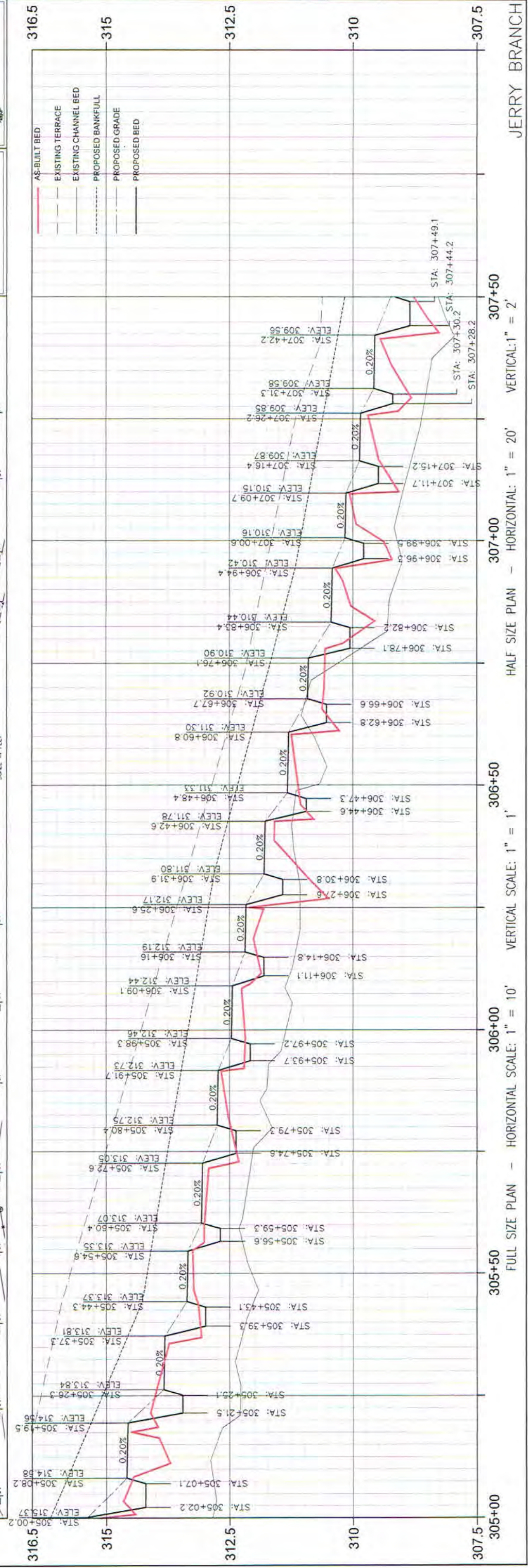
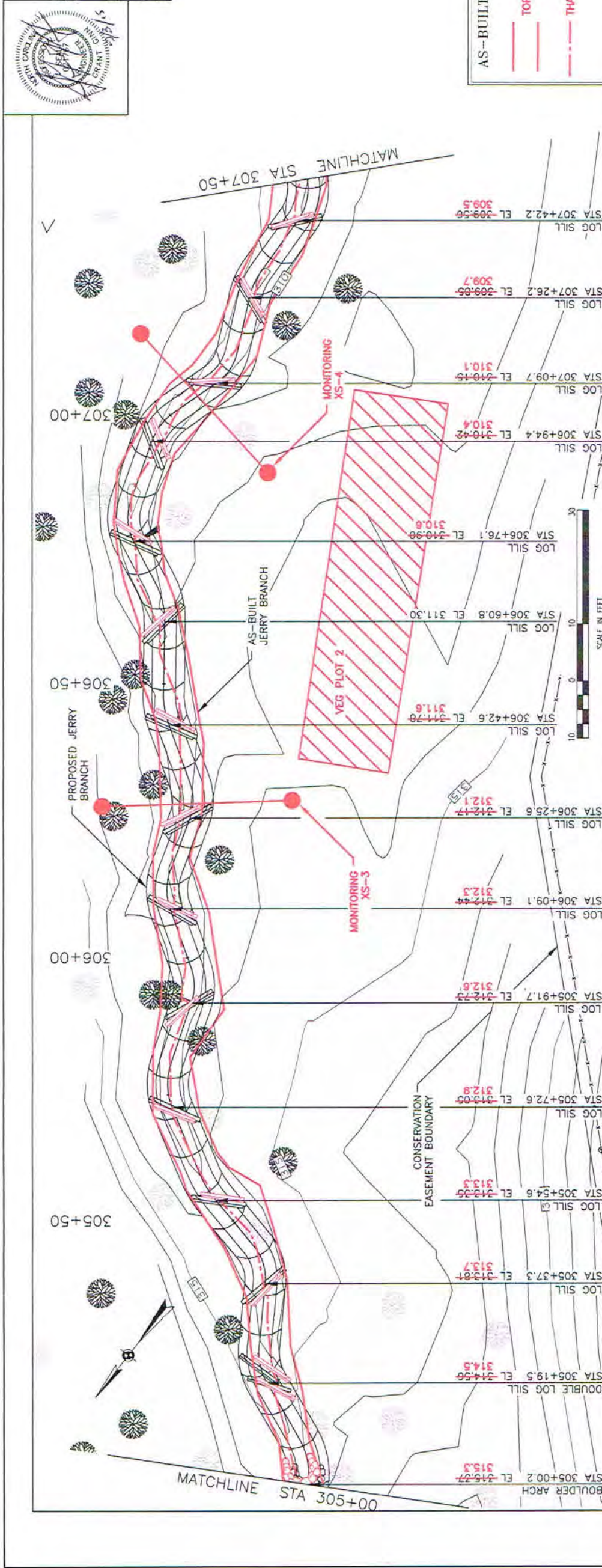
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT
- TOP OF BANK
- THALWEG



FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 2'
 HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'
 JERRY BRANCH

AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE 7/7/15	CHKD BY TGS	PROJECT NO. 1058	SHEET NUMBER AB-28
DATE 7/7/15	BY CME	DATE 7/7/15	REV	DESCRIPTION
DATE 7/7/15	BY CME	DATE 7/7/15	REV	DESCRIPTION
DATE 7/7/15	BY CME	DATE 7/7/15	REV	DESCRIPTION

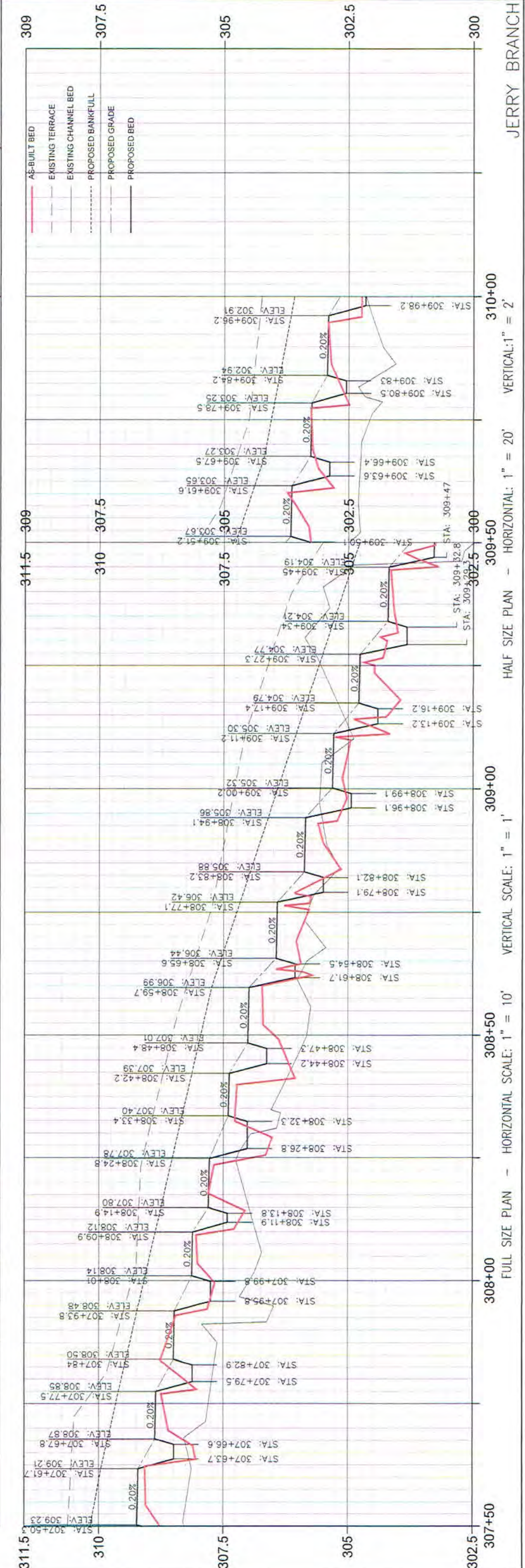
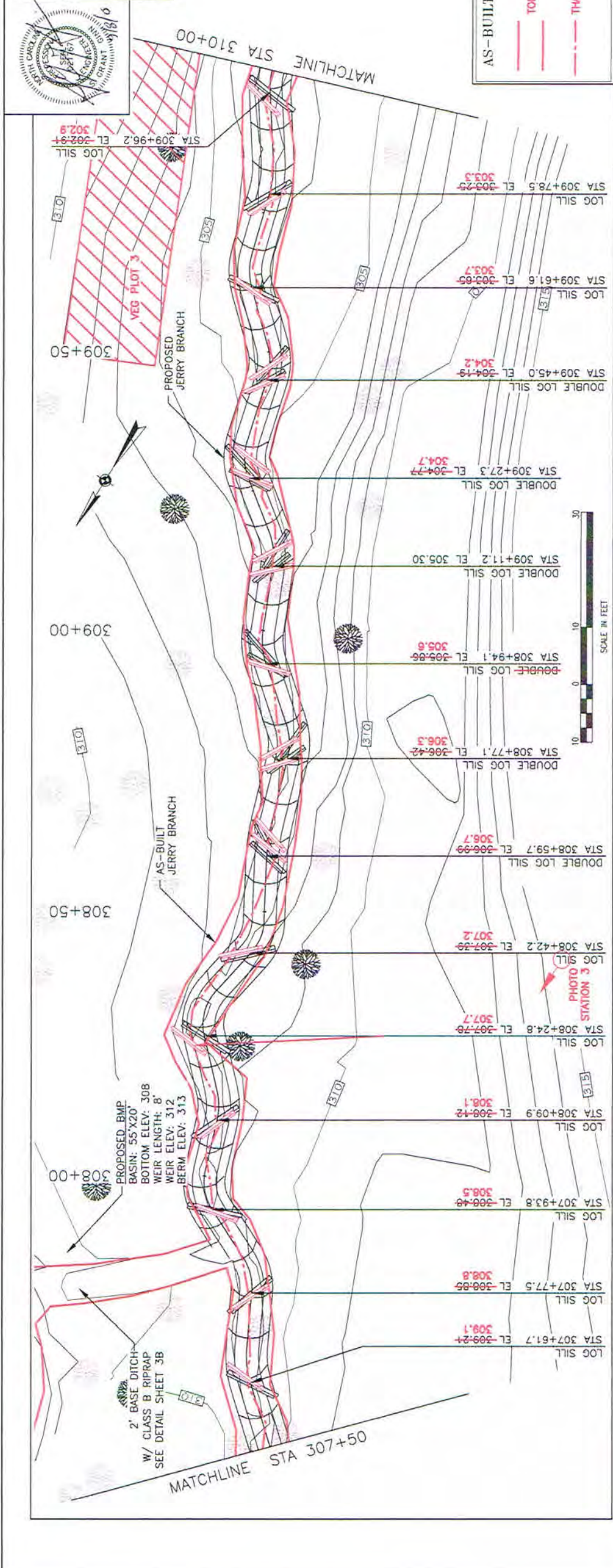
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT BED
- TOP OF BANK
- THALWEG

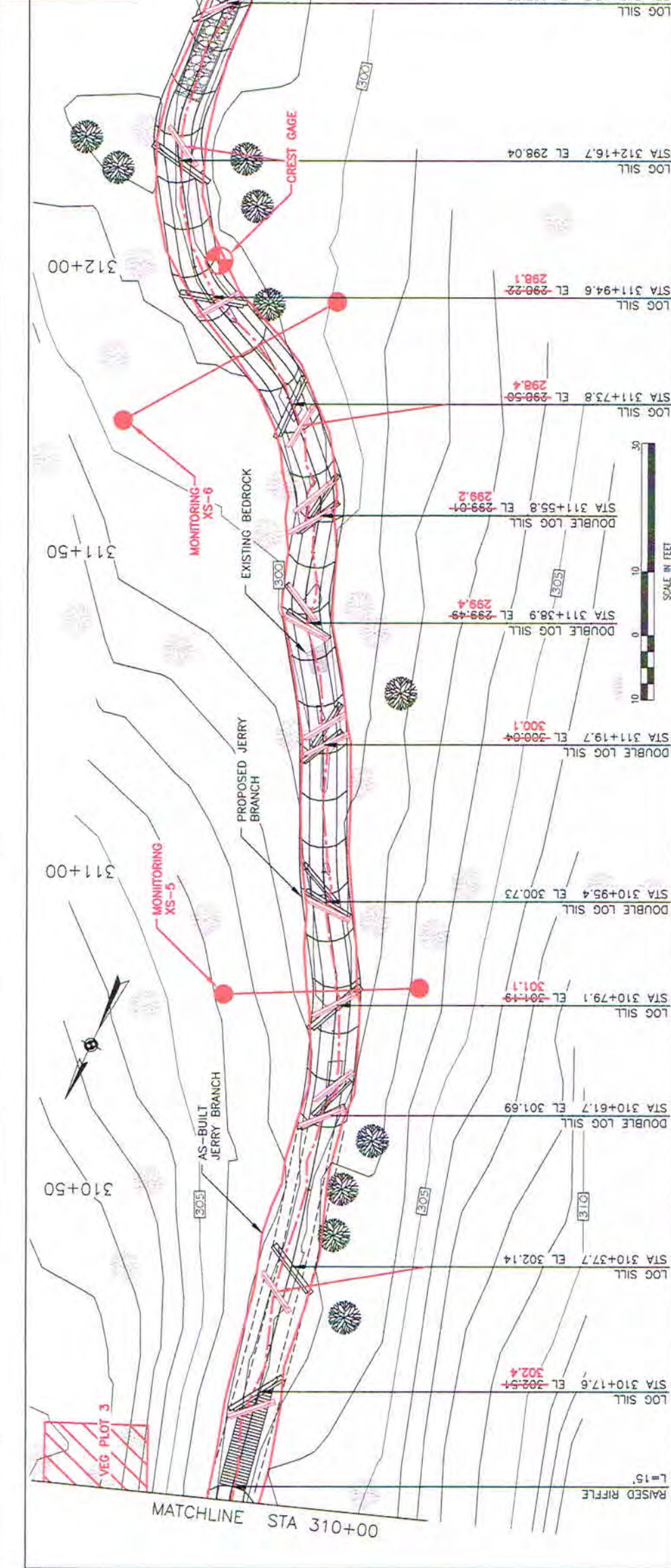


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 ENGINEERING & ENVIRONMENTAL CONSULTING
 LICENSE NO. P-0417 Asheville, NC 28601
 12 1/2 Wall St., Suite C PHONE: (828) 449-1000 WWW.WOLFCKEENG.COM
 PROJECT FEE DEE STREAM RESTORATION
 OWNER RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE: 7/7/15
 DRAWN BY: TMS
 CHECKED BY: JMS
 SHEET NO.: 1058
 PROJECT NO.: AB-29

DATE: 7/7/15
 DRAWN BY: TMS
 CHECKED BY: JMS
 SHEET NO.: 1058
 PROJECT NO.: AB-29

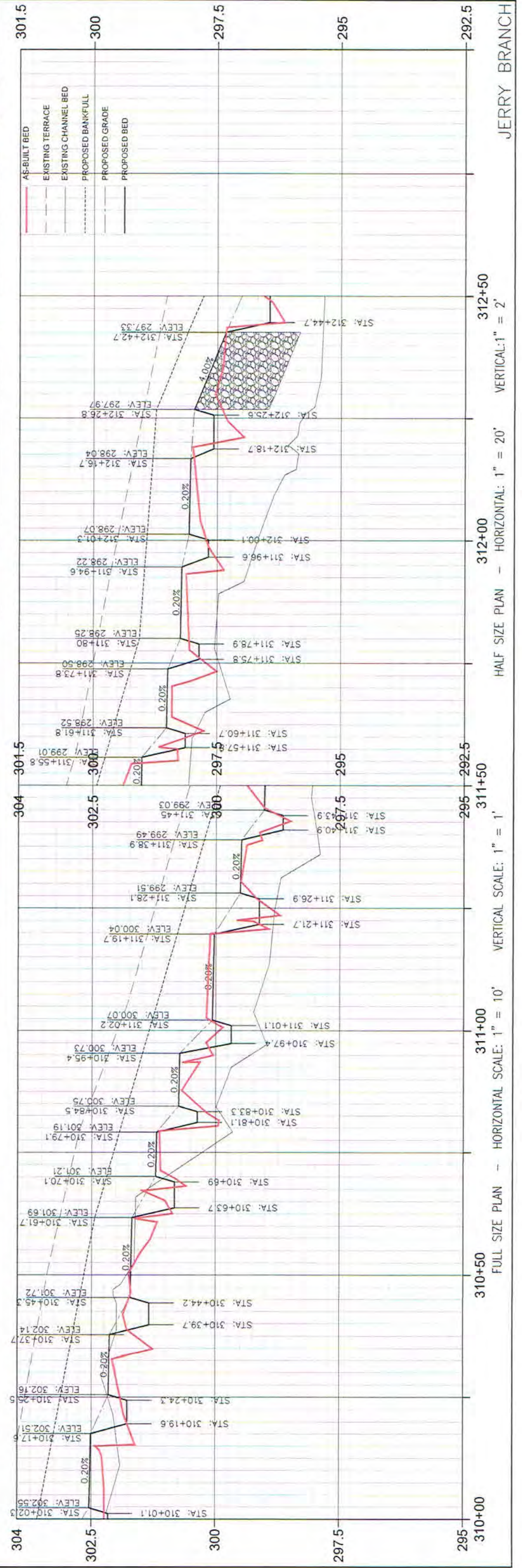


LOCATION KEY

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
- PROPOSED FILL
- PROPOSED CUT
- EXISTING FENCE
- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT BED
- TOP OF BANK
- THALWEG



AS-BUILT LEGEND

- AS-BUILT BED
- EXISTING TERRACE
- EXISTING CHANNEL BED
- PROPOSED BANKFULL
- PROPOSED GRADE
- PROPOSED BED

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'
 FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

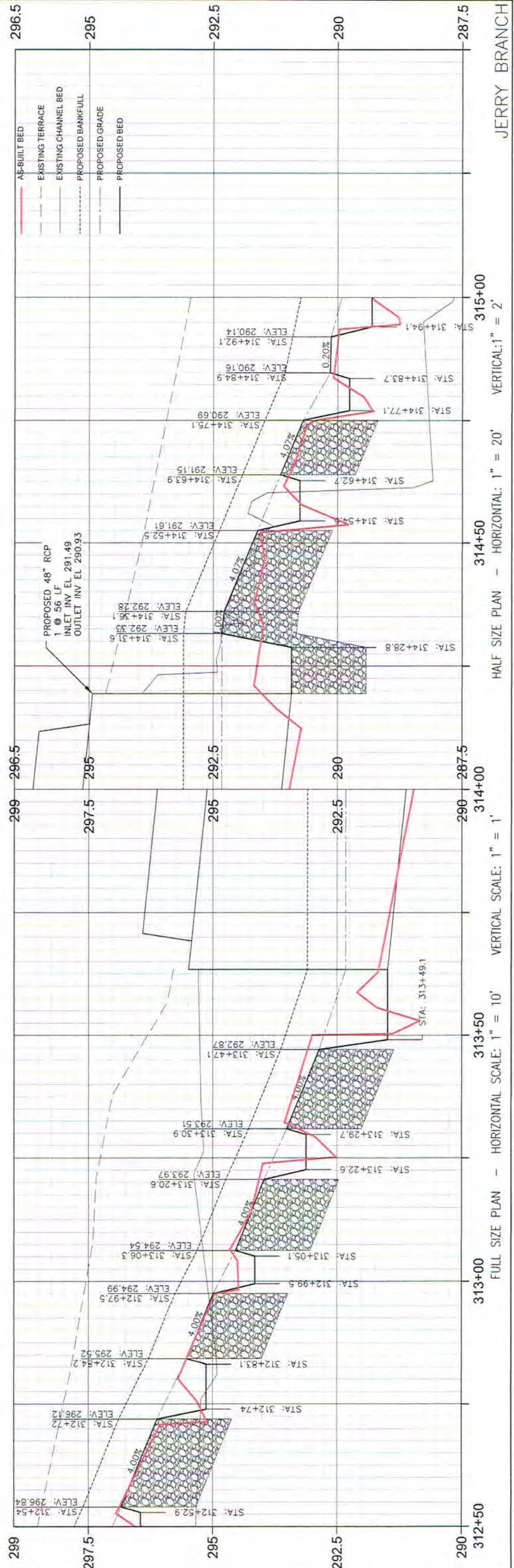
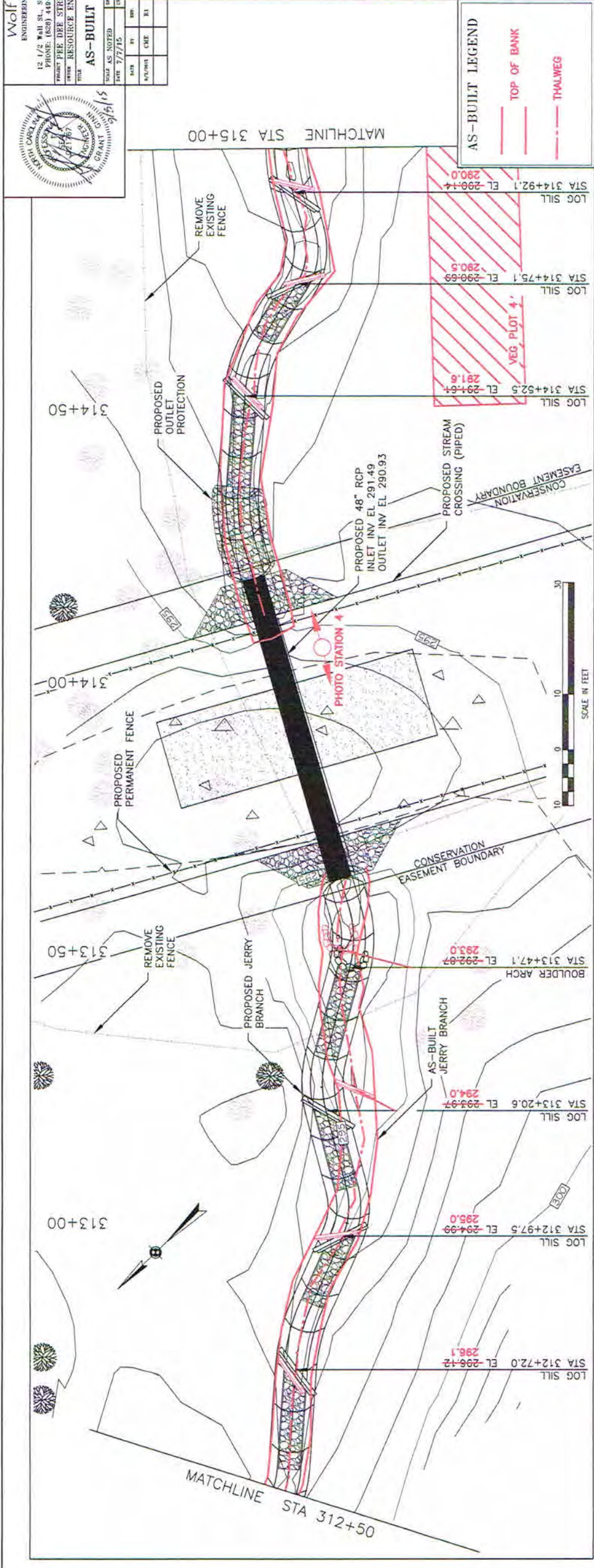
LOCATION KEY

LEGEND

- PROPOSED RESTORATION
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AS-BUILT LEGEND

- TOP OF BANK
- THALWEG



JERRY BRANCH

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

Wolf Creek Engineering
ENGINEERING & ENVIRONMENTAL CONSULTING
7 Florida Ave. Weaverville, NC 28787
PHONE: (828) 658-3649 WWW.WOLFCKEENG.COM

PROJECT: PEE DEE STREAM RESTORATION
OWNER: RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

SCALE AS NOTED	DATE BY T.A.S.	PROJECT NO.	SHEET NUMBER
DATE: 7/7/15	DATE BY SUG	1056	AJ-31

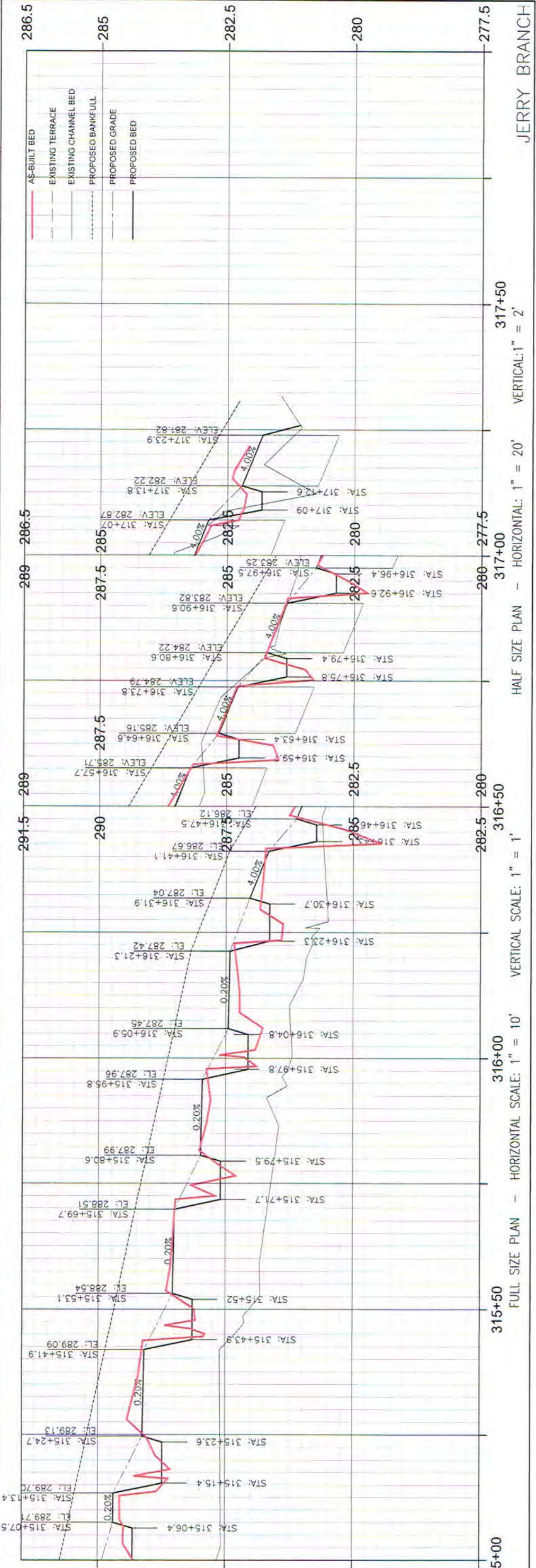
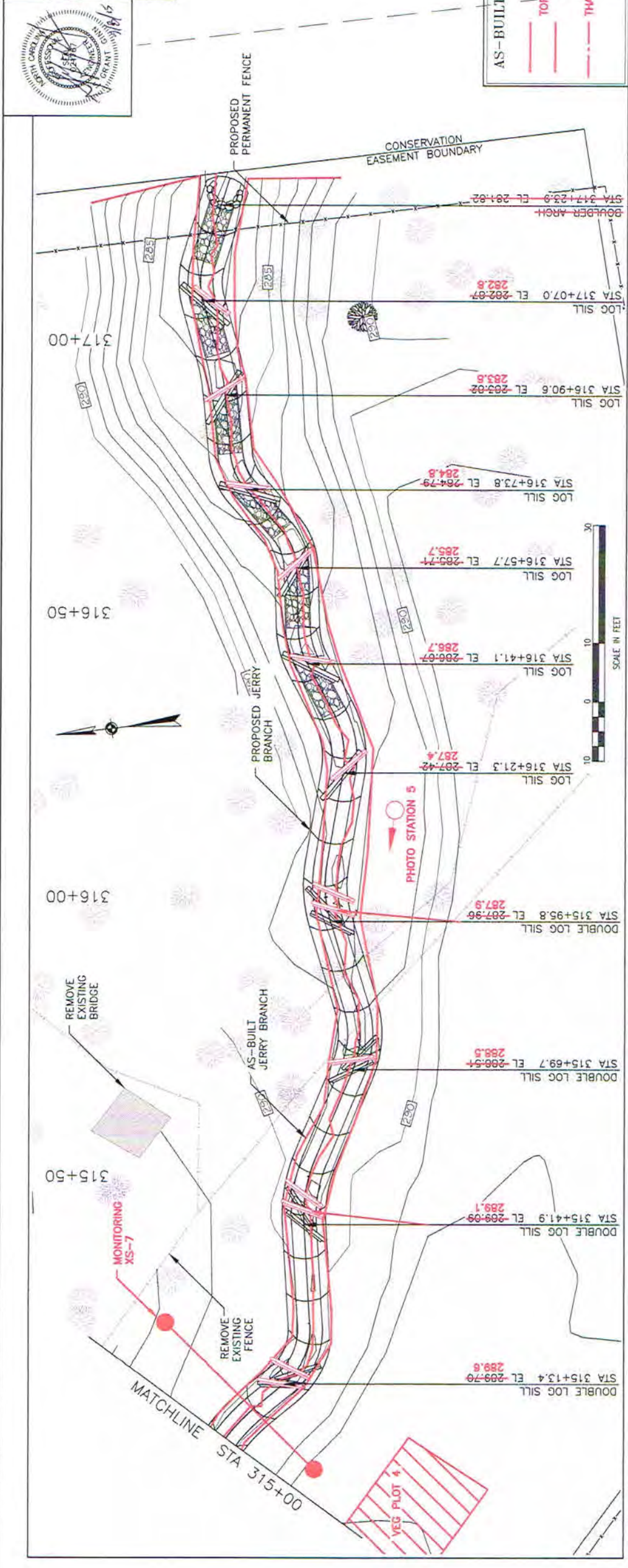
DATE: 7/7/15
BY: T.A.S.
CME: B1
TITLE BLOCK

LOCATION KEY

- PROPOSED RESTORATION
- IN-LINE RESTORATION
- PROPOSED ARMORED RIFFLE
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- EXISTING TREE
- SAVE TREE

AS-BUILT LEGEND

- AS-BUILT
- TOP OF BANK
- THALWEG



315+00 315+50 316+00 316+50 317+00 317+50

282.5 285 287.5 290 291.5

286.5 285 282.5 280 277.5

HALF SIZE PLAN - HORIZONTAL: 1" = 20' VERTICAL: 1" = 2'

FULL SIZE PLAN - HORIZONTAL SCALE: 1" = 10' VERTICAL SCALE: 1" = 1'

JERRY BRANCH

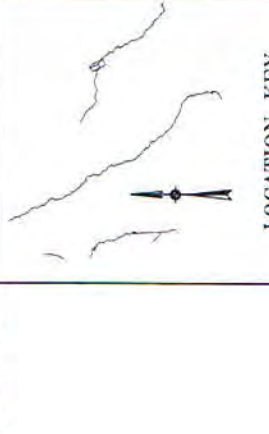
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 12 1/2 Wall St., Suite C
 PHONE: (628) 449-1900
 WWW.WOLFCREEKENG.COM

PROJECT: FEE DEE STREAM RESTORATION
 OWNER: RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

AS-BUILT PLAN & PROFILE

DATE	BY	CHKD BY	PROJECT NO.	SHEET NUMBER
7/7/15	TAS	1058	AD-32	

DATE	BY	CHKD BY	PROJECT NO.	SHEET NUMBER
7/7/15	TAS	1058	AD-32	



LEGEND

- PROPOSED RESTORATION
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- PROPOSED FILL
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- EXISTING FENCE
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AS-BUILT LEGEND

- TOP OF BANK
- THALWEG

