MY00 FINAL MONITORING REPORT

Dales Creek Restoration Site
Buncombe County, North Carolina
French Broad River Basin - 06010105

DMS Project #100128
DMS Contract #7910
DMS RFP #16-007724 (Issue Date: November 13, 2018)
USACE AID #: SAW 2019-00834 DWR #: 20190864
Monitoring Data Collected: 2022

Prepared for:
NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699

Monitoring and Design Firm

Prepared by:

KCI Associates of North Carolina, PC
4505 Falls of Neuse Road
Suite 400
Raleigh, NC 27609
(919) 783-9214

Project Contact: Adam Spiller
Email: adam.spiller@kci.com

KCI ASSOCIATES OF NORTH CAROLINA, PA

ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS

4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 (919) 783-9214 (919) 783-9266 Fax

MEMORANDUM

Date:	September 1, 2022
To:	Harry Tsomides, DMS Project Manager
From:	Adam Spiller, Project Manager KCI Associates of North Carolina, PA
Subject:	MY-00 Monitoring Report Comments Dales Creek DMS #7910, Contract 100128 French Broad River Basin CU 06010105 Buncombe County, North Carolina

Please find below our responses in italics to the MY-00 Monitoring Report comments from NCDMS received on August 15, 2022 for the Dales Creek Restoration Site.

1. "As Built Plans" should be labelled as "Record Drawings" or "As-Built Record Drawings" to indicate these are the drawings of record.
   KCI Response: "As-Built Plans" have been changed to "As-Built Record Drawings".

2. A PLS-sealed as built survey is needed for the project.
   KCI Response: This has been provided with the final deliverables.

3. Crossing area fencing was not accurately depicted on the as builts. Please include the installed fence layer and existing fence layer on the CCPV, as built survey, and record drawings. The installed fence should be a surveyed layer to verify correct placement. Any fencing or features no longer present should not appear on the as built survey.
   KCI Response: The surveyed fence layer has been provided with the final deliverables.

4. Planting tables show no deviations from the Mitigation Plan. Please verify that plant species and quantities did not deviate from the approved list. If there is a deviation from the approved planting plan, this should be noted as redline changes to these tables.
   KCI Response: There were no deviations from the approved planting plan from the Mitigation Plan.

5. Please remember to include photo stations of the stream/culvert conditions at each of the installed culverts.
   KCI Response: Photos of the stream/culvert conditions at each of the installed crossings will be provided starting in MY01.

6. Any hydrologic features for example the wet /grassy swales that was installed to accommodate floodplain drainage from the concrete ring waterer. The waterers should be shown in the survey as well. Please include these features on the as-built, CCPV and include a feature shape file in the digital deliverable.
   KCI Response: These features have been included in both the as-built and CCPV.

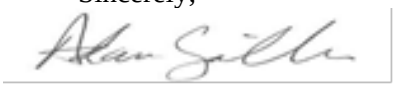
7. The easement signage that was put on the posts looks hastily installed. The corners are not pinned down and many signs are loose or have been bent haphazardly over the barb wire to get the screws in after the wiring was installed. The screws are not the ideal type as they will rust soon and pop through the holes as the heads are barely bigger than the holes. Recommend that KCI re-evaluate installed signage and update where possible. The frequency of postings along the unfenced segment is appreciated. The fencing itself and the fencepost placements just outside the corner caps look great.
   KCI Response: KCI will take this into account on future projects and will replace any signs that fall off over the course of monitoring.

8. Invasives need treating (e.g., oriental bittersweet, princess tree, privet, rose); dense in some areas. When does KCI plan to conduct the next treatment?
   KCI Response: Invasives on site were treated on August 23, 2022. KCI will continue to monitor invasives on the site and treat as necessary.

Digital Deliverable Comments:

1. The centerline or thalweg must be submitted with attribute data that includes reach names and breaks.
   KCI Response: Reach names have been added to the attribute table of the appropriate shapefiles.

Sincerely,



Adam Spiller
Project Manager

TABLE OF CONTENTS

Appendix A – Visual Assessment Data

Appendix B – Vegetation Plot Data

Appendix C – Stream Geomorphology Data

Appendix D – Project Timeline and Contact Info

Appendix E – As-Built Plan Sheets

PROJECT SUMMARY

The Dales Creek Restoration Site (DCRS) was completed in April 2022 and restored and enhanced a total of 3,978 linear feet of stream. The DCRS is a riparian system in the French Broad River Basin (06010105 8-digit cataloging unit) in Buncombe County, North Carolina. The site's natural hydrologic regime has been substantially modified through livestock impacts and removal of the riparian buffer. This site offers the chance to restore streams impacted by pasture and agriculture to a stable headwater ecosystem with a functional riparian buffer and floodplain access, while also reducing incoming nutrients from livestock. Project planting and construction were completed in April 2022 and the monitoring components were installed in April 2022.

Table 1. Dales Creek Restoration Site (ID-100128) Project Mitigation Quantities and Credits

Project Segment	Original Mitigation Plan Ft/Ac	As-Built Ft/ Ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits		Comments
Stream								
UT1 Reach 1	967	967	Cool	EII	5.00000	193.400		
UT1 Reach 2	332	332	Cool	EII	2.50000	132.800		
UT1 Reach 3	488	478	Cool	EI	1.50000	325.333		
UT1 Reach 4	873	869	Cool	EI	1.50000	582.000		Crossing exception at STA 31+37 to 32+03
UT2	343	343	Cool	EII	2.50000	137.200		
UT3	396	388	Cool	R	1.00000	396.000		Crossing exception at STA 302+79 to 303+43
UT4 Reach 1	56	58	Cool	EII	2.50000	22.400		
UT4 Reach 2	134	134	Cool	EII	5.00000	26.800		
UT5 Reach 1	290	290	Cool	EII	2.50000	116.000		
UT5 Reach 2	99	99	Cool	EII	5.00000	19.800		
					Total:	**1,951.733**		

Project Credits

	Stream			Riparian	Non-Riparian	Coastal
Restoration Level	Warm	Cool	Cold	Wetland	Wetland	Marsh
Restoration		396.000				
Re-establishment						
Rehabilitation						
Enhancement						
Enhancement I		907.333				
Enhancement II		648.400				
Creation						
Preservation						
Total		1951.733				

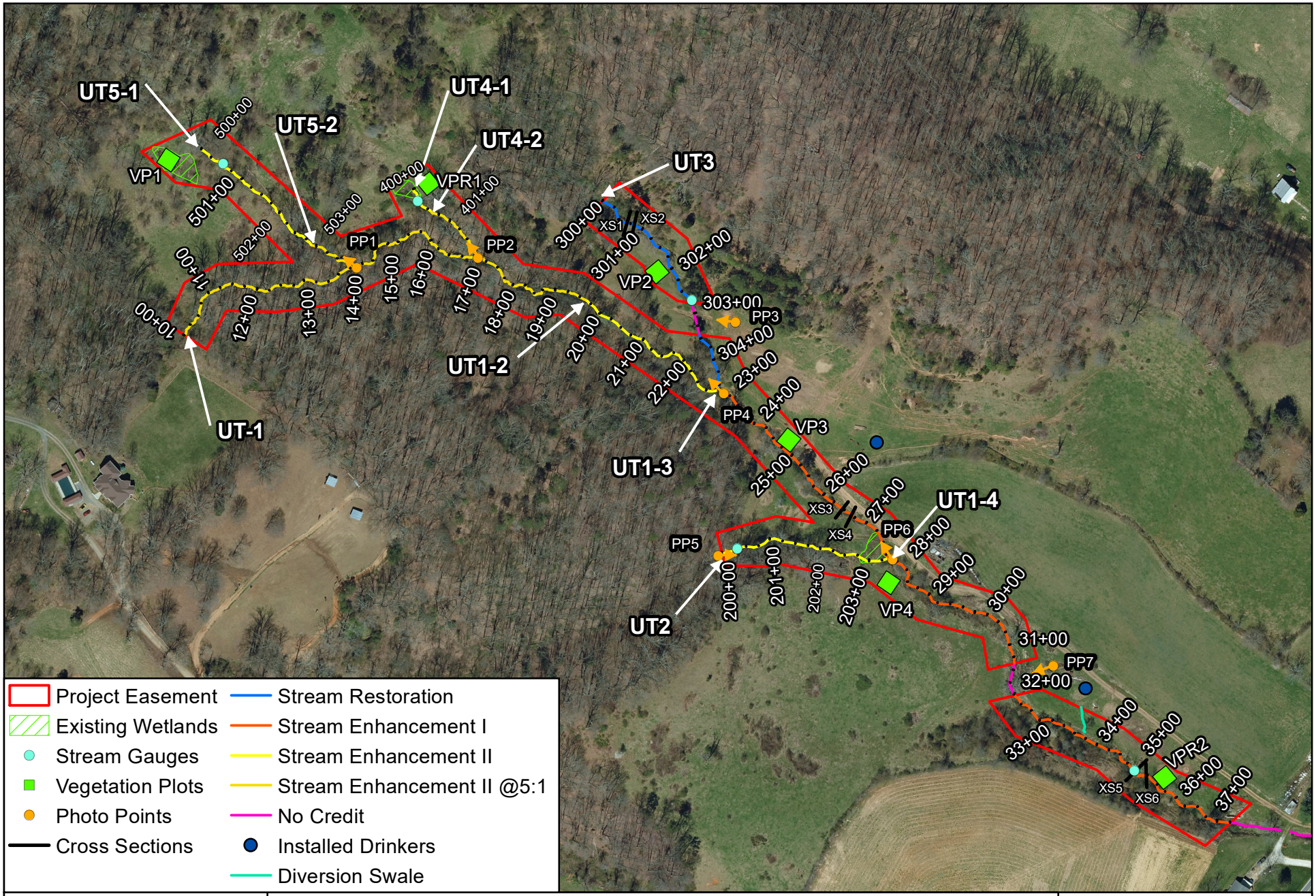

UT5-1
UT5-2
UT4-1
UT4-2
UT3
UT1-1
UT1-2
UT1-3
UT1-4
UT2
VP1
VP2
VP3
VP4
VPR1
VPR2
PP1
PP2
PP3
PP4
PP5
PP6
PP7
XS1
XS2
XS3
XS4
XS5
XS6
500+00
501+00
502+00
503+00
400+00
401+00
300+00
301+00
302+00
303+00
304+00
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00
29+00
30+00
31+00
32+00
33+00
34+00
35+00
36+00
37+00
200+00
201+00
202+00
203+00
Project Easement
Existing Wetlands
Stream Gauges
Vegetation Plots
Photo Points
Cross Sections
Stream Restoration
Stream Enhancement I
Stream Enhancement II
Stream Enhancement II @5:1
No Credit
Installed Drinkers
Diversion Swale
0
125
250
Feet
CURRENT CONDITIONS PLAN VIEW
DALES CREEK RESTORATION SITE
BUNCOMBE COUNTY, NC
N
Image Source: NC Statewide Orthoimagery, 2019

Table 2. Dales Creek Restoration Site (ID-100128) Goals, Performance and Results

Goal	Objective/Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Restore channelized and livestock impacted streams to stable B-type channels	-Relocate or stabilize channelized and/or incised streams to connect to a floodplain or floodprone area -Install a bankfull-sized channel cross-section - Create bedform diversity with pools, riffles, and habitat structures	Dispersion of high flows on the floodplain, increase in biogeochemical cycling within the system, and recharging of riparian wetlands.	BHR<1.2, ER>2.2, and no change >10% in BHR or ER between monitoring events; 4 bankfull events; continuous flow for at least 30 days each year	6 cross-section surveys, 5 pressure transducer stream gauges (measuring bankfull events on UT1-4 and stream flow on UT2, UT3, UT4, and UT5), annual visual inspection of stream banks and bed	
Restore a forested riparian buffer to provide bank stability filtration and shading	-Fence out livestock to reduce nutrient, bacterial, and sediment impacts from adjacent grazing and farming practices to the project tributaries. -Plant the site with native trees and shrubs and a herbaceous seed mix	Reduction in floodplain sediment inputs from runoff, increased bank stability, increased LWD and organic material in streams.	Survival rate of 320 stems per acre at MY3, 260 planted stems per acre at MY5, and 210 stems per acre at MY7.	6 vegetation monitoring plots, annual visual inspection of fencing and vegetation condition (including vigor and presence of invasive species)	

Table 3. Dales Creek Restoration Site (ID-100128) Project Attribute Table

Project Name	Dales Creek Restoration Site		
County	Buncombe County		
Project Area (acres)	7.692		
Project Coordinates (latitude and longitude decimal degrees)	35.5991°N, -82.7466°W		
Project Watershed Summary Information			
Physiographic Province	Mountain		
River Basin	French Broad		
USGS Hydrologic Unit 8-digit	06010105		
DWR Sub-basin	04/03/02		
Project Drainage Area (acres)	139		
Project Drainage Area Percentage of Impervious Area	<1%		
Land Use Classification	Forest (73%), Pasture/Farmland (26%), and Low-density Residential Development (1%).		
Reach Summary Information			
Parameters	**All Reaches Combined**		
Pre-project length (feet)	4,114		
Post-project (feet)	4,088		
Valley confinement (Confined, moderately confined, unconfined)	Partially confined to confined		
Drainage area (acres)	139		
Perennial, Intermittent, Ephemeral	Intermittent – Perennial		
NCDWR Water Quality Classification	C		
Dominant Stream Classification (existing)	F4		
Dominant Stream Classification (proposed)	B4a		
Dominant Evolutionary class (Simon) if applicable	Stage IV		
Parameters	**W1**	**W2**	**W3**
Pre-project (acres)	0.07	0.03	0.04
Post-project (acres)	0.07	0.03	0.04
Wetland Type (non-riparian, riparian)	Riparian	Riparian	Riparian
Mapped Soil Series	Toecan-Tusquitee Complex	Toecan-Tusquitee Complex	Tate
Soil Hydric Status	Non-hydric	Non-hydric	Non-hydric
Regulatory Considerations			
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404	Yes	Yes	SAW-2019-00834
Water of the United States - Section 401	Yes	Yes	DWR# 19-0864
Endangered Species Act	Yes	Yes	USFWS
Historic Preservation Act	No	N/A	NCSHPO
Coastal Zone Management Act (CZMA or CAMA)	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

BASELINE CONDITIONS

The site was planted in April 2022. The baseline vegetation monitoring was conducted on April 27, 2022. All six vegetation monitoring plots had greater than 320 stems/acre and at least four native species. Baseline monitoring was conducted during dormancy, so some of the stems were not identified to species. During MY01, these trees will be identified to species.

The baseline longitudinal profile and cross-sections were surveyed in April 2022. The baseline survey found that the stream was constructed as designed and all structures were installed as planned with one small exception. A small section of UT3 (approximately STA 301+75) was realigned to better fit the onsite conditions The profile and cross-section survey found that the dimension and profile of the stream are as designed, with some small variation as is typical for stream restoration projects.

REFERENCES

NCDENR, Ecosystem Enhancement Program. 2009. French Broad River Basin Restoration Priorities 2009. Raleigh, NC. https://deq.nc.gov/media/8060/download

NCDEQ, Division of Mitigation Services. June 2017. "As-built Baseline Monitoring Report Format, Data and Content Requirement." https://files.nc.gov/ncdeq/Mitigation%20Services/Document%20Management%20Library/Guidance%20and%20Template%20Documents/6_AB_Baseline__Rep_Templ_June%202017.pdf

NCIRT. October 24, 2016. "Wilmington District Stream and Wetland Compensatory Mitigation Update." https://saw-reg.usace.army.mil/PN/2016/Wilmington-District-Mitigation-Update.pdf

USACE, Sprecher, S. W.; Warne, A. G. 2000. "Accessing and Using Meteorological Data to Evaluate Wetland Hydrology." https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/ADA378910.xhtml

APPENDIX A

Visual Assessment Data

Table 4. Dales Creek Resotration Site (ID-100128) Visual Stream Stability Assessment

Reach	UT1 Reach 3
Assessed Stream Length	488
Assessed Bank Length	976

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	4	4		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	4	4		100%

Table 4. Dales Creek Resotration Site (ID-100128) Visual Stream Stability Assessment

Reach	UT1 Reach 4
Assessed Stream Length	873
Assessed Bank Length	1746

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A		N/A
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	N/A	N/A		N/A

Table 4. Dales Creek Resotration Site (ID-100128) Visual Stream Stability Assessment

Reach	UT3
Assessed Stream Length	396
Assessed Bank Length	792

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	1	1		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	1	1		100%

Table 5. Dales Creek Restoration Site (ID-100128) Visual Vegetation Assessment

Planted acreage **4.11**

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10acres	0.00	0.0%
	Total		0.00	0.0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
	Cumulative Total		0.00	0.0%

Easement Acreage **7.69**

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	*	#VALUE!
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	# Encroachments noted	

*Invasive mapping was not performed in MY00. Invasive species were treated on August 23, 2022, after the visual assessment was performed. Full mapping of any remaining invasive species will begin in MY01.

Photo Reference Photos

PP1 – MY-00 – 4/27/22

PP2 – MY-00 – 4/27/22

PP3 – MY-00 – 4/27/22

PP4 – MY-00 – 4/27/22

PP5 – MY-00 – 4/27/22

PP6 – MY-00 – 4/27/22

PP7 – MY-00 – 4/27/22

Vegetation Monitoring Plot Photos

Vegetation Plot 1 – MY-00 – 7/14/22*

Vegetation Plot 2 – MY-00 – 4/27/22

Vegetation Plot 3 – MY-00 – 4/27/22

Vegetation Plot 4 – MY-00 – 4/27/22

Vegetation Plot R1 – MY-00 – 4/27/22

Vegetation Plot R2 – MY-00 - 4/27/22

*Photo taken 7/14/22, plot data collected 5/2/22

APPENDIX B

Vegetation Plot Data

Table 6. Vegetation Plot Data
Dales Creek Restoration Site (ID-100128)

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 1 R	Veg Plot 2 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total
Species Included in Approved Mitigation Plan	Aesculus flava	yellow buckeye	Tree	FACU					3	3	2	2	3	5
	Alnus serrulata	hazel alder	Tree	FACW	2	2								
	Betula lenta	sweet birch	Tree	FACU	3	3	2	2	2	2	3	3	5	
	Carpinus caroliniana	American hornbeam	Tree	FAC	4	4								
	Carya sp.	hickory	Tree								1	1		
	Cornus amomum	silky dogwood	Shrub	FACW	9	9								
	Liriodendron tulipifera	tuliptree	Tree	FACU			4	4			2	2	2	3
	other	unknown	Tree				4	4	13	13	3	3	6	
	Platanus occidentalis	American sycamore	Tree	FACW			4	4	1	1	1	1		2
	Quercus falcata	southern red oak	Tree	FACU							1	1		
	Quercus rubra	northern red oak	Tree	FACU									1	
	Quercus sp.	oak	Tree				7	7	5	5	9	9	9	7
Sum	Performance Standard				18	18	21	21	24	24	22	22	26	17
Mitigation Plan Performance Standard	Current Year Stem Count					18		21		24		22	26	17
	Stems/Acre					729		850		931		891	1052	688
	Species Count					4		5		5		8	6	4
	Dominant Species Composition (%)					50		33		54		41	35	41
	Average Plot Height (ft.)					2		1		1		1	1	1
	% Invasives					0		0		0		0	0	0
Post Mitigation Plan Performance	Current Year Stem Count					18		21		24		22	26	17
	Stems/Acre					729		850		931		891	1052	688
	Species Count					4		5		5		8	6	4
	Dominant Species Composition (%)					50		33		54		41	35	41

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Planted Acreage	4.11
Date of Initial Plant	4/11/2022
Date(s) of Supplemental Plant(s)	
Date(s) Mowing	
Date of Current Survey	4/27/2022
Plot size (ACRES)	0.0247

Table 7. Vegetation Performance Standards Summary Table
Dales Creek Restoration Site (ID-100128)

Vegetation Performance Standards Summary Table												
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	729	2	4	0	850	1	5	0	931	1	5	0
	Veg Plot Group 4 F				Veg Plot Group 1 R				Veg Plot Group 2 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	891	1	8	0	1052	1	6	0	688	1	4	0

APPENDIX C

Stream Geomorphology Data

Table 8. Baseline Stream Data Summary
Dales Creek, UT1 Reach 3

Parameter	Pre-Existing Condition (if applicable)					Design		Monitoring Baseline (MY0)		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	4.6			22.2	2	6.8		4.9		1
Floodprone Width (ft)	8.9			26.0	2	18.3		11.7		1
Bankfull Mean Depth (ft)	0.3			0.8	2	0.5		0.3		1
Bankfull Max Depth (ft)	0.4			1.2	2	0.8		0.6		1
Bankfull Cross Sectional Area (ft^2)	3.5			6.3	2	3.4		1.7		1
Width/Depth Ratio	6.0			77.7	2	13.5		14.7		1
Entrenchment Ratio	1.2			2.0	2	2.7		2.4		1
Bank Height Ratio	1.7			3.8	2	1.0		1.0		1
Max part size (mm) mobilized at bankfull	151					111		74		
Rosgen Classification	G4/B4a					B4a		B4a		
Bankfull Discharge (cfs)	24.5					24.7		24.7		
Sinuosity (ft)	1.1					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.074					0.074		0.075		
Other										

Table 8. Baseline Stream Data Summary
Dales Creek, UT1 Reach 4

Parameter	Pre-Existing Condition (if applicable)					Design		Monitoring Baseline (MY0)		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5.1	6.9	7.3	7.8	4	8.0		8.6		1
Floodprone Width (ft)	10.1	13.3	12.8	17.4	4	20		27.9		1
Bankfull Mean Depth (ft)	0.5	0.7	0.7	0.8	4	0.6		0.9		1
Bankfull Max Depth (ft)	1.0	1.1	1.1	1.1	4	0.9		1.4		1
Bankfull Cross Sectional Area (ft^2)	3.8	3.4	4.2	5.3	4	4.8		7.8		1
Width/Depth Ratio	6.3	11.2	11.2	16.1	4	13.2		9.5		1
Entrenchment Ratio	1.4	2.0	1.9	2.6	4	2.5		3.2		1
Bank Height Ratio	1.0	2.4	1.4	6.0	4	1.0		1.0		1
Max part size (mm) mobilized at bankfull	79					84		121		
Rosgen Classification	G4/B4a					B4a		B4a		
Bankfull Discharge (cfs)	27.7					31.2		31.2		
Sinuosity (ft)	1.1					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.048					0.048		0.047		
Other										

Table 8. Baseline Stream Data Summary Dales Creek, UT3										
Parameter	**Pre-Existing Condition (if applicable)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	2.0	3.4	2.9	6.3	5	5.0		4.7		1
Floodprone Width (ft)	3.0	6.2	5.5	12.6	5	15.5		18.7		1
Bankfull Mean Depth (ft)	0.3	0.4	0.4	0.5	5	0.4		0.5		1
Bankfull Max Depth (ft)	0.4	0.6	0.6	0.8	5	0.6		0.9		1
Bankfull Cross Sectional Area (ft^2)	1.0	1.2	1.2	1.6	5	1.9		2.3		1
Width/Depth Ratio	3.8	10.0	7.1	24.6	5	13.5		9.5		1
Entrenchment Ratio	1.2	1.9	1.6	3.3	5	3.1		4.0		1
Bank Height Ratio	1.0	2.4	1.9	4.9	5	1.0		1.0		1
Max part size (mm) mobilized at bankfull	100					115		147		
Rosgen Classification	G4					B4a		B4a		
Bankfull Discharge (cfs)	6.6					12.9		12.9		
Sinuosity (ft)	1.1					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.104					0.105		0.108		
Other										

Table 9. Cross-section Morphology Monitoring Summary
Dales Creek Restoration Site (ID-100128)

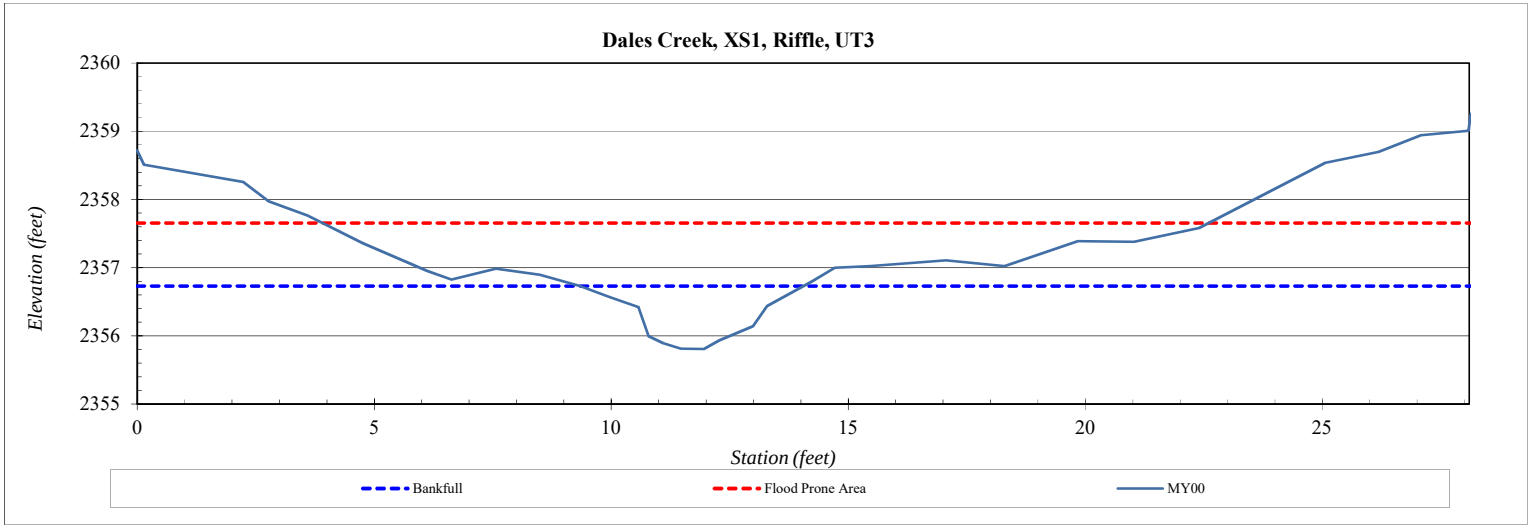
	Cross Section 1 (Riffle - UT3)							Cross Section 2 (Pool - UT3)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2356.7							2355.3						
Bank Height Ratio - Based on AB Bankfull Area	1.0							---						
Thalweg Elevation	2355.8							2354.5						
LTOB Elevation	2356.7							2355.3						
LTOB Max Depth (ft)	0.9							0.9						
LTOB Cross Sectional Area (ft^2)	2.3							2.8						
	Cross Section 3 (Riffle - UT1-3)							Cross Section 4 (Pool - UT1-3)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2286.9							2285.8						
Bank Height Ratio - Based on AB Bankfull Area	1.0							---						
Thalweg Elevation	2286.3							2284.8						
LTOB Elevation	2286.9							2285.8						
LTOB Max Depth (ft)	0.6							1.1						
LTOB Cross Sectional Area (ft^2)	1.7							3.0						
	Cross Section 5 (Riffle - UT1-4)							Cross Section 6 (Pool - UT1-4)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2242.6							2241.4						
Bank Height Ratio - Based on AB Bankfull Area	1.0							---						
Thalweg Elevation	2241.2							2240.6						
LTOB Elevation	2242.6							2241.4						
LTOB Max Depth (ft)	1.4							0.7						
LTOB Cross Sectional Area (ft^2)	7.8							2.8						

Cross-Section Plots

River Basin:	French Broad
Site:	Dales Creek
XS ID	XS1
Drainage Area (sq mi):	0.02
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2358.72
0.1	2358.51
2.2	2358.26
2.8	2357.98
3.6	2357.76
4.8	2357.36
6.1	2356.95
6.6	2356.83
7.6	2356.99
8.5	2356.90
9.3	2356.73
10.0	2356.57
10.6	2356.42
10.8	2356.00
11.1	2355.89
11.5	2355.81
12.0	2355.81
12.3	2355.93
13.0	2356.14
13.3	2356.44
14.2	2356.80
14.7	2357.00
15.5	2357.02
17.1	2357.11
18.3	2357.02
19.8	2357.39
21.0	2357.38
22.4	2357.58
25.1	2358.54
26.2	2358.70
27.1	2358.94
28.1	2359.01
28.1	2359.26

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2356.731
Bankfull Cross-Sectional Area:	2.3
LTOB Cross-Sectional Area:	2.3
Bankfull Width:	4.7
Flood Prone Area Elevation:	2357.66
Flood Prone Width:	18.7
LTOB Max Depth	0.9
LTOB Mean Depth	0.5
W / D Ratio:	9.5
Entrenchment Ratio:	4.0
Bank Height Ratio:	1.0
Thalweg Elevation:	2355.81

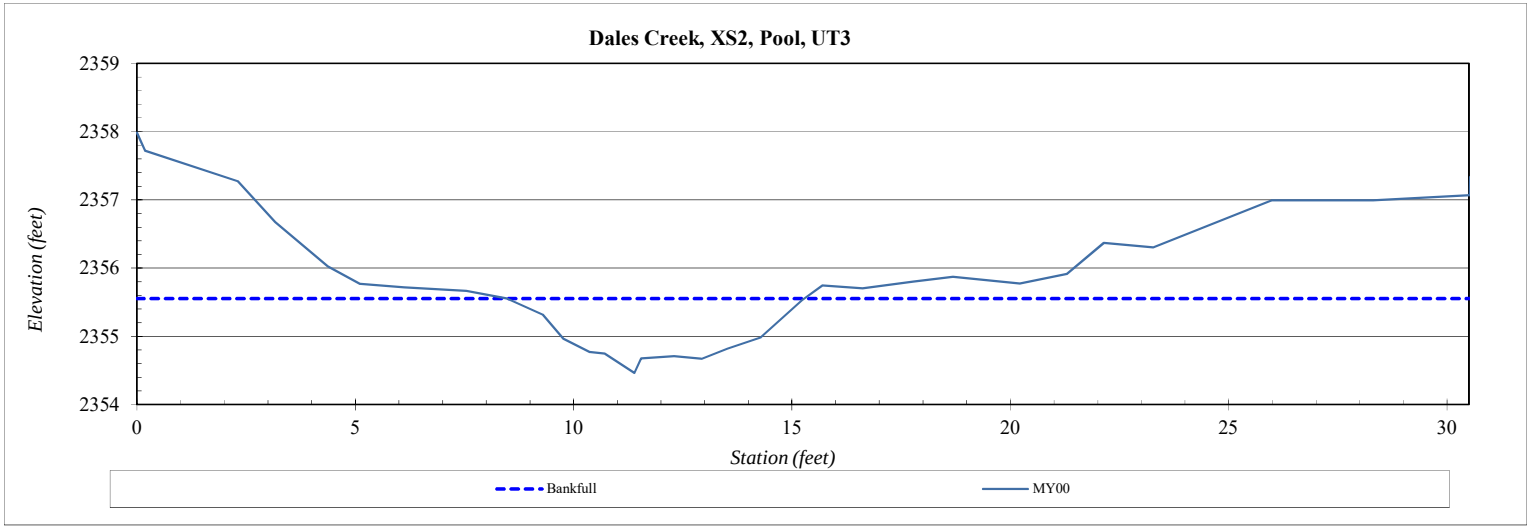


Cross-Section Plots

River Basin:	French Broad
Site:	Dales Creek
XS ID	XS2
Drainage Area (sq mi):	0.02
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2357.99
0.2	2357.72
2.3	2357.27
3.2	2356.67
4.4	2356.03
5.1	2355.77
6.1	2355.72
7.5	2355.66
8.5	2355.55
9.3	2355.32
9.8	2354.97
10.4	2354.77
10.7	2354.74
11.4	2354.46
11.5	2354.68
12.3	2354.71
12.9	2354.67
13.5	2354.82
14.3	2354.98
15.2	2355.53
15.7	2355.75
16.6	2355.70
17.8	2355.80
18.7	2355.87
20.2	2355.77
21.3	2355.91
22.1	2356.37
23.3	2356.30
26.0	2356.99
28.3	2356.99
30.5	2357.07
30.5	2357.34

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2355.55
Bankfull Cross-Sectional Area:	4.2
LTOB Cross-Sectional Area:	4.2
Bankfull Width:	6.8
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	1.1
LTOB Mean Depth	0.6
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2354.46

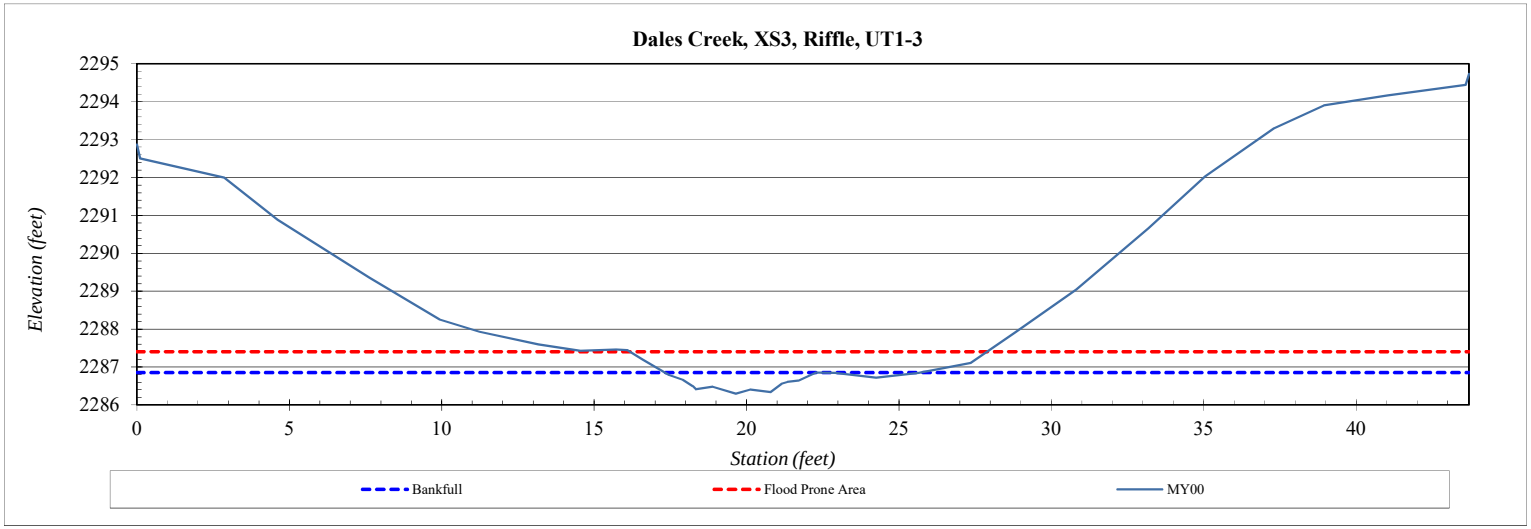


Cross-Section Plots

River Basin:	French Broad
Site:	Dales Creek
XS ID	XS3
Drainage Area (sq mi):	0.15
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2292.87
0.1	2292.50
2.9	2292.00
4.6	2290.89
7.6	2289.36
9.9	2288.25
11.2	2287.93
13.2	2287.59
14.5	2287.43
15.7	2287.46
16.1	2287.44
16.6	2287.19
17.5	2286.79
17.9	2286.67
18.2	2286.50
18.3	2286.42
18.9	2286.48
19.6	2286.30
20.1	2286.40
20.8	2286.33
21.2	2286.57
21.3	2286.60
21.7	2286.64
22.3	2286.85
22.9	2286.85
24.3	2286.71
25.6	2286.84
27.3	2287.10
28.8	2287.91
30.8	2289.05
33.2	2290.66
35.0	2292.03
37.3	2293.31
38.9	2293.90
41.0	2294.16
43.6	2294.45

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2286.85
Bankfull Cross-Sectional Area:	1.7
LTOB Cross-Sectional Area:	1.7
Bankfull Width:	4.9
Flood Prone Area Elevation:	2287.41
Flood Prone Width:	11.7
LTOB Max Depth	0.6
LTOB Mean Depth	0.3
W / D Ratio:	14.7
Entrenchment Ratio:	2.4
Bank Height Ratio:	1.0
Thalweg Elevation:	2286.30

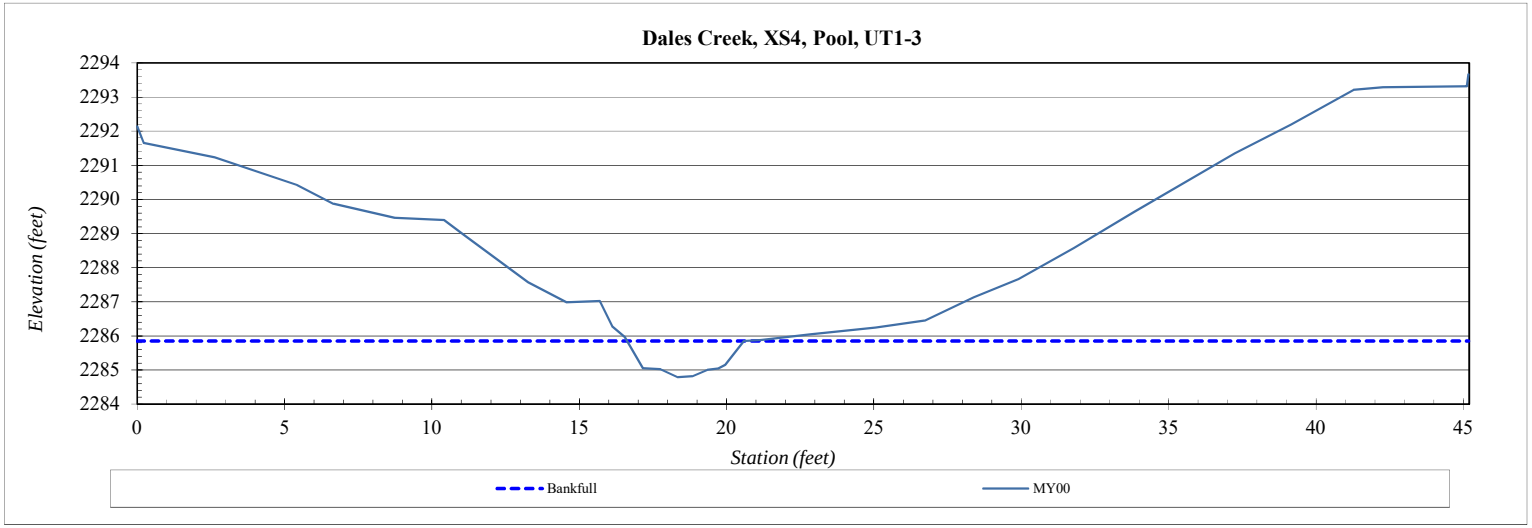


Cross-Section Plots

River Basin:	French Broad
Site:	Dales Creek
XS ID	XS4
Drainage Area (sq mi):	0.15
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2292.14
0.2	2291.66
2.6	2291.23
5.4	2290.43
6.7	2289.87
8.7	2289.46
10.4	2289.39
11.1	2288.97
13.3	2287.58
14.6	2286.98
15.7	2287.02
16.1	2286.28
16.5	2285.96
17.2	2285.05
17.8	2285.02
18.3	2284.79
18.8	2284.81
19.3	2285.01
19.7	2285.04
20.0	2285.15
20.6	2285.85
21.2	2285.87
22.9	2286.04
25.1	2286.24
26.7	2286.44
28.4	2287.13
29.9	2287.67
31.8	2288.57
33.8	2289.64
37.2	2291.36
39.2	2292.20
41.3	2293.21
42.3	2293.28
45.1	2293.31
45.2	2293.67

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2285.85
Bankfull Cross-Sectional Area:	3.0
LTOB Cross-Sectional Area:	3.0
Bankfull Width:	4.0
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	1.1
LTOB Mean Depth	0.7
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2284.79

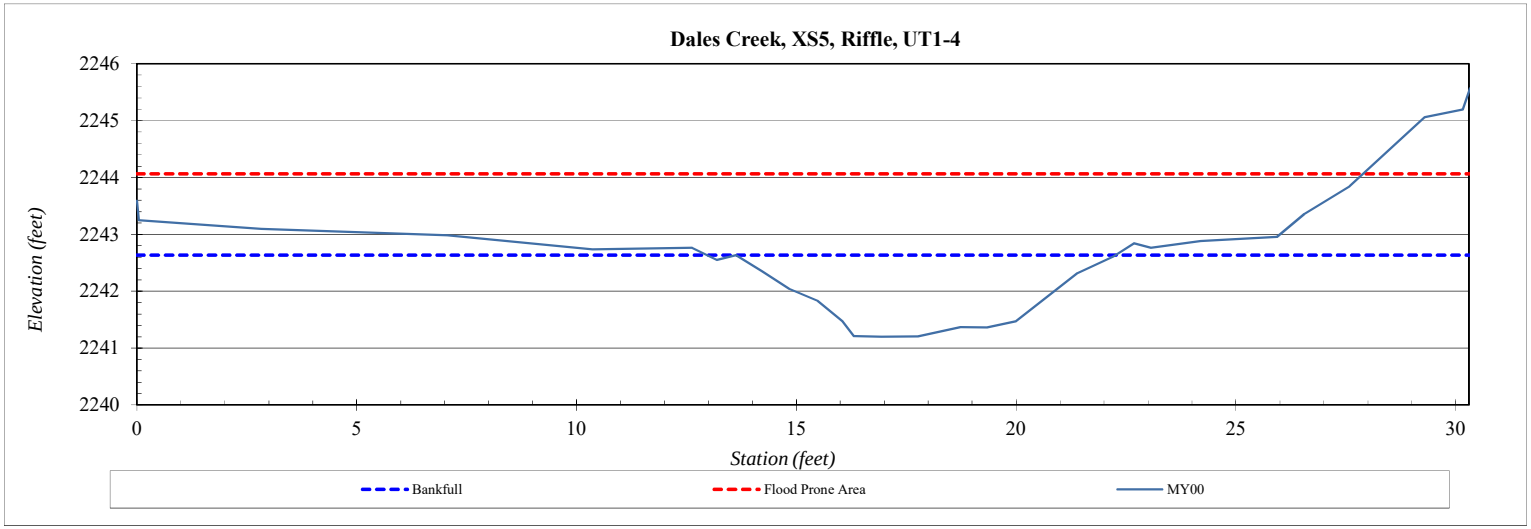


Cross-Section Plots

River Basin:	French Broad
Site:	Dales Creek
XS ID	XS5
Drainage Area (sq mi):	0.22
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2243.59
0.0	2243.25
2.8	2243.10
7.1	2242.98
10.4	2242.74
12.6	2242.77
13.2	2242.55
13.6	2242.63
14.2	2242.35
14.8	2242.04
15.5	2241.83
16.0	2241.48
16.3	2241.21
16.9	2241.20
17.8	2241.20
18.7	2241.37
19.3	2241.36
20.0	2241.47
21.4	2242.32
22.2	2242.61
22.7	2242.84
23.1	2242.76
24.2	2242.88
25.9	2242.96
26.6	2243.36
27.6	2243.84
29.3	2245.06
30.2	2245.20
30.3	2245.57

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2242.63
Bankfull Cross-Sectional Area:	7.8
LTOB Cross-Sectional Area:	7.8
Bankfull Width:	8.6
Flood Prone Area Elevation:	2244.07
Flood Prone Width:	27.9
LTOB Max Depth	1.4
LTOB Mean Depth	0.9
W / D Ratio:	9.5
Entrenchment Ratio:	3.2
Bank Height Ratio:	1.0
Thalweg Elevation:	2241.20

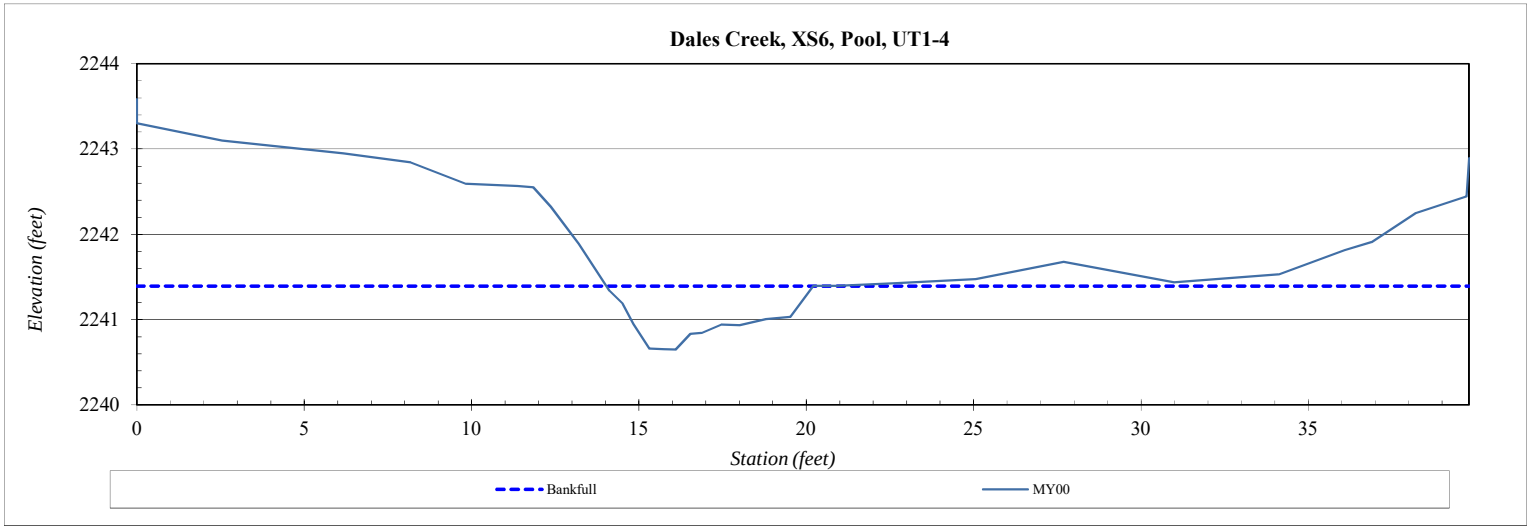


Cross-Section Plots

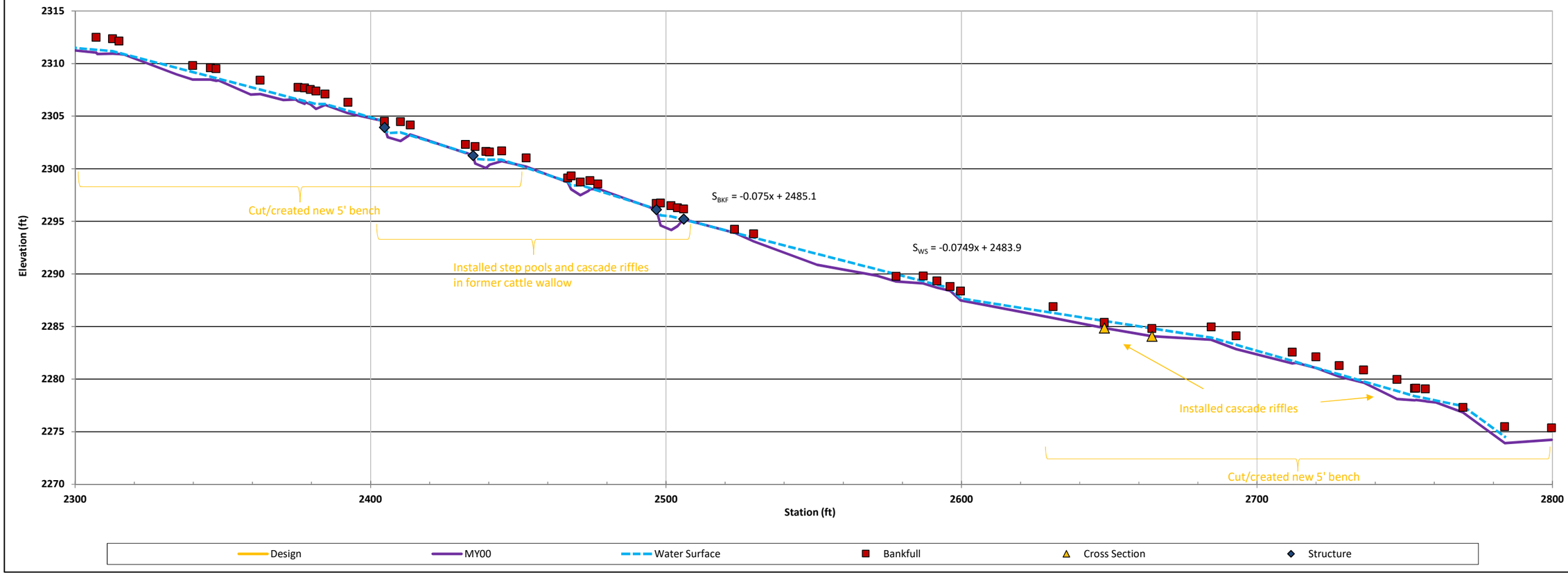
River Basin:	French Broad
Site:	Dales Creek
XS ID	XS6
Drainage Area (sq mi):	0.22
Date:	4/28/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2243.59
0.0	2243.30
2.5	2243.10
6.2	2242.95
8.2	2242.84
9.8	2242.59
11.4	2242.57
11.8	2242.55
12.4	2242.32
13.2	2241.89
14.1	2241.34
14.5	2241.19
14.8	2240.95
15.3	2240.66
15.7	2240.65
16.1	2240.65
16.5	2240.83
16.9	2240.84
17.5	2240.94
18.0	2240.93
18.8	2241.00
19.5	2241.03
20.2	2241.39
20.9	2241.40
22.6	2241.43
25.1	2241.47
27.7	2241.68
31.0	2241.44
34.1	2241.53
36.1	2241.81
36.9	2241.91
38.2	2242.25
39.7	2242.45
39.8	2242.89

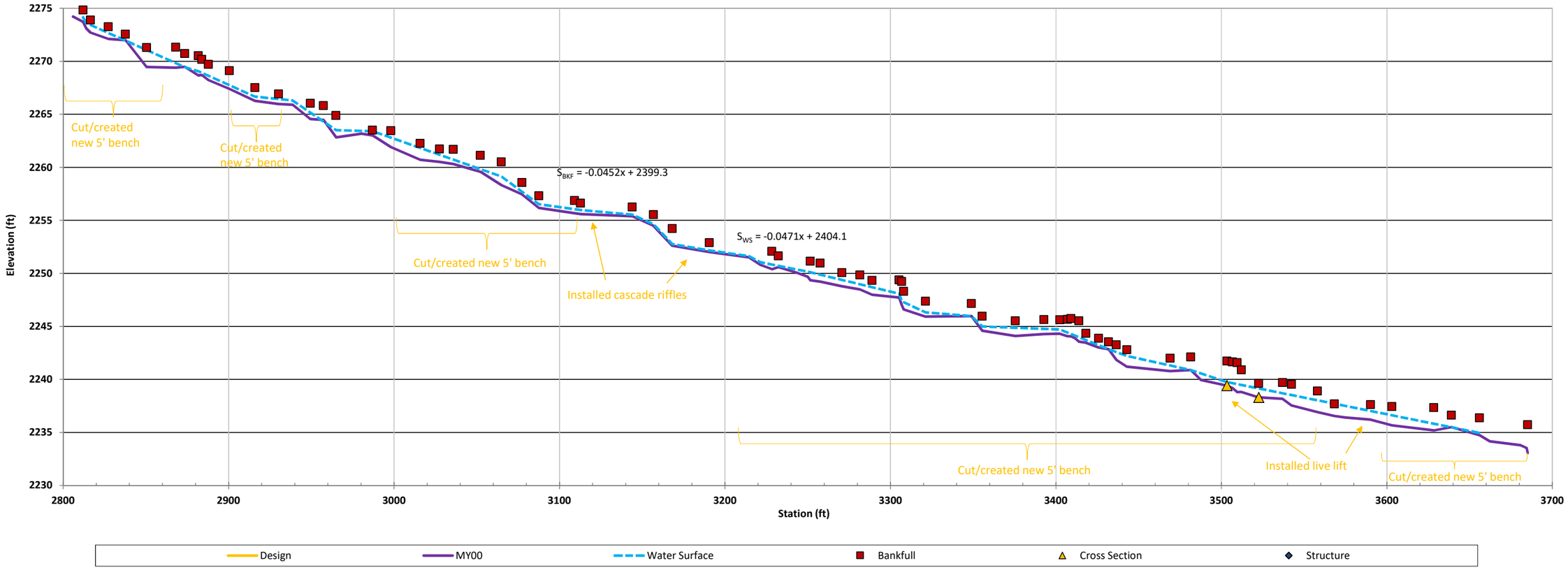
SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2241.39
Bankfull Cross-Sectional Area:	2.8
LTOB Cross-Sectional Area:	2.8
Bankfull Width:	6.2
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	0.7
LTOB Mean Depth	0.4
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2240.65



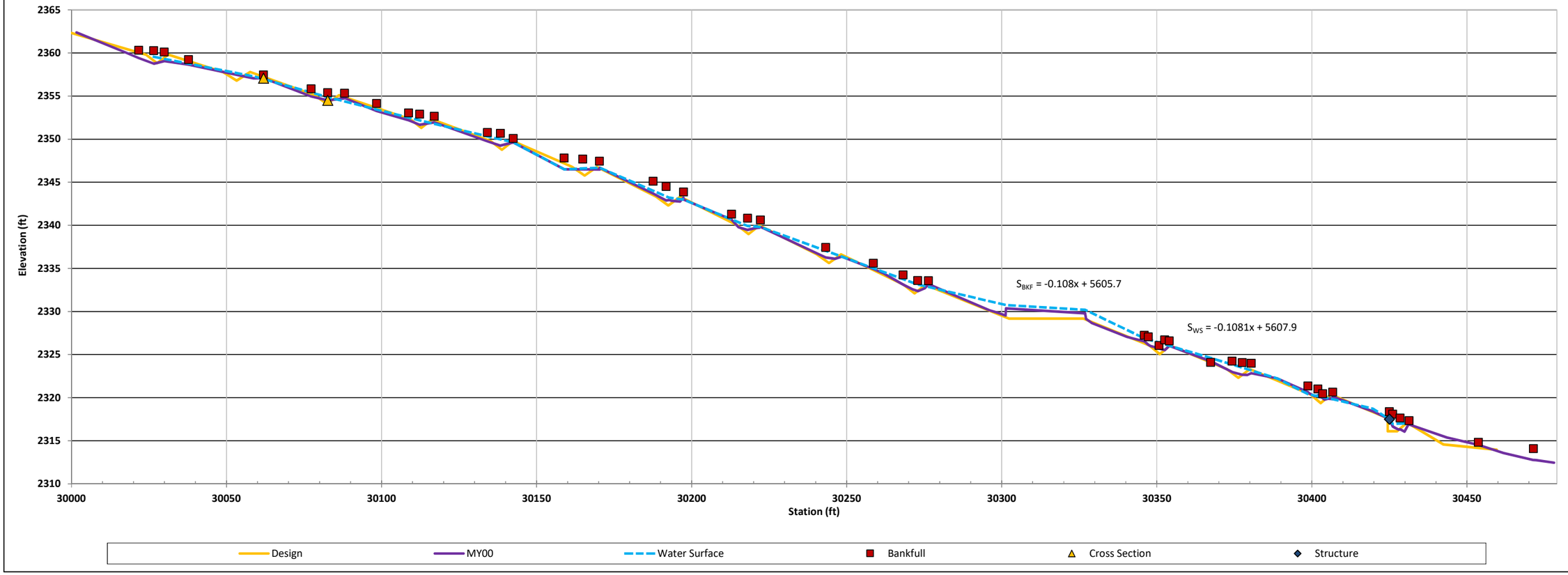
Longitudinal Profile
Dales Creek Restoration Site - UT1-3
Monitoring Year 00, 2022



Longitudinal Profile
Dales Creek Restoration Site - UT1-4
Monitoring Year 00, 2022



Longitudinal Profile
Dales Creek Restoration Site - T1
Monitoring Year 00, 2022



APPENDIX D

Project Timeline and Contact Info

Table 10. Project Activity & Reporting History Dales Creek Restoration Site, DMS Project #100128		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Site Instituted		May 23, 2019
Mitigation Plan		Feb. 19, 2021
Final Design - Construction Plans		Aug. 25, 2021
Construction Grading Completed		April 1, 2022
Planting Completed		April 11, 2022
As-built Survey		April 29, 2022
Baseline Monitoring/Report		May 2022
Vegetation Monitoring	April 27, 2022	
Stream Survey	April 28, 2022	
Invasive Species Treatment		August 23, 2022

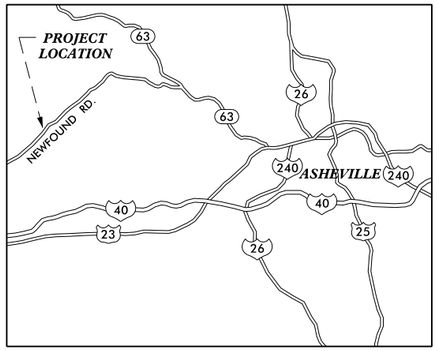
Table 11. Project Contacts Dales Creek Restoration Site, DMS Project #100128	
Design Firm	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	Chatham Civil Contracting, LLC 811 Archie Johnson Road Siler City, NC 27344 Contact: Mr. Stephen James Phone: (919)704-4442
Planting Contractor	Shenandoah Habitats 1983 Jefferson Highway Waynesboro, VA 22980 Contact: Mr. David Coleman Phone: (540) 941-0067
Monitoring Performers	
	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller

APPENDIX E

As-Built Plan Sheets

KCI JOB# : 161904754

CONTRACT #: 7910



VICINITY MAP
NOT TO SCALE

NCDEQ DIVISION OF MITIGATION SERVICES

STATE	CONTRACT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	7910	1	10

	REVISED PER DMS COMMENTS	SEPTEMBER 2022
A		

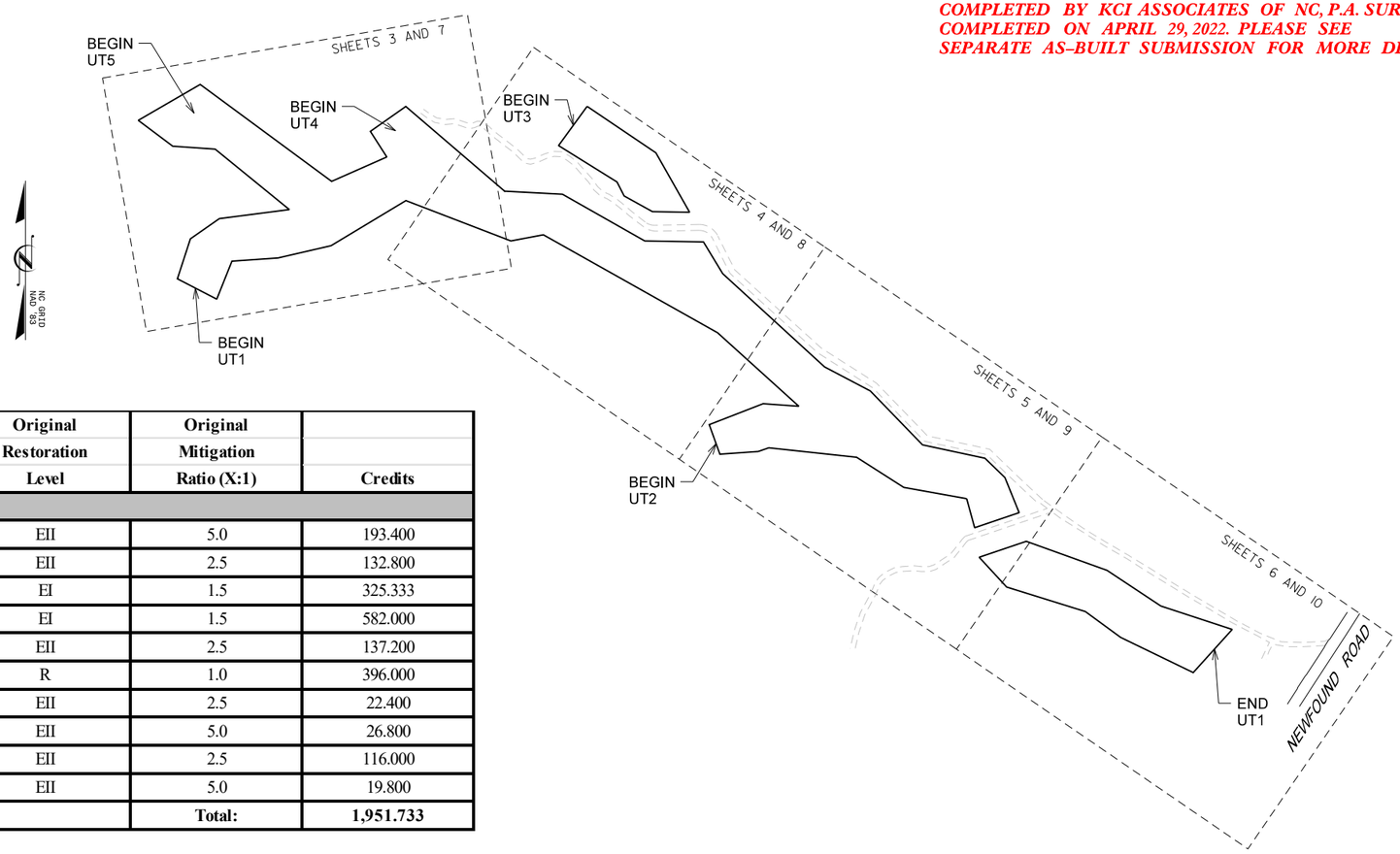
REVISIONS

DALE'S CREEK RESTORATION SITE

BUNCOMBE COUNTY, NORTH CAROLINA
FRENCH BROAD RIVER BASIN
CATALOGING UNIT 06010105
(LAT 35.5970 / LON –82.7427)

RECORD DRAWINGS

AS–BUILT DATA TAKEN FROM AS–BUILT SURVEY COMPLETED BY KCI ASSOCIATES OF NC, P.A. SURVEYING COMPLETED ON APRIL 29, 2022. PLEASE SEE SEPARATE AS–BUILT SUBMISSION FOR MORE DETAILS.



PROJECT DATA:

Project Segmen	Original Mitigation Plan Ft/Ac	As-Built Ft/ Ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits
Stream						
UT1 Reach 1	967	967	Cool	EII	5.0	193.400
UT1 Reach 2	332	332	Cool	EII	2.5	132.800
UT1 Reach 3	488	478	Cool	EI	1.5	325.333
UT1 Reach 4	873	869	Cool	EI	1.5	582.000
UT2	343	343	Cool	EII	2.5	137.200
UT3	396	388	Cool	R	1.0	396.000
UT4 Reach 1	56	58	Cool	EII	2.5	22.400
UT4 Reach 2	134	134	Cool	EII	5.0	26.800
UT5 Reach 1	290	290	Cool	EII	2.5	116.000
UT5 Reach 2	99	99	Cool	EII	5.0	19.800
					Total:	**1,951.733**

DIRECTIONS TO SITE

FROM ASHEVILLE, TAKE U.S. 74 ATL. USE THE TWO RIGHT LANES TO TAKE A RIGHT ONTO NC–63 WEST. TURN LEFT ONTO NEWFOUND ROAD. AFTER 6 MILES, THE STREAM PROJECT ENTRANCE WILL BE ON ON THE RIGHT ,JUST BEFORE THE DRIVEWAY AT 1281 NEWFOUND RD.

INDEX OF SHEETS

Prepared In the Office of:

KCI ASSOCIATES OF NC
ENGINEERS•PLANNERS•ECOLOGISTS
4505 FALLS OF NEUSE ROAD
SUITE 400
RALEIGH, NC 27609

Prepared for:

HARRY TSOMIDES
DMS PROJECT MANAGER

Prepared by:

KRISTIN E. KNIGHT, PE
PROJECT ENGINEER

ALEX FRENCH
PROJECT DESIGNER

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022 *P.E.*

SIGNATURE:

GENERAL NOTES:

BEARINGS AND DISTANCES:
ALL BEARINGS ARE NAD 1983 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.

DEVIATIONS, ADDITIONS, AND SUBTRACTIONS TO ORIGINAL CONSTRUCTION PLANS AND ANY ADDITIONAL NOTES ARE MARKED IN RED.

CONTROL POINTS:

POINT	NORTHING	EASTING	ELEV.
101	693167.61	887709.51	2229.57
102	692666.28	887349.42	2242.21
103	693239.58	887436.71	2239.08
104	693185.23	887309.98	2264.79
105	693421.72	887149.68	2259.88
106	693407.22	886967.13	2279.77
107	693511.76	887037.65	2267.77
108	693624.14	886950.28	2275.15
109	693715.56	886844.99	2282.49
110	693790.30	886620.74	2306.39
111	693884.84	886706.61	2301.23
112	694034.92	886498.46	2320.02
113	694128.04	886509.55	2334.48
114	694260.40	886359.34	2353.97
117	693817.87	887511.07	2316.43
118	693750.94	887696.20	2307.26
119	692919.62	887227.77	2259.50

PROJECT LEGEND:

Designed Thalweg w/Approximate Bankfull Limits ..... 

As–Built Thalweg w/Approximate Bankfull Limits ..... 

Installed Riffle Enhancement ..... 

Installed Riffle Grade Control ..... 

Installed Cascade Riffle ..... 

Installed Step Pool ..... 

Installed Live Lift ..... 

Filled Existing Channel ..... 

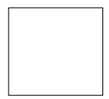
Vegetation Plot ..... 

Photo Point ..... 

Stream Gauge ..... 

Cross–section .....

Minor Contour Line (1ft.) .....

Major Contour Line (5ft.) .....

Overhead Utility .....

Installed Fencing .....

Installed Drinkers ..... 

09-29-2022

A	REVISED PER DMS COMMENTS	SEP 2022
SYM.	DESCRIPTION	DATE

REVISIONS

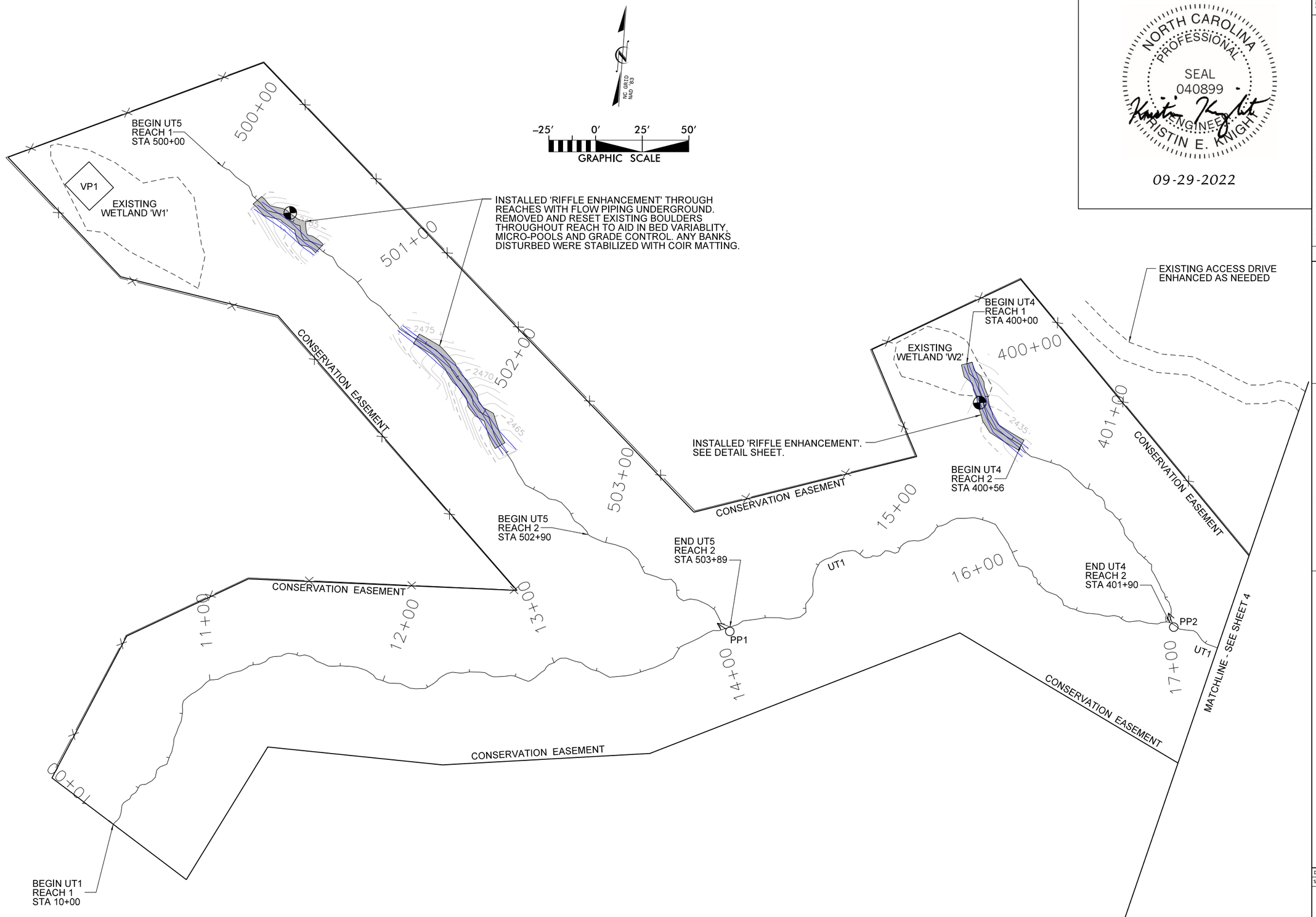
NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: N.T.S.

GENERAL NOTES & PROJECT LEGEND



NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS	SEP 2022
SYM.	DESCRIPTION	DATE

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

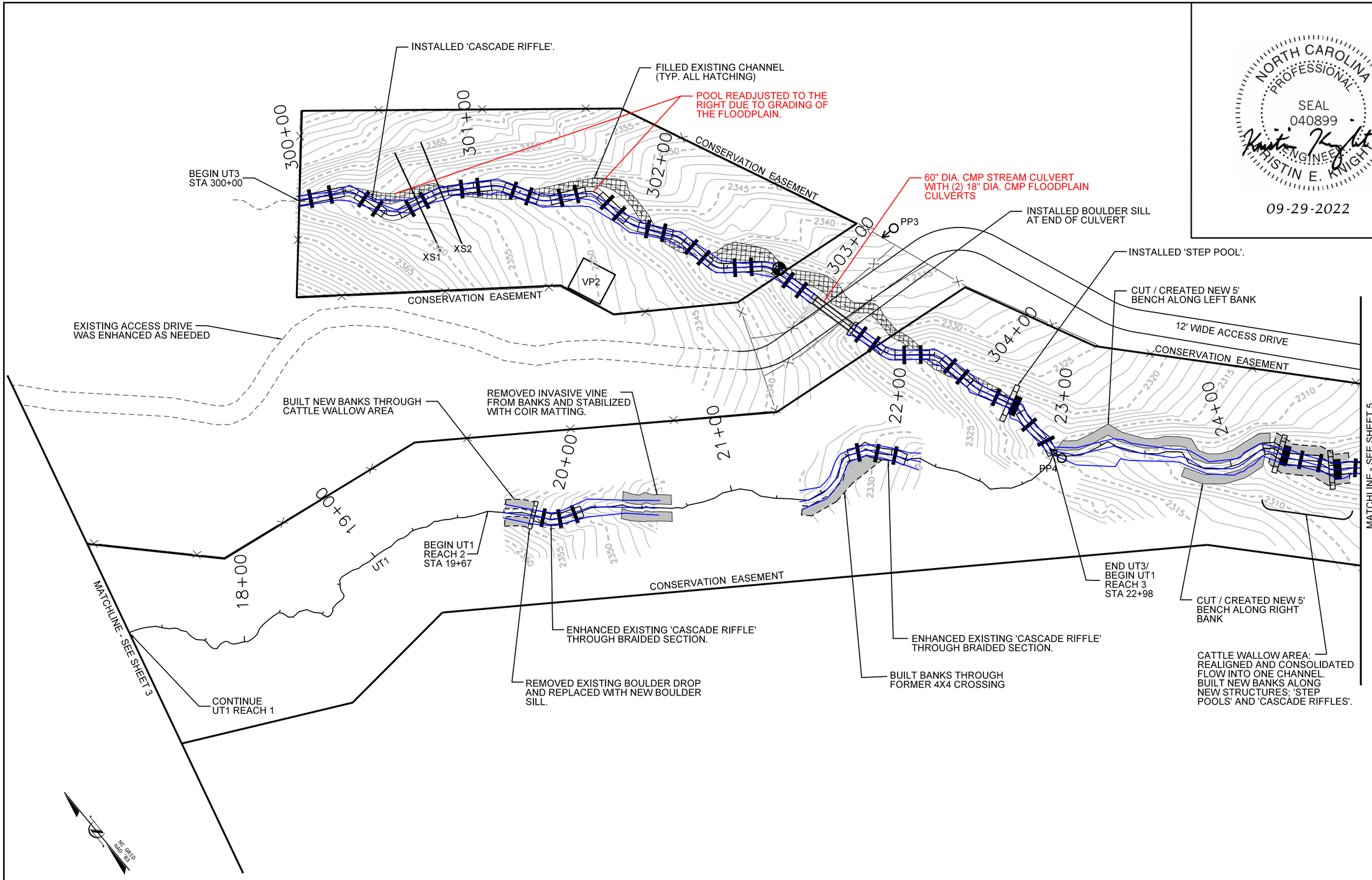
DALE'S CREEK RESTORATION SITE

Record Drawings

BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

SITE PLAN



NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS	SYM.	DESCRIPTION	DATE
			REVISIONS	SEP 2022

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

SITE PLAN

SHEET 4 OF 10

NC GRID NAD 83

–25′ 0′ 25′ 50′

GRAPHIC SCALE

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS		SEP 2022
		DESCRIPTION	DATE

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

MATCHLINE - SEE SHEET 4

CONTINUE UT1 REACH 3

12' WIDE ACCESS DRIVE

REALIGNED THALWEG AND INSTALLED 'CASCADE RIFFLE'

BUILT BANKS THROUGH CATTLE WALLOW AREA

ROAD TERRACE EROSION: REGRADED AND STABILIZED COIR MATTING.

INSTALLED 'CASCADE RIFFLE'.

END UT2 STA 203+43/ BEGIN UT1 REACH 4 STA 27+86

ALL PATHS OF FORMER ACCESS INSIDE THE EASEMENT WERE TILLED AND SUPPLEMENTED WITH TOP SOIL.

ALL FENCING AND DEBRIS INSIDE THE EASEMENT WAS REMOVED

ENHANCED EXISTING LEFT BANK BENCH THROUGH CATTLE DAMAGED AREAS.

15' WIDE ACCESS DRIVE

25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00

VP3 VP4 PP5 PP6 PP7

XS3 XS4

CUT / CREATED NEW 5' BENCH ALONG RIGHT BANK

CUT / CREATED NEW 5' BENCH ALONG BANKS

CUT / CREATED NEW 5' BENCH ALONG RIGHT BANK

REALIGNED CHANNEL AND INSTALLED 'CASCADE RIFFLE'.

BRAIDED SECTION: REALIGNED AND CONSOLIDATED FLOW INTO ONE CHANNEL. BUILT NEW BANKS ALONG NEW STRUCTURES.

EXISTING WETLAND 'W3'

INSTALLED 'STEP POOL'.

CONSERVATION EASEMENT

201+00 202+00 203+00

FILLED EXISTING CHANNEL (TYP. ALL HATCHING)

INSTALLED 'CASCADE RIFFLE'.

CONSERVATION EASEMENT

ENHANCED EXISTING BOULDER CASCADE WITH CLASS I/A/B STONE MIXTURE.

200+00

BEGIN UT2 STA 200+00

INSTALLED 'ROCK FORD CROSSING'.

60" DIA. CMP STREAM CULVERT WITH (2) 18" DIA. CMP FLOODPLAIN CULVERTS

INSTALLED BOULDER SILL AT END OF CULVERT

INSTALLED 'CASCADE RIFFLE'

CUT / CREATED NEW 5' BENCH ALONG BANKS.

EXISTING ACCESS DRIVE

MATCHLINE - SEE SHEET 6

DALE'S CREEK RESTORATION SITE

Record Drawings

BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022

SCALE: GRAPHIC

SITE PLAN

SHEET 5 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

EXISTING ACCESS DRIVE

ENHANCED EXISTING LEFT BANK BENCH THROUGH CATTLE DAMAGED AREAS.

CUT / CREATED 5' NEW BENCH ALONG LEFT BANK.

ENHANCED EXISTING LEFT BANK BENCH THROUGH CATTLE DAMAGED AREAS.

INSTALLED 'LIVE LIFT' ALONG LEFT BANK AND CONNECTED LOW BENCH UP/DOWN STREAM.

DIVERSION SWALE FROM INSTALLED DRINKER

CONSERVATION EASEMENT

CONTINUE UT1 REACH 4

MATCHLINE - SEE SHEET 5

33+00

34+00

35+00

36+00

37+00

XS5

XS6

2255

2250

2245

INSTALLED 'LIVE LIFT'.

REALIGNED THALWEG AWAY FROM STEEP TERRACE AND INSTALLED 'LIVE LIFT'.

CONSERVATION EASEMENT

CUT / CREATED NEW 5' BENCH ALONG LEFT BANK.

OVERHEAD UTILITY LINE

OH

REALIGNED THALWEG ENTERING EXISTING CULVERT.

NEWFOUND ROAD

END UT1 REACH 4 STA 37+25

OVERHEAD UTILITY LINE

NC GRID MAD 83

–25′ 0′ 25′ 50′

GRAPHIC SCALE

REVISIONS		
STAL.	DESCRIPTION	DATE
A	REVISED PER DMS COMMENTS	SEP 2022

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK RESTORATION SITE

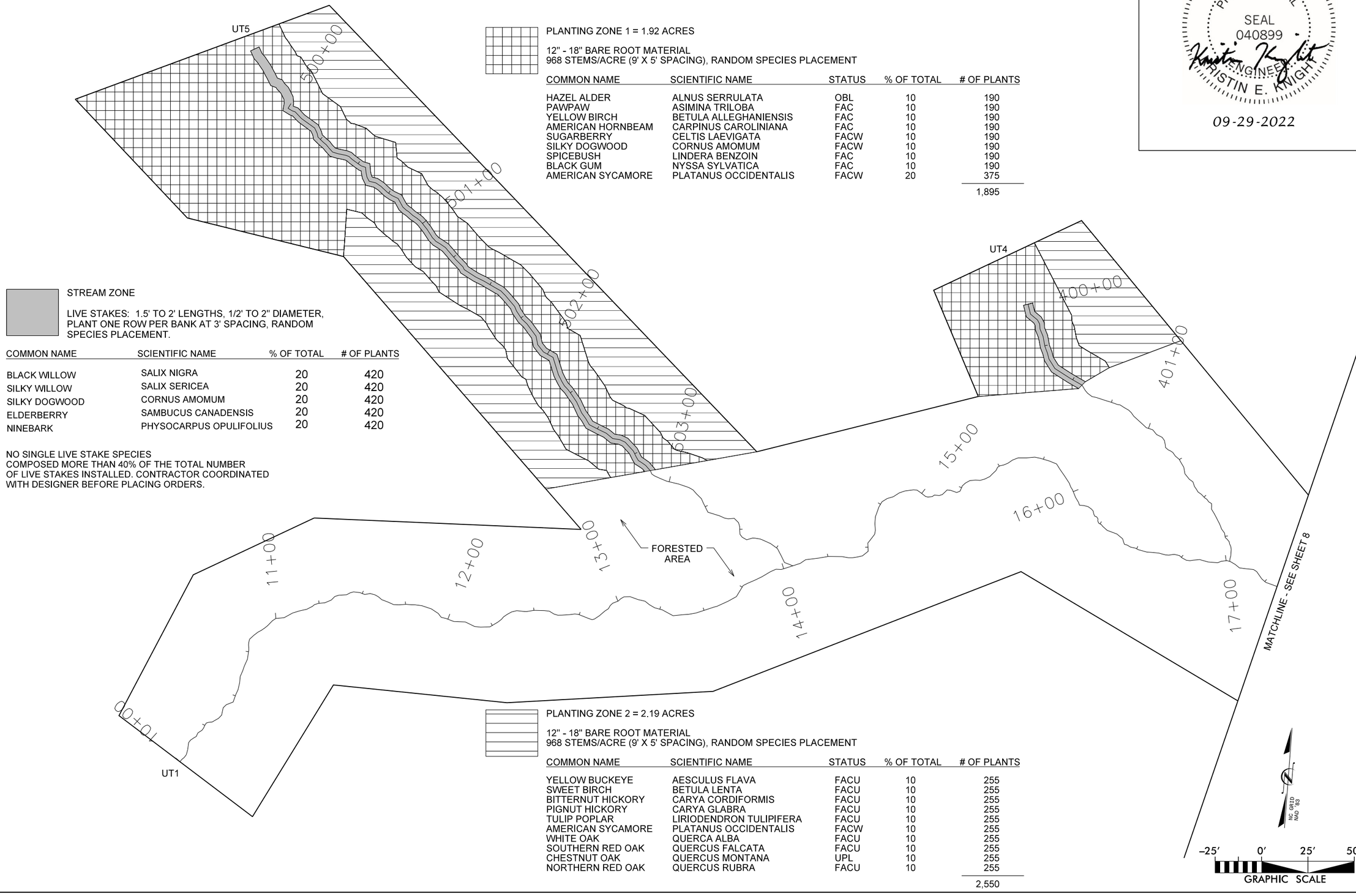
Record Drawings

BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022

SCALE: GRAPHIC

SITE PLAN



STREAM ZONE

LIVE STAKES: 1.5' TO 2' LENGTHS, 1/2' TO 2" DIAMETER, PLANT ONE ROW PER BANK AT 3' SPACING, RANDOM SPECIES PLACEMENT.

COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	# OF PLANTS
BLACK WILLOW	SALIX NIGRA	20	420
SILKY WILLOW	SALIX SERICEA	20	420
SILKY DOGWOOD	CORNUS AMOMUM	20	420
ELDERBERRY	SAMBUCUS CANADENSIS	20	420
NINEBARK	PHYSOCARPUS OPULIFOLIUS	20	420

NO SINGLE LIVE STAKE SPECIES COMPOSED MORE THAN 40% OF THE TOTAL NUMBER OF LIVE STAKES INSTALLED. CONTRACTOR COORDINATED WITH DESIGNER BEFORE PLACING ORDERS.

PLANTING ZONE 1 = 1.92 ACRES

12" - 18" BARE ROOT MATERIAL
968 STEMS/ACRE (9' X 5' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	STATUS	% OF TOTAL	# OF PLANTS
HAZEL ALDER	ALNUS SERRULATA	OBL	10	190
PAWPAW	ASIMINA TRILOBA	FAC	10	190
YELLOW BIRCH	BETULA ALLEGHANIENSIS	FAC	10	190
AMERICAN HORNBEAM	CARPINUS CAROLINIANA	FAC	10	190
SUGARBERRY	CELTIS LAEVIGATA	FACW	10	190
SILKY DOGWOOD	CORNUS AMOMUM	FACW	10	190
SPICEBUSH	LINDERA BENZOIN	FAC	10	190
BLACK GUM	NYSSA SYLVATICA	FAC	10	190
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	20	375
				1,895

PLANTING ZONE 2 = 2.19 ACRES

12" - 18" BARE ROOT MATERIAL
968 STEMS/ACRE (9' X 5' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	STATUS	% OF TOTAL	# OF PLANTS
YELLOW BUCKEYE	AESCULUS FLAVA	FACU	10	255
SWEET BIRCH	BETULA LENTA	FACU	10	255
BITTERNUT HICKORY	CARYA CORDIFORMIS	FACU	10	255
PIGNUT HICKORY	CARYA GLABRA	FACU	10	255
TULIP POPLAR	LIRIODENDRON TULIPIFERA	FACU	10	255
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	10	255
WHITE OAK	QUERCA ALBA	FACU	10	255
SOUTHERN RED OAK	QUERCUS FALCATA	FACU	10	255
CHESTNUT OAK	QUERCUS MONTANA	UPL	10	255
NORTHERN RED OAK	QUERCUS RUBRA	FACU	10	255
				2,550

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS	SEP 2022
SYM.	DESCRIPTION	DATE

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

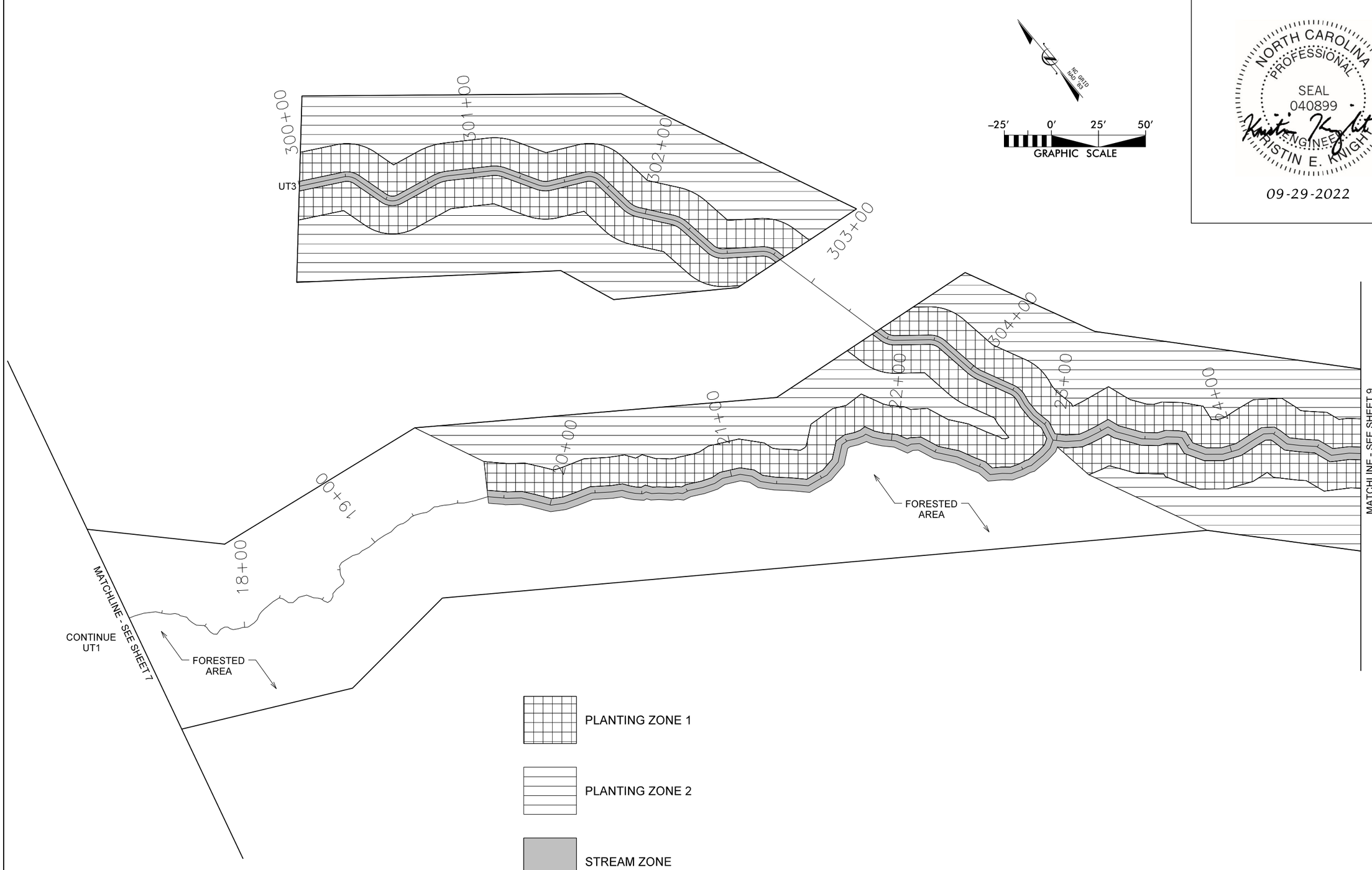
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

PLANTING PLAN

SHEET 7 OF 10



* NOTE: SEE SHEET 7 FOR PLANTING QUANTITIES

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS	SEP 2022	
SYM.	DESCRIPTION	DATE	

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

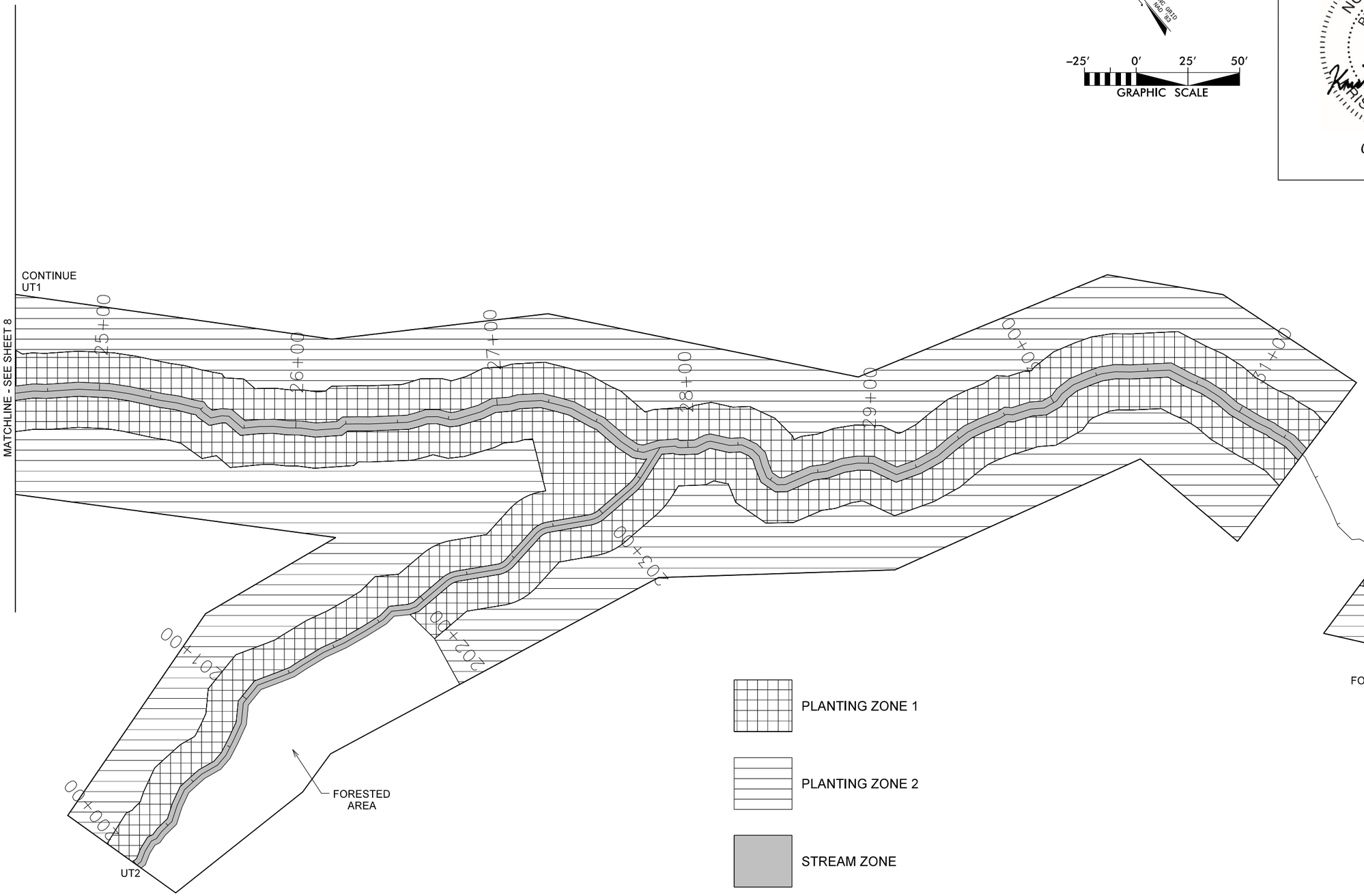
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

PLANTING PLAN

SHEET 8 OF 10



* NOTE: SEE SHEET 7 FOR PLANTING QUANTITIES

NC GRID MAG DEG

–25′ 0′ 25′ 50′

GRAPHIC SCALE

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

A	REVISED PER DMS COMMENTS	SEP 2022
SYM.	DESCRIPTION	DATE

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

PLANTING PLAN

SHEET 9 OF 10

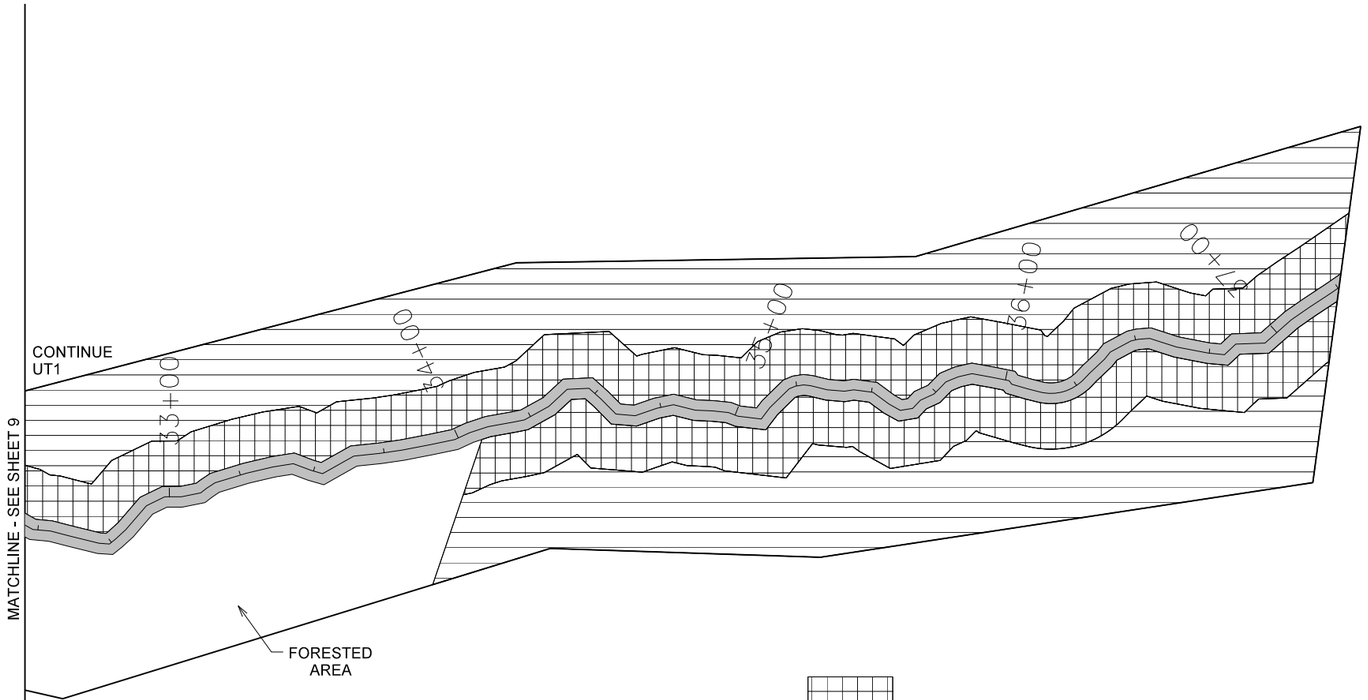
NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

09-29-2022

NC GRID NAD 83

–25′ 0′ 25′ 50′

GRAPHIC SCALE



PLANTING ZONE 1

PLANTING ZONE 2

STREAM ZONE

*NOTE: SEE SHEET 7 FOR PLANTING QUANTITIES

A	REVISED PER DMS COMMENTS	SEP 2022
SYM.	DESCRIPTION	DATE

REVISIONS

NCDEQ – DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

DALE'S CREEK
RESTORATION SITE
Record Drawings
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: MAY 2022
SCALE: GRAPHIC

PLANTING PLAN