MY00 MONITORING REPORT

Round Hill Branch Restoration Site
Buncombe County, North Carolina
French Broad River Basin - 06010105

DMS Project #100066
DMS Contract #7534
DMS RFP #16-007334 (Issue date: September 8, 2017)
USACE AID #: SAW 2108-01168 DWR #: 2018-1031
Monitoring Data Collected: 2022

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

NORTH CAROLINA
Department of Environmental Quality

Monitoring and Design Firm

Prepared by:

KCI Associates of North Carolina, PA
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: May 16, 2022
To: Matthew Reid, DMS Project Manager
From: Adam Spiller, Project Manager
KCI Associates of North Carolina, PA
Subject: MY-00 Monitoring Report Comments
Round Hill Branch DMS #7534, Contract 100066
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 March 22, 2022 for the Round Hill Branch Restoration Site.

1. The site currently has two unresolved property disputes with adjacent land owners. The first at the beginning of RHB and the second at the end of RHB. Currently, the Stewardship Program will not accept the conservation easement with a known unresolved dispute. When KCI responds to the comment letter, please provide a detailed response to how KCI plans to resolve these issues moving forward. The Task 6 invoice payment and initial credit release will be delayed until a resolution has a path forward.
KCI Response: KCI has sent letters to these landowners stating that their fences are in the conservation easement and will be moved/reconstructed on their property. The letter will provide information about the survey and ask that the landowner reach out to KCI with any concerns about this remedy. These landowners will be free to provide evidence from a licensed surveyor and KCI will then work to resolve this inconsistency. DMS and SPO will be provided documentation as this process progresses.

2. Please add (Issue date: September 8, 2017) after RFP #16-007334.
KCI Response: This change has been made.

3. The Project Summary discusses a large scale rain event that occurred from August 15-18, 2021 followed by repairs in September 2021. Was the asbuilt survey field work completed prior to this event, or does the asbuilt survey represent the site post storm repairs?
KCI Response: The as-built survey was completed on August 11, 2021, before the storms damaged the site; however, the post storm repairs largely returned the site to the as-built condition. The only minor differences are some isolated areas of floodplain scour that are acting as vernal pools and enhance ecological function to the site. An entry for "As-built Survey" has been added to Table 10 to clarify this.

4. Photo point 5 and SG2 are shown in the incorrect position on the CCPV relative to the asbuilt. Please review and revise.
KCI Response: The locations shown on the CCPV are the correct ones. The as-built drawings will be corrected to match the actual locations of these features. This error has been corrected.

5. XS3, XS4, photo point 5 and SG2 all shifted upstream by one meander length. This appears to be the only deviation from the proposed monitoring plan in the approved mitigation plan. Please provide a brief explanation why the location was changed.
   KCI Response: Photo point 5 was installed in the location shown on the proposed monitoring plan (the location shown on the as-builts was not correct and has been corrected). XS3 and 4 were moved upstream to avoid the large tree that was left intact in the location of the proposed cross-sections. SG2 (which has been relabeled as SG-RHB) was moved downstream from its proposed location to XS5 to better capture bankfull events that occur on site.

6. Please include the installed fence layer and existing fence layer on the CCPV and asbuilt/redline drawing. The installed fence should be a surveyed layer to verify correct placement.
   KCI Response: The installed fence and existing fence layers have been added to the CCPV and the asbuilt/redline drawing.

7. Please add "Site Instituted – April 25, 2018" as the first entry on Table 10.
   KCI Response: This change has been made.

8. Planting tables shown on sheet 5 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: No changes were made from the proposed planting plan and species and quantity were planted as shown on sheet 5 of the as-built drawings.

9. The two areas of property/conservation easement dispute should be clearly marked in red on the asbuilt. Construction of riffle enhancement at the top of RHB did not extend to the CE boundary. Construction stopped at the existing fence line within the CE boundary.
   KCI Response: These two areas have been addressed in the report and asbuilt plan sheets.

10. Two photo points are shown on the asbuilt/redline drawing, but they are not labeled. One on RHB near sta: 10+00 and another near sta: 12+50, but no photos are included for these stations. Please update photolog to include these stations in MY1.
    KCI Response: These symbols represent filler photo points that were being used to set up the as-built drawings before we had the exact locations. They have been removed from the as-built drawings.

11. Please call out on the asbuilt and CCPV where crediting begins on RHB1, T1 and T2. Notes indicate crediting begins at full 30' width buffer, but it is unclear where this point is. Recommend adding stationing of where credit begins under the notes/comments section on Table 1 for each of the reaches.
    KCI Response: This information has been added to the report.

12. Two pattern deviations are shown on the asbuilt, but not called out as redline changes. RHB 12+00 and Tributary 1 104+00. Please update asbuilt and explain deviation.
    KCI Response: These two small pattern deviations are due to bedrock in the channel that was discovered during construction. They have been called out as redline changes on the as-built drawings.

13. A site visit was conducted on March 9, 2022 with KCI, and following items were observed and will need to be rectified before MY0 can be finalized and invoiced.
    - Fence at the beginning of RHB is currently located approximately 5 feet inside of the conservation easement boundary. This section of fence will need to be moved and located on the easement line or outside of the easement.

- Fence at the bottom of RHB is also located within the conservation easement and will need to be relocated.
  KCI Response: KCI is working towards a resolution to disputed fencing locations at the top and bottom of RHB (see response to first comment above).
  Landowner has logs and gravel stored near sta: 18+00 on RHB that is encroaching into the easement. This material will need to be stored outside of the conservation easement.
  KCI Response: KCI has spoken to the landowner about the items stored in the conservation easement and these items have since been removed.
- A drainage swale has been constructed on the left floodplain on the upstream side of the crossing near sta: 13+50 on RHB to alleviate land owner concerns for water that was directed into the crossing. This feature was not depicted on the asbuilt or CCPV. Please include this feature on the asbuilt, CCPV and include a feature shape file in the digital deliverable. Please verify the property owner understand this swale cannot be maintained as it is inside the conservation easement. DMS recommends mulch, seed and matting for this feature.
  KCI Response: This feature has been added to the as-built drawings and the landowner has been informed that this swale may not be maintained.
- DMS recommends over seeding portions of the site with temporary and permanent seed this spring to help with the impact caused by intense winter storms.
  KCI Response: Any portions of the site that are deemed to be lacking in adequate herbaceous cover will be over seeded this spring.

Digital Deliverable Comments

1. The submitted stream features represent the mitigation plan lengths. Please submit a set of features that reflect the asbuilt ft/ac column.
   KCI Response: The as-built stream shapefile has been added to the digital deliverables.

2. Please include unique ID's in the attribute table of the stream pressure transducers.
   KCI Response: The unique ID's have been added to the attribute table of the stream pressure transducers.

3. If available, please submit features that represent the condition of the stream before restoration (e.g. existing stream features).
   KCI Response: The pre-construction existing streams shapefile has been added to the digital deliverables.

4. Please include a .dwg file with the digital submittal.
   KCI Response: This has been added to the digital deliverables.

Sincerely,

Adam Spiller
Project Manager

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PROJECT SUMMARY

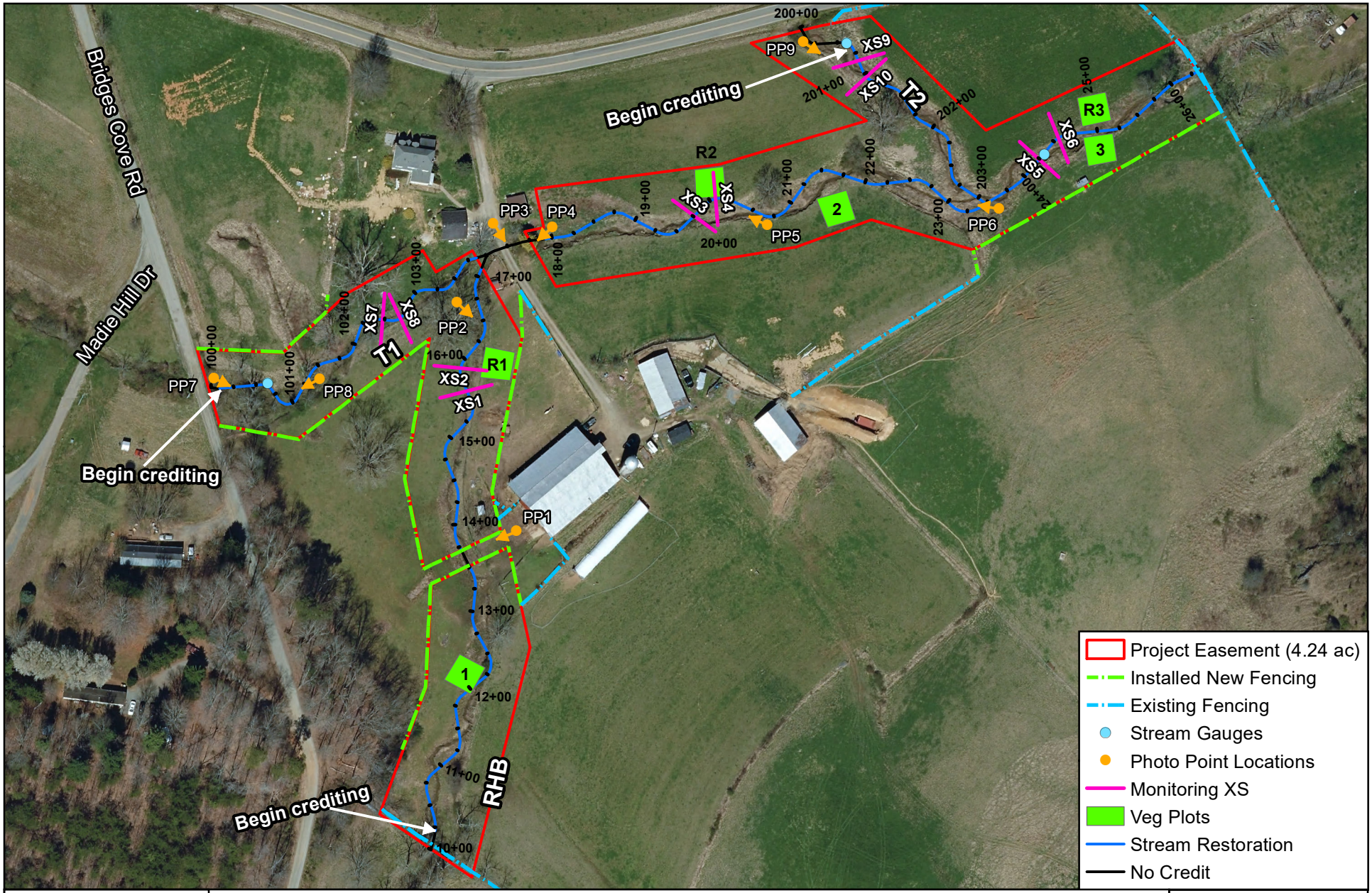
The Round Hill Branch Restoration Site (RHBRS) was completed in December 2021 and restored a total of 2,142 linear feet of stream. The RHBRS is a riparian system in the French Broad River Basin (06010105 8-digit cataloging unit) in Buncombe County, North Carolina. The site's natural hydrologic regime has been substantially modified through the relocation and straightening of the existing stream channels, livestock impacts, and clearing of the riparian buffers. This site offers the chance to restore streams impacted by pasture and agriculture to a stable stream ecosystem with a functional riparian buffer and floodplain access. Site grading was initially completed in June 2021 with no major changes from the construction plans. From August 15 – 18, 2021, the site received 7.6" of rain. This large scale rain event caused a significant amount of deposition to the upper portion of RHB-1, mainly upstream of the first crossing. This deposition, along with a few areas of bank scour along RHB-2, was repaired in September 2021. These repairs involved removing the sediment that had been deposited in the stream and sloping back and reinstalling coir matting on the scoured banks. One small area of floodplain scour located on the left bank, just downstream of the confluence of RHB and T2, was left as a floodplain depression. This area is stable and is not anticipated to expand. It also acts as an ephemeral pool and provides beneficial habitat diversity to the site. Project planting was completed on December 20, 2021 and the monitoring components were installed on January 19, 2022.

Table 1. Round Hill Branch Restoration Site (ID-100066) 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							
RHB Reach 1	705	702	Cool	R	1.00000	670.000	Crediting at full 30'-width buffer (STA 10+21); 20' exception for crossing STA 13+51 to 13+71; exception at crossing STA 17+11 to 17+26
RHB Reach 2	622	619	Cool	R	1.00000	555.000	No credit (limited widths/crossing) from STA 17+26 to 17+92
RHB Reach 3	284	284	Cool	R	1.00000	284.000	
T1	387	384	Cool	R	1.00000	375.000	Crediting begins at full 30'-width buffer (STA 100+09; no credit at crossing from STA 103+84 to 103+97
T2	258	253	Cool	R	1.00000	258.000	Crediting begins at full 30'-width buffer (200+53)
					Total:	**2,142.000**	

Project Credits

Restoration Level	Stream			Riparian Wetland	Non-Riparian Wetland	Coastal Marsh
	Warm	Cool	Cold			
Restoration		2142.000				
Re-establishment						
Rehabilitation						
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation						
Total		**2142.000**				



CURRENT CONDITIONS PLANVIEW
ROUND HILL BRANCH RESTORATION SITE
BUNCOMBE COUNTY, NC

Table 2. Round Hill Branch Restoration Site (ID-100066) Goals, Performance and Results

Goal	Objective/Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Restore channelized and livestock-impacted streams to stable C and B-type channels	Relocate or stabilize channelized and/or incised streams to connect to a floodplain or floodprone area	Hydraulics	4 bankfull events in 4 separate years; 30 consecutive days of flow	1 pressure transducer on RHB-2; 2 pressure transducers and cameras on T1 and T2	
	Install a cross-section sized to the bankfull discharge	Geomorphology	BHR<1.2, ER>2.2	10 cross-sections; annual visual inspection	
	Create bedform diversity with pools, riffles, and habitat structures	Geomorphology	Percent riffle and pool, pool-to-pool spacing, and facet slopes as designed	Longitudinal profile in MY00, annual visual inspection	
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.	Geomorphology	No change >10% in cross-section measurements between monitoring events	10 cross-sections; annual visual inspection	
		Physiochemical	Fencing installed as designed, vegetation meeting success criteria	Estimated reductions based on converted land use	
	Plant the site with native trees and shrubs and a herbaceous seed mix	Geomorpholgy and Species composition	260 stems/acre and average height of 6'after 5 years, 210 stems/acre and average height of 8' after 7 years; at least 4 species from the approved planting plan in each plot w/ no species making up >50% of the stems	6 vegetation monitoring plots	

Table 3. Round Hill Branch Restoration Site (ID-100066) Project Attribute Table

Project Name	Round Hill Branch Restoration Site		
County	Buncombe County		
Project Area (acres)	4.24		
Project Coordinates (latitude and longitude decimal degrees)	35.6305 N and -82.7369 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)	471		
Project Drainage Area Percentage of Impervious Area	3%		
Land Use Classification	Forest (62%), Pasture/Farmland (25%), Low-density Residential Development (12%), and Roads (1%).		
Reach Summary Information			
Parameters			
Pre-project length (feet)	2,214		
Post-project (feet)	2,289		
Valley confinement (Confined, moderately confined, unconfined)	Partially confined to confined		
Drainage area (acres)	471 acres		
Perennial, Intermittent, Ephemeral	Intermittent - Perennial		
NCDWR Water Quality Classification	C (Aquatic life, secondary recreation)		
Dominant Stream Classification (existing)	F4/G4/E4		
Dominant Stream Classification (proposed)	B4/C4		
Dominant Evolutionary class (Simon) if applicable	Stage IV		
Wetland Summary Information			
Parameters	**W1 & W3**	**W2**	**W4**
Pre-project (acres)	0.17 & 0.01	0.10	0.10
Post-project (acres)	0.17 & 0.01	0.10	0.10
Wetland Type (non-riparian, riparian)	Riparian	Riparian	Riparian
Mapped Soil Series	Tate Loam	French Loam	Tate Loam
Soil Hydric Status	No	No	No
Regulatory Considerations			
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404	Yes	Yes	SAW-2018-01168
Water of the United States - Section 401	Yes	Yes	DWR# 18-1031
Endangered Species Act	Yes	Yes	USFWS
Historic Preservation Act	No	N/A	N/A
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 on December 20, 2021. The baseline vegetation monitoring was conducted January 18, 2022. The average plot stem density from the six surveyed plots is 951 planted stems/acre. Baseline monitoring was conducted during dormancy, so many of the stems were not identified to species. During MY01, these trees will be identified to species.

The baseline longitudinal profile was surveyed in August 2021. The baseline cross-sections were surveyed on January 19, 2022. The baseline survey found that the stream was constructed as designed and all structures were installed as planned with no major changes from the construction plans. 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.

There are two issue areas in terms of fencing with adjoining landowners. One area is at the top of Round Hill Branch where there is existing fence located approximately 5 feet inside of the conservation easement. The second area is at the bottom of Round Hill Branch where existing fence pole is within the conservation easement. Both areas are being addressed by sending the adjoining landowners letters notifying them where their property line is and having the fence moved to the appropriate locations. Documentation of this will be in subsequent monitoring reports.

REFERENCES

NCDENR, Ecosystem Enhancement Program. 2009. Upper Yadkin Pee-Dee River Basin Restoration Priorities 2009. Raleigh, NC. https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Yadkin_River_Basin/2009%20Upper%20Yadkin%20RBRP_Final%20Final%2C%2026feb%2709.pdf

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. Round Hill Branch Resotration Site (ID-100066) Visual Stream Stability Assessment — Assessment Date: 1/19/2022

Reach: RHB-1
Assessed Stream Length: 702
Assessed Bank Length: 1404

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.	7	7		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)	7	7		100%

Table 4. Round Hill Branch Resotration Site (ID-100066) Visual Stream Stability Assessment — Assessment Date: 1/19/2022

Reach: RHB-2
Assessed Stream Length: 590
Assessed Bank Length: 1180

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.	2	2		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)	2	2		100%

Table 4. Round Hill Branch Resotration Site (ID-100066) Visual Stream Stability Assessment — Assessment Date: 1/19/2022

Reach: RHB-3
Assessed Stream Length: 284
Assessed Bank Length: 568

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. Round Hill Branch Resotration Site (ID-100066) Visual Stream Stability Assessment — Assessment Date: 1/19/2022

Reach: T1
Assessed Stream Length: 385
Assessed Bank Length: 770

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. Round Hill Branch Resotration Site (ID-100066) Visual Stream Stability Assessment — Assessment Date: 1/19/2022

Reach T2

Assessed Stream Length 253

Assessed Bank Length 506

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.	5	5		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)	5	5		100%

Table 5. Round Hill Branch Restoration Site (ID-100066) Visual Vegetation Assessment

Planted acreage **3.68**

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 **4.24**

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.	0.00 acres	0.00	0.0%
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	

Photo Reference Photos

PP1 – MY-00 – 1/18/22

PP2 – MY-00 – 1/18/22

PP3 – MY-00 – 1/18/22

PP4 – MY-00 – 1/18/22

PP5 – MY-00 – 1/18/22

PP6 – MY-00 – 1/18/22

PP7 – MY-00 – 1/18/22

PP8 – MY-00 – 1/18/22

PP9 – MY-00 – 1/18/22

Vegetation Monitoring Plot Photos

Vegetation Plot 1 – MY-00 – 1/18/22

Vegetation Plot 2 – MY-00 – 1/18/22

Vegetation Plot 3 – MY-00 – 1/18/22

Vegetation Plot R1 – MY-00 – 1/18/22

Vegetation Plot R2 – MY-00 – 1/18/22

Vegetation Plot R3 – MY-00 – 1/18/22

APPENDIX B

Vegetation Plot Data

Table 6. Vegetation Plot Data
Round Hill Branch Restoration Site (ID-100066)

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R
					Planted	Total	Planted	Total	Planted	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Aesculus flava	yellow buckeye	Tree	FACU			4	4			5	1	
	Celtis laevigata	sugarberry	Tree	FACW					3	3		1	2
	Cornus amomum	silky dogwood	Shrub	FACW			1	1			6	3	1
	other				15	15	6	6	14	14	7	9	15
	Platanus occidentalis	American sycamore	Tree	FACW	6	6			1	1	1	5	6
	Quercus alba	white oak	Tree	FACU			4	4			1		
	Quercus rubra	northern red oak	Tree	FACU			1	1					
	Quercus sp.						3	3	1	1	4	4	5
	Salix nigra	black willow	Tree	OBL								5	
	Sambucus canadensis	American black elderberry	Tree									1	
Sum	Performance Standard				21	21	19	19	19	19	24	29	29
Mitigation Plan Performance Standard	Current Year Stem Count					21		19		19	24	29	29
	Stems/Acre					850		769		769	972	1174	1174
	Species Count					2		6		4	6	8	5
	Dominant Species Composition (%)					71		32		74	29	31	52
	Average Plot Height (ft.)					1		1		1	1	1	1
	% Invasives					0		0		0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					21		19		19	24	29	29
	Stems/Acre					850		769		769	972	1174	1174
	Species Count					2		6		4	6	8	5
	Dominant Species Composition (%)					71		32		74	29	31	52
	Average Plot Height (ft.)					1		1		1	1	1	1
	% Invasives					0		0		0	0	0	0

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	3.68
Date of Initial Plant	2021-12-20
Date(s) of Supplemental Plant(s)	
Date(s) Mowing	
Date of Current Survey	2022-01-18
Plot size (ACRES)	0.0247

Table 7. Vegetation Performance Standards Summary Table
Round Hill Branch Restoration Site (ID-100066)

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	850	1	2	0	769	1	6	0	769	1	4	0
	Veg Plot Group 1 R				Veg Plot Group 2 R				Veg Plot Group 3 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	972	1	6	0	1174	1	8	0	1174	1	5	0

APPENDIX C

Stream Geomorphology Data

Table 8. Baseline Stream Data Summary Round Hill Branch, RHB-1										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5.2	6.0	6.0	6.8	4	9.8		13.3		1
Floodprone Width (ft)	18.5	33.4	27.5	60+	4	40	52	56.9		1
Bankfull Mean Depth (ft)	0.9	1.0	1.0	1.2	4	0.8		0.7		1
Bankfull Max Depth (ft)	1.2	1.5	1.5	1.9	4	1.3		1.5		1
Bankfull Cross Sectional Area (ft^2)	5.4	6.0	6.1	6.3	4	7.6		8.9		1
Width/Depth Ratio	4.3	6.1	6.2	7.6	4	12.6		19.8		1
Entrenchment Ratio	2.7	6.0	4.6	12.3	4	4.1	5.3	4.3		1
Bank Height Ratio	1.0	1.2	1.2	1.3	4	1.0		1.0		1
Max part size (mm) mobilized at bankfull	48					52		39		
Rosgen Classification	F4/E4					C4/B4c		C4/B4c		
Bankfull Discharge (cfs)	27.9					39.2		39.2		
Sinuosity (ft)	1.07					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.020					0.021		0.020		
Other										

Table 8. Baseline Stream Data Summary Round Hill Branch, RHB-2										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5.5				1	11.4		9.7		1
Floodprone Width (ft)	35.0				1	44	65	73.9		1
Bankfull Mean Depth (ft)	1.3				1	0.9		0.6		1
Bankfull Max Depth (ft)	1.6				1	1.4		1.1		1
Bankfull Cross Sectional Area (ft^2)	7.1				1	10.2		6.1		1
Width/Depth Ratio	4.2				1	12.8		15.5		1
Entrenchment Ratio	6.4				1	3.9	5.7	7.6		1
Bank Height Ratio	1.0				1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	57					39		30		
Rosgen Classification	F4/E4					C4/B4c		C4/B4c		
Bankfull Discharge (cfs)	35.5					47.5		47.5		
Sinuosity (ft)	1.05					1.2		1.2		
Water Surface Slope (Channel) (ft/ft)	0.020					0.014		0.016		
Other										

Table 8. Baseline Stream Data Summary Round Hill Branch, RHB-3										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	11.5				1	11.8		12.3		1
Floodprone Width (ft)	29.4				1	38	55	56.1		1
Bankfull Mean Depth (ft)	0.8				1	0.9		0.7		1
Bankfull Max Depth (ft)	2.1				1	1.5		1.5		1
Bankfull Cross Sectional Area (ft^2)	9.0				1	11.2		8.6		1
Width/Depth Ratio	14.6				1	12.5		17.7		1
Entrenchment Ratio	2.6				1	3.2	4.7	4.5		1
Bank Height Ratio	1.0				1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	34					47		32		
Rosgen Classification	F4/E4					C4/B4c		C4/B4c		
Bankfull Discharge (cfs)	42.7					55.6		55.6		
Sinuosity (ft)	1.12					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.018					0.017		0.016		
Other										

Table 8. Baseline Stream Data Summary Round Hill Branch, T1										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	3.8			4.1	2	6.8		6.6		1
Floodprone Width (ft)	7.9	19.0		30.0	2	35	45	50.2		1
Bankfull Mean Depth (ft)	0.7	0.7		0.7	2	0.5		0.5		1
Bankfull Max Depth (ft)	0.9	1.0		1.1	2	0.9		0.9		1
Bankfull Cross Sectional Area (ft^2)	2.5	2.7		2.9	2	3.7		3.5		1
Width/Depth Ratio	5.8	5.9		5.9	2	12.7		12.2		1
Entrenchment Ratio	1.9	4.9		7.9	2	5.1	6.6	7.6		1
Bank Height Ratio	1.0	1.4		1.7	2	1.0		1.0		1
Max part size (mm) mobilized at bankfull	34					29		26		
Rosgen Classification	F4					C4/B4c		C4/B4c		
Bankfull Discharge (cfs)	10.0					14.2		14.2		
Sinuosity (ft)	1.10					1.13		1.13		
Water Surface Slope (Channel) (ft/ft)	0.020					0.019		0.017		
Other										

Table 8. Baseline Stream Data Summary Round Hill Branch, T2										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	9.7				1	6.4		6.2		1
Floodprone Width (ft)	11.8				1	27	34	36.1		1
Bankfull Mean Depth (ft)	0.3				1	0.5		0.5		1
Bankfull Max Depth (ft)	0.8				1	0.8		0.8		1
Bankfull Cross Sectional Area (ft^2)	3.3				1	3.1		3.1		1
Width/Depth Ratio	28.1				1	13.2		12.6		1
Entrenchment Ratio	1.2				1	4.2	5.3	5.8		1
Bank Height Ratio	1.0				1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	31					48		54		
Rosgen Classification	G4					B4/C4b		B4/C4b		
Bankfull Discharge (cfs)	10.3					14.0		14.0		
Sinuosity (ft)	1.06					1.13		1.13		
Water Surface Slope (Channel) (ft/ft)	0.031					0.031		0.037		
Other										

Table 9. Cross-section Morphology Monitoring Summary
Round Hill Branch Restoration Site (ID-100066)

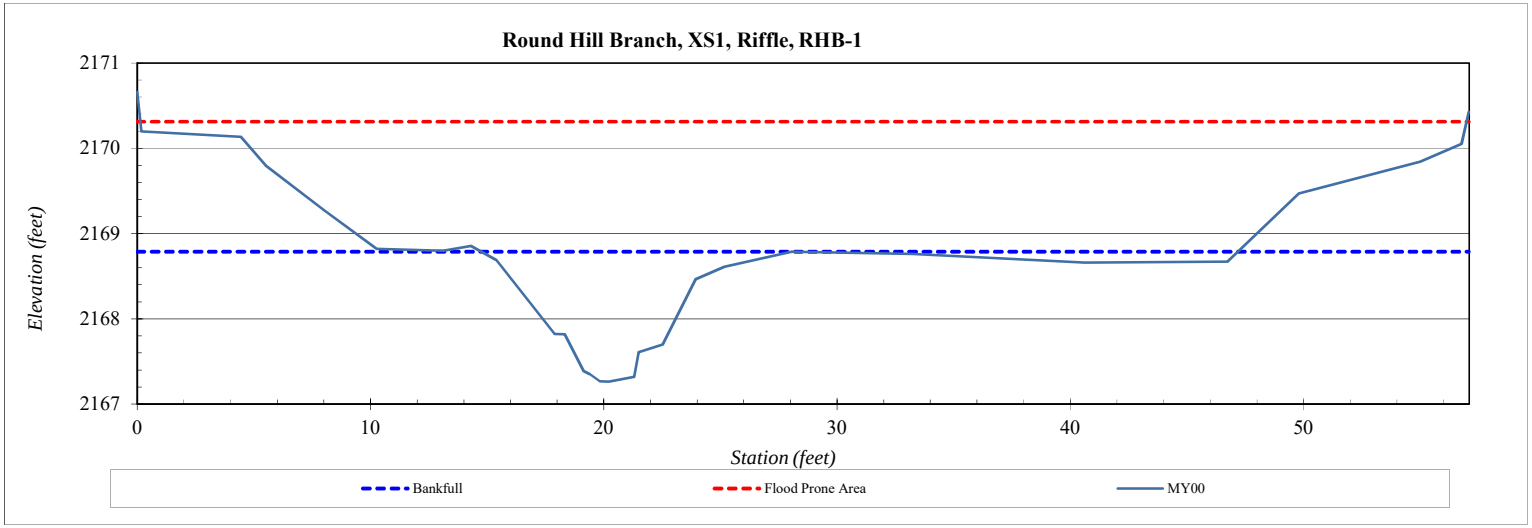
	Cross Section 1 (Riffle - RHB-1)							Cross Section 2 (Pool - RHB-1)							Cross Section 3 (Riffle - RHB-2)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2168.8							2168.0							2161.1						
Bank Height Ratio - Based on AB Bankfull Area	1.0							---							1.0						
Thalweg Elevation	2167.3							2165.8							2160.1						
LTOB Elevation	2168.8							2168.0							2161.1						
LTOB Max Depth (ft)	1.5							2.1							1.1						
LTOB Cross Sectional Area (ft^2)	8.9							15.5							6.1						
	Cross Section 4 (Pool - RHB-2)							Cross Section 5 (Riffle - RHB-3)							Cross Section 6 (Pool - RHB-3)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2160.7							2154.4							2153.8						
Bank Height Ratio - Based on AB Bankfull Area	---							1.0							---						
Thalweg Elevation	2157.5							2152.9							2150.6						
LTOB Elevation	2160.7							2154.4							2153.8						
LTOB Max Depth (ft)	3.2							1.5							3.2						
LTOB Cross Sectional Area (ft^2)	29.7							8.6							26.4						
	Cross Section 7 (Riffle - T1)							Cross Section 8 (Pool - T1)							Cross Section 9 (Riffle - T2)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2167.7							2167.2							2162.5						
Bank Height Ratio - Based on AB Bankfull Area	1.0							---							1.0						
Thalweg Elevation	2166.8							2165.4							2161.7						
LTOB Elevation	2167.7							2167.2							2162.5						
LTOB Max Depth (ft)	0.9							1.8							0.8						
LTOB Cross Sectional Area (ft^2)	3.5							10.2							3.1						
	Cross Section 10 (Pool - T2)																				
	MY0	MY1	MY2	MY3	MY5	MY7	MY+														
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2161.4																				
Bank Height Ratio - Based on AB Bankfull Area	---																				
Thalweg Elevation	2159.8																				
LTOB Elevation	2161.4																				
LTOB Max Depth (ft)	1.6																				
LTOB Cross Sectional Area (ft^2)	6.8																				

Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS1
Drainage Area (sq mi):	0.46
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2170.66
0.2	2170.20
4.4	2170.14
5.5	2169.79
8.0	2169.28
10.3	2168.82
13.1	2168.80
14.3	2168.86
15.4	2168.69
17.9	2167.82
18.3	2167.82
19.1	2167.39
19.4	2167.35
19.8	2167.27
20.2	2167.26
21.3	2167.32
21.5	2167.61
22.5	2167.70
23.9	2168.47
25.2	2168.61
28.1	2168.79
33.2	2168.76
40.6	2168.66
46.7	2168.67
49.8	2169.47
55.0	2169.84
56.8	2170.05
57.1	2170.43

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2168.79
Bankfull Cross-Sectional Area:	8.9
LTOB Cross-Sectional Area:	8.9
Bankfull Width:	13.3
Flood Prone Area Elevation:	2170.31
Flood Prone Width:	56.9
LTOB Max Depth	1.5
LTOB Mean Depth	0.7
W / D Ratio:	19.8
Entrenchment Ratio:	4.3
Bank Height Ratio:	1.0
Thalweg Elevation:	2167.26

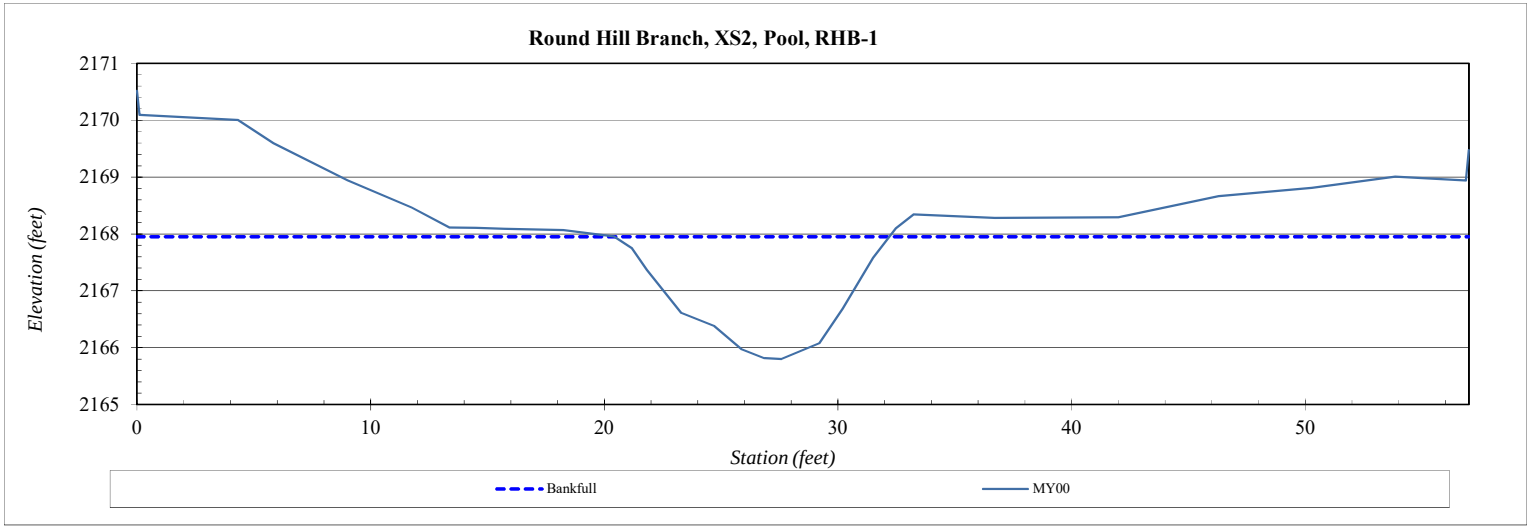


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS2
Drainage Area (sq mi):	0.46
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2170.52
0.1	2170.10
4.3	2170.01
5.8	2169.60
9.0	2168.94
11.8	2168.46
13.4	2168.11
14.5	2168.10
15.7	2168.09
18.2	2168.07
20.4	2167.95
21.2	2167.75
21.8	2167.37
23.3	2166.61
24.7	2166.38
25.9	2165.97
26.9	2165.81
27.6	2165.80
29.2	2166.08
30.2	2166.69
31.5	2167.59
32.5	2168.10
33.2	2168.34
36.7	2168.28
42.0	2168.29
46.3	2168.67
50.3	2168.81
53.8	2169.01
56.9	2168.94
57.0	2169.47

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2167.95
Bankfull Cross-Sectional Area:	15.5
LTOB Cross-Sectional Area:	15.5
Bankfull Width:	11.8
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	2.1
LTOB Mean Depth	1.3
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2165.80

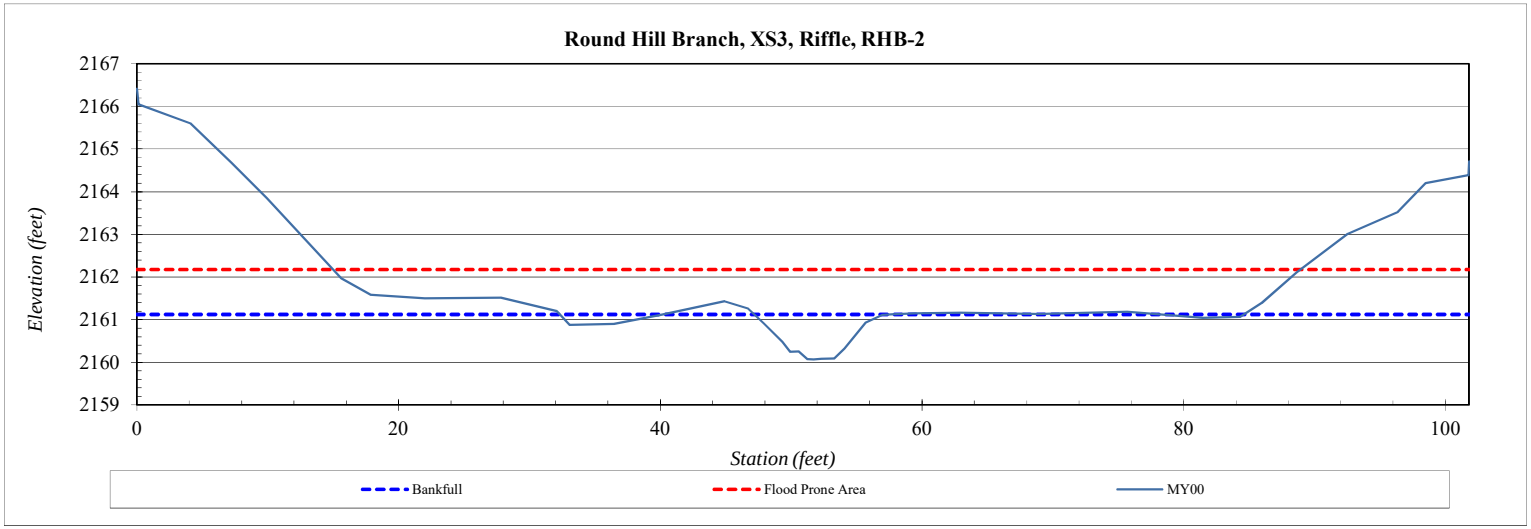


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS3
Drainage Area (sq mi):	0.59
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2166.41
0.1	2166.05
4.1	2165.60
7.2	2164.68
9.9	2163.85
15.6	2161.97
17.9	2161.58
22.0	2161.50
27.8	2161.52
32.1	2161.20
33.1	2160.88
36.4	2160.90
40.0	2161.11
44.9	2161.43
46.7	2161.27
47.9	2160.91
49.3	2160.48
49.9	2160.25
50.6	2160.25
51.3	2160.07
51.7	2160.07
52.3	2160.08
53.3	2160.09
54.1	2160.32
55.7	2160.94
56.9	2161.11
57.7	2161.12
59.5	2161.14
63.0	2161.16
68.9	2161.13
92.5	2163.02
96.4	2163.52
98.5	2164.20
101.8	2164.39
101.8	2164.71

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2161.12
Bankfull Cross-Sectional Area:	6.1
LTOB Cross-Sectional Area:	6.1
Bankfull Width:	9.7
Flood Prone Area Elevation:	2162.17
Flood Prone Width:	73.9
LTOB Max Depth	1.1
LTOB Mean Depth	0.6
W / D Ratio:	15.5
Entrenchment Ratio:	7.6
Bank Height Ratio:	1.0
Thalweg Elevation:	2160.07

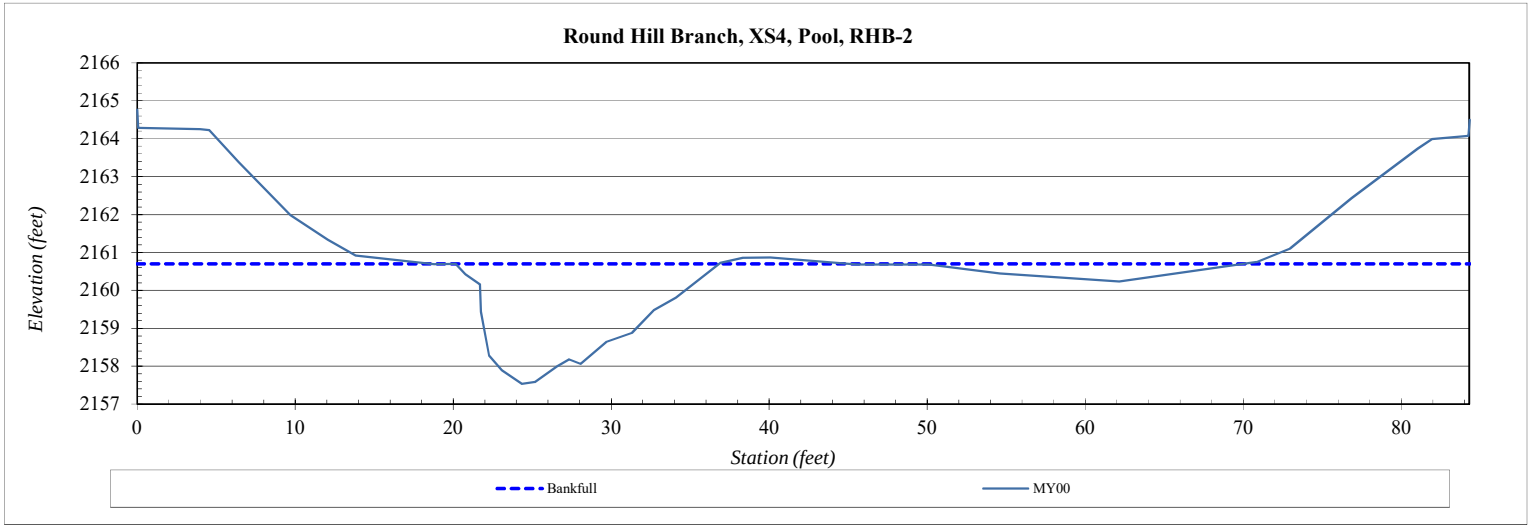


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS4
Drainage Area (sq mi):	0.59
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2164.77
0.1	2164.28
4.0	2164.25
4.6	2164.23
6.4	2163.38
9.7	2161.99
12.0	2161.34
13.9	2160.91
18.8	2160.69
20.2	2160.70
20.8	2160.43
21.7	2160.15
21.8	2159.44
22.3	2158.29
23.1	2157.90
24.3	2157.54
25.2	2157.58
26.6	2158.00
27.3	2158.18
28.1	2158.06
29.7	2158.65
31.3	2158.88
32.7	2159.48
34.1	2159.81
36.9	2160.72
38.3	2160.86
40.1	2160.87
45.6	2160.68
50.1	2160.68
54.6	2160.44
81.1	2163.74
81.9	2163.99
84.2	2164.08
84.3	2164.50

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2160.70
Bankfull Cross-Sectional Area:	29.7
LTOB Cross-Sectional Area:	29.7
Bankfull Width:	18.3
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	3.2
LTOB Mean Depth	1.6
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2157.54

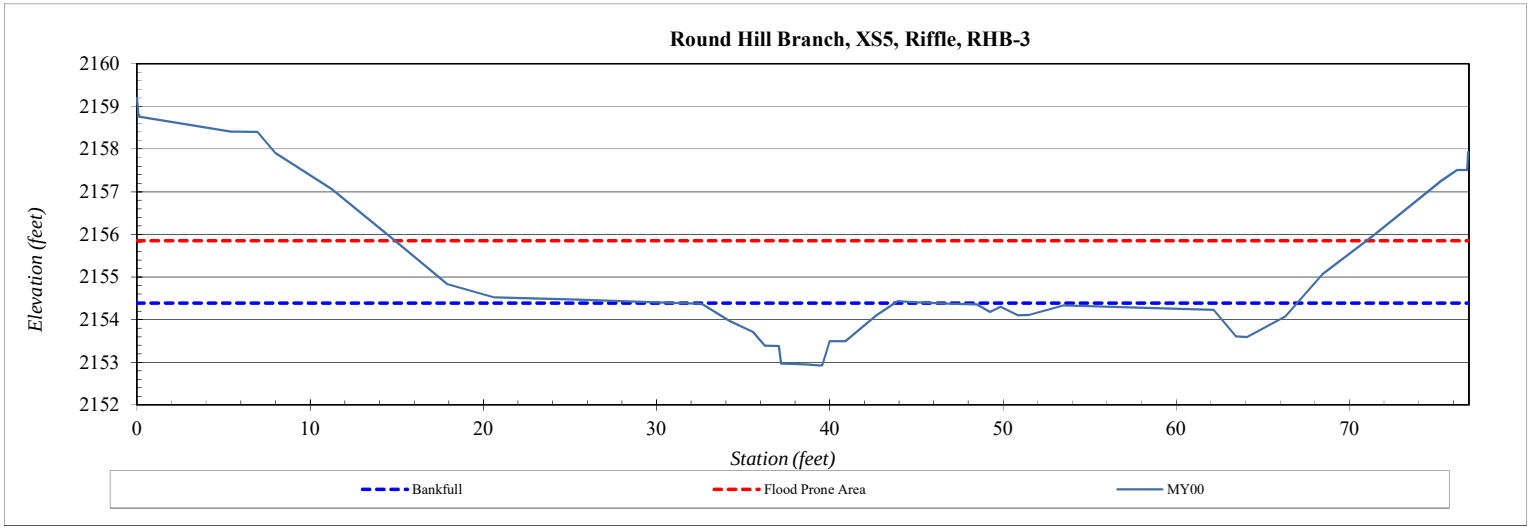


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS5
Drainage Area (sq mi):	0.74
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2159.20
0.1	2158.76
5.4	2158.41
7.0	2158.40
8.0	2157.91
11.2	2157.07
15.0	2155.84
17.9	2154.84
20.7	2154.52
25.4	2154.47
29.7	2154.41
31.4	2154.39
32.6	2154.37
34.2	2153.97
35.6	2153.71
36.3	2153.39
37.1	2153.38
37.2	2152.97
37.9	2152.96
38.8	2152.94
39.4	2152.93
39.6	2152.93
40.0	2153.50
40.9	2153.49
42.7	2154.11
43.9	2154.43
44.8	2154.41
47.0	2154.37
48.5	2154.36
49.3	2154.18
49.9	2154.30
75.3	2157.25
76.2	2157.51
76.8	2157.51
76.9	2157.93

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2154.39
Bankfull Cross-Sectional Area:	8.6
LTOB Cross-Sectional Area:	8.6
Bankfull Width:	12.3
Flood Prone Area Elevation:	2155.85
Flood Prone Width:	56.1
LTOB Max Depth	1.5
LTOB Mean Depth	0.7
W / D Ratio:	17.7
Entrenchment Ratio:	4.5
Bank Height Ratio:	1.0
Thalweg Elevation:	2152.93

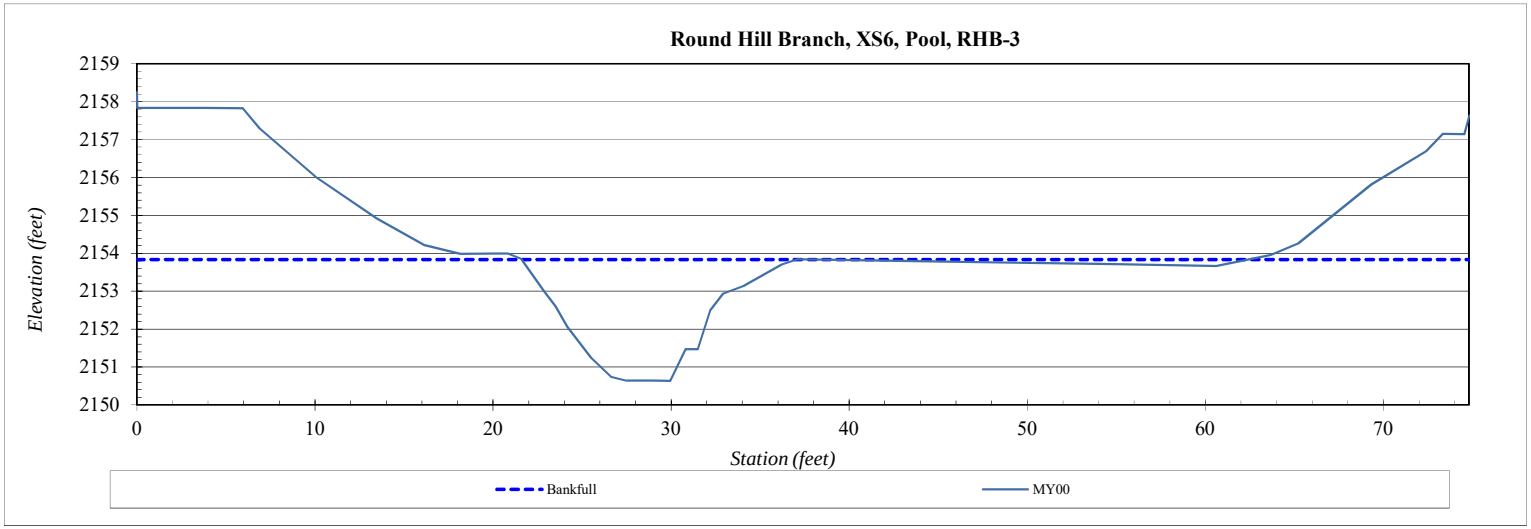


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS6
Drainage Area (sq mi):	0.74
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2158.25
0.0	2157.83
3.8	2157.83
6.0	2157.82
6.9	2157.29
10.1	2156.00
13.5	2154.92
16.2	2154.21
18.2	2153.98
20.2	2154.00
20.9	2153.99
21.6	2153.86
22.8	2153.02
23.5	2152.60
24.2	2152.07
25.5	2151.24
26.6	2150.74
27.5	2150.64
28.9	2150.64
29.9	2150.63
30.8	2151.47
31.5	2151.47
32.2	2152.50
32.9	2152.93
34.1	2153.14
36.2	2153.70
37.1	2153.84
38.3	2153.83
44.3	2153.79
48.2	2153.76
53.7	2153.72
72.4	2156.70
73.3	2157.15
74.5	2157.15
74.8	2157.63

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2153.84
Bankfull Cross-Sectional Area:	26.4
LTOB Cross-Sectional Area:	26.4
Bankfull Width:	14.2
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	3.2
LTOB Mean Depth	1.9
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2150.63

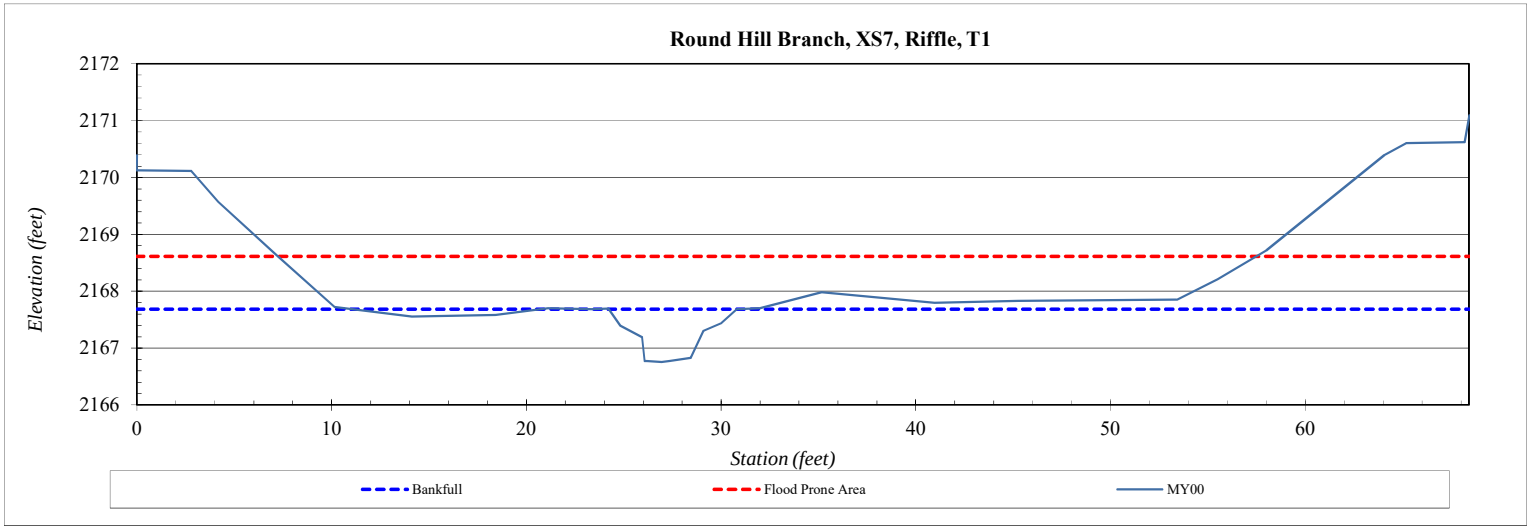


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS7
Drainage Area (sq mi):	0.11
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2170.39
0.0	2170.13
2.8	2170.11
4.2	2169.57
7.2	2168.64
10.2	2167.72
14.1	2167.56
18.4	2167.58
21.1	2167.70
23.4	2167.68
24.2	2167.69
24.8	2167.40
25.9	2167.19
26.1	2166.77
26.2	2166.77
26.9	2166.76
27.3	2166.77
28.4	2166.83
29.1	2167.31
30.0	2167.44
30.8	2167.68
32.0	2167.70
35.2	2167.98
41.0	2167.79
45.3	2167.83
53.4	2167.85
55.5	2168.21
58.0	2168.72
64.1	2170.40
65.2	2170.60
68.2	2170.62
68.4	2171.09

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2167.68
Bankfull Cross-Sectional Area:	3.5
LTOB Cross-Sectional Area:	3.5
Bankfull Width:	6.6
Flood Prone Area Elevation:	2168.61
Flood Prone Width:	50.2
LTOB Max Depth	0.9
LTOB Mean Depth	0.5
W / D Ratio:	12.2
Entrenchment Ratio:	7.6
Bank Height Ratio:	1.0
Thalweg Elevation:	2166.76

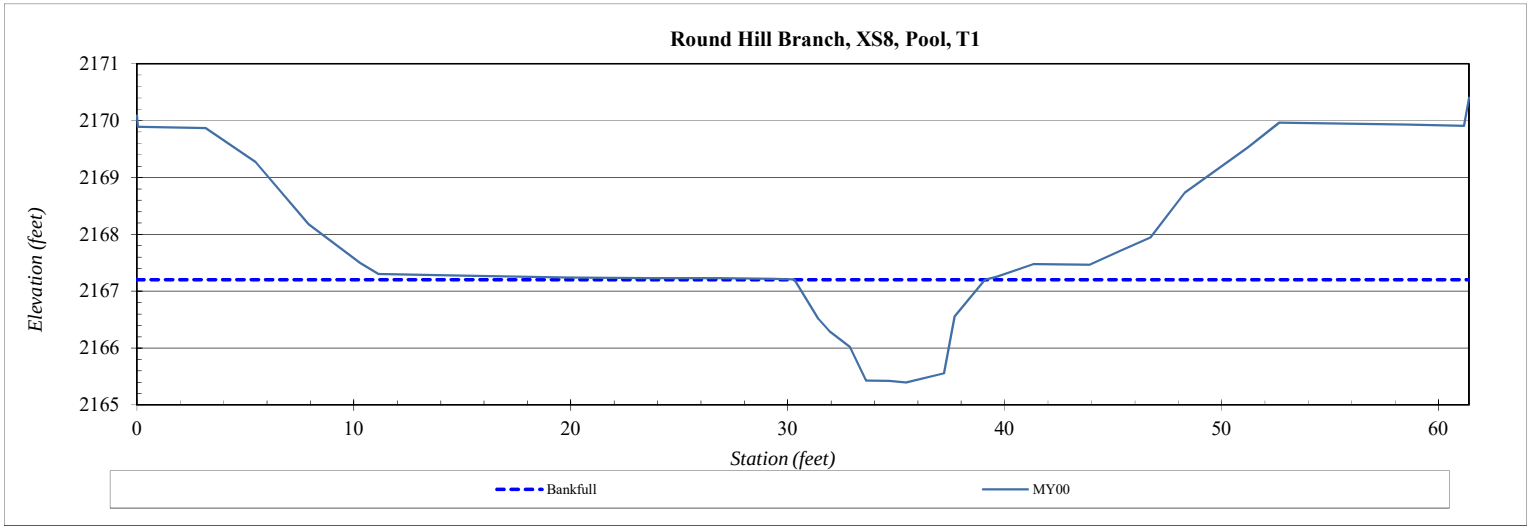


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS8
Drainage Area (sq mi):	0.11
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2170.09
0.0	2169.89
3.2	2169.87
5.5	2169.27
7.9	2168.18
10.3	2167.50
11.1	2167.30
15.7	2167.27
19.8	2167.24
23.7	2167.23
26.8	2167.23
29.3	2167.22
30.3	2167.20
31.4	2166.52
31.9	2166.30
32.9	2166.02
33.6	2165.43
34.7	2165.42
35.5	2165.39
37.2	2165.56
37.7	2166.55
39.1	2167.20
39.6	2167.25
41.3	2167.48
43.9	2167.47
45.3	2167.71
46.7	2167.95
48.3	2168.73
51.2	2169.53
52.6	2169.96
58.5	2169.93
61.2	2169.91
61.4	2170.40

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2167.20
Bankfull Cross-Sectional Area:	10.2
LTOB Cross-Sectional Area:	10.2
Bankfull Width:	8.8
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	1.8
LTOB Mean Depth	1.2
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2165.39

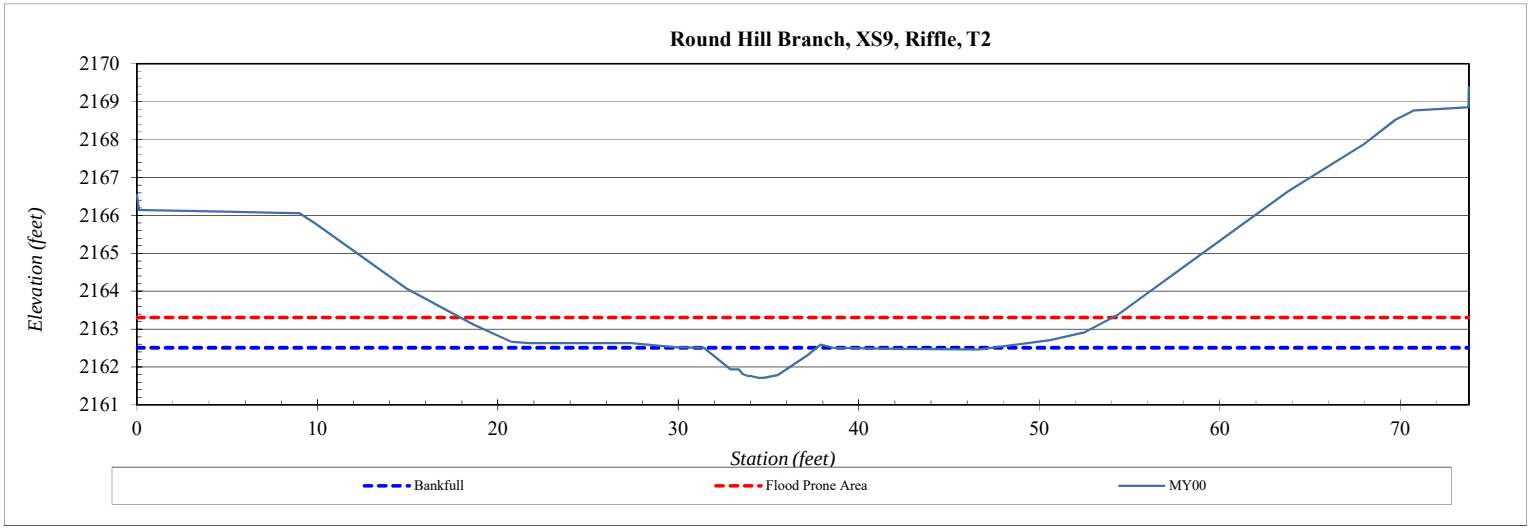


Cross-Section Plots

River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS9
Drainage Area (sq mi):	0.11
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2166.54
0.1	2166.14
4.8	2166.10
7.9	2166.07
9.0	2166.06
9.9	2165.80
14.9	2164.07
18.6	2163.13
20.8	2162.66
21.7	2162.63
25.1	2162.63
27.4	2162.63
29.9	2162.52
31.0	2162.51
31.4	2162.51
32.9	2161.94
33.4	2161.94
33.6	2161.82
33.9	2161.75
34.0	2161.76
34.5	2161.71
34.8	2161.72
35.5	2161.78
36.1	2161.99
37.1	2162.31
37.9	2162.59
38.7	2162.50
42.3	2162.48
46.6	2162.46
50.6	2162.71
52.5	2162.91
54.3	2163.38
69.7	2168.53
70.7	2168.77
73.8	2168.85
73.8	2169.39

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2162.51
Bankfull Cross-Sectional Area:	3.1
LTOB Cross-Sectional Area:	3.1
Bankfull Width:	6.2
Flood Prone Area Elevation:	2163.31
Flood Prone Width:	36.1
LTOB Max Depth	0.8
LTOB Mean Depth	0.5
W / D Ratio:	12.6
Entrenchment Ratio:	5.8
Bank Height Ratio:	1.0
Thalweg Elevation:	2161.71

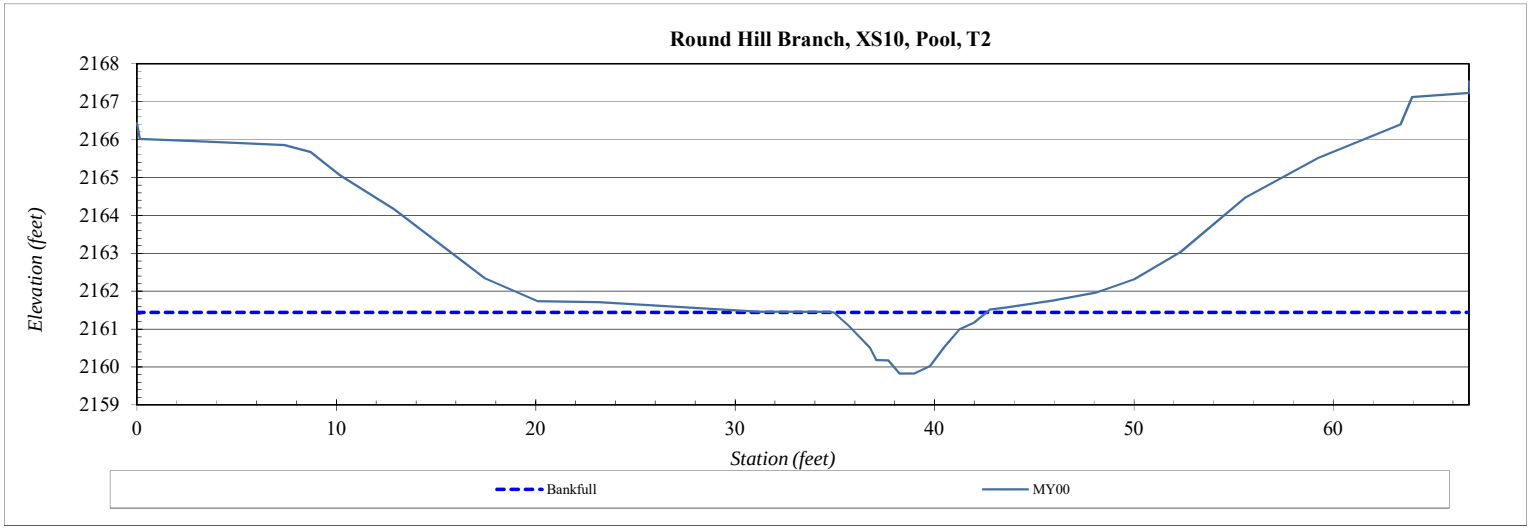


Cross-Section Plots

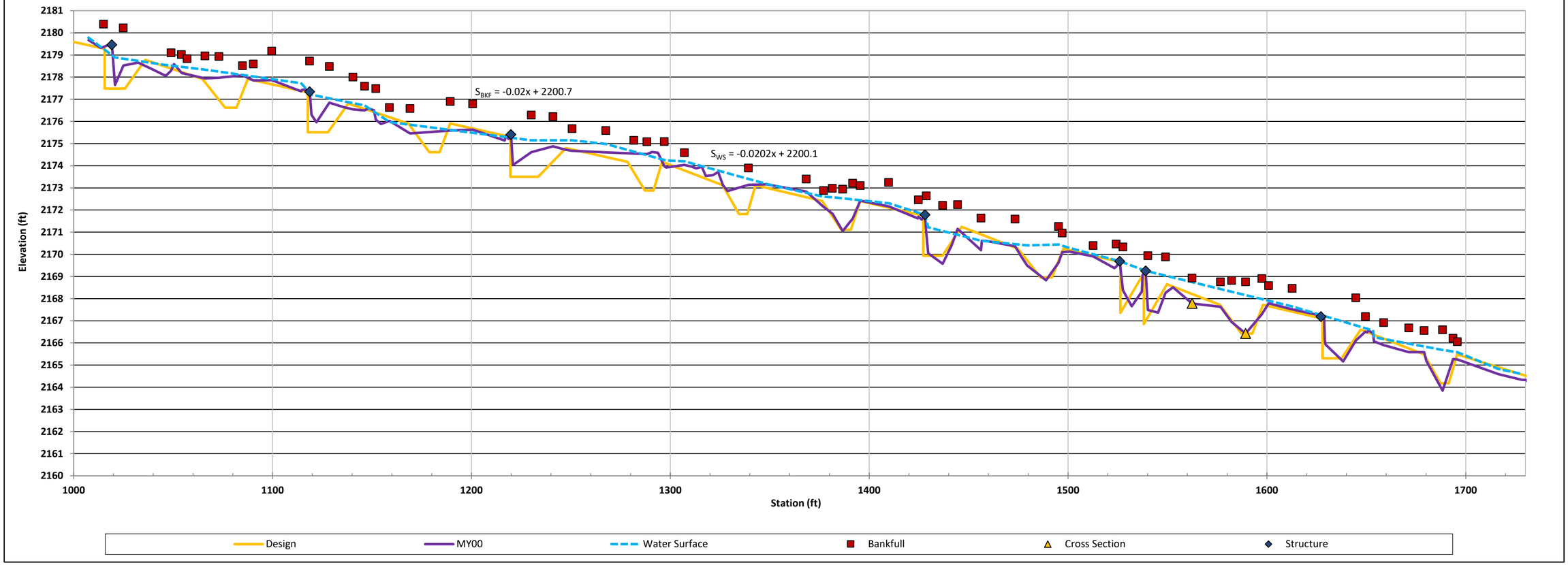
River Basin:	French Broad
Site:	Round Hill Branch
XS ID	XS10
Drainage Area (sq mi):	0.11
Date:	1/19/2022
Field Crew:	TS, KB

Station	Elevation
0.0	2166.43
0.1	2166.02
3.4	2165.95
7.4	2165.85
8.7	2165.67
10.2	2165.06
12.9	2164.17
17.5	2162.34
20.1	2161.73
23.2	2161.71
26.4	2161.61
31.2	2161.46
34.2	2161.45
35.0	2161.44
35.7	2161.10
36.8	2160.49
37.1	2160.18
37.7	2160.17
38.3	2159.83
39.0	2159.83
39.8	2160.03
40.5	2160.54
41.3	2161.00
42.0	2161.17
42.8	2161.51
43.6	2161.57
45.9	2161.75
48.1	2161.97
50.0	2162.31
52.3	2163.03
55.6	2164.48
59.2	2165.52
63.4	2166.41
63.9	2167.12
66.8	2167.23
66.8	2167.54

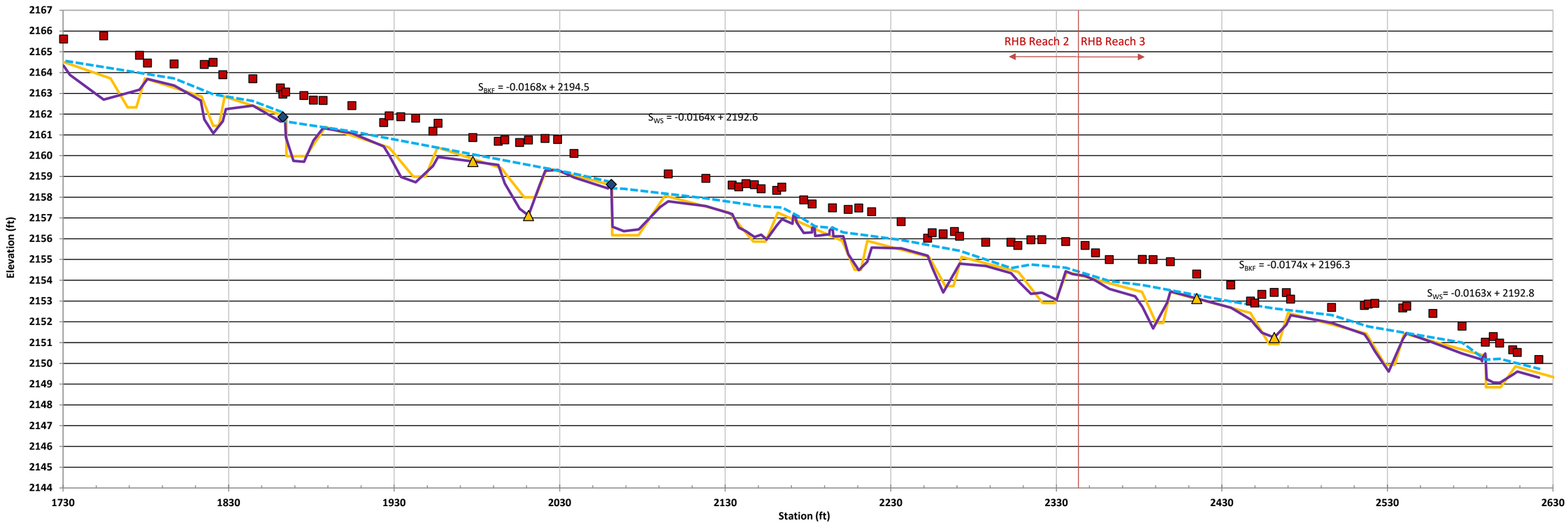
SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	2161.44
Bankfull Cross-Sectional Area:	6.8
LTOB Cross-Sectional Area:	6.8
Bankfull Width:	7.7
Flood Prone Area Elevation:	---
Flood Prone Width:	---
LTOB Max Depth	1.6
LTOB Mean Depth	0.9
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	2159.83



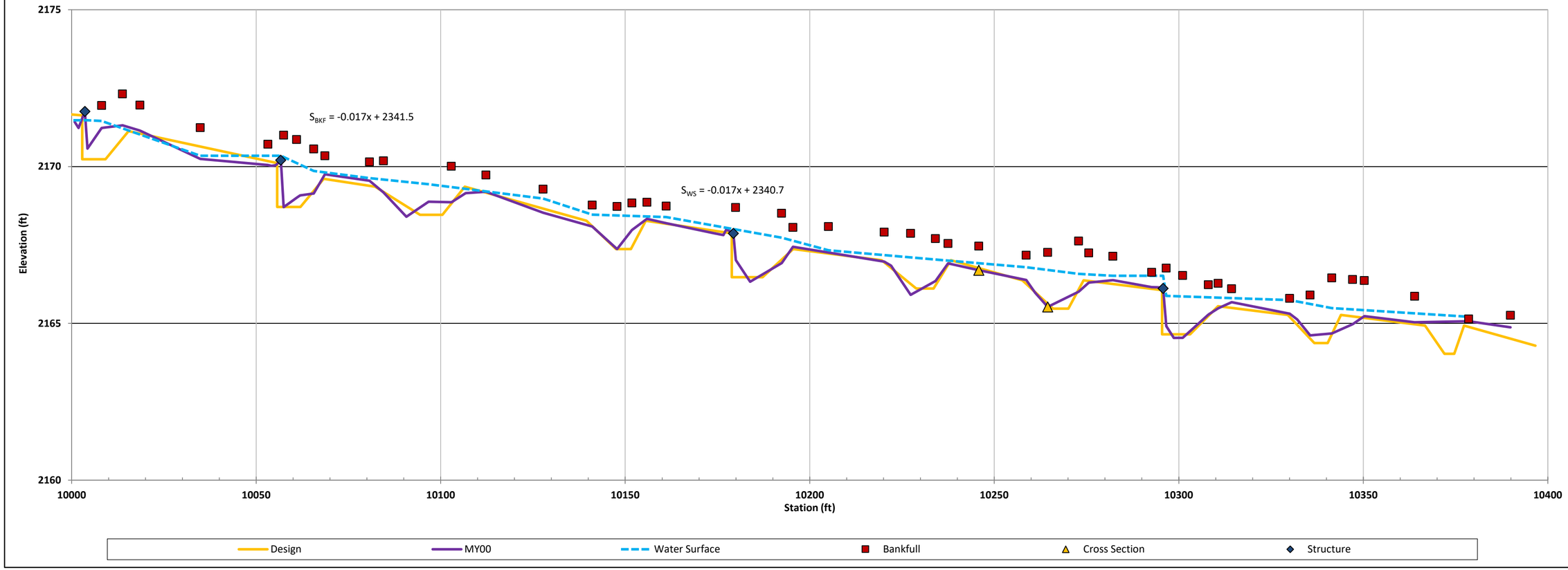
Longitudinal Profile
Round Hill Branch Restoration Site - RHB Reach 1
Monitoring Year 00, 2022



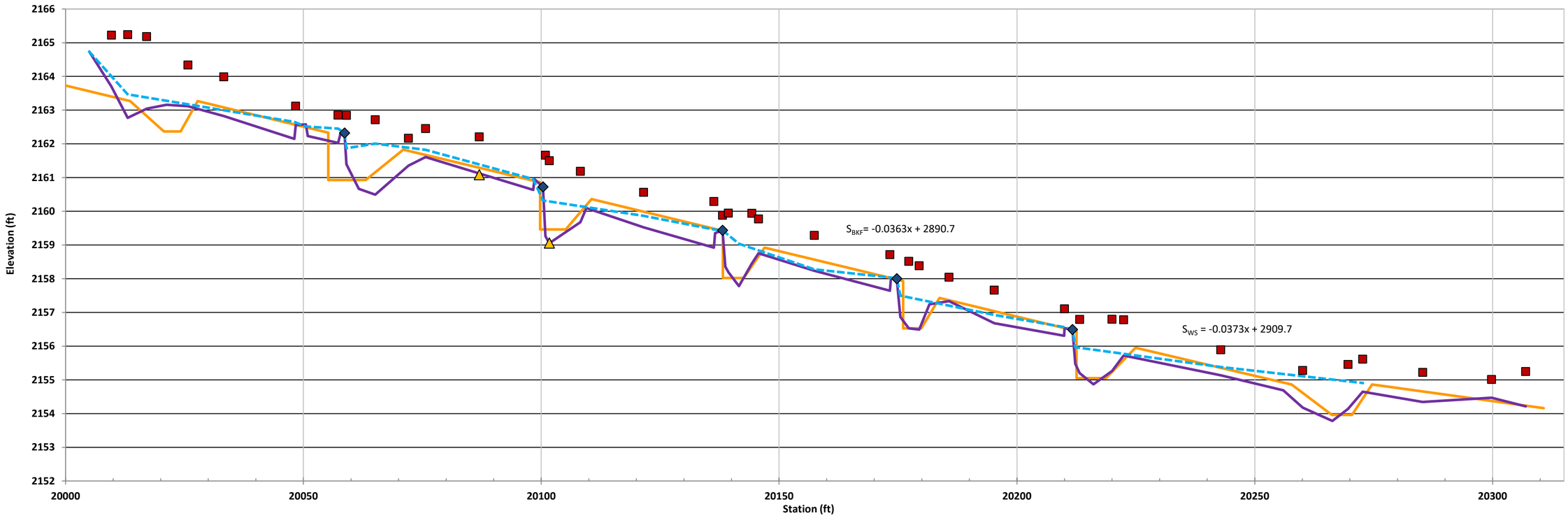
Longitudinal Profile
Round Hill Branch Restoration Site - RHB Reach 2 & 3
Monitoring Year 00, 2022



Longitudinal Profile
Round Hill Branch Restoration Site - T1
Monitoring Year 00, 2022



Longitudinal Profile
Round Hill Branch Restoration Site - T2
Monitoring Year 00, 2022



APPENDIX D

Project Timeline and Contact Info

Table 10. Project Activity & Reporting History Round Hill Branch Restoration Site, DMS Project #100066		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Site Instituted		April 25, 2018
Mitigation Plan		Nov. 13, 2020
Final Design - Construction Plans		Feb. 12, 2021
Construction Grading Completed		June 18, 2021
As-built Survey		August 11, 2021
Repairs from Storm Damage Completed		Sept. 26, 2021
Planting Completed		Dec. 20, 2021
Baseline Monitoring/Report		February 2022
Vegetation Monitoring	January 18, 2022	
Stream Survey	January 19, 2022	

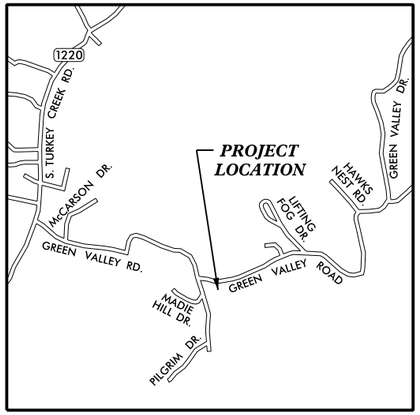
Table 11. Project Contacts Round Hill Branch Restoration Site, DMS Project #100066	
Design Firm	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	KCI Environmental Technologies and Construction 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller
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# : 161802916

CONTRACT #: 7534



VICINITY MAP
NOT TO SCALE

NCDEQ DIVISION OF MITIGATION SERVICES

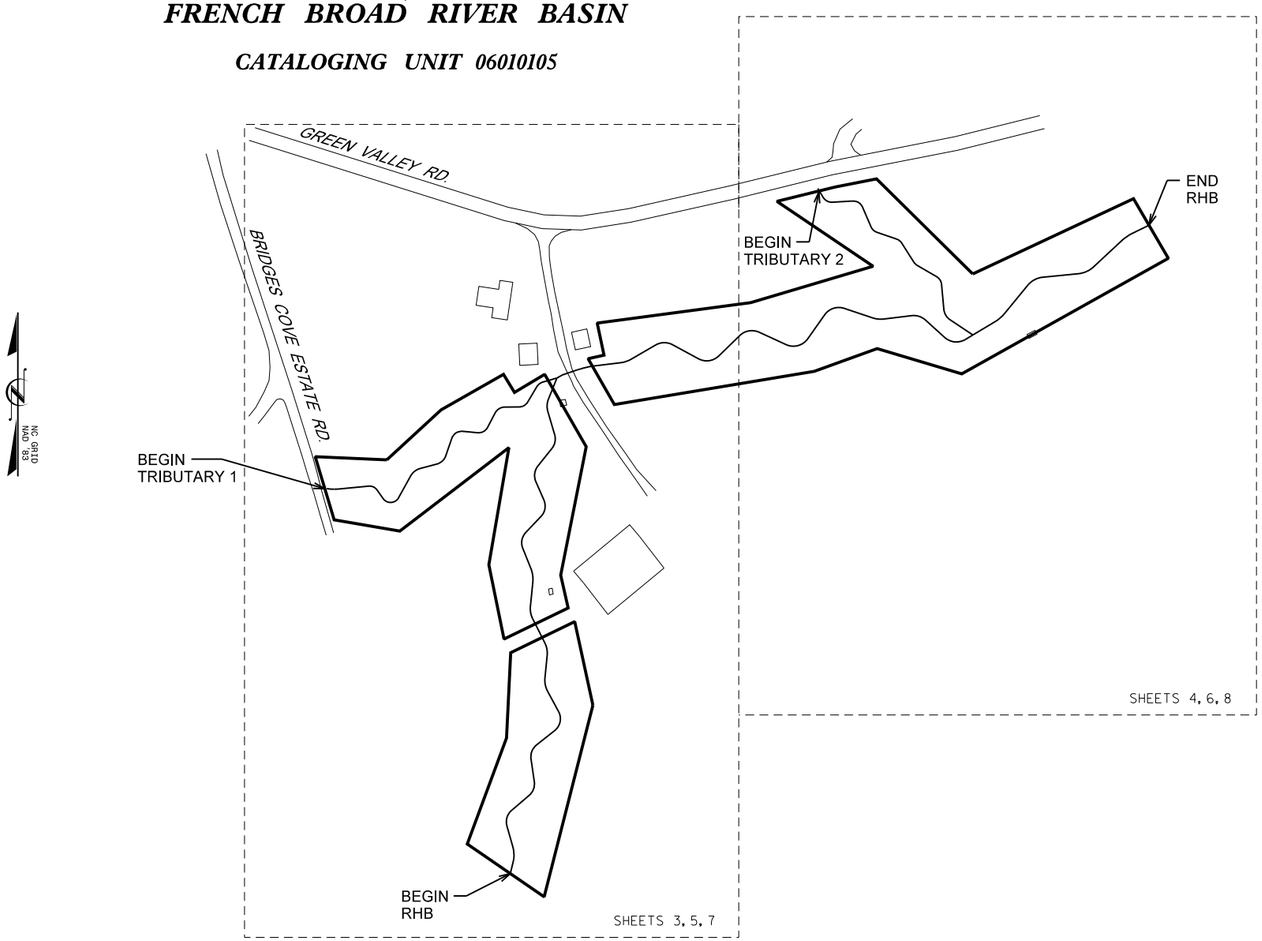
STATE	CONTRACT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	7534	1	8

	REVISED PER DMS COMMENTS	MAY 2022

ROUND HILL BRANCH RESTORATION SITE

BUNCOMBE COUNTY, NORTH CAROLINA
FRENCH BROAD RIVER BASIN

CATALOGING UNIT 06010105



AS–BUILT PLANS

NOTES:

THERE WAS A LARGE STORM EVENT
ON AUGUST 16, 2021 AND
THE SITE WAS REPAIRED TO THE
ORIGINAL CONSTRUCTION PLANS.

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. TAKE RABBIT HAM ROAD TO GREEN VALLEY ROAD. THE STREAM PROJECT ENTRANCE WILL BE ON ON THE LEFT AT 588 GREEN VALLEY ROAD, LEICESTER, NC 28748.

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:

MATTHEW REID
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

02-08-2022

SIGNATURE: *P.E.*

GENERAL NOTES:

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

UTILITY/SUBSURFACE PLANS:
NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT.
EXISTING UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED.
THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING A UTILITY LOCATOR AND ESTABLISHING THE EXACT LOCATION OF ANY AND ALL EXISTING UTILITIES IN THE PROJECT REACH.

PROJECT LEGEND:

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

Installed Riffle Enhancement ..... 

Installed Riffle Grade Control ..... 

Installed Cascade Structure ..... 

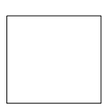
Installed Step Pool ..... 

Installed Live Lift ..... 

Former Channel Filled ..... 

Photo Point ..... 

Stream Gauge ..... 

Vegetation Plot ..... 

Cross–section .....

Minor Contour Line (As–Built) .....

Major Contour Line (As–Built) .....

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

Existing Fencing .....

A New Fencing .....

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

	DATE	DESCRIPTION
A		REVISED PER DMS COMMENT
	MAY 2022	

REVISIONS

NCDEQ — DIVISION OF MITIGATION SERVICES

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RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH RESTORATION SITE
As-Built Plans
BUNCOMBE COUNTY, NORTH CAROLINA

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

GENERAL NOTES & PROJECT LEGEND

NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′
GRAPHIC SCALE

ISSUE WITH ADJOINING LANDOWNER AND FENCE LINE IS IN THE PROCESS OF BEING ADDRESSED. DOCUMENTATION OF THIS WILL BE IN SUBSEQUENT MONITORING REPORTS.

POOL READJUSTED DUE TO BEDROCK IN CHANNEL.

BEGIN CREDITING

BEGIN RHB

INSTALLED 'RIFFLE GRADE CONTROL' / 'ROCK FORD'.

DRAINAGE SWALE INSTALLED TO REDIRECT WATER FROM CROSSING.

INSTALLED 'LIVE LIFT'.

EXISTING WETLAND 'W1'

EXISTING TREES TO REMAIN. TYPICAL ALL "●"

BEGIN CREDITING

BEGIN TRIBUTARY 1

BRIDGES COVE ESTATE RD.

EXISTING 18" CMP CULVERT REMOVED

INSTALLED PLUNGE POOL. COORDINATED WITH DESIGN REPRESENTATIVE TO INSTALL OVER-WIDENED BANKS IN THIS AREA.

STABILIZED INCOMING DRAINAGE WITH ROCK OUTLET.

EXISTING WETLAND 'W4'

CONSERVATION EASEMENT

POOL READJUSTED DUE TO BEDROCK IN CHANNEL.

GREEN VALLEY RD.

HOUSE

INSTALLED CLASS 1 / B STONE MIXTURE CULVERT PROTECTION

HOUSE

GRAVEL ACCESS DRIVE

SHED

CONSERVATION EASEMENT

INSTALLED 'STEP POOL'.

INSTALLED 'CASCADE RIFFLE'.

INSTALLED 'RIFFLE ENHANCEMENT'.

EXISTING CHICKEN COOPS REMOVED

BARN

INSTALLED (2) 24" DIA. x 24' HDPE FLOODPLAIN CULVERT

EXISTING PLUNGE POOL BANKS REMAINED AS-IS

FILLED EXISTING CHANNEL (TYPICAL ALL HATCHING)

INSTALLED 'RIFFLE GRADE CONTROL'.

MATCHLINE - SEE SHEET 4

ALL TOPOGRAPHIC AND FEATURE DATA ARE BASED ON THE AS-BUILT SURVEY COMPLETED MAY 2021.

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

SYM.	DESCRIPTION	DATE
	REVISIONS	

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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH RESTORATION SITE

As-Built Plans

BUNCOMBE COUNTY, NORTH CAROLINA

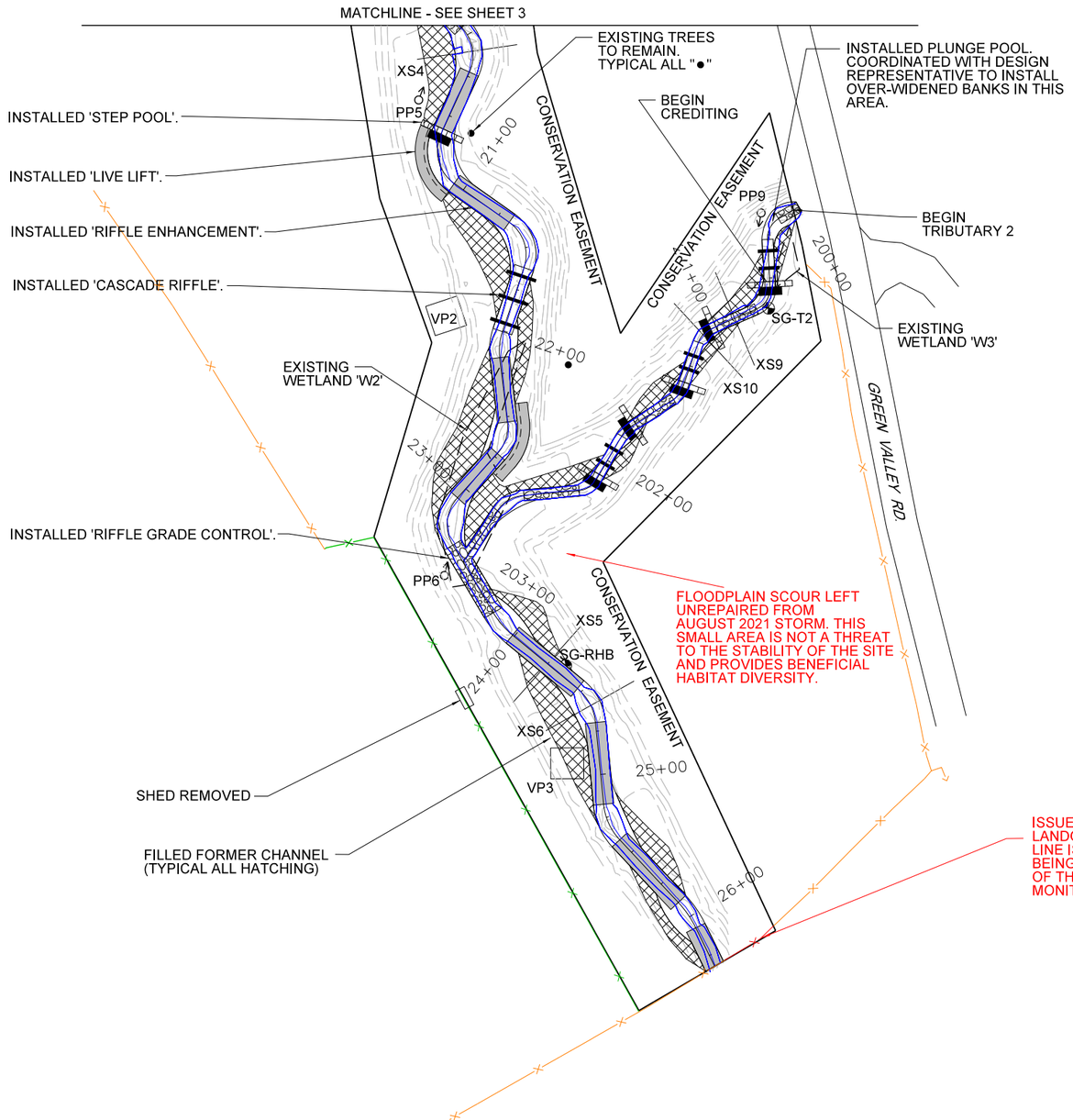
DATE: FEBRUARY 2022
SCALE: GRAPHIC

SITE PLAN

NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′

GRAPHIC SCALE



ALL TOPOGRAPHIC AND FEATURE DATA ARE BASED ON THE AS-BUILT SURVEY COMPLETED MAY 2021.

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

SYM.	DESCRIPTION	DATE
	REVISIONS	

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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH RESTORATION SITE

As-Built Plans

BUNCOMBE COUNTY, NORTH CAROLINA

DATE: FEBRUARY 2022
SCALE: GRAPHIC

SITE PLAN

PLANTING ZONE 1 = 1.49 ACRES

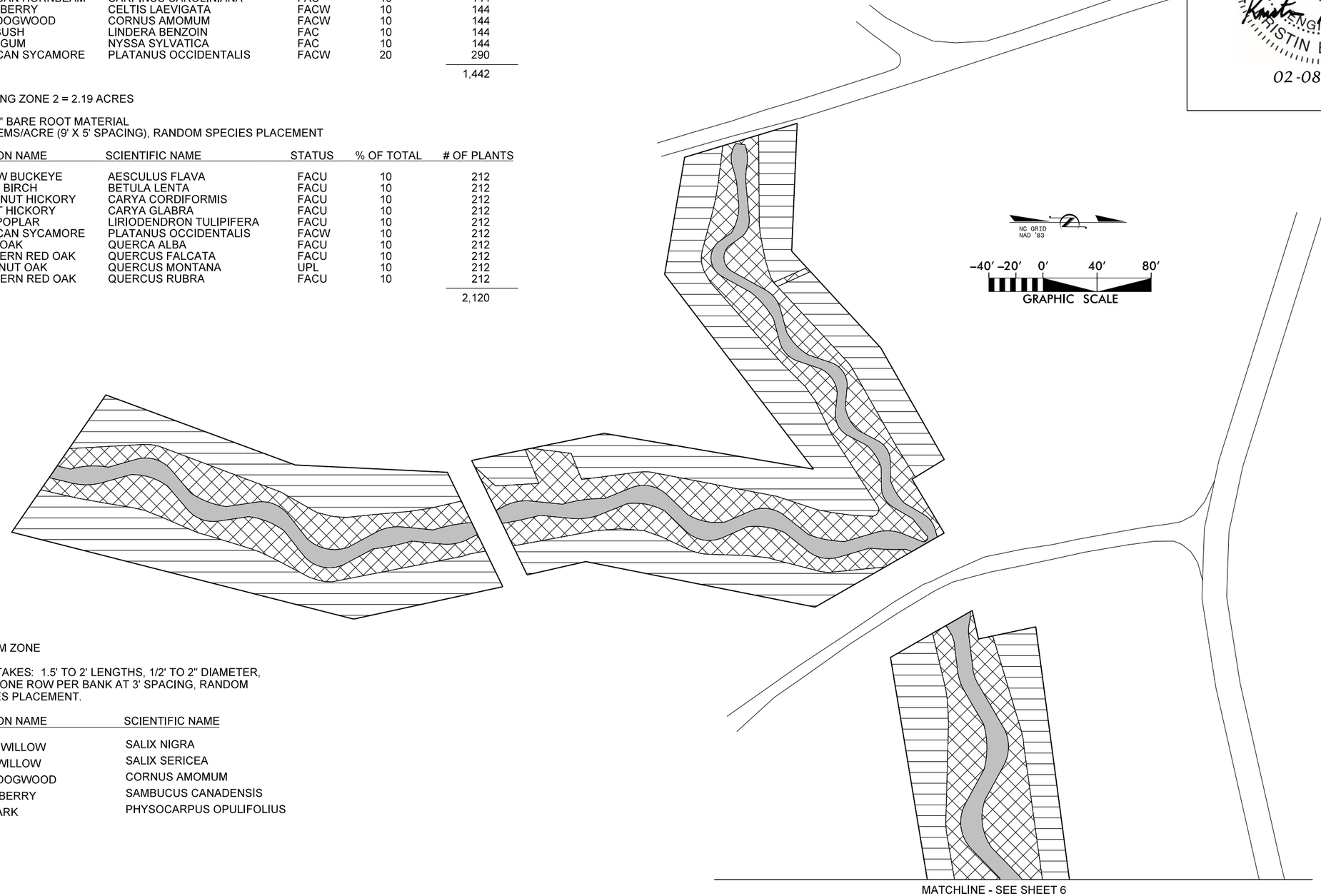
12" - 18" BARE ROOT MATERIAL
968 STEMS/ACRE (9' X 5' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	STATUS	% OF TOTAL	# OF PLANTS
HAZEL ALDER	ALNUS SERRULATA	OBL	10	144
PAWPAW	ASIMINA TRILOBA	FAC	10	144
YELLOW BIRCH	BETULA ALLEGHANIENSIS	FAC	10	144
AMERICAN HORNBEAM	CARPINUS CAROLINIANA	FAC	10	144
SUGARBERRY	CELTIS LAEVIGATA	FACW	10	144
SILKY DOGWOOD	CORNUS AMOMUM	FACW	10	144
SPICEBUSH	LINDERA BENZOIN	FAC	10	144
BLACK GUM	NYSSA SYLVATICA	FAC	10	144
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	20	290
				1,442

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	212
SWEET BIRCH	BETULA LENTA	FACU	10	212
BITTERNUT HICKORY	CARYA CORDIFORMIS	FACU	10	212
PIGNUT HICKORY	CARYA GLABRA	FACU	10	212
TULIP POPLAR	LIRIODENDRON TULIPIFERA	FACU	10	212
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	10	212
WHITE OAK	QUERCA ALBA	FACU	10	212
SOUTHERN RED OAK	QUERCUS FALCATA	FACU	10	212
CHESTNUT OAK	QUERCUS MONTANA	UPL	10	212
NORTHERN RED OAK	QUERCUS RUBRA	FACU	10	212
				2,120



NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′
GRAPHIC SCALE

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
BLACK WILLOW	SALIX NIGRA
SILKY WILLOW	SALIX SERICEA
SILKY DOGWOOD	CORNUS AMOMUM
ELDERBERRY	SAMBUCUS CANADENSIS
NINEBARK	PHYSOCARPUS OPULIFOLIUS

MATCHLINE - SEE SHEET 6

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT
02-08-2022

NO.	DESCRIPTION	DATE
	REVISIONS	

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RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH
RESTORATION SITE
As-Built Plans
BUNCOMBE COUNTY, NORTH CAROLINA

DATE: FEBRUARY 2022
SCALE: GRAPHIC

PLANTING PLAN

PLANTING ZONE 1

PLANTING ZONE 2

STREAM ZONE

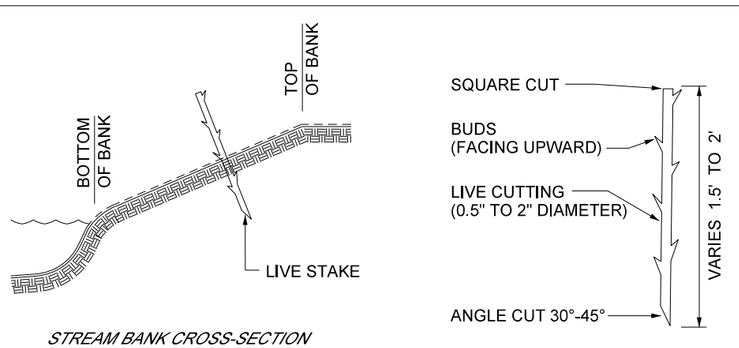
*NOTE: SEE SHEET 5 FOR PLANTING QUANTITIES

MATCHLINE - SEE SHEET 5

NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′

GRAPHIC SCALE



STREAM BANK CROSS-SECTION

PLANTING NOTES:

RIFFLES - 1 ROW OF LIVE STAKES ON BOTH SIDES OF CHANNEL.
POOLS - NO LIVE STAKES ON INNER BANKS, INSTALLED STAKES ONLY ON THE OUTER BANKS.

LIVE STAKES

SCALE: NTS

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

REVISIONS			
SYM.	DESCRIPTION	DATE
A	UPDATED PLANTING ZONES TO ALIGN WITH WETLAND SHAPES	7/10/2020

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RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH
RESTORATION SITE
As-Built Plans
BUNCOMBE COUNTY, NORTH CAROLINA

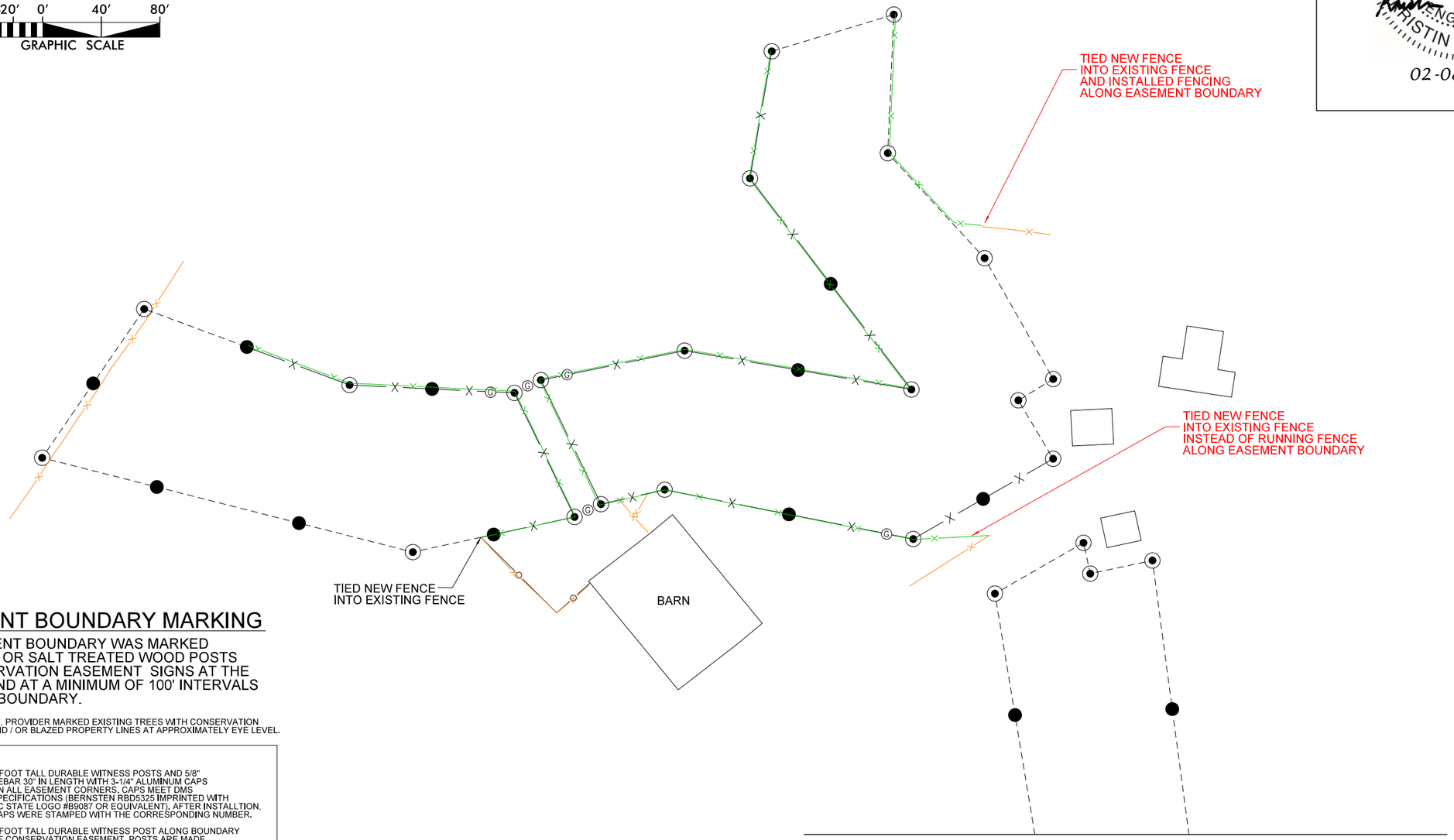
DATE: FEBRUARY 2022
SCALE: GRAPHIC

PLANTING PLAN

NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′

GRAPHIC SCALE



EASEMENT BOUNDARY MARKING

THE EASEMENT BOUNDARY WAS MARKED WITH METAL OR SALT TREATED WOOD POSTS AND CONSERVATION EASEMENT SIGNS AT THE CORNERS AND AT A MINIMUM OF 100' INTERVALS ALONG THE BOUNDARY.

WHEN APPROPRIATE, PROVIDER MARKED EXISTING TREES WITH CONSERVATION EASEMENT SIGNS AND / OR BLAZED PROPERTY LINES AT APPROXIMATELY EYE LEVEL.

- 6-FOOT TALL DURABLE WITNESS POSTS AND 5/8" REBAR 30" IN LENGTH WITH 3-1/4" ALUMINUM CAPS ON ALL EASEMENT CORNERS. CAPS MEET DMS SPECIFICATIONS (BERNSTEN RBD5325 IMPRINTED WITH NC STATE LOGO #B9087 OR EQUIVALENT). AFTER INSTALLTION, CAPS WERE STAMPED WITH THE CORRESPONDING NUMBER.
- 6-FOOT TALL DURABLE WITNESS POST ALONG BOUNDARY OF CONSERVATION EASEMENT. POSTS ARE MADE OF MATERIAL THAT WILL LAST A MINIMUM OF 20 YEARS. THE PROVIDER ATTACHED A CONSERVATION EASEMENT SIGN TO EACH WITNESS POST AND PLACED ADDITIONAL SIGNS AT NO MORE THAN 100-FOOT INTERVALS ON BOUNDARY LINES.
- INSTALLED NEW WOVEN WIRE FENCE
- DO NOT INSTALL FENCE - CONSERVATION EASEMENT
- EXISTING CATTLE FENCE
- INSTALLED ACCESS GATE

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

NO.	DESCRIPTION	DATE
	REVISIONS	

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4505 FALLS OF NEUSE ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27609

ROUND HILL BRANCH RESTORATION SITE

As-Built Plans

BUNCOMBE COUNTY, NORTH CAROLINA

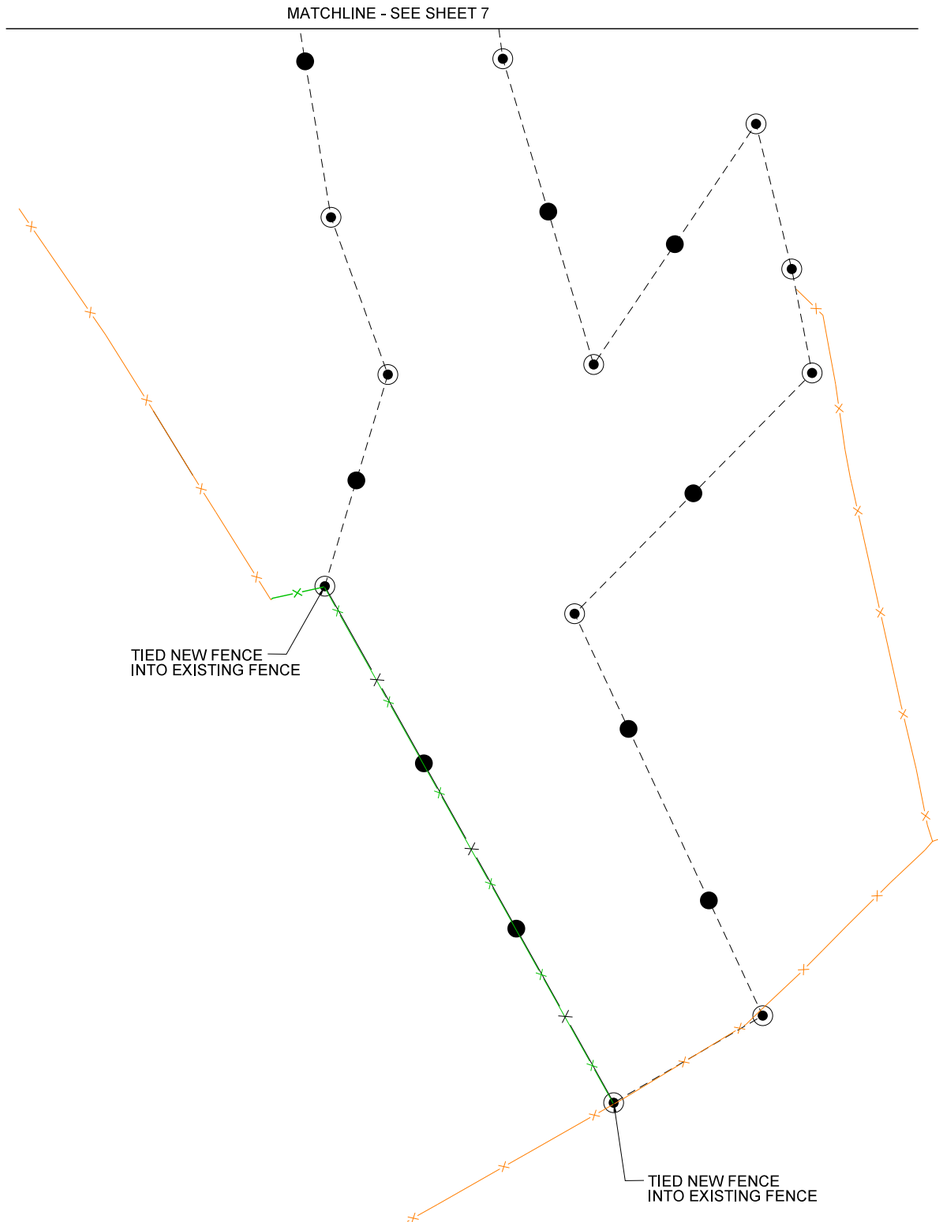
DATE FEBRUARY 2022
SCALE GRAPHIC

BOUNDARY MARKING PLAN

NC GRID
NAD '83

–40′ –20′ 0′ 40′ 80′

GRAPHIC SCALE



EASEMENT BOUNDARY MARKING

THE EASEMENT BOUNDARY WAS MARKED WITH METAL OR SALT TREATED WOOD POSTS AND CONSERVATION EASEMENT SIGNS AT THE CORNERS AND AT A MINIMUM OF 100' INTERVALS ALONG THE BOUNDARY.

WHEN APPROPRIATE, PROVIDER MARKED EXISTING TREES WITH CONSERVATION EASEMENT SIGNS AND / OR BLAZE DPROPERTY LINES AT APPROXIMATELY EYE LEVEL.

- 6-FOOT TALL DURABLE WITNESS POSTS AND 5/8" REBAR 30" IN LENGTH WITH 3-1/4" ALUMINUM CAPS ON ALL EASEMENT CORNERS. CAPS MEET DMS SPECIFICATIONS (BERNSTEN RBD5325 IMPRINTED WITH NC STATE LOGO #B9087 OR EQUIVALENT). AFTER INSTALLATION, CAPS WERE STAMPED WITH THE CORRESPONDING NUMBER.
- 6-FOOT TALL DURABLE WITNESS POST ALONG BOUNDARY OF CONSERVATION EASEMENT. POSTS ARE MADE OF MATERIAL THAT WILL LAST A MINIMUM OF 20 YEARS. THE PROVIDER ATTACHED A CONSERVATION EASEMENT SIGN TO EACH WITNESS POST AND PLACED ADDITIONAL SIGNS AT NO MORE THAN 100-FOOT INTERVALS ON BOUNDARY LINES.
- INSTALLED NEW WOVEN WIRE FENCE
- DO NOT INSTALL FENCE - CONSERVATION EASEMENT
- EXISTING CATTLE FENCE
- INSTALLED ACCESS GATE

NORTH CAROLINA PROFESSIONAL SEAL 040899 ENGINEER KRISTIN E. KNIGHT

02-08-2022

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

ROUND HILL BRANCH RESTORATION SITE

As-Built Plans

BUNCOMBE COUNTY, NORTH CAROLINA

DATE: FEBRUARY 2022

SCALE: GRAPHIC

BOUNDARY MARKING PLAN