



# Year 6 Monitoring Report

Roses Creek

Burke County, NC

DMS Project ID No. 96309

Construction Completed: May 2016

UAS Data Collected: March 4, 2021

Visual Data Collected: February 25, March 4, July 27, Sept 8,  
Nov 4, 2021

Submitted: January 2022

Prepared for:

NC Department of Environmental Quality



Division of Mitigation Services

1652 Mail Service Center

Raleigh, NC 27699-1652

Prepared by:

HDR Engineering Inc. (HDR) of the Carolinas



555 Fayetteville Street, Suite 900

Raleigh, NC 27601-3034



January 25, 2022

Dear Harry Tsomides  
Project Manager, NCDEQ-DMS

DMS provided the following comments and HDR has replied with the below responses in italics:

- HDR states that “During Year 5 monitoring, when considering natural recruits, stems per acre were exceeding criteria, and visual monitoring was suggested for the remainder of the monitoring period.” Does this mean HDR is not planning to quantitatively monitor vegetation during MY7? Please note that all approved mitigation plan monitoring and performance standards need to be followed unless a mitigation plan addendum is approved.

*HDR will plan to quantitatively monitor vegetation during MY7. Amended report on page 4.*

- It is indicated that the culvert above UT 1 connecting to the pond is most likely blocked and needs to be adjusted; does HDR currently have any plan to rectify this?

*The following statement was added to page 4. “In early 2022, HDR plans to investigate and remediate with the landowner any potential blockage at the culvert crossing above UT1.*

- Miscellaneous down cutting/erosion is noted on UT1 and UT2. Was there any head cutting? Please indicate if HDR is planning any remedial action on these areas, or feel that no action is warranted. Similarly, please indicate any plan to address the cow wasting/adjacent impact areas at the lower end of Roses Creek. These have all been observed over the years so if HDR is planning any activities, it would be a good idea to implement in 2022 prior to planned close out in 2023.

*HDR added the following clarifying statements on page 4. “In early 2022, HDR plans to investigate and remediate with the landowner any potential blockage at the culvert crossing above UT1.” For the minor channel downcutting - “HDR does not feel any repair actions are necessary for the minor downcutting along UT1 and UT2.” For the lagoon area - “In 2022, HDR will continue to monitor this area and will work with the landowner to see if fencing out an additional area in the vicinity is achievable”.*

- Thank you for noting the various invasive species and plans to treat in early 2022. DMS recommends allowing for follow up treatment in early 2023 as well, to address any resprouting prior to closeout in 2023.

*HDR will plan for a final treatment in early 2023.*

- Please show the vegetation plots (and all monitoring features) on the CCPVs; even though plot data were not collected in 2021, all monitoring features need to be shown

on the CCPVs. You may indicate that the 2020/MY5 attainment data were used to determine whether the plots showed success or failure.

*HDR has added all monitoring features to the CCPV.*

- Please continue to include the 8/27/2019 IRT meeting minutes and USACE and DWR comments, as an Appendix, and reference in the report.

*HDR has included the IRT meeting minutes as Appendix D and has referenced it in the report.*

- Please describe in the report if and how the recently noted encroachment issues have been addressed.

*HDR has not addressed any encroachment issues (two cow wasting areas at the bottom of Roses Creek) in 2021 and these will be addressed in 2022.*

- The data collection years for 2021 events in the events table are listed as 2020; assume this is a typo that just needs to be changed to 2021.

*HDR has amended the typos and changed to "2021" and also changed the stream morphology collection data to September 2021 as stated on page 4.*

- At the 2021 credit release meeting, the IRT asked about Cross Section 4, which has down cut approximately 1 foot, and asked that HDR look at that cross section in detail in MY6 (2021). Please provide an update and comment on the channel conditions at that location.

*During the credit release meeting in 2020, Cross Section 4 was noted to have down cut approximately 1 foot. Cross Section 4 is in the vicinity of a previous dam removal from 2019 and appears to be redistributing sediment throughout the reach. HDR will carry out cross section monitoring in Year 7 to determine if it has stabilized.*

- At the 2021 credit release meeting, the IRT requested that site monitoring not be conducted until later into the growing season. Thank you for collecting the vegetation data in September. The 2021 (MY6) visual assessment for geomorphology is listed as February; please ensure that all monitoring data collection in 2022 be performed later in the year.

*HDR adjusted the geomorphology to September, as this was a typo.*

- Please date the problem area and aerial photos.

*HDR dated the problem area and aerial photos in the report.*

### Digital Support File Comments

- Please submit stream problem areas as line features and ensure that a feature is submitted for each identified problem area.

*HDR added line features instead of polygons for each of the three problem areas and added an encroachment polyline file for the two areas of cow wasting adjacent to the easement fence.*

- The scoured eroding segment of Roses Creek should have an associated number of unstable segments associated with the reported length – it is currently listed as 0.

*HDR added in 10 feet of length in Table 5 to represent Roses Creek downcutting areas around Cross Section 4.*

- Please submit water level gauge data, include figures in the report, and include the surface water summary table with the number of consecutive days. If data is unavailable, please explain why.

*HDR water level gauge data was corrupted for all three UTs. HDR reached out to Onset to rectify the data files however, no solution was found. No data will be submitted this year. Data loggers will be re-launched early in Year 7 monitoring period and will be checked to be sure they are in working order.*

- Please include the photos used in the report as JPEGs.

*HDR has included the photos in the report as JPEGs.*

- Please include a figure displaying the 30<sup>th</sup> and 70<sup>th</sup> percentile of monthly precipitation relative to observed precipitation and submit these data.

*HDR has included the USACE Antecedent Tool output showing 30-day rolling total rainfall, large rain events, and the 30-year normal range of monthly precipitation. Between May and June of 2021, it was drier than normal.*

Sincerely,  
HDR Engineering (HDR) of the Carolinas



Jessica Tisdale  
Sr. Environmental Scientist

Prepared by:



**HDR | ICA**  
**555 Fayetteville Street, Suite 900**  
**Raleigh, North Carolina 27601**  
919.232.6600  
919.232.6642 (fax)

I HEREBY CERTIFY THAT THE DOCUMENT CONTAINED HEREIN, ROSES CREEK YEAR 6 MONITORING REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

SIGNED AND DATED THIS 25 DAY OF January 2022.

A handwritten signature in blue ink that reads "Vickie Miller".

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Vickie Miller, PWS, AICP

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## 1.0 PROJECT SUMMARY

The following report summarizes the vegetation establishment and stream stability for Year 6 monitoring for the Roses Creek Site (hereafter referred to as the “Site”) in Burke County, North Carolina.

### 1.1 Goals and Objectives

Primary goals for the Site, as detailed in the Roses Creek Stream Mitigation Site Mitigation Plan (ICA Engineering 2015) include:

1. Reducing water quality stressors and providing/enhancing flood attenuation.
2. Restoring and enhancing aquatic, semi-aquatic and riparian habitat.
3. Restoring and enhancing habitat connectivity with adjacent natural habitats.

The following objectives accomplish the goals listed above:

1. Reducing water quality stressors and providing/enhancing flood attenuation through:
  - a. Restoring the existing degraded, straightened and incised/entrenched streams as primarily a Priority 1 restoration where bankfull and larger flows can access the floodplain allowing nutrients, sedimentation, trash and debris from upstream runoff to settle from floodwaters to the extent practical. Restoring a stable dimension, pattern, and profile will ensure the channel will transport and attenuate watershed flows and sediment loads without aggrading or degrading.
  - b. Restore channel banks by relocating the channel, excavating bankfull benches, placing in-stream structures to reduce shearing forces on outside meander bends, and planting native vegetative species to provide soil stability, thus reducing stream bank stressors.
  - c. Reducing point source (i.e. cattle and equipment crossings) and non-point source (i.e. stormwater runoff through pastures) pollution associated with on-site agricultural operations (hay production and cattle) by exclusionary fencing from the stream and riparian buffer and by eliminating all stream crossings from the easement.
  - d. Plant a vegetative buffer on stream banks and adjacent floodplains to treat nutrient enriched surface runoff from adjacent pastureland associated with on-site agricultural operations.
  - e. Restoring riparian buffers adjacent to the streams that are currently maintained for hay production that will attenuate floodwaters, in turn reducing stressors from upstream impacts.
2. Restoring and enhancing aquatic, semi-aquatic and riparian habitat through:
  - a. Restoration of a sinuous gravel bed channel that promotes a stable bed form, and accommodates benthic macroinvertebrate and fish propagation. Additionally, woody materials such as log structures, overhanging planted vegetation and toe wood/brush toe in submerged water will provide a diversity of shading, bed form and foraging opportunities for aquatic organisms.
  - b. Restoring native vegetation to the stream channel banks and the adjacent riparian corridor, that is currently grass dominated, will diversify flora and create a protected habitat corridor, which will provide an abundance of available foraging and cover habitat for a multitude of amphibians, reptiles, mammals and birds.
3. Restoring and enhancing habitat connectivity with adjacent natural habitats through:
  - a. Planting the riparian buffer with native vegetation.

- b. Protection of the restored community will ensure a protected wildlife corridor between the Site and the upstream and downstream mature riparian buffers and upland habitats.
- c. Converting approximately 15 acres from existing agricultural land to riparian buffer protected by permanent conservation easement.

## 1.2 Success Criteria

Monitoring of restoration efforts will be performed until success criteria are fulfilled. Monitoring includes stream channel/hydraulics and vegetation. In general, the restoration success criteria, and required remediation actions, are based on the Stream Mitigation Guidelines (USACE et al. 2003) and the Ecosystem Enhancement Program Monitoring Requirements and Performance Standards for stream and/or Wetland Mitigation (NCEEP 2011). Project success criteria are further detailed in the Baseline Monitoring Document & As-Built Baseline Report (HDR|ICA 2016).

## 1.3 Background Summary

The North Carolina Department of Environmental Quality Division of Mitigation Services (DMS) contracted HDR|ICA to restore 4,746 linear feet of Roses Creek and three of its unnamed tributaries within the Site to assist in fulfilling stream mitigation needs in the watershed. The Site is located approximately 12 miles northwest of downtown Morganton in Burke County, NC. The Site contains Roses Creek and three unnamed headwater tributaries of Roses Creek (UT 1, UT 2 and UT 3). The Site is located within the 03050101060030 14-digit Hydrologic Unit, which is also a DMS Targeted Hydrologic Unit for Cataloging Unit 03050101 of the Catawba River Basin. Roses Creek is classified as a Water Supply Watershed (WS-III), as it is part of the headwaters that feed Lake Rhodhiss. The Site is comprised of one property owned by Robert B. Sisk and Martha M. Sisk (PIN # 1767479652) (known as the Sisk Farm). Additional information concerning project history is presented in Table 2.

## 1.4 Visual Vegetation Assessment

Visual assessment of on-site vegetation suggests that planted stems are continuing a healthy growth pattern trajectory and volunteer stems comprised of many native species are becoming prevalent across the site. Thick recruits of river birch are located on the downstream right of Roses Creek at STA. 35+00 - 39+00. This early successional vegetation competition is a sign of good soil productivity and the area will naturally thin itself through resource competition.

Mimosa (*Albizia julibrissin*), Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*) and Japanese honeysuckle (*Lonicera japonica*) were the invasive species noted along UT 1. A large mimosa shrub is located at STA 12+00 on the downstream right bank about 35 feet from the stream. Chinese privet, multiflora rose and Japanese honeysuckle were noted around STA 12+50, STA 18+50 and sporadically in between these two areas along UT 1. Removal treatments to these species occurred along UT 1 in 2019 (mechanical and chemical) and in 2020 (chemical only). HDR plans to do additional mechanical and chemical treatments in early 2022 before the growing season and a final treatment as suggested by DMS in early 2023. Sparse patches of cattails (*Typha latifolia*) are located at the top of UT 2 around STA 11+00 through STA 12+00 on the downstream left area. Figures 3.1 – 3.3 and CCPV illustrates the current conditions and location of these invasive species.

During Year 5 monitoring, when considering natural recruits, stems per acre were exceeding criteria, and visual monitoring was suggested for the remainder of the monitoring period in 2020. However, HDR will continue to provide quantitative vegetative monitoring during Year 7. Overall, visual vegetation observations indicate that the Site's planted stock will meet the vegetative performance standard of 210 stems per acre in Year 7 and an average 8 feet in height.

### **1.5 Visual Stream Assessment**

Roses Creek remains stable and functioning as designed. During Year 6 visual monitoring no areas of erosion were noted along the channel toes and banks. Bank repairs from 2018 appear stable and vegetation growth along the stream banks is maturing as expected. During the credit release meeting in 2020, Cross Section 4 was noted to have down cut approximately 1 foot. Cross Section 4 is in the vicinity of a previous dam removal from 2019 and appears to be redistributing sediment throughout the reach. HDR will carry out cross section monitoring in Year 7 and will determine if it has stabilized. A beaver dam was discovered at STA 24+50 in July 2021 creating minimal backwater effects upstream to STA 24+00. The dam was removed in August 2021, and two beavers were trapped and removed by APHIS. The stream is currently stable in the vicinity of the old beaver dam location (Figures 3.9 – 3.11). HDR will continue to monitor stream bank stability through Year 7.

Generally, UT 1, UT 2 and UT 3 have remained stable over the Year 6 monitoring period. The IRT has raised concerns about the flow in the tributaries in the past on-site meetings. (Appendix D) However, two small areas of minor channel erosion were noted on UT 1 and UT 2. At STA 18+50 along UT 1 an area of in-channel downcutting is occurring (Figure 3.12). During the November field visit, it was noted there was a lack of channel flow at the top of UT 1. The upstream road culvert (18" CPP) above UT 1 connecting to the pond is most likely blocked/damaged and needs to be adjusted and/or cleaned out to allow for stream flow. In early 2022, HDR plans to investigate and remediate with the landowner a potential blockage at the culvert crossing above UT1. On UT 2 at STA 16+50, adjacent to vegetation plot 8, there was minor channel erosion/downcutting within the channel and, despite this, the stream banks appear stable. (Figure 3.13). HDR does not feel any repair actions are necessary for the minor downcutting along UT1 and UT2. At the bottom of Roses Creek at STA 41+25 there is a cow wasting area adjacent to the easement fencing on the downstream left (Figure 3.14 - 15). The herbaceous/forested buffer between this area and the stream is approximately 50 feet wide and is helping to filter this manure by soil absorption and plant nutrient uptake. In 2022, HDR will continue to monitor this area and will work with the landowner to see if fencing out an additional area in the vicinity is achievable.

Thick herbaceous cover during the growing season along these UTs make it difficult to observe the channel however a single channel is apparent during from UAS photographs taken in March 2021. Figures 3.12 – 3.15 illustrates single channel flow for all three UTs.

A pebble count was conducted on Roses Creek in September 2021. Results show the average particle size has remained similar from D50 of 50.54 mm at Year 5 to 51.73 mm at Year 6. The two largest particle type classes include gravel at 58 percent and cobble at 32 percent.

The USGS rain gauge in Morganton indicates the Site received a few large rain events throughout Year 6 monitoring. On March 25, 2021 3.16 inches of precipitation fell within a 24-hour period, during August 15 -17, 2021 4.11 inches, and another 2.26 inches on August 26, 2021 were

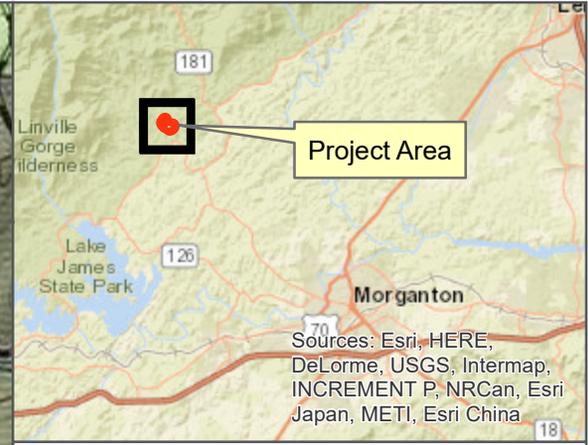
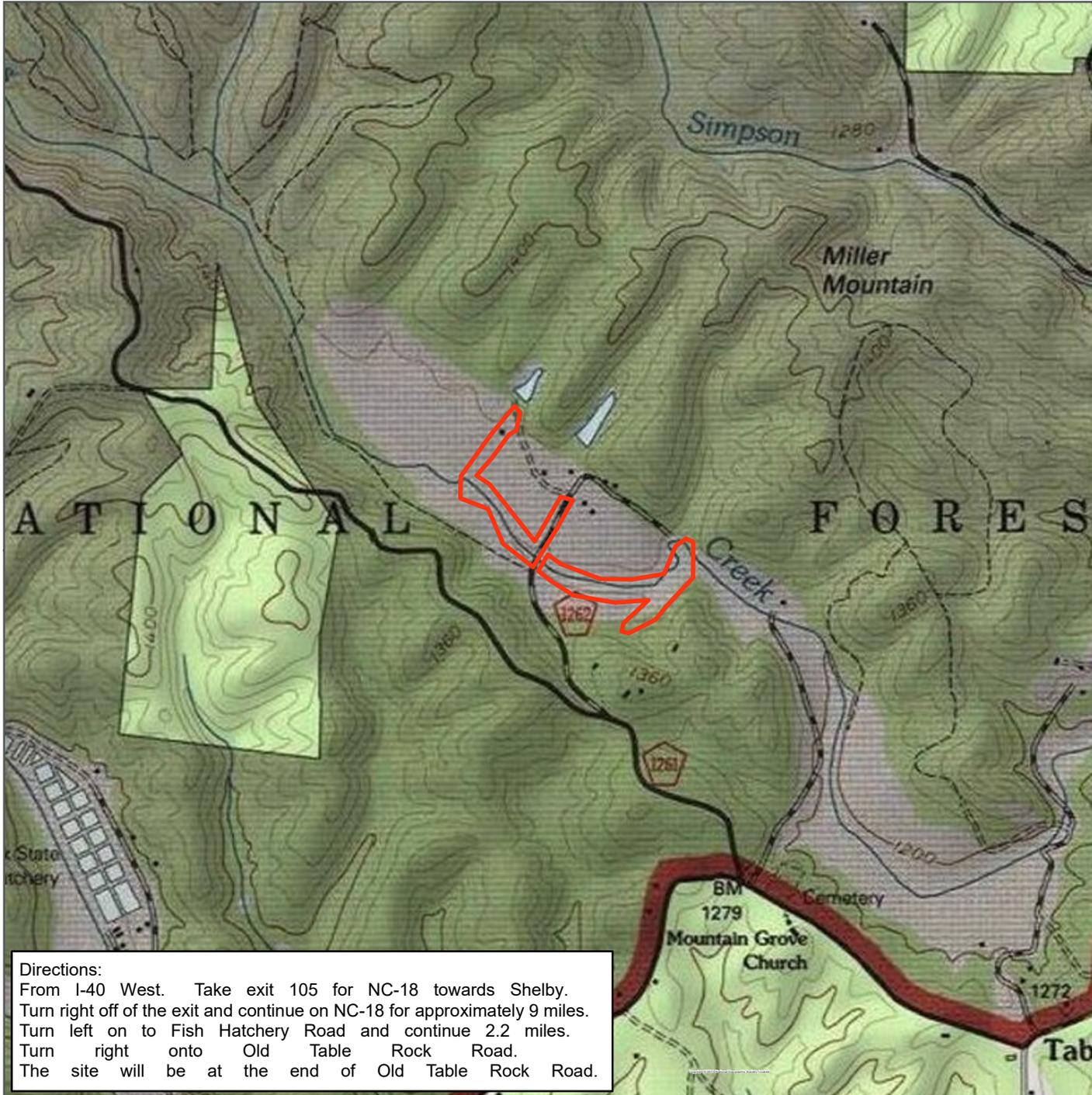
recorded. The USACE Antecedent precipitation has been included as Figure 4.1 to show the actual observed range and the normal 30-year range. Worth noting, it was drier than normal during the months of May and June in 2021. No water level data was obtained from the Hobo U20 pressure transducers in monitoring Year 6 as all three water level gauge data files were corrupt. HDR reached out to the manufacturer, Onset, to rectify the data files however, no solution was found. Data loggers will be re-launched early in Year 7 monitoring period and will be checked to be sure they are in working order.

## 2.0 REFERENCES

- Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 (<http://cvs.bio.unc.edu/methods.htm>).
- U.S. Army Corps Engineers (USACE). Antecedent Precipitation Tool Version 1.0.19 (<https://github.com/jDeters-USACE/Antecedent-Precipitation-Tool>).
- Weakley, Alan S. 2011. Flora of the Southern and Mid-Atlantic States. University of North Carolina Herbarium, North Carolina Botanical Garden, University of North Carolina, Chapel Hill, North Carolina. ([http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora\\_2011-May-nav.pdf](http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2011-May-nav.pdf))

## APPENDICES

### **Appendix A. Project Vicinity Map and Background Tables**



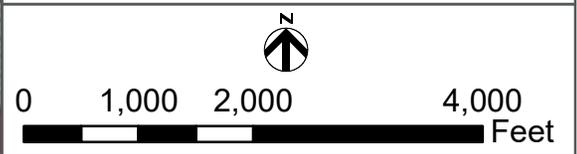
## Legend

█ Project Easement

The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, monitoring, and stewardship of the restoration site is permitted within the terms and timeframes of their defined, pre-approved roles. Any intended site visitation or activity by any person outside of these previously sanctioned activities/roles requires prior coordination with DMS.

### ROSES CREEK STREAM MITIGATION SITE

VICINITY MAP  
BURKE COUNTY, NC



**Directions:**  
 From I-40 West. Take exit 105 for NC-18 towards Shelby.  
 Turn right off of the exit and continue on NC-18 for approximately 9 miles.  
 Turn left on to Fish Hatchery Road and continue 2.2 miles.  
 Turn right onto Old Table Rock Road.  
 The site will be at the end of Old Table Rock Road.



FIGURE 1

**Table 1. Project Components and Mitigation Credits**

Roses Creek, Burke County DMS Project No. 96309									
Credit Summary									
	Stream SMU		Riparian Wetland WMU		Non- riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	5,009.6								
Project Components									
Project Component or Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII, etc.)	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	SMU		
Roses Creek	10+00- 41+81	3,643	PI	Restoration	3,181	1:1	3,121*		
Roses Creek	41+81- 42+19	38	-	EII	38	2.5:1	15		
UT 1	10+00- 12+54; 16+11- 16+46	267	PI	Restoration	289	1:1	289		
UT 1	12+54- 16+11; 16+46- 19+30	641	-	EII	641	2.5:1	256		
UT 2	10+00- 17+07	610	PI	Restoration	707	1:1	707		
UT 3	10+00- 16+21	558	PI	Restoration	621	1:1	621		
Total	NA	5,757	PI	Restoration/ EII	5,477	1-2.5:1	5,009.6		

\* Stream Mitigation Units decreased by 60 to account for break in easement at the stream crossing on Sisk Farm Road

Component Summation						
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	4,798					
Enhancement II	679					

**Table 2. Project Activity and Reporting History**

<b>Activity or Report</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Mitigation Plan	September 2015	September 2015
Final Design – Construction Plans	September 2015	March 2016
Construction	February 25, 2016	May 18, 2016
Temporary S&E Mix Applied to Entire Project Area	---	May 18, 2016
Permanent Seed Mix Applied to Entire Project Area	---	May 18, 2016
Bare Root, Containerized, and B&B plantings for Entire Project Area	---	May 27, 2016
Mitigation Plan/As-built (Year 0 Monitoring-Baseline)	May 2016	July 2016
Year 1 Monitoring	November 2016	January 2017
Stream Morphology	November 2016	--
Vegetation	August 2016	--
Supplemental Planting	---	February 2017
Year 2 Monitoring	August 2017	November 2017
Stream Morphology	June 2017	--
Vegetation	August 2017	--
Supplemental Planting	---	February 2018
Year 3 Monitoring	August 2018	November 2018
Stream Morphology	March 2018	--
Vegetation	August 2018	--
Structural Repairs	---	October 2018
Year 4 Monitoring	November 2019	December 2019
Stream Morphology	--	--
Vegetation	--	--
Dam Removal		September 2019
Invasive Treatment		Jan. and Sept. 2019
Year 5 Monitoring		December 2020
Stream Morphology	February 2020	
Vegetation	August 2020	
Year 6 Monitoring		January 2022
Stream Morphology	September 2021	
Vegetation	September 2021	
Dam Removal		August 2021
Year 7 Monitoring		
Stream Morphology		
Vegetation		

**Table 3. Project Contacts Table**

<b>Designer</b> Primary project design POC	ICA Engineering 555 Fayetteville Street, Suite 900 Raleigh, North Carolina 27601 Chris Smith (919) 851-6066
<b>Construction Contractor</b> Construction Contractor POC	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592 Lloyd Glover (919) 639-6132
<b>Structural Repair Contractor</b> Structural Repair Contractor POC	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592 Lloyd Glover (919) 639-6132
<b>Planting Contractor</b> Planting Contractor POC	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592 Lloyd Glover (919) 639-6132
<b>Supplemental Planting Contractor</b> Supplemental Planting Contractor POC	River Works, Inc. 114 W Main Street, Suite 106 Clayton, NC 27520 Bill Wright (919) 590-5193
<b>Seeding Contractor</b> Seeding Contractor POC	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27607 Lloyd Glover (919) 639-6132
Seed Mix Sources	Green Resources – Triangle Office
Nursery Stock Suppliers	1) Dykes and Son Nursery, McMinnville, TN 2) Foggy Mountain Nursery (live stakes)
<b>Monitoring Performers</b>	HDR ICA Engineering Inc. 555 Fayetteville Street, Suite 900 Raleigh, North Carolina 27601 Vickie Miller (919) 232-6600
Stream Monitoring POC	HDR ICA Engineering Inc. 555 Fayetteville Street, Suite 900 Raleigh, North Carolina 27601 Jessica Tisdale (919) 232-6600
Vegetation Monitoring POC	HDR ICA Engineering Inc. 555 Fayetteville Street, Suite 900 Raleigh, North Carolina 27601 Jessica Tisdale (919) 232-6600

**Table 4. Project Information**

<b>Project Information</b>				
Project Name		Roses Creek Stream Mitigation Site		
County		Burke		
Project Area (acres)		17.3		
Project Coordinates (latitude and longitude)		35.850953, -81.819541		
<b>Project Watershed Summary Information</b>				
Physiographic Province		Piedmont / Mountain		
River Basin		Catawba		
USGS Hydrologic Unit 8-digit	03050101	USGS Hydrologic Unit 14-digit	03050101060030	
NCDWQ Sub-basin		03-08-31		
Project Drainage Area (acres)		Roses: 3,309, UT 1: 35, UT 2: 47, UT 3: 10		
Project Drainage Area Percentage of Impervious Area		<1%		
CGIA Land Use Classification		Agricultural/Pasture		
Ecoregion		Northern Inner Piedmont		
Geological Unit		Zabg: Alligator Back Formation; Gneiss		
<b>Reach Summary Information</b>				
Parameters	Roses Creek	UT 1	UT 2	UT 3
Length of reach (linear feet)	3,681 existing	900 existing	610 existing	558 existing
Valley Classification	VIII	VIII	VIII	VIII
Drainage Area (acres)	3,309	35	47	13
NCDWQ Stream Identification Score	56	30	33.5	34
NCDWQ Water Quality Classification	WS-III; Tr	WS-III; Tr	WS-III; Tr	WS-III; Tr
Morphological Description (stream type)	E4, B4, and F4	B5, F5	B5	B5, G5
Evolutionary Trend	Simon's Stages: Premodified » Constructed » Degradation and Widening	Could maintain a B type channel in majority of reach Or F » B	G » B/E	G » B

<b>Regulatory Considerations (cont.)</b>			
Coastal Zone Management (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	CLOMR/LOMR
Essential Fisheries Habitat	No	N/A	N/A

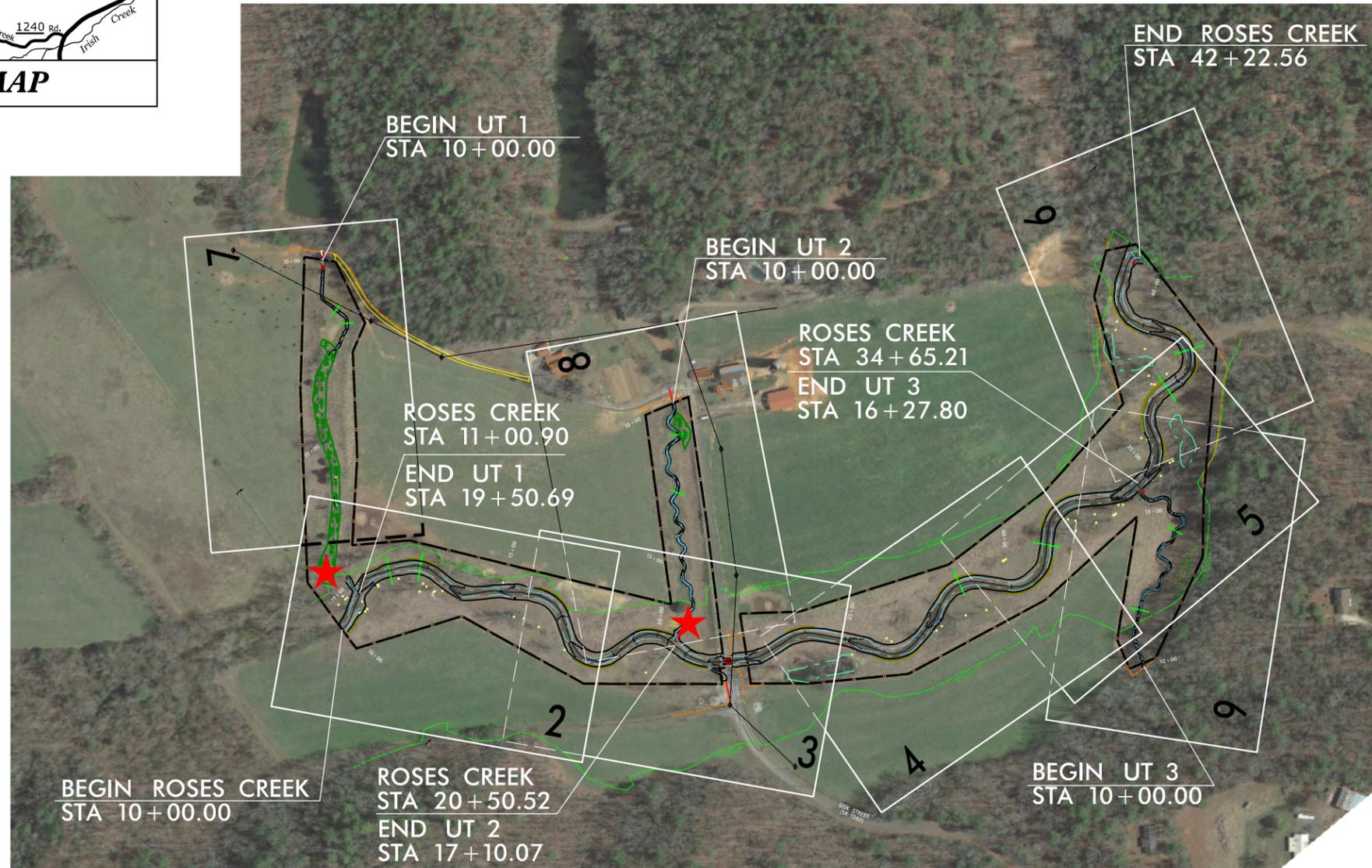
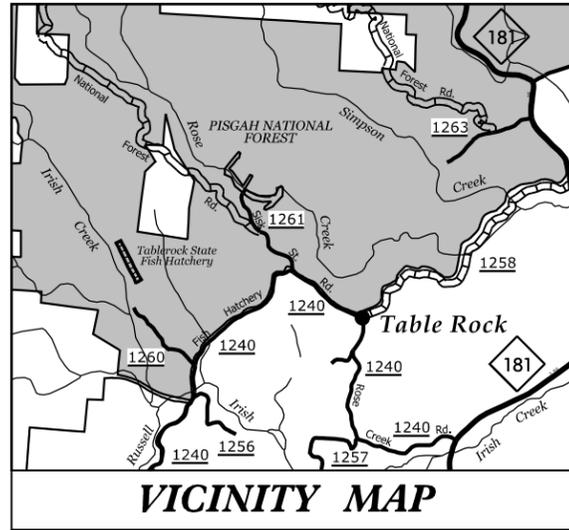
**Appendix B. Visual Assessment Data**

# CURRENT CONDITIONS PLAN VIEW (CCPV) ROSES CREEK

**LOCATION: BURKE COUNTY, NORTH CAROLINA**

**LAT: 35°51'01" N      LONG: -81°49'11" W**

**TYPE OF WORK: CCPV PLANS - YEAR 6**



**YEAR 6 CONDITIONS**

**BANK/BED CONDITION**

- ★ SCOUR HOLE / GULLEY

**VEGETATION PROBLEM AREAS**

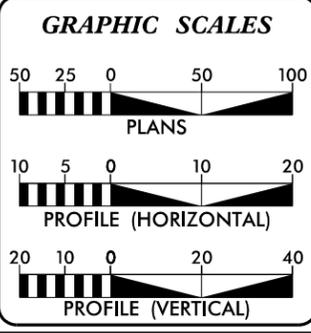
- INVASIVE POPULATION

**VEGETATION PLOT CONDITIONS**

- CRITERIA MET

**LEGEND**

- ASBUILT ALIGNMENTS & STATIONING
- THALWEG
- BANKFULL
- EPHEMERAL POOL
- CONSERVATION EASEMENT
- POWERLINE
- FENCE
- XS-1 CROSS-SECTION LOCATION
- FLOW METER
- CREST GAUGE
- EXISTING WETLANDS
- BRUSH TOE
- ROCK L-VANE
- ROCK CROSS VANE
- ROCK STEP STRUCTURE w/ BOULDERS
- ROCK STEP STRUCTURE w/ CLASS B RIP RAP
- ROCK /LOG CROSS VANE
- FLOODPLAIN INTERCEPTOR
- 5' x 10' VEG PLOT
- 10' x 10' VEG PLOT
- PHOTO POINT AND DIRECTION



ROSES CREEK	UT 1	UT 2	UT 3
DESIGN STREAM TYPE = C4	DESIGN STREAM TYPE = C5	DESIGN STREAM TYPE = C5	DESIGN STREAM TYPE = C5
BANKFULL AREA (FT <sup>2</sup> ) = 66.4	BANKFULL AREA (FT <sup>2</sup> ) = 2.1	BANKFULL AREA (FT <sup>2</sup> ) = 2.1	BANKFULL AREA (FT <sup>2</sup> ) = 2.6
BANKFULL WIDTH (FT) = 30.5	BANKFULL WIDTH (FT) = 5.0	BANKFULL WIDTH (FT) = 5.0	BANKFULL WIDTH (FT) = 5.5
MAX DEPTH (FT) = 2.72	MAX DEPTH (FT) = 0.58	MAX DEPTH (FT) = 0.58	MAX DEPTH (FT) = 0.63
WIDTH /DEPTH RATIO = 14.0	WIDTH /DEPTH RATIO = 13.0	WIDTH /DEPTH RATIO = 13.0	WIDTH /DEPTH RATIO = 13.1
DRAINAGE AREA (MF) = 5.17	DRAINAGE AREA (MF) = 0.06	DRAINAGE AREA (MF) = 0.07	DRAINAGE AREA (MF) = 0.02
BANKFULL SLOPE(FT/FT) = 0.0062	BANKFULL SLOPE(FT/FT) = 0.0021	BANKFULL SLOPE(FT/FT) = 0.0021	BANKFULL SLOPE(FT/FT) = 0.0021

**PROJECT LENGTH**

	PROPOSED DESIGN STREAM LENGTH	ASBUILT STREAM LENGTH
ROSES CREEK	= 3,219.20 FT	3,222.56 FT
UT 1	= 930.38 FT	950.69 FT
UT 2	= 707.59 FT	710.07 FT
UT 3	= 621.03 FT	627.80 FT

**VICKIE MILLER**  
PROJECT MANAGER

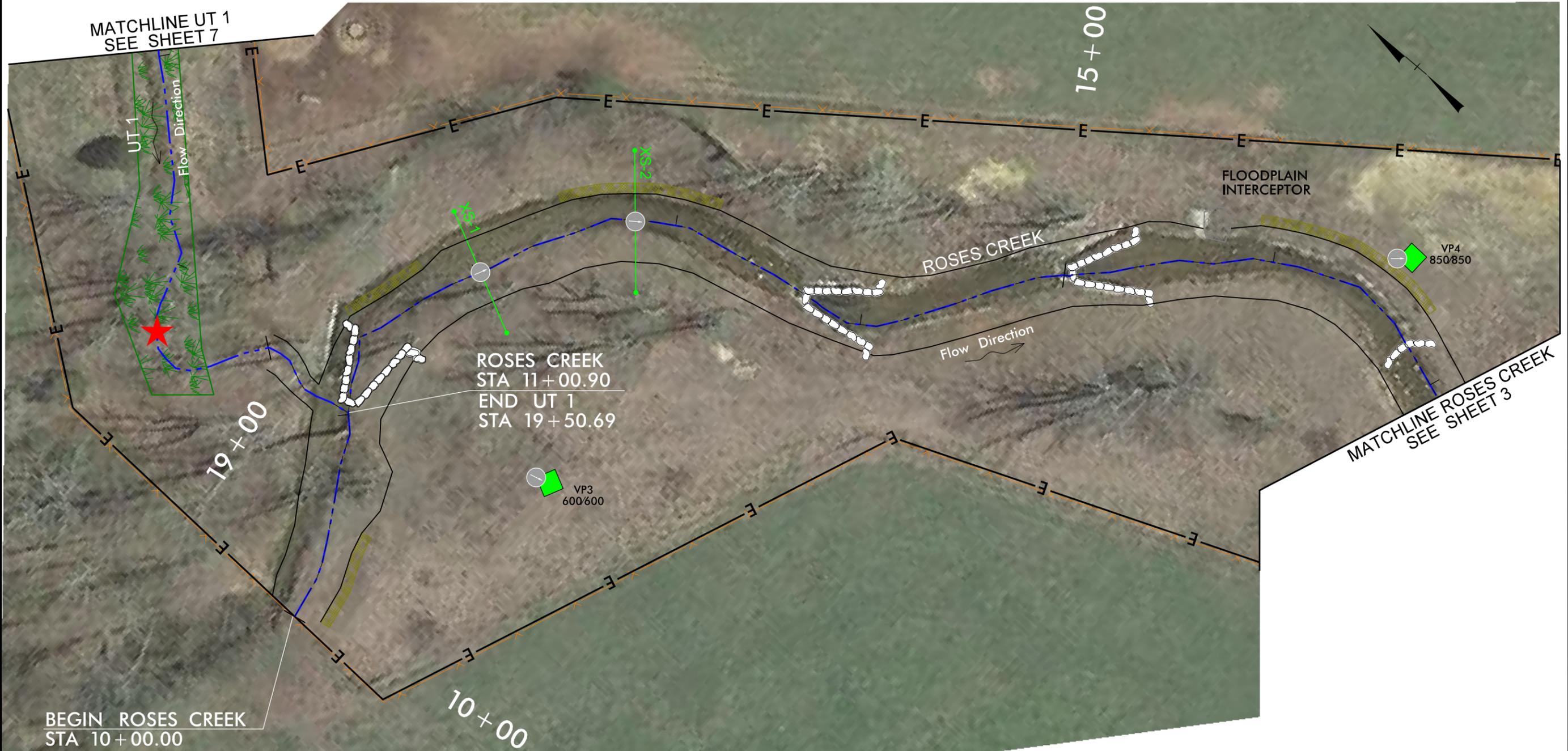
*Prepared in the Office of:*

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Suite 900  
Raleigh, NC 27601  
NC License No: F-0258

1/24/2022 6:NRosesCrk-dsh\_01.dgn

**CONTRACT: ROSES CREEK DMS PROJECT #: 96309**

**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



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- 15+00
- ASBUILT ALIGNMENTS & STATIONING
- THALWEG
- BANKFULL
- EPHEMERAL POOL
- CONSERVATION EASEMENT
- FENCE

**LEGEND**

- CROSS-SECTION LOCATION
- BRUSH TOE
- CREST GAUGE
- FLOODPLAIN INTERCEPTOR
- PHOTO POINT AND DIRECTION
- ROCK L-VANE
- ROCK CROSS VANE
- ROCK STEP STRUCTURE w/ BOULDERS
- ROCK STEP STRUCTURE w/ CLASS B RIP RAP
- 10' x 10' VEG PLOT

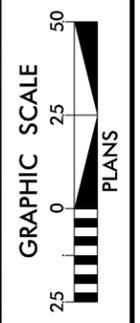
- YEAR 6 CONDITIONS**
- BANK/BED CONDITION**
- SCOUR HOLE / GULLEY
- VEGETATION PROBLEM AREAS**
- INVASIVE POPULATION
- VEGETATION PLOT CONDITIONS**
- CRITERIA MET



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ROSES CREEK  
RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



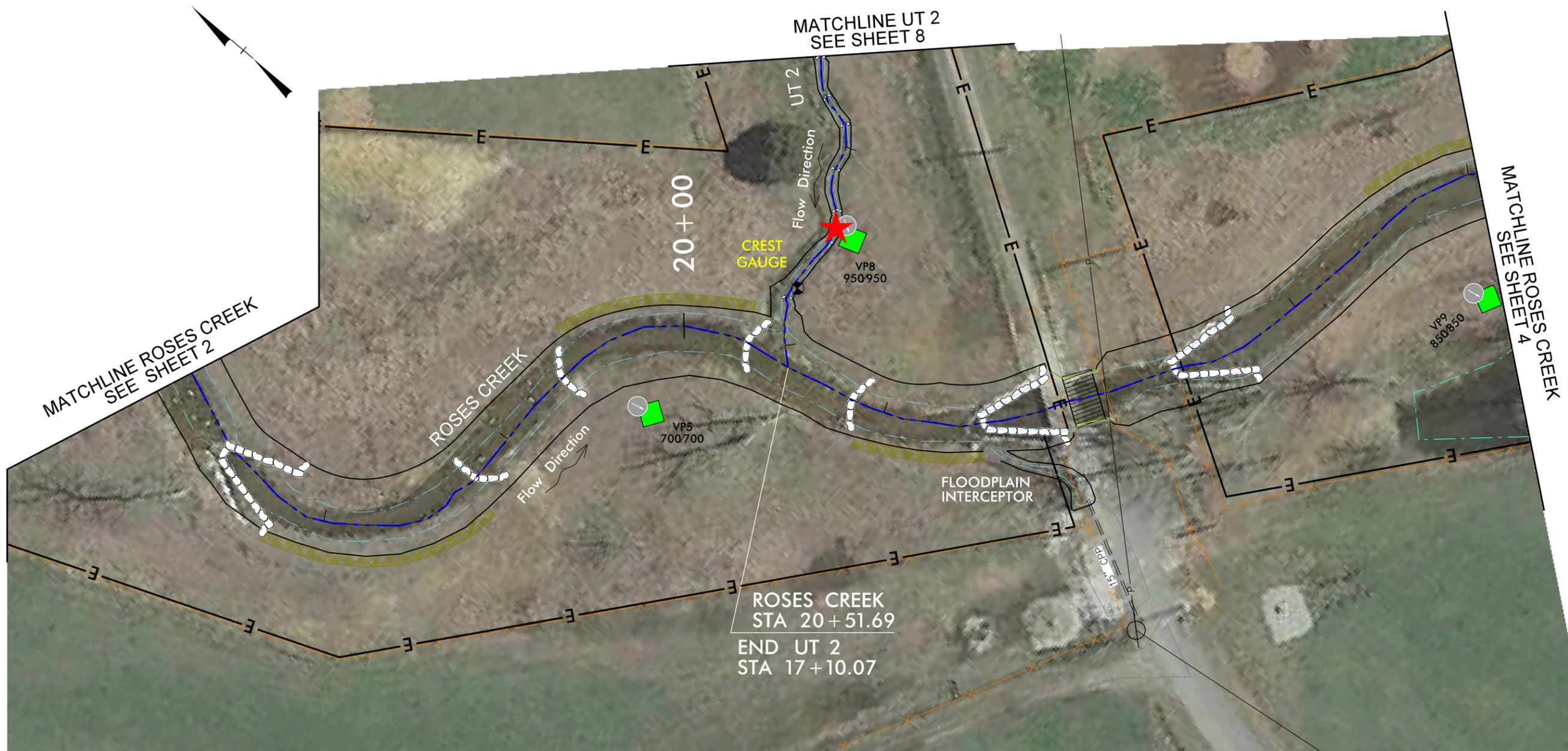
DATE: 12-01-21

CCPV  
YEAR 6

SHEET  
2

EEP# 96309

**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



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LEGEND	
	ASBUILT ALIGNMENTS & STATIONING
	THALWEG
	BANKFULL
	EPHEMERAL POOL
	CONSERVATION EASEMENT
	FENCE
	CROSS-SECTION LOCATION
	BRUSH TOE
	CREST GAUGE
	FLOODPLAIN INTERCEPTOR
	PHOTO POINT AND DIRECTION
	ROCK L-VANE
	ROCK CROSS VANE
	ROCK STEP STRUCTURE w/ BOULDERS
	ROCK STEP STRUCTURE w/ CLASS B RIP RAP
	10' x 10' VEG PLOT

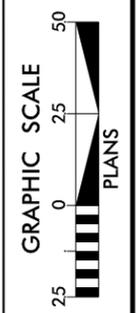
YEAR 6 CONDITIONS	
<b>BANK/BED CONDITION</b>	
	SCOUR HOLE / GULLEY
<b>VEGETATION PROBLEM AREAS</b>	
	INVASIVE POPULATION
<b>VEGETATION PLOT CONDITIONS</b>	
	CRITERIA MET



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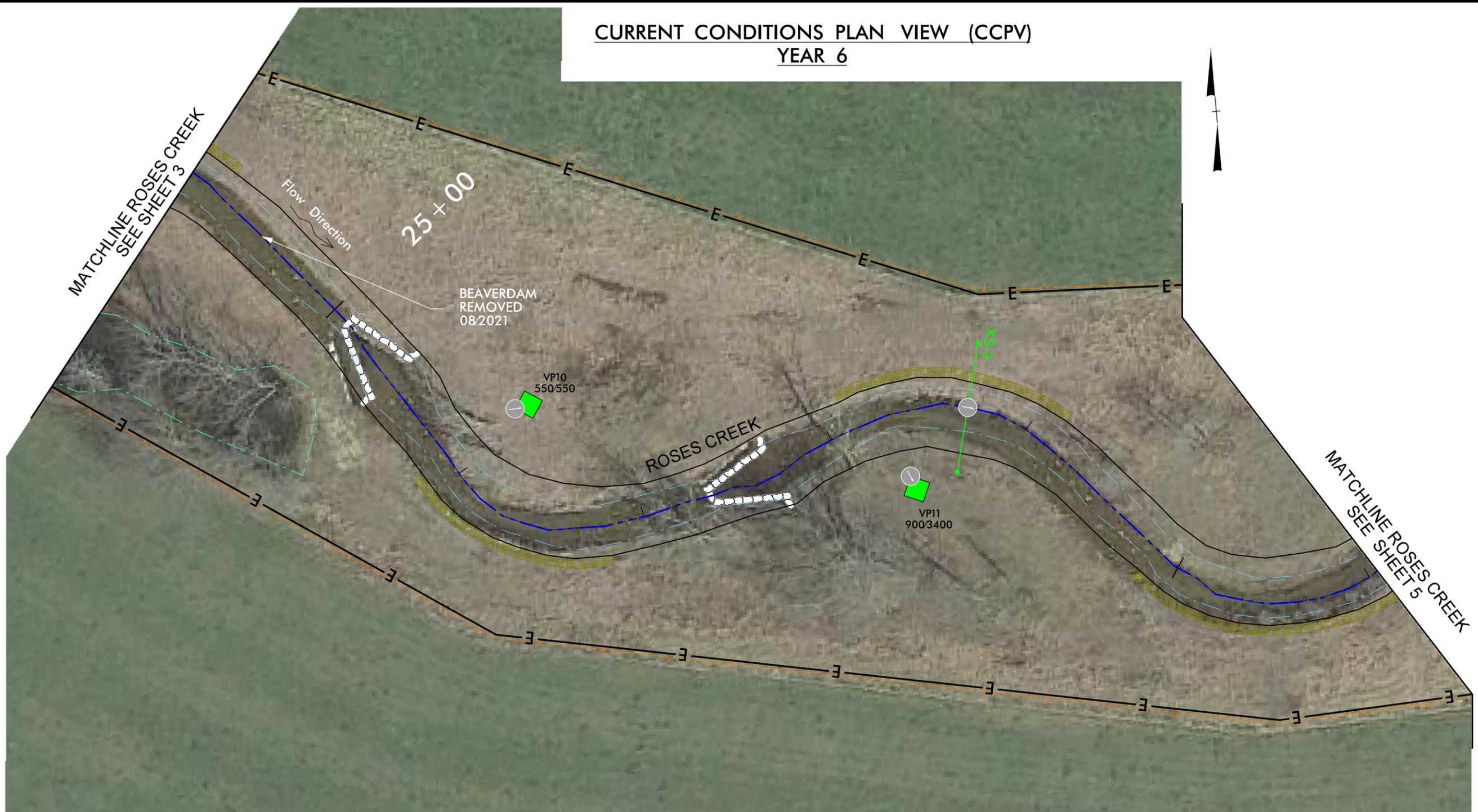


ROSES CREEK RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21  
CCPV YEAR 6  
SHEET 3  
EEP# 96309

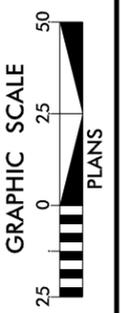
**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



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ROSES CREEK RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21  
CCPV YEAR 6  
SHEET 4  
EEP# 96309

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**YEAR 6 CONDITIONS**

**BANKBED CONDITION**

- ★ SCOUR HOLE / GULLEY

**VEGETATION PROBLEM AREAS**

- INVASIVE POPULATION

**VEGETATION PLOT CONDITIONS**

- CRITERIA MET

**LEGEND**

- ASBUILT ALIGNMENTS & STATIONING
- THALWEG
- BANKFULL
- EPHEMERAL POOL
- CONSERVATION EASEMENT
- FENCE
- CROSS-SECTION LOCATION
- BRUSH TOE
- CREST GAUGE
- FLOODPLAIN INTERCEPTOR
- PHOTO POINT AND DIRECTION
- ROCK L-VANE
- ROCK CROSS VANE
- ROCK STEP STRUCTURE w/ BOULDERS
- ROCK STEP STRUCTURE w/ CLASS B RIP RAP
- 10' x 10' VEG PLOT

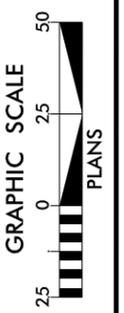
**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



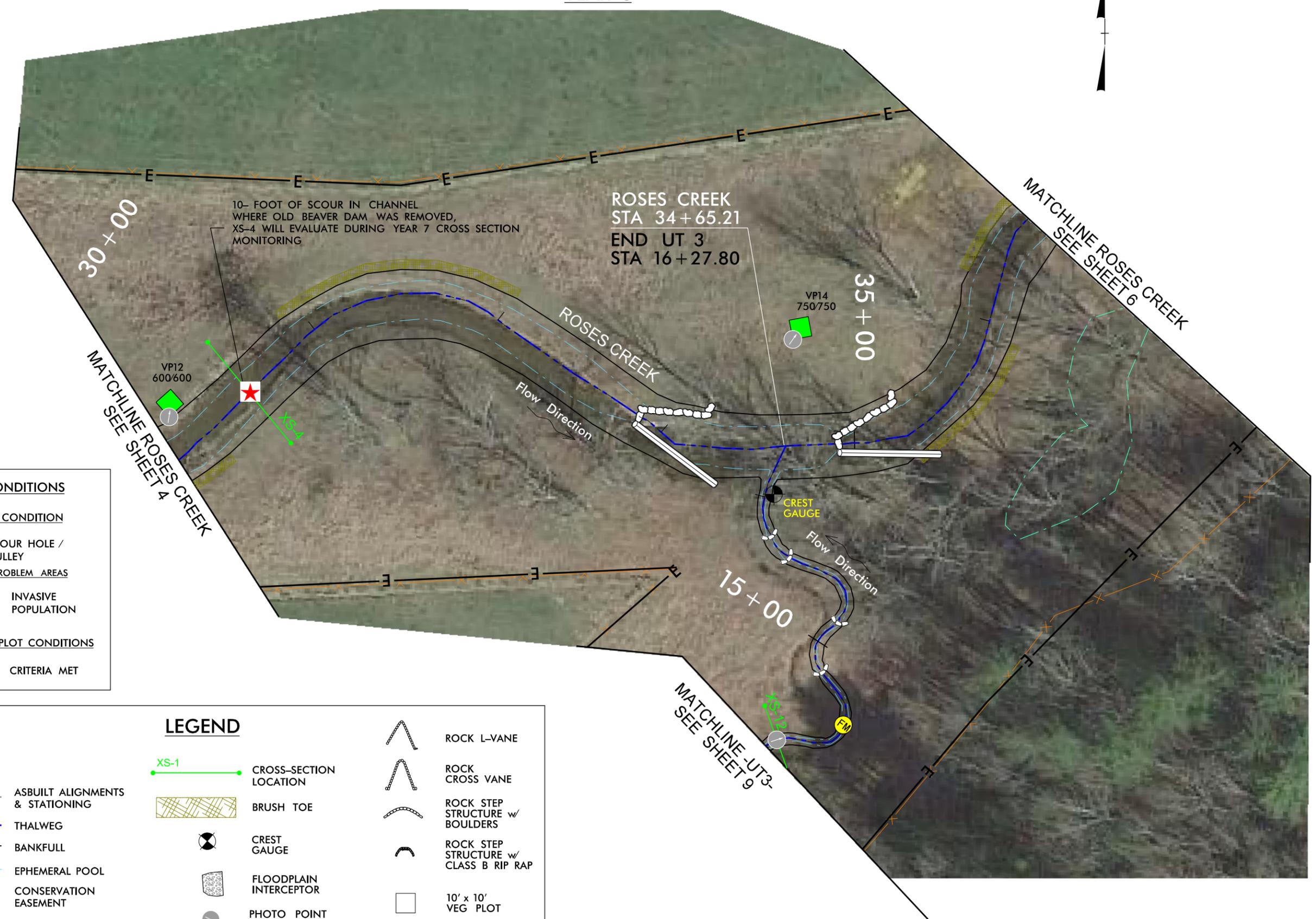
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ROSES CREEK  
RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21  
CCPV  
YEAR 6  
SHEET  
5  
EEP# 96309



10- FOOT OF SCOUR IN CHANNEL  
WHERE OLD BEAVER DAM WAS REMOVED,  
XS-4 WILL EVALUATE DURING YEAR 7 CROSS SECTION  
MONITORING

ROSES CREEK  
STA 34+65.21  
END UT 3  
STA 16+27.80

**YEAR 6 CONDITIONS**

**BANK/BED CONDITION**

★ SCOUR HOLE / GULLEY

VEGETATION PROBLEM AREAS

INVASIVE POPULATION

**VEGETATION PLOT CONDITIONS**

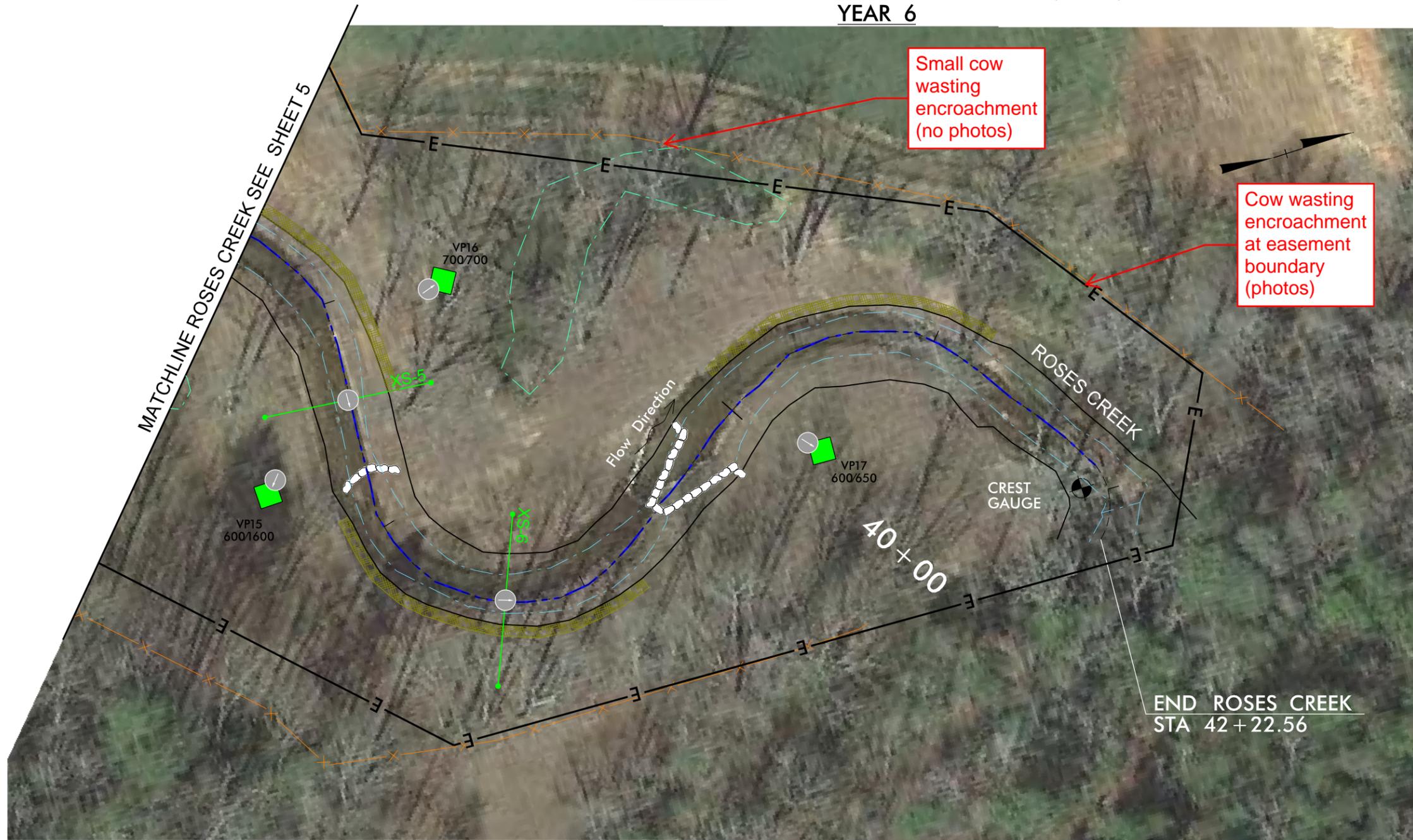
CRITERIA MET

**LEGEND**

15+00	ASBUILT ALIGNMENTS & STATIONING	XS-1	CROSS-SECTION LOCATION	ROCK L-VANE
--- ---	THALWEG	[Cross-hatched box]	BRUSH TOE	ROCK CROSS VANE
---	BANKFULL	⊙	CREST GAUGE	ROCK STEP STRUCTURE w/ BOULDERS
-.-.-	EPHEMERAL POOL	⊙	FLOODPLAIN INTERCEPTOR	ROCK STEP STRUCTURE w/ CLASS B RIP RAP
—E—	CONSERVATION EASEMENT	⊙	PHOTO POINT AND DIRECTION	10' x 10' VEG PLOT
—X—	FENCE			

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**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



LEGEND	
	ASBUILT ALIGNMENTS & STATIONING
	THALWEG
	BANKFULL
	EPHEMERAL POOL
	CONSERVATION EASEMENT
	FENCE
	CROSS-SECTION LOCATION
	BRUSH TOE
	CREST GAUGE
	FLOODPLAIN INTERCEPTOR
	PHOTO POINT AND DIRECTION
	ROCK L-VANE
	ROCK CROSS VANE
	ROCK STEP STRUCTURE w/ BOULDERS
	ROCK STEP STRUCTURE w/ CLASS B RIP RAP
	10' x 10' VEG PLOT

YEAR 6 CONDITIONS	
<b>BANK/BED CONDITION</b>	
	SCOUR HOLE / GULLEY
<b>VEGETATION PROBLEM AREAS</b>	
	INVASIVE POPULATION
<b>VEGETATION PLOT CONDITIONS</b>	
	CRITERIA MET

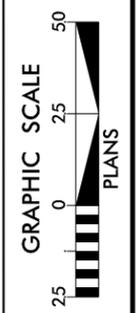
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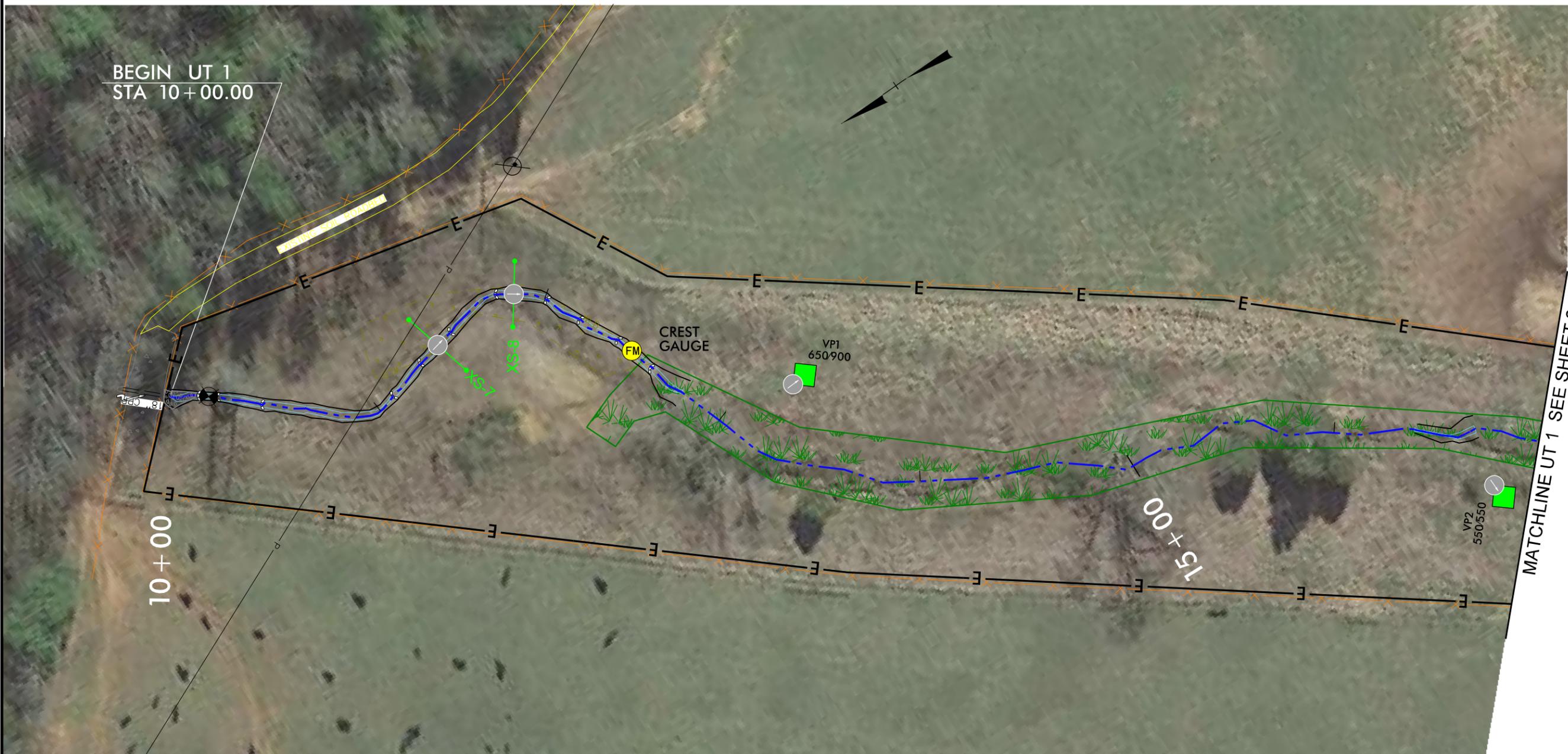


ROSES CREEK RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21  
CCPV YEAR 6  
SHEET 6  
EEP# 96309

# CURRENT CONDITIONS PLAN VIEW (CCPV) YEAR 6



BEGIN UT 1  
STA 10+00.00

10+00

15+00

MATCHLINE UT 1 SEE SHEET 2

**YEAR 6 CONDITIONS**

**BANK/BED CONDITION**

- SCOUR HOLE / GULLEY

**VEGETATION PROBLEM AREAS**

- INVASIVE POPULATION

**VEGETATION PLOT CONDITIONS**

- CRITERIA MET

**LEGEND**

	ASBUILT ALIGNMENTS & STATIONING		CROSS-SECTION LOCATION		ROCK L-VANE
	THALWEG		BRUSH TOE		ROCK CROSS VANE
	BANKFULL		CREST GAUGE		ROCK STEP STRUCTURE w/ BOULDERS
	EPHEMERAL POOL		FLOODPLAIN INTERCEPTOR		ROCK STEP STRUCTURE w/ CLASS B RIP RAP
	CONSERVATION EASEMENT		PHOTO POINT AND DIRECTION		10' x 10' VEG PLOT
	FENCE				

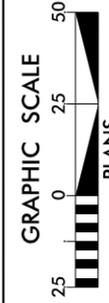
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ROSES CREEK  
RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21

CCPV  
YEAR 6

SHEET  
7

EEP# 96309

**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**

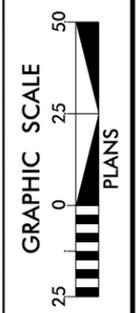


BEGIN UT 2  
STA 10+00.00

MATCHLINE UT 2  
SEE SHEET 3

LEGEND	
	ASBUILT ALIGNMENTS & STATIONING
	THALWEG
	BANKFULL
	EPHEMERAL POOL
	CONSERVATION EASEMENT
	FENCE
	5' x 10' VEG PLOT
	CROSS-SECTION LOCATION
	BRUSH TOE
	CREST GAUGE
	FLOODPLAIN INTERCEPTOR
	PHOTO POINT AND DIRECTION
	ROCK L-VANE
	ROCK CROSS VANE
	ROCK STEP STRUCTURE w/ BOULDERS
	ROCK STEP STRUCTURE w/ CLASS B RIP RAP
	10' x 10' VEG PLOT

YEAR 6 CONDITIONS	
	BANK/BED CONDITION
	SCOUR HOLE / GULLY
	VEGETATION PROBLEM AREAS
	INVASIVE POPULATION
	VEGETATION PLOT CONDITIONS
	CRITERIA MET

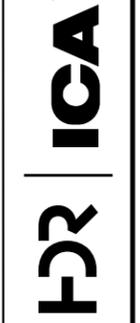


DATE: 12-01-21  
CCPV YEAR 6  
SHEET 8  
EEP# 96309

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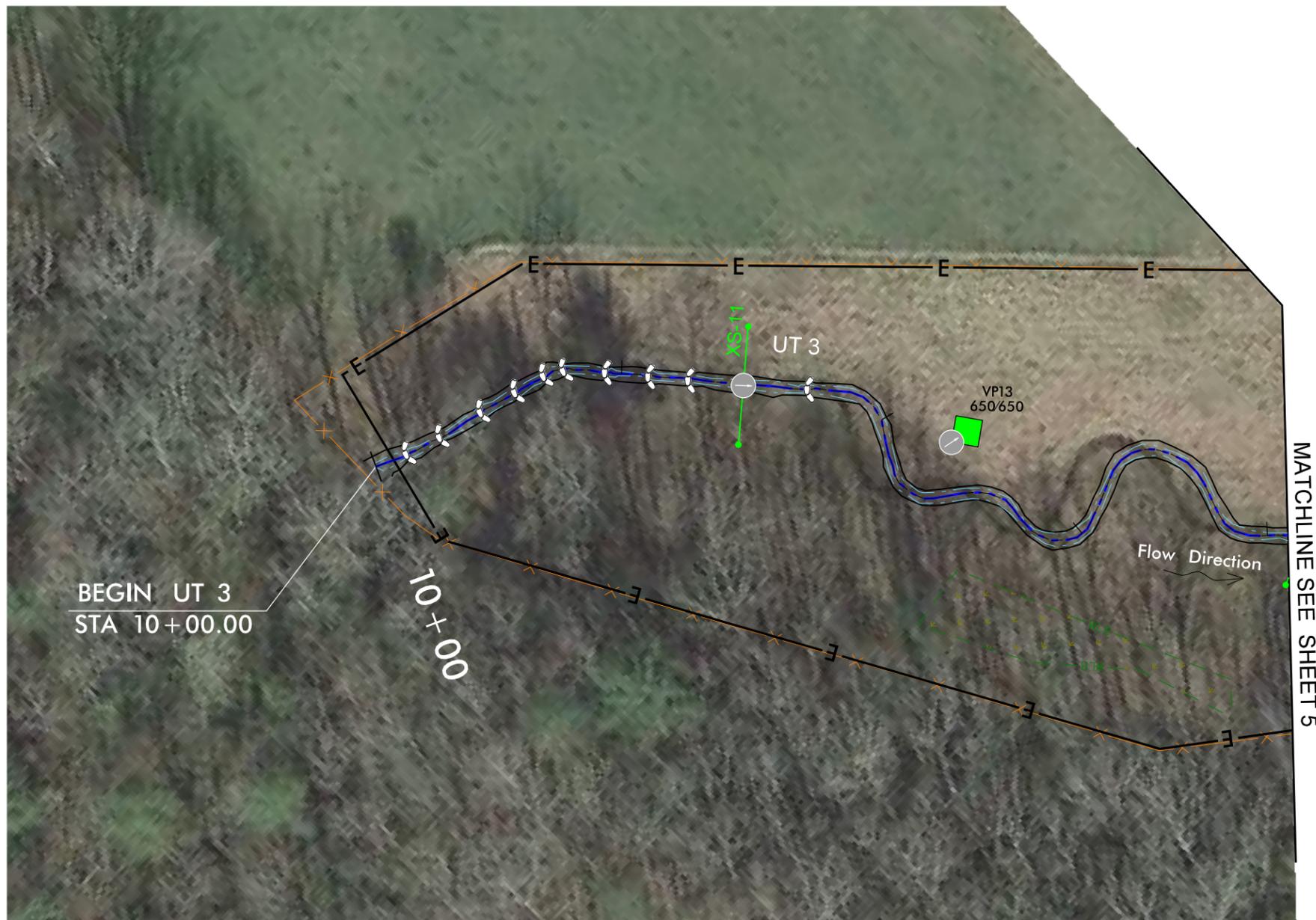


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ROSES CREEK RESTORATION PROJECT  
BURKE COUNTY, NORTH CAROLINA

**CURRENT CONDITIONS PLAN VIEW (CCPV)  
YEAR 6**



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LEGEND	
	ASBUILT ALIGNMENTS & STATIONING
	THALWEG
	BANKFULL
	EPHEMERAL POOL
	CONSERVATION EASEMENT
	FENCE
	CROSS-SECTION LOCATION
	BRUSH TOE
	CREST GAUGE
	FLOODPLAIN INTERCEPTOR
	PHOTO POINT AND DIRECTION
	ROCK L-VANE
	ROCK CROSS VANE
	ROCK STEP STRUCTURE w/ BOULDERS
	ROCK STEP STRUCTURE w/ CLASS B RIP RAP
	10' x 10' VEG PLOT

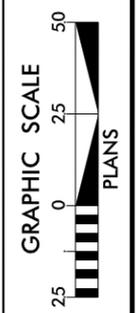
YEAR 6 CONDITIONS	
<b>BANKBED CONDITION</b>	
	SCOUR HOLE / GULLEY
<b>VEGETATION PROBLEM AREAS</b>	
	INVASIVE POPULATION
<b>VEGETATION PLOT CONDITIONS</b>	
	CRITERIA MET



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ROSES CREEK  
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BURKE COUNTY, NORTH CAROLINA



DATE: 12-01-21  
CCPV  
YEAR 6  
SHEET  
9  
EEP# 96309

**Table 5: Visual Stream Morphology Stability Assessment**  
**Reach ID: Roses Creek**  
**Assessed Length: 3,121 FT**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			1	10	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	17	17			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	18	18			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	18	18			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	17	17			100%
		2. Thalweg centering at downstream of meander (Glide)	17	17	100%		
	2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0
2. Undercut		Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.	0			0	100%
3. Mass Wasting		Bank slumping, calving, or collapse	0			0	100%
<b>Totals</b>					<b>0</b>	<b>0</b>	<b>100.0%</b>
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	19	19			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	19	19			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	19	19			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	19	19			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	19	19			100%

**Table 5a: Visual Stream Morphology Stability Assessment**  
 Reach ID: UT1  
 Assessed Length: 234 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			1	10	96%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	0	0			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	2	2			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	2	2			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%
		2. Thalweg centering at downstream of meander (Glide)	3	3	100%		
	2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0
2. Undercut		Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.	0			0	100%
3. Mass Wasting		Bank slumping, calving, or collapse	0			0	100%
<b>Totals</b>					0	0	100.0%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	12	12			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	12	12			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	12	12			100%

**Table 5b: Visual Stream Morphology Stability Assessment**  
**Reach ID: UT2**  
**Assessed Length: 707 LF**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			1	5	99%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	22	22			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	21	21			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	21	21			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	22	22			100%
		2. Thalweg centering at downstream of meander (Glide)	22	22	100%		
	2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0
2. Undercut		Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.	0			0	100%
3. Mass Wasting		Bank slumping, calving, or collapse	0			0	100%
<b>Totals</b>					<b>0</b>	<b>0</b>	<b>100.0%</b>
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	21	21			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	21	21			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	21	21			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	21	21			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	21	21			100%

**Table 5c: Visual Stream Morphology Stability Assessment**  
**Reach ID: UT3**  
**Assessed Length: 620 LF**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	13	13			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	12	12			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	13	13			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	13	13			100%
		2. Thalweg centering at downstream of meander (Glide)	13	13	100%		
	2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0
2. Undercut		Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.	0			0	100%
3. Mass Wasting		Bank slumping, calving, or collapse	0			0	100%
<b>Totals</b>					<b>0</b>	<b>0</b>	<b>100.0%</b>
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	14	14			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	14	14			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	14	14			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	14	14			100%

**Table 6. Vegetation Condition Assessment**

<b>Planted Acreage</b>		<b>15.81</b>				
<b>Vegetation Category</b>	<b>Definitions</b>	<b>Mapping Threshold</b>	<b>CCPV Depiction</b>	<b>Number of Polygons</b>	<b>Combined Acreage</b>	<b>% of Planted Acreage</b>
<b>1. Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.05 Acres	Pink polygons filled with green x's	0	0.00	0.0%
<b>2. Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 Acres	Blue cross hatch pattern	0	0.0	0.0%
<b>Total</b>						
<b>3. Areas of Poor Growth Rates or Vigor</b>	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.1 Acres	Pattern and color.	0	0	0%
<b>Cumulative Total</b>						

<b>Easement Acreage</b>		<b>17.33</b>				
<b>Vegetation Category</b>	<b>Definitions</b>	<b>Mapping Threshold</b>	<b>CCPV Depiction</b>	<b>Number of Polygons</b>	<b>Combined Acreage</b>	<b>% of Easement Acreage</b>
<b>4. Invasive Areas of Concern</b>	Areas or points (if too small to render as polygons at map scale).	1000 SF	Green grass pattern.	2	0.4	2%
<b>5. Easement Encroachment Areas</b>	Areas or points (if too small to render as polygons at map scale).	None	N/A	N/A	N/A	N/A

**Figures 3.1 - 3.18. Problem Areas, Buffer Vegetation and Aerial Photos**



**3.1 UT 1 Invasive Mimosa (7/27/21)**



**3.2 UT 1 Invasive Chinese privet (7/27/21)**



**3.3 UT 2 Invasive cattails (7/27/21)**



**3.4 River birch Roses floodplain (9/8/21)**



**3.5 Roses Creek Buffer (9/8/21)**



**3.6 UT 1 Buffer Vegetation (9/8/21)**



**3.7 UT 2 Buffer Vegetation (9/8/21)**



**3.8 UT 3 Buffer Vegetation (9/8/21)**



**3.9 Roses Creek beaver dam (7/27/21)**



**3.10 Roses Creek beaver dam (7/27/21)**



**3.11 Beaver dam after removal (9/8/21)**



**3.12 UT 1 channel erosion (7/27/21)**



**3.13 UT 2 channel erosion (11/4/21)**



**3.14 Cow wasting area (11/4/21)**



**3.15 Wasting area (outside easement)**



**3.16 UT 1 aerial (March 4, 2021)**



**3.17 UT 2 aerial (March 4, 2021)**



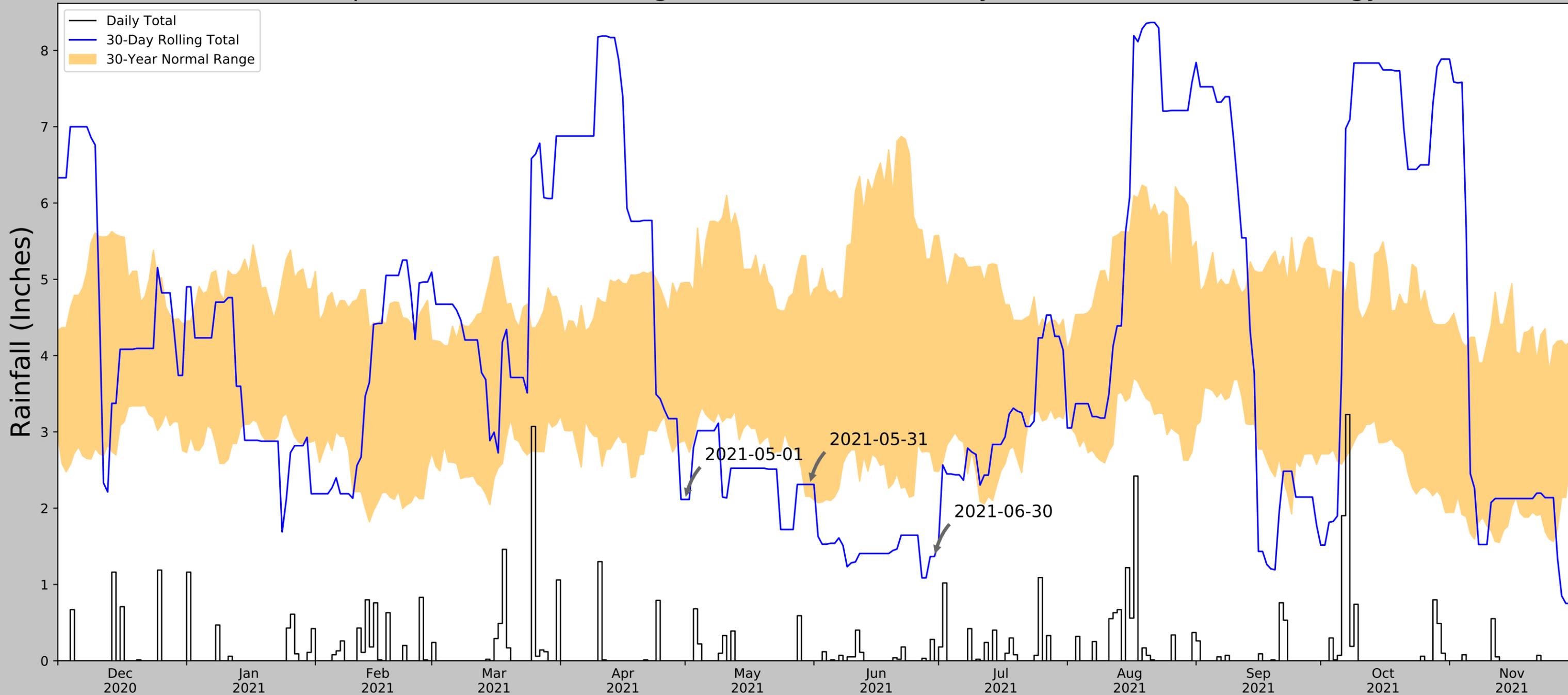
**3.18 UT 3 aerial (March 4, 2021)**

**Appendix C. Hydrologic Data**

**Table 7. Verification of Bankfull Events**

Date	Crest Gauge Info		Gauge Reading (ft)	Gauge Elevation (ft)	Crest Elevation (ft)	Bankfull Elevation (ft)	Height above Bankfull (ft)
	Site	Sta.					
10/5/2016	1	Roses Creek Lower	0.00	1212.11	N/A	1213.93	N/A
10/5/2016	2	UT 1	0.00	1267.45	N/A	1267.95	N/A
10/5/2016	3	UT 2	0.35	1227.81	1228.16	1228.19	N/A
10/5/2016	4	UT 3	0.25	1216.94	1217.19	1217.36	N/A
11/22/2016	1	Roses Creek Lower	0.00	1212.11	N/A	1213.93	N/A
11/22/2016	2	UT 1	0.00	1267.45	N/A	1267.95	N/A
11/22/2016	3	UT 2	0.00	1227.81	N/A	1228.19	N/A
11/22/2016	4	UT 3	0.35	1216.94	1217.29	1217.36	N/A
6/2/2017	1	Roses Creek Lower	1.89	1212.11	1214.00	1213.93	0.07
6/2/2017	2	UT 1	0.80	1267.45	1268.25	1267.95	0.30
6/2/2017	3	UT 2	1.50	1227.81	1229.31	1228.19	1.12
6/2/2017	4	UT 3	1.80	1216.94	1218.74	1217.36	1.38
8/15/2017	1	Roses Creek Lower	0.50	1212.11	1212.61	1213.93	N/A
8/15/2017	2	UT 1	0.38	1267.45	1267.83	1267.95	N/A
8/15/2017	3	UT 2	0.85	1227.81	1228.66	1228.19	0.47
8/15/2017	4	UT 3	1.64	1216.94	1218.58	1217.36	1.22
3/28/2018	1	Roses Creek Lower	2.83	1212.11	1214.94	1213.93	1.01
3/28/2018	2	UT 1	0.38	1267.45	1267.83	1267.95	N/A
3/28/2018	3	UT 2	2.50	1227.81	1230.31	1228.19	2.12
3/28/2018	4	UT 3	1.38	1216.94	1218.32	1217.36	0.96
8/6/2018	1	Roses Creek Lower	3.75	1212.11	1215.86	1213.93	1.93
8/6/2018	2	UT 1	1.13	1267.45	1268.58	1267.95	0.63
8/6/2018	3	UT 2	2.54	1227.81	1230.35	1228.19	2.16
8/6/2018	4	UT 3	2.92	1216.94	1219.86	1217.36	2.50
1/29/2019	1	Roses Creek Lower	2.68	1212.11	1214.79	1213.93	0.86
1/29/2019	2	UT 1	0.67	1267.45	1268.12	1267.95	0.17
1/29/2019	3	UT 2	3.83	1227.81	1231.64	1228.19	3.45
1/29/2019	4	UT 3	3.75	1216.94	1220.69	1217.36	3.33
2020/2021	Insect damage to crest gauges, unreadable for Years 5 & 6						

# Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.850953, -81.819541
Observation Date	2021-06-30
Elevation (ft)	1232.79
Drought Index (PDSI)	Mild wetness
WebWIMP H <sub>2</sub> O Balance	Dry Season

30 Days Ending	30 <sup>th</sup> %ile (in)	70 <sup>th</sup> %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-06-30	2.488583	5.567323	1.366142	Dry	1	3	3
2021-05-31	2.155512	4.738189	2.311024	Normal	2	2	4
2021-05-01	2.886221	4.958662	2.114173	Dry	1	1	1
Result							Drier than Normal - 8

Figure and tables made by the  
**Antecedent Precipitation Tool**  
Version 1.0

Written by Jason Deters  
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
BRIDGEWATER HYDRO	35.7428, -81.8361	1100.066	7.53	132.724	4.388	11225	90
GLEN ALPINE 0.7 WSW	35.7266, -81.7902	1262.139	8.748	29.349	4.193	124	0
MARION 4.7 NE	35.7344, -81.9537	1232.94	11.017	0.15	4.959	1	0
MORGANTON	35.7297, -81.6728	1180.118	11.74	52.672	5.901	3	0

**Appendix D. 2019/2020 IRT Meeting Minutes Notes**

# Meeting Minutes

Project: Roses Creek Stream Mitigation Site (DMS # 96309)

Subject: IRT Credit Release Meeting

Date: Tuesday, August 27, 2019

Location: Burke County

Attendees: Todd Tugwell (USACE)

Kim Browning (USACE)

Mac Haupt (DWR)

Erin Davis (DWR)

Paul Wiesner (DMS)

Harry Tsomides (DMS)

Tim Baumgartner (DMS)

Melonie Allen (DMS)

Joe Famularo (DMS)

Ryan Smith (HDR)

Chris Smith (HDR)

The IRT Credit Release Meeting for the Roses Creek Stream Mitigation Site was held at 9:00 AM on Tuesday, August 27, 2019 at the project site in Burke County. The following represents highlights of discussions that occurred during the site visit:

1. Chris Smith provided a synopsis of the project site to begin the meeting.
2. The IRT expressed concern over the following items at this stage in monitoring (year 4):
  - a. Vegetation.
    - i. 2 vegetation plots along UT 1 are not currently meeting success criteria
      1. Supplemental planting occurred during 2018.
    - ii. Invasive Plants: Privet has been treated along UT 1 multiple times this year but no measures were taken prior to 2019.
  - b. Repair areas along Roses Creek.
  - c. Tributary discharge and maintenance of single thread channel as opposed to wetland complex.

## **Site Walk**

1. Discussion regarding the current condition of the tributaries. UT 2 and UT 3 are the tributaries of concern:
  - a. HDR observed that the monitoring cross sections for the tributaries do not show aggradation or significant alteration in cross sectional dimension.

- b. HDR observed that the flow gauge data indicates all the tributaries meet performance standard requirements.
  - c. There is flow through the restored channels, however, there is also water flowing in the floodplains of UT 2 and UT 3.
  - d. Dense, low growing vegetation (juncus/carex/salix/polygonum) is prevalent along several reaches of UT 2 and UT 3's channel side slopes and floodplain. The IRT expressed concern that vegetation is constricting channel flow and could in the future cause enough aggradation within the channels to the point that they function as a linear wetland rather than the channel functioning as a stream. HDR reiterated that monitoring cross-sectional data confirms that the channel is maintaining its dimension even though the vegetation is admittedly dense which restricts the ability to visually identify sections of existing bed and bank within some restored channel reaches.
  - e. Some sediment entered the upstream extent of UT 2 due to a soil access road that had not been stabilized immediately following construction completion. The road is now stabilized, however there is still sediment that is slowly being mobilized downstream.
  - f. The IRT indicated that stream reaches proposed for stream mitigation credit should function as streams and be considered jurisdictional streams by the regulatory agencies at project closeout. The IRT noted that stream channels that are determined to be non-jurisdictional will not be eligible to receive stream mitigation credit. The IRT suggested documenting stream conditions with photos and videos during winter when plants are dormant in an effort to more clearly identify the channel bed and bank. The IRT noted that there has been allowances for providers to maintain vegetation on channel banks through the first two monitoring years. The IRT does not desire channel vegetation manipulation at this point for the project, but noted it as a potential tool for future sites.
  - g. There was discussion during the site walk on if flow gauges should be moved further upstream compared with their current locations. At the end of the walk it was determined that the tributaries appear to display sufficient flow and that it may not be necessary to relocate flow gauges.
2. Continued treatment of invasives including but not limited to privet and multi-flora rose is necessary though project closeout.
  3. Evidence of livestock within the easement was observed.
  4. Vegetation on UT 1 was a concern prior to the site walk due to low survival rates within monitoring plots as noted in the monitoring report. However, during the site walk woody vegetation was noted to be dense along UT 1, displaying healthy vigor and survivability. HDR will review monitoring plots to determine if monitored vegetation within the plots is accurate and/or if vegetation with the plots is representative of survivability along UT 1 and will detail the information in the MY4 (2019) report.
  5. Beaver have entered the site near the downstream terminus of restoration on Roses Creek (have built one dam and began a second). The IRT noted that beaver management should begin and removal of the dam is necessary. Beaver inspection, management and dam removal should be completed until project closeout.
    - a. NOTE: As of September 11, 2019 the beaver dams have been removed and an eradication program has begun through a contract with the USDA APHIS.

6. The IRT noted that overall the site is functioning well (both streams, repairs from storm events and vegetation). The IRT noted issues on both UT 2 and UT 3 that have potential credit implications. The IRT was willing to release stream credits for MY3 (2018) as long as the remaining amount of unreleased credits exceeded the potential stream credits associated with both UT2 and UT3. The IRT indicated that they would review the MY4 report and any supplemental data provided and discuss the project and additional project credit release at the 2020 IRT credit release meeting.
7. The IRT noted that HDR should document any adaptive management measures and discuss measures during the credit release meeting in April 2020. Any significant adaptive management must be pre-approved by the IRT before implementation.

## Notes from 2020 Meeting

Roses Creek  
96309  
2020 – MY5  
HDR  
PM: Tsomides

2021: Todd (USACE) reminded everyone that the IRT had recently visited the site in 2019/ 2020. The IRT is still concerned about the tributaries that flow into Roses Creek (UT 1, UT2, and UT3). Vickie Miller (ICA) noted that both UT1 & UT2 are single thread channels and there is no sediment source currently upstream of UT 2. DMS still believes UT3 is at risk of credit loss at closeout. Todd asked about encroachment on the site. Vickie noted that there has been encroachment but the landowner is planning or has repaired the fencing. The IRT wants follow up documentation regarding encroachment in the MY6 (2021) monitoring report. Todd asked about vegetation on the site and the numerous river birch volunteers on the site. ICA is continuing to treat invasives on the site as required. Todd asked about Cross Section 4; which has down cut approximately 1 foot. Todd asked ICA to look at that cross section in detail in MY6 (2021). Kim asked if beaver were currently on the site. ICA noted that no beaver dams are currently on-site and they will continue to manage beaver through project closeout. Todd requested that site monitoring not be conducted until later into the growing season (2020 geomorphology data was collected in Feb. 2020). ICA will plan to collect data later in the applicable monitoring year. The IRT indicated that credits can be released as proposed with no site visit required.

=====  
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Nothing Compares