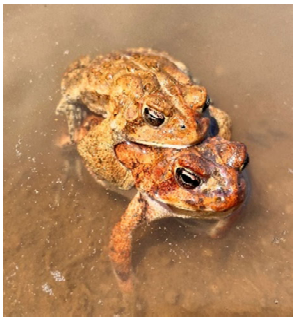


MONITORING YEAR 0 ANNUAL REPORT

FINAL

August 2022

HUNTSMAN MITIGATION SITE

Wilkes County, NC
Yadkin River Basin
HUC 03040102

DMS Project No. 100123
DMS Contract No. 7891
DMS RFP No. 16-007728; Date of Issue: Nov. 13, 2018
USACE Action ID No. SAW-2019-00836
DWR Project No. 20190866
Data Collection Dates: April - May 2022

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
MARC RECKTENWALD
Director

NORTH CAROLINA
Environmental Quality

July 18, 2022

Ms. Kristi Suggs
Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

Subject: Huntsman Draft MY0 Report Review
Yadkin River Basin – CU# 03040102
Wilkes County
DMS Project ID No. 100123
Contract # 7891

Dear Ms. Suggs,

The Division of Mitigation Services (DMS) received the Draft Mitigation Plan for Huntsman from Wildlands Engineering, Inc on July 6, 2022. The Project is expected to provide 5,816.952 SMUs. The following are the DMS review team's comments on the draft report.

- Recommend shortening November to Nov. on Title Page when listing 'Date of Issue' so the entire date will fit on one line.
- Table 1: There is a discrepancy of .001 credits in the credit total shown on Table 1. The total credits for the site should be 5,816.952. This is the official amount used on the projects debit ledger. This error appears to occur when the Restoration credits are summed and/or how Excel rounds. The lower table shows Restoration credits as 5,397.863 but the upper table sums to 5,397.862. Please revise.
- Table 1: The credit summation for the upper section of the table following the stream reaches includes the additional credit from the buffer, but the 181.720 additional buffer credits are not shown as a segment. Please correct to either show 5,635.232 OR add a line for the wider buffer credits in this section and include in summation.
- Appendix D was not included in the draft hard copy. Please verify all sections are included with final submittal.
- 2.1.15 Vegetation Monitoring Plots: Mobile Plot 2 and Permanent Plot 6 locations were switched. As a result, there is not a permanent plot in the old pond bottom on UT1. DMS recommends including a mobile plot in the pond bottom during MY1 to monitor vegetation survival in the area.
- 3.4 Stream Areas of Concern: Thank you for providing photos of the Stream Areas of Concern in Appendix A. Please add these locations to the CCPV. Are there any maintenance activities planned to correct these issues at this time?
- CCPV: The Fence Line appears to be within the conservation easement in many areas on the CCPV. The asbuilt survey shows fence locations outside or on the conservation

easement line. Please verify the fence was not installed inside the conservation easement and ensure correct line work is shown on CCPV.

- CCPV: Recommend changing the color/line type of the conservation easement so it is easily discernable from other line work.
- Photo Points for Trapper Trib and Rifle Trib do not seem to indicate a defined channel with bed and bank. These credits are potentially at risk if these tribs are unable to maintain stream features and become wetlands. Please provide an update in MY1 regarding the condition of these two tribs.

Digital Deliverable Review:

- Please review the digital data submission 'Surveyed AB Steam Alignment'. The data submitted is missing two credited reaches from the attribute table and the reported lengths do not equal the lengths reported in the in the Quantities and Credits Table. The internal crossing lengths appear to be incomplete and do not equal the platted crossing spatial extents. The linear feet reported extends outside of the easement boundary on at least one reach.
- The recorded plat for this project indicates a utility ROW 50 feet in width on UT 1 Reach 1, and a 30' Utility ROW on North Little Hunting Creek reach 2; the ROW on UT 1 reach 1 has been attributed as an internal crossing, please verify this is accurate
- The Conservation Easement Boundary submitted differs from the DMS Conservation Easement Boundary, the restricted convenance area is indicted in note 11 on the recorded plat as not being included in the conservation easement boundary; please remove this area from the digital CE submitted.
- There is conflicting language in Tables 2 and 3 as submitted in the report and the digital table submitted; the performance standards are different for at least one metric and the project and drainage areas differ. These table must be duplicates with no deviations between report and digital submission. Please use consistent language in the report and digital data submission; a crest gauge and a constant stage recorder may measure data differently and meet differing performance standards.
- The CCPV should include clear Conservation Easement boundary lines; these are obscured by the parcel lines in a few locations in the report.

At your earliest convenience, please provide a written response letter addressing the DMS comments provided and one final hard copy of the revised/updated Baseline Monitoring Document and Record Drawings. The comment response letter should be included in the revised report after the report cover page. Please include a full final electronic copy with electronic support files on a CD or USB drive.

Sincerely,

Matthew Reid

Matthew Reid
Western Project Manager
NCDENR – Division of Mitigation Services
5 Ravenscroft Dr., Suite 102
Asheville, NC 28801
828-231-7912

August 2, 2022

ATTN: Matthew Reid
Western Project Manager
NCDEQ – Division of Mitigation Services
5 Ravenscroft Dr., Suite 102
Asheville, NC 28801

RE: Huntsman Draft MY0 Report Review
Yadkin River Basin – CU# 03040102
Wilkes County
DMS Project ID No. 100123
Contract # 7891

Dear Mr. Matthew Reid:

Wildlands Engineering, Inc. (Wildlands) has reviewed Division of Mitigation Services' (DMS) comments from the Draft Monitoring Year 0 (MY0) Report for the Huntsman Mitigation Site. The report has been updated to reflect those comments. The following Wildlands responses to DMS's comments are noted below.

DMS Comments, Matthew Reid:

1. *Recommend shortening November to Nov. on Title Page when listing 'Date of Issue' so the entire date will fit on one line.*

   Wildlands Response: Title page has been updated as recommended.

2. *Table 1: There is a discrepancy of .001 credits in the credit total shown on Table 1. The total credits for the site should be 5,816.952. This is the official amount used on the projects debit ledger. This error appears to occur when the Restoration credits are summed and/or how Excel rounds. The lower table shows Restoration credits as 5,397.863 but the upper table sums to 5,397.862. Please revise.*

   Wildlands Response: The credit totals have been revised.

3. *Table 1: The credit summation for the upper section of the table following the stream reaches includes the additional credit from the buffer, but the 181.720 additional buffer credits are not shown as a segment. Please correct to either show 5,635.232 OR add a line for the wider buffer credits in this section and include in summation.*

   Wildlands Response: A row has been added to Table 1 for the wider buffer credits.

4. *Appendix D was not included in the draft hard copy. Please verify all sections are included with final submittal.*

Wildlands Response: The exclusion of Appendix D from the draft hard copy was an oversight. Appendix D has been added to the final submittal.

5. *2.1.15 Vegetation Monitoring Plots: Mobile Plot 2 and Permanent Plot 6 locations were switched. As a result, there is not a permanent plot in the old pond bottom on UT1. DMS recommends including a mobile plot in the pond bottom during MY1 to monitor vegetation survival in the area.*

   Wildlands Response: Since all mobile plots established in MY0 will remain in the same location for assessment in MY1, mobile plot 2 will be monitored in its current location, the pond bottom, in MY1.

6. *3.4 Stream Areas of Concern: Thank you for providing photos of the Stream Areas of Concern in Appendix A. Please add these locations to the CCPV. Are there any maintenance activities planned to correct these issues at this time?*

   Wildlands Response: Stream areas of concern have been added to the CCPV maps for the final submittal. Depending on contractor availability, maintenance activities for areas of concern will be conducted in either late MY1 or early MY2. Wildlands will provide a status update in the MY1 report.

7. *CCPV: The Fence Line appears to be within the conservation easement in many areas on the CCPV. The asbuilt survey shows fence locations outside or on the conservation easement line. Please verify the fence was not installed inside the conservation easement and ensure correct line work is shown on CCPV.*

   Wildlands Response: Wildlands verified that the fence line polygon was obtained from the as-built survey file. The issue was with symbol that was used to reflect the placement of the fence. The symbol has been corrected and updated, and it now correctly reflects the alignment of the fence.

8. *Recommend changing the color/line type of the conservation easement so it is easily discernable from other line work.*

   Wildlands Response: The conservation easement color was changed to red so that it is easier to see in the CCPV figures.

Digital Deliverable Review:

9. *Please review the digital data submission 'Surveyed AB Stream Alignment'. The data submitted is missing two credited reaches from the attribute table and the reported lengths do not equal the lengths reported in the in the Quantities and Credits Table. The internal crossing lengths appear to be incomplete and do not equal the platted crossing spatial extents. The linear feet reported extends outside of the easement boundary on at least one reach.*

   Wildlands Response: The layer submitted was included in error. It was not the correct finalized layer. The correct finalized layer is now included in the digital submittal.

10. *The recorded plat for this project indicates a utility ROW 50 feet in width on UT 1 Reach 1, and a 30' Utility ROW on North Little Hunting Creek reach 2; the ROW on UT 1 reach 1 has been attributed as an internal crossing, please verify this is accurate.*

Wildlands Response: UT1 Reach 1 has been updated to reflect that it is a ROW.

11. *The Conservation Easement Boundary submitted differs from the DMS Conservation Easement Boundary, the restricted convenance area is indicted in note 11 on the recorded plat as not being included in the conservation easement boundary; please remove this area from the digital CE submitted.*

    Wildlands Response: The restricted covenant area was incorrectly labeled as the conservation easement. As requested, Wildlands separated the two areas into two separate layer files in the digital submittal.

12. *There is conflicting language in Tables 2 and 3 as submitted in the report and the digital table submitted; the performance standards are different for at least one metric and the project and drainage areas differ. These table must be duplicates with no deviations between report and digital submission. Please use consistent language in the report and digital data submission; a crest gauge and a constant stage recorder may measure data differently and meet differing performance standards.*

    Wildlands Response: Tables 2 and 3 of the digital submittal have been updated to match Tables 2 and 3 of the report.

13. The CCPV should include clear Conservation Easement boundary lines; these are obscured by the parcel lines in a few locations in the report.

    Wildlands Response: The symbol for the parcel boundary line has been changed and should no longer obscure the Conservation Easement boundary.

As requested, Wildlands has included one hard copy of the revised/updated Baseline Monitoring Document and Record Drawings. A copy of the DMS comment letter and our response letter are also included in the report after the cover page. A full final electronic copy of the report and support files are included as well. Please let me know if you have any questions.

Sincerely,

Kristi Suggs

Senior Environmental Scientist
ksuggs@wildlandseng.com

PREPARED BY:

Wildlands Engineering, Inc.
1430 South Mint St, Suite 104
Charlotte, NC 28203

Phone: 704.332.7754
Fax: 704.332.3306

HUNTSMAN MITIGATION SITE

Monitoring Year 0 Annual Report

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Section 1: Section 1: Project Overview

The Huntsman Mitigation Site (Site) is located in Wilkes County approximately 5 miles south of Ronda and 8 miles southwest of Jonesville, North Carolina. The Site is located within the North Little Hunting Creek targeted local watershed (TLW) Hydrologic Unit Code (HUC) 03040102020030 and will provide warm stream credits in the South Yadkin 03040102 (Yadkin 02) Cataloging Unit (CU). North Little Hunting Creek and its tributaries are classified as Water Supply III (WS-III) with additional protections for Class C uses. Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

Mitigation work within the Site included restoration and enhancement II of perennial stream channels. Table 1 below shows stream credits by reach and the total amount of stream credits expected at closeout.

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	**Mitigation Plan Footage**	**As-Built Footage**	**Mitigation Category**	**Restoration Level**	**Mitigation Ratio (X:1)**	**Credits**	**Comments**
Stream							
North Little Hunting Creek Reach 1	722.905	717.000	Warm	R	1.0	722.905	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, invasive species treatment, and protecting with conservation easement
North Little Hunting Creek Reach 2	1,027.718	1,033.000	Warm	R	1.0	1,027.718	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, invasive species treatment, protecting with conservation easement, and bridge crossing
UT1 Reach 1	1,432.561	1,433.000	Warm	R	1.0	1,432.561	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, invasive species treatment, protecting with conservation easement, and bridge crossing

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	**Mitigation Plan Footage**	**As-Built Footage**	**Mitigation Category**	**Restoration Level**	**Mitigation Ratio (X:1)**	**Credits**	**Comments**
UT1 Reach 2	244.166	244.000	Warm	R	1.0	244.166	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, invasive species treatment, protecting with conservation easement, and road crossing
UT1 Reach 3	217.715	217.000	Warm	R	1.0	217.715	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, invasive species treatment, and protecting with conservation easement
UT2 Reach 1	299.853	300.000	Warm	EII	2.5	119.941	Partial channel restoration, riparian planting, fencing out livestock, protecting with a conservation easement, and bridge crossing
UT2 Reach 2	286.763	287.000	Warm	R	1.0	286.763	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, riparian planting, invasive species treatment, fencing out livestock, and protecting with conservation easement
UT2 Reach 3	568.949	569.000	Warm	R	1.0	568.949	
UT2 Reach 4	522.002	522.000	Warm	R	1.0	522.002	
Barn Branch	287.612	289.000	Warm	R	1.0	287.612	
Old Bus Branch	87.471	88.000	Warm	R	1.0	87.471	Restoring dimension, pattern, and profile, stormwater BMP implementation, reconnecting channels with floodplains and wetlands, riparian planting, fencing out livestock, protecting with conservation easement
Rifle Tributary	252.855	245.000	Warm	EII	2.5	101.142	Stormwater BMP implementation, partial channel restoration, riparian planting, fencing out livestock, and protecting with conservation easement

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	**Mitigation Plan Footage**	**As-Built Footage**	**Mitigation Category**	**Restoration Level**	**Mitigation Ratio (X:1)**	**Credits**	**Comments**
Trapper Tributary	40.718	41.000	Warm	EII	2.5	16.287	Partial channel restoration, riparian planting, fencing out livestock, and protecting with conservation easement
Net Credit Gain for buffers wider than 30-ft.						181.720	
Total:						**5,816.952**	

Restoration Level	**Stream**		
	Warm	**Cool**	**Cold**
Restoration	5,397.862		
Enhancement I	--		
Enhancement II	237.370		
Preservation	--		
Credit Gain: Buffers > 30-feet[3]	181.720		
Totals	**5,816.952**		
Total Stream Credit	**5,816.952**		

1. Crossing lengths have been removed from restoration footage
2. No direct credit for BMPs.
3. Detailed calculations to determine the net credit gain for buffers wider than 30-ft. are in Appendix 11 of the Mitigation Plan.

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits. Table 2 below describes expected outcomes to water quality and ecological processes and provides project goals and objectives.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	**Objective/ Treatment**	**Likely Functional Uplift**	**Performance Criteria**	**Measurement**	**Cumulative Monitoring Results**
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time.	Reduce sediment inputs from bank erosion. Reduce shear stress on channel boundary.	ER over 1.4 for B-type and 2.2 for C-type channels and BHR below 1.2 with visual assessments showing progression towards stability.	16 Cross-sections will be assessed during MY1, MY2, MY3, MY5, and MY7 and visual inspections will be assessed annually.	No deviations from design.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Reconnect channels with floodplains to allow a natural flooding regime.	Reconstruct stream channels with designed bankfull dimensions and depth based on reference reach data. Remove pond above T2.	Allow more frequent flood flows to disperse on the floodplain.	Four bankfull events in separate years within the 7-year monitoring period.	Three automated crest gages were installed on restoration reaches and will record flow elevations and durations.	Reported in MY1.
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks.	Reduce sediment inputs from bank erosion and runoff. Increase nutrient cycling and storage in floodplain. Provide riparian habitat. Add a source of LWD and organic material to stream.	Survival rate of 320 stems per acre at MY3, 260 planted stems per acre at MY5, and 210 stems per acre at MY7.	Twelve (12) permanent and 4 mobile one hundred square meter vegetation plots are placed on 2% of the planted area of the Site and monitored during MY1, MY2, MY3, MY5, and MY7.	All 16 vegetation plots have a planted stem density greater than 320 stems per acre.
Improve instream habitat.	Install habitat features such as constructed riffles, lunker logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians leading to colonization and increase in biodiversity over time.	There is no required performance standard for this metric.	Visual assessment.	N/A
Diffuse concentrated agricultural runoff.	Install stormwater BMPs in areas of concentrated agricultural runoff to diffuse and provide vegetated infiltration for runoff before it enters the stream channel.	Reduce agricultural and sediment inputs to the project, which will reduce likelihood of accumulated fines and excessive algal blooms from nutrients.	There is no required performance standard for this metric.	N/A	N/A
Permanently protect the project Site from harmful uses.	Establish conservation easements on the Site.	Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No easement encroachments.

1.3 Project Attributes

North Little Hunting Creek originates offsite to the west in the steep, forested Brushy Mountains. The stream gradually widens and flattens in slope as it travels downstream out of the mountains and flows through several agricultural parcels before it enters the Site. UT1 originates within the Site limits, north of Ingle Hollow Road, and flows under Ingle Hollow Road to join North Little Hunting Creek. Land use in the drainage area of UT1 includes agricultural fields and chicken houses. UT2 begins in steep woods offsite, enters the Site from the south, and joins North Little Hunting Creek within the project area. Old Bus Branch, Rifle Tributary, Trapper Tributary, and Barn Branch all originate within Site limits and are tributaries to UT2. Within Site limits, North Little Hunting Creek, UT2, and the UT2 tributaries all flow through actively grazed pastures.

Table 3: Project Attributes

PROJECT INFORMATION					
Project Name	Huntsman Mitigation Site	County			Wilkes County
Project Area (acres)	17.7	Project Coordinates			36.140689, - 80.932189
PROJECT WATERSHED SUMMARY INFORMATION					
Physiographic Province	Piedmont	River Basin			Yadkin River
USGS HUC 8-digit	03040102	USGS HUC 14-digit			03040102020030
DWR Sub-basin	03-07-06	Land Use Classification			74% forested, 22% agriculture, 2% shrubland, 1% developed, 1% open water
Project Drainage Area (acres)	1,274	Percentage of Impervious Area			0.23%
RESTORATION TRIBUTARY SUMMARY INFORMATION					
Parameters	**North Little Hunting Creek**	**UT1**	**UT2**	**Barn Branch**	**Old Bus Branch**
Pre-project length (feet)	1,646	996	1,707	247	90
Post-project (feet)	1,750	1,894	1,678	289	88
Valley confinement (Confined, moderately confined, unconfined)	Unconfined	Moderately Confined	Confined to Unconfined	Moderately Confined	Confined
Drainage area (acres)	1,274	70	43	10	5.2
Perennial, Intermittent, Ephemeral	Perennial				
DWR Water Quality Classification	WS-III				
Dominant Stream Classification (existing)	G4	C4/B4	A6, E5b	B5a	G5

Table 3: Project Attributes

RESTORATION TRIBUTARY SUMMARY INFORMATION					
Parameters	**North Little Hunting Creek**	**UT1**	**UT2**	**Barn Branch**	**Old Bus Branch**
Dominant Stream Classification (proposed)	C4	B4a/C4b/C4	B5a, B5, C5	B5a	A5
Dominant Evolutionary class (Simon) if applicable	Stage IV-V	Stage II-III	Stage III	Stage IV	Stage III-IV
REGULATORY CONSIDERATIONS					
Parameters	**Applicable?**		**Resolved?**	**Supporting Documentation**	
Water of the United States - Section 404	Yes		Yes	USACE Action ID No. SAW-2019-00836	
Water of the United States - Section 401	Yes		Yes	DWR # 2019-0866	
Endangered Species Act	Yes		Yes	Categorical Exclusion in Mitigation Plan (Wildlands, 2021)	
Historic Preservation Act	Yes		Yes		
Coastal Zone Management Act (CZMA or CAMA)	N/A		N/A	N/A	
FEMA Floodplain Compliance	Yes		Yes	Wilkes County – No Rise Certification	
Essential Fisheries Habitat	N/A		N/A	N/A	

Section 2: Section 2: As-Built Condition (Baseline)

The Site construction was completed in April 2022. The as-built survey, which included developing an as-built topographic surface; as well as, surveying the as-built channel centerlines, top of banks, structures, and cross-sections, was completed in May 2022. The Site's construction planting was completed on 04/05/22. Monitoring device installation and vegetative and substrate data collection were completed by 04/12/2022.

2.1 As-Built/Record Drawings

A sealed half-size set of the as-built survey and record drawing which includes the post-construction survey, alignments, structures, and monitoring features are in Appendix E. Field adjustments made during construction that differ from the design plans are shown as red lines on the record drawing. These adjustments were made during construction, where needed, based on field evaluations, and are listed below.

2.1.1 North Little Hunting Creek Reach 1

- STA: 100+19 – Riffle material added for stream stability.
- STA: 100+45 – Rock added to stabilize ditch.
- STA: 103+51 – Boulder toe added for bank stability.

2.1.2 North Little Hunting Creek Reach 2

- STA: 118+07 – Stone added to stabilize channel.
- STA: 118+20 – Log J-hook, boulder toe, and geolift replaced rock J-hook for added stability.
- STA: 118+68 – Riffle added for stream stability.

2.1.3 UT1 Reach 1

- STA: 200+12 – Riffle added for stream stability.
- STA: 200+66 – Log sill moved upstream for additional grade stability and changed to rock sill for habitat diversity.
- STA: 201+54, 201+69, 201+85, 202+00, and 202+15 – Surveyed sills are part of the originally designed rock cascade with pools.
- STA: 202+44 – Log sill added for stream stability.
- STA: 207+30 – Rock added to stabilize ditch.
- Rock added to stabilize ditch outfalls in left floodplain
- STA: 210+94, 211+11, 211+30, 211+47, 211+65, 211+82, and 212+00 – Surveyed sills are part of the originally designed rock cascade with pools.
- Grass swale installed to stabilize ditch in right floodplain.
- STA: 212+12 – Log sill added for stream stability.
- STA: 214+16 – Brush toe replaced geolift due to extra available material.
- Farm crossing with 85" x 44" envirospan bottomless culvert installed instead of CMP culvert.
- STA: 214+38 – Riffle materials added for stream stability.
- STA: 214+78 – Riffle material added for stream stability.

2.1.4 UT1 Reach 2

- STA: 214+94 – Brush toe and log sill replaced rock toe and rock sill due to extra available material.

- STA: 216+33 – Log sill replaced rock sill for habitat diversity.
- STA: 216+72 – Log sill replaced rock sill for habitat diversity.
- STA: 217+16 – Riffle material added for stream stability.

2.1.5 UT1 Reach 3

- STA: 219+27 – Log J-hook replaced log vane for additional grade control.
- STA: 219+81 – Rock sill replaced log sill for habitat diversity.
- STA: 219+94 – STA: 220+26 – Profile adjusted to meet the tie-in elevation of North Little Hunting Creek.

2.1.6 UT2 Reach 1

- STA: 301+64, 301+83, 301+99, 302+11, 302+27, 302+42, 302+59, 302+73, and 303+05 – Surveyed sills are part of the originally designed rock cascade with pools.
- Farm crossing with 85" x 44" envirospan bottomless culvert installed instead of CMP culvert.
- STA: 303+33 – Rock sill installed for stream stability.
- STA: 303+47 – Rock sill installed for stream stability.

2.1.7 UT2 Reach 2

- STA: 303+63, 303+79, 303+94, and 304+20 – Surveyed sills are part of the originally designed rock cascade with pools.
- STA: 304+41, 304+59, 304+79, 305+00, 305+26, 305+49, 305+65, 305+81, 305+95, and 306+18 – Surveyed sills are part of the originally designed rock cascade with pools.

2.1.8 UT2 Reach 3

- STA: 307+50 – Riffle was added for stream stability
- STA: 308+45 – Rock sill moved upstream in place of log sill for stability.
- STA: 310+71 – Log J-hook installed instead of log vane for additional grade control.

2.1.9 UT2 Reach 4

- No deviations from design.

2.1.10 Rifle Tributary

- BMP redesigned as a step pool stormwater conveyance prior to construction.
- STA: 251+47 – STA: 252+47 – Profile adjustment due to change in topography from the existing conditions survey.

2.1.11 Trapper Tributary

- No deviations from design.

2.1.12 Old Bus Branch

- STA: 260+09 – Rock sill added to BMP for additional grade control
- STA: 260+36, 260+47, 260+55, 260+69, 260+81, 260+93, 261+04, 261+17, 261+28, 261+41, and 261+54 – Surveyed sills are part of the originally designed rock cascade with pools.

2.1.13 Barn Branch

- No deviations from design.

2.1.14 Vegetation Planting List & Plan

Changes within the planted riparian buffer were minimal and consisted of one species change within the Streambank Planting Zone. Species replacements were made due to availability of the species at the time of planting. All species replacements were approved species or alternate species within the Final Mitigation Plan's planting list (Wildlands, 2021), so no approval for the inclusion of the species is needed.

Streambank Planting Zone

- Tag alder (*Alnus serrulatta*) was excluded from the streambank planting list and replaced with black willow (*Salix nigra*).

2.1.15 Fencing Overview

- No deviations from design.

2.1.16 Monitoring Components

Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Minor deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.

Vegetation Monitoring Plots

- North Little Hunting Creek Reach 1
    - Permanent vegetation plot 8 (VP8) was moved further into the left floodplain to better assess this area of the reach.
- North Little Hunting Creek Reach 2
    - VP4 was moved from the left floodplain to the right floodplain.
- UT1 Reach 1
    - UT1 was constructed in a confined valley, resulting in a narrow floodplain. Hence, several permanent and mobile vegetation plot locations had to be adjusted to fit in the narrow floodplain; however, the same number of permanent and mobile plots were used along this tributary.
        - VP5 was moved from the left floodplain to the right floodplain.
        - Mobile vegetation plot 2 (MVP2) and VP6 locations were switched along the reach and from one floodplain to the other.
        - VP7 was moved from the left floodplain to the right floodplain.
- UT2 Reach 4
    - VP12 was moved from the right floodplain to the left floodplain to capture more of the existing wetland.

Cross-sections

- Cross-sections 1 and 2 on North Little Hunting Creek Reach 1 were moved two meanders upstream due to a nesting killdeer in the floodplain.

Section 3: Monitoring Year 0 Data Assessment

The as-built and MY0 data collection was conducted between April and May 2022 to assess the baseline condition of the project. The vegetation, stream, and wetland success criteria for the Site follow the approved Mitigation Plan (Wildlands, 2021).

Performance criteria for vegetation, stream, and hydrologic assessments are located in Section 1.2 Table 3: Goals, Performance Criteria, and Functional Improvements. The first annual monitoring assessment (MY1) will be completed in the fall of 2022, at least 6 months after the MY0 assessment. The Site will be monitored for a total of seven years, with the final monitoring activities scheduled for 2028.

3.1 Vegetative Assessment

A total of 16 vegetation plots, 12 permanent and 4 mobile, were established throughout the project area. Mobile plots established in MY0 will be used for vegetative assessment in MY1. Baseline vegetation monitoring resulted in a stem density range of 445 to 648 planted stems per acre which is well above the interim requirement of 320 stems per acre required at MY3. Average stem density was 579 planted stems per acre. All 16 vegetation plots met the interim success criteria and are on track to meet the final success criteria required for MY7, and no species dominance per plot was greater than 50%. Refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix B for Vegetation Plot Data.

3.2 Vegetation Areas of Concern

Vegetation management and herbicide applications were implemented prior and during construction to prevent the spread of invasive species that could compete with planted native vegetation. Chinese privet (*Ligustrum sinense*), tree of heaven (*Ailanthus altissima*), and multiflora rose (*Rosa multiflora*) were treated with herbicidal applications. During construction, any remaining invasive species vegetation, treated, dead, and/or surviving were mechanically removed to prevent post-construction re-establishment within the conservation easement. Invasive species will continue to be monitored, mapped, and controlled as necessary throughout the monitoring period.

3.3 Stream Assessment

Morphological surveys conducted throughout the Site show all streams as stable and functioning as designed. Most reaches on Site were constructed similar design parameters; however, a couple riffle cross-sections are larger than designed. Though the dimensions are larger than designed on couple cross-sections, the parameters for all the cross-sections are within those defined for the channel's stream type, and all cross-sections are stable and functioning as intended. It is anticipated that cross-sections will narrow, and cross-sectional areas may decrease in size due to natural channel adjustments such as the establishment of herbaceous vegetation along the tops of banks and slight bed and or bank deposition. Bank height ratios are less than 1.2, and entrenchment ratios are greater than 1.4 for B-type and 2.2 for C-type channels.

Reachwide and 100-count riffle pebble counts were conducted in April of 2022 to establish stream classification at baseline conditions and characterize pavement at as-built. Riffles along most reaches have a median particle size classification of coarse gravel to small cobble. Based on a DMS Technical Workgroup memo from 10/19/21 and concurrence received on 10/27/2021 from the DMS project manager for the Site, pebble counts will not be conducted during the remaining monitoring years unless requested by the IRT or deemed necessary by best professional judgement. A copy of the DMS Technical Workgroup Memo (2021) and the email confirmation from the DMS project manager (Reid, 2021) are located in Appendix F.

3.4 Stream Areas of Concern

The Site is largely performing as designed; however, several areas of concern were documented during a post-survey Site walk. Wildlands will address these areas of concern in either late MY1 or early MY2 based on contractor availability. Maintenance details will be included in the MY1 report. Wildlands will continue to assess the Site and will report any additional issues as needed.

3.4.1 North Little Hunting Creek Reach 1

- STA 102+60: Localized scour behind top of bank.

3.4.2 UT1 Reach 1

- STA 210+50 - 215+70: Riffle substrate was swept out of multiple riffles in this section from storm events.
- STA 212+75: Riffle material from upstream displacement areas was deposited in the pool.

3.5 Hydrology Assessment

In total, 3 automated crest gages (CG) were installed throughout the Site to monitor bankfull events. One CG was installed on North Little Hunting Creek Reach 2, UT1 Reach 2, and UT2 Reach 4. Hydrologic data will be collected and reported during MY1.

3.6 Adaptive Management Plan

No adaptive management plans are needed at this time.

3.7 Monitoring Year 0 Summary

Overall, the Site looks good, is performing as intended, and is on track to meet success criteria. All vegetation plots are exceeding the MY3 interim requirement of 320 planted stems per acre, and streams within the Site are stable and meeting project goals. Herbaceous vegetation is becoming well established across the Site. Invasive species were treated and/or physically removed across the Site prior to and during construction and will continued to be assessed throughout the monitoring years. Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 4: Methodology

Annual monitoring will consist of collecting morphologic, vegetative, and hydrologic data to assess project success based on the goals outlined in the Site's Mitigation Plan (Wildlands, 2021). Monitoring requirements will follow guidelines outlined in the NC IRT Stream and Wetland Mitigation Guidance Update (2016). Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.

Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was collected by either a professional licensed surveyor or an Arrow 100® Submeter GNSS Receiver and processed using ArcPro. Crest gages, using automated pressure transducers, were installed in riffle cross-sections to monitor stream hydrology throughout the year. Stream hydrology and vegetation monitoring protocols followed the Wilmington District Stream and Wetland Compensatory Mitigation Update (NCIRT, 2016). Vegetation installation data collection follow the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008); however, vegetation data processing follows the NC DMS Vegetation Data Entry Tool and Vegetation Plot Data Table (NCDMS, 2020).

Section 5: REFERENCES

Doll, B.A., Grabow, G.L., Hall, K.A., Halley, J., Harman, W.A., Jennings, G.D., and Wise, D.E. 2003. Stream Restoration A Natural Channel Design Handbook.

Harrelson, C.C., Rawlins, C.L., Potyondy, J.P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

Lee, Michael T., Peet, Robert K., Steven D., Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Retrieved: http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-5.pdf.

North Carolina Division of Mitigation Services (NCDMS). 2009 Upper Yadkin Pee-Dee River Basin Restoration Priorities (RBRP), accessed at: https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Yadkin_River_Basin/2009%20Upper%20Yadkin%20RBRP_Final%20Final%2C%2026feb%2709.pdf

NC DMS. 2020. Vegetation Data Entry Tool and Vegetation Plot Data Table. Raleigh, NC. https://ncdms.shinyapps.io/Veg_Table_Tool/

NC DMS and Interagency Review Team (IRT) Technical Workgroup. 2018. Standard Measurement of the BHR Monitoring Parameter. Raleigh, NC.

NC DMS and IRT Technical Workgroup. 2021. Pebble Count Data Requirements. Raleigh, NC. October 19, 2021.

North Carolina Division of Water Resources (NCDWR) 2008 Yadkin-Pee Dee River Basinwide Water Quality Plan, accessed at: https://files.nc.gov/ncdeq/Water%20Quality/Planning/BPU/BPU/Yadkin/Yadkin%20Plans/2010%20Plan/Yadkin%202008%20Plan%20with%20IR%20and%20Bio%20Appendice.pdf

North Carolina Division of Water Quality (NCDWQ). 2011. Surface Water Classifications. http://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications

North Carolina Geological Survey (NCGS). 2017. NCGS Publications. https://deq.nc.gov/about/divisions/energy-mineral-land-resources/north-carolina-geological-survey/interactive-geologic-maps

NCGS. 1985. Geologic Map of North Carolina: Raleigh, North Carolina Department of Natural Resources and Community Development, Geological Survey Section, scale 1:500,00, in color.

North Carolina Interagency Review Team (NCIRT). 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update. Accessed at: https://saw-reg.usace.army.mil/PN/2016/Wilmington-District-Mitigation-Update.pdf

Reid, M. 2021. Email Correspondence, Pebble Count Data Requirements. October 28, 2021.

Rosgen, D. L. 1994. A classification of natural rivers. Catena 22:169-199.

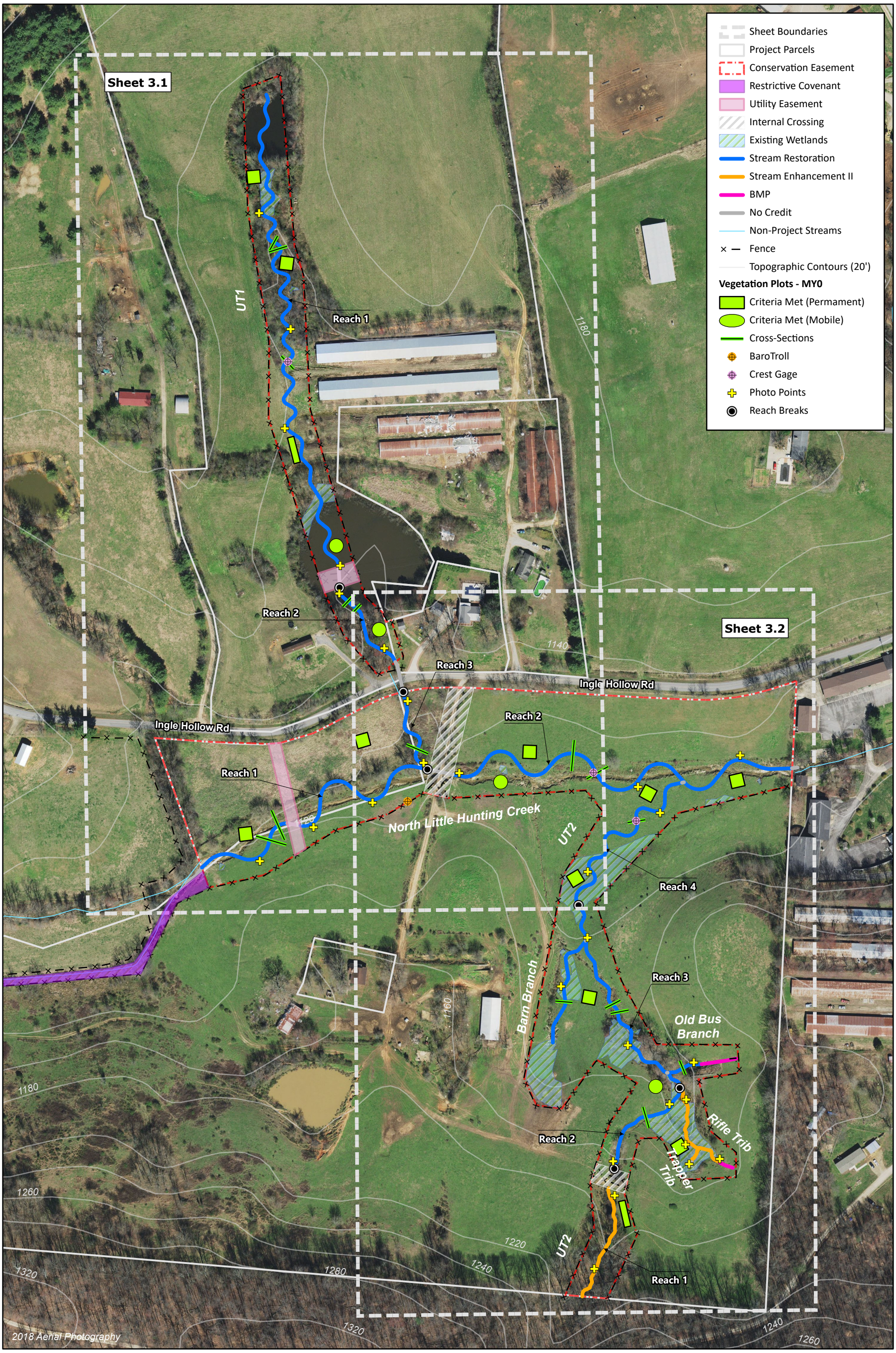
Rosgen, D.L. 1996. Applied River Morphology. Pagosa Springs, CO: Wildland Hydrology Books.

Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Raleigh, North Carolina.

Simon, A. 1989. A model of channel response in disturbed alluvial channels. Earth Surface Processes and Landforms 14(1):11-26.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2019. http://websoilsurvey.sc.egov.usda.gov/. Accessed August 2019.

Wildlands Engineering, Inc. (2021). Huntsman Mitigation Site Final Mitigation Plan. DMS, Raleigh, NC.



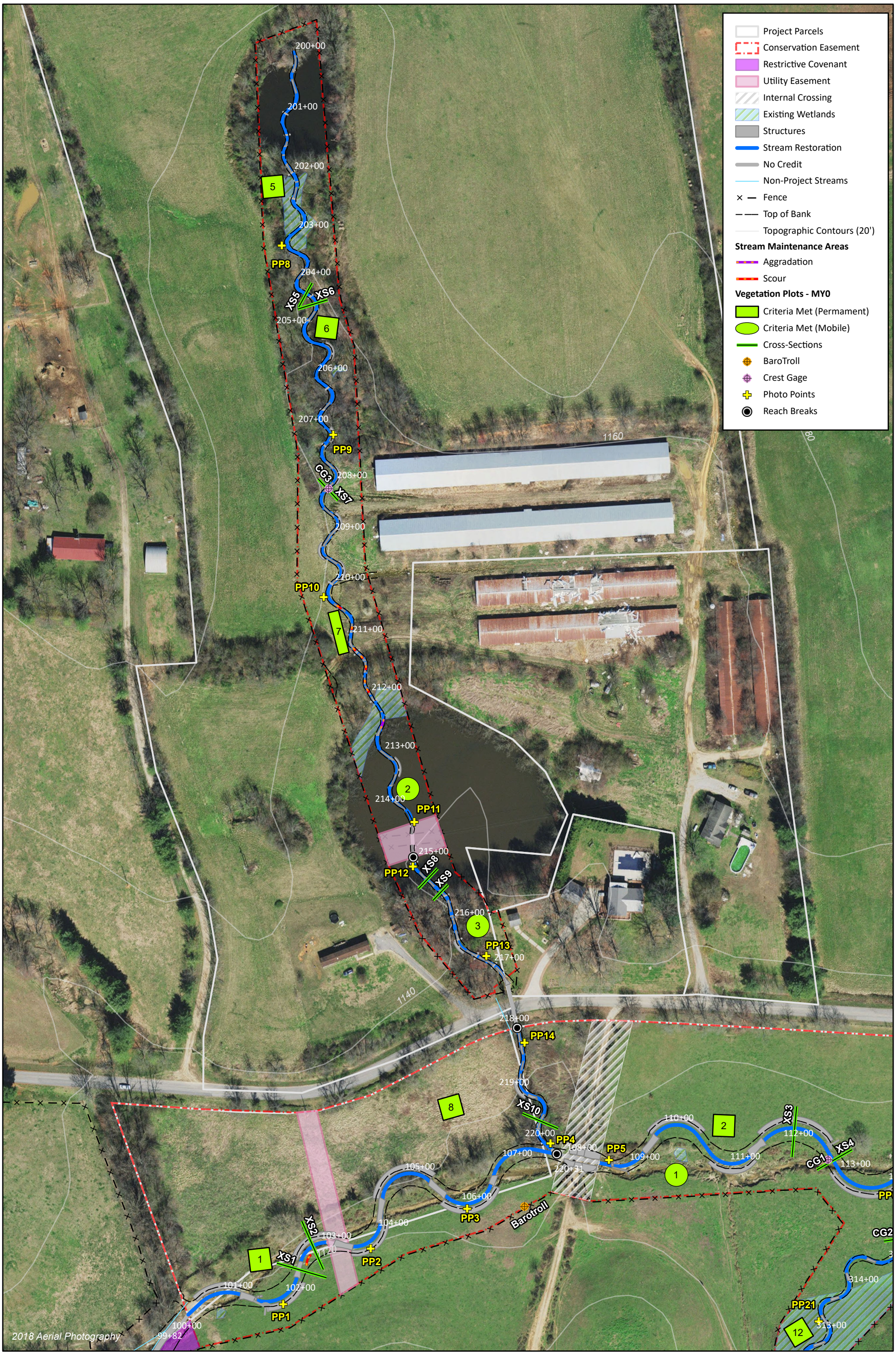
WILDLANDS ENGINEERING

0 110 220 Feet

N

Figure 3.0 (Key) Current Condition Plan View
Huntsman Mitigation Site
Yadkin River Basin (03040102)

Wilkes County, NC

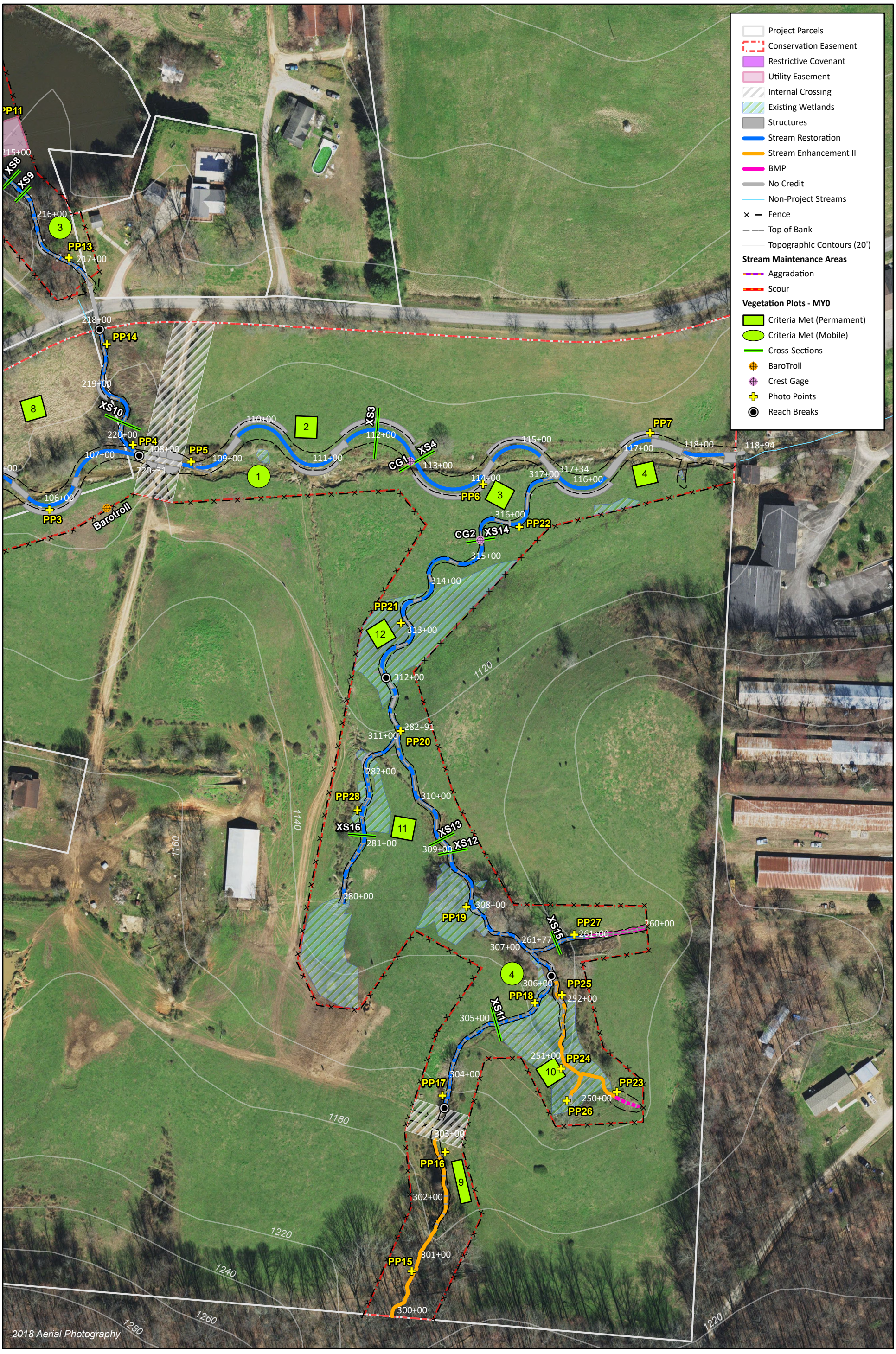


WILDLANDS ENGINEERING

0 100 200 Feet

Figure 3.1 Current Condition Plan View
Huntsman Mitigation Site
Yadkin River Basin (03040102)

Wilkes County, NC



WILDLANDS ENGINEERING

0 100 200 Feet

N

Figure 3.2 Current Condition Plan View
Huntsman Mitigation Site
Yadkin River Basin (03040102)

Wilkes County, NC

APPENDIX A. Visual Assessment Data

Table 4a. Visual Stream Morphology Stability Assessment Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

North Little Hunting Creek Reach Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	717
					Assessed Bank Length	1,434
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			18	99%
	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:	**18**	**99%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	1	1		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	8	8		100%

North Little Hunting Creek Reach Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	1,033
					Assessed Bank Length	2,066
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%.	10	10		100%

Table 4b. Visual Stream Morphology Stability Assessment Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 Reach 1 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	1,433
					Assessed Bank Length	2,866
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.	27	27		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	8	8		100%

UT1 Reach 2 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	244
					Assessed Bank Length	488
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%.	2	2		100%

Table 4c. Visual Stream Morphology Stability Assessment Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 Reach 3 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	217
					Assessed Bank Length	434
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%.	1	1		100%

UT2 Reach 2 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	287
					Assessed Bank Length	573
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.	14	14		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	0	0		100%

Table 4d. Visual Stream Morphology Stability Assessment Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 Reach 3 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	569
					Assessed Bank Length	1,138
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.	12	12		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1		100%

UT2 Reach 4 Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	522
					Assessed Bank Length	1,044
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.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	0	0		100%

Table 4e. Visual Stream Morphology Stability Assessment Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Old Bus Branch Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	88
					Assessed Bank Length	176
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.	13	13		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	0	0		100%

Barn Branch Date Last Assessed: 06/01/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	289
					Assessed Bank Length	578
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.	8	8		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1		100%

Table 5. Vegetation Condition Assessment Table
Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Date Last Assessed: 6/1/2022
Planted Acreage within Easement **16.00**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
		Total	**0**	**0%**
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
		Cumulative Total	**0.0**	**0%**

Easement Acreage **17.66**

Vegetation Category	Definitions	Mapping Threshold (ac)	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. Invasive species included in summation above should be identified in report summary.	0.10	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	0 Encroachments Noted / 0 ac	

Stream Photographs

MY0

Photo Point 1 – NL Hunting R1, view upstream *(4/5/2022)*

Photo Point 1 – NL Hunting R1, view downstream *(4/5/2022)*

Photo Point 2 – NL Hunting R1, view upstream *(4/5/2022))*

Photo Point 2 – NL Hunting R1, view downstream *(4/5/2022)*

Photo Point 3 – NL Hunting R1, view upstream *(4/5/2022)*

Photo Point 3 – NL Hunting R1, view downstream *(4/5/2022)*

Photo Point 4 – NL Hunting R1, view upstream *(4/5/2022)*

Photo Point 4 – NL Hunting R1, view downstream *(4/5/2022)*

Photo Point 4 – UT1 Reach 3 view upstream *(4/5/2022)*

Photo Point 5 – NL Hunting R2, view upstream *(4/5/2022)*

Photo Point 5 – NL Hunting R2, view downstream *(4/5/2022)*

	
Photo Point 6 – NL Hunting R2, view upstream *(4/5/2022)*	**Photo Point 6** – NL Hunting R2, view downstream *(4/5/2022)*
	
Photo Point 7 – NL Hunting R2, view upstream *(4/5/2022)*	**Photo Point 7** – NL Hunting R2, view downstream *(4/5/2022)*
	
Photo Point 8 – UT1 Reach 1, view upstream *(4/5/2022)*	**Photo Point 8** – UT1 Reach 1, view downstream *(4/5/2022)*

	
Photo Point 9 – UT1 Reach 1, view upstream *(4/5/2022)*	**Photo Point 9** – UT1 Reach 1, view downstream *(4/5/2022)*
	
Photo Point 10 – UT1 Reach 1, view upstream *(4/5/2022)*	**Photo Point 10** – UT1 Reach 1, view downstream *(4/5/2022)*
	
Photo Point 11 – UT1 Reach 1, view upstream *(4/5/2022)*	**Photo Point 11** – UT1 Reach 1, view downstream *(4/5/2022)*

Photo Point 12 – UT1 Reach 2, view upstream *(4/5/2022)*

Photo Point 12 – UT1 Reach 2, view downstream *(4/5/2022)*

Photo Point 13 – UT1 Reach 2, view upstream *(4/5/2022)*

Photo Point 13 – UT1 Reach 2, view downstream *(4/5/2022)*

Photo Point 14 – UT1 Reach 3, view upstream *(4/5/2022)*

Photo Point 14 – UT1 Reach 2, view downstream *(4/5/2022)*

Photo Point 15 – UT2 Reach 1, view upstream *(4/5/2022)*

Photo Point 15 – UT2 Reach 1, view downstream *(4/5/2022)*

Photo Point 16 – UT2 Reach 1, view upstream *(4/5/2022)*

Photo Point 16 – UT2 Reach 1, view downstream *(4/5/2022)*

Photo Point 17 – UT2 Reach 2, view upstream *(4/5/2022)*

Photo Point 17 – UT2 Reach 2, view downstream *(4/5/2022)*

Photo Point 18 – UT2 Reach 2, view upstream *(4/5/2022)*

Photo Point 18 – UT2 Reach 2, view downstream *(4/5/2022)*

Photo Point 19 – UT2 Reach 3, view upstream *(4/5/2022)*

Photo Point 19 – UT2 Reach 3, view downstream *(4/5/2022)*

Photo Point 20 – UT2 Reach 3, view upstream *(4/5/2022)*

Photo Point 20 – UT2 Reach 3, view downstream *(4/5/2022)*

	
Photo Point 21 – UT2 Reach 4, view upstream *(4/5/2022)*	**Photo Point 21 –** UT2 Reach 4, view downstream *(4/5/2022)*
	
Photo Point 22 – UT2 Reach 4, view upstream *(4/5/2022)*	**Photo Point 22 –** UT2 Reach 4, view downstream *(4/5/2022)*
	
Photo Point 23 – Rifle Tributary, view upstream *(4/5/2022)*	**Photo Point 23** – Rifle Tributary, view downstream *(4/5/2022)*

Photo Point 24 – Rifle Tributary, view upstream *(4/5/2022)*

Photo Point 24 – Rifle Tributary, view downstream *(4/5/2022)*

Photo Point 25 – Rifle Tributary, view upstream *(4/5/2022)*

Photo Point 25 – Rifle Tributary, view downstream *(4/5/2022)*

Photo Point 26 – Trapper Tributary, view upstream *(4/5/2022)*

Photo Point 26 – Trapper Trib, view downstream *(4/5/2022)*

	
Photo Point 27 – Old Bus Branch, view upstream *(4/5/2022)*	**Photo Point 27 –** Old Bus Branch, view downstream *(4/5/2022)*
	
Photo Point 28 – Barn Branch, view upstream *(4/5/2022)*	**Photo Point 28** – Barn Branch, view downstream *(4/5/2022)*

Vegetation Plot Photographs

PERMANENT VEGETATION PLOT 1 *(04/06/2022)*

PERMANENT VEGETATION PLOT 2 *(04/07/2022)*

PERMANENT VEGETATION PLOT 3 *(04/06/2022)*

PERMANENT VEGETATION PLOT 4 *(04/06/2022)*

PERMANENT VEGETATION PLOT 5 *(04/06/2022)*

PERMANET VEGETATION PLOT 6 *(04/06/2022)*

PERMANENT VEGETATION PLOT 7 *(04/07/2022)*

PERMANENT VEGETATION PLOT 8 *(04/06/2022)*

PERMANENT VEGETATION PLOT 9 *(04/07/2022)*

PERMANENT VEGETATION PLOT 10 *(04/07/2022)*

PERMANENT VEGETATION PLOT 11 *(06/01/2022)*

PERMANENT VEGETATION PLOT 12 *(04/07/2022)*

MOBILE VEGETATION PLOT 1 *(04/07/2022)*

MOBILE VEGETATION PLOT 2 *(04/07/2022)*

MOBILE VEGETATION PLOT 3 *(04/07/2022)*

MOBILE VEGETATION PLOT 4 *(04/07/2022)*

MY1 Maintenance Photographs

Displaced Riffle Material – UT1 Reach 1 STA 210+50 - 212+50 *(06/01/2022)*

Displaced Riffle Material – UT1 Reach 1 STA 211+20 *(06/01/2022)*

Displaced Riffle Material in Pool – UT1 Reach 1 STA 212+75 *(06/01/2022)*

Floodplain Scour behind Top of Bank – NL Hunting Creek R1 **STA 102+60** *(06/01/2022)*

APPENDIX B. Vegetation Plot Data

Table 6a. Vegetation Plot Data

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Planted Acreage	16
Date of Initial Plant	2022-04-07
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-12
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC	2	2	1	1	1	1	3	3	2	2	1	1	2	2
	Asimina triloba	pawpaw	Tree	FAC							1	1					2	2
	Betula nigra	river birch	Tree	FACW	3	3	3	3	2	2	3	3	2	2	3	3		
	Calycanthus floridus	eastern sweetshrub	Shrub	FACU			1	1	1	1	1	1	1	1	1	1	1	1
	Cornus florida	flowering dogwood	Tree	FACU	1	1	1	1	1	1	1	1	1	1	2	2		
	Diospyros virginiana	common persimmon	Tree	FAC	1	1	1	1	3	3			2	2	2	2	1	1
	Fagus grandifolia	American beech	Tree	FACU			1	1	1	1			1	1			1	1
	Lindera benzoin	northern spicebush	Tree	FAC							1	1					1	1
	Nyssa sylvatica	blackgum	Tree	FAC	2	2									2	2		
	Platanus occidentalis	American sycamore	Tree	FACW	3	3	3	3	4	4	3	3	3	3	1	1	2	2
	Quercus alba	white oak	Tree	FACU	1	1	1	1	1	1					1	1	1	1
	Quercus rubra	northern red oak	Tree	FACU	1	1							1	1	1	1		
	Ulmus americana	American elm	Tree	FACW			1	1			1	1	1	1			2	2
	Ulmus rubra	slippery elm	Tree	FAC	1	1	2	2			1	1					2	2
Sum	Performance Standard				15	15	15	15	14	14	15	15	14	14	14	14	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					15		15		14		15		14		14		15
	Stems/Acre					607		607		567		607		567		567		607
	Species Count					9		10		8		9		9		9		10
	Dominant Species Composition (%)					20		20		29		20		21		21		13
	Average Plot Height (ft.)					2		2		2		2		2		2		2
	% Invasives					0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					15		15		14		15		14		14		15
	Stems/Acre					607		607		567		607		567		567		607
	Species Count					9		10		8		9		9		9		10
	Dominant Species Composition (%)					20		20		29		20		21		21		13
	Average Plot Height (ft.)					2		2		2		2		2		2		2
	% Invasives					0		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.

Table 6b. Vegetation Plot Data
Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Planted Acreage	16
Date of Initial Plant	2022-04-07
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-12
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R	Veg Plot 4 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC	1	1	1	1	1	1			1	1		2	3	2
	Asimina triloba	pawpaw	Tree	FAC			2	2			1	1	2	2		1		
	Betula nigra	river birch	Tree	FACW	4	4	2	2	2	2	2	2	1	1	3	1	2	2
	Calycanthus floridus	eastern sweetshrub	Shrub	FACU			1	1	1	1	1	1			1	2		1
	Cornus florida	flowering dogwood	Tree	FACU					1	1	2	2	1	1		1	1	
	Diospyros virginiana	common persimmon	Tree	FAC			2	2	2	2	2	2	2	2	2	1	1	
	Fagus grandifolia	American beech	Tree	FACU	1	1	1	1	1	1					1		1	
	Lindera benzoin	northern spicebush	Tree	FAC	1	1	2	2					2	2	2	1		1
	Nyssa sylvatica	blackgum	Tree	FAC	2	2			2	2	1	1	1	1	2		1	1
	Platanus occidentalis	American sycamore	Tree	FACW	3	3	2	2	2	2	4	4	1	1	1		4	3
	Quercus alba	white oak	Tree	FACU	2	2	1	1							1	1		
	Quercus rubra	northern red oak	Tree	FACU					1	1	2	2	2	2	1	3		1
	Ulmus americana	American elm	Tree	FACW					1	1			1	1		1		1
	Ulmus rubra	slippery elm	Tree	FAC	2	2							1	1		1		1
Sum	Performance Standard				16	16	14	14	14	14	15	15	15	15	14	15	13	13
Mitigation Plan Performance Standard	Current Year Stem Count					16		14		14		15		15	14	15	13	11
	Stems/Acre					648		567		567		607		607	567	607	526	445
	Species Count					8		9		10		8		11	9	11	7	7
	Dominant Species Composition (%)					25		14		14		27		13	21	20	31	27
	Average Plot Height (ft.)					2		2		2		2		2	2	2	2	2
	% Invasives					0		0		0		0		0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					16		14		14		15		15	14	15	13	11
	Stems/Acre					648		567		567		607		607	567	607	526	445
	Species Count					8		9		10		8		11	9	11	7	7
	Dominant Species Composition (%)					25		14		14		27		13	21	20	31	27
	Average Plot Height (ft.)					2		2		2		2		2	2	2	2	2
	% Invasives					0		0		0		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.

Table 7. Vegetation Plot Data
Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

	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	607		9	0	607		10	0	567		8	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 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	607		9	0	567		9	0	567		9	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 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	607		10	0	648		8	0	567		9	0
	Veg Plot 10 F				Veg Plot 11 F				Veg Plot 12 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	567		10	0	607		8	0	607		11	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	567		9	0	607		11	0	526		7	0
	Veg Plot Group 4 R											
	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	445		7	0								

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

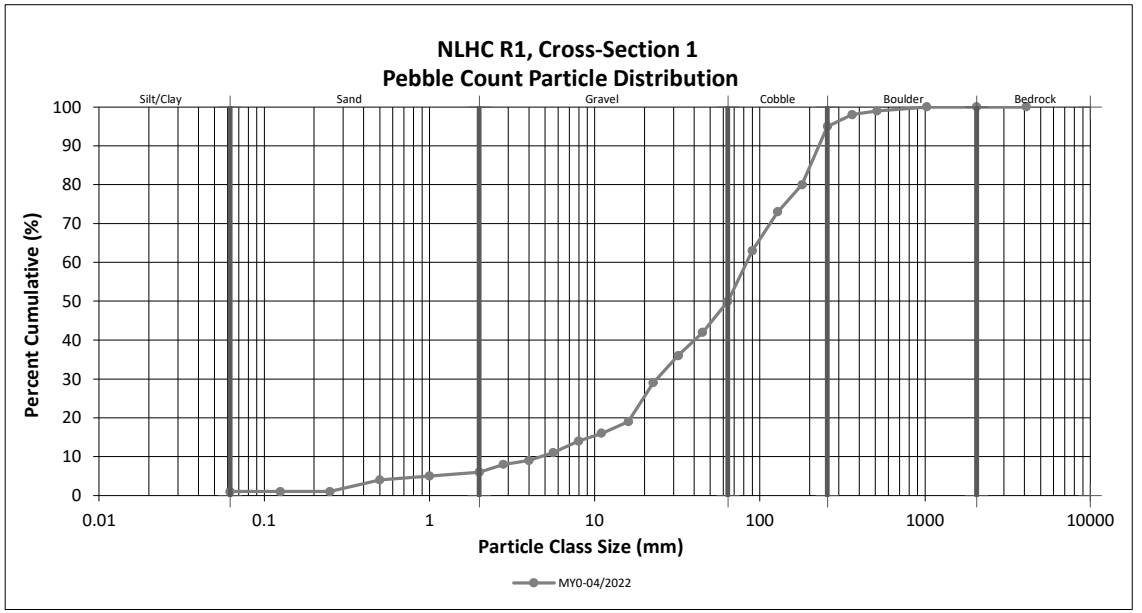
APPENDIX C. Stream Geomorphology Data

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

NLHC R1, Cross-Section 1

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50	3	3	4
	Coarse	0.5	1.0	1	1	5
	Very Coarse	1.0	2.0	1	1	6
GRAVEL	Very Fine	2.0	2.8	2	2	8
	Very Fine	2.8	4.0	1	1	9
	Fine	4.0	5.6	2	2	11
	Fine	5.6	8.0	3	3	14
	Medium	8.0	11.0	2	2	16
	Medium	11.0	16.0	3	3	19
	Coarse	16.0	22.6	10	10	29
	Coarse	22.6	32	7	7	36
	Very Coarse	32	45	6	6	42
	Very Coarse	45	64	8	8	50
COBBLE	Small	64	90	13	13	63
	Small	90	128	10	10	73
	Large	128	180	7	7	80
	Large	180	256	15	15	95
BOULDER	Small	256	362	3	3	98
	Small	362	512	1	1	99
	Medium	512	1024	1	1	100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



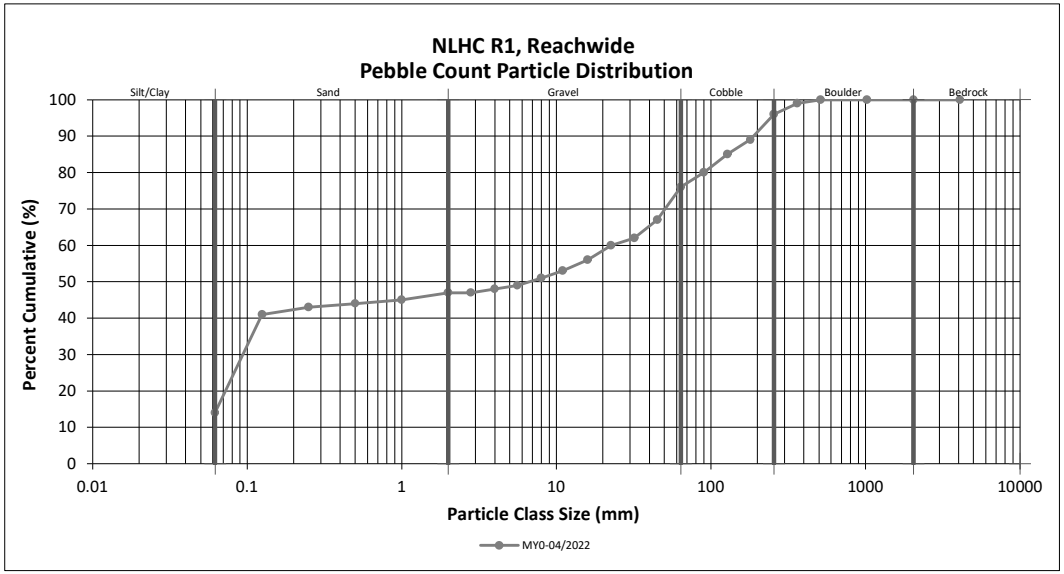
Cross-Section 1	
Channel materials (mm)	
D_{16} =	11.00
D_{35} =	30.45
D_{50} =	64.0
D_{84} =	197.7
D_{95} =	256.0
D_{100} =	1024.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

NLHC R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		14	14	14	14
SAND	Very fine	0.062	0.125		27	27	27	41
	Fine	0.125	0.250		2	2	2	43
	Medium	0.25	0.50		1	1	1	44
	Coarse	0.5	1.0		1	1	1	45
	Very Coarse	1.0	2.0	1	1	2	2	47
GRAVEL	Very Fine	2.0	2.8					47
	Very Fine	2.8	4.0	1		1	1	48
	Fine	4.0	5.6	1		1	1	49
	Fine	5.6	8.0	1	1	2	2	51
	Medium	8.0	11.0	2		2	2	53
	Medium	11.0	16.0	2	1	3	3	56
	Coarse	16.0	22.6	3	1	4	4	60
	Coarse	22.6	32	2		2	2	62
	Very Coarse	32	45	4	1	5	5	67
	Very Coarse	45	64	9		9	9	76
COBBLE	Small	64	90	4		4	4	80
	Small	90	128	5		5	5	85
	Large	128	180	4		4	4	89
	Large	180	256	7		7	7	96
BOULDER	Small	256	362	3		3	3	99
	Small	362	512	1		1	1	100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



Reachwide	
Channel materials (mm)	
D_{16} =	0.07
D_{35} =	0.11
D_{50} =	6.7
D_{84} =	119.3
D_{95} =	243.4
D_{100} =	512.0

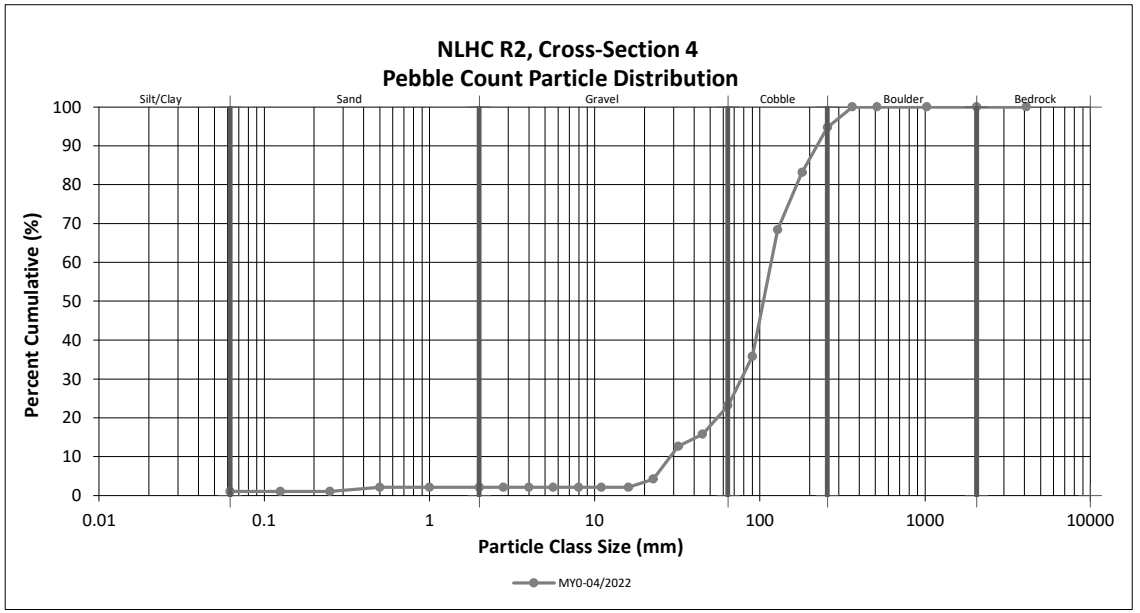
Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

NLHC R2, Cross-Section 4

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50	1	1	2
	Coarse	0.5	1.0			2
	Very Coarse	1.0	2.0			2
GRAVEL	Very Fine	2.0	2.8			2
	Very Fine	2.8	4.0			2
	Fine	4.0	5.6			2
	Fine	5.6	8.0			2
	Medium	8.0	11.0	5		2
	Medium	11.0	16.0			2
	Coarse	16.0	22.6	2	2	4
	Coarse	22.6	32	8	8	13
	Very Coarse	32	45	3	3	16
	Very Coarse	45	64	7	7	23
COBBLE	Small	64	90	12	12	36
	Small	90	128	31	31	68
	Large	128	180	14	14	83
	Large	180	256	11	11	95
BOULDER	Small	256	362	5	5	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**95**	**100**

Cross-Section 4	
Channel materials (mm)	
D_{16} =	45.46
D_{35} =	88.10
D_{50} =	104.9
D_{84} =	184.7
D_{95} =	260.5
D_{100} =	362.0

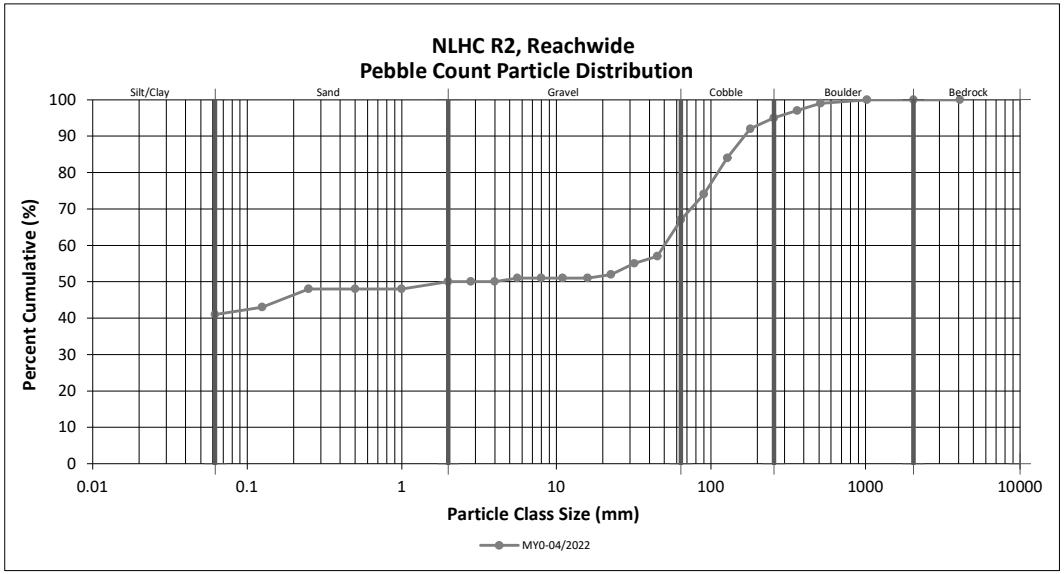


Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

NLHC R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		41	41	41	41
SAND	Very fine	0.062	0.125		2	2	2	43
	Fine	0.125	0.250		5	5	5	48
	Medium	0.25	0.50					48
	Coarse	0.5	1.0					48
	Very Coarse	1.0	2.0		2	2	2	50
GRAVEL	Very Fine	2.0	2.8					50
	Very Fine	2.8	4.0					50
	Fine	4.0	5.6	1		1	1	51
	Fine	5.6	8.0					51
	Medium	8.0	11.0					51
	Medium	11.0	16.0					51
	Coarse	16.0	22.6	1		1	1	52
	Coarse	22.6	32	3		3	3	55
	Very Coarse	32	45	2		2	2	57
	Very Coarse	45	64	10		10	10	67
COBBLE	Small	64	90	7		7	7	74
	Small	90	128	10		10	10	84
	Large	128	180	8		8	8	92
	Large	180	256	3		3	3	95
BOULDER	Small	256	362	2		2	2	97
	Small	362	512	2		2	2	99
	Medium	512	1024	1		1	1	100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



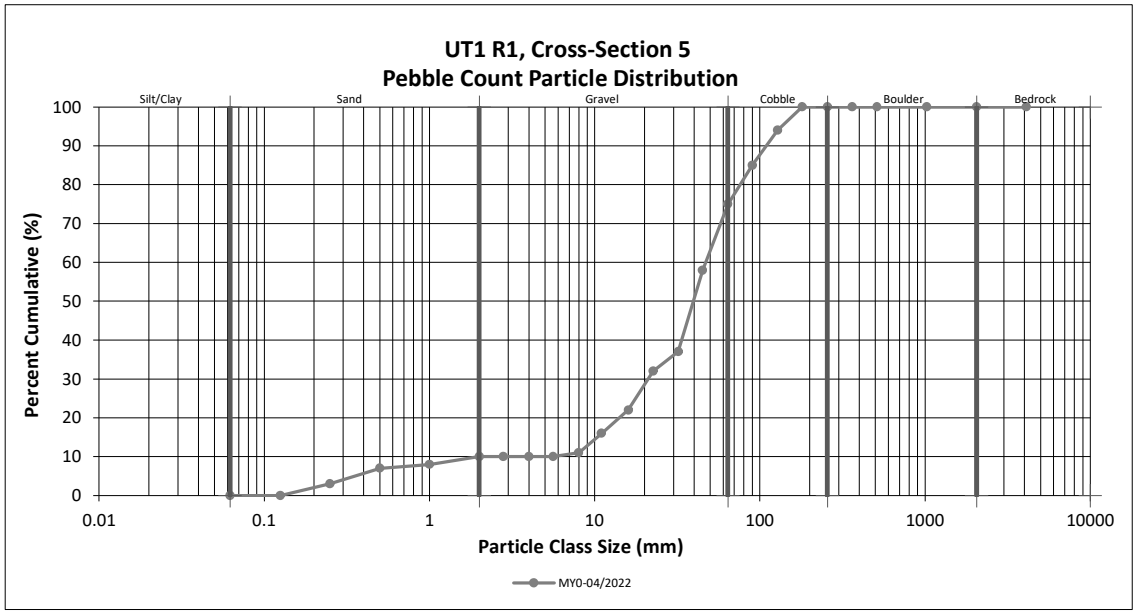
Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	2.0
D_{84} =	128.0
D_{95} =	256.0
D_{100} =	1024.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R1, Cross-Section 5

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250	3	3	3
	Medium	0.25	0.50	4	4	7
	Coarse	0.5	1.0	1	1	8
	Very Coarse	1.0	2.0	2	2	10
GRAVEL	Very Fine	2.0	2.8			10
	Very Fine	2.8	4.0			10
	Fine	4.0	5.6			10
	Fine	5.6	8.0	1	1	11
	Medium	8.0	11.0	5	5	16
	Medium	11.0	16.0	6	6	22
	Coarse	16.0	22.6	10	10	32
	Coarse	22.6	32	5	5	37
	Very Coarse	32	45	21	21	58
	Very Coarse	45	64	17	17	75
COBBLE	Small	64	90	10	10	85
	Small	90	128	9	9	94
	Large	128	180	6	6	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



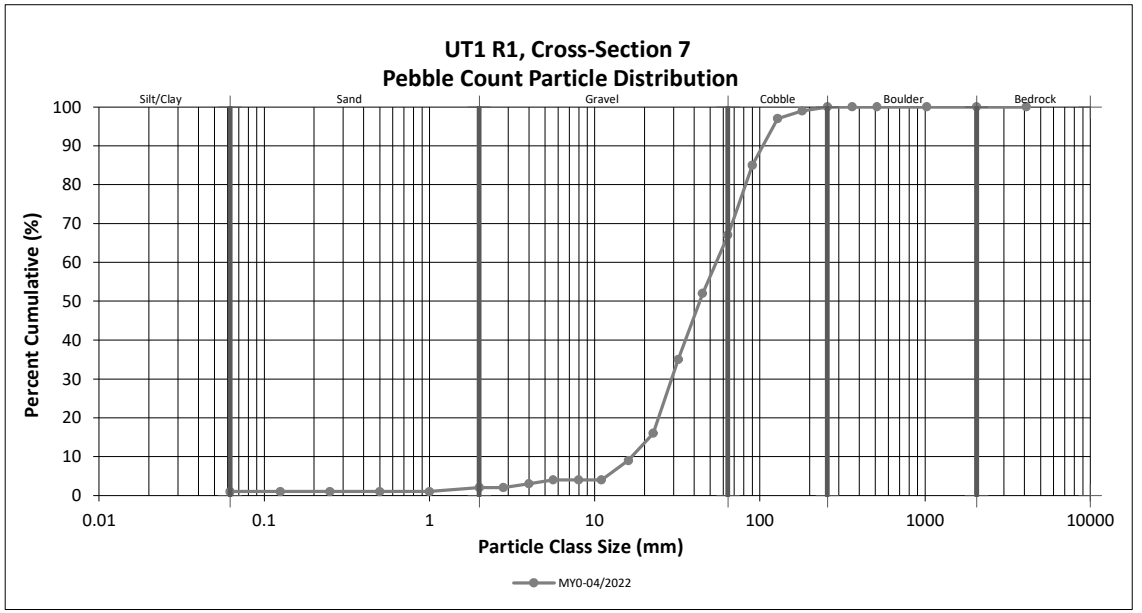
Cross-Section 5	
Channel materials (mm)	
D_{16} =	11.00
D_{35} =	27.84
D_{50} =	39.5
D_{84} =	87.0
D_{95} =	135.5
D_{100} =	180.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R1, Cross-Section 7

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50			1
	Coarse	0.5	1.0			1
	Very Coarse	1.0	2.0	1	1	2
GRAVEL	Very Fine	2.0	2.8			2
	Very Fine	2.8	4.0	1	1	3
	Fine	4.0	5.6	1	1	4
	Fine	5.6	8.0			4
	Medium	8.0	11.0			4
	Medium	11.0	16.0	5	5	9
	Coarse	16.0	22.6	7	7	16
	Coarse	22.6	32	19	19	35
	Very Coarse	32	45	17	17	52
	Very Coarse	45	64	15	15	67
COBBLE	Small	64	90	18	18	85
	Small	90	128	12	12	97
	Large	128	180	2	2	99
	Large	180	256	1	1	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



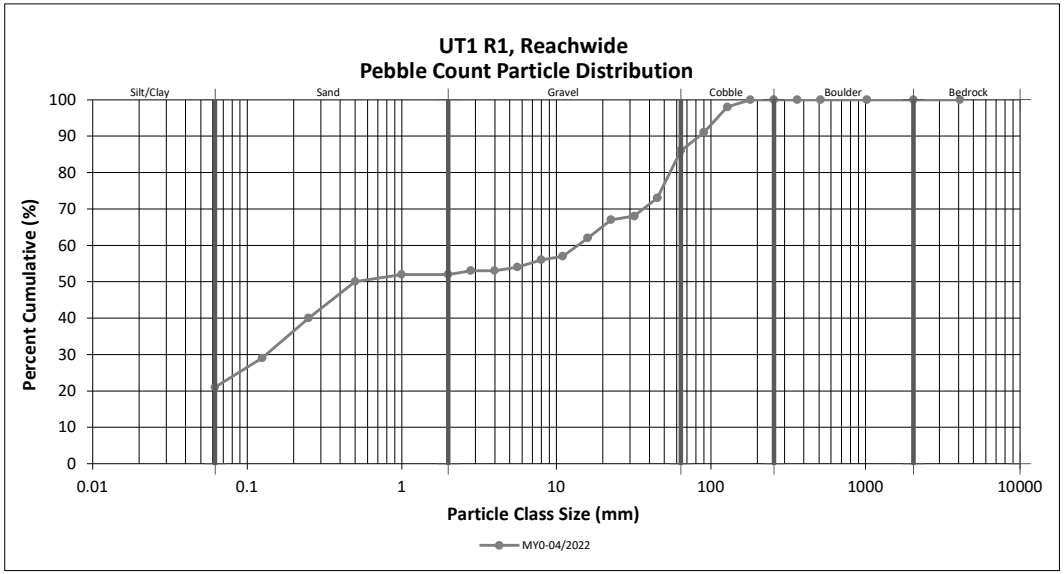
Cross-Section 7	
Channel materials (mm)	
D_{16} =	22.60
D_{35} =	32.00
D_{50} =	43.2
D_{84} =	88.3
D_{95} =	120.7
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	20	21	21	21
SAND	Very fine	0.062	0.125	1	7	8	8	29
	Fine	0.125	0.250	2	9	11	11	40
	Medium	0.25	0.50	4	6	10	10	50
	Coarse	0.5	1.0	1	1	2	2	52
	Very Coarse	1.0	2.0					52
GRAVEL	Very Fine	2.0	2.8		1	1	1	53
	Very Fine	2.8	4.0					53
	Fine	4.0	5.6		1	1	1	54
	Fine	5.6	8.0	2		2	2	56
	Medium	8.0	11.0	1		1	1	57
	Medium	11.0	16.0	5		5	5	62
	Coarse	16.0	22.6	3	2	5	5	67
	Coarse	22.6	32	1		1	1	68
	Very Coarse	32	45	4	1	5	5	73
	Very Coarse	45	64	11	2	13	13	86
COBBLE	Small	64	90	5		5	5	91
	Small	90	128	7		7	7	98
	Large	128	180	2		2	2	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



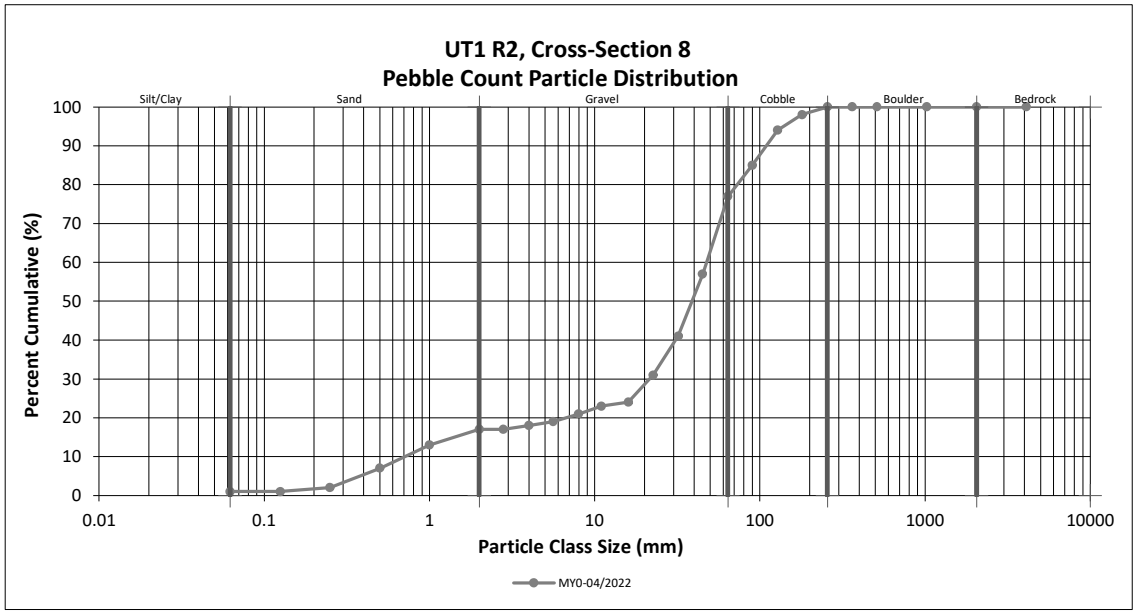
Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.18
D_{50} =	0.5
D_{84} =	60.6
D_{95} =	110.1
D_{100} =	180.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R2, Cross-Section 8

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250	1	1	2
	Medium	0.25	0.50	5	5	7
	Coarse	0.5	1.0	6	6	13
	Very Coarse	1.0	2.0	4	4	17
GRAVEL	Very Fine	2.0	2.8			17
	Very Fine	2.8	4.0	1	1	18
	Fine	4.0	5.6	1	1	19
	Fine	5.6	8.0	2	2	21
	Medium	8.0	11.0	2	2	23
	Medium	11.0	16.0	1	1	24
	Coarse	16.0	22.6	7	7	31
	Coarse	22.6	32	10	10	41
	Very Coarse	32	45	16	16	57
	Very Coarse	45	64	20	20	77
COBBLE	Small	64	90	8	8	85
	Small	90	128	9	9	94
	Large	128	180	4	4	98
	Large	180	256	2	2	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



Cross-Section 8	
Channel materials (mm)	
D_{16} =	1.68
D_{35} =	25.97
D_{50} =	38.8
D_{84} =	86.2
D_{95} =	139.4
D_{100} =	256.0

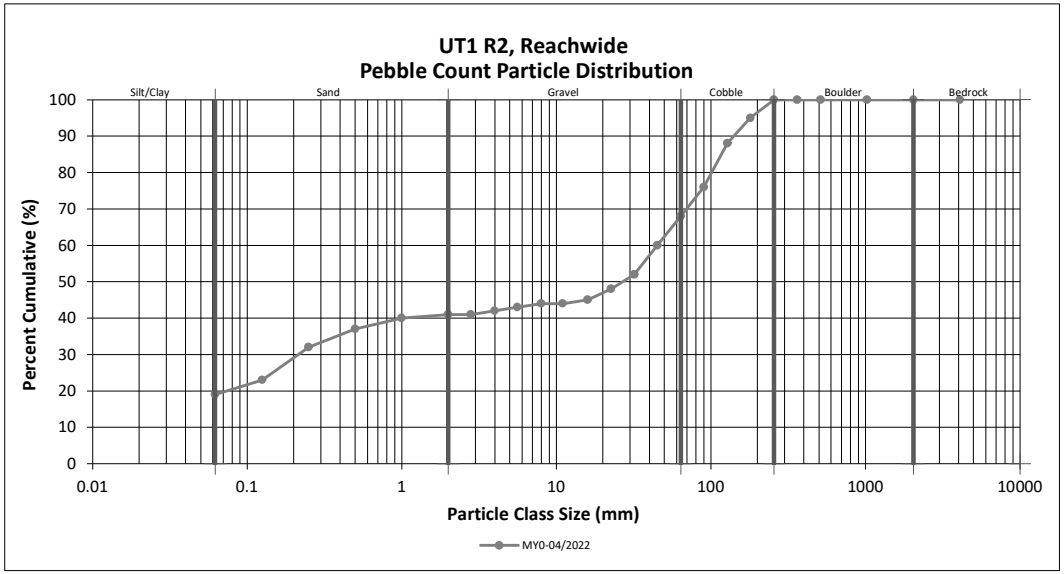
Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	18	19	19	19
SAND	Very fine	0.062	0.125		4	4	4	23
	Fine	0.125	0.250		9	9	9	32
	Medium	0.25	0.50		5	5	5	37
	Coarse	0.5	1.0		3	3	3	40
	Very Coarse	1.0	2.0		1	1	1	41
GRAVEL	Very Fine	2.0	2.8					41
	Very Fine	2.8	4.0	1		1	1	42
	Fine	4.0	5.6	1		1	1	43
	Fine	5.6	8.0		1	1	1	44
	Medium	8.0	11.0					44
	Medium	11.0	16.0	1		1	1	45
	Coarse	16.0	22.6	2	1	3	3	48
	Coarse	22.6	32	3	1	4	4	52
	Very Coarse	32	45	3	5	8	8	60
	Very Coarse	45	64	7	1	8	8	68
COBBLE	Small	64	90	8		8	8	76
	Small	90	128	11	1	12	12	88
	Large	128	180	7		7	7	95
	Large	180	256	5		5	5	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.38
D_{50} =	26.9
D_{84} =	113.8
D_{95} =	180.0
D_{100} =	256.0

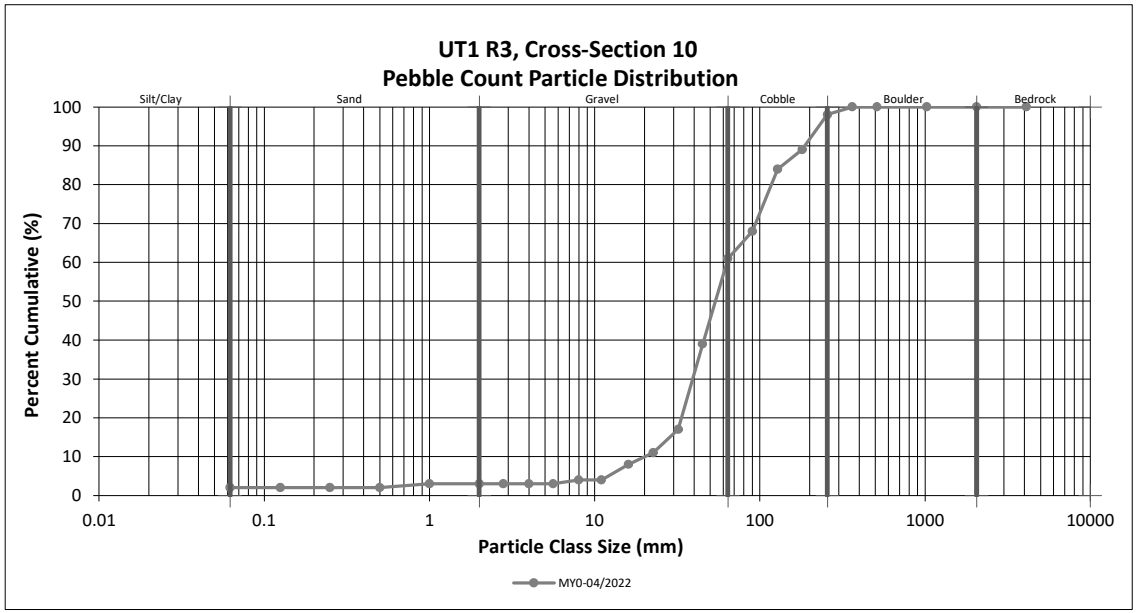


Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R3, Cross-Section 10

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.25	0.50			2
	Coarse	0.5	1.0	1	1	3
	Very Coarse	1.0	2.0			3
GRAVEL	Very Fine	2.0	2.8			3
	Very Fine	2.8	4.0			3
	Fine	4.0	5.6			3
	Fine	5.6	8.0	1	1	4
	Medium	8.0	11.0			4
	Medium	11.0	16.0	4	4	8
	Coarse	16.0	22.6	3	3	11
	Coarse	22.6	32	6	6	17
	Very Coarse	32	45	22	22	39
	Very Coarse	45	64	22	22	61
COBBLE	Small	64	90	7	7	68
	Small	90	128	16	16	84
	Large	128	180	5	5	89
	Large	180	256	9	9	98
BOULDER	Small	256	362	2	2	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



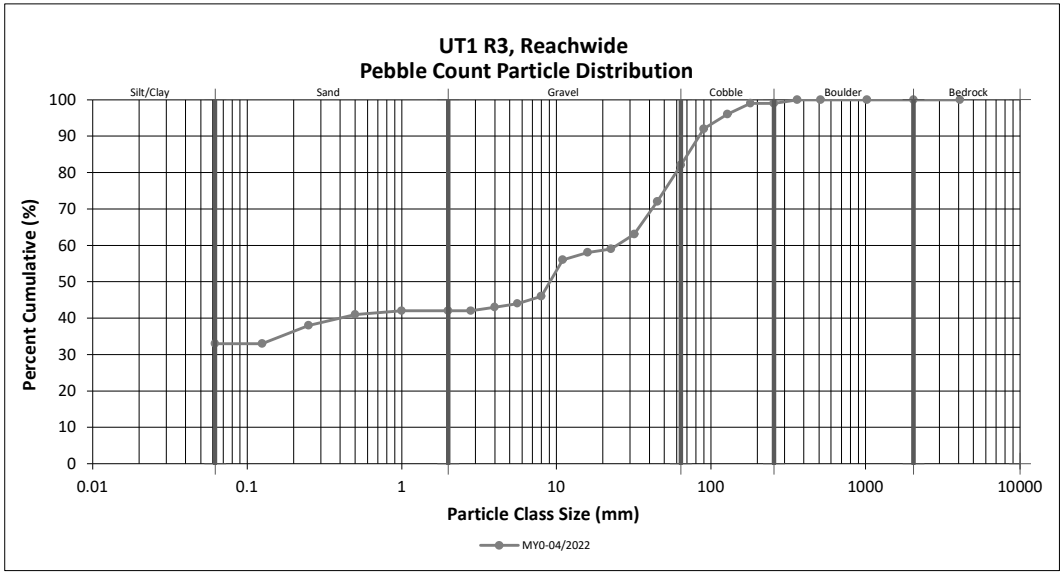
Cross-Section 10	
Channel materials (mm)	
D_{16} =	30.20
D_{35} =	42.30
D_{50} =	53.7
D_{84} =	128.0
D_{95} =	227.6
D_{100} =	362.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT1 R3, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		33	33	33	33
SAND	Very fine	0.062	0.125					33
	Fine	0.125	0.250		5	5	5	38
	Medium	0.25	0.50		3	3	3	41
	Coarse	0.5	1.0	1		1	1	42
	Very Coarse	1.0	2.0					42
GRAVEL	Very Fine	2.0	2.8					42
	Very Fine	2.8	4.0		1	1	1	43
	Fine	4.0	5.6		1	1	1	44
	Fine	5.6	8.0		2	2	2	46
	Medium	8.0	11.0	7	3	10	10	56
	Medium	11.0	16.0	2		2	2	58
	Coarse	16.0	22.6	1		1	1	59
	Coarse	22.6	32	4		4	4	63
	Very Coarse	32	45	9		9	9	72
	Very Coarse	45	64	8	2	10	10	82
COBBLE	Small	64	90	10		10	10	92
	Small	90	128	4		4	4	96
	Large	128	180	3		3	3	99
	Large	180	256					99
BOULDER	Small	256	362	1		1	1	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.16
D_{50} =	9.1
D_{84} =	68.5
D_{95} =	117.2
D_{100} =	362.0

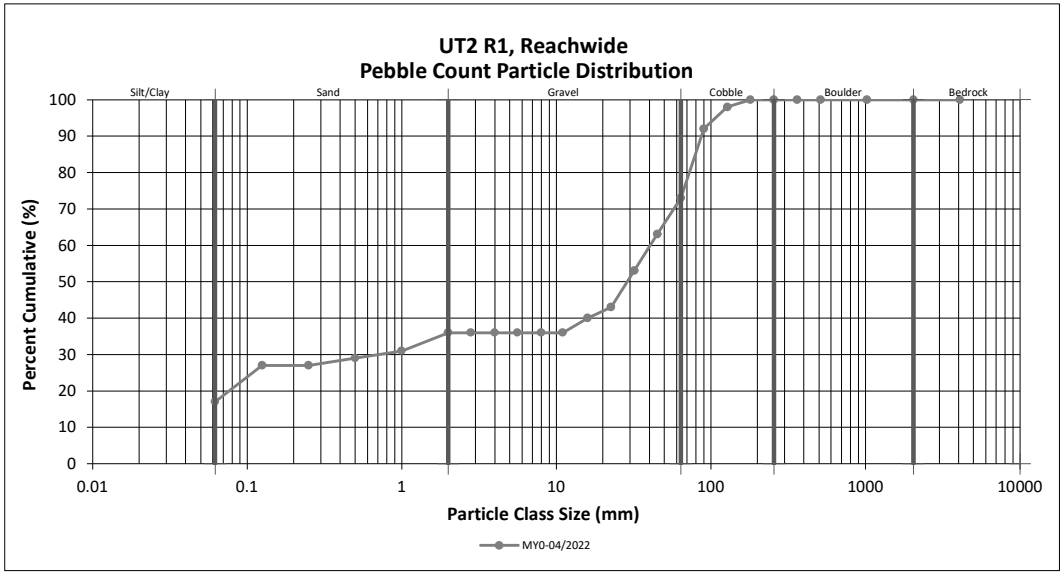
Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	16	17	17	17
SAND	Very fine	0.062	0.125		10	10	10	27
	Fine	0.125	0.250					27
	Medium	0.25	0.50		2	2	2	29
	Coarse	0.5	1.0		2	2	2	31
	Very Coarse	1.0	2.0		5	5	5	36
GRAVEL	Very Fine	2.0	2.8					36
	Very Fine	2.8	4.0					36
	Fine	4.0	5.6					36
	Fine	5.6	8.0					36
	Medium	8.0	11.0					36
	Medium	11.0	16.0	2	2	4	4	40
	Coarse	16.0	22.6	3		3	3	43
	Coarse	22.6	32	6	4	10	10	53
	Very Coarse	32	45	10		10	10	63
	Very Coarse	45	64	9	1	10	10	73
COBBLE	Small	64	90	14	5	19	19	92
	Small	90	128	3	3	6	6	98
	Large	128	180	2		2	2	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	1.74
D_{50} =	28.8
D_{84} =	78.0
D_{95} =	107.3
D_{100} =	180.0

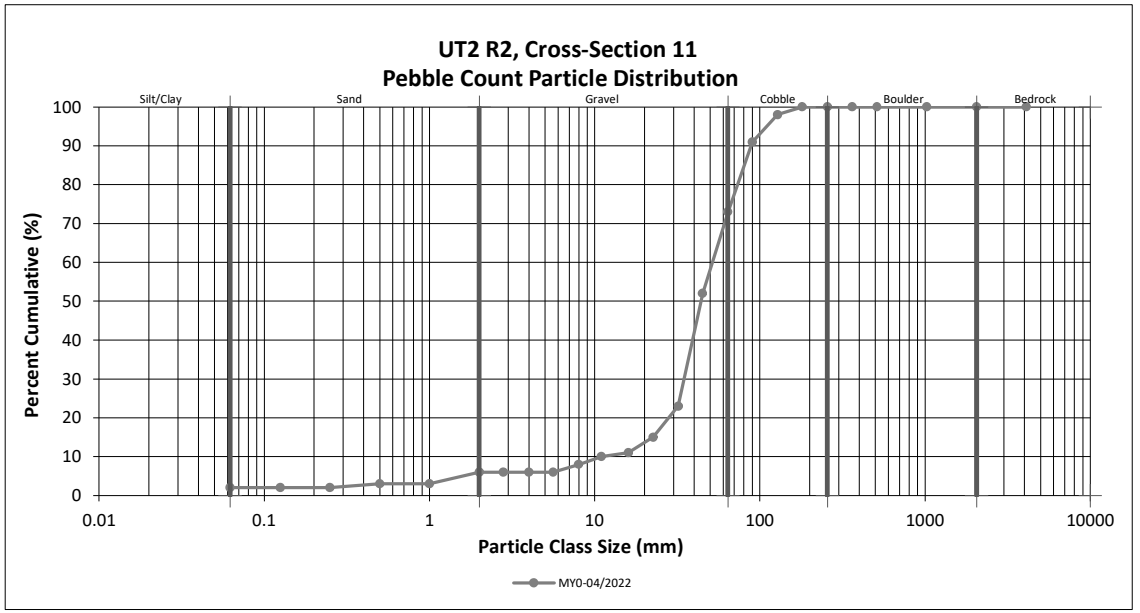


Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R2, Cross-Section 11

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.25	0.50	1	1	3
	Coarse	0.5	1.0			3
	Very Coarse	1.0	2.0	3	3	6
GRAVEL	Very Fine	2.0	2.8			6
	Very Fine	2.8	4.0			6
	Fine	4.0	5.6			6
	Fine	5.6	8.0	2	2	8
	Medium	8.0	11.0	2	2	10
	Medium	11.0	16.0	1	1	11
	Coarse	16.0	22.6	4	4	15
	Coarse	22.6	32	8	8	23
	Very Coarse	32	45	29	29	52
	Very Coarse	45	64	21	21	73
COBBLE	Small	64	90	18	18	91
	Small	90	128	7	7	98
	Large	128	180	2	2	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



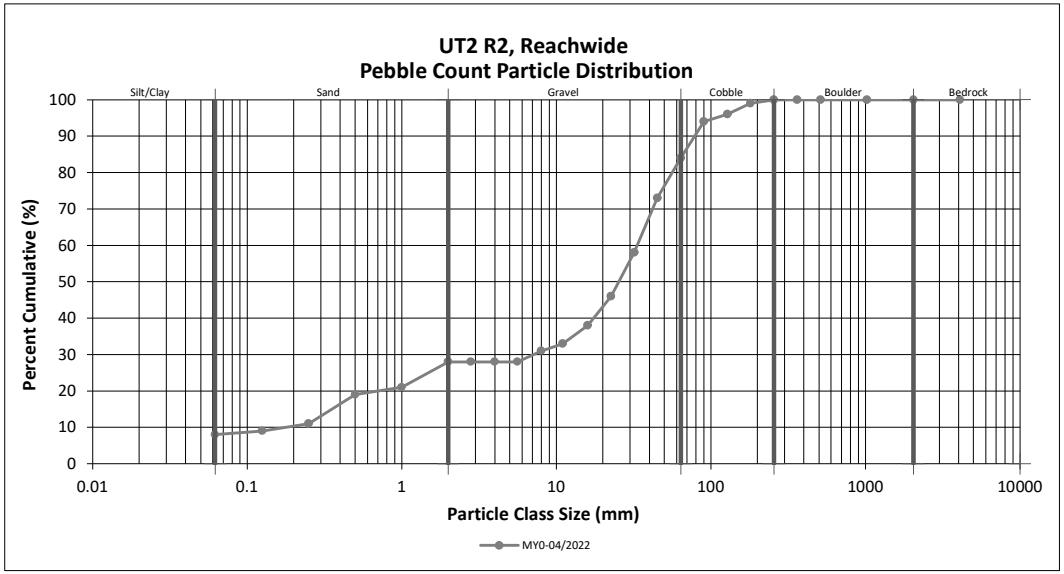
Cross-Section 11	
Channel materials (mm)	
D_{16} =	23.60
D_{35} =	36.85
D_{50} =	44.0
D_{84} =	78.8
D_{95} =	110.1
D_{100} =	180.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	7	8	8	8
SAND	Very fine	0.062	0.125	1		1	1	9
	Fine	0.125	0.250		2	2	2	11
	Medium	0.25	0.50	1	7	8	8	19
	Coarse	0.5	1.0		2	2	2	21
	Very Coarse	1.0	2.0	1	6	7	7	28
GRAVEL	Very Fine	2.0	2.8					28
	Very Fine	2.8	4.0					28
	Fine	4.0	5.6					28
	Fine	5.6	8.0	1	2	3	3	31
	Medium	8.0	11.0		2	2	2	33
	Medium	11.0	16.0	1	4	5	5	38
	Coarse	16.0	22.6	4	4	8	8	46
	Coarse	22.6	32	8	4	12	12	58
	Very Coarse	32	45	11	4	15	15	73
	Very Coarse	45	64	9	2	11	11	84
COBBLE	Small	64	90	8	2	10	10	94
	Small	90	128	1	1	2	2	96
	Large	128	180	2	1	3	3	99
	Large	180	256	1		1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



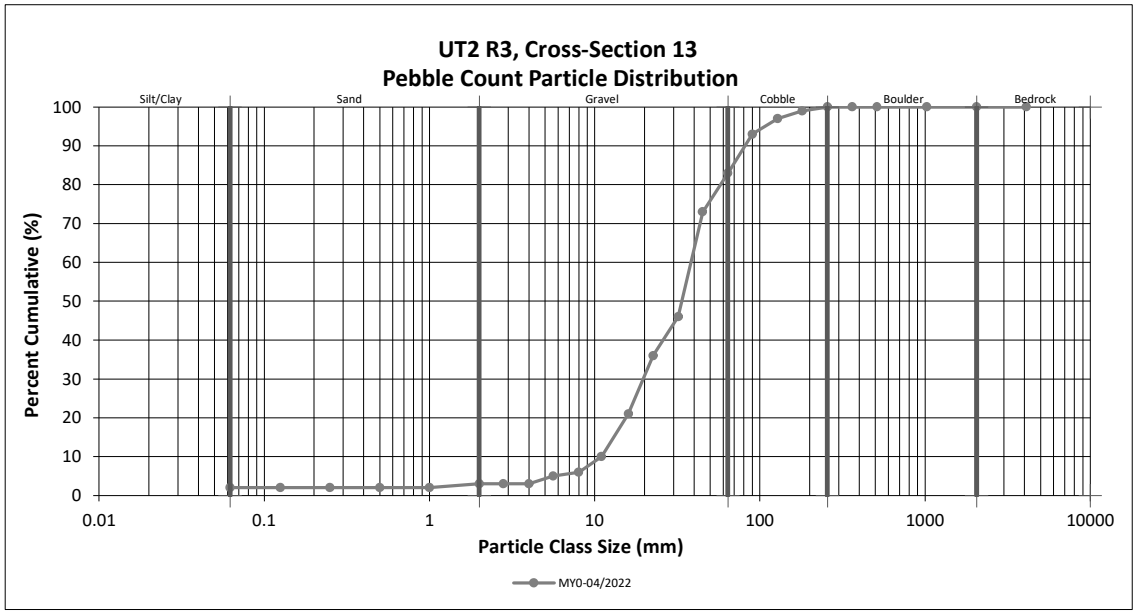
Reachwide	
Channel materials (mm)	
D_{16} =	0.39
D_{35} =	12.78
D_{50} =	25.4
D_{84} =	64.0
D_{95} =	107.3
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R3, Cross-Section 13

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.25	0.50			2
	Coarse	0.5	1.0			2
	Very Coarse	1.0	2.0	1	1	3
GRAVEL	Very Fine	2.0	2.8			3
	Very Fine	2.8	4.0			3
	Fine	4.0	5.6	2	2	5
	Fine	5.6	8.0	1	1	6
	Medium	8.0	11.0	4	4	10
	Medium	11.0	16.0	11	11	21
	Coarse	16.0	22.6	15	15	36
	Coarse	22.6	32	10	10	46
	Very Coarse	32	45	27	27	73
	Very Coarse	45	64	10	10	83
COBBLE	Small	64	90	10	10	93
	Small	90	128	4	4	97
	Large	128	180	2	2	99
	Large	180	256	1	1	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



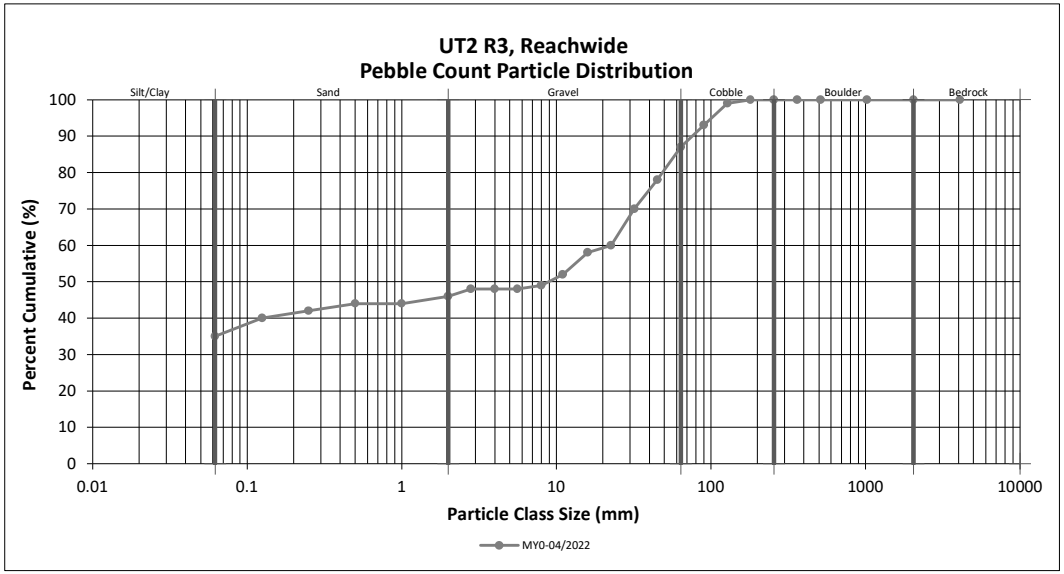
Cross-Section 13	
Channel materials (mm)	
D_{16} =	13.49
D_{35} =	22.09
D_{50} =	33.7
D_{84} =	66.2
D_{95} =	107.3
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R3, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		35	35	35	35
SAND	Very fine	0.062	0.125		5	5	5	40
	Fine	0.125	0.250		2	2	2	42
	Medium	0.25	0.50		2	2	2	44
	Coarse	0.5	1.0					44
	Very Coarse	1.0	2.0	2		2	2	46
GRAVEL	Very Fine	2.0	2.8	1	1	2	2	48
	Very Fine	2.8	4.0					48
	Fine	4.0	5.6					48
	Fine	5.6	8.0	1		1	1	49
	Medium	8.0	11.0	1	2	3	3	52
	Medium	11.0	16.0	3	3	6	6	58
	Coarse	16.0	22.6	2		2	2	60
	Coarse	22.6	32	10		10	10	70
	Very Coarse	32	45	8		8	8	78
	Very Coarse	45	64	9		9	9	87
COBBLE	Small	64	90	6		6	6	93
	Small	90	128	6		6	6	99
	Large	128	180	1		1	1	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**



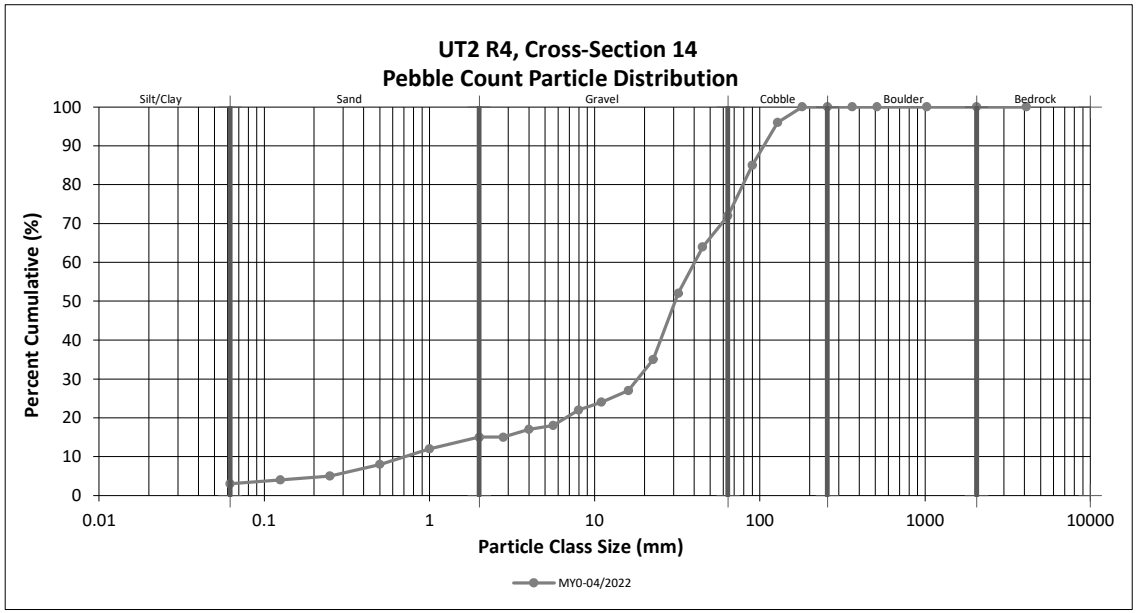
Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	8.9
D_{84} =	56.9
D_{95} =	101.2
D_{100} =	180.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R4, Cross-Section 14

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	3	3
SAND	Very fine	0.062	0.125	1	1	4
	Fine	0.125	0.250	1	1	5
	Medium	0.25	0.50	3	3	8
	Coarse	0.5	1.0	4	4	12
	Very Coarse	1.0	2.0	3	3	15
GRAVEL	Very Fine	2.0	2.8			15
	Very Fine	2.8	4.0	2	2	17
	Fine	4.0	5.6	1	1	18
	Fine	5.6	8.0	4	4	22
	Medium	8.0	11.0	2	2	24
	Medium	11.0	16.0	3	3	27
	Coarse	16.0	22.6	8	8	35
	Coarse	22.6	32	17	17	52
	Very Coarse	32	45	12	12	64
	Very Coarse	45	64	8	8	72
COBBLE	Small	64	90	13	13	85
	Small	90	128	11	11	96
	Large	128	180	4	4	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



Cross-Section 14	
Channel materials (mm)	
D_{16} =	3.35
D_{35} =	22.60
D_{50} =	30.7
D_{84} =	87.7
D_{95} =	124.0
D_{100} =	180.0

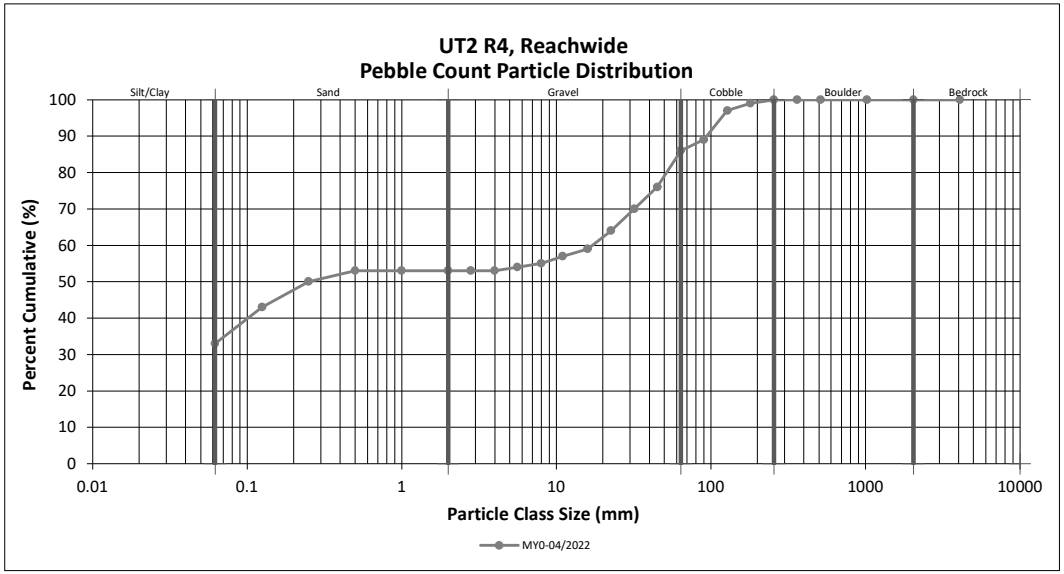
Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

UT2 R4, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		33	33	33	33
SAND	Very fine	0.062	0.125		10	10	10	43
	Fine	0.125	0.250	2	5	7	7	50
	Medium	0.25	0.50	2	1	3	3	53
	Coarse	0.5	1.0					53
	Very Coarse	1.0	2.0					53
GRAVEL	Very Fine	2.0	2.8					53
	Very Fine	2.8	4.0					53
	Fine	4.0	5.6		1	1	1	54
	Fine	5.6	8.0	1		1	1	55
	Medium	8.0	11.0	2		2	2	57
	Medium	11.0	16.0	2		2	2	59
	Coarse	16.0	22.6	5		5	5	64
	Coarse	22.6	32	6		6	6	70
	Very Coarse	32	45	6		6	6	76
	Very Coarse	45	64	10		10	10	86
COBBLE	Small	64	90	3		3	3	89
	Small	90	128	8		8	8	97
	Large	128	180	2		2	2	99
	Large	180	256	1		1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.07
D_{50} =	0.3
D_{84} =	59.6
D_{95} =	117.2
D_{100} =	256.0

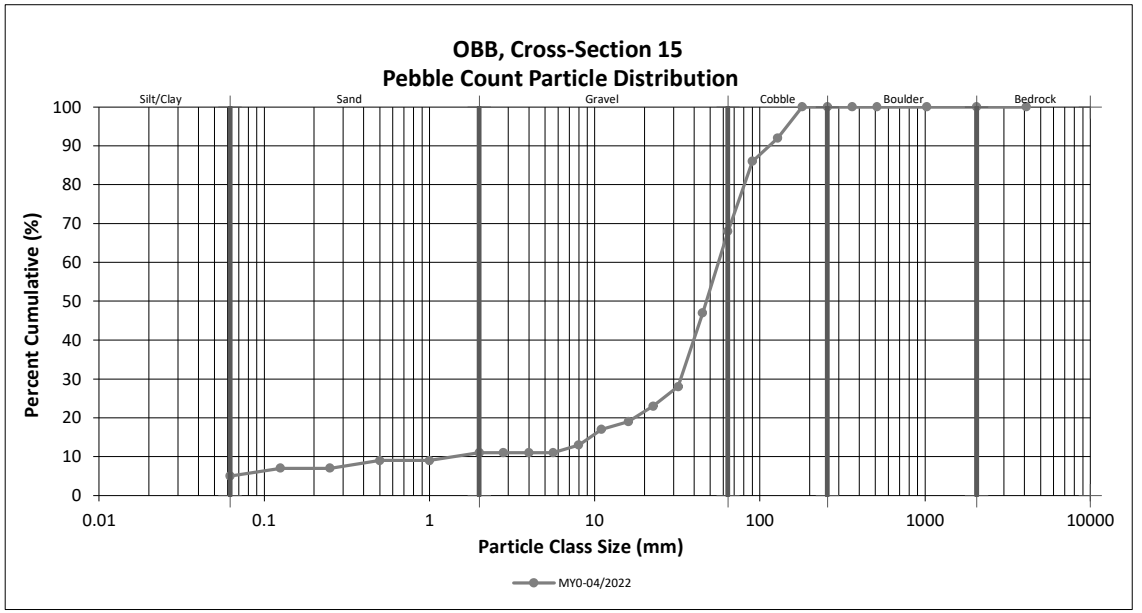


Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

OBB, Cross-Section 15

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	5	5	5
SAND	Very fine	0.062	0.125	2	2	7
	Fine	0.125	0.250			7
	Medium	0.25	0.50	2	2	9
	Coarse	0.5	1.0			9
	Very Coarse	1.0	2.0	2	2	11
GRAVEL	Very Fine	2.0	2.8			11
	Very Fine	2.8	4.0			11
	Fine	4.0	5.6			11
	Fine	5.6	8.0	2	2	13
	Medium	8.0	11.0	4	4	17
	Medium	11.0	16.0	2	2	19
	Coarse	16.0	22.6	4	4	23
	Coarse	22.6	32	5	5	28
	Very Coarse	32	45	19	19	47
	Very Coarse	45	64	21	21	68
COBBLE	Small	64	90	18	18	86
	Small	90	128	6	6	92
	Large	128	180	8	8	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



Cross-Section 15	
Channel materials (mm)	
D_{16} =	10.16
D_{35} =	36.28
D_{50} =	47.3
D_{84} =	86.7
D_{95} =	145.5
D_{100} =	180.0

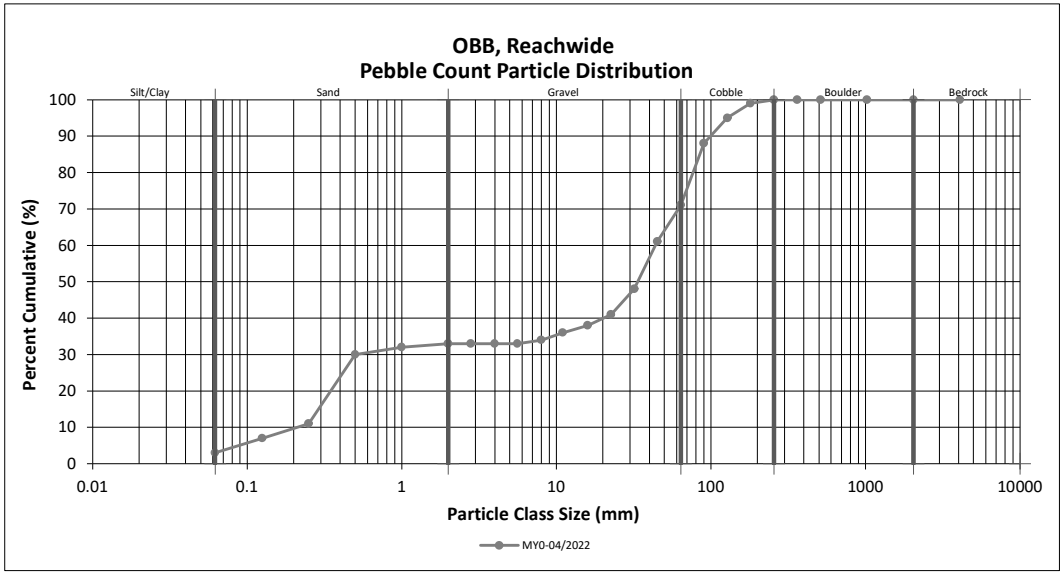
Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

OBB, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	1	3	3	3
SAND	Very fine	0.062	0.125		4	4	4	7
	Fine	0.125	0.250		4	4	4	11
	Medium	0.25	0.50	1	18	19	19	30
	Coarse	0.5	1.0		2	2	2	32
	Very Coarse	1.0	2.0		1	1	1	33
GRAVEL	Very Fine	2.0	2.8					33
	Very Fine	2.8	4.0					33
	Fine	4.0	5.6					33
	Fine	5.6	8.0		1	1	1	34
	Medium	8.0	11.0		2	2	2	36
	Medium	11.0	16.0		2	2	2	38
	Coarse	16.0	22.6		3	3	3	41
	Coarse	22.6	32	4	3	7	7	48
	Very Coarse	32	45	10	3	13	13	61
	Very Coarse	45	64	8	2	10	10	71
COBBLE	Small	64	90	16	1	17	17	88
	Small	90	128	6	1	7	7	95
	Large	128	180	2	2	4	4	99
	Large	180	256	1		1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.30
D_{35} =	9.38
D_{50} =	33.7
D_{84} =	83.1
D_{95} =	128.0
D_{100} =	256.0

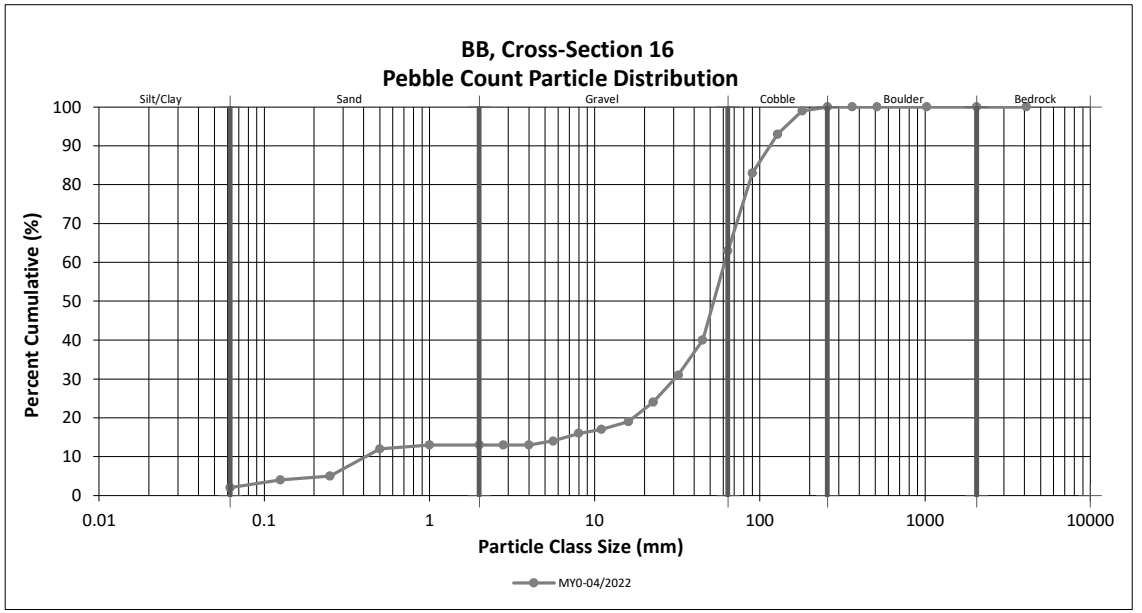


Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

BB, Cross-Section 16

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2	2
SAND	Very fine	0.062	0.125	2	2	4
	Fine	0.125	0.250	1	1	5
	Medium	0.25	0.50	7	7	12
	Coarse	0.5	1.0	1	1	13
	Very Coarse	1.0	2.0			13
GRAVEL	Very Fine	2.0	2.8			13
	Very Fine	2.8	4.0			13
	Fine	4.0	5.6	1	1	14
	Fine	5.6	8.0	2	2	16
	Medium	8.0	11.0	1	1	17
	Medium	11.0	16.0	2	2	19
	Coarse	16.0	22.6	5	5	24
	Coarse	22.6	32	7	7	31
	Very Coarse	32	45	9	9	40
	Very Coarse	45	64	23	23	63
COBBLE	Small	64	90	20	20	83
	Small	90	128	10	10	93
	Large	128	180	6	6	99
	Large	180	256	1	1	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**



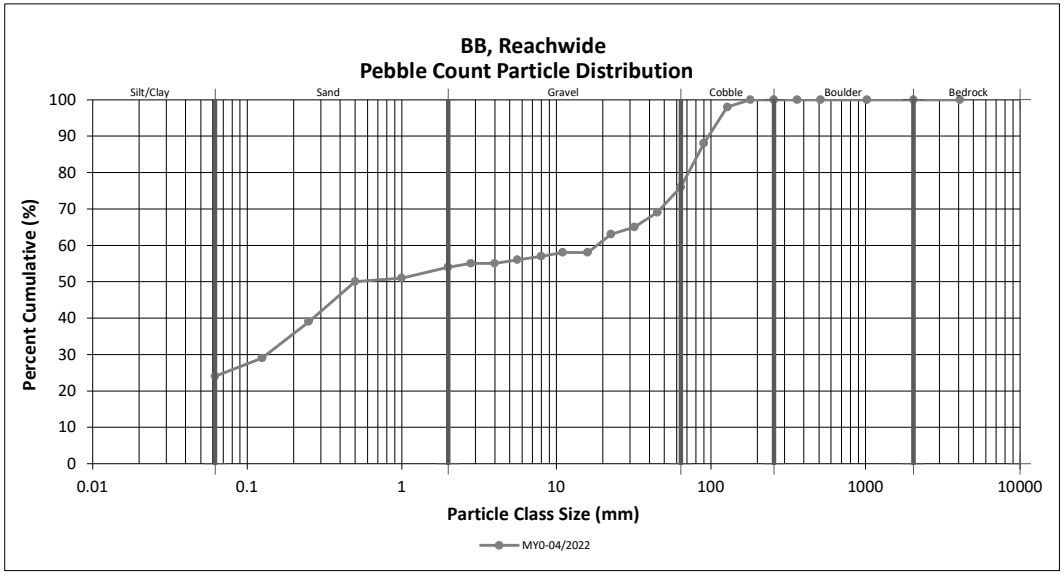
Cross-Section 16	
Channel materials (mm)	
D_{16} =	8.00
D_{35} =	37.24
D_{50} =	52.4
D_{84} =	93.2
D_{95} =	143.4
D_{100} =	256.0

Reachwide and Cross-Section Pebble Count Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

BB, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	23	24	24	24
SAND	Very fine	0.062	0.125		5	5	5	29
	Fine	0.125	0.250	1	9	10	10	39
	Medium	0.25	0.50	2	9	11	11	50
	Coarse	0.5	1.0		1	1	1	51
	Very Coarse	1.0	2.0	1	2	3	3	54
GRAVEL	Very Fine	2.0	2.8		1	1	1	55
	Very Fine	2.8	4.0					55
	Fine	4.0	5.6	1		1	1	56
	Fine	5.6	8.0	1		1	1	57
	Medium	8.0	11.0	1		1	1	58
	Medium	11.0	16.0					58
	Coarse	16.0	22.6	5		5	5	63
	Coarse	22.6	32	2		2	2	65
	Very Coarse	32	45	4		4	4	69
	Very Coarse	45	64	7		7	7	76
COBBLE	Small	64	90	12		12	12	88
	Small	90	128	10		10	10	98
	Large	128	180	2		2	2	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

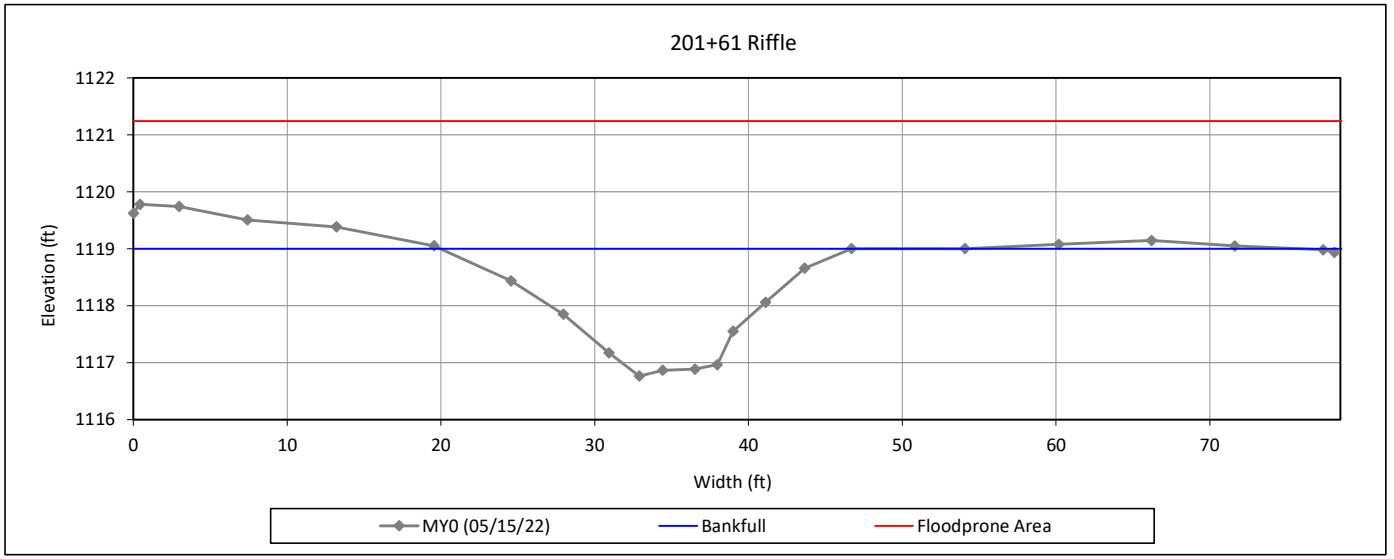


Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.19
D_{50} =	0.5
D_{84} =	80.3
D_{95} =	115.2
D_{100} =	180.0

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 1 - North Little Hunting Creek Reach 1



Bankfull Dimensions

28.6	x-section area (ft.sq.)
22.1	width (ft)
1.3	mean depth (ft)
2.2	max depth (ft)
22.6	wetted perimeter (ft)
1.3	hydraulic radius (ft)
17.1	width-depth ratio
78.1	W flood prone area (ft)
3.5	entrenchment ratio
1.0	low bank height ratio

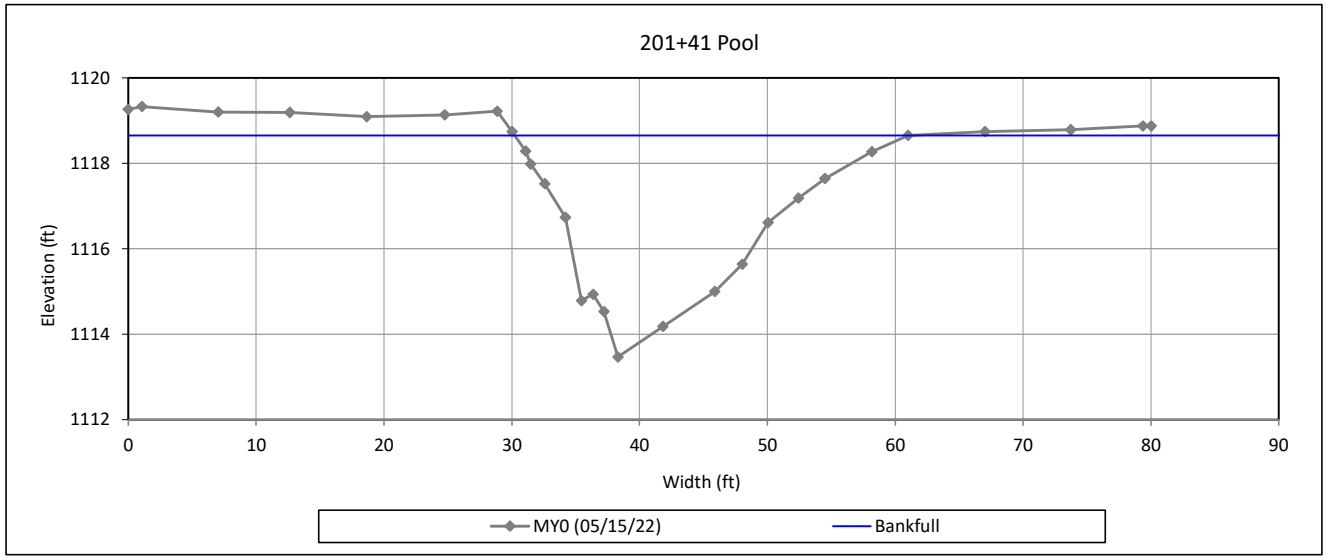
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 2 - North Little Hunting Creek Reach 1



Bankfull Dimensions	
74.9	x-section area (ft.sq.)
30.8	width (ft)
2.4	mean depth (ft)
5.2	max depth (ft)
33.5	wetted perimeter (ft)
2.2	hydraulic radius (ft)
12.6	width-depth ratio

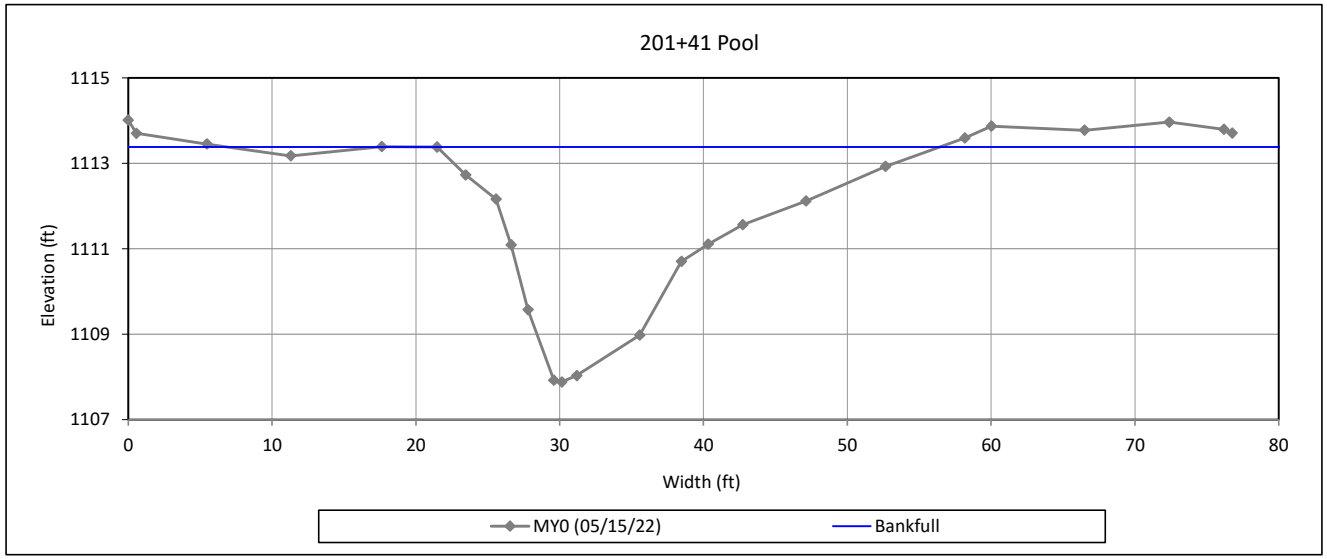
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 3 - North Little Hunting Creek Reach 2



Bankfull Dimensions	
78.6	x-section area (ft.sq.)
35.0	width (ft)
2.2	mean depth (ft)
5.5	max depth (ft)
37.8	wetted perimeter (ft)
2.1	hydraulic radius (ft)
15.6	width-depth ratio

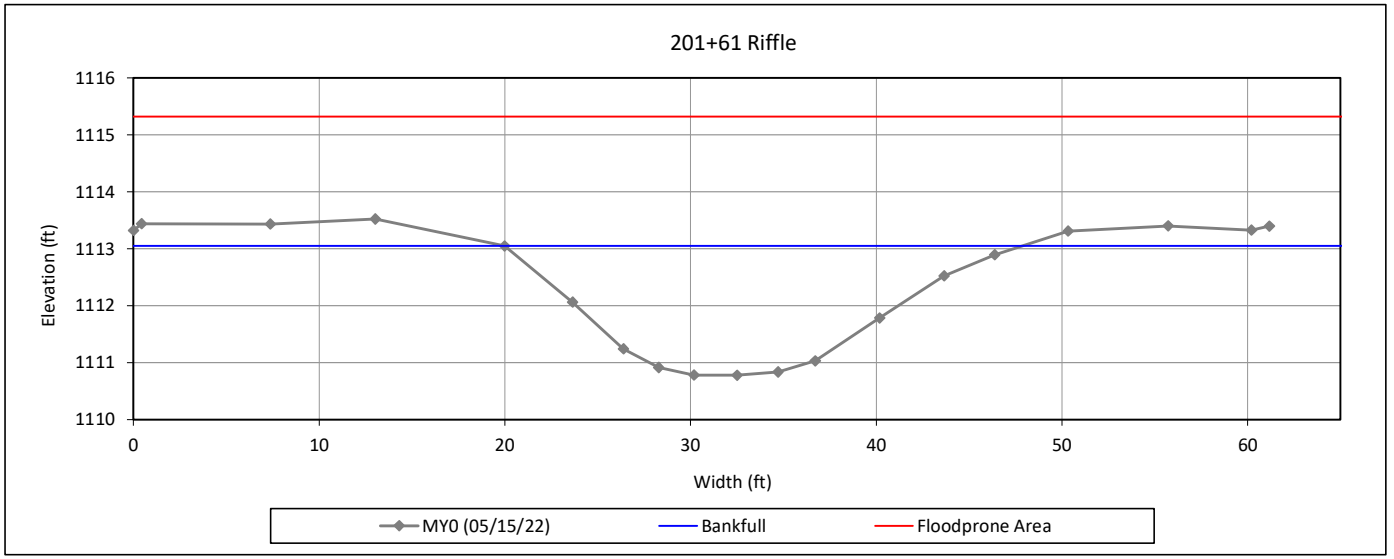
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 4 - North Little Hunting Creek Reach 2



Bankfull Dimensions

37.8	x-section area (ft.sq.)
27.9	width (ft)
1.4	mean depth (ft)
2.3	max depth (ft)
28.3	wetted perimeter (ft)
1.3	hydraulic radius (ft)
20.5	width-depth ratio
61.2	W flood prone area (ft)
2.2	entrenchment ratio
1.0	low bank height ratio

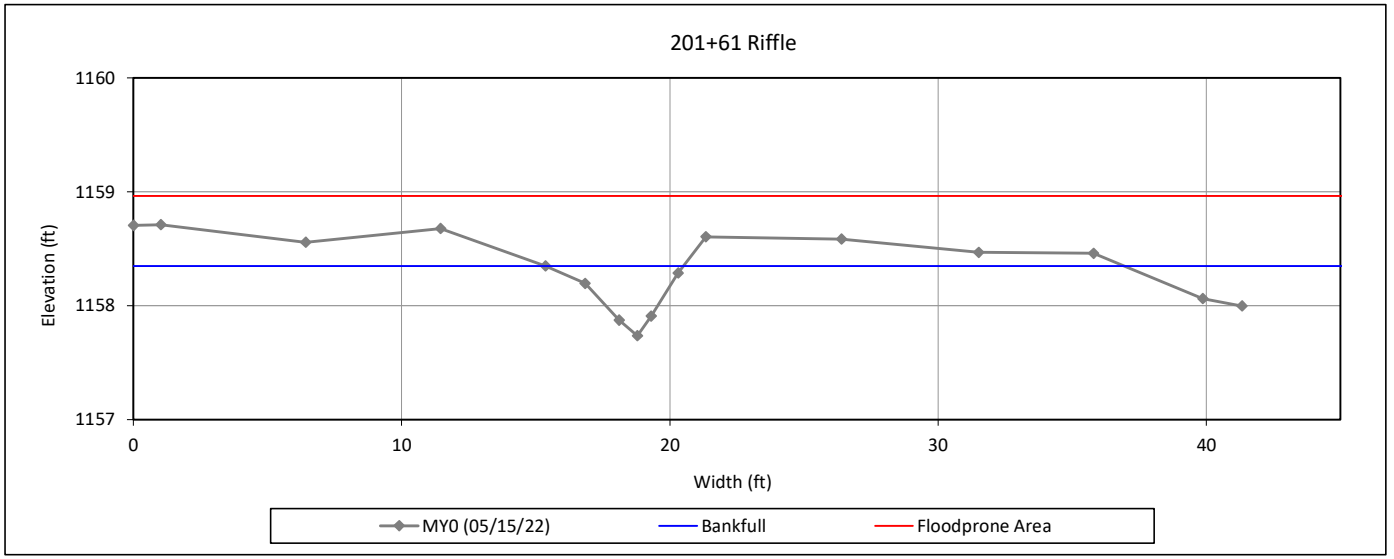
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 5 - UT1 Reach 1



Bankfull Dimensions

1.4	x-section area (ft.sq.)
5.2	width (ft)
0.3	mean depth (ft)
0.6	max depth (ft)
5.3	wetted perimeter (ft)
0.3	hydraulic radius (ft)
18.8	width-depth ratio
41.3	W flood prone area (ft)
8.0	entrenchment ratio
1.0	low bank height ratio

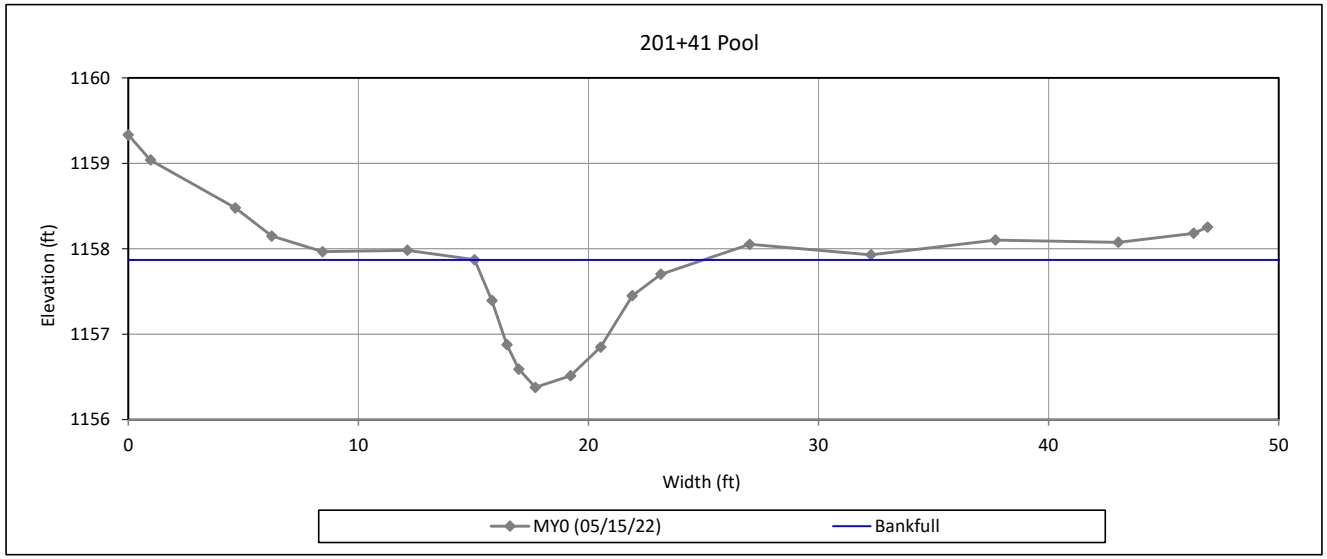
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 6 - UT1 Reach 1



Bankfull Dimensions	
7.5	x-section area (ft.sq.)
10.0	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
10.6	wetted perimeter (ft)
0.7	hydraulic radius (ft)
13.3	width-depth ratio

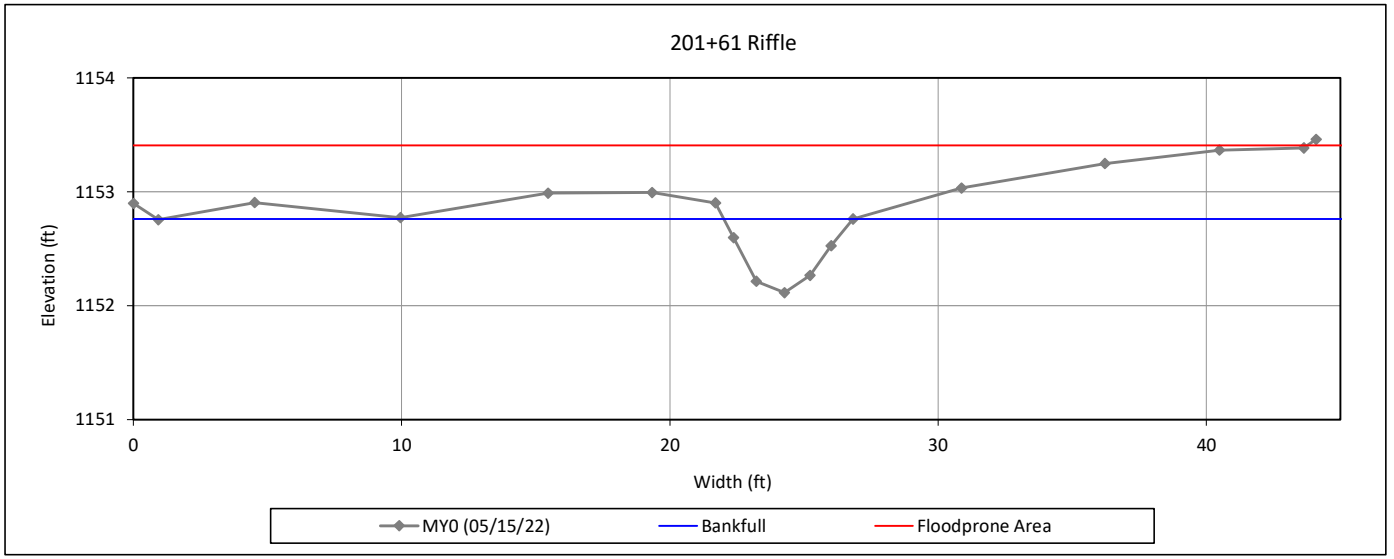
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 7 - UT1 Reach 1



Bankfull Dimensions

1.9	x-section area (ft.sq.)
4.8	width (ft)
0.4	mean depth (ft)
0.6	max depth (ft)
5.0	wetted perimeter (ft)
0.4	hydraulic radius (ft)
12.3	width-depth ratio
43.8	W flood prone area (ft)
9.1	entrenchment ratio
1.0	low bank height ratio

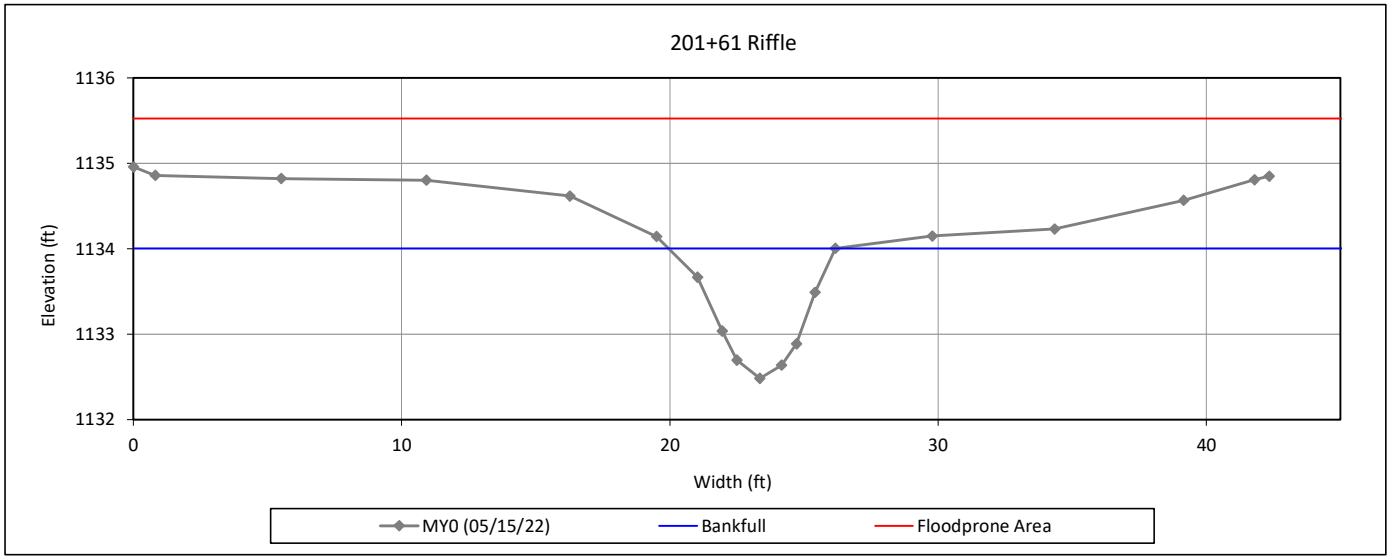
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 8 - UT1 Reach 2



Bankfull Dimensions

5.2	x-section area (ft.sq.)
6.2	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
7.0	wetted perimeter (ft)
0.7	hydraulic radius (ft)
7.4	width-depth ratio
42.3	W flood prone area (ft)
6.8	entrenchment ratio
1.0	low bank height ratio

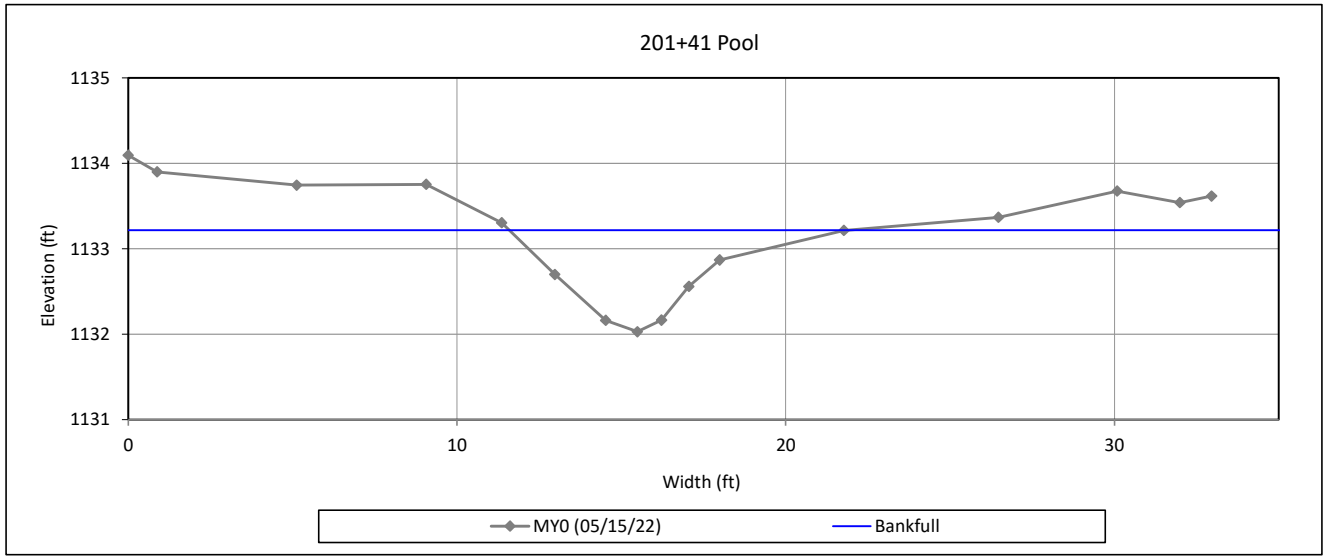
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 9 - UT1 Reach 2



Bankfull Dimensions	
5.3	x-section area (ft.sq.)
10.2	width (ft)
0.5	mean depth (ft)
1.2	max depth (ft)
10.5	wetted perimeter (ft)
0.5	hydraulic radius (ft)
19.5	width-depth ratio

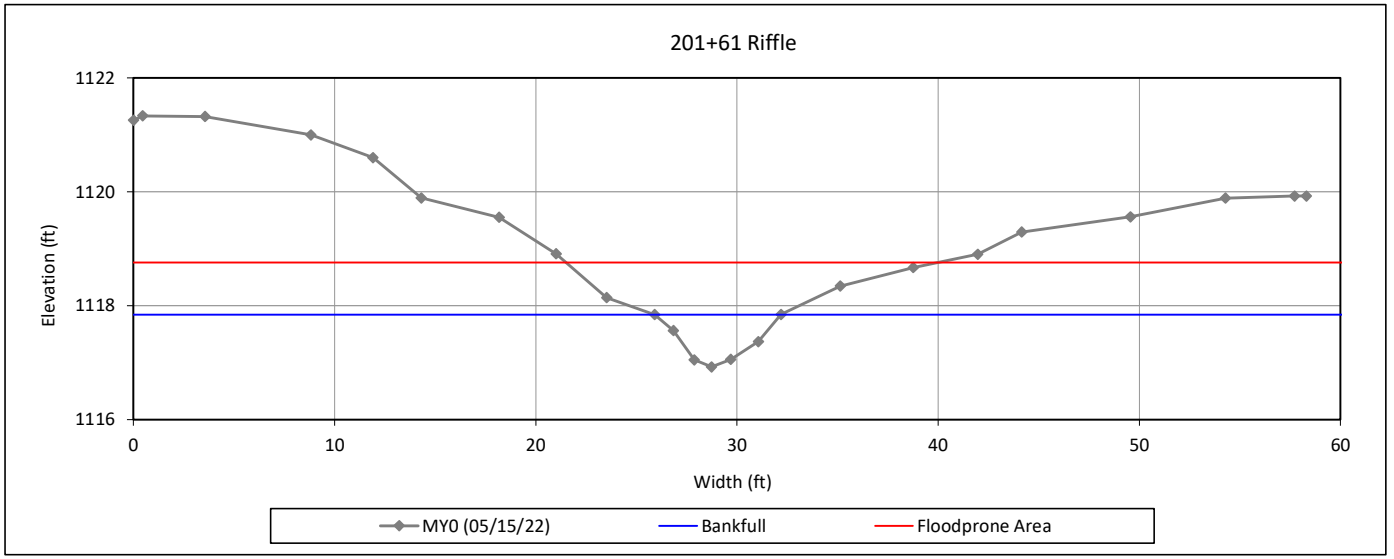
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 10 - UT1 Reach 3



Bankfull Dimensions

3.4	x-section area (ft.sq.)
6.3	width (ft)
0.5	mean depth (ft)
0.9	max depth (ft)
6.6	wetted perimeter (ft)
0.5	hydraulic radius (ft)
11.7	width-depth ratio
18.4	W flood prone area (ft)
2.9	entrenchment ratio
1.0	low bank height ratio

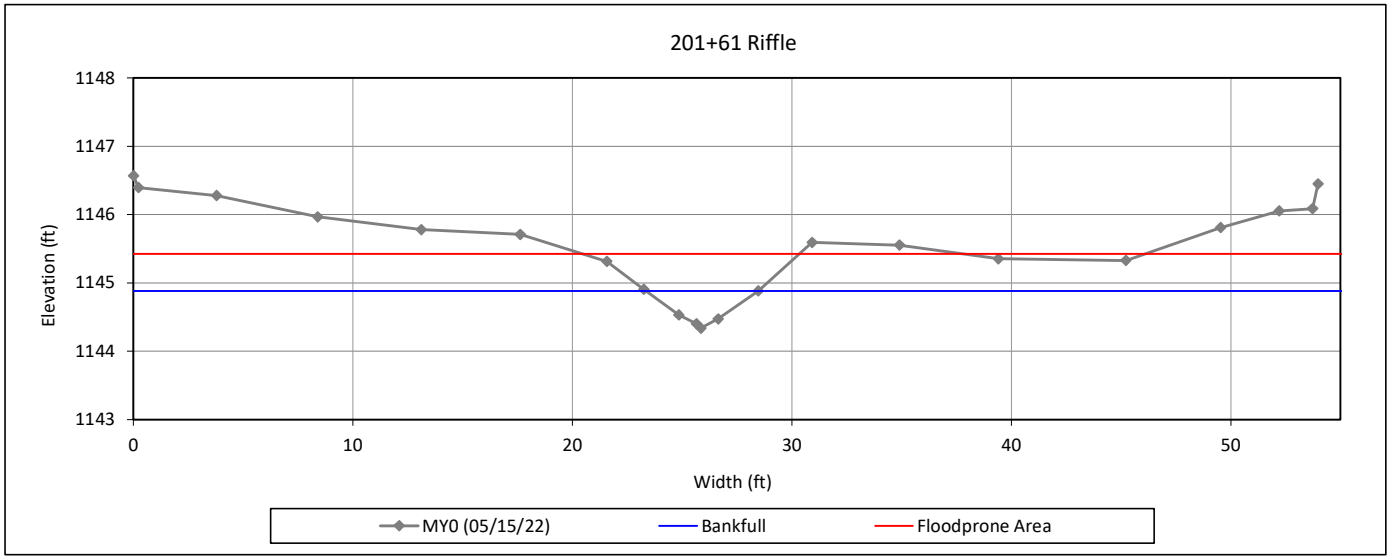
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 11 - UT2 Reach 2



Bankfull Dimensions

1.4	x-section area (ft.sq.)
5.1	width (ft)
0.3	mean depth (ft)
0.5	max depth (ft)
5.2	wetted perimeter (ft)
0.3	hydraulic radius (ft)
18.0	width-depth ratio
18.2	W flood prone area (ft)
3.6	entrenchment ratio
1.0	low bank height ratio

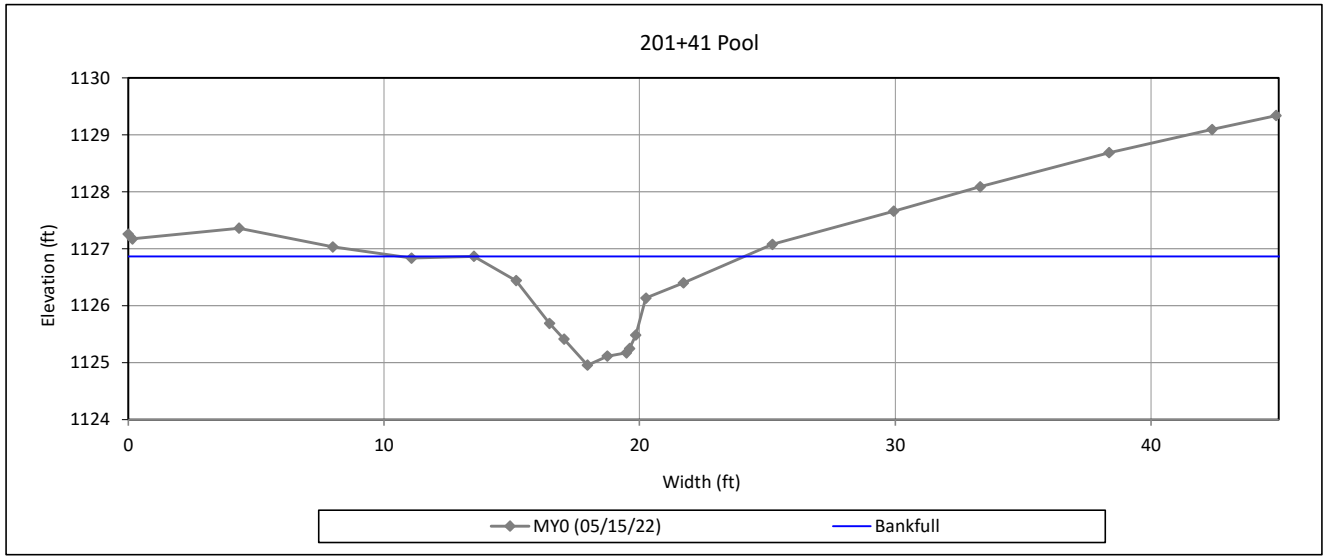
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 12 - UT2 Reach 3



Bankfull Dimensions	
8.8	x-section area (ft.sq.)
10.6	width (ft)
0.8	mean depth (ft)
1.9	max depth (ft)
11.6	wetted perimeter (ft)
0.8	hydraulic radius (ft)
12.7	width-depth ratio

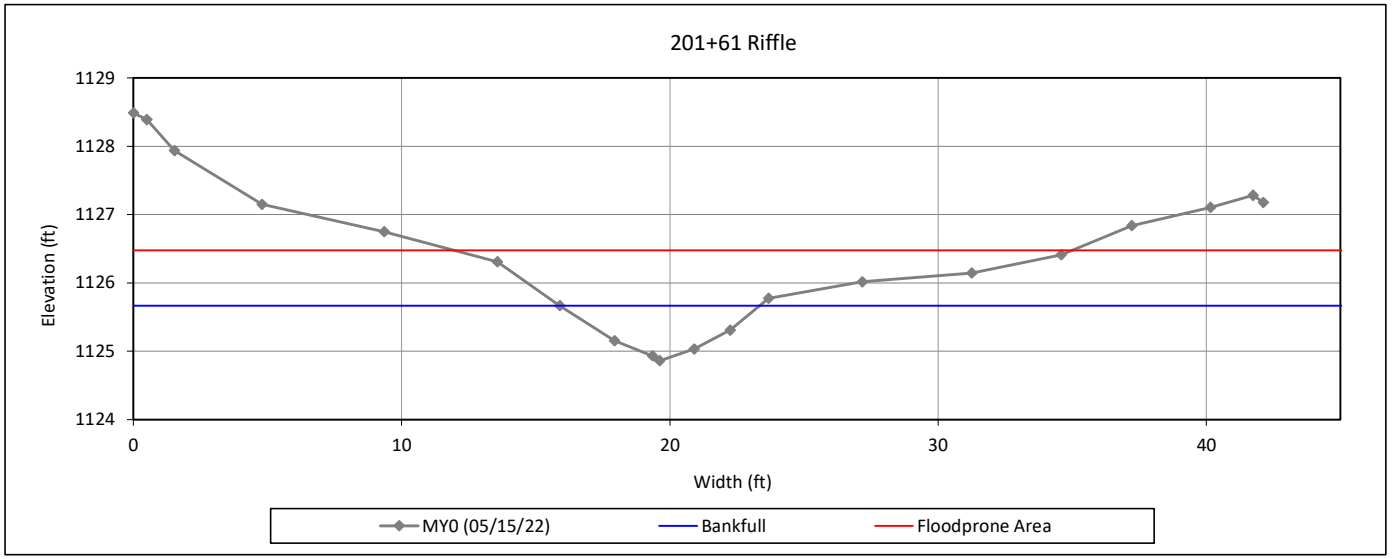
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 13 - UT2 Reach 3



Bankfull Dimensions

3.4	x-section area (ft.sq.)
7.5	width (ft)
0.5	mean depth (ft)
0.8	max depth (ft)
7.7	wetted perimeter (ft)
0.4	hydraulic radius (ft)
16.3	width-depth ratio
23.0	W flood prone area (ft)
3.1	entrenchment ratio
1.0	low bank height ratio

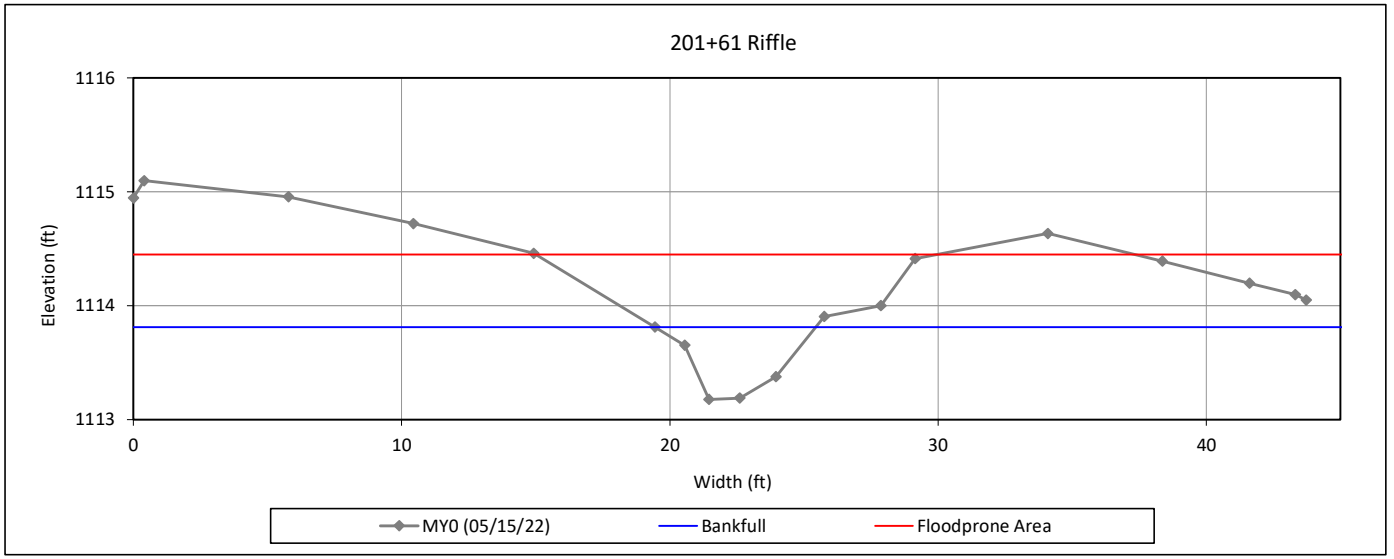
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 14 - UT2 Reach 4



Bankfull Dimensions

2.2	x-section area (ft.sq.)
6.0	width (ft)
0.4	mean depth (ft)
0.6	max depth (ft)
6.2	wetted perimeter (ft)
0.4	hydraulic radius (ft)
16.3	width-depth ratio
21.3	W flood prone area (ft)
3.6	entrenchment ratio
1.0	low bank height ratio

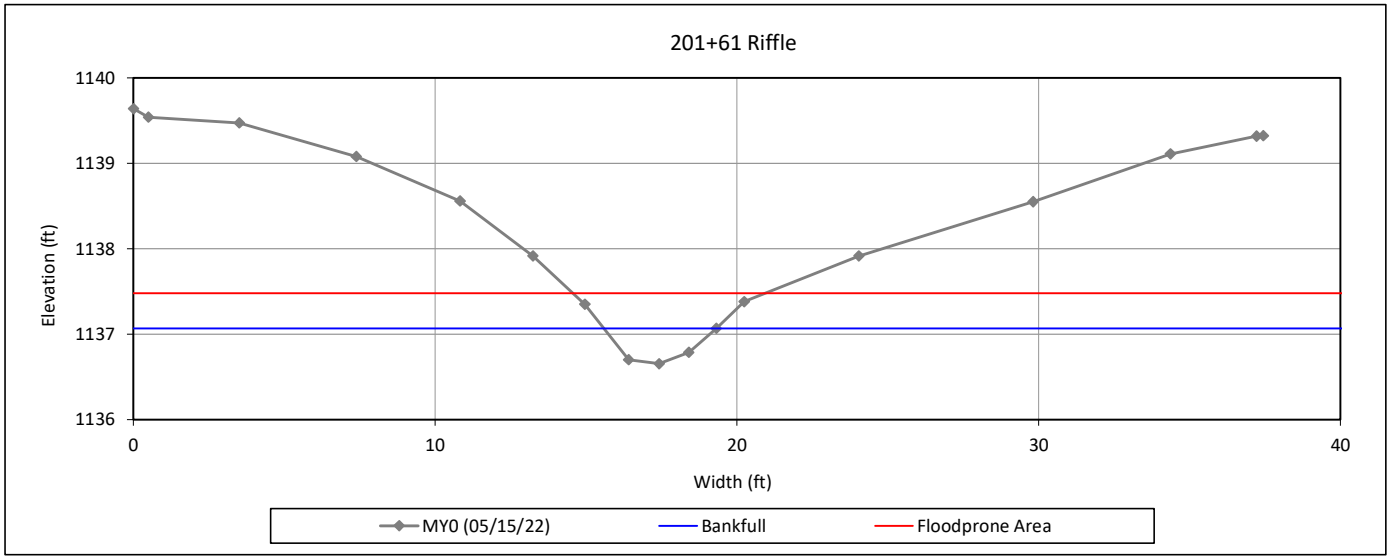
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 15 - Old Bus Branch



Bankfull Dimensions

1.0	x-section area (ft.sq.)
3.7	width (ft)
0.3	mean depth (ft)
0.4	max depth (ft)
3.8	wetted perimeter (ft)
0.3	hydraulic radius (ft)
13.7	width-depth ratio
6.4	W flood prone area (ft)
1.7	entrenchment ratio
1.0	low bank height ratio

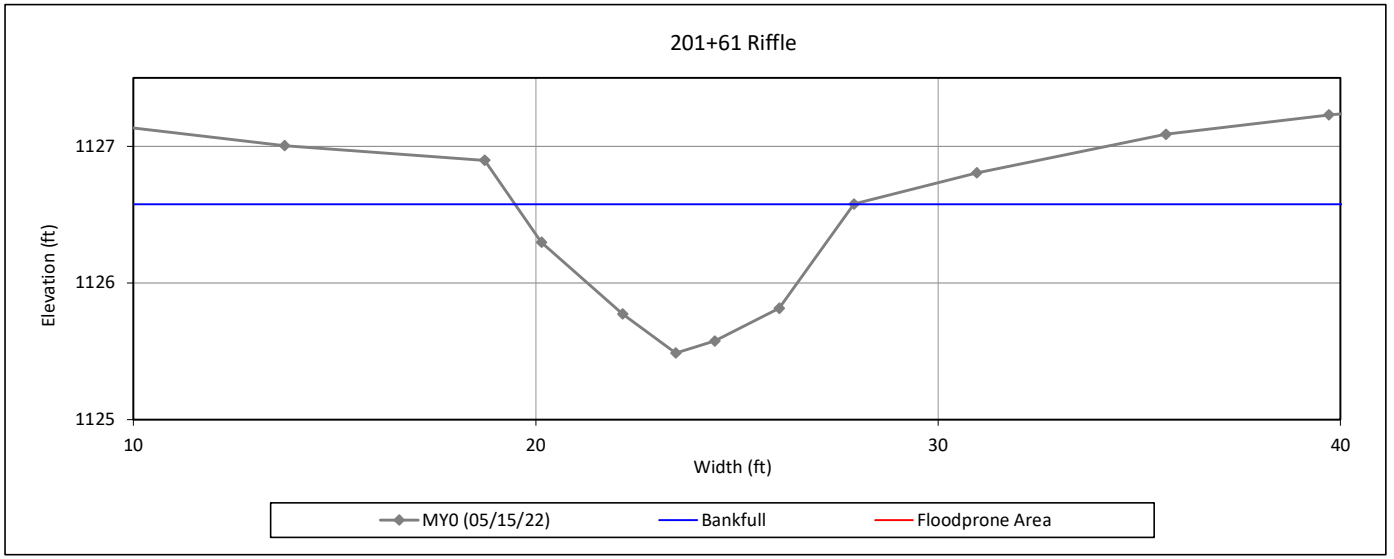
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

View Downstream

Cross-Section Plots

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Cross-Section 16 - Barn Branch



Bankfull Dimensions

5.6	x-section area (ft.sq.)
8.4	width (ft)
0.7	mean depth (ft)
1.1	max depth (ft)
8.8	wetted perimeter (ft)
0.6	hydraulic radius (ft)
12.7	width-depth ratio
40.1	W flood prone area (ft)
4.8	entrenchment ratio
1.0	low bank height ratio

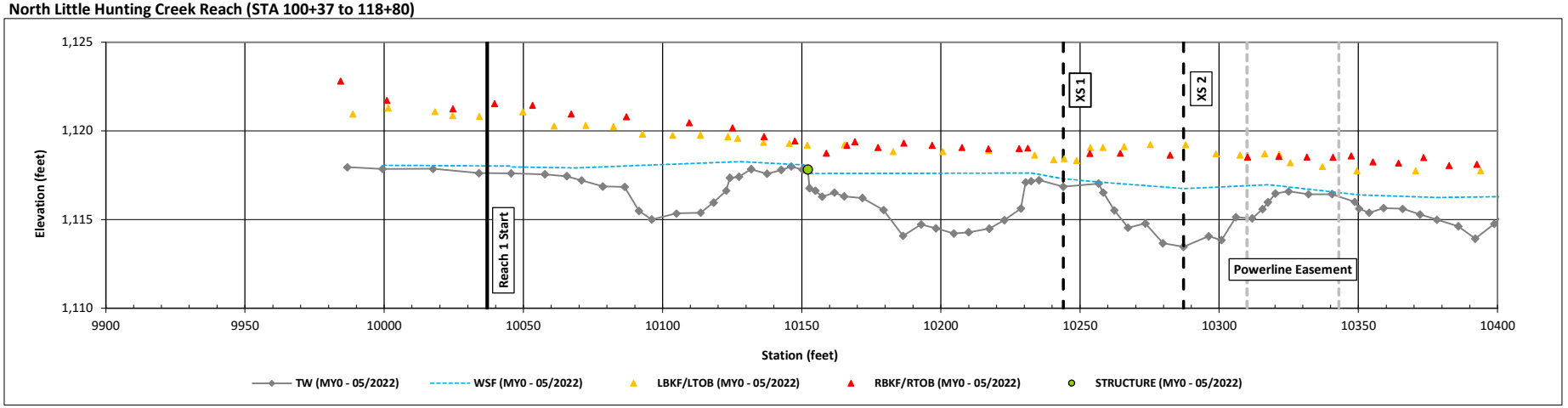
Survey Date: 05/15/22
Field Crew: Turner Land Surveying

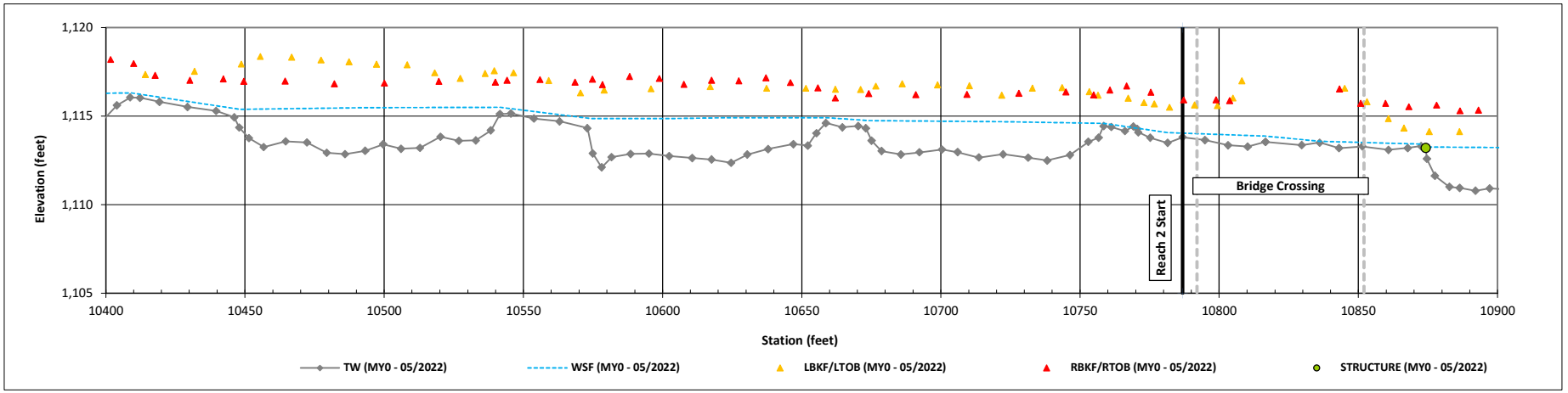
View Downstream

Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

North Little Hunting Creek Reach (STA 100+37 to 118+80)

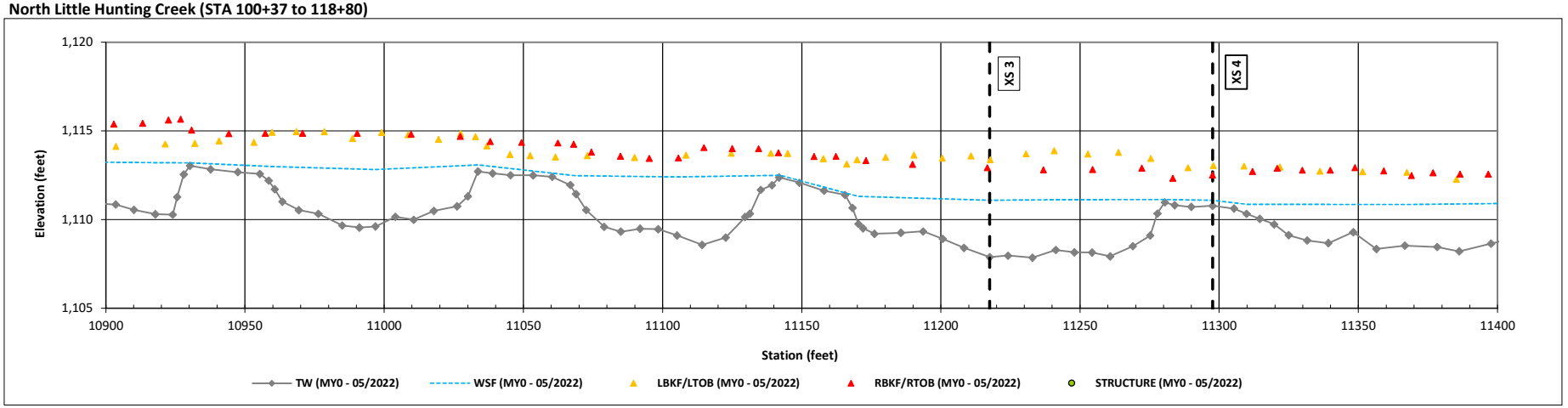


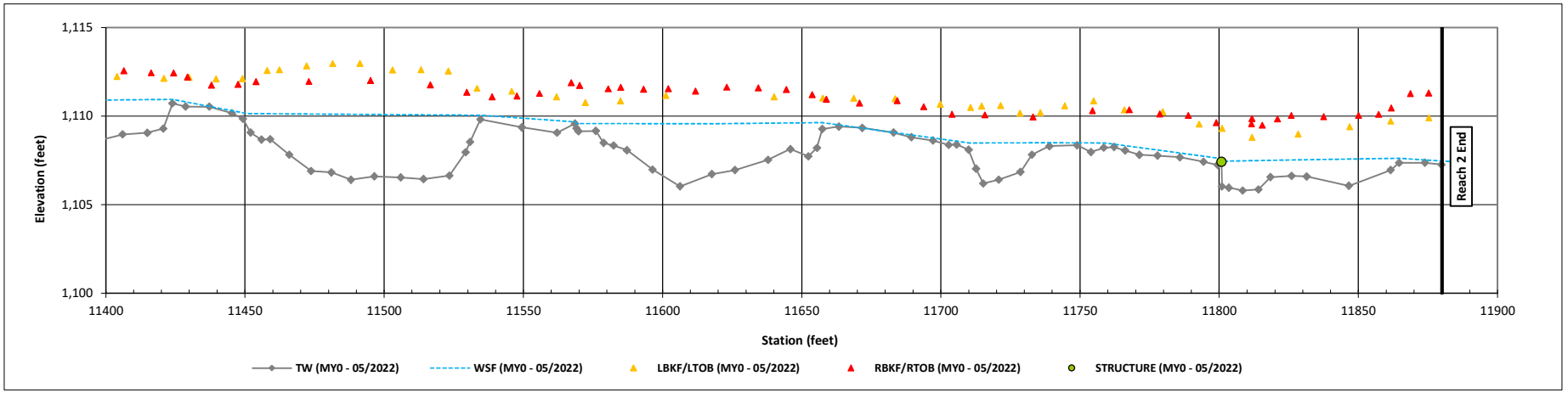


Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

North Little Hunting Creek (STA 100+37 to 118+80)

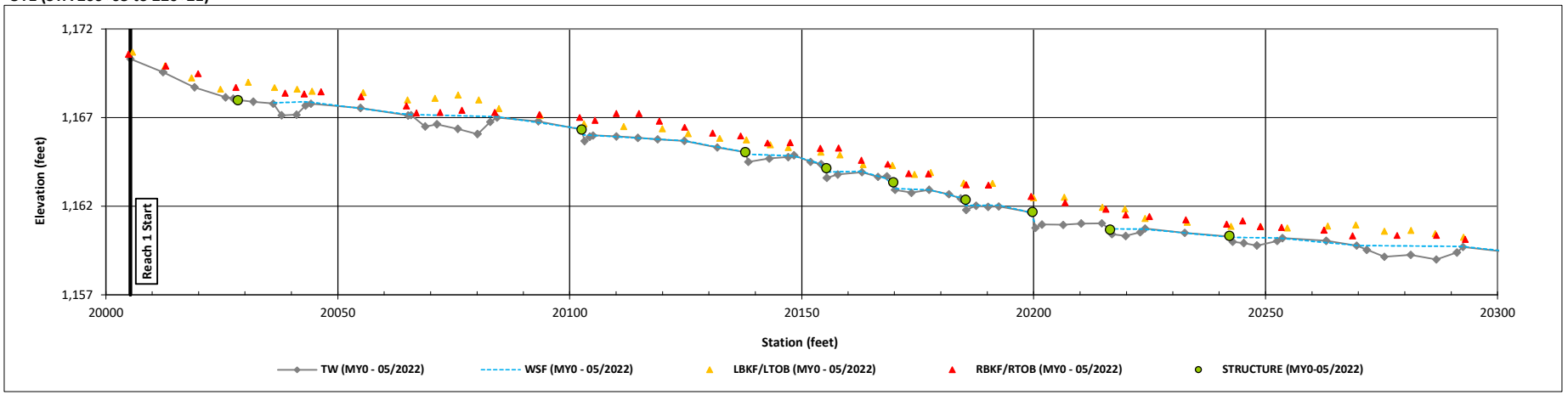




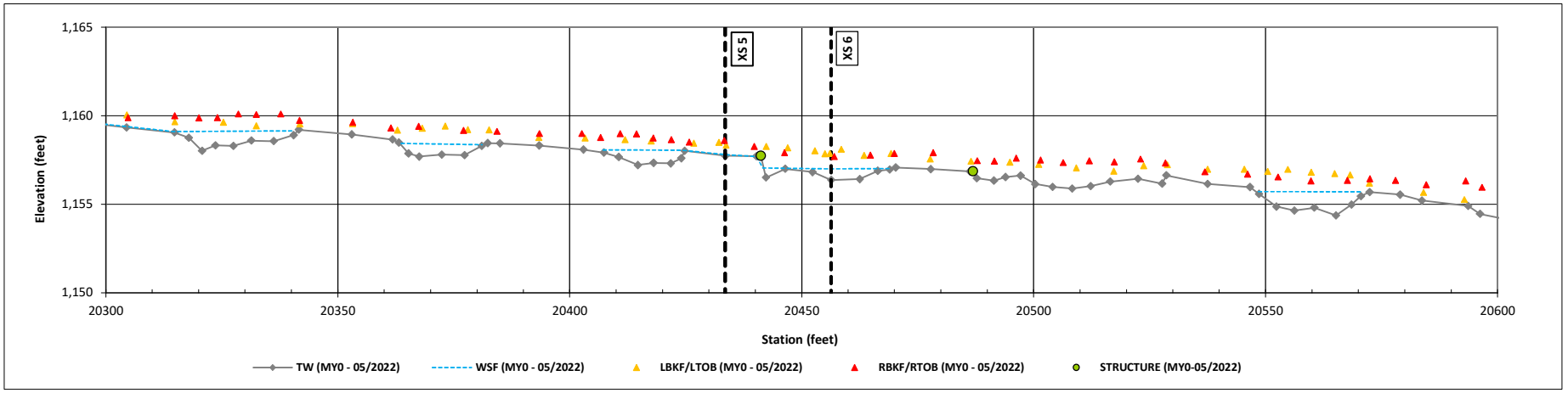
Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 220+21)



Portions of the reach were dry during survey.

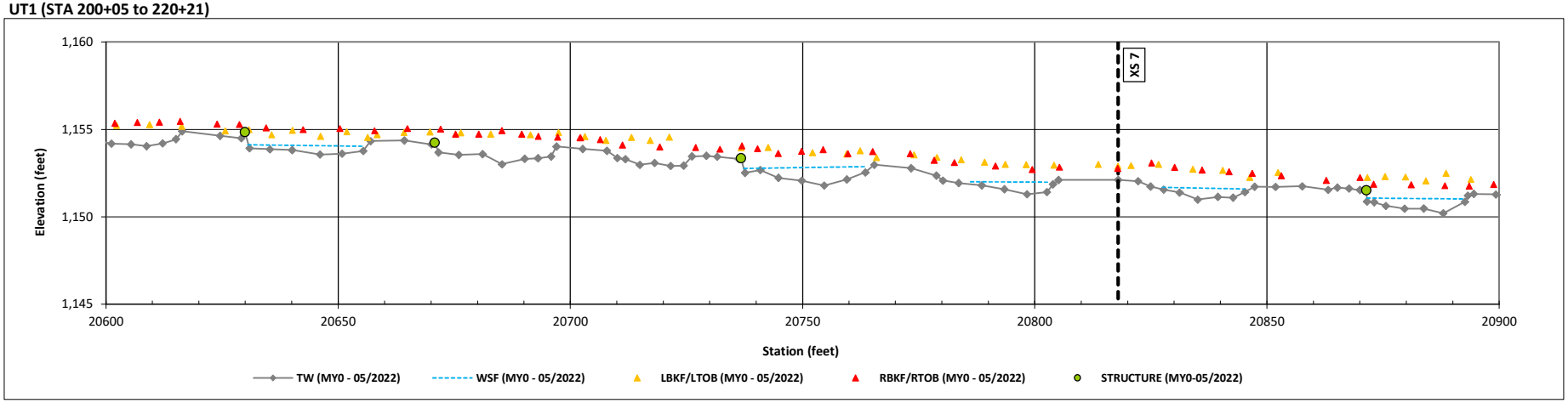


Portions of the reach were dry during survey.

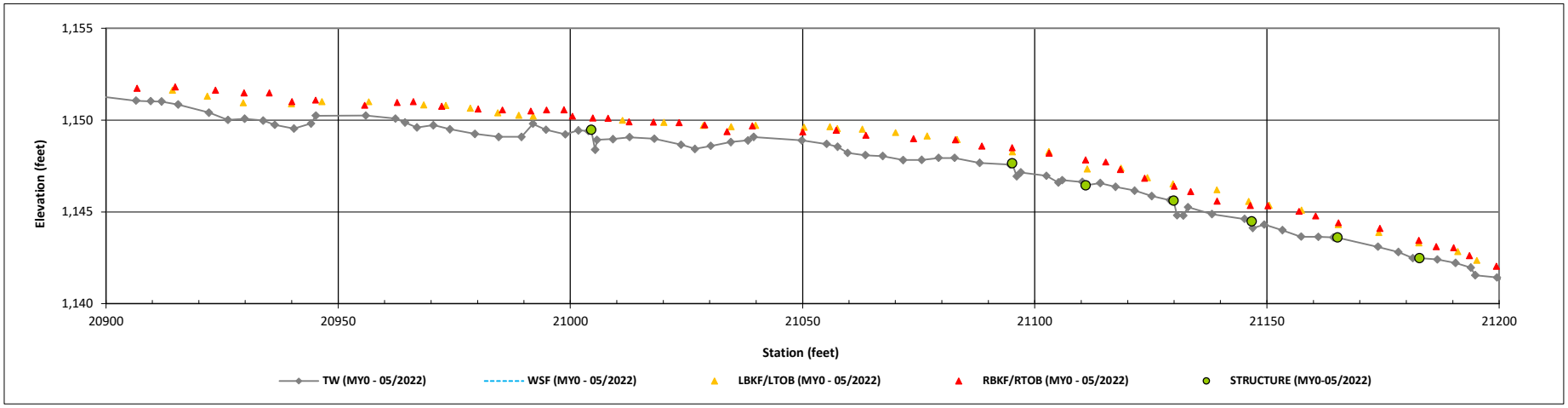
Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 220+21)



Portions of the reach were dry during survey.

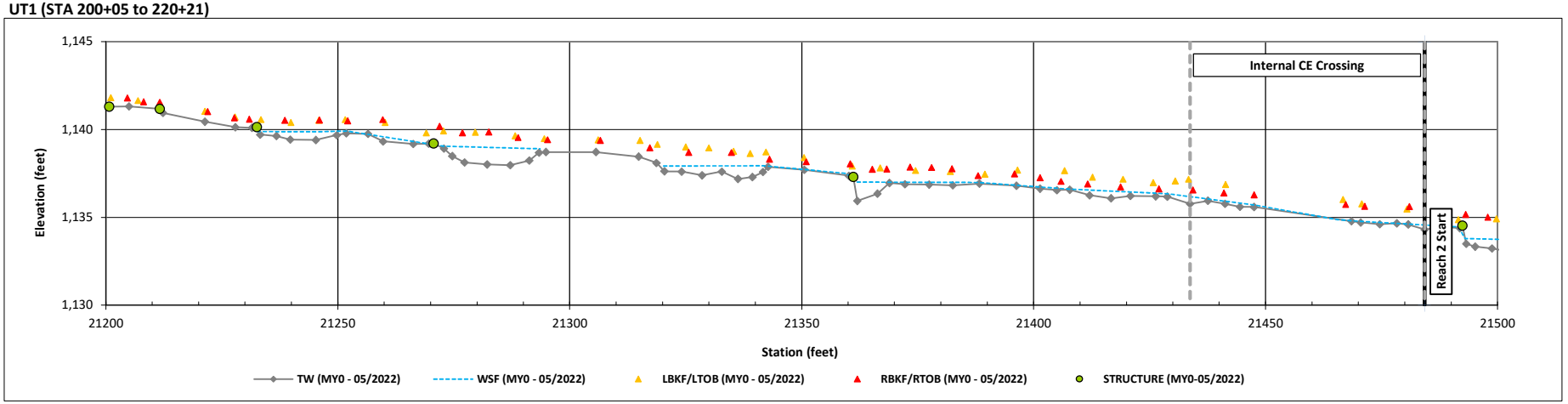


Portions of the reach were dry during survey.

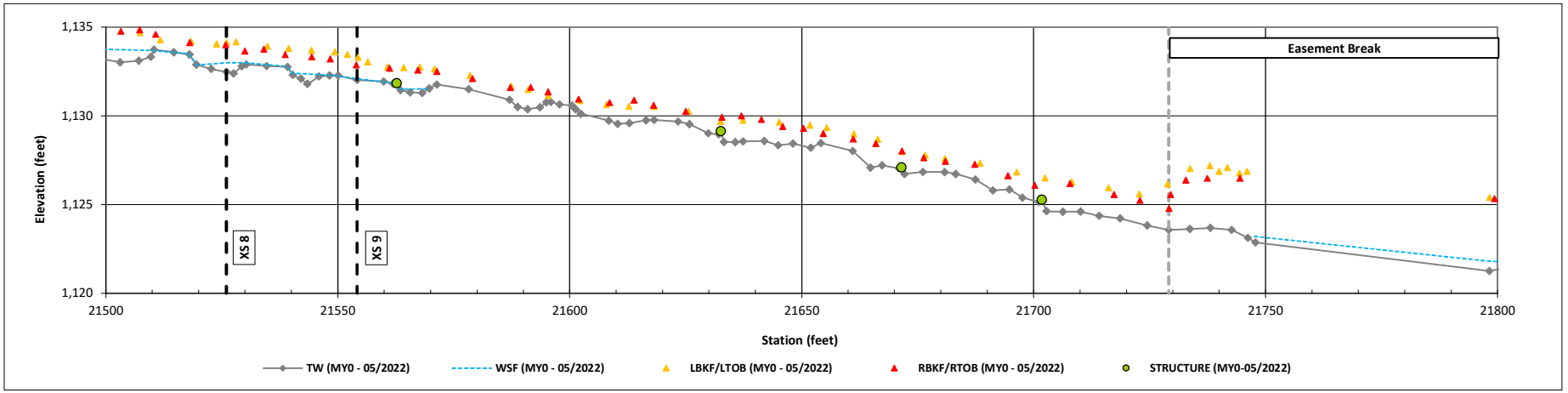
Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 220+21)



Portions of the reach were dry during survey.

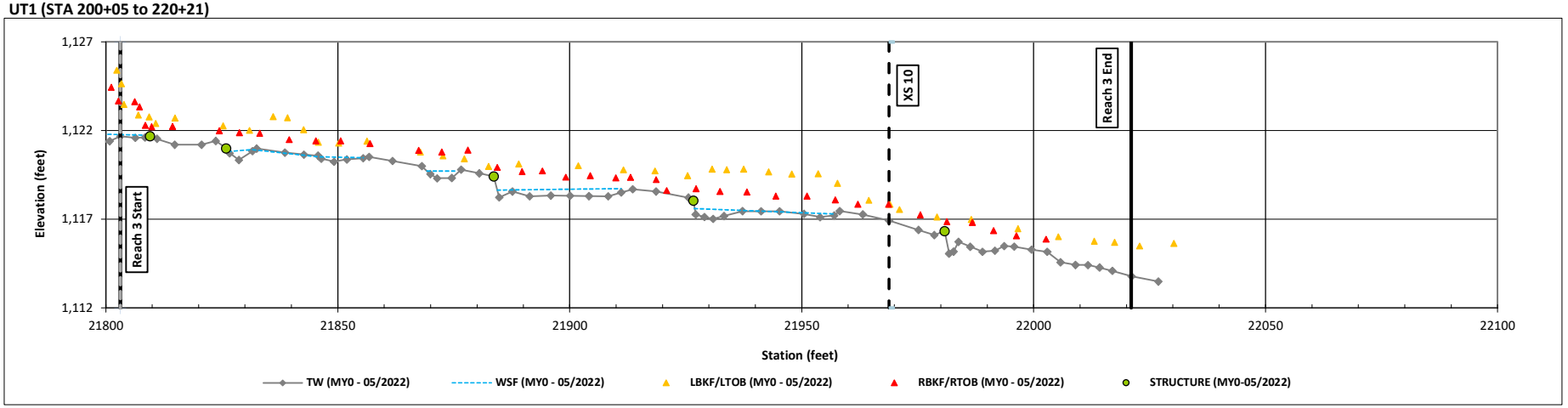


Portions of the reach were dry during survey.

Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 220+21)

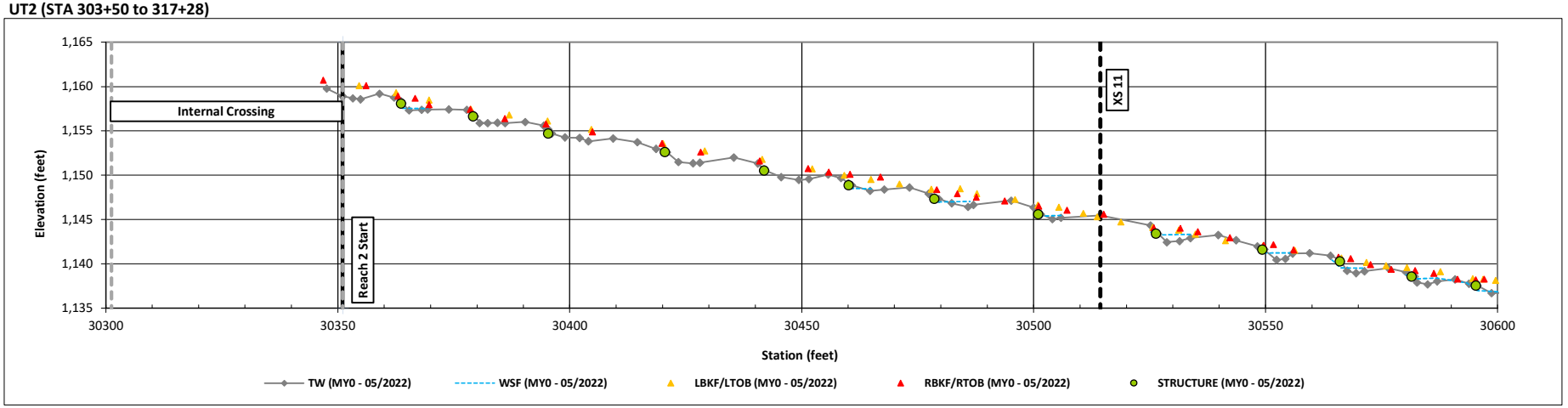


Portions of the reach were dry during survey.

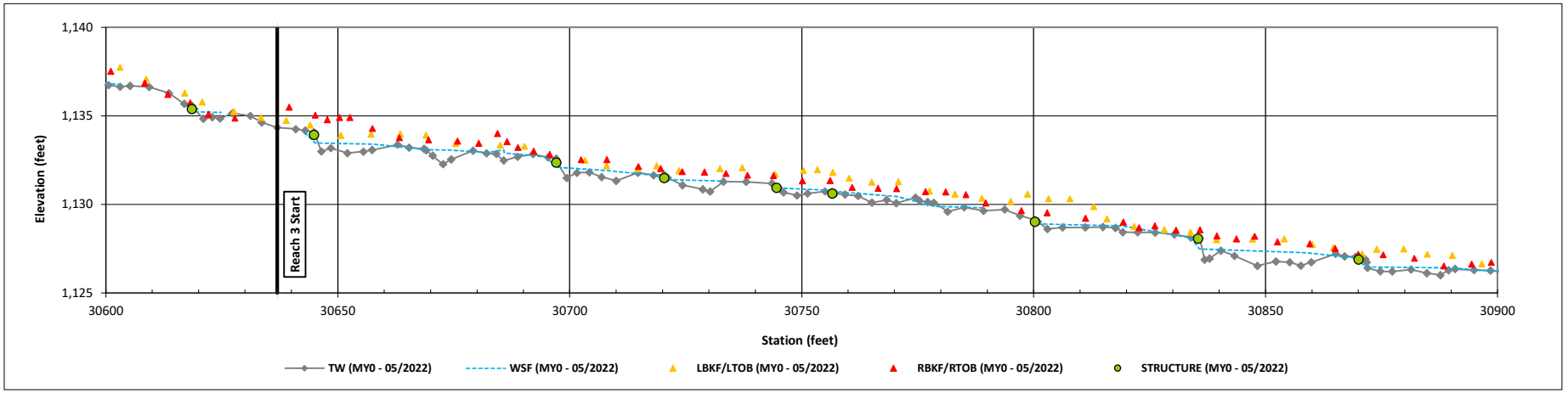
Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

UT2 (STA 303+50 to 317+28)



Portions of the reach were dry during survey.



Portions of the reach were dry during survey.

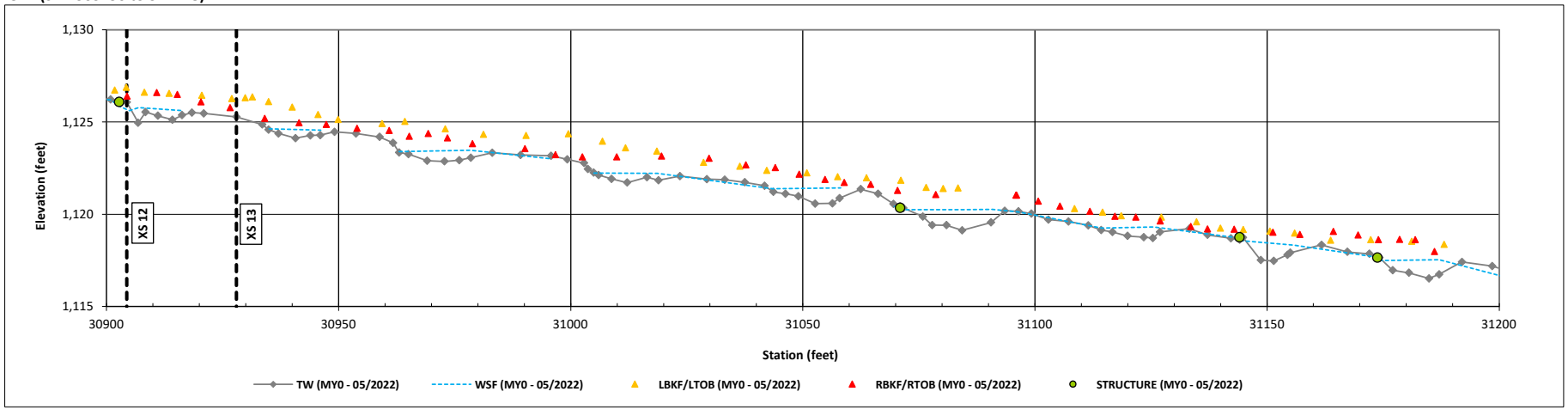
Longitudinal Profile Plots

Hunstman Mitigation Site

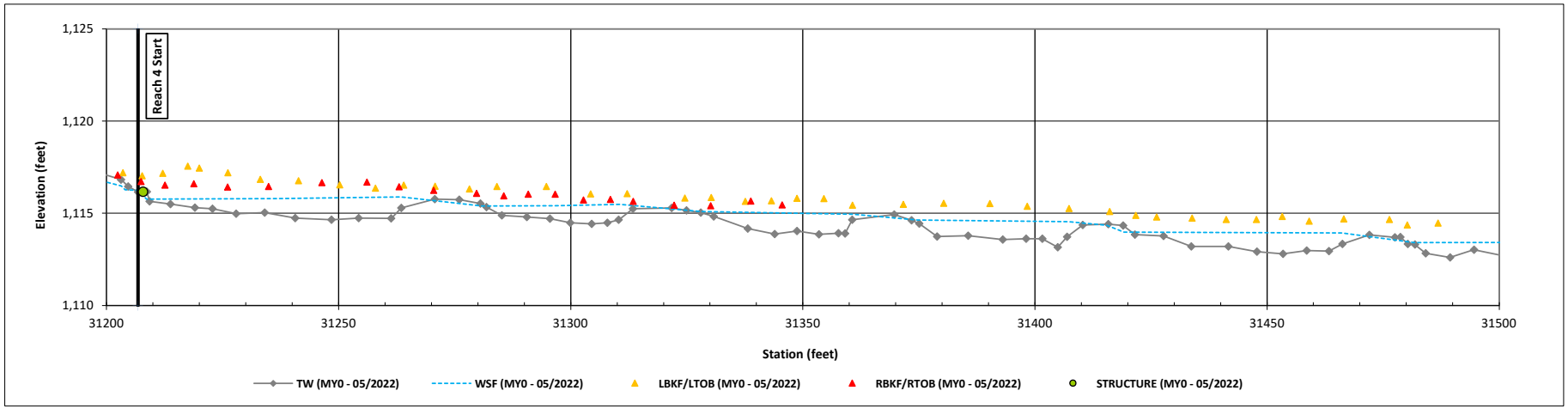
DMS ID No. 100123

Monitoring Year 0 - 2022

UT2 (STA 303+50 to 317+28)



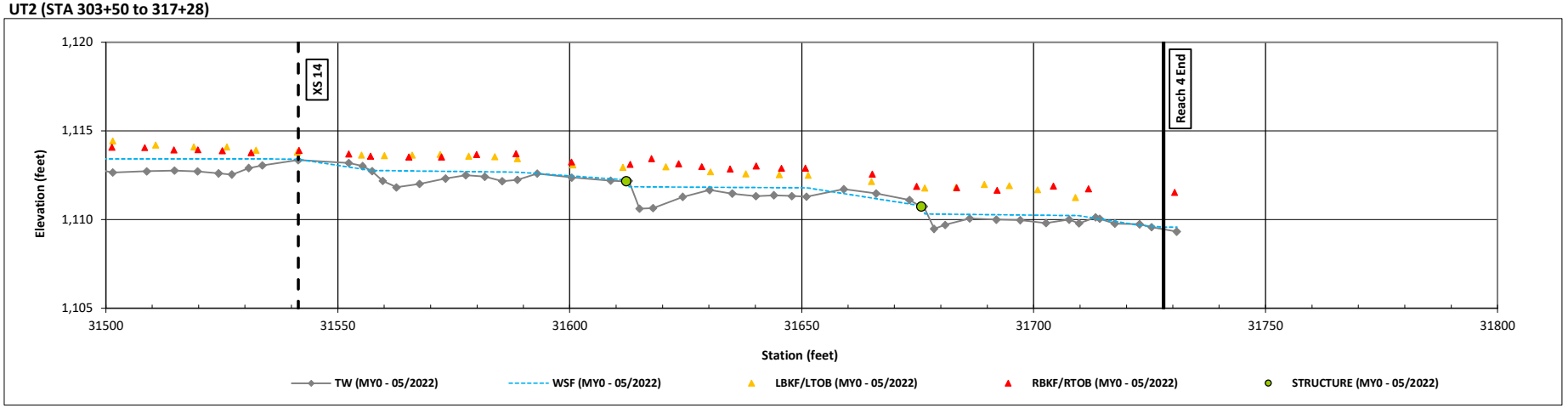
Portions of the reach were dry during survey.



Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

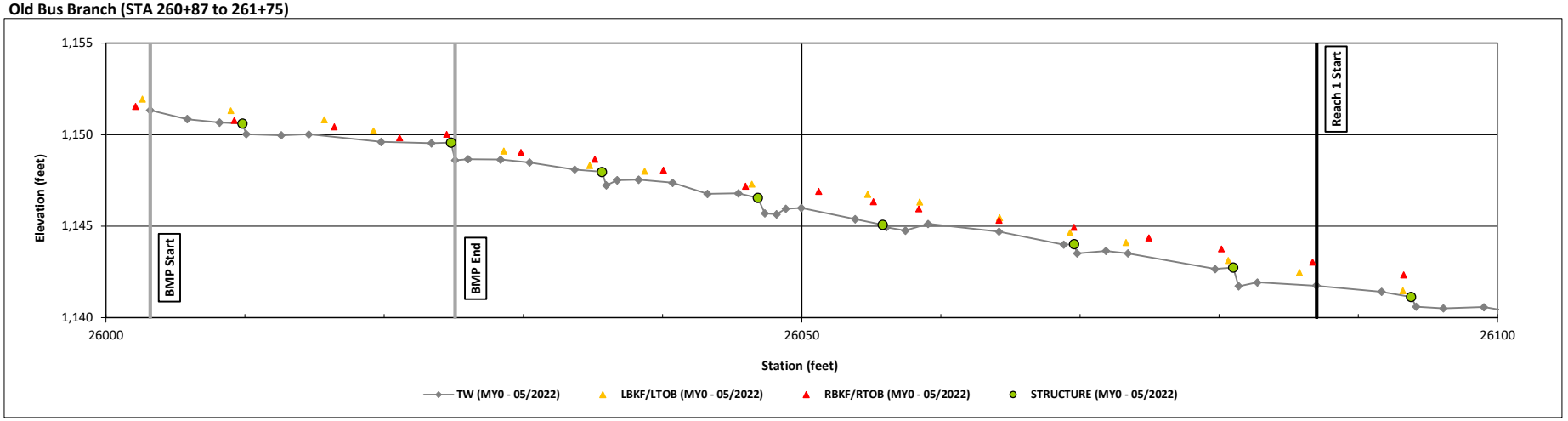
UT2 (STA 303+50 to 317+28)



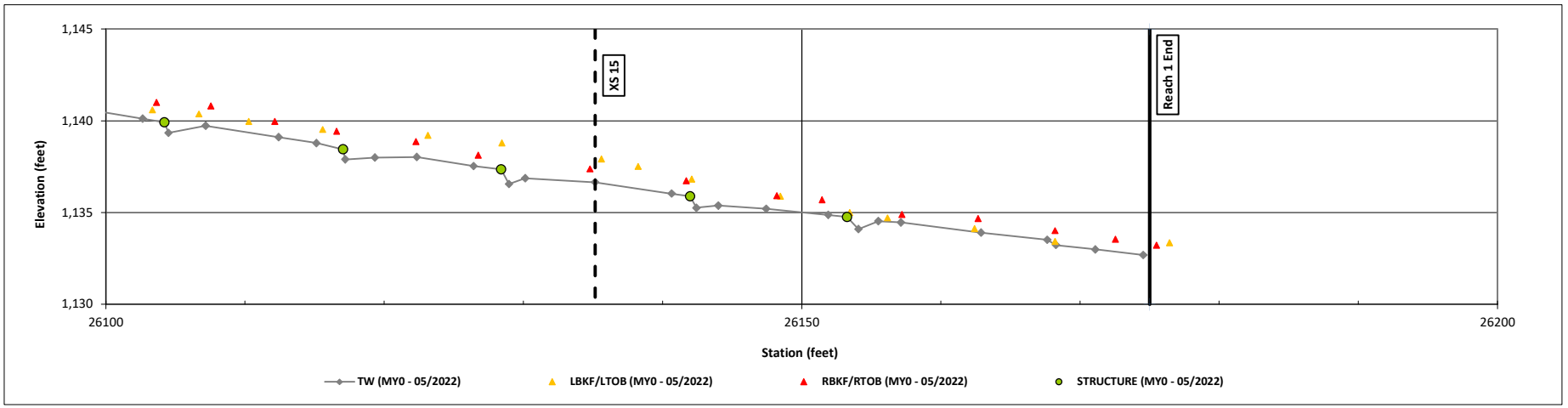
Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

Old Bus Branch (STA 260+87 to 261+75)



Channel was dry at the time of survey.

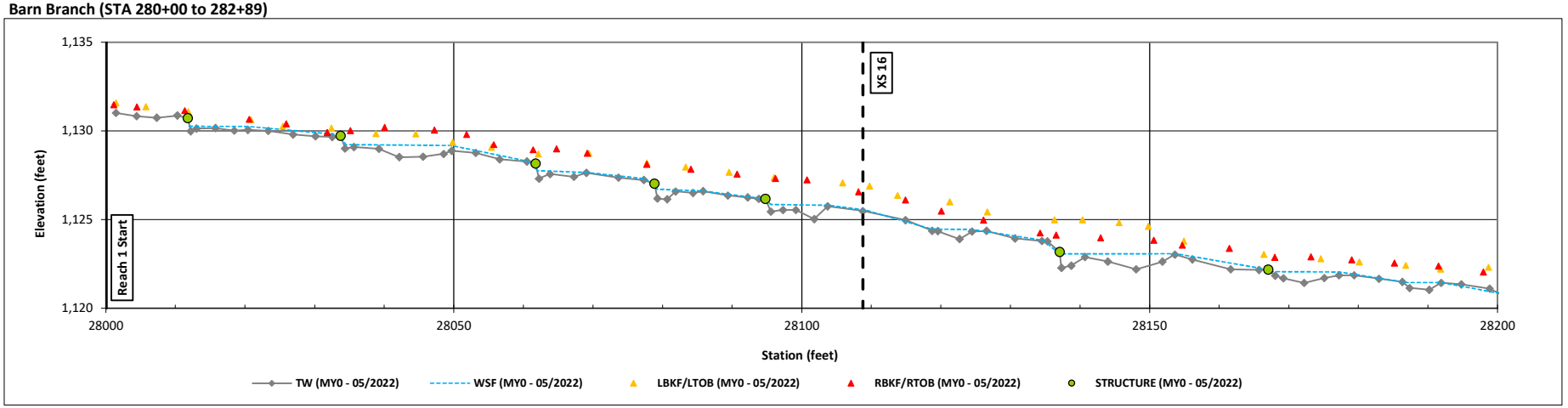


Channel was dry at the time of survey.

Longitudinal Profile Plots

Hunstman Mitigation Site
DMS ID No. 100123
Monitoring Year 0 - 2022

Barn Branch (STA 280+00 to 282+89)



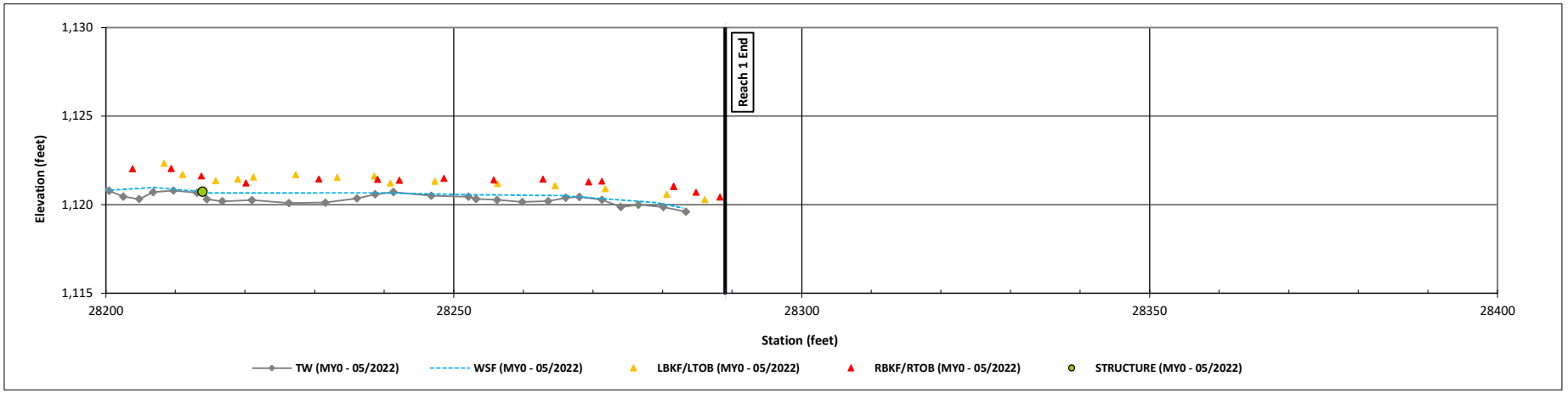


Table 8a. Baseline Stream Data Summary

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**North Little Hunting Creek Reach 1**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	12.4	16.3	2	22.0		22.1		1
Floodprone Width (ft)	17.0	44.0	2	48.0	220.0	78.1		1
Bankfull Mean Depth	1.6	1.7	2	1.3		1.3		1
Bankfull Max Depth	2.1	2.3	2	2.0		2.2		1
Bankfull Cross Sectional Area (ft^2)	20.6	25.8	2	29.2		28.6		1
Width/Depth Ratio	7.5	10.3	2	16.6		17.1		1
Entrenchment Ratio	1.4	2.7	2	2.2	10.0	3.5		1
Bank Height Ratio	2.0	2.3	2	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	15.00			--		64.0		1
Rosgen Classification	G4			C4		C4		
Bankfull Discharge (cfs)	100-110			100.0		90.6		
Sinuosity	1.1			1.3		1.3		
Water Surface Slope ($ft/ft)^2$	0.0073			0.0049		0.0053		
Other	--			--		--		
Parameter	**North Little Hunting Creek Reach 2**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	12.4	16.3	2	23.0		27.9		1
Floodprone Width (ft)	17.0	44.0	2	51.0	230.0	61.2		1
Bankfull Mean Depth	1.6	1.7	2	1.4		1.4		1
Bankfull Max Depth	2.1	2.3	2	2.0		2.3		1
Bankfull Cross Sectional Area (ft^2)	20.6	25.8	2	31.1		37.8		1
Width/Depth Ratio	7.5	10.3	2	17.0		20.5		1
Entrenchment Ratio	1.4	2.7	2	2.2	10.0	2.2		1
Bank Height Ratio	2.0	2.3	2	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	15.00			--		105		1
Rosgen Classification	G4			C4		C3		
Bankfull Discharge (cfs)	100-110			110.0		114.8		
Sinuosity	1.1			1.2		1.2		
Water Surface Slope ($ft/ft)^2$	0.0073			0.0066		0.0061		
Other	--			--		--		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

Table 8b. Baseline Stream Data Summary

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**UT1 Reach 1**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	10.2	13.7	2	4.5	5.7	4.8	5.2	2
Floodprone Width (ft)	23.0	35.0	2	10.0	57.0	41.3	43.8	2
Bankfull Mean Depth	0.7	0.8	2	0.3	0.4	0.3	0.4	2
Bankfull Max Depth	1.3	1.7	2	0.5	0.6	0.6		2
Bankfull Cross Sectional Area (ft^2)	8.2	9.8	2	1.5	2.3	1.4	1.9	2
Width/Depth Ratio	12.7	19.1	2	13.5	13.9	12.3	18.8	2
Entrenchment Ratio	2.2	2.5	2	>1.4	>2.2	8.0	9.1	2
Bank Height Ratio	1.0	1.8	2	1.0	1.1	1.0		2
Max part size (mm) mobilized at bankfull	27.00			--		39.5	43.2	2
Rosgen Classification	E4/C4			C4 & B4		C4b		
Bankfull Discharge (cfs)	7-11			7.0		3.4		
Sinuosity	1.1			1.1	1.3	1.2		
Water Surface Slope ($ft/ft)^2$	0.0296			0.0190	0.0595	0.0243		
Other	--			--		--		
Parameter	**UT1 Reach 2**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	10.2	13.7	2	6.2		6.2		1
Floodprone Width (ft)	23.0	35.0	2	11.0	25.0	42.3		1
Bankfull Mean Depth	0.7	0.8	2	0.4		0.8		1
Bankfull Max Depth	1.3	1.7	2	0.6		1.5		1
Bankfull Cross Sectional Area (ft^2)	8.2	9.8	2	2.6		5.2		1
Width/Depth Ratio	12.7	19.1	2	14.6		7.4		1
Entrenchment Ratio	2.2	2.5	2	1.8	4.0	6.8		1
Bank Height Ratio	1.0	1.8	2	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	27.00			--		39		1
Rosgen Classification	E4/C4			C4b		C4b		
Bankfull Discharge (cfs)	7-11			10.0		31.8		
Sinuosity	1.1			1.2		1.2		
Water Surface Slope ($ft/ft)^2$	0.0296			0.0380		0.0399		
Other	--			--		--		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.
2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

Table 8c. Baseline Stream Data Summary

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**UT1 Reach 3**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	10.2	13.7	2	6.6		6.3		1
Floodprone Width (ft)	23.0	35.0	2	12.0	26.0	18.4		1
Bankfull Mean Depth	0.7	0.8	2	0.5		0.5		1
Bankfull Max Depth	1.3	1.7	2	0.8		0.9		1
Bankfull Cross Sectional Area (ft^2)	8.2	9.8	2	3.0		3.4		1
Width/Depth Ratio	12.7	19.1	2	14.3		11.7		1
Entrenchment Ratio	2.2	2.5	2	1.8	4.0	2.9		1
Bank Height Ratio	1.0	1.8	2	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	27.00			--		53.7		1
Rosgen Classification	E4/C4			C4b		C4b		
Bankfull Discharge (cfs)	7-11			11.0		15.3		
Sinuosity	1.1			1.1		1.1		
Water Surface Slope ($ft/ft)^2$	0.0296			0.0310		0.0366		
Other	--			--		--		
Parameter	**UT2 Reach 2**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	3.5		1	5.0		5.1		1
Floodprone Width (ft)	5.0		1	7.0	12.0	18.2		1
Bankfull Mean Depth	0.8		1	0.3		0.3		1
Bankfull Max Depth	1.0		1	0.5		0.5		1
Bankfull Cross Sectional Area (ft^2)	2.6		1	1.6		1.4		1
Width/Depth Ratio	4.7		1	15.4		18.0		1
Entrenchment Ratio	1.3		1	1.4	2.4	3.6		1
Bank Height Ratio	2.8		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	0.90			--		44		1
Rosgen Classification	A6			B5a		B4a		
Bankfull Discharge (cfs)	7.0			7.0		6.7		
Sinuosity	1.1			1.1		1.1		
Water Surface Slope ($ft/ft)^2$	0.0791			0.0830		0.0856		
Other	--			--		--		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

Table 8d. Baseline Stream Data Summary

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN			MONITORING BASELINE (MY0)		
Parameter	**UT2 Reach 3**								
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Bankfull Width (ft)	3.0		1	6.6			7.5		1
Floodprone Width (ft)	10.0		1	9.0	16.0		23.0		1
Bankfull Mean Depth	1.1		1	0.4			0.5		1
Bankfull Max Depth	1.4		1	0.5			0.8		1
Bankfull Cross Sectional Area (ft^2)	3.2		1	2.6			3.4		1
Width/Depth Ratio	2.9		1	17.1			16.3		1
Entrenchment Ratio	3.2		1	1.4	2.4		3.1		1
Bank Height Ratio	2.3		1	1.0	1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.90			--			33.7		1
Rosgen Classification	E5b			B5			C4b		
Bankfull Discharge (cfs)	9.0			9.0			13.3		
Sinuosity	1.1			1.1			1.1		
Water Surface Slope ($ft/ft)^2$	0.0254			0.0300			0.0319		
Other	--			--			--		
Parameter	**UT2 Reach 4**								
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Bankfull Width (ft)	3.0		1	8.4			6.0		1
Floodprone Width (ft)	10.0		1	18.0	84.0		21.3		1
Bankfull Mean Depth	1.1		1	0.5			0.4		1
Bankfull Max Depth	1.4		1	0.8			0.6		1
Bankfull Cross Sectional Area (ft^2)	3.2		1	4.5			2.2		1
Width/Depth Ratio	2.9		1	15.8			16.3		1
Entrenchment Ratio	3.2		1	2.2	10.0		3.6		1
Bank Height Ratio	2.3		1	1.0	1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.90			--			31		1
Rosgen Classification	E5b			C5			C4		
Bankfull Discharge (cfs)	9.0			9.0			4.7		
Sinuosity	1.1			1.3			1.3		
Water Surface Slope ($ft/ft)^2$	0.0254			0.0700			0.0128		
Other	--			--			--		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

Table 8e. Baseline Stream Data Summary

Huntsman Mitigation Site

DMS Project No. 100123

Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN			MONITORING BASELINE (MY0)		
Parameter	**Old Bus Branch**								
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Bankfull Width (ft)	4.1		1	3.0			3.7		1
Floodprone Width (ft)	7.0		1	4.0	7.0		6.4		1
Bankfull Mean Depth	0.8		1	0.3			0.3		1
Bankfull Max Depth	1.2		1	0.5			0.4		1
Bankfull Cross Sectional Area (ft^2)	3.4		1	0.9			1.0		1
Width/Depth Ratio	4.9		1	10.3			13.7		1
Entrenchment Ratio	1.7		1	1.4	2.4		1.7		1
Bank Height Ratio	6.3		1	1.0	1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.10			--			47.3		1
Rosgen Classification	G5			A5			B4a		
Bankfull Discharge (cfs)	4.0			4.0			4.9		
Sinuosity	1.1			1.0			1.0		
Water Surface Slope ($ft/ft)^2$	0.0284			0.0900			0.1030		
Other	--			--			--		
Parameter	**Barn Branch**								
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**n**	**Min**	**Max**	**n**
Bankfull Width (ft)	3.8		1	4.3			8.4		1
Floodprone Width (ft)	9.0		1	6.0	10.0		40.1		1
Bankfull Mean Depth	0.9		1	0.3			0.7		1
Bankfull Max Depth	1.2		1	0.5			1.1		1
Bankfull Cross Sectional Area (ft^2)	3.3		1	1.4			5.6		1
Width/Depth Ratio	4.3		1	13.2			12.7		1
Entrenchment Ratio	2.5		1	1.4	2.4		4.8		1
Bank Height Ratio	2.5		1	1.0	1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.10			--			52		1
Rosgen Classification	B5a			B5a			B4a		
Bankfull Discharge (cfs)	6.0			6.0			30.2		
Sinuosity	1.0			1.1			1.1		
Water Surface Slope ($ft/ft)^2$	0.0435			0.0520			0.0388		
Other	--			--			--		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

2. Channel slope is calculated from the surface of the channel bed rather than water surface.

(---): Data was not provided, N/A: Not Applicable

Table 9. Cross-Section Morphology Monitoring Summary

Huntsman Mitigation Site

DMS Project No. 100123

Monitoring Year 0 - 2022

	North Little Hunting Creek Reach 1												North Little Hunting Creek Reach 2											
	Cross-Section 1 (Riffle)						Cross-Section 2 (Pool)						Cross-Section 3 (Pool)						Cross-Section 4 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	1119.0						1118.7						1113.4						1113.1					
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0						--						--						1.0					
Thalweg Elevation	1116.9						1113.5						1107.9						1110.8					
LTOB[2] Elevation	1119.0						1118.7						1113.4						1113.1					
LTOB[2] Max Depth (ft)	2.2						5.2						5.5						2.3					
LTOB[2] Cross Sectional Area (ft^2)	28.6						74.9						78.6						37.8					
	UT1 Reach 1																		UT1 Reach 2					
	Cross-Section 5 (Riffle)						Cross-Section 6 (Pool)						Cross-Section 7 (Riffle)						Cross-Section 8 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	1158.4						1157.9						1152.8						1134.0					
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0						--						1.0						1.0					
Thalweg Elevation	1157.7						1156.4						1152.1						1132.5					
LTOB[2] Elevation	1158.4						1157.9						1152.8						1134.0					
LTOB[2] Max Depth (ft)	0.6						1.5						0.6						1.5					
LTOB[2] Cross Sectional Area (ft^2)	1.4						7.5						1.9						5.2					
	UT1 Reach 2						UT1 Reach 3						UT2 Reach 2						UT2 Reach 3					
	Cross-Section 9 (Pool)						Cross-Section 10 (Riffle)						Cross-Section 11 (Riffle)						Cross-Section 12 (Pool)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	1133.2						1117.8						1144.9						1126.9					
Bank Height Ratio - Based on AB Bankfull[1] Area	--						1.0						1.0						--					
Thalweg Elevation	1132.0						1116.9						1144.3						1125.0					
LTOB[2] Elevation	1133.2						1117.8						1144.9						1126.9					
LTOB[2] Max Depth (ft)	1.2						0.9						0.5						1.9					
LTOB[2] Cross Sectional Area (ft^2)	5.3						3.4						1.4						8.8					
	UT2 Reach 3						UT2 Reach 4						Old Bus Branch						Barn Branch					
	Cross-Section 13 (Riffle)						Cross-Section 14 (Riffle)						Cross-Section 15 (Riffle)						Cross-Section 16 (Riffle)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	1125.7						1113.8						1137.1						1126.6					
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0						1.0						1.0						1.0					
Thalweg Elevation	1124.9						1113.2						1136.7						1125.5					
LTOB[2] Elevation	1125.7						1113.8						1137.1						1126.6					
LTOB[2] Max Depth (ft)	0.8						0.6						0.4						1.1					
LTOB[2] Cross Sectional Area (ft^2)	3.4						2.2						1.0						5.6					

[1]Bank Height Ratio (BHR) takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation.

[2]LTOB Area and Max depth - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

APPENDIX D. Project Timeline and Contact Info

Table 10. Project Activity and Reporting History

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		N/A	May 21, 2019
Mitigation Plan Approved		June 2019	June 2021
Construction (Grading) Completed		N/A	April 2022
Planting Completed		N/A	April 2022
As-Built Survey Completed		May 2022	May 2022
Baseline Monitoring Document (Year 0)	Stream Survey	May 2022	June 2022
	Vegetation Survey	April 2022	
Year 1 Monitoring	Stream Survey		
	Vegetation Survey		
Year 2 Monitoring	Stream Survey		
	Vegetation Survey		
Year 3 Monitoring	Stream Survey		
	Vegetation Survey		
Year 4 Monitoring			
Year 5 Monitoring	Stream Survey		
	Vegetation Survey		
Year 6 Monitoring			
Year 7 Monitoring	Stream Survey		
	Vegetation Survey		

Table 11. Project Contact Table

Huntsman Mitigation Site
DMS Project No. 100123
Monitoring Year 0 - 2022

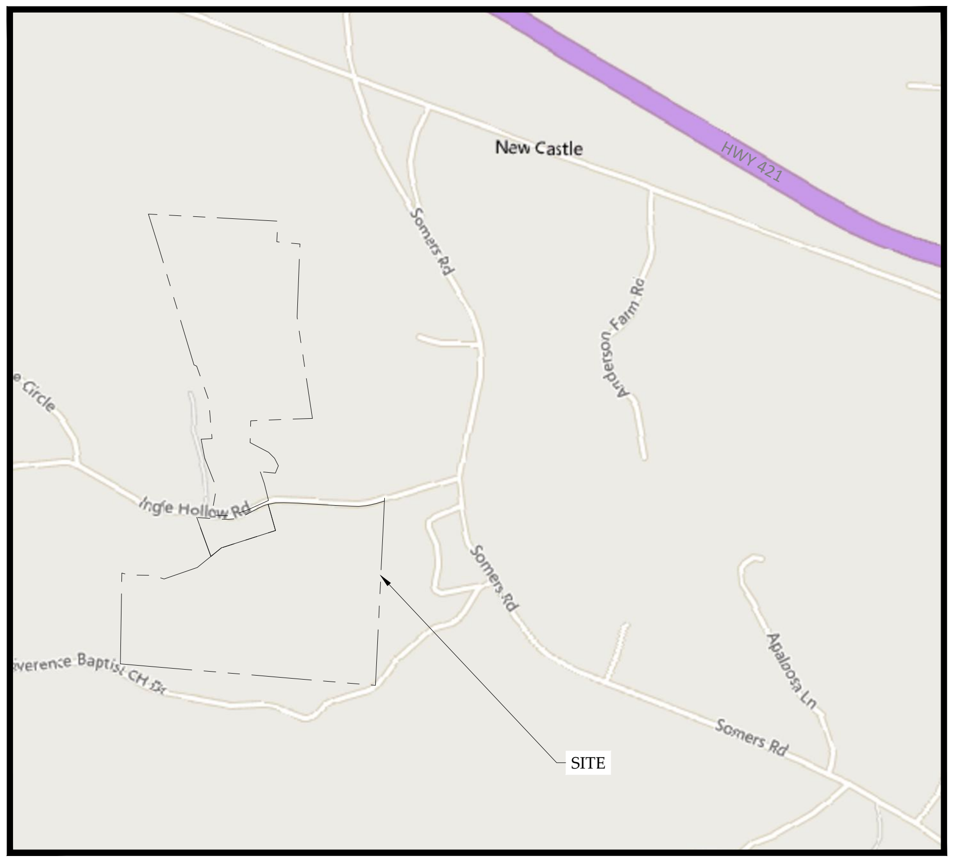
Designer Aaron Earley, PE	**Wildlands Engineering, Inc.** 1430 S. Mint St., Suite 104 Charlotte, NC 28203
	704.819.0848
Construction Contractor	**Wildlands Construction, Inc.** 1430 S. Mint St., Suite 104 Charlotte, NC 28203
Planting Contractor	**Bruton Natural Systems, Inc.** PO Box 1197 Fremont, NC 27830
Seeding Contractor	**Wildlands Construction, Inc.**
Nursery Stock Supplies	**Bruton Natural Systems, Inc.**
Herbaceous Plugs	**Bruton Natural Systems, Inc.**
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Kristi Suggs 704.332.7754

APPENDIX E. Record Drawings and Sealed As-Built Survey

Huntsman Stream Mitigation Site
Record Drawing

Catawba County, North Carolina
Yadkin River Basin 03040102
for
NCDEQ
Division of Mitigation Services

Environmental Quality



Vicinity Map
Not to Scale

Stream Origins		
Name	Northing	Easting
North Little Hunting Creek	875150	1428844
UT 1	877096	1429043
UT 2	874128	1429824
Rifle Tributary	874443	1430197
Trapper Tributary	874452	1430094
Old Bus Branch	874715	1430204
Barn Branch	874755	1423951

RECORD DRAWINGS
ISSUED AUGUST 2, 2022

Sheet Index

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Aaron Earley, PE
704-332-7754

Surveying:
Turner Land Surveying
P.O. Box 148
Swannanoa, NC 28778
David S. Turner, PLS
919-827-0745

Owner:
Matthew Reid
NCDEQ
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699
828-231-7912

DMS ID No. 100123
NCDEQ Contract No. 7891
USACE Action ID No. SAW-2019-00836
NC DWR No. 20190816

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Title Sheet

Revisions:

Date: AUGUST 2, 2022
Job Number: 005-02183
Project Engineer: SRK
Drawn By: JCK
Checked By: EGR

Sheet 0.1

Pre-Construction Features

- Pre-Construction Property Line
- Pre-Construction NCDOT Right of Way (R/W)
- Pre-Construction Overhead Utility Line (OU)
- Pre-Construction Top of Bank (TB)
- Pre-Construction Overhead Utility Easement (OUE)
- Pre-Construction Utility Pole (PP)
- Pre-Construction Fence (X)
- Pre-Construction Storm Pipe
- Pre-Construction Building
- Pre-Construction Wetland
- Pre-Construction Farm Road
- Pre-Construction Rip Rap

Design Features

- Design Alignment (10+00)
- Design Bankfull
- Design Major Contour (5' Interval) (100)
- Design Minor Contour
- Design Limits of Disturbance (LOD)

Design Structures

- Design Angled Log Drop
- Design Log J-hook
- Design Log Vane
- Design Rock Sill
- Design Rock J-hook

Design Structures

- Design Various Constructed Riffles
- Design Rock Cascade with Pools
- Design Brush Toe
- Design Vegetated Soil Lift
- Design Rock Protection
- Design BMP with Rock Weir Outlet
- Design BMP - Rock Cascade with Pools
- Design Culvert Crossing
- Design Debris Removal
- Design Additional Grading

Asbuilt Structures

- Asbuilt Various Constructed Riffles
- Asbuilt Rock Cascade with Pools
- Asbuilt Brush Toe
- Asbuilt Vegetated Soil Lift
- Asbuilt Rock Protection
- Asbuilt Gravel Road

Asbuilt Features

- Asbuilt Alignment
- Asbuilt Bankfull
- Recorded CE (CE)
- Recorded Internal Crossing (CE-IX)
- Recorded Restrictive Covenant
- Asbuilt Major Contour (5' Interval) (100)
- Asbuilt Minor Contour
- Asbuilt Culvert
- Asbuilt Fence (X)

Asbuilt Structures

- Asbuilt Angled Log Drop
- Asbuilt Log J-hook
- Asbuilt Rock Sill
- Asbuilt Boulder Toe

Monitoring Structures

- Photo Point (PP #)
- Permanent Vegetation Plot (VP #)
- Barotroll (BT)
- Crest Gage (CG #)
- Monitoring Cross Section (XS #)

Topographic Survey completed by Turner Mapping and Surveying in March 2020. Parcel Boundary survey completed by Turner Mapping and Surveying in March 2020. Asbuilt survey completed by Turner Mapping and Surveying in May 2022.

Types of Constructed Riffles used at certain locations may be modified at Engineer's Discretion.

PROJECT NOTES:

1. *DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED*

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing

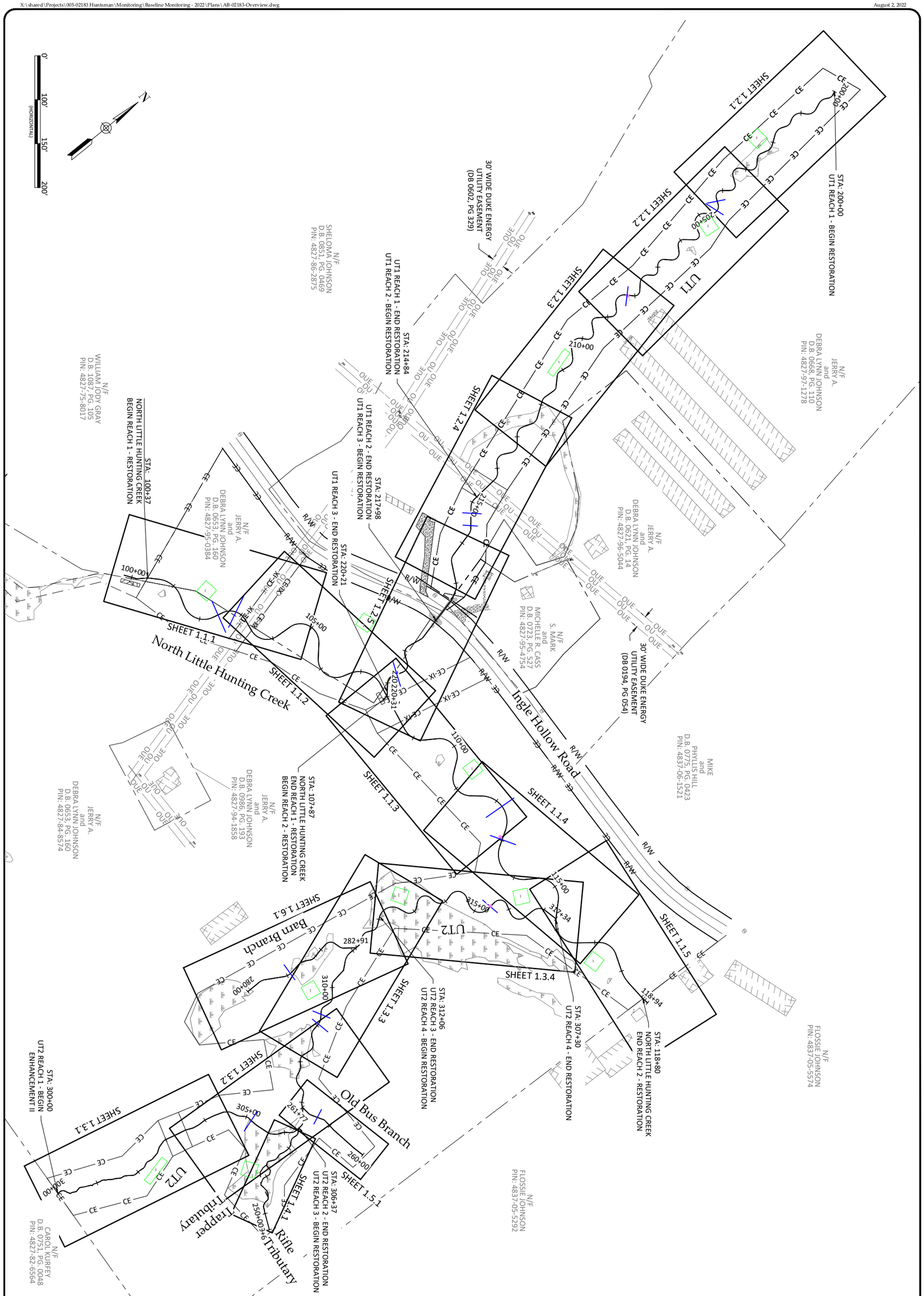
Wilkes County, North Carolina

General Notes and Symbols

Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 0.2



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

0.3
Sheet

Revisions:

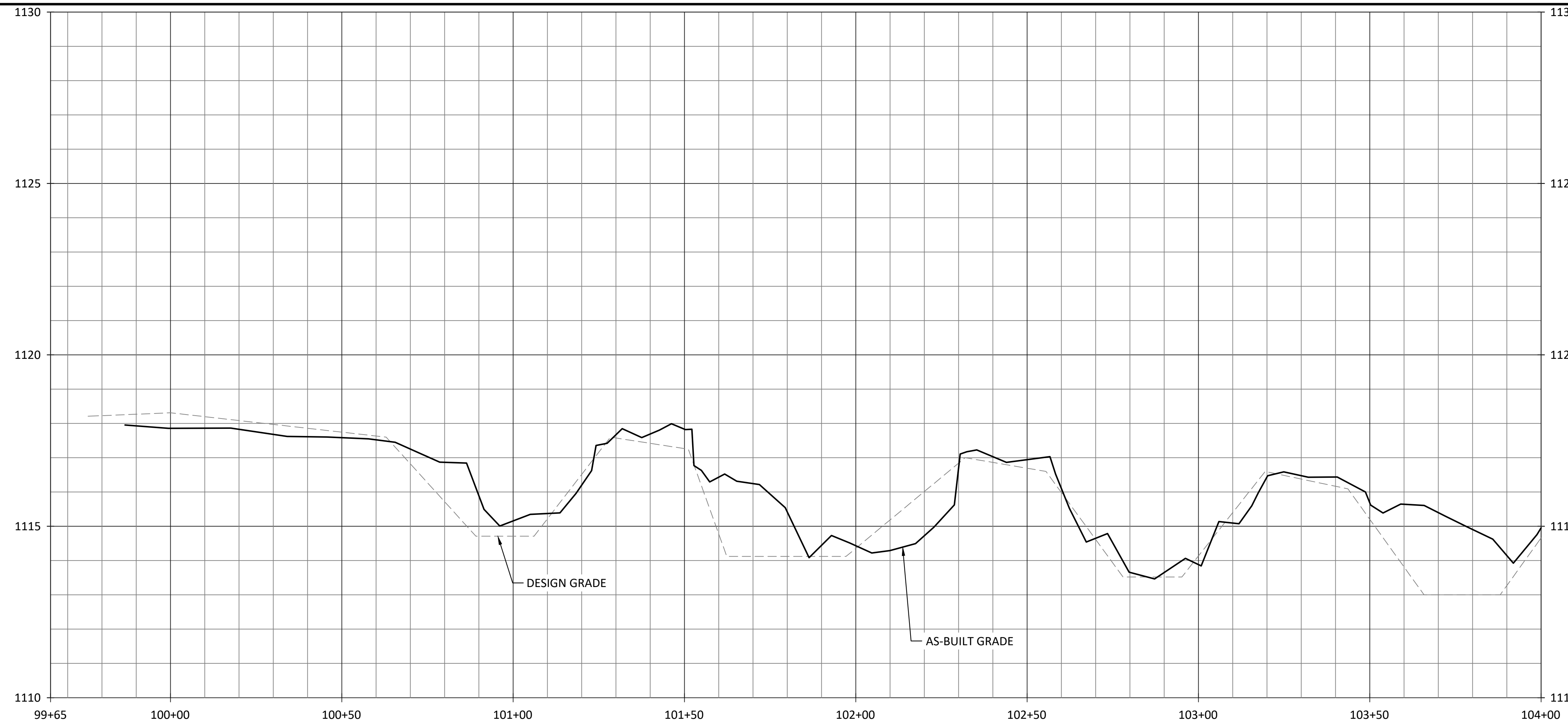
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

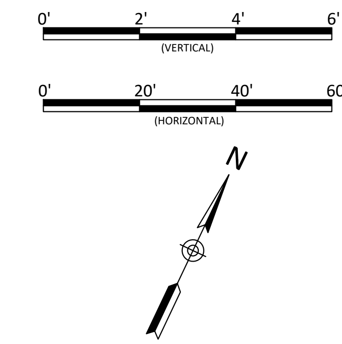
Project Overview

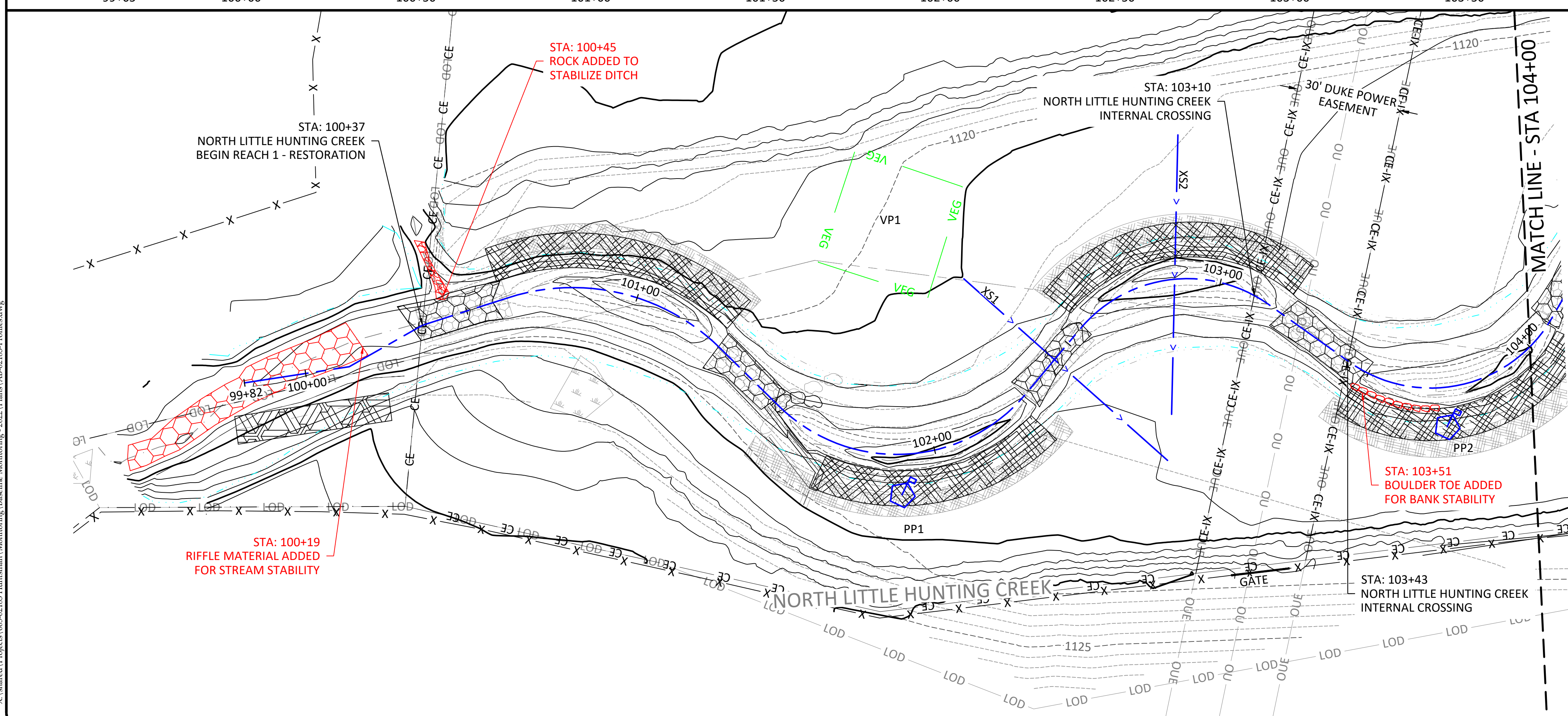
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028370 AARON S. EARLES 6-10-22

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

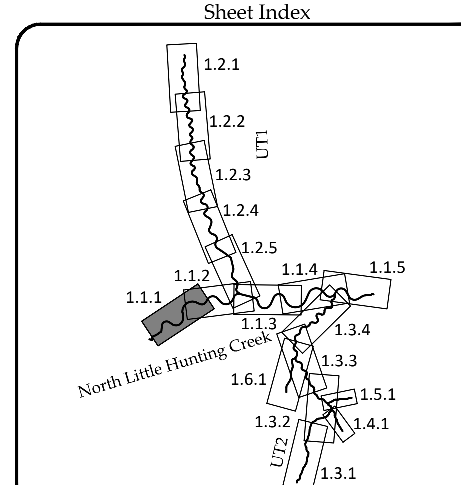
August 2, 2022







Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

Huntsman Stream Mitigation Site Record Drawing

Wilkes County, North Carolina

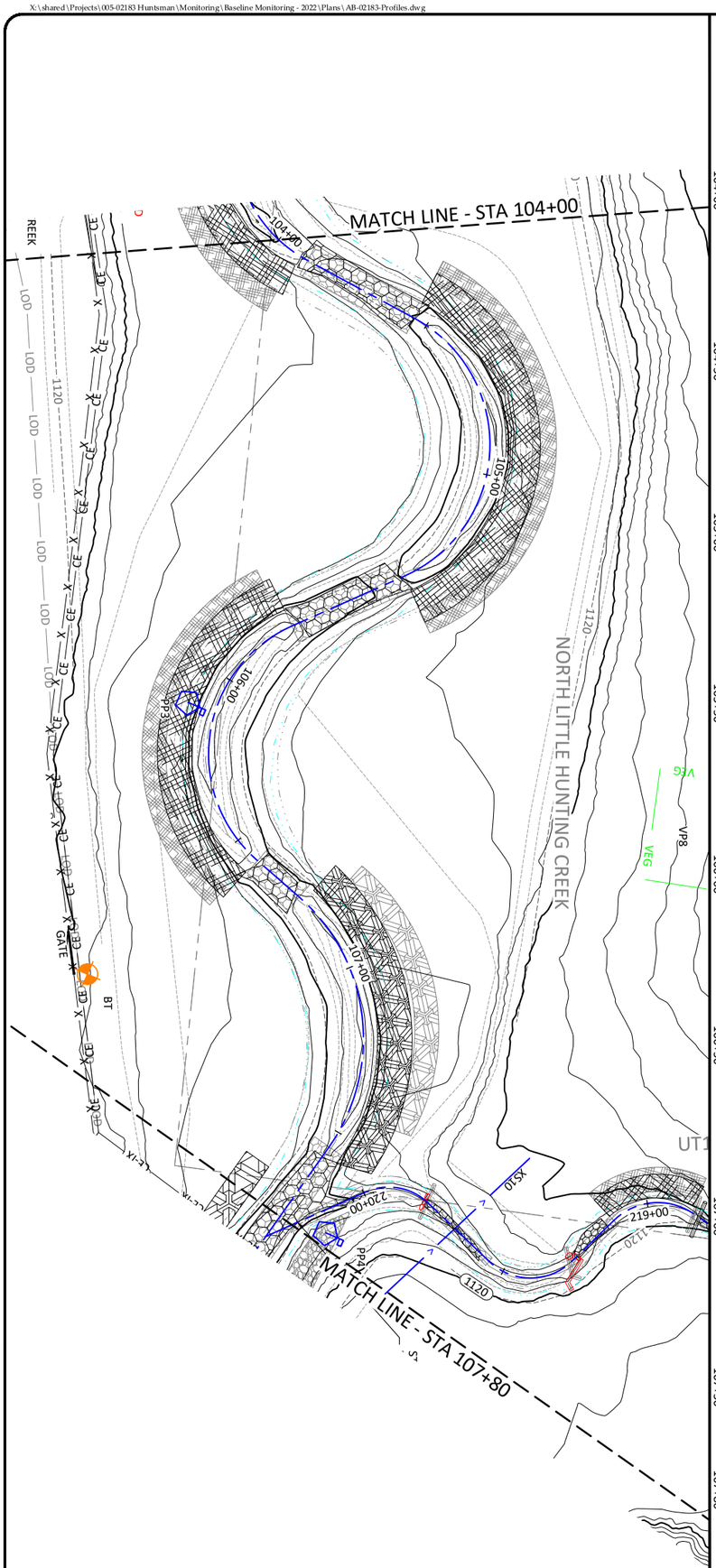
North Little Hunting Creek Stream Plan and Profile

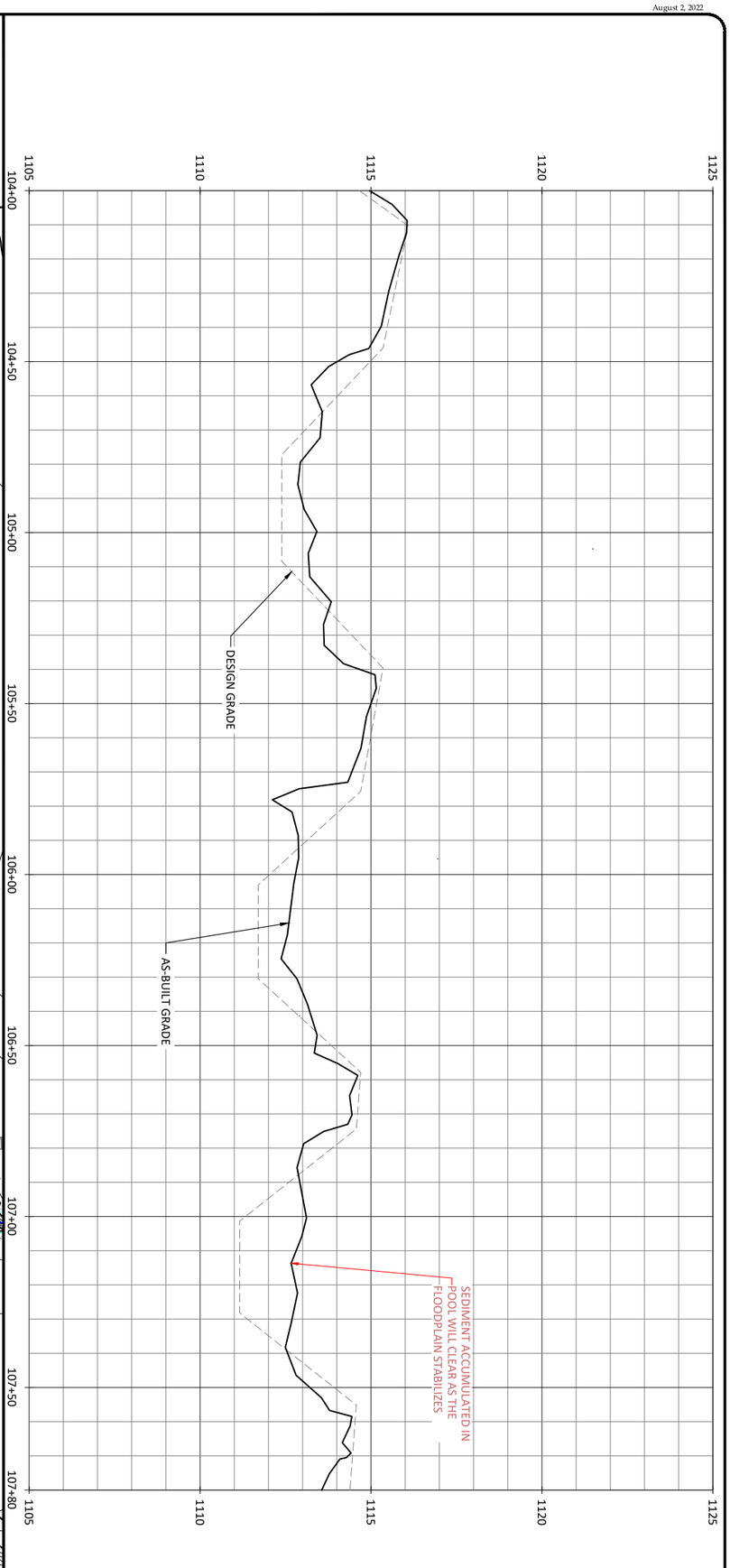
Revisions:

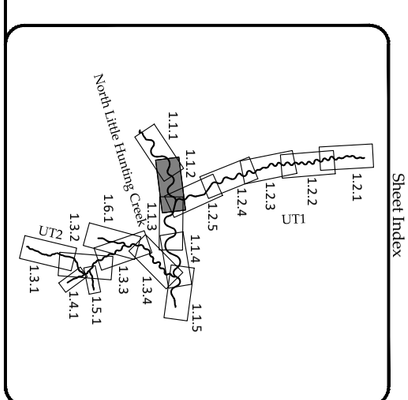
Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.1.1

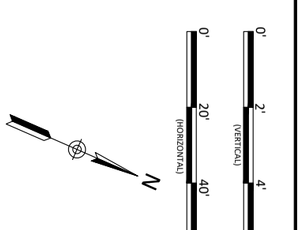
X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg







Sheet Index



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

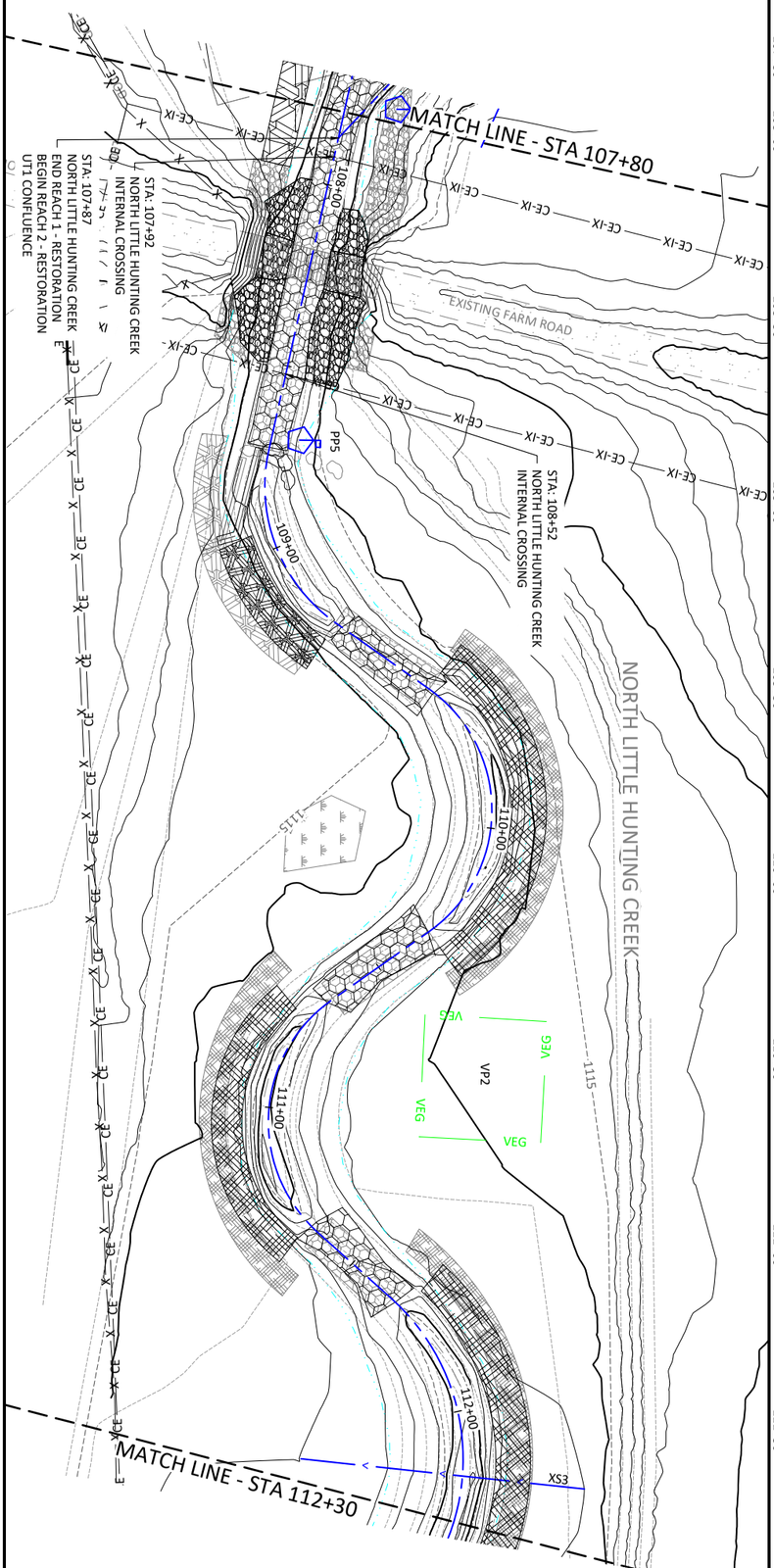
1.1.2
Sheet

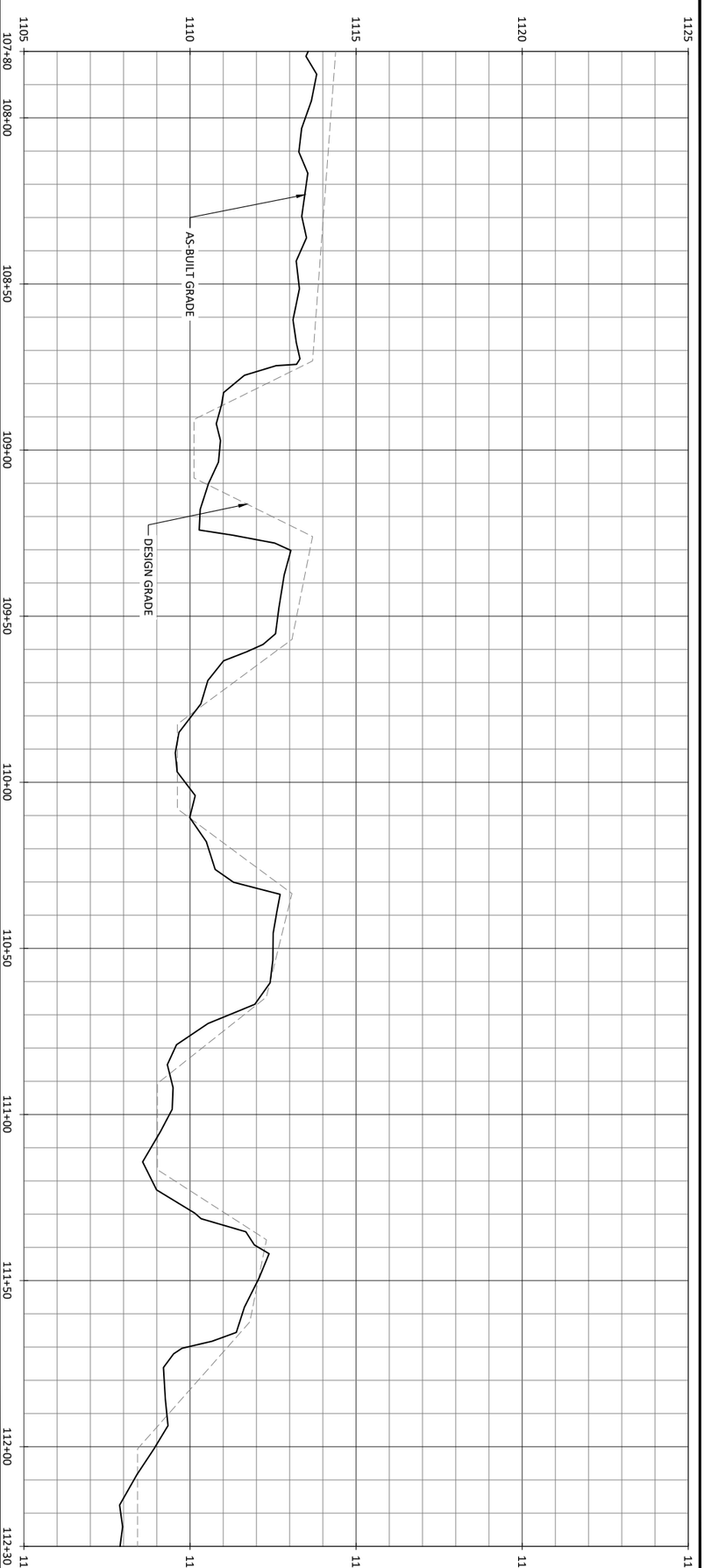
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

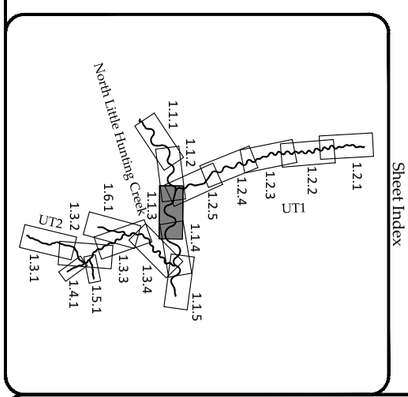
North Little Hunting Creek
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028340 AARON S. EARLE 6-10-22

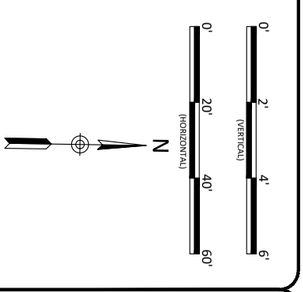
WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831







Sheet Index



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

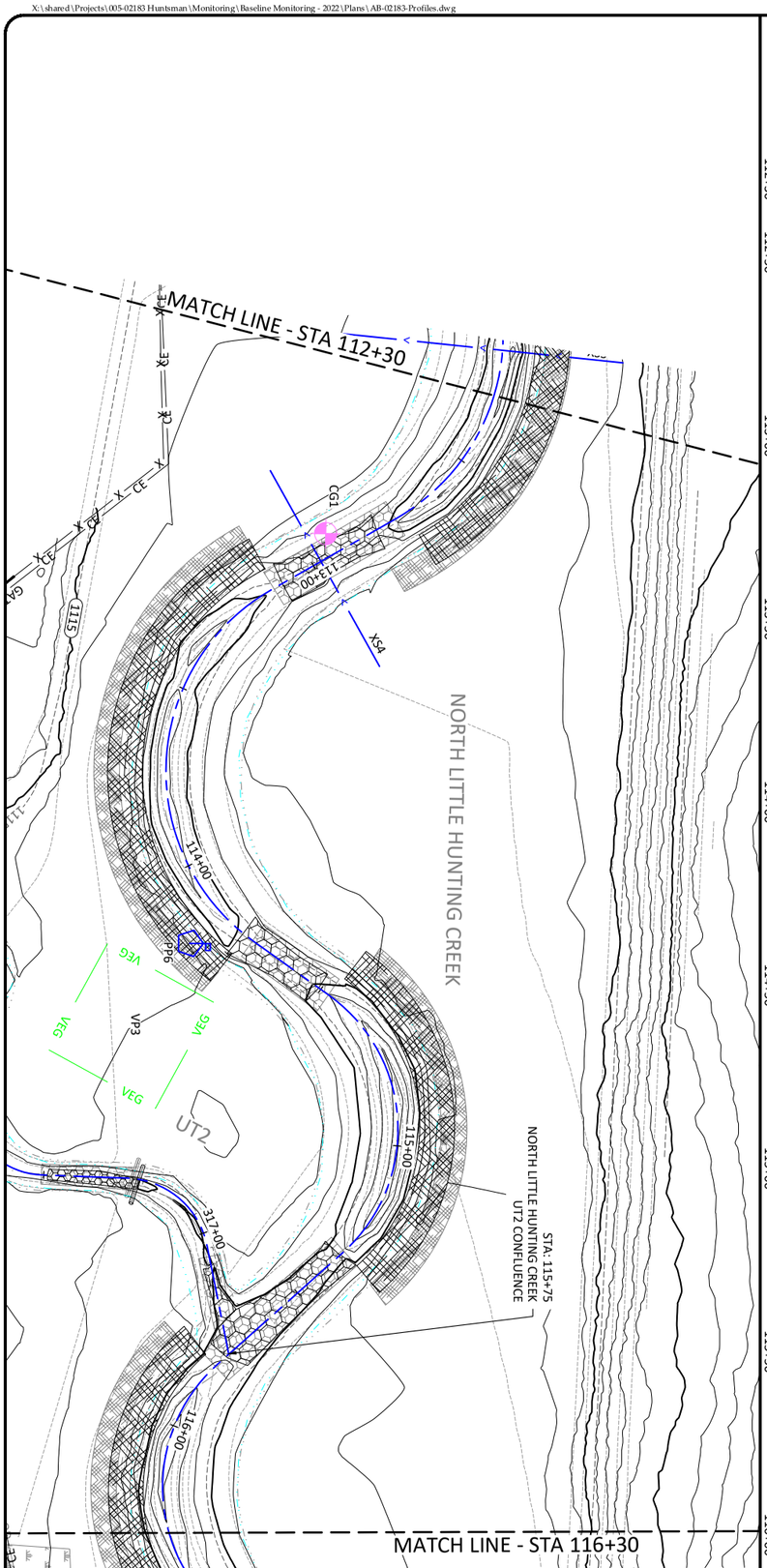
1.1.3
Sheet

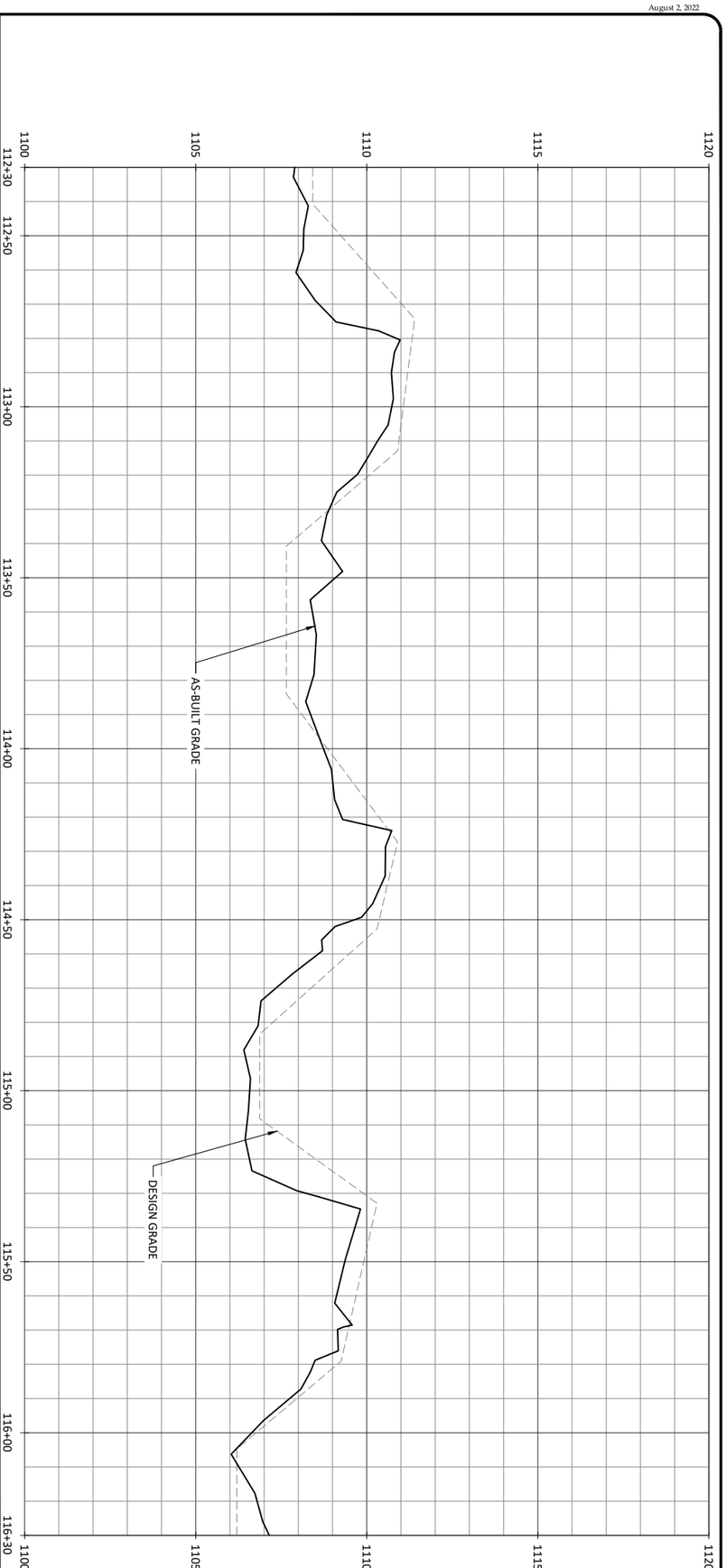
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

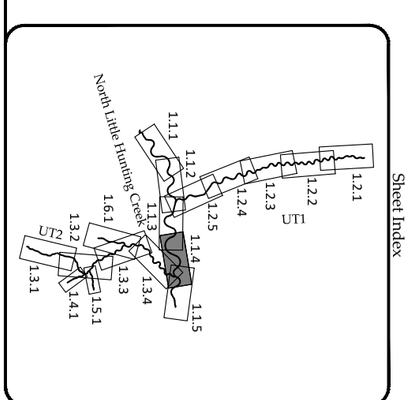
North Little Hunting Creek
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028340 AARON S. EARLEY 6-10-22

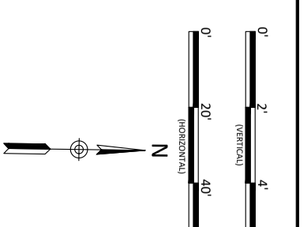
WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831







Sheet Index



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

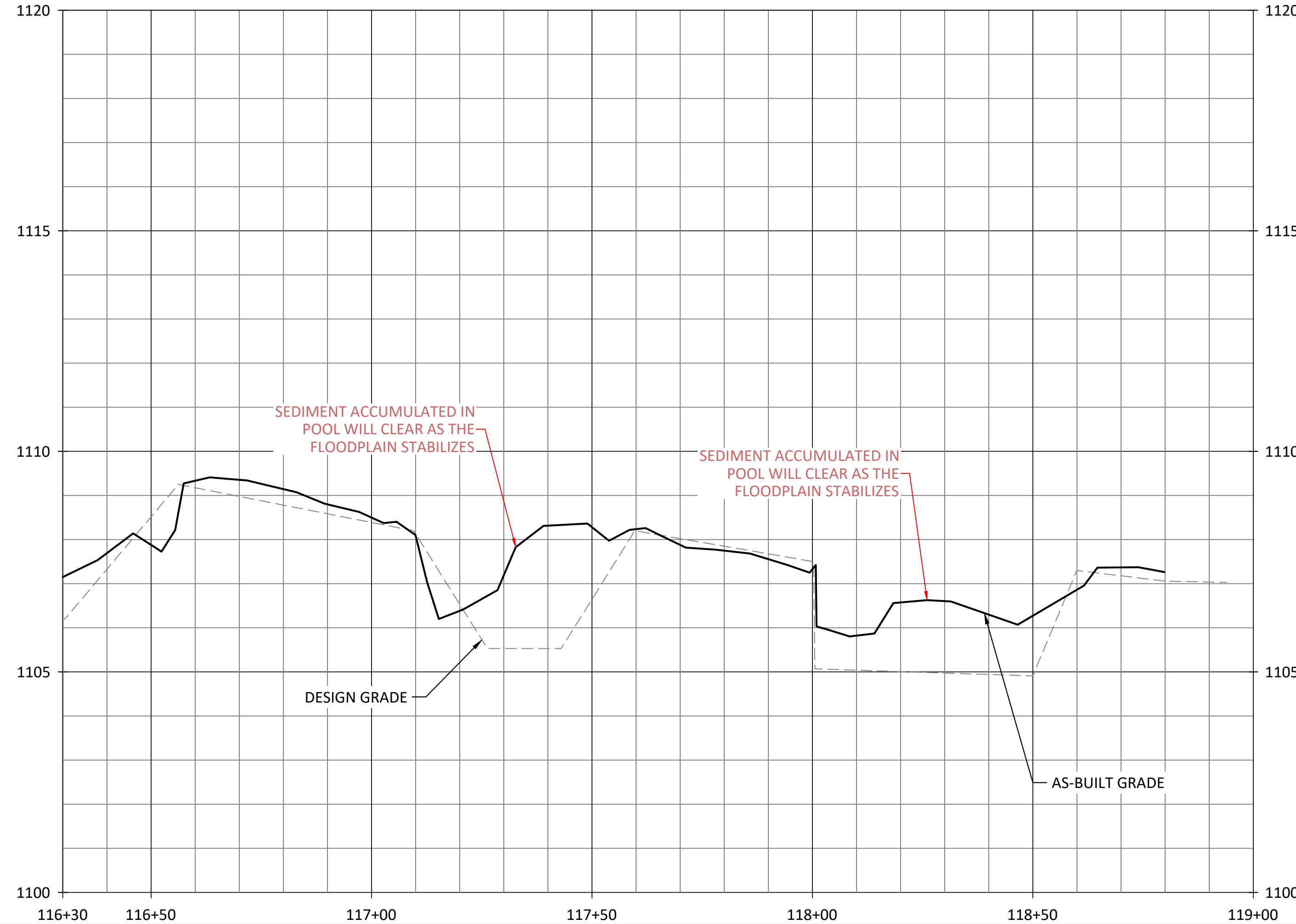
1.1.4
Sheet

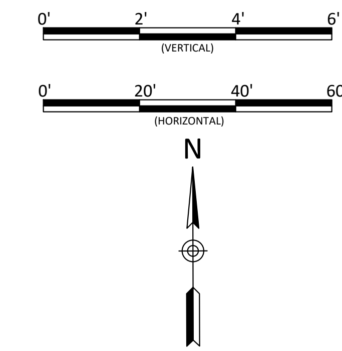
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

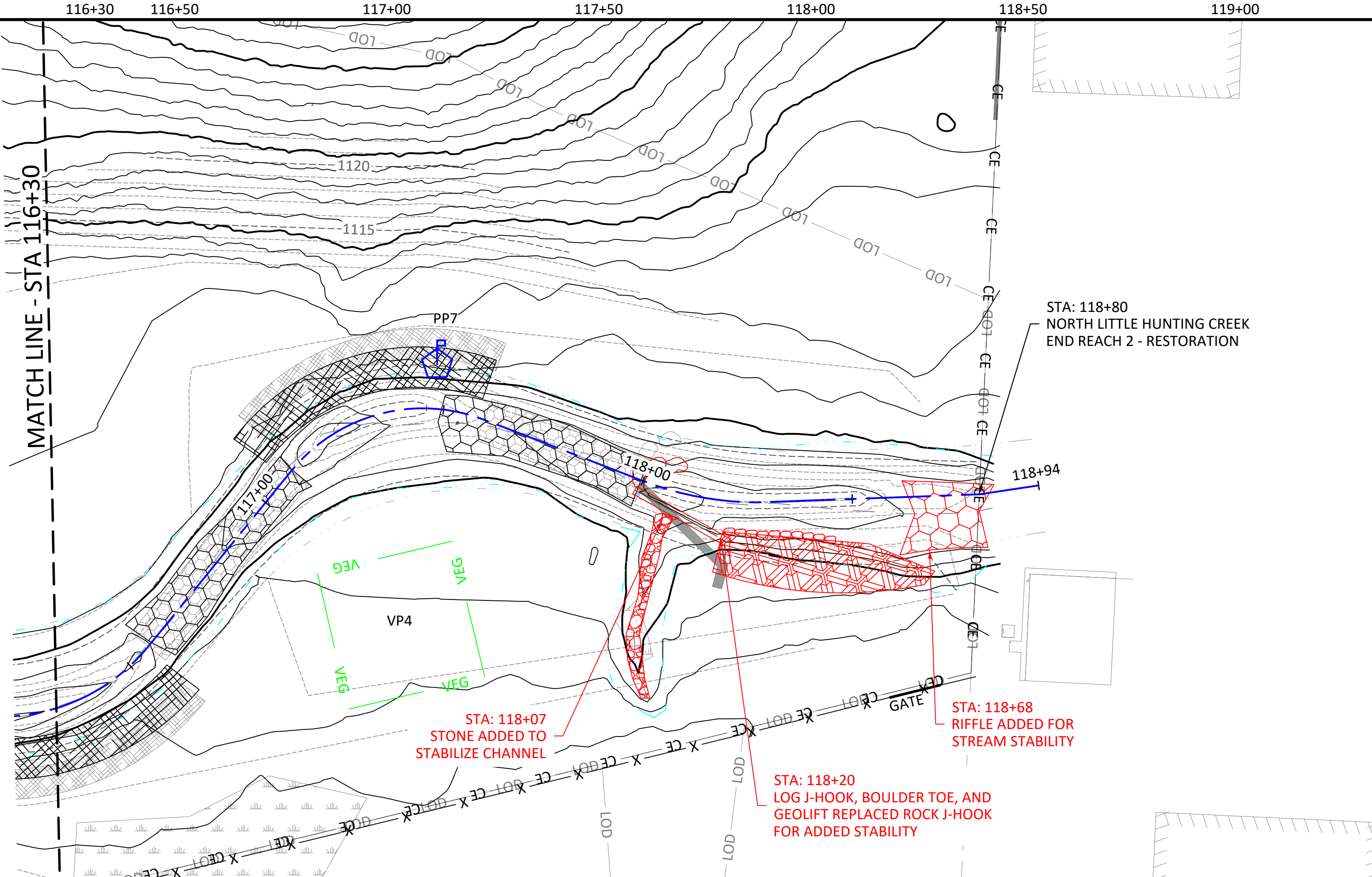
North Little Hunting Creek
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL SEAL 023470 ENGINEER AARON S. EARLEY 6-10-22

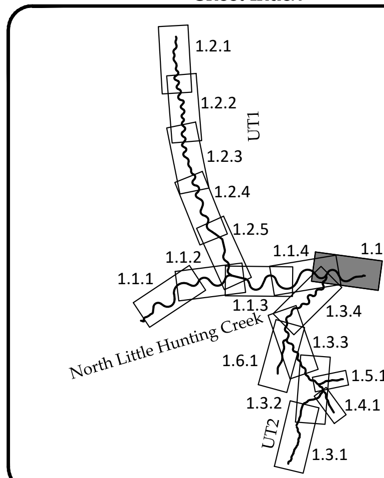
WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831







Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

North Little Hunting Creek
Stream Plan and Profile

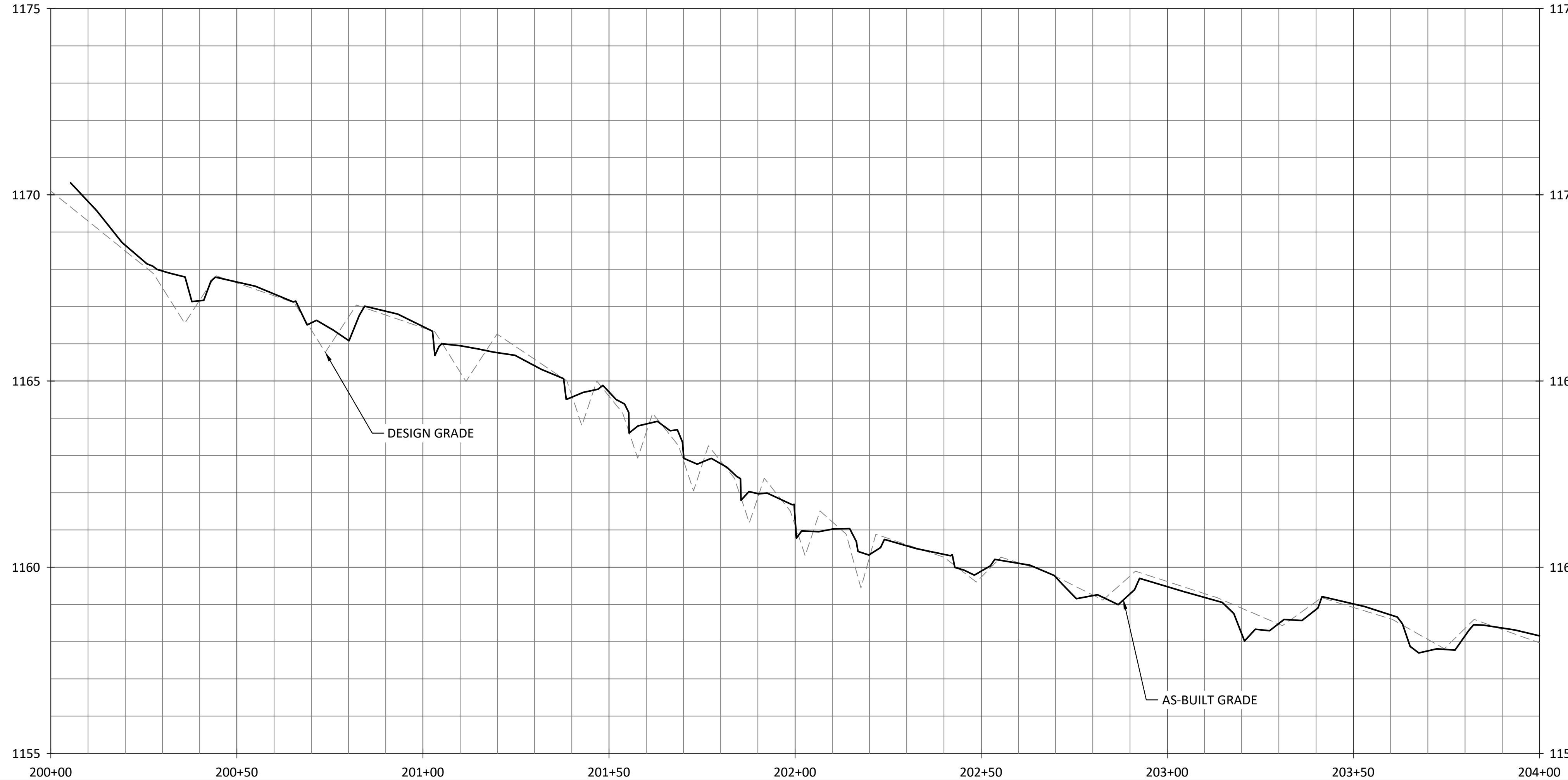
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

1.1.5

Sheet

August 2, 2022



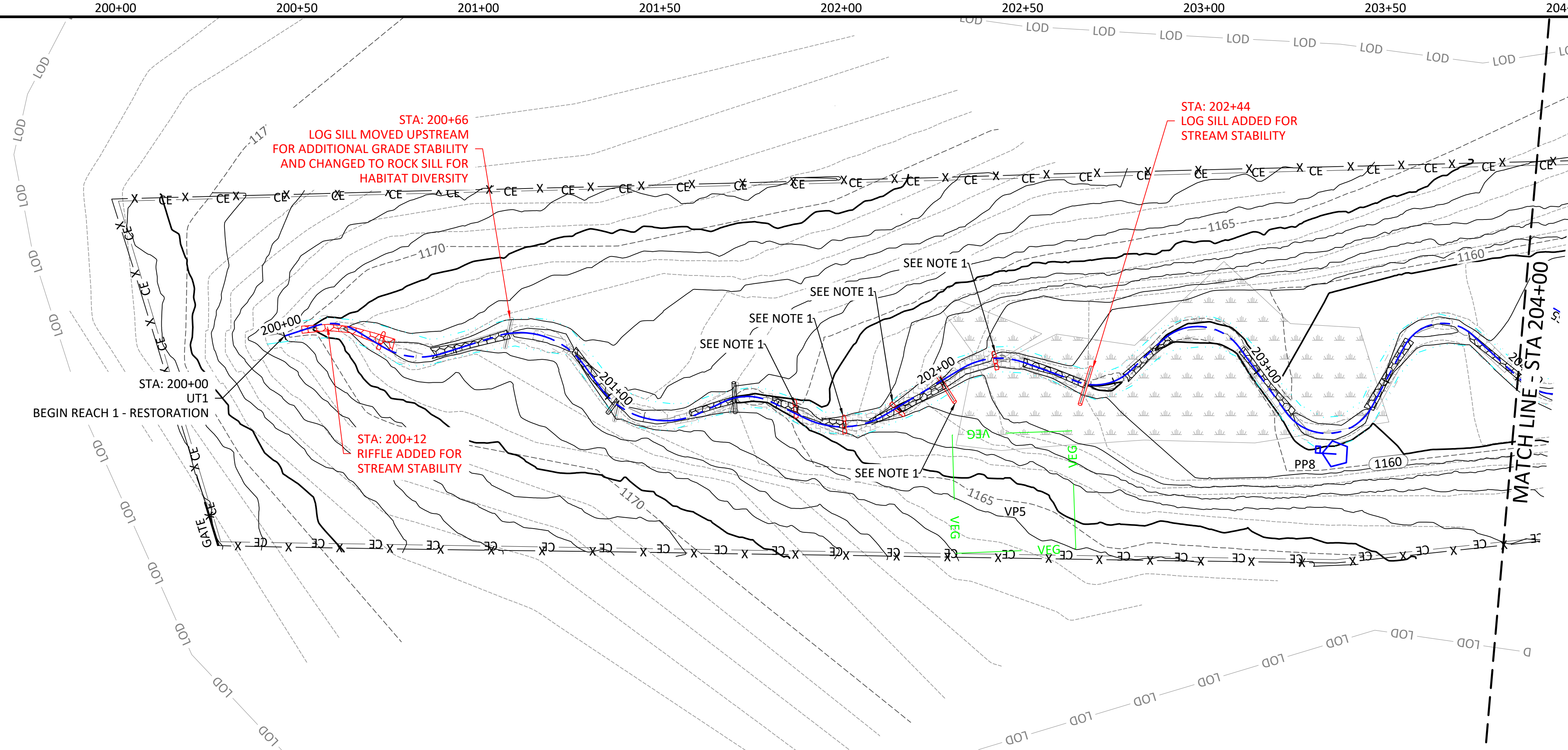
0' 2' 4' 6' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)

N

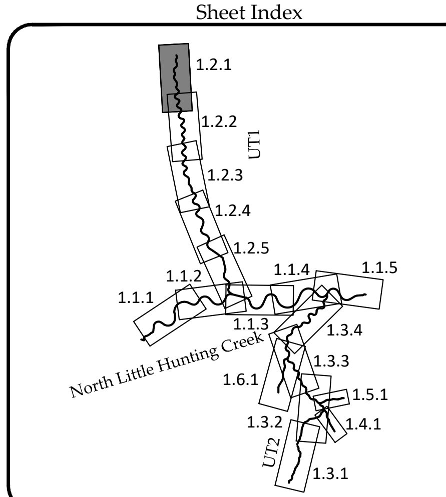
WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22



NOTES:
1. SURVEYED SILLS ARE PART OF THE ORIGINALLY DESIGNED ROCK CASCADE WITH POOLS AT STA: 201+54, STA: 201+69, STA: 201+85, AND STA: 202+00

Sheet Index



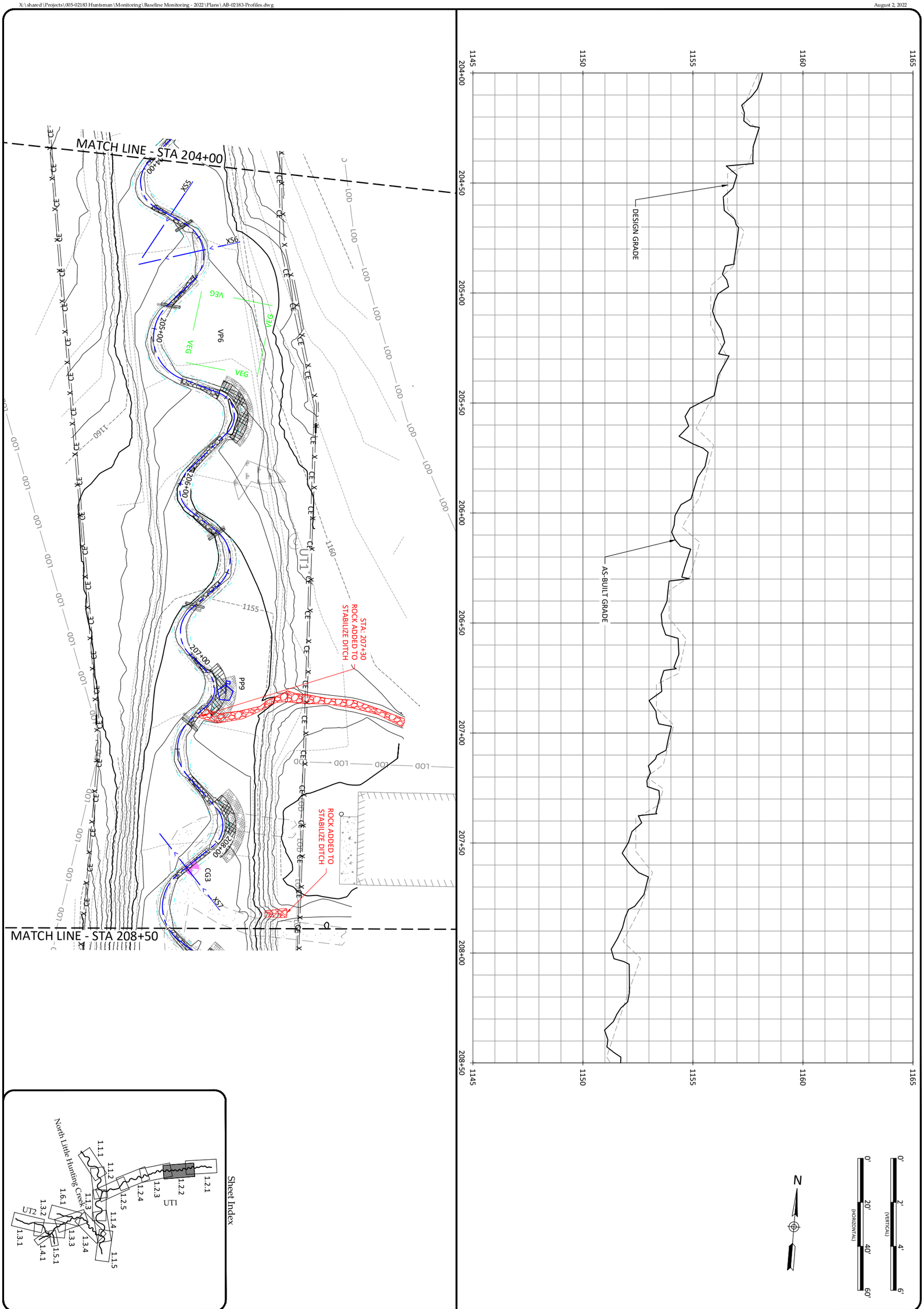
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

UT1
Stream Plan and Profile

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

Sheet 1.2.1



Sheet Index

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

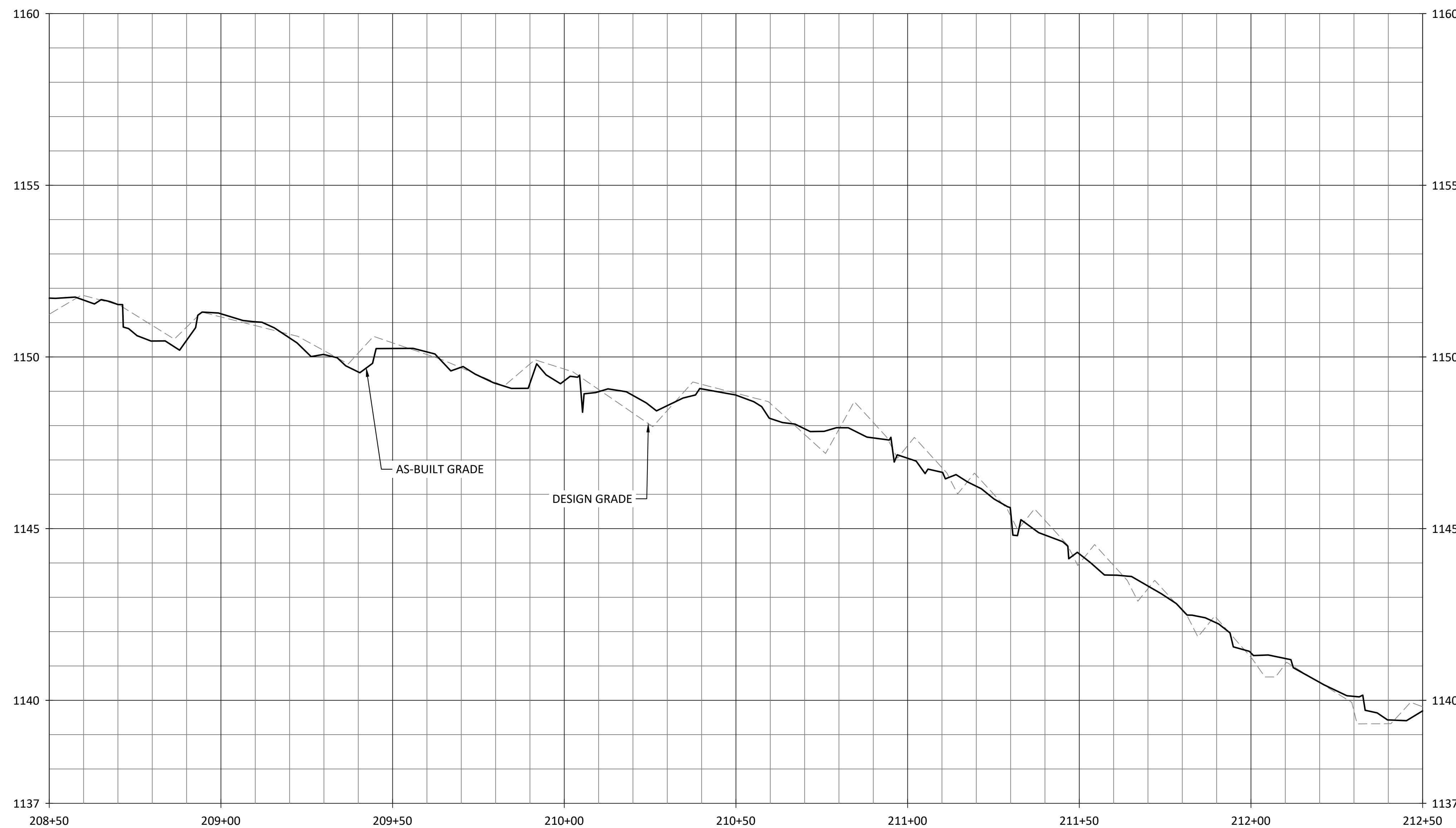
1.2.2
Sheet

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

UT1
Stream Plan and Profile

NORTH CAROLINA PROFESSIONAL SEAL 023470 ENGINEER AARON S. EARLE 6-10-22

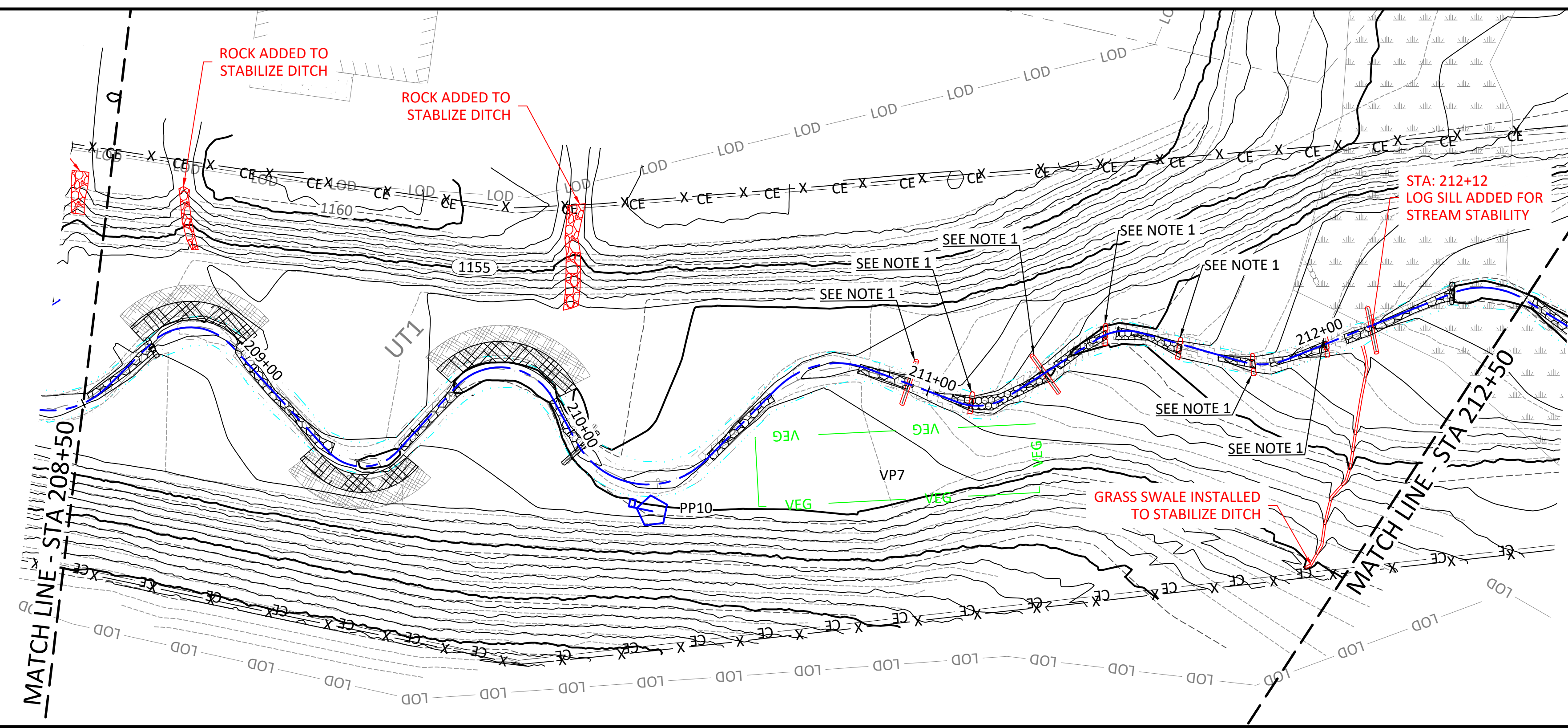
WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831



0' 2' 4' 6' (VERTICAL)

0' 20' 40' 60' (HORIZONTAL)

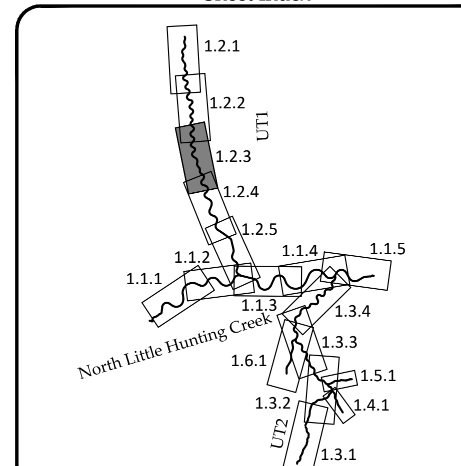
N



NOTES:

1. SURVEYED SILLS ARE PART OF THE ORIGINALLY DESIGNED ROCK CASCADE WITH POOLS AT STA: 210+94, STA: 211+11, STA: 211+30, STA: 211+47, STA: 211+65, STA: 211+82, AND STA: 212+00

Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing

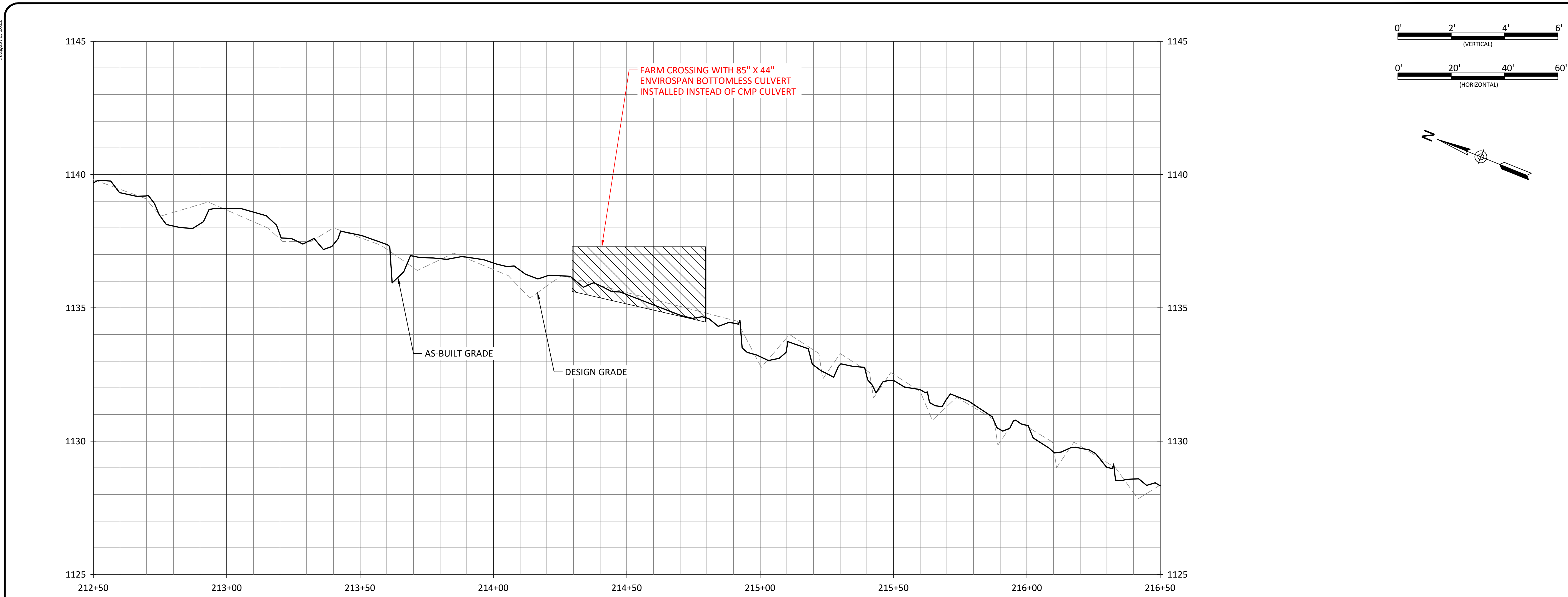
Wilkes County, North Carolina

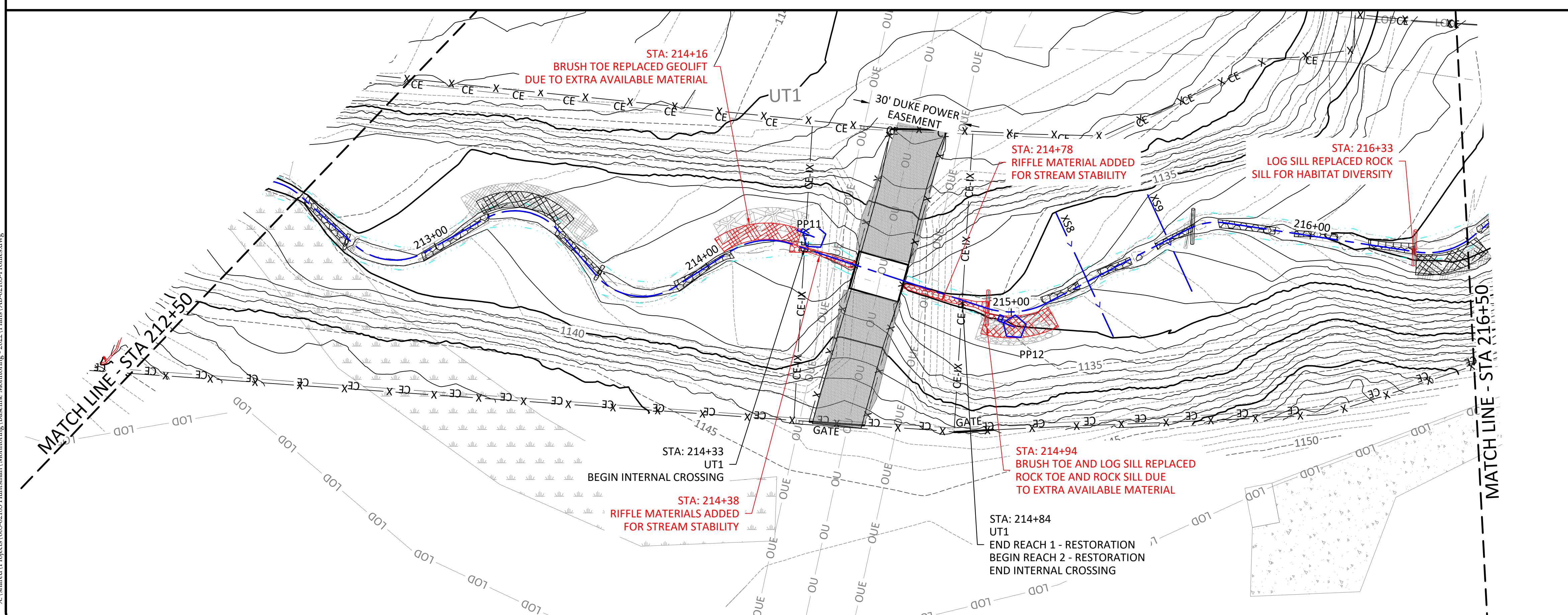
UT1
Stream Plan and Profile

Revisions:

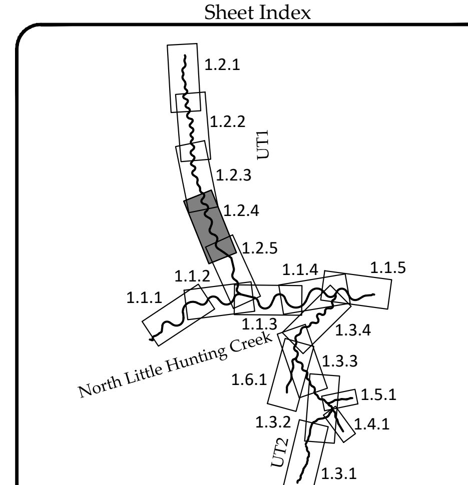
Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.2.3





Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

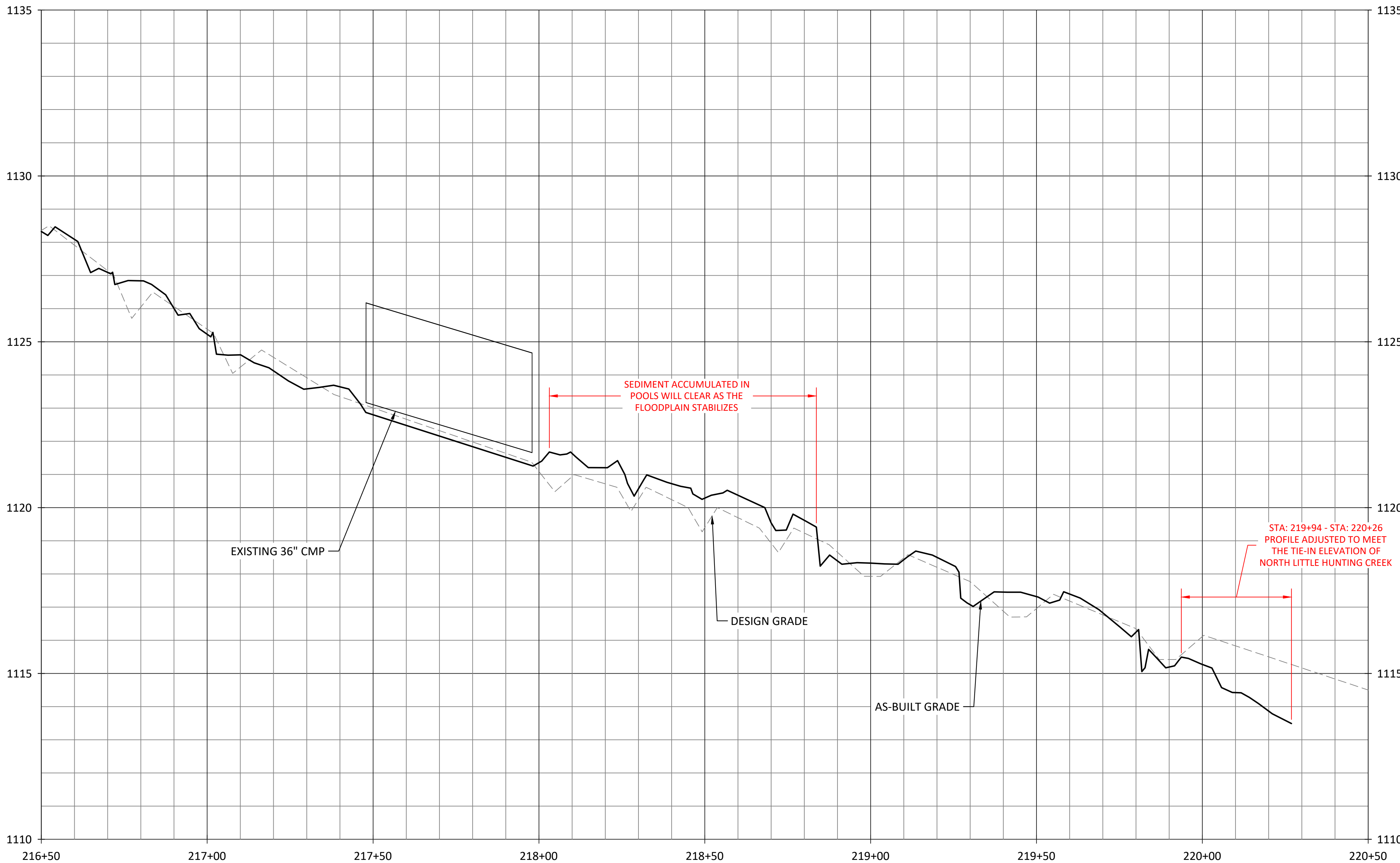
UT1
Stream Plan and Profile

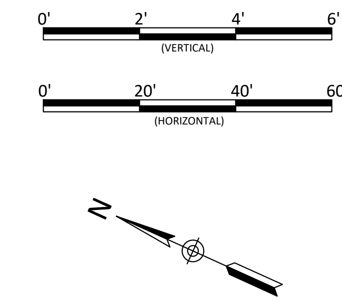
Revisions:

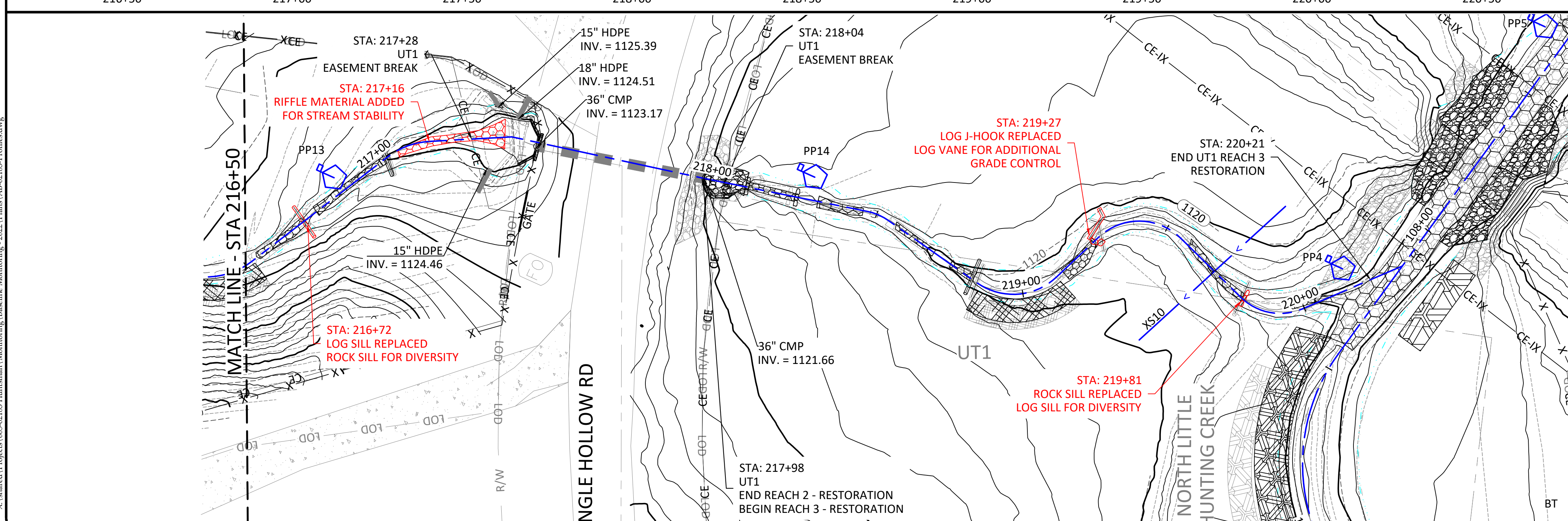
Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.2.4

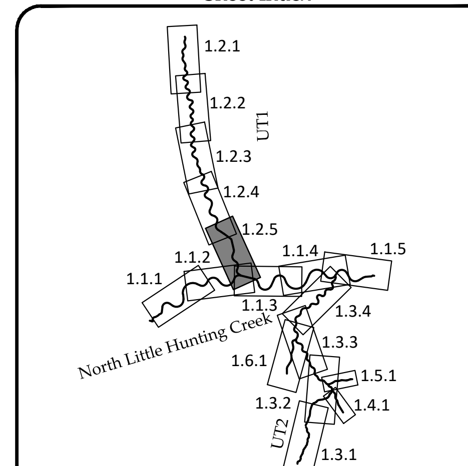
August 2, 2022







Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

UT1
Stream Plan and Profile

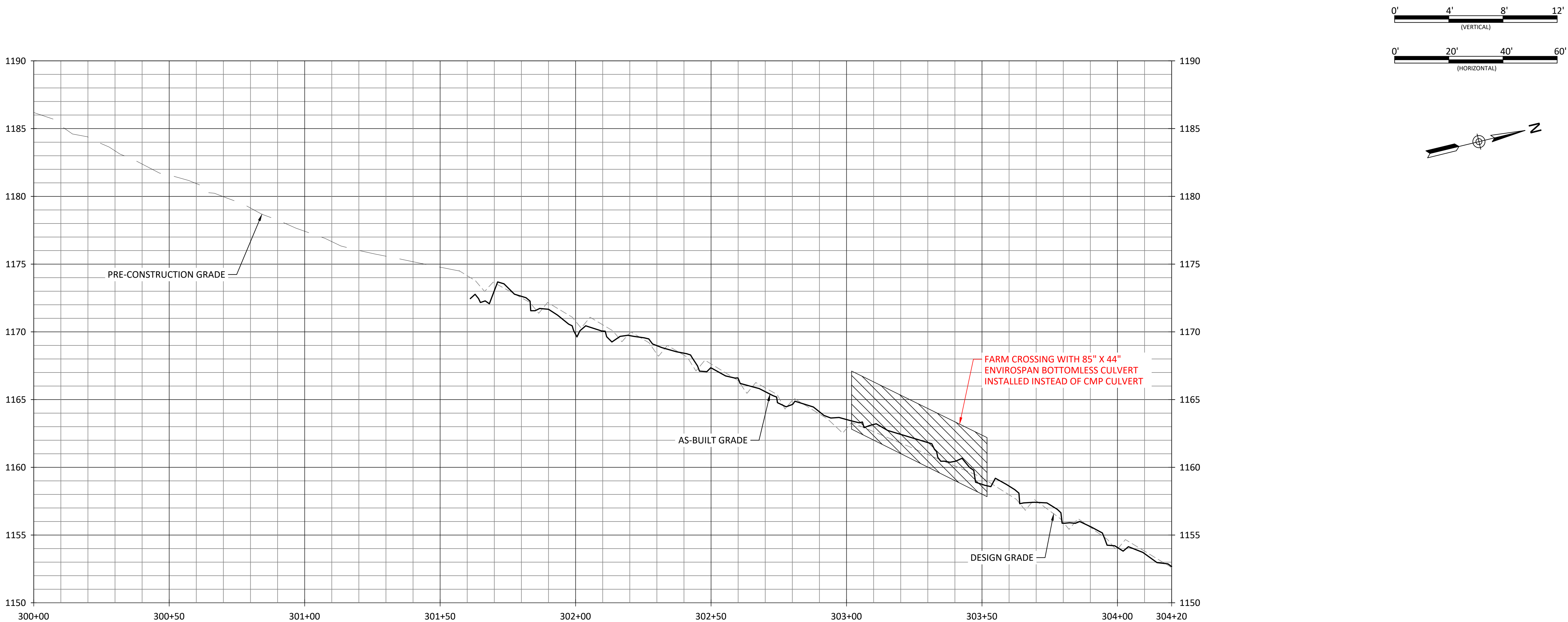
Revisions:

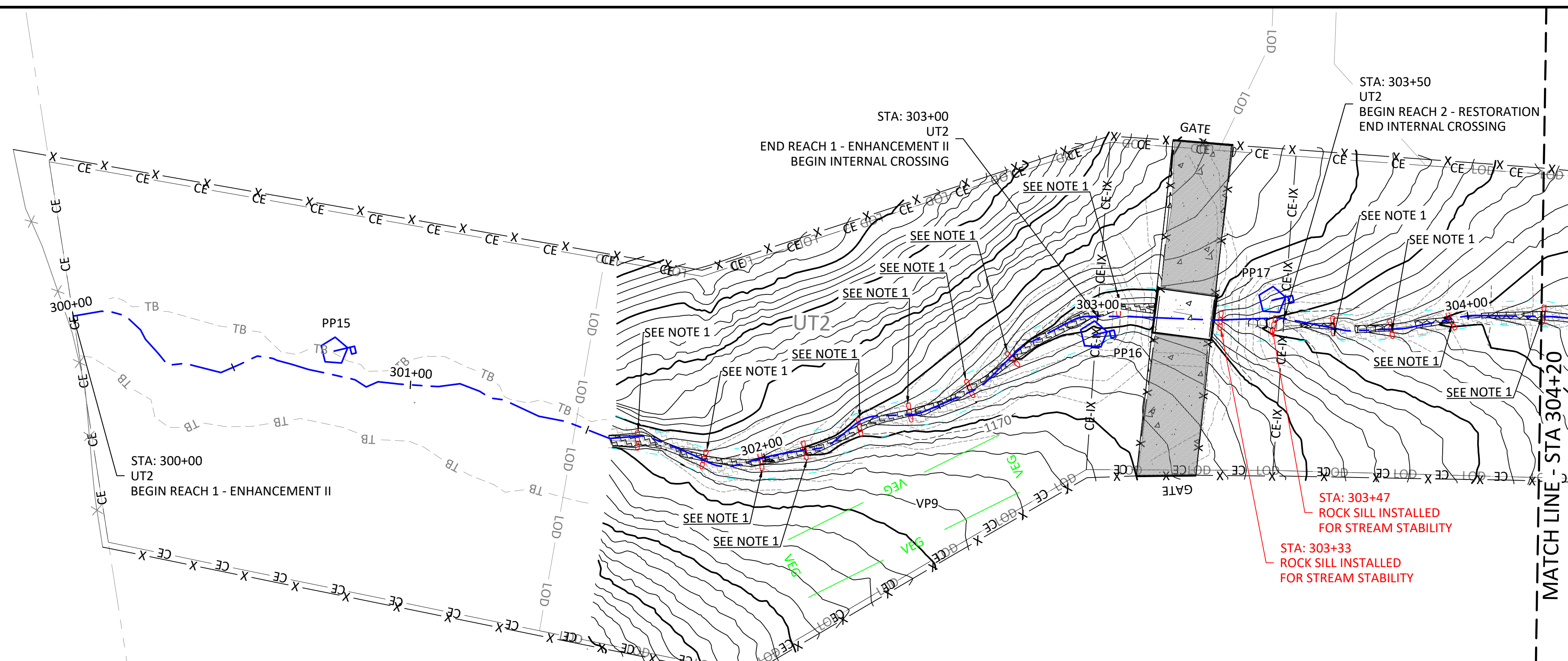
Date: AUGUST 2, 2022
Job Number: 005-02183
Project Engineer: SRK
Drawn By: JCK
Checked By: EGR

Sheet 1.2.5

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg

August 2, 2022

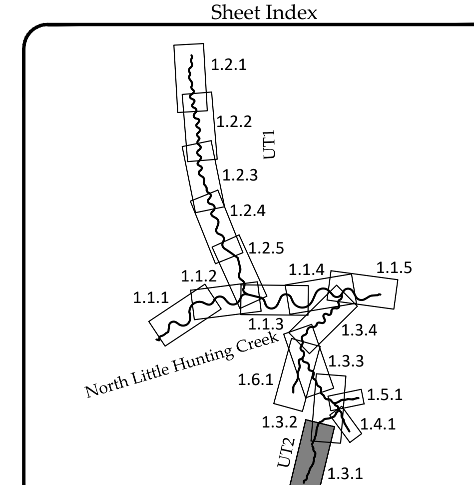




NOTES:

1. SURVEYED SILLS ARE PART OF THE ORIGINALLY DESIGNED ROCK CASCADE WITH POOLS AT STA: 301+64, STA: 301+83, STA: 301+99, STA: 302+11, STA: 302+27, STA: 302+42, STA: 302+59, STA: 302+73, STA: 303+05, STA: 303+63, STA: 303+79, STA: 303+94, AND STA: 304+20

Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

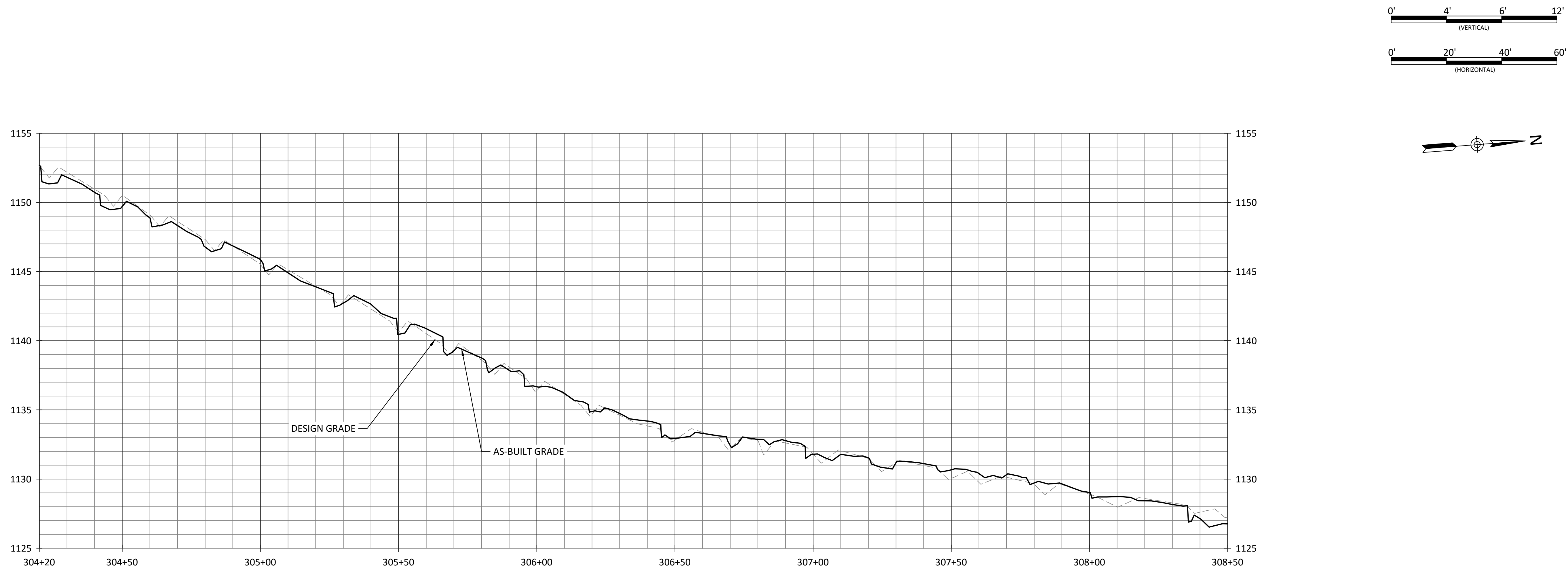
UT2
Stream Plan and Profile

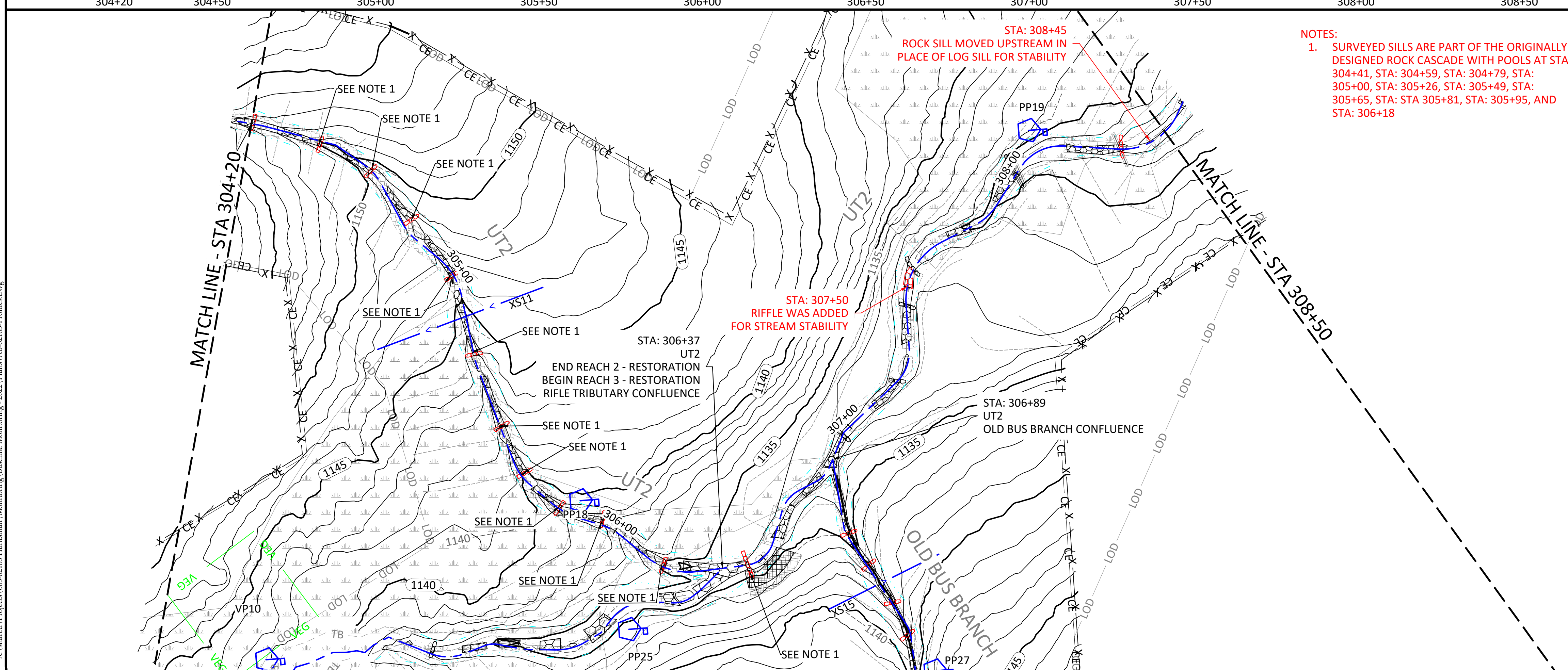
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.3.1

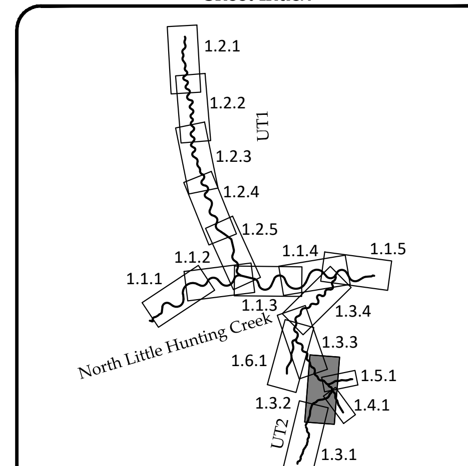
X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg





NOTES:
1. SURVEYED SILLS ARE PART OF THE ORIGINALLY DESIGNED ROCK CASCADE WITH POOLS AT STA: 304+41, STA: 304+59, STA: 304+79, STA: 305+00, STA: 305+26, STA: 305+49, STA: 305+65, STA: STA 305+81, STA: 305+95, AND STA: 306+18

Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

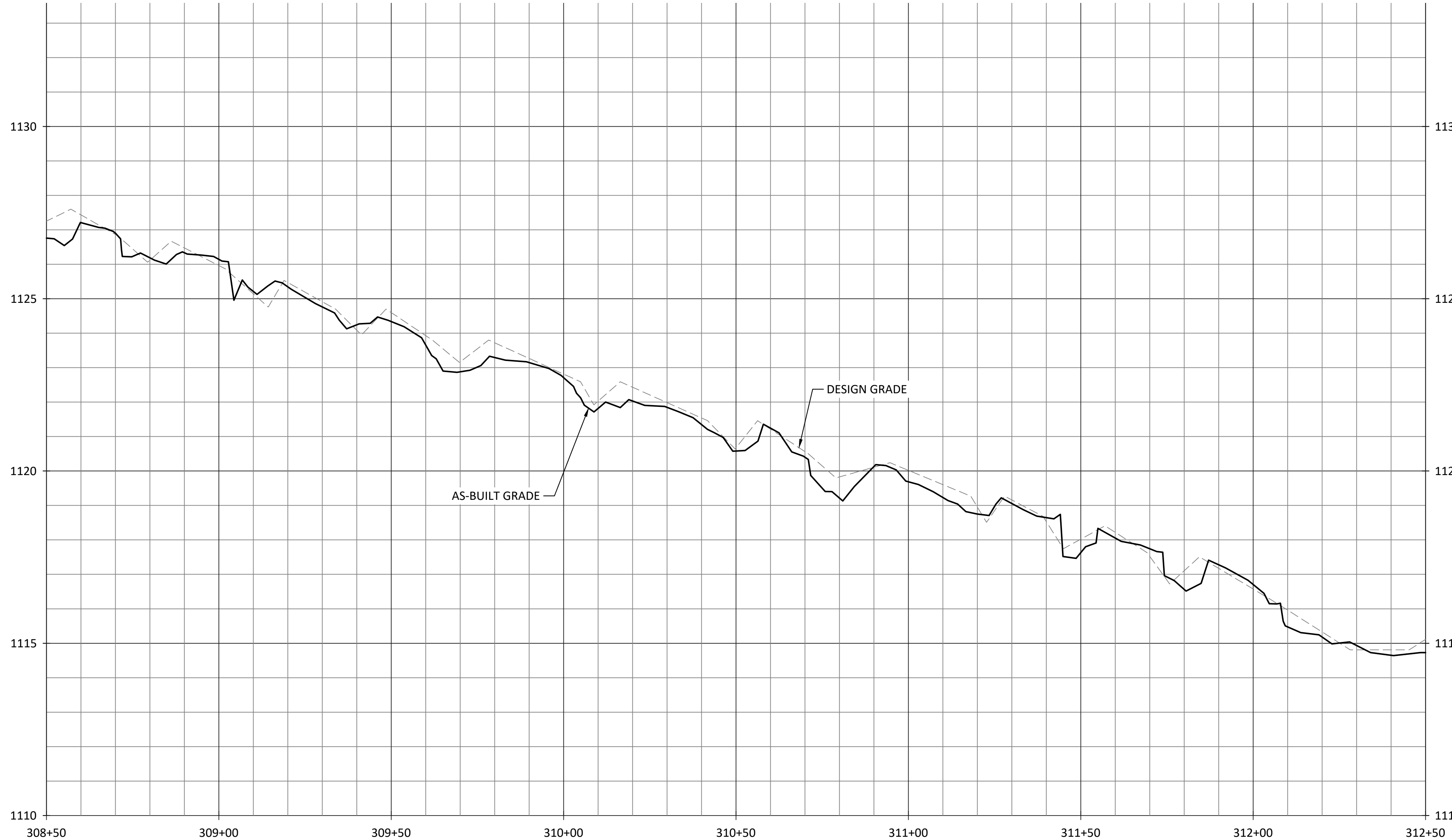
UT2
Stream Plan and Profile

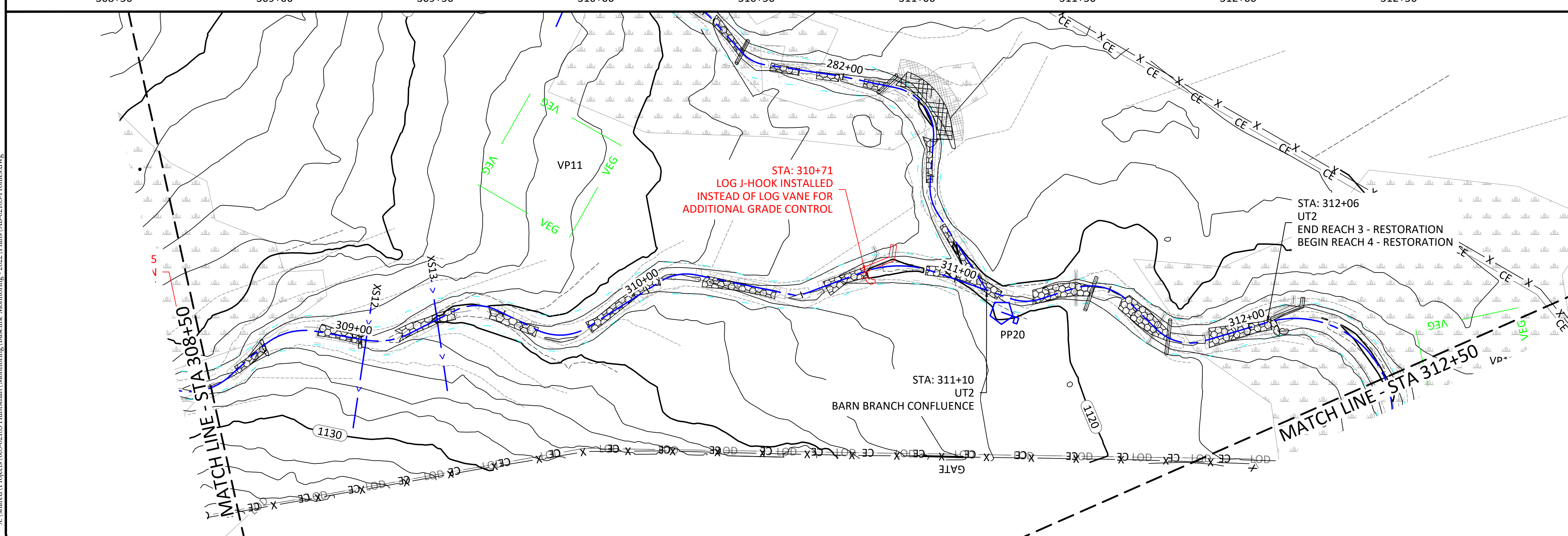
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

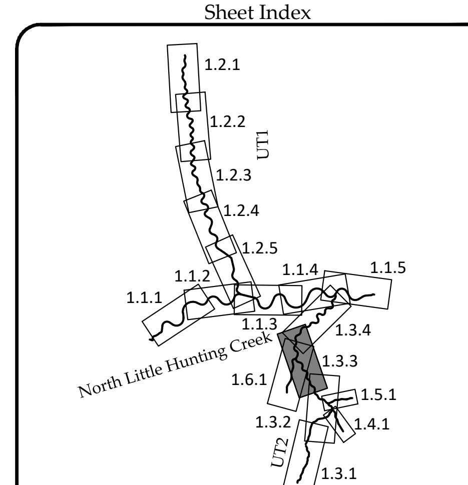
Sheet 1.3.2

August 2, 2022





Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

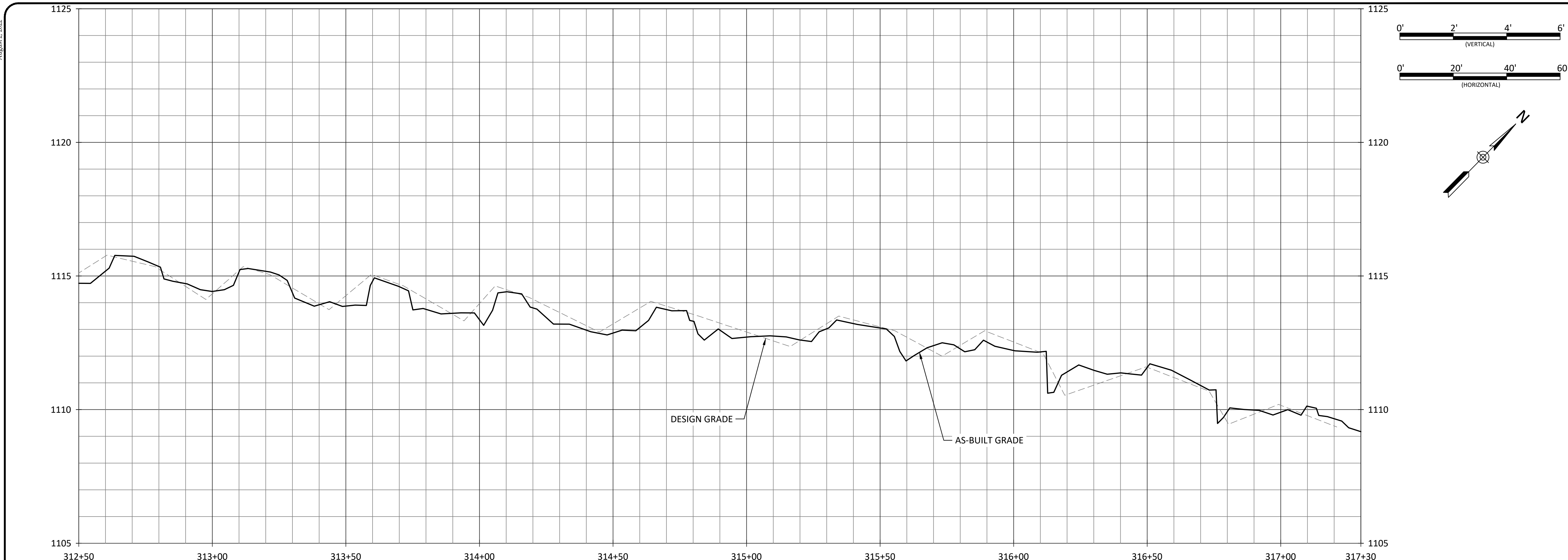
UT2
Stream Plan and Profile

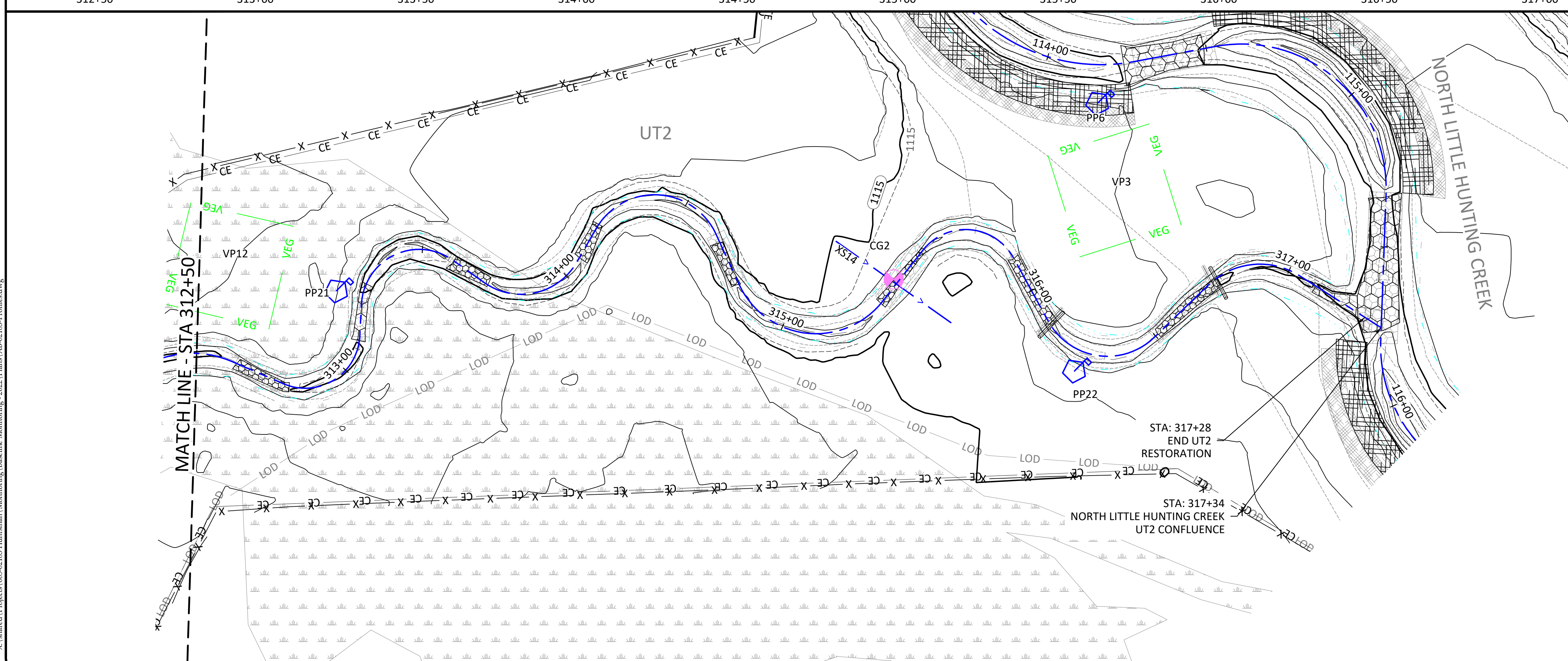
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

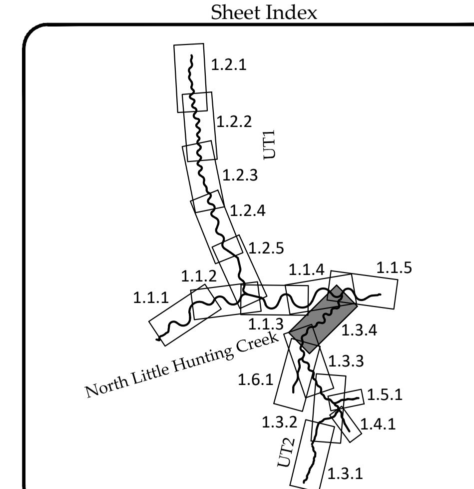
Sheet 1.3.3

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg





Sheet Index



WILDLANDS
ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing

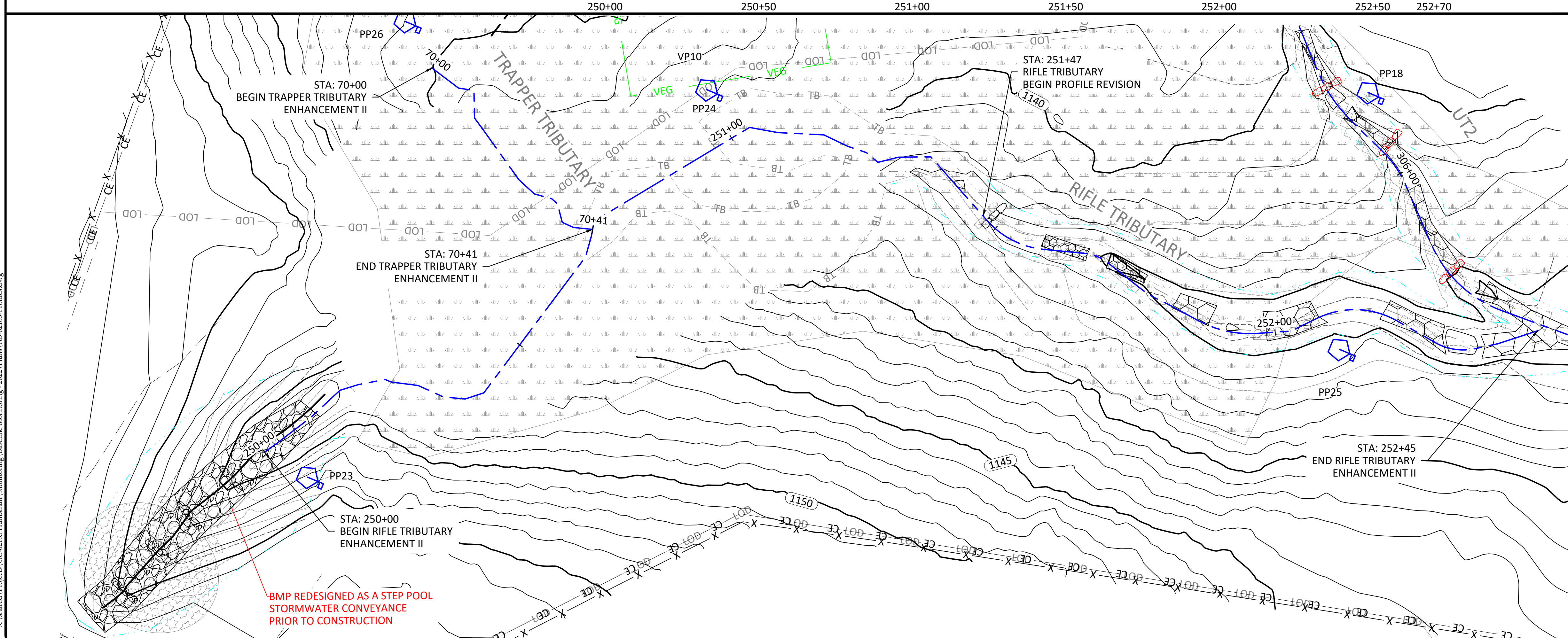
Wilkes County, North Carolina

UT2
Stream Plan and Profile

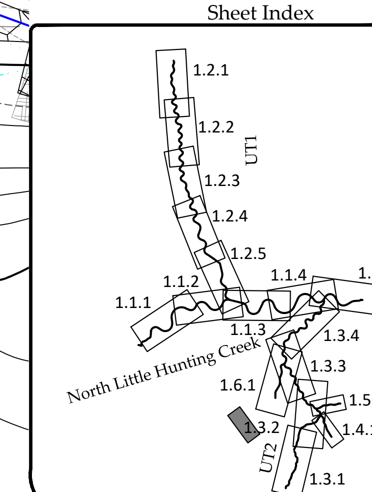
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.3.4



Sheet Index



0' 1' 2' 3' (VERTICAL)

0' 10' 20' 30' (HORIZONTAL)

N

WILDLANDS ENGINEERING

1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Rifle and Trapper Tributary Stream Plan and Profile

Revisions:

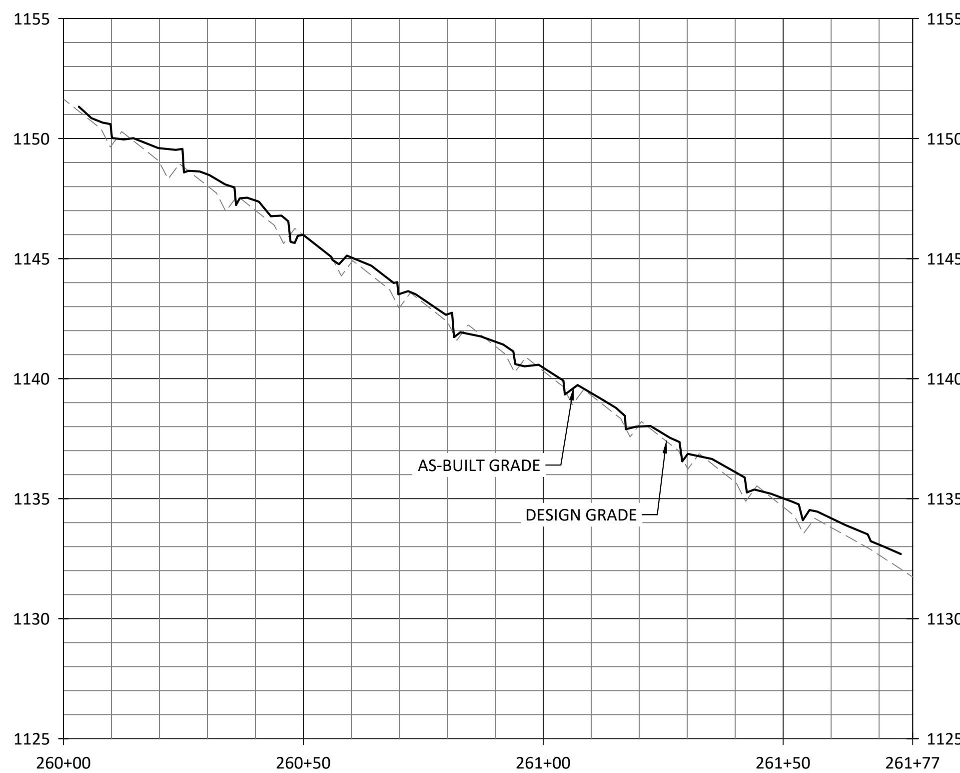
Date: AUGUST 2, 2022
Job Number: 005-02183
Project Engineer: SRK
Drawn By: JCK
Checked By: EGR

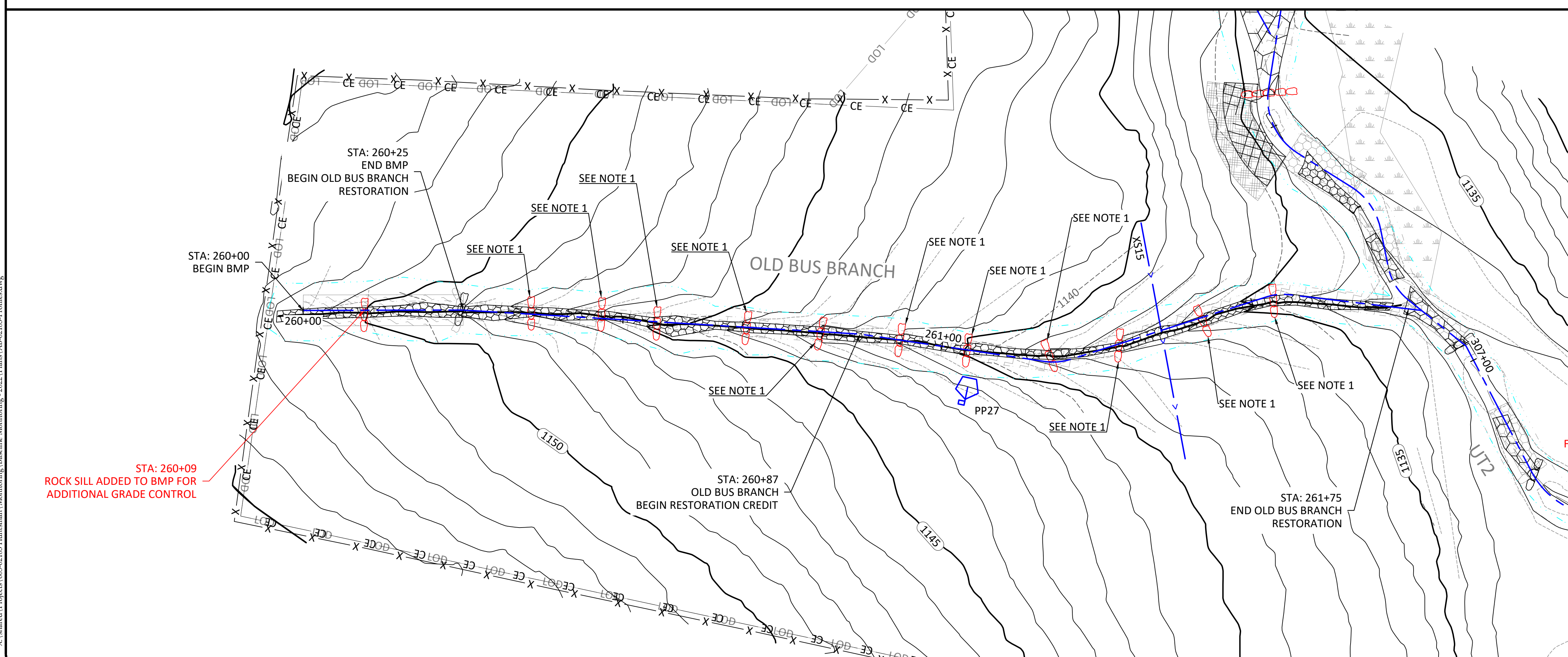
Sheet 1.4.1

August 2, 2022

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg

August 2, 2022

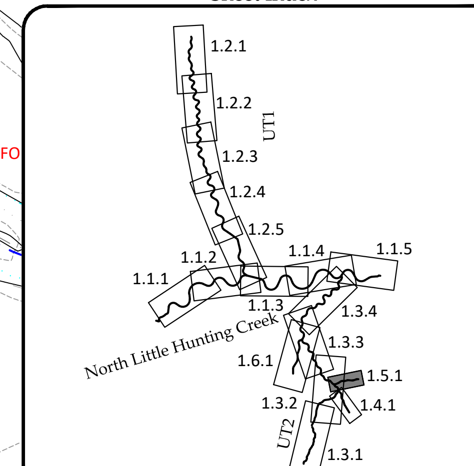




NOTES:

1. SURVEYED SILLS ARE PART OF THE ORIGINALLY DESIGNED ROCK CASCADE WITH POOLS AT STA: 260+36, STA: 260+47, STA: 260+55, STA: 260+69, STA: 260+81, STA: 260+93, STA: 261+04, STA: 261+17, STA: 261+28, STA: 261+41, AND STA: 261+54

Sheet Index



0' 1' 2' 3' (VERTICAL)

0' 10' 20' 30' (HORIZONTAL)

N

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

Huntsman Stream Mitigation Site Record Drawing

Wilkes County, North Carolina

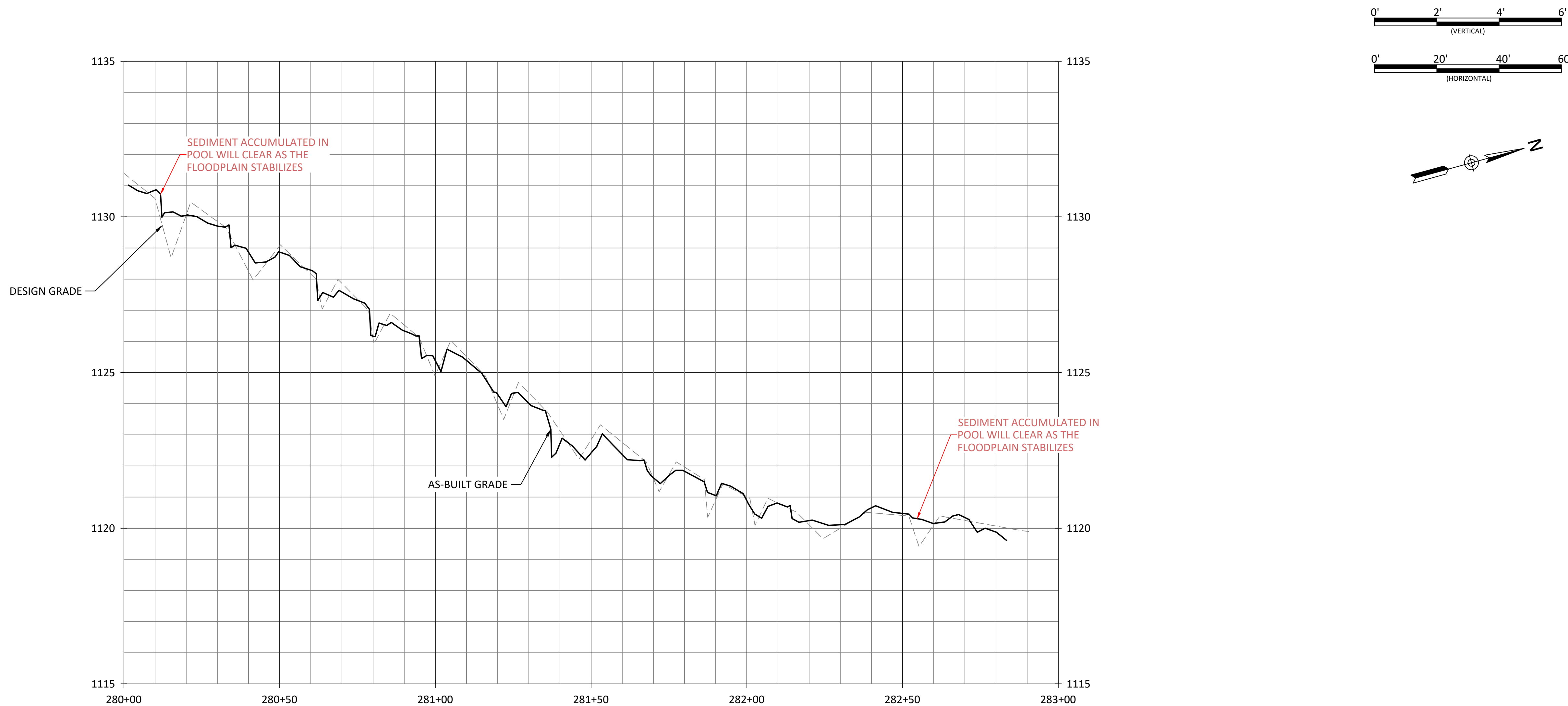
Old Bus Branch
Stream Plan and Profile

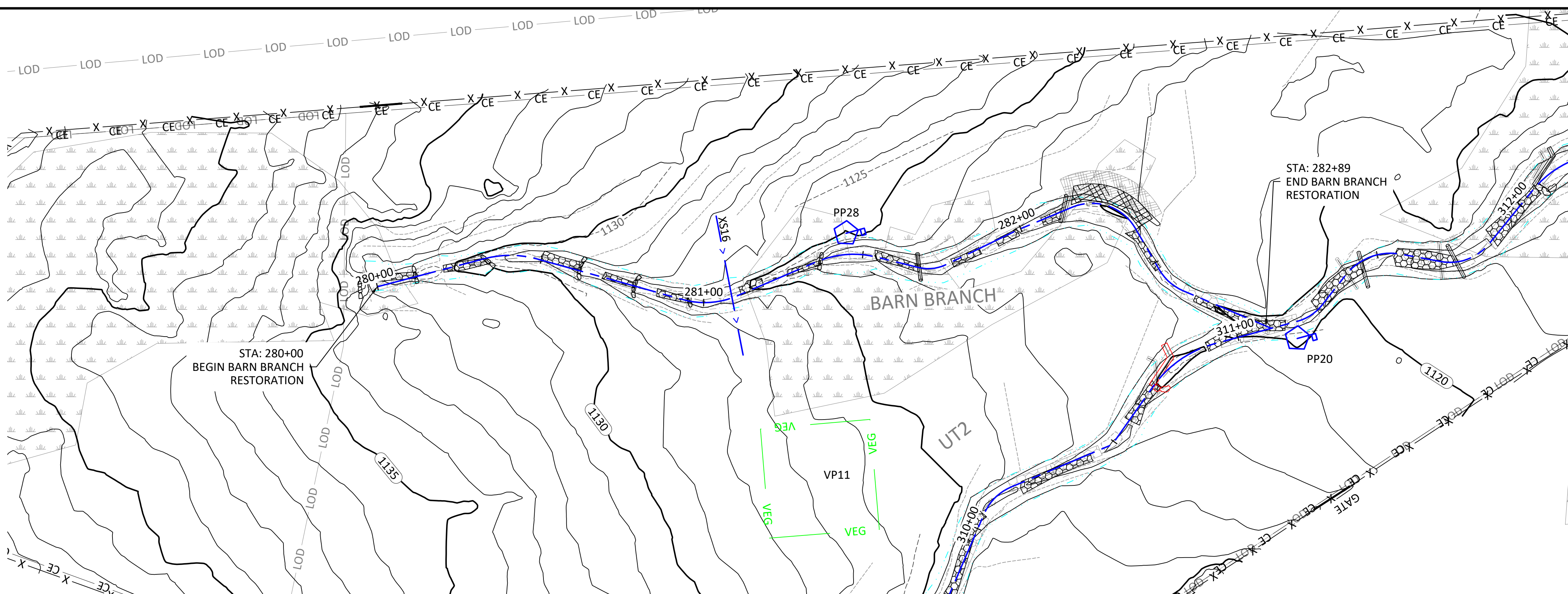
Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

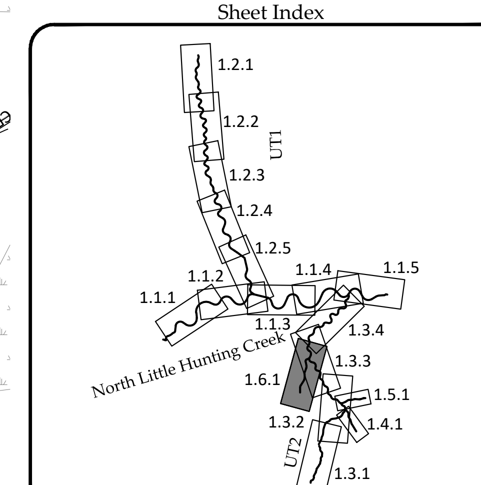
Sheet 1.5.1

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg





Sheet Index



WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Barn Branch
Stream Plan and Profile

Revisions:

Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 1.6.1

August 2, 2022

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Profiles.dwg

August 2, 2022

Open Riparian Buffer Planting Zone

Buffer Planting Zone						
Open/Graded Bare Roots						
Species	Common Name	Indiv. Spacing	Min. Caliper Size	Stratum**	# of Stems	Wetland Indicator Status
*Platanus occidentalis**	Sycamore	6-8 ft.	0.25" - 1.0"	Canopy	15%	FACW
*Betula nigra**	River birch	6-8 ft.	0.25" - 1.0"	Canopy	15%	FACW
Nyssa sylvatica	Black gum	6-8 ft.	0.25" - 1.0"	Canopy	5%	FAC
Fagus grandifolia	American beech	6-8 ft.	0.25" - 1.0"	Canopy	5%	FACU
Quercus rubra	Northern red oak	6-8 ft.	0.25" - 1.0"	Canopy	5%	FACU
*Ulmus americana**	American elm	6-8 ft.	0.25" - 1.0"	Canopy	5%	FACW
Ulmus rubra	Slippery elm	6-8 ft.	0.25" - 1.0"	Subcanopy	5%	FAC
*Acer negundo**	Boxelder	6-8 ft.	0.25" - 1.0"	Subcanopy	10%	FAC
Cornus florida	Flowering dogwood	6-8 ft.	0.25" - 1.0"	Subcanopy	5%	FACU
Diospyros virginiana	Persimmon	6-8 ft.	0.25" - 1.0"	Canopy	10%	FAC
*Calycanthus floridus**	Sweetshrub	6-8 ft.	0.25" - 1.0"	Shrub	5%	FACU
Lindera benzoin	Spicebush	6-8 ft.	0.25" - 1.0"	Shrub	5%	FAC
Asimina triloba	Pawpaw	6-8 ft.	0.25" - 1.0"	Shrub	5%	FAC
Quercus alba	White oak	6-8 ft.	0.25" - 1.0"	Canopy	5%	FACU
*Species to be planted in wetter portions of the site					100%	
** Only canopy species are subject to monitoring height requirements.						

Shaded Riparian Buffer Planting Zone

Buffer Planting Zone						
Shaded Bare Roots						
Species	Common Name	Indiv. Spacing	Min. Caliper Size	Stratum**	# of Stems	Wetland Indicator Status
Platanus occidentalis	Sycamore	6-8 ft.	0.25" - 1.0"	Canopy	15%	FACW
Betula nigra	River birch	6-8 ft.	0.25" - 1.0"	Canopy	15%	FACW
Liriodendron tulipifera	Tulip poplar	6-8 ft.	0.25" - 1.0"	Canopy	2%	FACU
Carpinus caroliniana	American hornbeam	6-8 ft.	0.25" - 1.0"	Subcanopy	5%	FAC
Diospyros virginiana	Persimmon	6-8 ft.	0.25" - 1.0"	Canopy	5%	FAC
Nyssa sylvatica	Black gum	6-8 ft.	0.25" - 1.0"	Canopy	10%	FAC
Euonymus americana	American strawberry bush	6-8 ft.	0.25" - 1.0"	Shrub	3%	FAC
Calycanthus floridus	Sweetshrub	6-8 ft.	0.25" - 1.0"	Shrub	5%	FACU
Hamamelis virginiana	Witch hazel	6-8 ft.	0.25" - 1.0"	Shrub	5%	FACU
Quercus rubra	Northern red oak	6-8 ft.	0.25" - 1.0"	Canopy	10%	FACU
Fagus grandifolia	American beech	6-8 ft.	0.25" - 1.0"	Canopy	5%	FACU
Quercus alba	White oak	6-8 ft.	0.25" - 1.0"	Canopy	10%	FACU
Lindera benzoin	Spicebush	6-8 ft.	0.25" - 1.0"	Shrub	5%	FAC
Cornus florida	Flowering dogwood	6-8 ft.	0.25" - 1.0"	Subcanopy	5%	FACU
** Only canopy species are subject to monitoring height requirements.					100%	

Permanent Seeding

Note:
Permanent Riparian seeding in all disturbed areas within Conservation Easement

Buffer Planting Zone				
Riparian Seed Mix				
Species	Common Name	Stratum	Density (lbs/acre)	Wetland Indicator Status
Panicum rigidulum	Redtop Panicgrass	Herb	1	FACW
Chasmanthium latifolium	River Oats	Herb	1	FACU
Elymus virginicus	Virginia Wild Rye	Herb	3	FACW
Dichanthelium clandestinum	Deertongue	Herb	3	FAC
Sorghastrum nutans	Indiangrass	Herb	3	FACU
Schizachyrium scoparium	Little Bluestem	Herb	2	FACU
Panicum virgatum	Switchgrass	Herb	1	FAC
Rudbeckia hirta	Blackeyed Susan	Herb	1	FACU
Bidens aristosa	Showy Tickseed Sunflower	Herb	1	FACW
Helianthus angustifolius	Narrowleaf Sunflower	Herb	0.6	FACW
Coreopsis lanceolata	Lanceleaf Coreopsis	Herb	1	FACU
Chamaecrista fasciculata	Partridge Pea	Herb	1	FACU
Heliopsis helianthoides var. helianthoides	Oxeye Sunflower	Herb	1	FACU
Juncus tenuis	Path Rush	Herb	0.4	FAC
		Total	20	

Streambank Planting Zone

Buffer Planting Zone						
Streambank Planting						
Species	Common Name	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems	Wetland Indicator Status
Streams > 8' Bankfull Width						
Salix nigra	Black Willow	2-8 ft	0.5"-1.5" cal	Shrub	14%	OBL
Cornus amomum	Silky Dogwood	2-8 ft	0.5"-1.5" cal	Shrub	24%	FACW
Salix sericea	Silky Willow	2-8 ft	0.5"-1.5" cal	Shrub	33%	OBL
Physocarpus opulifolius	Ninebark	2-8 ft	0.5"-1.5" cal	Shrub	14%	FACW
Sambucus canadensis	Elderberrry	2-8 ft	0.5"-1.5" cal	Shrub	15%	
Streams < 8' Bankfull Width						
Cornus amomum	Silky Dogwood	2-8 ft	0.5"-1.5" cal	Shrub	24%	FACW
Salix sericea	Silky Willow	2-8 ft	0.5"-1.5" cal	Shrub	33%	OBL
Physocarpus opulifolius	Ninebark	2-8 ft	0.5"-1.5" cal	Shrub	14%	FACW
Sambucus canadensis	Elderberrry	2-8 ft	0.5"-1.5" cal	Shrub	15%	FAC
~~*Alnus serrulata*~~	~~Tag Alder~~	~~2-8 ft~~	~~0.5"-1.5" cal~~	~~Shrub~~	~~15%~~	~~OBL~~
Salix nigra	Black Willow	2-8 ft	0.5"-1.5" cal	Shrub	14%	OBL
Plugs						
Juncus effusus	Common Rush	3-5 ft	1.0"-2.0" plug	Herb	40%	FACW
Carex lupulina	Hop Sedge	3-5 ft	1.0"-2.0" plug	Herb	15%	OBL
Scirpus cyperinus	Woolgrass	3-5 ft	1.0"-2.0" plug	Herb	15%	FACW
Carex crinita	Fringed Sedge	3-5 ft	1.0"-2.0" plug	Herb	15%	OBL
Carex lurida	Lurid Sedge	3-5 ft	1.0"-2.0" plug	Herb	15%	OBL

Temporary Seeding		
Approved Date		
Jan 1 - May 1	Winter Oats (Avena Sativa)	55
	Rye Grain (Secale cereale)	120
	Ladino Clover (Trifolium repens)	5
	Medium Red Clover (Trillium pretense)	5
	SoluCal Humic Plus	200
	Neem Seed Meal	200
	Fertoz 0-20-0	200
	Straw Mulch	4000
May 1 - Aug 15	German Millet (Setaria italica)	40
	Buckwheat (Fagopyrum esculentum)	40
	SoluCal Humic Plus	200
	Fertoz 0-20-0	200
	Neem Seed Meal	200
	Straw Mulch	4000
Aug 15 - Dec 30	Winter Oats (Avena Sativa)	55
	Medium Red Clover (Trillium pretense)	5
	Ladino Clover (Trifolium repens)	5
	Neem Seed Meal	200
	SoluCal Humic Plus	200
	Fertoz 0-20-0	200
	Straw Mulch	4000

Pasture Seeding

Disturbed areas outside easement.

Pasture Seeding			
Pure Live Seeding (50 lbs/acre)			
Species Name	Common Name	Density (lbs/acre)	Wetland Indicator Status
Dactylis glomerata	Orchard Grass	33	FACU
Trifolium pratense	Medium Red Cover	5	FACU
Trifolium repens	White Ladino Cover	5	FACU
Poa pratensis	Kentucky Bluegrass	7	FACU

Total Planted Area: 24 acres

X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Planting.dwg

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029340 AARON S. EARLEY 6-10-22

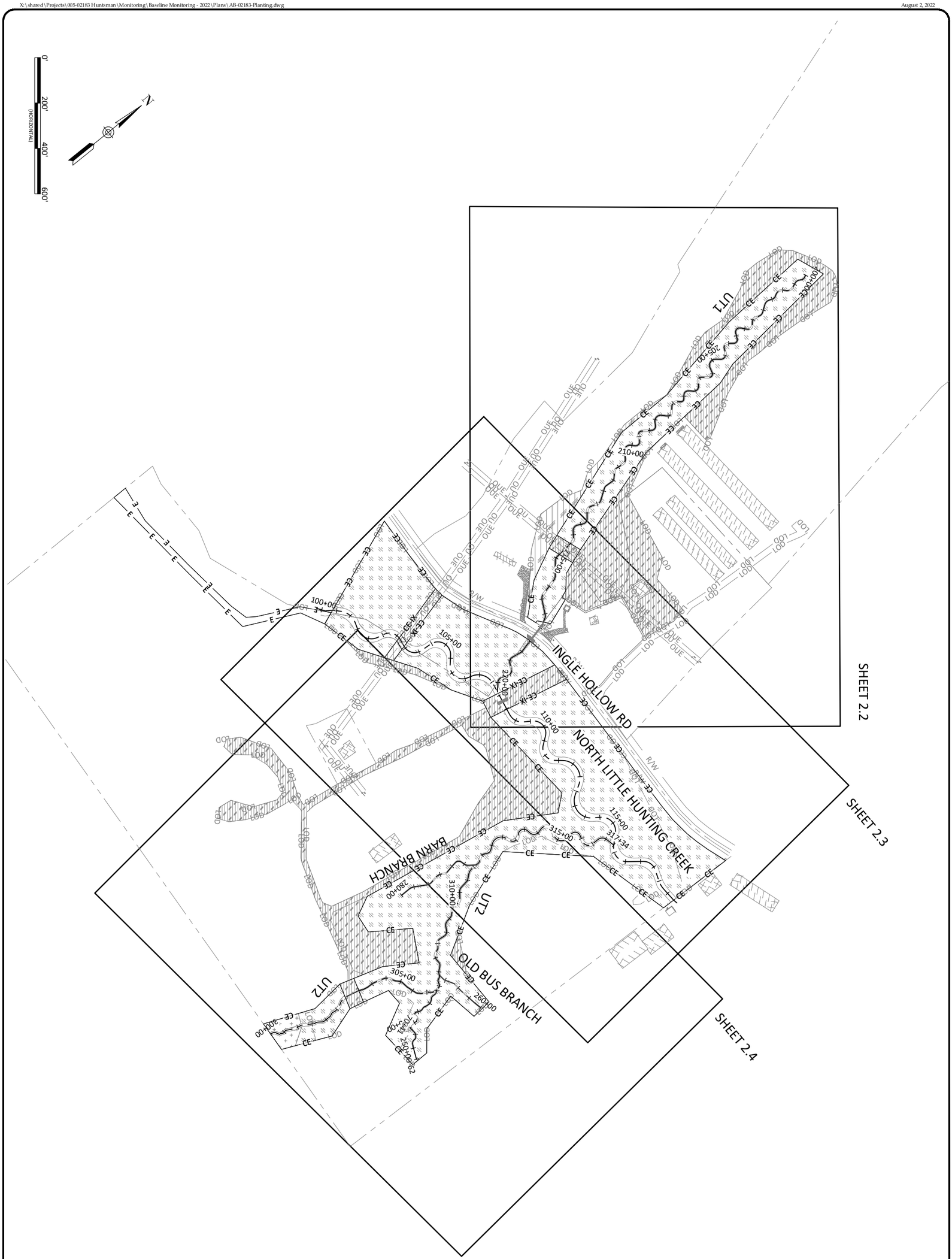
Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Plant Lists
Planting

Revisions:

Date: AUGUST 2, 2022
Job Number: 005-02183
Project Engineer: SRK
Drawn By: JCK
Checked By: EGR

Sheet 2.0



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Sheet 2.1

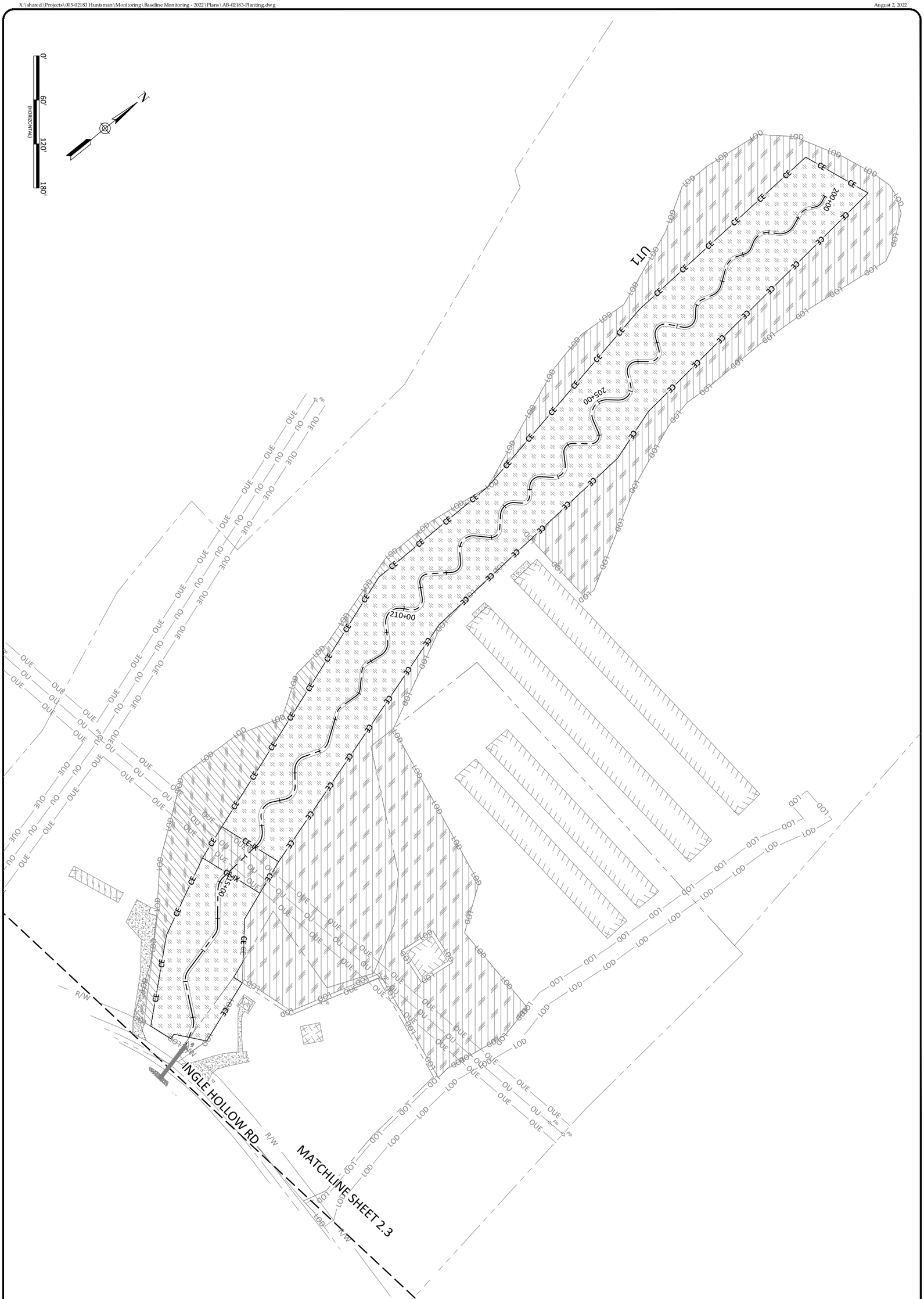
Revisions:

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Planting Overview
Planting

NORTH CAROLINA PROFESSIONAL SEAL 023470 ENGINEER AARON S. EARLEY 6-10-22

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

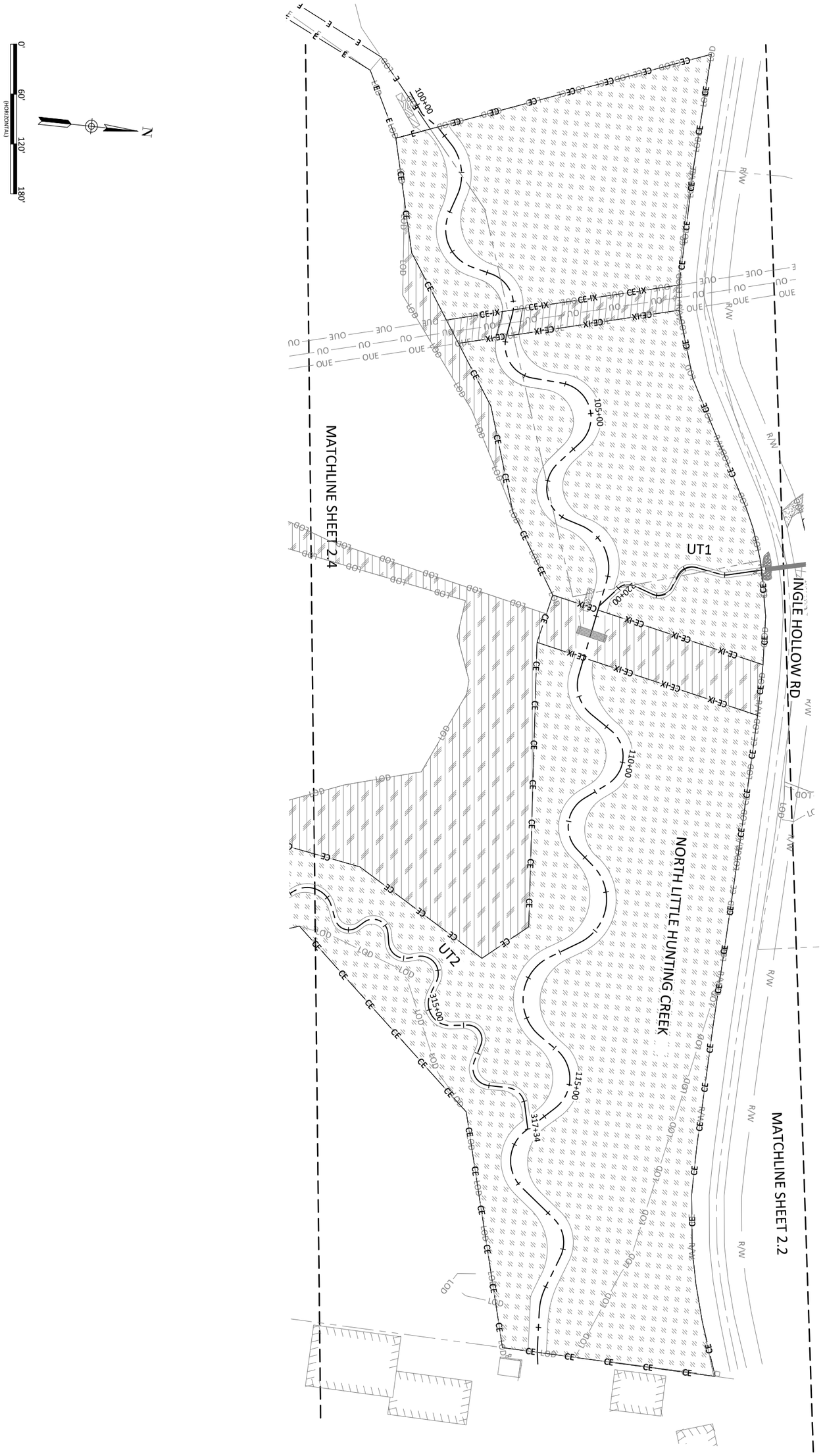
2.2
Sheet

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

UT1
Planting

NORTH CAROLINA PROFESSIONAL SEAL 028370 ENGINEER AARON S. EARLEY 6-10-22

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831



Date: AUGUST 2, 2022
Job Number: 005-02183
Project Engineer: SRK
Drawn By: JCK
Checked By: EGR

2.3
Sheet

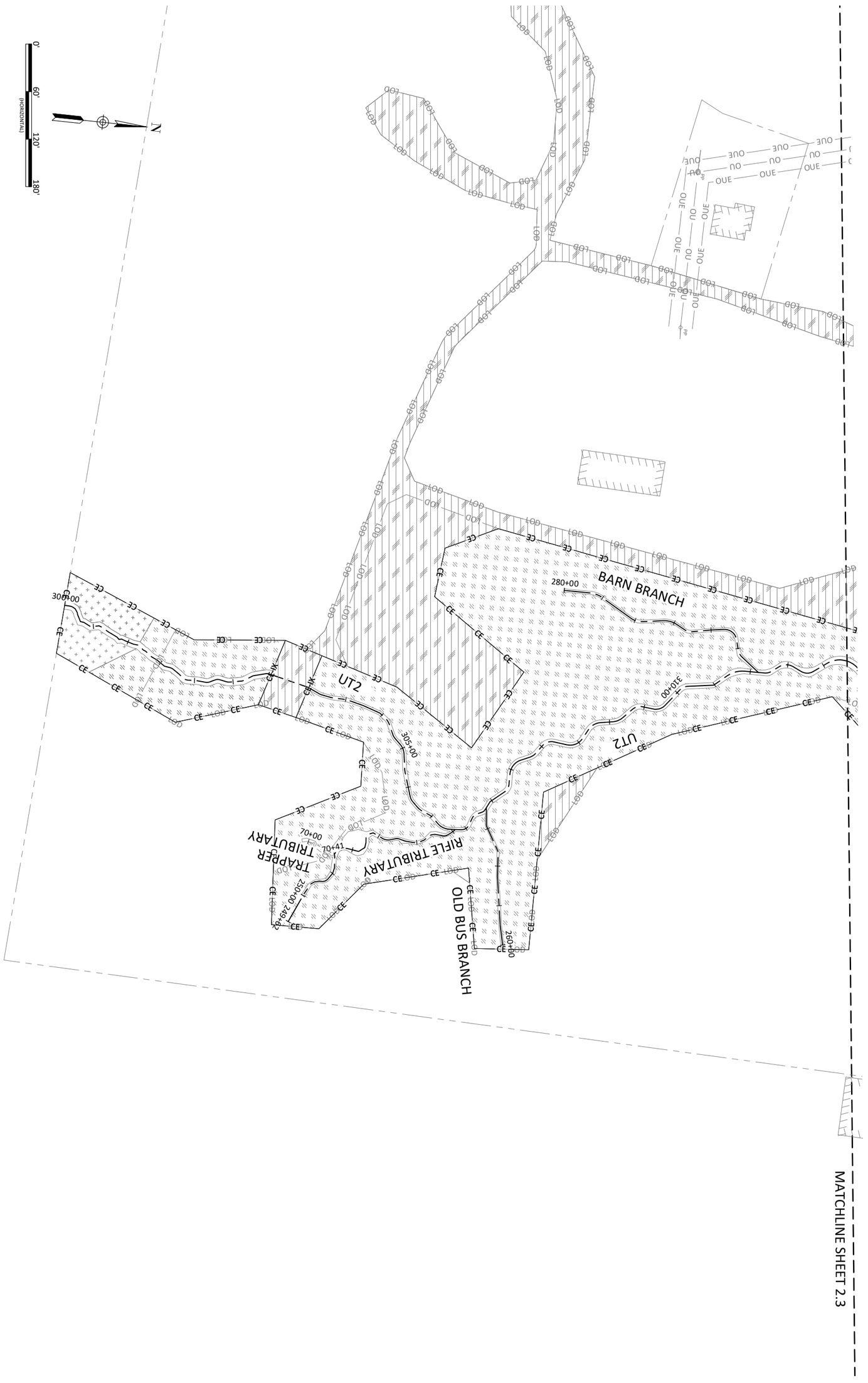
Revisions:

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

North Little Hunting Creek
Planting

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028370 AARON S. EARLEY
6-10-22

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831



Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

2.4
Sheet

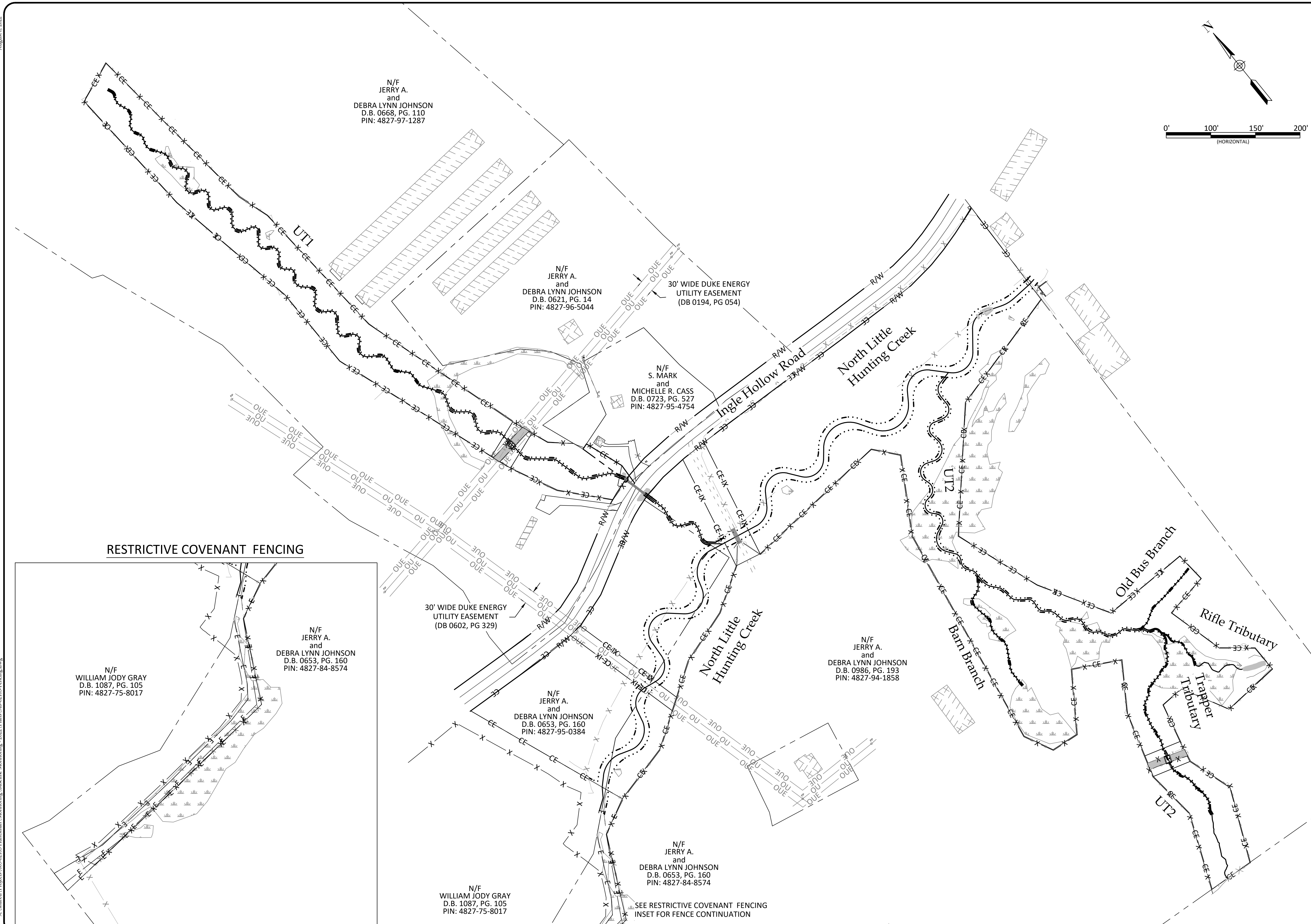
Revisions:

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

UT2
Planting

NORTH CAROLINA PROFESSIONAL SEAL 023470 ENGINEER AARON S. EARLEY 6-10-22

WILDLANDS ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831



WILDLANDS
ENGINEERING
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Tel: 704.332.7754
License No. F-0831

Huntsman Stream Mitigation Site Record Drawing
Wilkes County, North Carolina

Fencing Overview

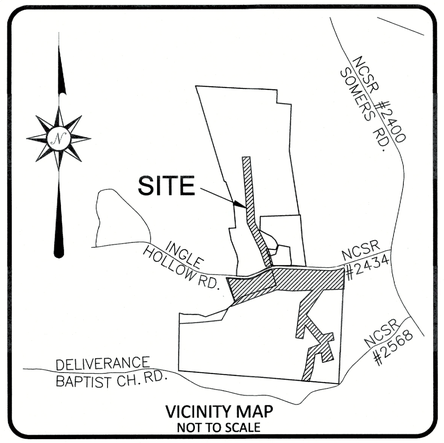
Date:	AUGUST 2, 2022
Job Number:	005-02183
Project Engineer:	SRK
Drawn By:	JCK
Checked By:	EGR

Revisions:

Sheet
3.0

August 8, 2022
X:\shared\Projects\005-02183 Huntsman\Monitoring\Baseline Monitoring - 2022\Plans\AB-02183-Fencing.dwg

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



VICINITY MAP
NOT TO SCALE

NADB3(2011) NAVD88

I, DAVID S. TURNER, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THUS ARE AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 22nd DAY OF JUNE, 2022.

David S. Turner
DAVID S. TURNER, P.L.S. #L-4551

NORTH CAROLINA PROFESSIONAL SEAL L-4551 LAND SURVEYOR DAVID S. TURNER 06-22-22

I, DAVID S. TURNER, CERTIFY THAT THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS TOPOGRAPHIC SURVEY WAS PERFORMED AT THE 95 PERCENT CONFIDENCE LEVEL TO MEET FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS FOR A TOPOGRAPHIC SURVEY TO THE HORIZONTAL ACCURACY OF CLASS A AND THE VERTICAL ACCURACY WHEN APPLICABLE TO CLASS C STANDARD, AND THAT THE ORIGINAL DATA WAS OBTAINED IN APR-MAY 2022; THAT THE SURVEY WAS COMPLETED ON 16 MAY 2022; AND ALL COORDINATES ARE BASED ON NAD83 (2011) AND ALL ELEVATIONS ARE BASED ON NAVD88. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL THIS 22nd DAY OF JUNE, 2022.

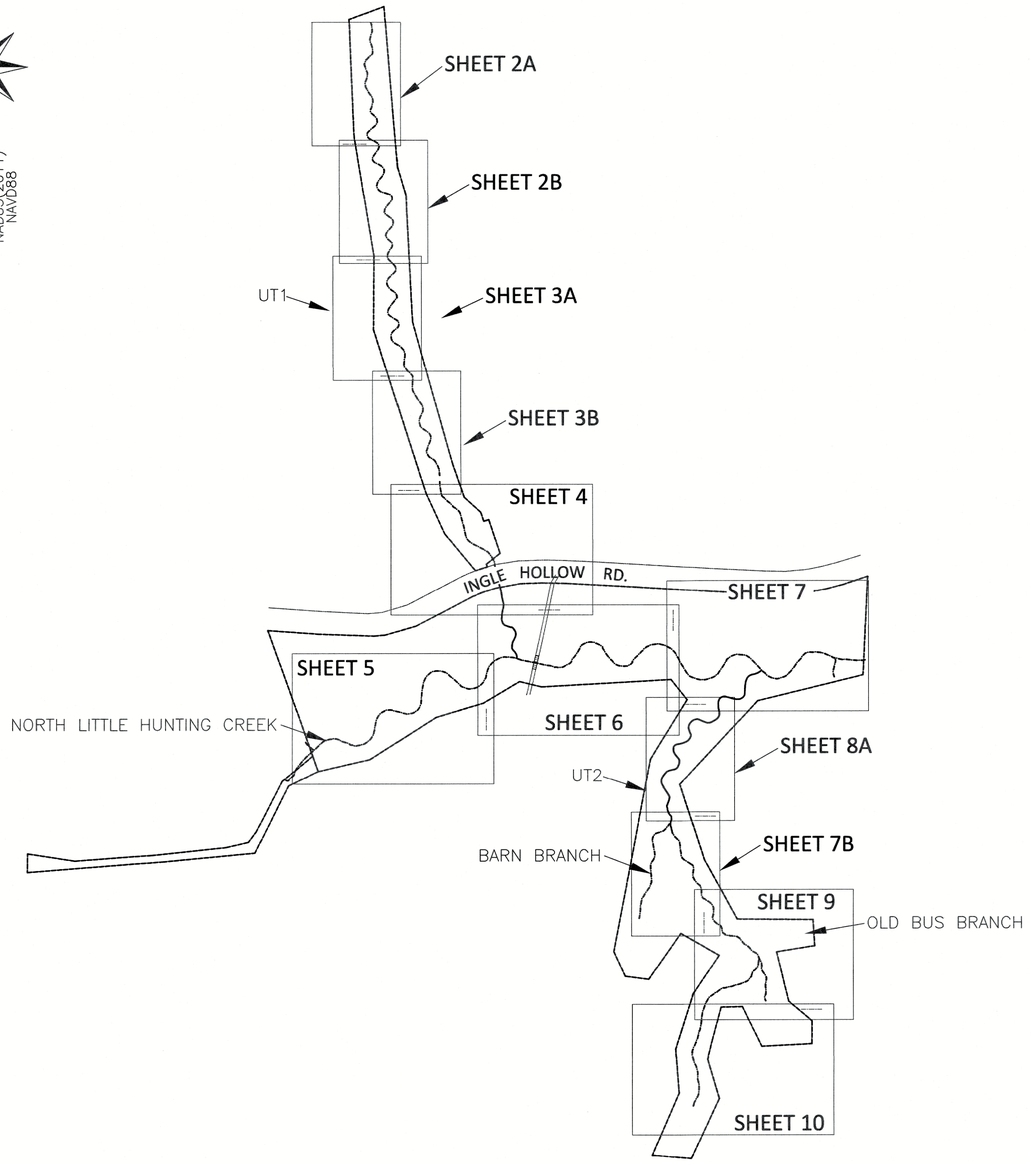
David S. Turner
DAVID S. TURNER, P.L.S. #L-4551

NORTH CAROLINA PROFESSIONAL SEAL L-4551 LAND SURVEYOR DAVID S. TURNER 06-22-22

GENERAL NOTES:
1. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
2. HORIZONTAL DATUM IS NAD83(2011) & VERTICAL DATUM IS NAVD88.
3. THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.
4. THE PURPOSE OF THIS MAP IS TO SHOW THE AS-BUILT CONDITIONS OF THE HUNTSMAN STREAM MITIGATION.
5. THE AS-BUILT CONTROL NETWORK WAS ESTABLISHED BY TURNER LAND SURVEYING DURING THE EXISTING CONDITIONS SURVEY AND RECOVERED AND SUPPLEMENTED DURING THE AS-BUILT SURVEY. THE COORDINATES ARE LISTED IN THE CHART BELOW.
6. NO PROPERTY RESEARCH, INVESTIGATION, OR INDEPENDENT SEARCH FOR ENCUMBERANCES, RESTRICTIVE COVENANTS, EASEMENTS OF RECORD, OWNERSHIP, TITLE EVIDENCE, OR OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE EXAMINATION MAY DISCLOSE WERE PERFORMED FOR THIS SURVEY. A LICENSED ATTORNEY-AT-LAW SHOULD BE CONSULTED REGARDING CORRECT OWNERSHIP, WIDTH, AND LOCATION OF EASEMENTS AND OTHER TITLE QUESTIONS REVEALED BY A TITLE EXAMINATION.
7. SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS, AND/OR ENCUMBRANCES THAT MAY AFFECT THE PROPERTY(S).
8. THIS SURVEYOR DOES NOT CERTIFY TO THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITIES THAT MAY OR MAY NOT EXIST WITHIN THE BOUNDARIES AS SHOWN HEREON.

AS-BUILT CONTROL

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1	875524.607	1430185.539	1122.901	TLS#1RBC RESET
2	875194.254	1429559.236	1145.980	TLS#2RBC GPS
3	875054.483	1429069.412	1151.401	TLS#3RBC GPS
20	875137.960	1429801.193	1117.800	TLS#20RBC=VP12
21	874839.840	1429880.206	1128.487	TLS#21RBC=XS13
22	874710.345	1430064.361	1139.323	TLS#22RBC=XS15
23	874595.853	1429973.619	1146.570	TLS#23RBC=XS11
30	875813.756	1429253.967	1133.617	TLS#30RBC=XS9
32	876450.981	1429080.301	1153.460	TLS#32RBC=XS7
33	876747.564	1429070.938	1158.705	TLS#33RBC=XS5
60	877118.467	1429056.928	1174.306	TLS#60NL



0 200 400 600
SCALE: 1 inch = 200 feet

SURVEY FOR:
ATTN: AARON EARLY, PE, CFM
PROJECT ENGINEER
1430 S. MINT ST.
SUITE 104
CHARLOTTE, NC 28203
(704)332-7754 x109

AS-BUILT SURVEY PERFORMED BY
TURNER LAND SURVEYING, PLLC
APRIL-MAY 2022

LEGEND:
- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- XS11 MONITORING CROSS-SECTION
- VP3 VEG PLOT
- MVP1 MOBILE VEG PLOT
- PP1 PHOTO POINT
- STREAM GAUGE
- TLS#60NL CONTROL POINT

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

TURNER LAND SURVEYING

REVISIONS, DATE AND INITIAL:

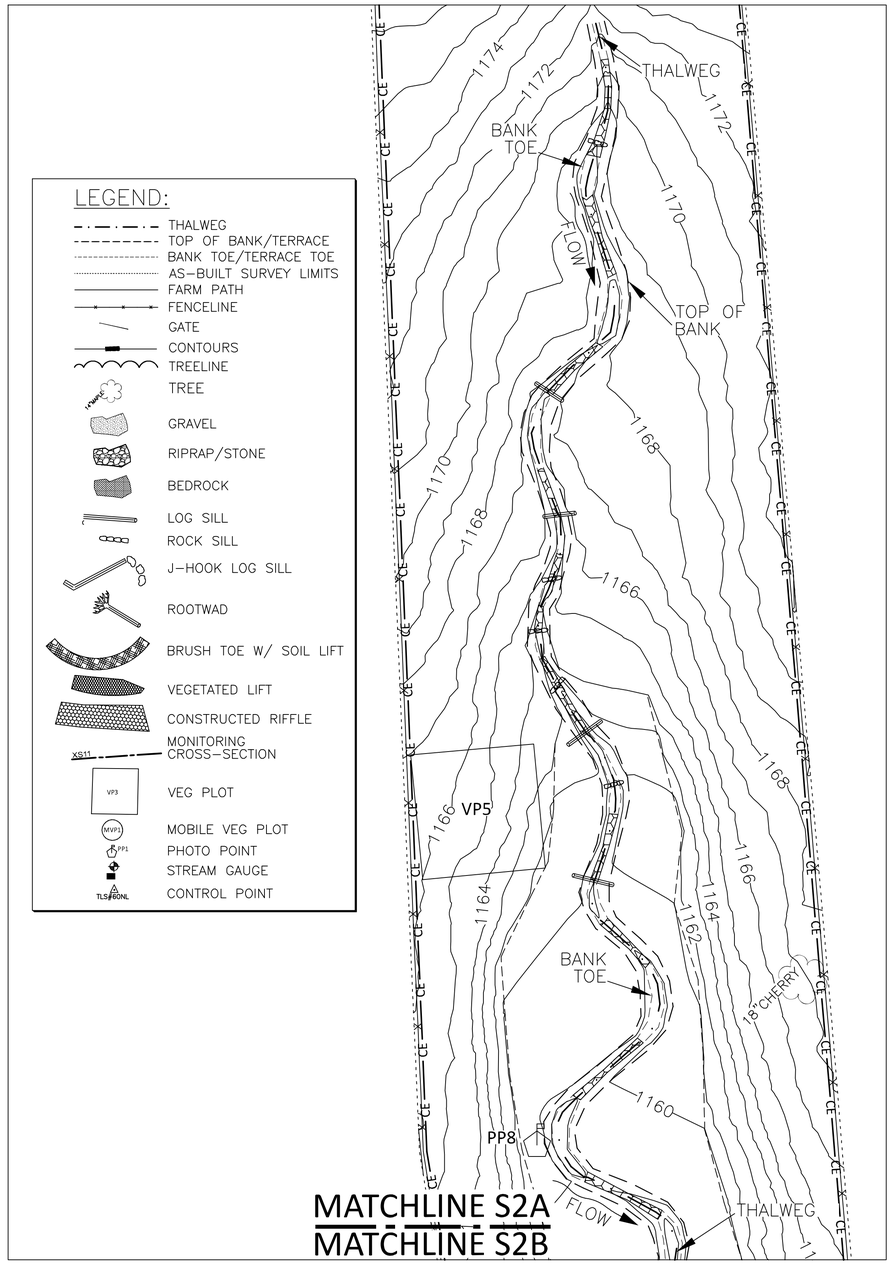
AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
WILKES COUNTY
NORTH CAROLINA
NEW CASTLE TOWNSHIP

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN
SHEET	1 of 10

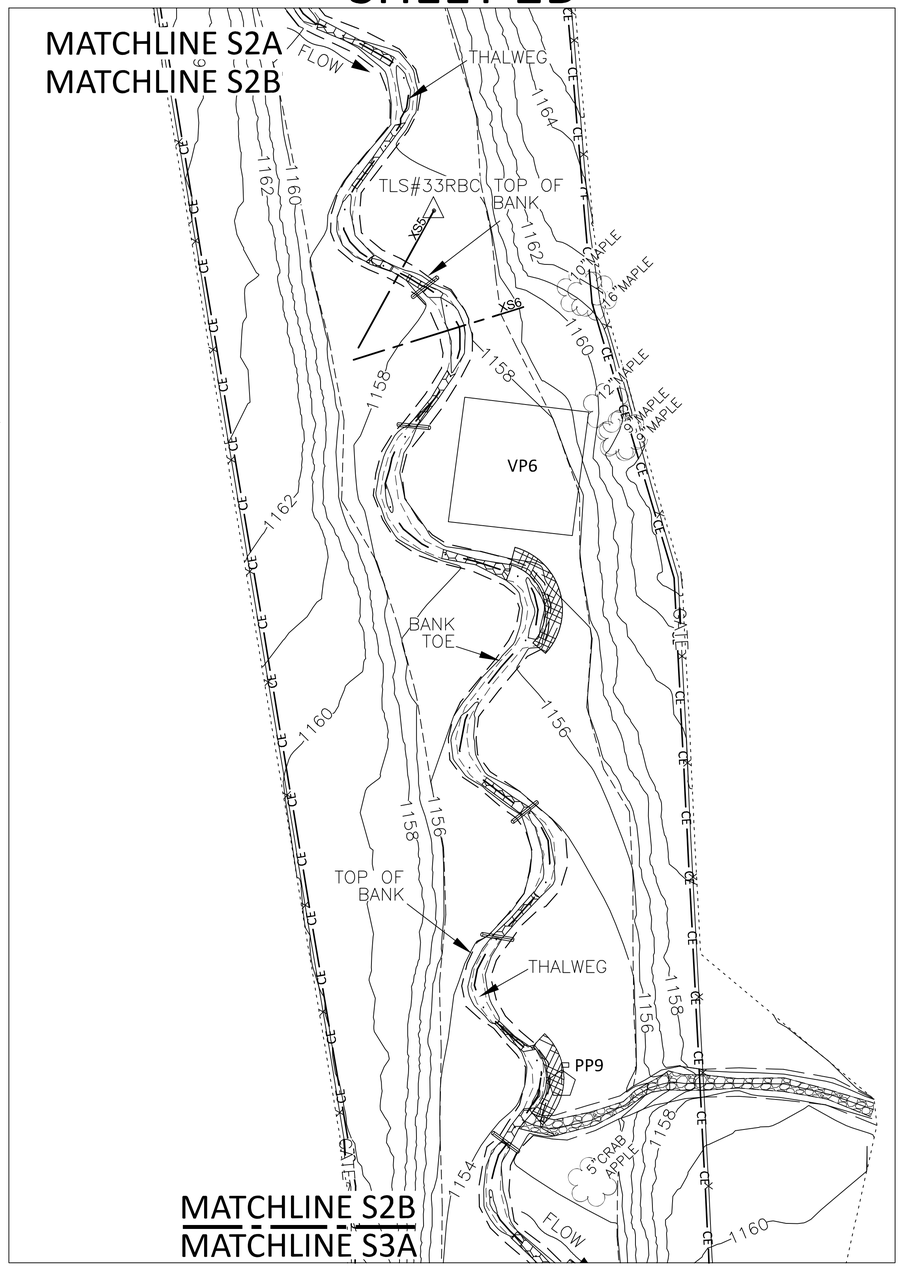
GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT

SHEET 2A



SHEET 2B



NAD83(2011) NAVD88

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
NEW CASTLE TOWNSHIP WILKES COUNTY NORTH CAROLINA

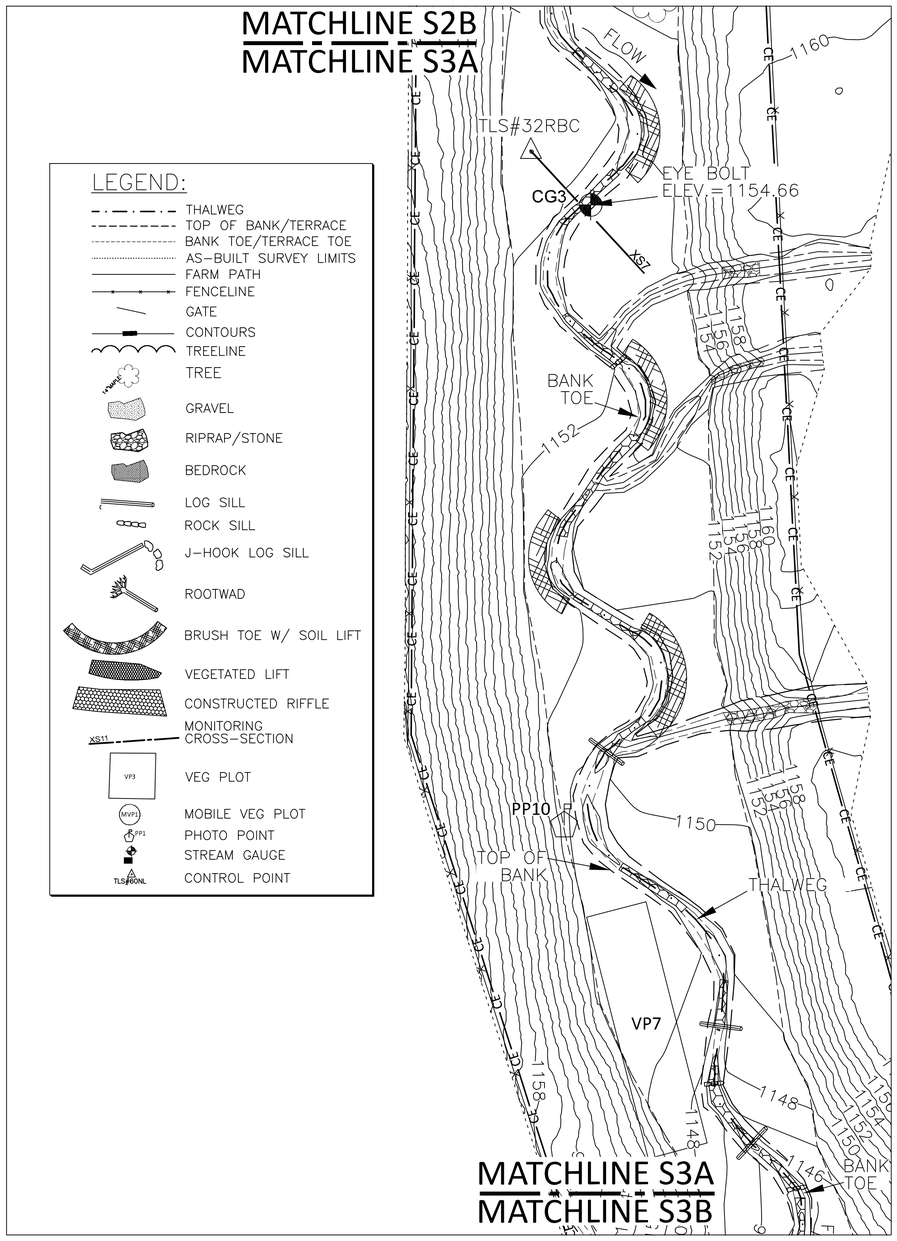
DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

SHEET 2 of 10

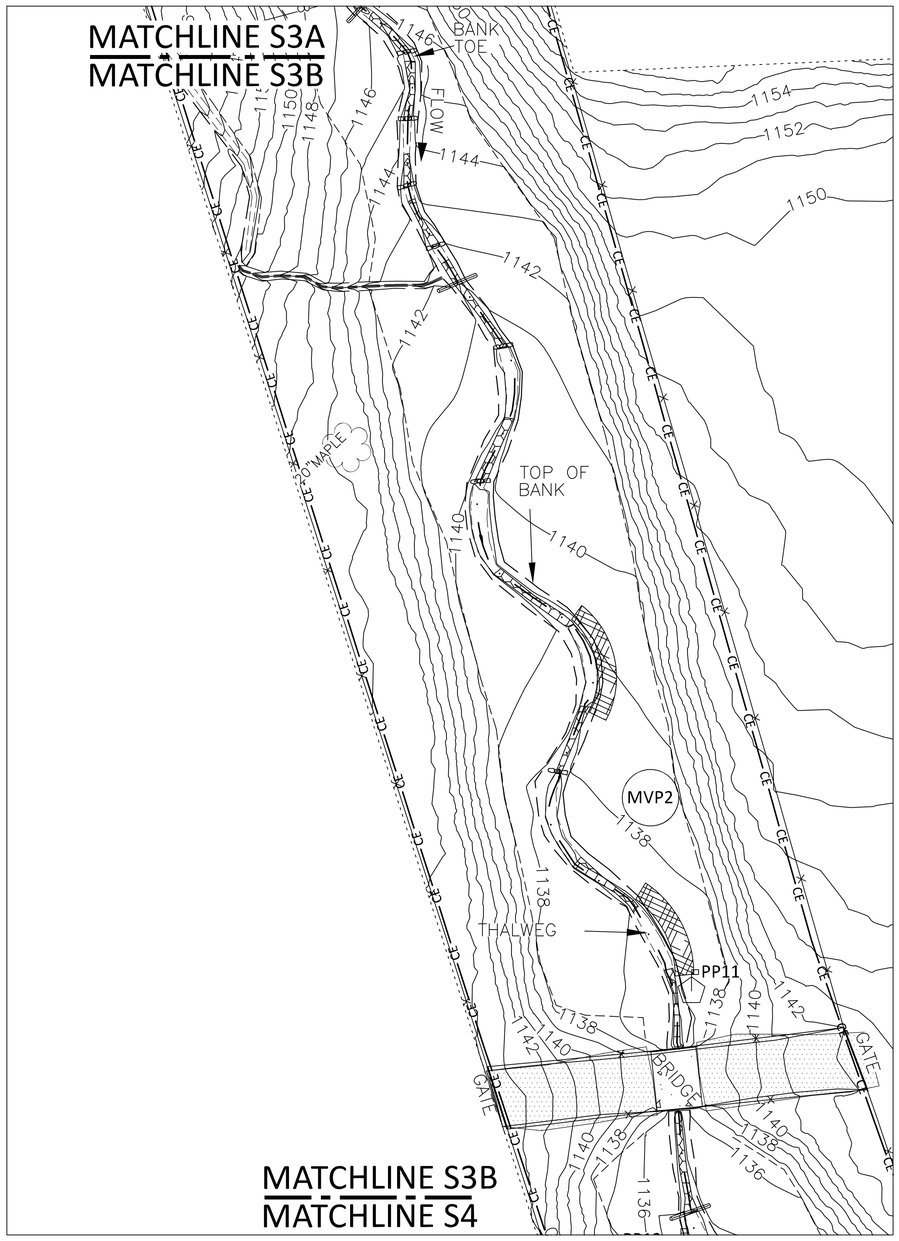
GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT

SHEET 3A



SHEET 3B



NAD83(2011)
NAVD88

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

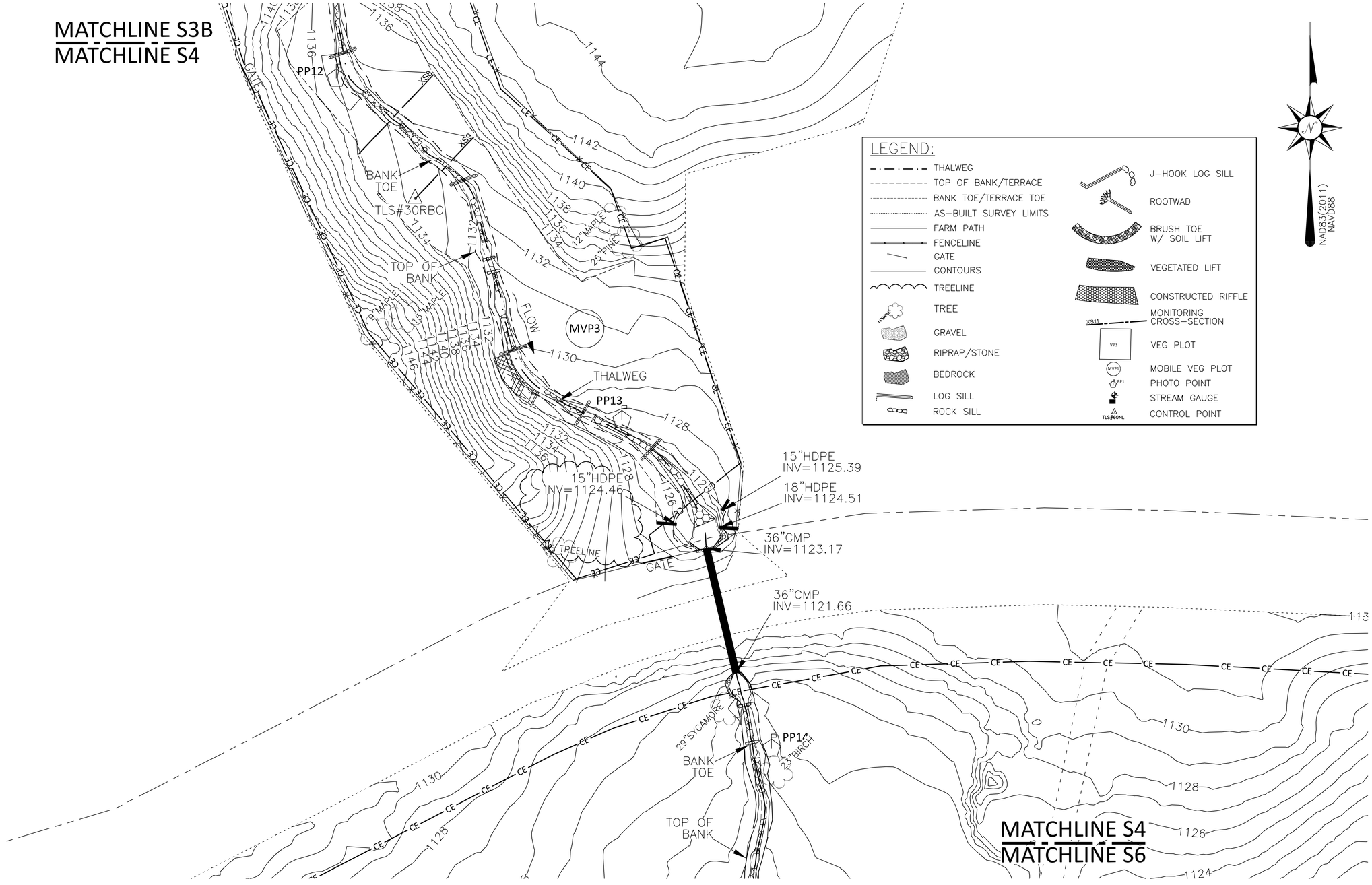
AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
NEW CASTLE TOWNSHIP
WILKES COUNTY
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT

MATCHLINE S3B
MATCHLINE S4



LEGEND:

- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- MONITORING CROSS-SECTION
- VEG PLOT
- MOBILE VEG PLOT
- PHOTO POINT
- STREAM GAUGE
- CONTROL POINT

NAD83(2011)
NAVD88

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

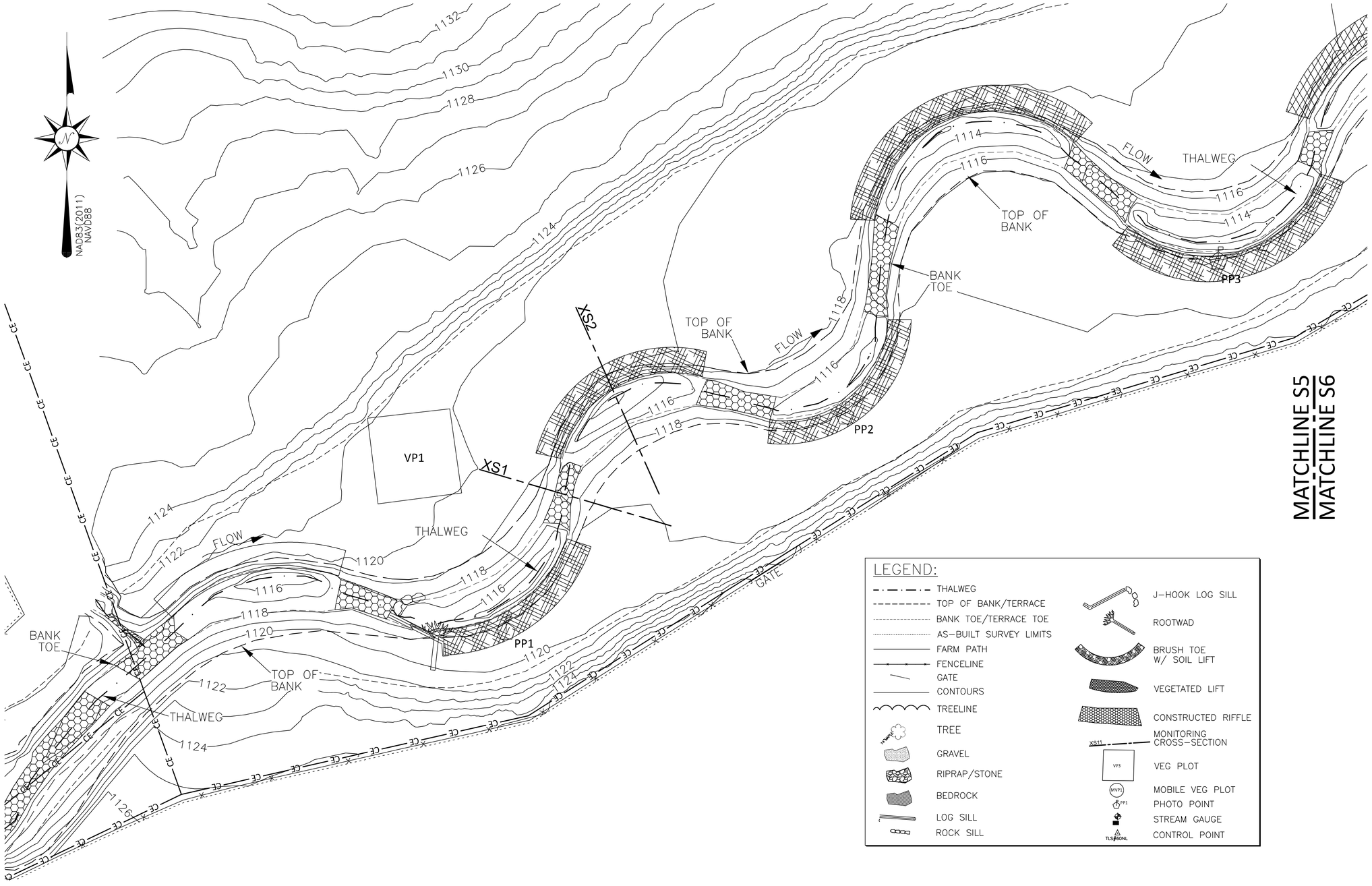
AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
WILKES COUNTY
NEW CASTLE TOWNSHIP
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

SHEET 4 of 10

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



LEGEND:

- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- MONITORING CROSS-SECTION
- VEG PLOT
- MOBILE VEG PLOT
- PHOTO POINT
- STREAM GAUGE
- CONTROL POINT

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

AS-BUILT SURVEY FOR:

HUNTSMAN STREAM MITIGATION SITE

WILKES COUNTY

NEW CASTLE TOWNSHIP

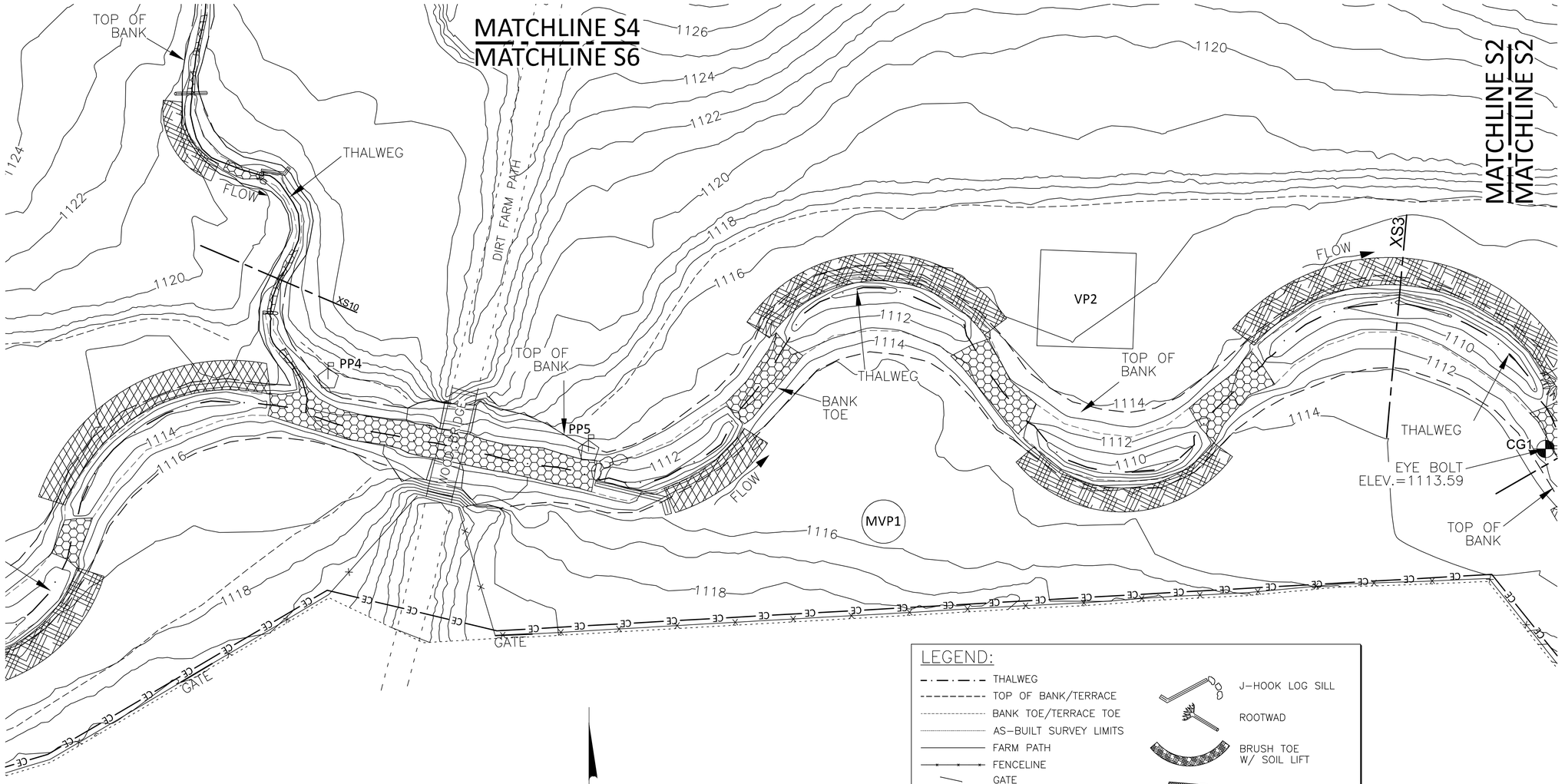
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

SHEET 5 of 10

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



LEGEND:

- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- MONITORING CROSS-SECTION (XS11)
- VEG PLOT (VP3)
- MOBILE VEG PLOT (MVP1)
- PHOTO POINT (PP1)
- STREAM GAUGE
- CONTROL POINT (TLS#60NL)

NAD83(2011)
NAVD88

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

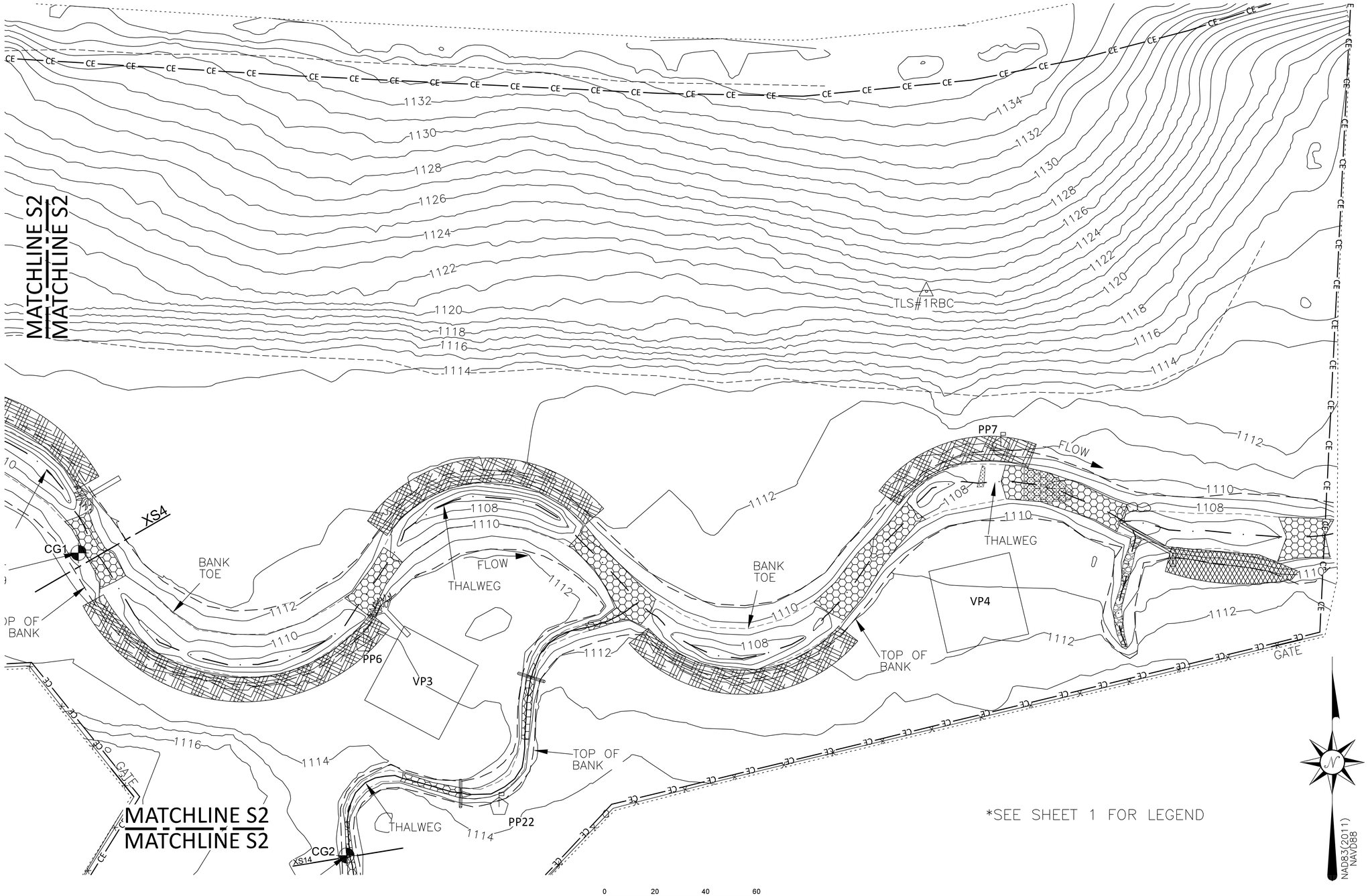
AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
WILKES COUNTY
NEW CASTLE TOWNSHIP
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

SHEET 6 of 10

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



*SEE SHEET 1 FOR LEGEND

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

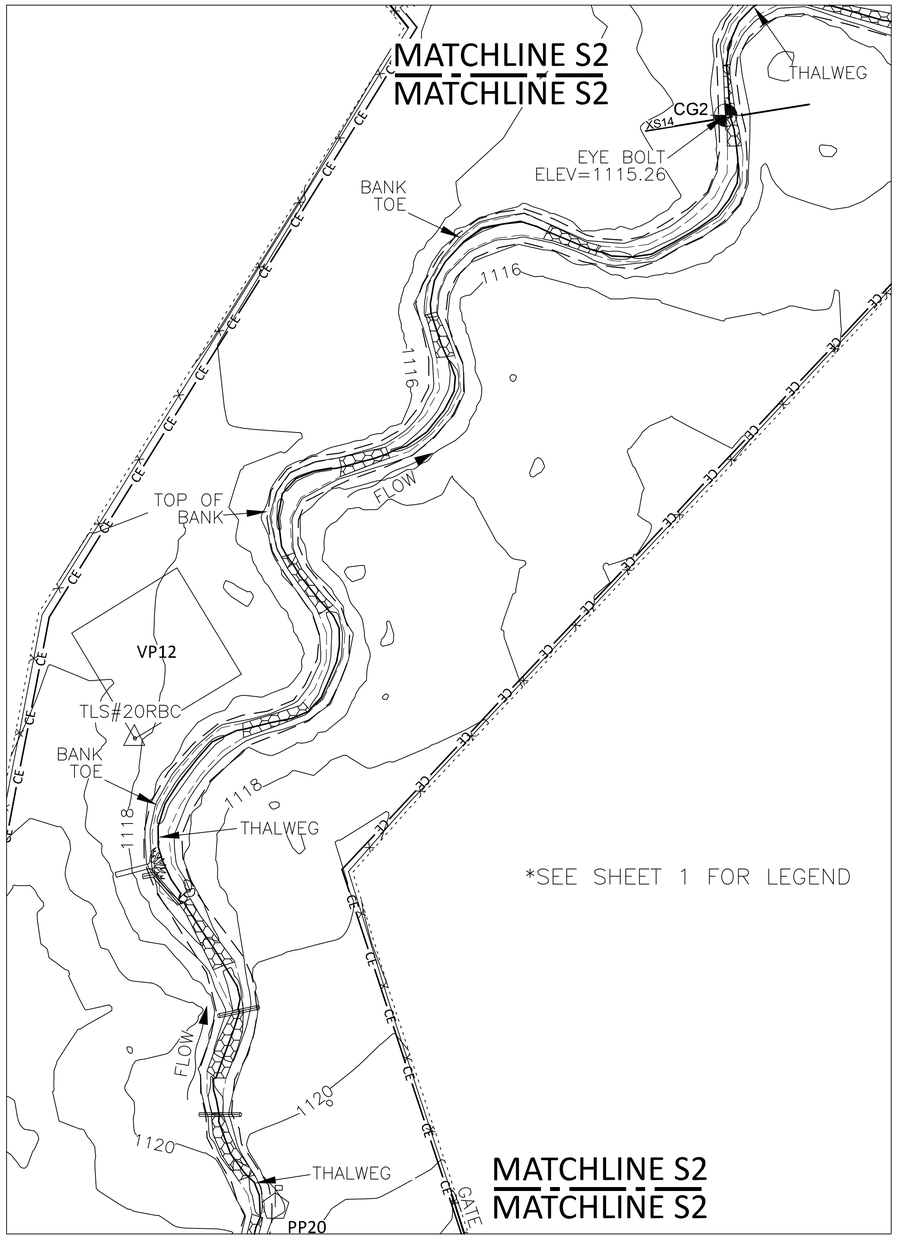
AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
WILKES COUNTY
NEW CASTLE TOWNSHIP
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

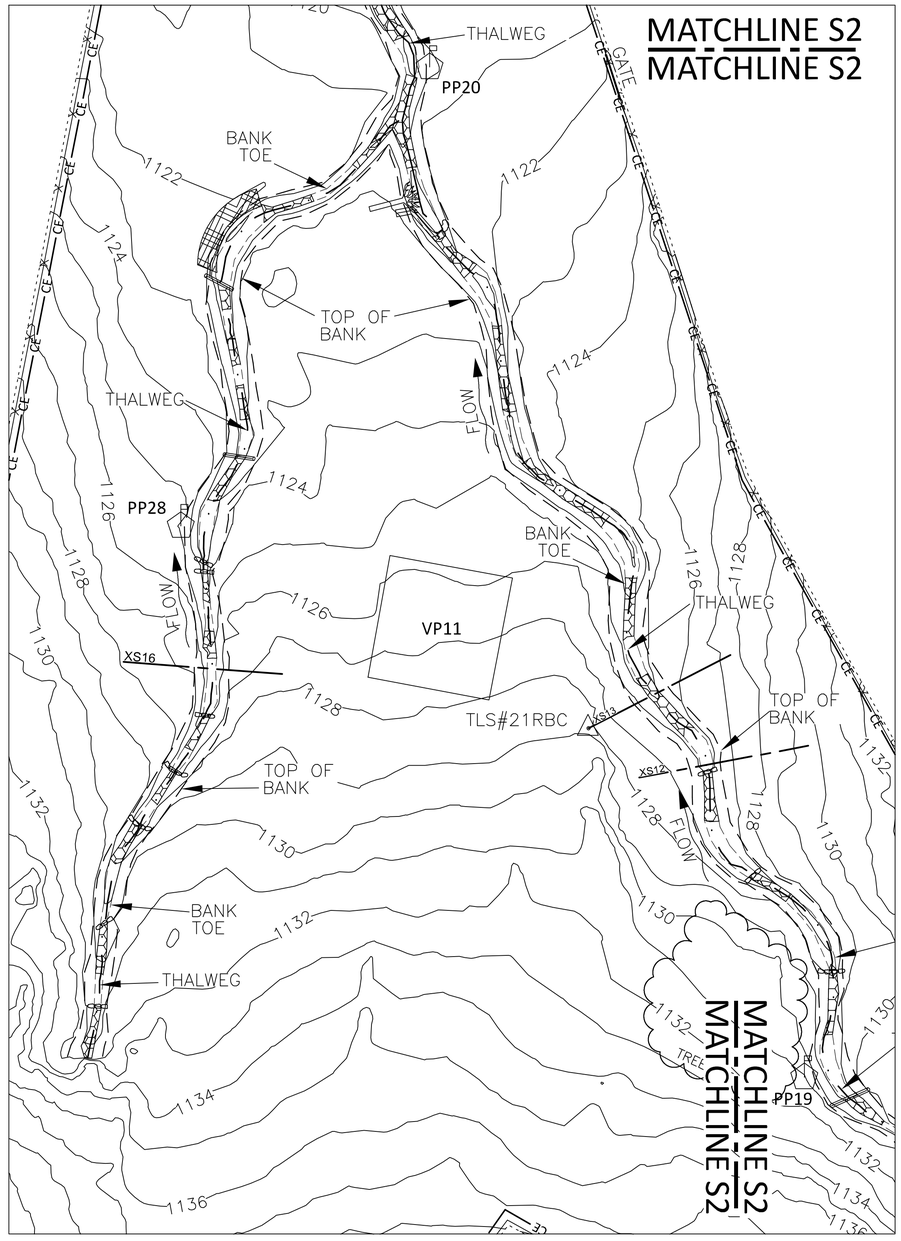
HUNTSMAN STREAM MITIGATION SITE AS-BUILT

SHEET 8A



*SEE SHEET 1 FOR LEGEND

SHEET 8B



NAD83(2011)
NAVD88

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

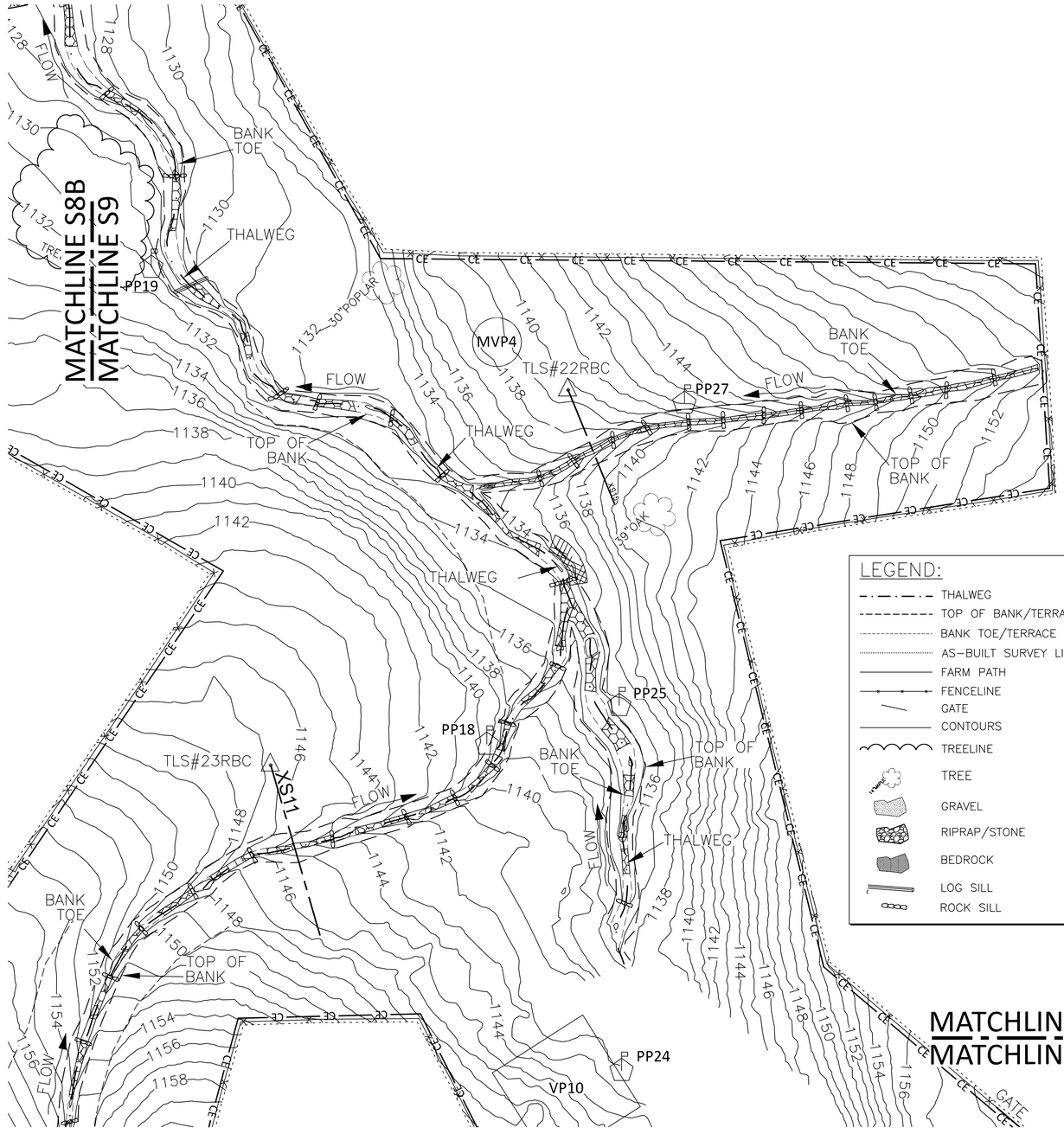
REVISIONS, DATE AND INITIAL:

AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
WILKES COUNTY
NEW CASTLE TOWNSHIP
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



NAD83(2011)
NAVD88

LEGEND:

- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- MONITORING CROSS-SECTION
- VEG PLOT
- MOBILE VEG PLOT
- PHOTO POINT
- STREAM GAUGE
- CONTROL POINT

0 20 40 60
SCALE: 1 inch = 20 feet

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

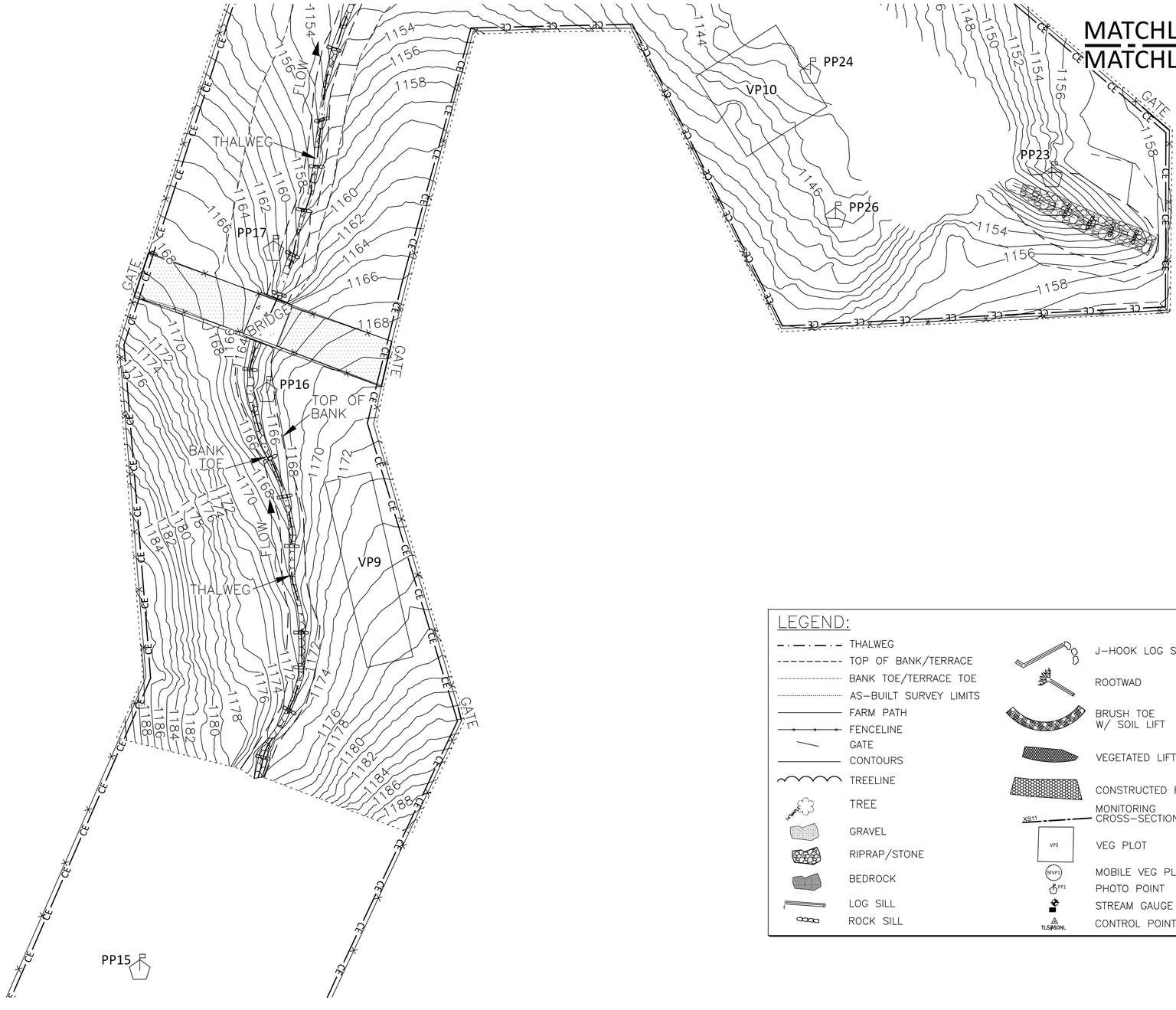
REVISIONS, DATE AND INITIAL:

AS-BUILT SURVEY FOR:
HUNTSMAN STREAM MITIGATION SITE
NEW CASTLE TOWNSHIP
WILKES COUNTY
NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

GENERAL NOTES:
1. SEE SHEET 1 FOR CERTIFICATIONS.
2. SEE SHEET 1 FOR GENERAL NOTES

HUNTSMAN STREAM MITIGATION SITE AS-BUILT



0 20 40 60
SCALE: 1 inch = 20 feet

LEGEND:

- THALWEG
- TOP OF BANK/TERRACE
- BANK TOE/TERRACE TOE
- AS-BUILT SURVEY LIMITS
- FARM PATH
- FENCELINE
- GATE
- CONTOURS
- TREELINE
- TREE
- GRAVEL
- RIPRAP/STONE
- BEDROCK
- LOG SILL
- ROCK SILL
- J-HOOK LOG SILL
- ROOTWAD
- BRUSH TOE W/ SOIL LIFT
- VEGETATED LIFT
- CONSTRUCTED RIFFLE
- MONITORING CROSS-SECTION (XS11)
- VEG PLOT (VP3)
- MOBILE VEG PLOT (MVP1)
- PHOTO POINT (PP1)
- STREAM GAUGE
- CONTROL POINT (TLSP60NL)

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
www.turnerlandsurveying.com
Certified DBE/WBE

REVISIONS, DATE AND INITIAL:

AS-BUILT SURVEY FOR:

HUNTSMAN STREAM MITIGATION SITE

WILKES COUNTY

NEW CASTLE TOWNSHIP

NORTH CAROLINA

DATE:	6/17/20212
SURVEYED BY:	DST/LDS
DRAWN BY:	EGT/DST
REVIEWED BY:	DST/EGT
PROJECT:	19-030
FILE:	HUNTSMAN MS_AB_F.DWG
SCALE:	AS SHOWN

SHEET 10 of 10

APPENDIX F. Correspondence

To: DMS Technical Workgroup, DMS operations staff

From: Periann Russell, Division of Mitigation Services (DMS)

RE: Pebble count data requirements

Date: October 19, 2021

The DMS Technical Work Group met September 29, 2021 to discuss Interagency Review Team (IRT) and DMS requirements for collecting pebble count data as part of monitoring (MY0-MYx). Agreement was reached between all attending parties that pebble count data will not be required during the monitoring period for all future projects.

Sediment data and particle distribution will still be required for the mitigation plan as part of the proposed design explanation and justification.

Pebble counts and/or particle distributions currently being conducted by providers for annual monitoring may be discontinued at the discretion of the DMS project manager. If particle distribution was listed as a performance standard in the project mitigation plan, the provider is required to communicate the intent to cease data collection with the DMS project manager. The absence of pebble count data in future monitoring reports where pebble count data was listed as part of monitoring in the mitigation plan must be documented in the monitoring report. The September 29, 2021 Technical Work Group meeting may be cited as the source of the new policy.

The IRT reserves the right to request pebble count data/particle distributions if deemed necessary during the monitoring period.

Kristi Suggs

From: Reid, Matthew <matthew.reid@ncdenr.gov>
Sent: Wednesday, October 27, 2021 1:26 PM
To: Kristi Suggs
Cc: Mimi Caddell
Subject: RE: [External] FW: Pebble Count Data Requirements

I am absolutely OK with not doing pebble counts anymore!

As stated in the memo, please add a statement in the monitoring reports citing the policy.

Thanks!

Matthew Reid
Project Manager – Western Region
North Carolina Department of Environmental Quality
Division of Mitigation Services

828-231-7912 Mobile
matthew.reid@ncdenr.gov

Western DMS Field Office
5 Ravenscroft Dr
Suite 102
Asheville, NC 28801

From: Kristi Suggs [mailto:ksuggs@wildlandseng.com]
Sent: Wednesday, October 27, 2021 1:24 PM
To: Reid, Matthew <matthew.reid@ncdenr.gov>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: [External] FW: Pebble Count Data Requirements

Matthew,

Jason Lorch in our Raleigh Office forwarded this meeting memo to me. It says that conducting pebble counts for DMS monitoring (MY0 – MY7) projects is no longer needed as long as it has been okayed by the DMS PM. Moving forward, are you going to allow us to stop doing them on your projects? If so, will DBB projects be treated the same? Please let me know. Thank you!

Kristi

Kristi Suggs | *Senior Environmental Scientist*
O: 704.332.7754 x110 **M**: 704.579.4828

Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

From: Jason Lorch <jlorch@wildlandseng.com>
Sent: Monday, October 25, 2021 9:05 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Subject: FW: Pebble Count Data Requirements

FYI!

Jason Lorch, GISP | *Senior Environmental Scientist*
O: 919.851.9986 x107 **M**: 919.413.1214

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

From: Russell, Periann <periann.russell@ncdenr.gov>
Sent: Thursday, October 21, 2021 10:05 AM
To: King, Scott <Scott.King@mbakerintl.com>; Catherine Manner <catherine@waterlandsolutions.com>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; adam.spiller@kci.com; Brad Breslow <bbreslow@res.us>; Davis, Erin B <erin.davis@ncdenr.gov>; gginn@wolfcreekeng.com; grant lewis <glewis@axiomenvironmental.org>; Jeff Keaton <jkeaton@wildlandseng.com>; katie mckeithan <Katie.McKeithan@mbakerintl.com>; Kayne Van Stell <kayne@waterlandsolutions.com>; Kevin Tweedy <ktweedy@eprusa.net>; Reid, Matthew <matthew.reid@ncdenr.gov>; Ryan Smith <rsmith@lmgroup.net>; Melia, Gregory <gregory.melia@ncdenr.gov>; Allen, Melonie <melonie.allen@ncdenr.gov>; Famularo, Joseph T <Joseph.Famularo@ncdenr.gov>; Rich@mogmit.com; Bryan Dick <Bryan.Dick@freese.com>; Ryan Medric <rmedric@res.us>; Kim Browning <Kimberly.D.Browning@usace.army.mil>; Kayne Van Stell <kayne@waterlandsolutions.com>; Worth Creech <worth@restorationsystems.com>; Jason Lorch <jlorch@wildlandseng.com>
Cc: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Reid, Matthew <matthew.reid@ncdenr.gov>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; Horton, Jeffrey <jeffrey.horton@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>; Ackerman, Anjie <anjie.ackerman@ncdenr.gov>; Blackwell, Jamie D <james.blackwell@ncdenr.gov>; Xu, Lin <lin.xu@ncdenr.gov>; Mir, Danielle <Danielle.Mir@ncdenr.gov>; Corson, Kristie <kristie.corson@ncdenr.gov>; Russell, Periann <periann.russell@ncdenr.gov>; Sparks, Kimberly L <Kim.sparks@ncdenr.gov>
Subject: Pebble Count Data Requirements

Please review the attached memo documenting the agreed upon policy for pebble count data requirements.
Please reply (me only) to this email if accept that this memo represents (or misrepresents) our discussion on Sept 29.
Thank you.

Periann Russell
Geomorphologist
Division of Mitigation Services, Science and Analysis
NC Department of Environmental Quality

919 707 8306 office
919 208 1426 mobile
periann.russell@ncdenr.gov

Mailing: 1652 Mail Service Center Raleigh, NC 27699-1652
Physical: 217 West Jones Street Raleigh, NC 27603