MY0 FINAL MONITORING REPORT

Bull Chute Stream and Riparian Wetland Mitigation Site

Randolph County, NC
Yadkin River Basin
Cataloging Unit 03040103

DMS Project ID No. 100137
Full Delivery Contract No. 7878-01
RFP #16-007878 (Issued: 5/6/2019)
USACE Action ID No. SAW-2020-00049
DWR Project No. 20200021

Data Collection: March - May 2022
Submission: July 2022

Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1652

Mitigation Services
ENVIRONMENTAL QUALITY

July 31, 2022

Mr. Matthew Reid
NCDEQ Division of Mitigation Services
Western DMS Field Office
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

Re: Bull Chute – MY-0 As-Built Report (DMS Project No. 100137)
Response to Comments

Dear Mr. Reid,

Please find below the response to comments on the Bull Chute As-Built Report provided by DMS, dated July 25, 2022:

1) Please add Table 1, Table 2, and Table 3 to Table of Contents.
Re: Tables 1-3 were added to the table of contents.

2) Monitoring Table Summary and 4.2 Hydrology Assessment indicates that 9 groundwater gauges were installed. The CCPV and soil boring logs show 10 ground water gauges. Please review and revise as necessary.
Re: The table was revised to reflect the 10 groundwater gauges installed throughout Site wetlands.

3) Table 8: Vegetation Plot Data Table: There are several species included on the vegetation table under the "species included in approved mitigation plan" section that were not part of the approved list (*Catalpa sp.*, *Quercus lyrate*, *Quercus pagoda* and *Viburnum dentatum*). Any species not included in the approved mitigation plan should be in the "post mitigation plan species" section (see DMSMonReportTablesOct2020.xls). These species should be counted in the "total" column and not in the "planted" column. Please revise table and update report to reflect any changes.
Re: The *Quercus lyrata* and *Quercus pagoda* were likely misidentified. These have been revised to *Quercus* sp. and will be identified to species during MY1 monitoring. The *Catalpa* sp. was a data entry error and has been corrected to *Carpinus caroliniana*. The *Viburnum dentatum* in Random Plot 10 was misidentified and has been revised to *Cornus amomum*. All identifications will be confirmed during MY1.

4) Several species from the approved mitigation plan do not appear in the table. *Carya tomentosa*, *Salix nigra* and C*arpinus caroliniana*. Revise as necessary.
Re: *Carya tomentosa* and *Carpinus caroliniana* were identified on Site. *Salix nigra* was planted in the streamside assemblage and was not captured in the vegetation plot data.

Clearwater Mitigation Solutions
604 Macon Place
Raleigh, NC 27609
919-624-6901
clearwatermitigation@gmail.com

5) Several *Quercus sp*. were counted in the vegetation plot data. Please identify in the MY1 report. If these are planted species, they should be either *Quercus nigra* or *Quercus phellos*.
Re: These will be identified to species during MY1 when leaves are present.

6) There was one *Carya sp*. identified in VP21. Should this be *Carya tomentosa*? Review and revise as necessary.
Re: Yes, this specimen has been revised to *Carya tomentosa*.

7) Record Drawing: Please add call outs to changes in red with short description (ex. log cross vane added, cross vane not constructed).
Re: All redline changes now have call outs.

8) Record Drawing: Hard copy was not printed in color. Red line markups were indiscernible as a result. Please revise for final submittal.
Re: The hard copy was printed in color for this submittal.

9) Record Drawing: Ironwood (*Carpinus caroliniana*) was the only species not planted. Please include a red line strike through since it is a deviation from the original design.
Re: Ironwood in design planting list has a line strike through.

Digital Deliverable Review:

10) Digital deliverables have been reviewed and are complete. Please provide an updated digital deliverable submittal based on comments above when submitting the revised final MY0 report.
Re: The digital deliverables have been updated based on the DMS comments.

Please do not hesitate to contact me with questions at 919-624-6901.

Sincerely,

Kevin Yates

Clearwater Mitigation Solutions
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Mitigation Services
ENVIRONMENTAL QUALITY

Prepared By:

CLEARWATER MITIGATION
SOLUTIONS

And

Axiom Environmental, Inc.

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APPENDICES

1.0 PROJECT SUMMARY

Clearwater Mitigation Services has established the North Carolina Division of Mitigation Services (NCDMS) Bull Chute Stream & Wetland Mitigation Site (hereafter referred to as the "Site"). The Site includes Unnamed Tributaries (UTs) to Caraway Creek in the Southern Outer Piedmont ecoregion of North Carolina. The Site is located in the Yadkin River Basin, cataloguing unit 03040103 and Targeted Local Watershed and Local Watershed Plan Area (Caraway Creek) 03040103050040 and North Carolina Division of Water Resources (NCDWR) subbasin number 03-08-38. Site watersheds range from approximately 0.008 of a square mile (5.4 acres) on UT2 to 0.19 of a square mile (120.9 acres) at the Site's outfall.

1.1 Project Background, Components, and Structure

Located in Randolph County, less than one-mile northwest of New Market and 4.5 miles northwest of Randleman, the Site encompasses 31.7 acres. Restoration activities within the Site included the construction of meandering, E/C-type stream channel resulting in 6974 linear feet of Priority I stream restoration, 617 linear feet of stream enhancement (Level I), 833 linear feet of stream enhancement (Level II), 450 linear feet of stream enhancement (Level II with an adjusted ratio), 3.13 acres of riparian wetland re-establishment, 0.114 acres of riparian wetland rehabilitation, and 1.462 acre of riparian wetland enhancement. The site is expected to provide 7742.933 warm water stream credits and 3.937 riparian wetland credits by closeout (Table 1, page 2). A conservation easement was granted to the State of North Carolina and recorded at the Randolph County Register of Deeds on April 9, 2021.

Prior to construction, the Site was characterized by disturbed forest and livestock pasture. Site design was completed in May 2021. Construction started on September 6, 2021 and ended within a final walkthrough on March 8, 2022. The Site was planted on March 18, 2022. Completed project activities, reporting history, completion dates, and project contacts are summarized in Tables 11-12 (Appendix E).

Table 1. Bull Chute Mitigation Site (ID-100137) Project Mitigation Quantities and Credits

Project Segment	Original Mitigation Plan Ft/Ac	As-Built Ft/Ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits		Comments
Stream								
UT 1 Reach A	173	187	Warm	EII	2.50000	69.200		
UT 1 Reach B	468	456	Warm	EI	1.50000	312.000		
UT 1 Reach C	68	68	Warm	EII	2.50000	27.200		
UT 1 Reach D	149	149	Warm	EI	1.50000	99.333		
UT 1 Reach E	2164	2168	Warm	R	1.00000	2,164.000		
UT 2	592	592	Warm	EII	2.50000	236.800		
UT 3 Reach A	418	423	Warm	R	1.00000	418.000		
UT 3 Reach B	306	303	Warm	EII*	7.50000	40.800		
UT 3 Reach C	1137	1119	Warm	R	1.00000	1,137.000		
UT 4A	410	402	Warm	R	1.00000	410.000		
UT 4B	295	290	Warm	R	1.00000	295.000		
UT 4C	180	175	Warm	No Credit	0.00000	0.000		
UT 4	2482	2492	Warm	R	1.00000	2,482.000		Approx. 30 lf (approx. sta. 10+11 to 10+41) was realigned during construction to avoid damaging mature trees. This resulted in an increase of stream restoration footage along this reach at MY0. However, no change to crediting is proposed for MY0.
UT 5A	37	36	Warm	No Credit	0.00000	0.000		
UT 5B	38	38	Warm	R	1.00000	38.000		
UT 6	121	130	Warm	No Credit	0.00000	0.000		
UT 7	68	77	Warm	EII*	5.00000	13.600		
					Total:	**7,742.933**		
Wetland								
Wetland Reestablish	3.13	3.13	R	REE	1.00000	3.130		
Wetland Rehabilitation	0.114	0.114	R	RH	1.50000	0.076		
Wetland Enhancement	1.462	1.462	R	E	2.00000	0.731		
					Total:	**3.937**		

Project Credits

	Stream			Riparian	Non-Rip	Coastal
Restoration Level	Warm	Cool	Cold	Wetland	Wetland	Marsh
Restoration	6,944.000	0.000	0.000	0.000	0.000	0.000
Re-establishment				3.130	0.000	0.000
Rehabilitation				0.076	0.000	0.000
Enhancement				0.731	0.000	0.000
Enhancement I	411.333	0.000	0.000			
Enhancement II	333.200	0.000	0.000			
Enhancement II*	54.400	0.000	0.000			
Creation				0.000	0.000	0.000
Preservation	0.000	0.000	0.000	0.000	0.000	
Totals	**7,742.933**			**3.937**		

*Enhancement Level II with an adjusted ratio (based on IRT comment and review).

Total Stream Credit **7,742.933**
Total Wetland Credit **3.937**

Wetland Mitigation Category

CM	Coastal Marsh
R	Riparian
NR	Non-Riparian

Restoration Level

HQP	High Quality Preservation
P	Preservation
E	Wetland Enhancement - Veg and Hydro
EII	Stream Enhancement II
EI	Stream Enhancement I
C	Wetland Creation
RH	Wetland Rehabilitation - Veg and Hydro
REE	Wetland Re-establishment Veg and Hydro
R	Restoration

Table 2. Summary: Goals, Performance, and Results

Goals	Objectives	Success Criteria
(1) HYDROLOGY		
• Minimize downstream flooding to the maximum extent possible.	• Construct new channel at historic floodplain elevation to restore overbank flows • Plant woody riparian buffer • Deep rip floodplain soils to reduce compaction and increase soil surface roughness • Protect riparian buffers with a perpetual conservation easement • Construct channels with proper pattern, dimension, and longitudinal profile	• BHR not to exceed 1.2 • Document four overbank events in separate monitoring years • Continuous intermittent surface flow for at least 30 days • Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded
• Increase stream stability within the Site so that channels are neither aggrading nor degrading.	• Construct channels with proper pattern, dimension, and longitudinal profile • Remove livestock from the property • Construct stable channels with appropriate substrate • Upgrade existing piped channel crossings and install piped crossings at existing forded crossings • Stabilize stream banks • Plant woody riparian buffer	• Cross-section measurements indicate a stable channel with appropriate substrate • Visual documentation of stable channels and structures • BHR not to exceed 1.2 • < 10% change in BHR in any given year • Livestock excluded from the easement • Attain Vegetation Success Criteria
(1) WATER QUALITY		
• Remove direct nutrient and pollutant inputs from the Site and reduce contributions to downstream waters.	• Remove agricultural livestock and reduce agricultural land/inputs • Install marsh treatment areas • Plant woody riparian buffer • Restore/enhance jurisdictional wetlands adjacent to Site streams • Provide surface roughness and reduce compaction through deep ripping/plowing • Restore overbank flooding by constructing channels at historic floodplain elevation	• Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria
(1) HABITAT		
• Improve instream and stream-side habitat.	• Construct stable channels with appropriate substrate • Plant woody riparian buffer to provide organic matter and shade • Construct new channel at historic floodplain elevation to restore overbank flows • Protect riparian buffers with a perpetual conservation easement • Restore/enhance jurisdictional wetlands adjacent to Site streams • Stabilize stream banks • Install in-stream structures	• Cross-section measurement indicate a stable channel with appropriate substrate • Visual documentation of stable channels and in-stream structures. • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded

Table 3. Project Attribute Table									
Project Name	Bull Chute Stream and Riparian Wetland Mitigation Site								
County	Randolph County, North Carolina								
Project Area (acres)	31.7								
Project Coordinates (latitude and longitude decimal degrees)	35.8325, -79.8879								
Project Watershed Summary Information									
Physiographic Province	Southern Outer Piedmont								
River Basin	Yadkin								
USGS Hydrologic Unit 8-digit	3040103050040								
DWR Sub-basin	03-07-09								
Project Drainage Area (acres)	218.5								
Project Drainage Area Percentage of Impervious Area	<2%								
Land Use Classification	Managed Herbaceous Cover & Hardwood Swamps								
Reach Summary Information									
Parameters	**UT 1**	**UT 2**	**UT 3**	**UT 4**	**UT 4A/B**	**UT 4C**	**UT 5**	**UT 6**	**UT 7**
Pre-project length (feet)	3022	592	1861	2482	705	180	75	121	68
Post-project (feet)	3149	592	1907	2558	693	175	75	130	77
Valley confinement (Confined, moderately confined,	A, C	A, C	A, C	A, C	A, C	A, C	A, C	A, C	A, C
Drainage area (acres)	97.6	48.1	48.1	120.9	10.2/8.9	8.3	12.5	5.4	16
Perennial, Intermittent, Ephemeral	Int/Per	Int	Int/Per	Per	Int	Int	Int	Int	Int
NCDWR Water Quality Classification	C								
Dominant Stream Classification (existing)	G5	---	G5	Fg/G5	Eg/Cf5	---	---	---	---
Dominant Stream Classification (proposed)	Ce 3/4	---	Ce 3/4	Ce 3/4	Ce 3/4	Ce 3/4	Ce 3/4	---	Ce 3/4
Dominant Evolutionary class (Simon) if applicable	IV	IV	IV	IV	IV	III	III	III	III
Wetland Summary Information									
Parameters	**Wetlands**								
Pre-project (acres)	3.130 acre drained & 1.576 acre degraded								
Post-project (acres)	3.206 restored & 0.731 enhanced								
Wetland Type (non-riparian, riparian)	Riparian riverine								
Mapped Soil Series	Mecklenburg, Wynott-Enon Complex, and field identified Wehadkee Variant								
Soil Hydric Status	Non-hydric, Non-hydric, and Hydric								

Regulatory Considerations			
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404	Yes	Yes	Section 404 Permit
Water of the United States - Section 401	Yes	Yes	Section 401
Endangered Species Act	Yes	Yes	CE Document
Historic Preservation Act	Yes	Yes	CE Document
Coastal Zone Management Act (CZMA or CAMA)	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

1.2 Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives identified from on-site NC SAM and NC WAM data collection. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving success criteria. The following summarizes Site annual success criteria.

Success Criteria

Streams
• All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05. • Continuous surface flow in intermittent streams must be documented each year for a minimum of 30 consecutive days. • Bank height ratio (BHR) cannot exceed 1.2 at any measured cross-section. • BHR at any measure riffle cross-section should not change by more than 10% from baseline condition during any given monitoring period. • The stream project shall remain stable and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1-7.
Wetland Hydrology
• Saturation or inundation, measured annually, within the upper 12 inches of the soil surface for, at a minimum, 12 percent of the growing season*, during average climatic conditions.
Vegetation
• Within planted portions of the site, a minimum of 320 stems per acre must be present at year 3; a minimum of 260 stems per acre must be present at year 5; and a minimum of 210 stems per acre must be present at year 7. • Trees must average 7 feet in height at year 5, and 10 feet in height at year 7 in each plot. • Planted and volunteer stems are counted, provided they are included in the approved planting list for the site; natural recruits not on the planting list may be considered by the IRT on a case-by-case basis. • Any volunteer species on the approved planting list must be established for at least 2 years to count towards success and will be subject to the average height standard.

*Growing season for this site is to start no earlier than March 1 and range through November 13 as verified by soil temperature and bud burst

2.0 AS-BUILT CONDITION (BASELINE)

Construction started on September 6, 2021 and ended within a final walkthrough on March 8, 2022. The Site was planted on March 18, 2022. As-built and MY0 data collection occurred between March and May 2022.

In general, no significant issues arose during the construction of the Site. A sealed half-size set of record drawings are provided in Appendix F, which includes the post-construction survey, alignments, structures, and monitoring features. These include redlines for any significant field adjustments made during construction that differ from the design plans. Where needed, adjustments were made during construction based on field evaluations and are listed below.

Location	Deviation	Explanation
UT-1 sta. 0+19	Log cross vane added	Slope in field conditions required a structure
UT-1 sta. 26+75	Log cross vane added	Slope in field conditions required a structure
UT-1 sta. 30+43	Cross vane not constructed	Slope in field conditions did not require a structure
UT-3 sta. 8+88	Log cross vane added	Slope in field conditions required a structure
UT-4 sta. 10+11 to 10+41	Alignment altered	To avoid damage to existing mature trees
UT-7 sta. 0+80	Cross vane not constructed	Property line in conflict with vane arm
All Easement Crossings	Culverted crossings replaced with bridge crossings	Improvement of crossings for landowner use, hydraulics, and aquatic life passage

Additional activities that occurred at the Site included the following.

- Planting 28.5 acres of the Site with 31,620 stems (planted species are included in Table 6A [Appendix B]).
- Treating Chinese privet (*Ligustrum sinense*) mechanically and with herbicide prior to planting.
- Treating fescue (Festuca sp.) with herbicide prior to planting.
- Applying a temporary seed mix consisting of grain rye (*Secale cereale*) and Brown Top Millet (*Urochloa ramosa*) primarily on disturbed or stockpiled areas, and Orchard Grass (*Dactylis glomerata*) and German Millet (*Setaria italica*) along stream channels and banks.
- Applying sitewide and streamside/wetland permanent seed mixes across the Site. Species lists are included in Table 6B (Appendix B).

3.0 PROJECT MONITORING – METHODS

Monitoring will be conducted in accordance with 2016 NCIRT Guidelines. Monitoring will be conducted by Axiom Environmental, Inc based on the schedule below. A summary of monitoring is outlined in Section 3.1. Annual monitoring reports will be submitted to the NCDMS by Clearwater Mitigation Solutions no later than December 1 of each monitoring year data is collected.

Monitoring Schedule

Resource	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Streams	■	■	■		■		■
Wetlands	■	■	■	■	■	■	■
Vegetation	■	■	■		■		■
Visual Assessment	■	■	■	■	■	■	■
Report Submittal	■	■	■	■	■	■	■

3.1 Monitoring

The monitoring parameters are summarized in the following table.

Monitoring Summary

Stream Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Stream Profile	Full longitudinal survey	As-built (unless otherwise required)	All restored stream channels	Graphic and tabular data.
Stream Dimension	Cross-sections	Years 1, 2, 3, 5, and 7	Total of 26 cross-sections on restored channels	Graphic and tabular data.
Channel Stability	Visual Assessments	Yearly	All restored stream channels	Areas of concern will be depicted on a plan view figure with a written assessment and photograph of the area included in the report.
	Additional Cross-sections	Yearly	Only if instability is documented during monitoring	Graphic and tabular data.
Stream Hydrology	Continuous monitoring surface water gauges and/or trail camera	Continuous recording through monitoring period	6 surface water gauges on UT 1, UT 2, UT 3, UT 4A, UT 4B, and UT 7	Surface water data for each monitoring period
Bankfull Events	Continuous monitoring surface water gauges and/or trail camera	Continuous recording through monitoring period	3 crest gauges on UT 1, UT 3, and UT 4	Surface water data for each monitoring period
	Visual/Physical Evidence	Continuous through monitoring period	Periodic Site visits throughout the year.	Visual evidence, photo documentation, and/or rain data.
Wetland Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Wetland Restoration	Groundwater gauges	Years 1, 2, 3, 4, 5, 6, and 7 throughout the year with the growing season defined as March 1-November 13*	10 gauges spread throughout restored wetlands	Soil temperature at the beginning of each monitoring period to verify the start of the growing season**, groundwater and rain data for each monitoring period
Vegetation Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Vegetation establishment and vigor	Permanent vegetation plots 0.0247 acre (100 square meters) in size; *CVS-EEP Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008)	As-built, Years 1, 2, 3, 5, and 7	21 plots spread across the Site	Species, height, planted vs. volunteer, stems/acre
	Annual random vegetation plots, 0.0247 acre (100 square meters) in size	As-built, Years 1, 2, 3, 5, and 7	10 plots randomly selected each year	Species and height

*The growing season will be verified by soil temperature and bud burst of more than one species (excluding Sambucus and red maple.)

**Growing season for the Site is to start no earlier than March 1 and will be verified by soil temperature and bud burst. The growing season will end November 13.

Note: Photo points will be taken at all cross sections and at vegetation plot origin points. In addition, photo points will be located at all culverts and crossings.

4.0 MONITORING YEAR 0 – DATA ASSESSMENT

Site visits were conducted between March and May 2022 to collect as-built and annual monitoring data for the project. Stream, wetland, and vegetation monitoring for the Site follow the approved success criteria presented in the Mitigation Plan and summarized in Section 1.3; monitoring methods are detailed in Section 3.0.

4.1 Stream Assessment

Geomorphology surveys for MY0 were conducted between May 18 - 26, 2022. All streams within the Site are stable and functioning as designed. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table. Refer to Appendix C for Stream Geomorphology Data. No stream areas of concern were identified during MY0.

4.2 Hydrology Assessment

lTen groundwater monitoring gauges were installed throughout the Site's wetlands. Hydrologic data will be collected and reported during MY1 (2023).

4.3 Vegetative Assessment

The MY0 vegetative survey was completed on April 4, 2022. Vegetation monitoring resulted in a sitewide stem density average of 778 planted stems per acre, above the interim requirement of 320 stems per acre required at MY3. All 21 fixed vegetation plots and 10 random transects met the interim success criteria. Please refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table, and Appendix B for Vegetation Plot Data. No vegetation areas of concern were identified during MY0.

4.4 Monitoring Year 0 Summary

In summary, the site streams are stable and performing as intended and vegetation establishment across the site appears to be on target to meet success criteria for permanent and random plots. Periodical monitoring will continue to be conducted to identify any areas of concern in the future.

5.0 REFERENCES

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

North Carolina Division of Mitigation Services (NCDMS). 2014. Stream and Wetland Mitigation Monitoring Guidelines. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

North Carolina Ecosystem Enhancement Program (NCEEP). 2005. Local Watershed Plan for the Upper Yadkin River Basin: Upper Uwharrie River Watershed (online). Available: https://ncdenr.s3.amazonaws.com/s3fs-public/Mitigation%20Services/Watershed_Planning/Yadkin_River_Basin/Upper_Uwharrie/Upper_Uwharrie_PFR_aug%2705.pdf (July 30, 2019).

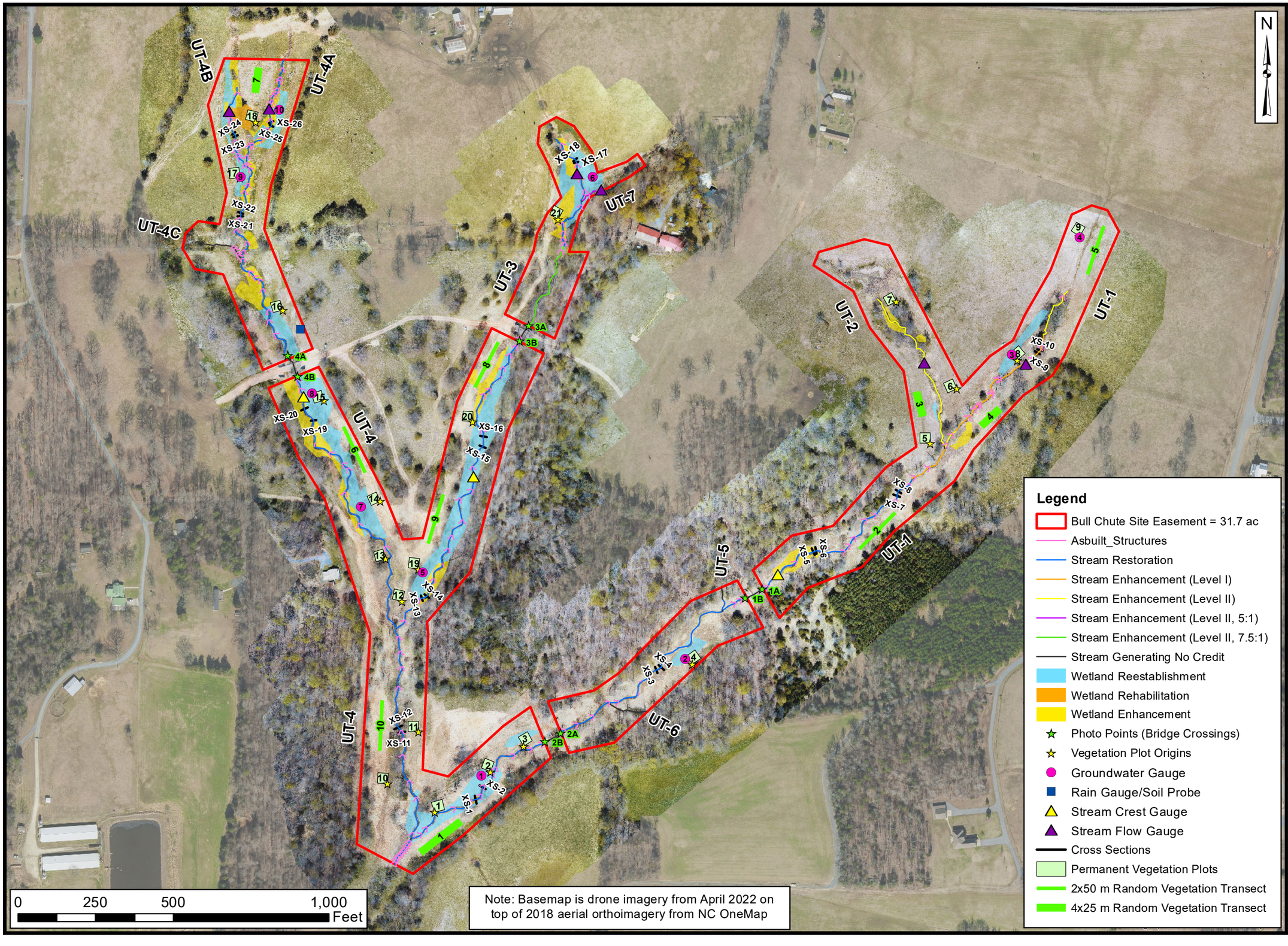
North Carolina Ecosystem Enhancement Program (NCEEP). 2009. Lower Yadkin Pee-Dee River Basin Restoration Priorities (online). Available: https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Yadkin_River_Basin/Lower%20Yadkin_Pee_Dee_RBRP_2009_Final092010.pdf (July 30, 2019).

North Carolina Stream Functional Assessment Team. (NC SFAT 2015). N.C. Stream Assessment Method (NC SAM) User Manual. Version 2.1.

North Carolina Wetland Functional Assessment Team. (NC WFAT 2010). N.C. Wetland Assessment Method (NC WAM) User Manual. Version 4.1.

APPENDIX A
Visual Assessment Data

Figure 1. Current Conditions Plan View
Tables 4A-H. Stream Visual Stability Assessment
Table 5. Visual Vegetation Assessment
Vegetation Plot Photographs
Permanent Photo Points (Bridge Crossings)



Axiom Environmental, Inc.

Prepared for:

Clearwater Mitigation Solutions

Project:

BULL CHUTE MITIGATION SITE

Randolph County, NC

Title:

CURRENT CONDITIONS PLAN VIEW

Drawn by: KRJ

Date: JUL 2022

Scale: 1:3500

Project No.: 20-006

FIGURE

1

Table 4A. Visual Stream Stability Assessment

Reach UT 1

Assessed Stream Length 3149 Survey Date: May 13, 2022

Assessed Bank Length 6298

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	46	46		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	46	46		100%

Table 4B. Visual Stream Stability Assessment

Reach UT 2

Assessed Stream Length 592 Survey Date: May 13, 2022

Assessed Bank Length 1184

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

Table 4C. Visual Stream Stability Assessment

Reach UT 3

Assessed Stream Length 1907 Survey Date: May 13, 2022

Assessed Bank Length 3814

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	30	30		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	30	30		100%

Table 4D. Visual Stream Stability Assessment

Reach UT 4

Assessed Stream Length 2558 Survey Date: May 13, 2022

Assessed Bank Length 5116

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	27	27		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	27	27		100%

Table 4E. Visual Stream Stability Assessment

Reach UT 4A

Assessed Stream Length 401 Survey Date: May 13, 2022

Assessed Bank Length 802

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	17	17		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	17	17		100%

Table 4F. Visual Stream Stability Assessment

Reach UT 4B

Assessed Stream Length 290 Survey Date: May 13, 2022

Assessed Bank Length 580

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	10	10		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	10	10		100%

Table 4G. Visual Stream Stability Assessment

Reach UT 4C

Assessed Stream Length 175 Survey Date: May 13, 2022

Assessed Bank Length 350

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

Table 4H. Visual Stream Stability Assessment

Reach UT 5

Assessed Stream Length 75 Survey Date: May 13, 2022

Assessed Bank Length 150

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

Table 4H. Visual Stream Stability Assessment

Reach UT 7

Assessed Stream Length 77 Survey Date: May 13, 2022

Assessed Bank Length 154

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

Table 5. Visual Vegetation Assessment

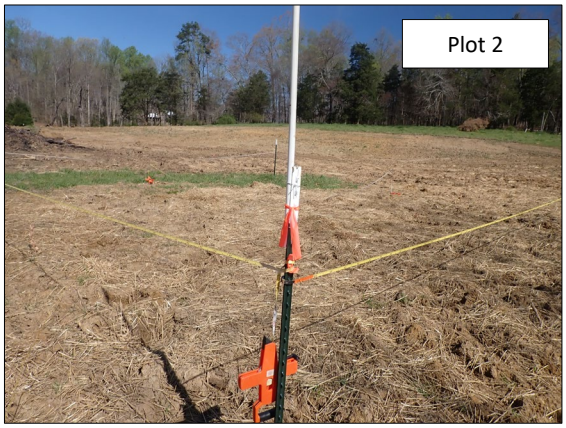
Planted acreage **28.5**

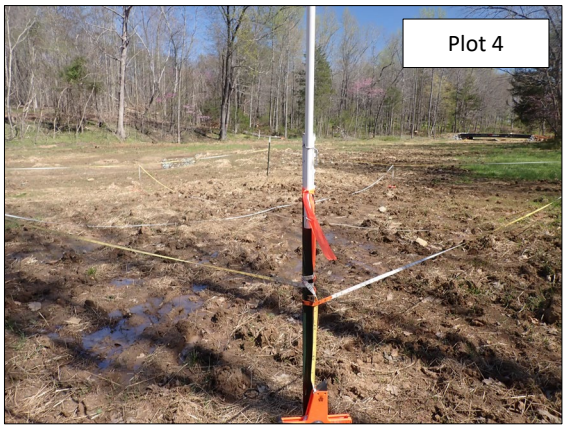
Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10acres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

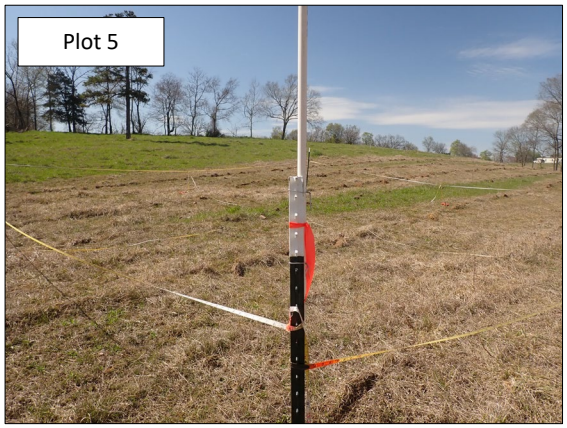
Easement Acreage **31.7**

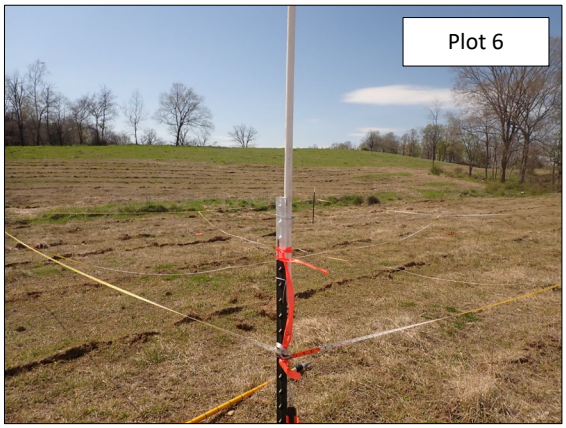
Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	0.00	0.0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	0 Encroachments noted	

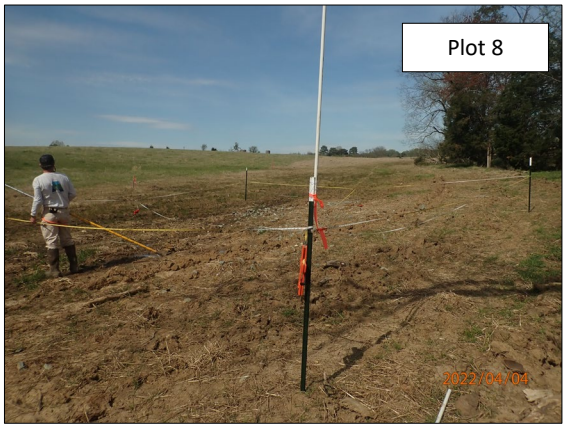
Bull Chute Mitigation Site
MY0 (2022) Vegetation Monitoring Photographs (taken April 4, 2022)





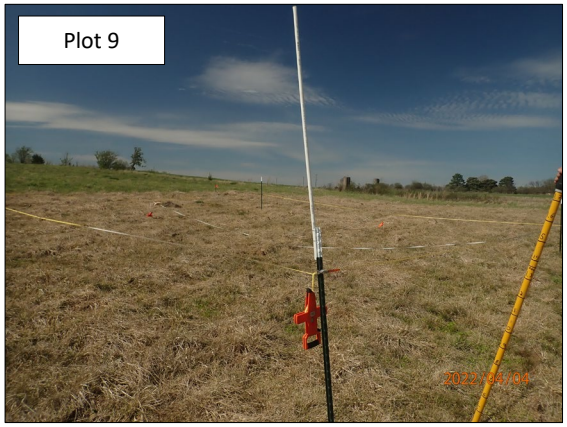






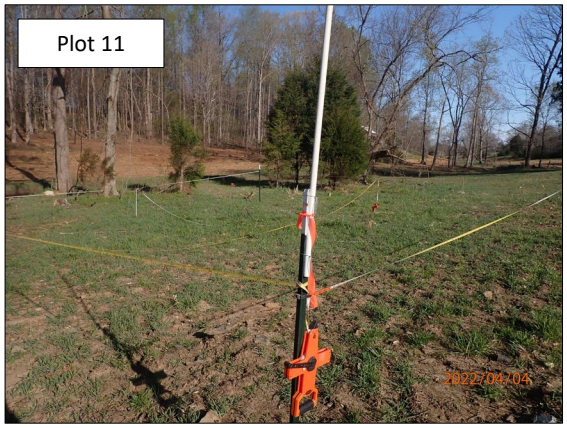
Bull Chute Mitigation Site
MY0 (2022) Vegetation Monitoring Photographs (taken April 4, 2022)

Plot 9



Plot 10

Plot 11



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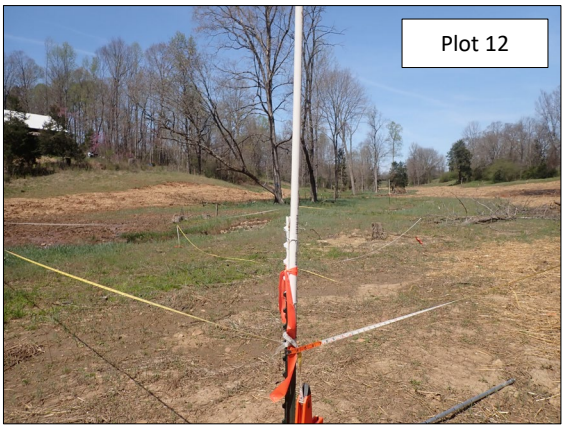

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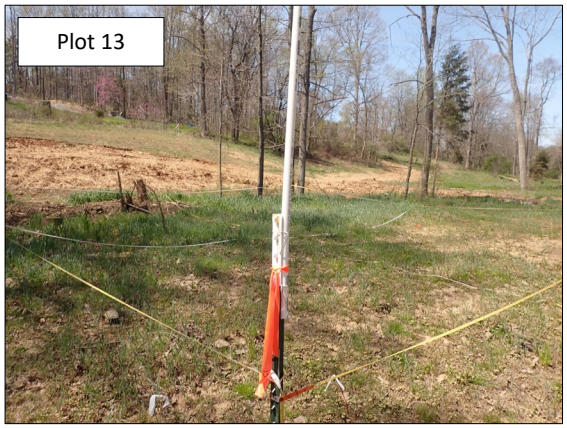
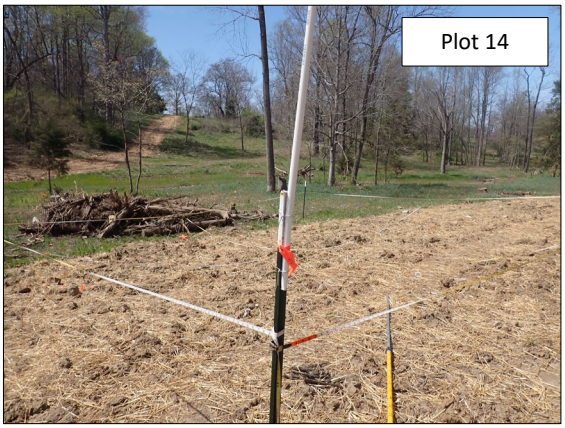


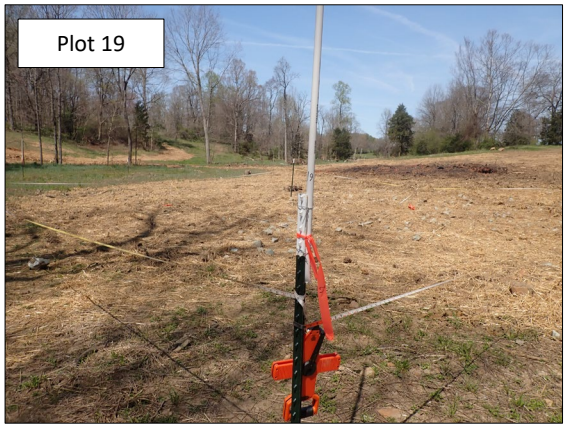
Plot 14

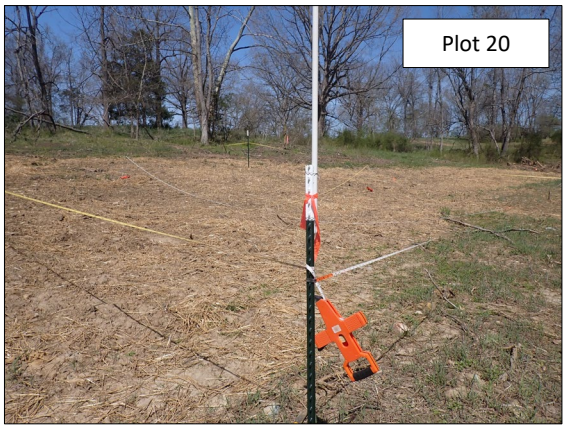


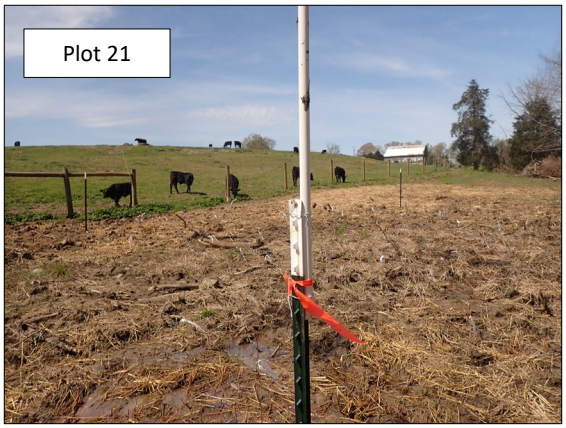
Plot 15

Plot 16

Bull Chute Mitigation Site
MY0 (2022) Vegetation Monitoring Photographs (taken April 4, 2022)







Bull Chute Mitigation Site
MY0 (2022) Permanent Photo Points (taken July 8, 2022)

Photo 1A

Photo 1B

Photo 2A

Photo 2B

Photo 3A

Photo 3B

Photo 4A

Photo 4B

Appendix B
Vegetation Data

Table 6A. Planted Bare-Root Woody Vegetation
Table 6B. Permanent Seed Mix
Table 7. Vegetation Plot Counts and Densities
Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

Table 6A. Planted Bare Root Woody Vegetation
Bull Chute Stream and Riparian Wetland Mitigation Site

Species	Total
Acres	**28.5**
Alnus serrulata	2,500
Betula nigra	4,000
Cercis canadensis	600
Carya tomentosa	200
Cornus amomum	5,000
Diospyros virginiana	420
Liriodendron tulipifera	1,700
Nyssa sylvatica	600
Platanus occidentalis	5,500
Quercus nigra	5,500
Quercus phellos	4,000
Salix nigra	1,600
TOTALS	**31,620**
Average Stems/Acre	**1,110**

Table 6B. Permanent Seed Mix
Bull Chute Stream and Riparian Wetland Mitigation Site

Species	Percent of Total Mix
Redtop (*Agrostis gigantea*)	10%
VA Wild Rye (*Elymus virginicus*)	15%
Switchgrass (*Panicum virgatum*)	15%
Eastern Gammagrass (*Tripsacum dactyloides*)	5%
PA Smartweed (*Polygonum pensylvanicum*)	5%
Little Bluestem (*Schizachyrium scoparium*)	5%
Soft Rush (*Juncus effusus*)	5%
Bur Marigold (*Bidens cernua*)	10%
Lance-leaved Tickseed (*Coreopsis lanceolata*)	10%
Deertongue (*Dichanthelium clandestinum*)	10%
Big Bluestem (*Andropogon gerardii*)	5%
Indiangrass (*Sorghastrum nutans*)	5%
TOTAL	**100%**

Table 7. Planted Vegetation Totals
Bull Chute Stream and Riparian Wetland Mitigation Site

Plot #	Planted Stems/Acre	Success Criteria Met?
1	1538	Yes
2	972	Yes
3	648	Yes
4	688	Yes
5	1012	Yes
6	891	Yes
7	1255	Yes
8	1295	Yes
9	729	Yes
10	607	Yes
11	607	Yes
12	1579	Yes
13	850	Yes
14	688	Yes
15	891	Yes
16	810	Yes
17	648	Yes
18	607	Yes
19	607	Yes
20	972	Yes
21	1376	Yes
Transect 1 (4x25 m)	324	Yes
Transect 2 (2x50 m)	445	Yes
Transect 3 (4x25 m)	648	Yes
Transect 4 (4x25 m)	405	Yes
Transect 5 (2x50 m)	364	Yes
Transect 6 (2x50 m)	567	Yes
Transect 7 (4x25 m)	324	Yes
Transect 8 (2x50 m)	405	Yes
Transect 9 (2x50 m)	445	Yes
Transect 10 (2x50 m)	931	Yes
Average Planted Stems/Acre	**778**	**Yes**

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

Planted Acreage	28.5
Date of Initial Plant	2022-04-01
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-04
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	Alnus serrulata	hazel alder	Tree	OBL					11	11	1	1						
	Betula nigra	river birch	Tree	FACW			2	2			2	2					27	27
	Carpinus caroliniana	American hornbeam	Tree	FAC														
	Carya tomentosa	mockernut hickory	Tree															
	Cercis canadensis	eastern redbud	Tree	FACU											1	1	3	3
	Cornus amomum	silky dogwood	Shrub	FACW	19	19	2	2	1	1	7	7						
	Diospyros virginiana	common persimmon	Tree	FAC													3	3
	Liriodendron tulipifera	tuliptree	Tree	FACU							4	4	10	10	1	1		
	Nyssa sylvatica	blackgum	Tree	FAC														
	Platanus occidentalis	American sycamore	Tree	FACW	8	8	3	3					4	4	8	8	1	1
	Quercus nigra	water oak	Tree	FAC	6	6	10	10	5	5	1	1			3	3	2	2
	Quercus phellos	willow oak	Tree	FAC	5	5	7	7	1	1	2	2	1	1	1	1	2	2
	Quercus sp.												10	10	8	8	1	1
Sum	Performance Standard				38	38	24	24	18	18	17	17	25	25	22	22	39	39
Mitigation Plan Performance Standard	Current Year Stem Count					38		24		18		17		25		22		39
	Stems/Acre					1538		972		648		688		1012		891		1255
	Species Count					4		5		4		6		4		6		7
	Dominant Species Composition (%)					50		42		61		41		40		36		69
	Average Plot Height (ft.)					1		1		1		2		1		1		2
	% Invasives					0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					38		24		18		17		25		22		39
	Stems/Acre					1538		972		648		688		1012		891		1255
	Species Count					4		5		4		6		4		6		7
	Dominant Species Composition (%)					50		42		61		41		40		36		69
	Average Plot Height (ft.)					1		1		1		2		1		1		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 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Planted Acreage	28.5
Date of Initial Plant	2022-04-01
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-04
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 13 F		Veg Plot 14 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Alnus serrulata	hazel alder	Tree	OBL							1	1	4	4				
	Betula nigra	river birch	Tree	FACW	7	7	3	3					3	3	2	2	6	6
	Carpinus caroliniana	American hornbeam	Tree	FAC														
	Carya tomentosa	mockernut hickory	Tree															
	Cercis canadensis	eastern redbud	Tree	FACU							1	1						
	Cornus amomum	silky dogwood	Shrub	FACW					5	5	12	12	14	14	6	6	5	5
	Diospyros virginiana	common persimmon	Tree	FAC	5	5												
	Liriodendron tulipifera	tuliptree	Tree	FACU	3	3	3	3					2	2			4	4
	Nyssa sylvatica	blackgum	Tree	FAC														
	Platanus occidentalis	American sycamore	Tree	FACW	8	8	6	6	1	1			5	5	5	5	2	2
	Quercus nigra	water oak	Tree	FAC			1	1	3	3	3	3	5	5	6	6		
	Quercus phellos	willow oak	Tree	FAC	3	3	1	1	6	6	1	1	4	4	1	1		
	Quercus sp.				6	6	4	4					2	2	1	1		
Sum	Performance Standard				32	32	18	18	15	15	18	18	39	39	21	21	17	17
Mitigation Plan Performance Standard	Current Year Stem Count					32		18		15		18		39		21		17
	Stems/Acre					1295		729		607		607		1579		850		688
	Species Count					6		6		4		5		8		6		4
	Dominant Species Composition (%)					25		33		40		67		36		29		35
	Average Plot Height (ft.)					1		1		2		1		2		2		2
	% Invasives					0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					32		18		15		18		39		21		17
	Stems/Acre					1295		729		607		607		1579		850		688
	Species Count					6		6		4		5		8		6		4
	Dominant Species Composition (%)					25		33		40		67		36		29		35
	Average Plot Height (ft.)					1		1		2		1		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 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Planted Acreage	28.5
Date of Initial Plant	2022-04-01
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-04
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 15 F		Veg Plot 16 F		Veg Plot 17 F		Veg Plot 18 F		Veg Plot 19 F		Veg Plot 20 F		Veg Plot 21 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Alnus serrulata	hazel alder	Tree	OBL									1	1				
	Betula nigra	river birch	Tree	FACW			1	1	2	2					5	5		
	Carpinus caroliniana	American hornbeam	Tree	FAC							1	1						
	Carya tomentosa	mockernut hickory	Tree														1	1
	Cercis canadensis	eastern redbud	Tree	FACU														
	Cornus amomum	silky dogwood	Shrub	FACW	11	11	4	4					3	3	1	1		
	Diospyros virginiana	common persimmon	Tree	FAC	1	1											1	1
	Liriodendron tulipifera	tuliptree	Tree	FACU					1	1	2	2			1	1	1	1
	Nyssa sylvatica	blackgum	Tree	FAC													9	9
	Platanus occidentalis	American sycamore	Tree	FACW			9	9	7	7	4	4			5	5	11	11
	Quercus nigra	water oak	Tree	FAC	2	2			1	1			1	1	2	2	2	2
	Quercus phellos	willow oak	Tree	FAC	4	4	4	4	2	2	5	5	4	4	8	8		
	Quercus sp.				4	4	2	2	3	3	3	3	6	6	2	2	9	9
Sum	Performance Standard				22	22	20	20	16	16	15	15	15	15	24	24	34	34
Mitigation Plan Performance Standard	Current Year Stem Count					22		20		16		15		15		24		34
	Stems/Acre					891		810		648		607		607		972		1376
	Species Count					5		5		6		5		5		7		7
	Dominant Species Composition (%)					50		45		44		33		40		33		32
	Average Plot Height (ft.)					2		2		31		90		2		2		1
	% Invasives					0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					22		20		16		15		15		24		34
	Stems/Acre					891		810		648		607		607		972		1376
	Species Count					5		5		6		5		5		7		7
	Dominant Species Composition (%)					50		45		44		33		40		33		32
	Average Plot Height (ft.)					2		2		31		90		2		2		1
	% 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 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Planted Acreage	28.5
Date of Initial Plant	2022-04-01
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-04-04
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 R Total	Veg Plot 2 R Total	Veg Plot 3 R Total	Veg Plot 4 R Total	Veg Plot 5 R Total	Veg Plot 6 R Total	Veg Plot 7 R Total	Veg Plot 8 R Total	Veg Plot 9 R Total	Veg Plot 10 R Total
Species Included in Approved Mitigation Plan	Alnus serrulata	hazel alder	Tree	OBL										
	Betula nigra	river birch	Tree	FACW	7	2		3	2			1	1	
	Carpinus caroliniana	American hornbeam	Tree	FAC										
	Carya tomentosa	mockernut hickory	Tree											
	Cercis canadensis	eastern redbud	Tree	FACU				1	1					
	Cornus amomum	silky dogwood	Shrub	FACW						1				7
	Diospyros virginiana	common persimmon	Tree	FAC										
	Liriodendron tulipifera	tuliptree	Tree	FACU			6			7		4	7	7
	Nyssa sylvatica	blackgum	Tree	FAC										
	Platanus occidentalis	American sycamore	Tree	FACW	3	8	3		3		8	1	2	6
	Quercus nigra	water oak	Tree	FAC			3	1	1					
	Quercus phellos	willow oak	Tree	FAC		3	3	5	1	2	1	4	1	2
	Quercus sp.						1		1	4	2		1	1
Sum	Performance Standard				10	13	16	10	9	14	11	10	12	23
Mitigation Plan Performance Standard	Current Year Stem Count				10	13	16	10	9	14	11	10	12	23
	Stems/Acre				324	445	648	405	364	567	324	405	445	931
	Species Count				2	3	5	4	6	4	3	4	5	5
	Dominant Species Composition (%)				70	62	38	50	33	50	73	40	58	30
	Average Plot Height (ft.)				2	2	1	2	1	1	1	2	1	1
	% Invasives				0	0	0	0	0	0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count				10	13	16	10	9	14	11	10	12	23
	Stems/Acre				324	445	648	405	364	567	324	405	445	931
	Species Count				2	3	5	4	6	4	3	4	5	5
	Dominant Species Composition (%)				70	62	38	50	33	50	73	40	58	30
	Average Plot Height (ft.)				2	2	1	2	1	1	1	2	1	1
	% Invasives				0	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.

Appendix C
Stream Geomorphology Data

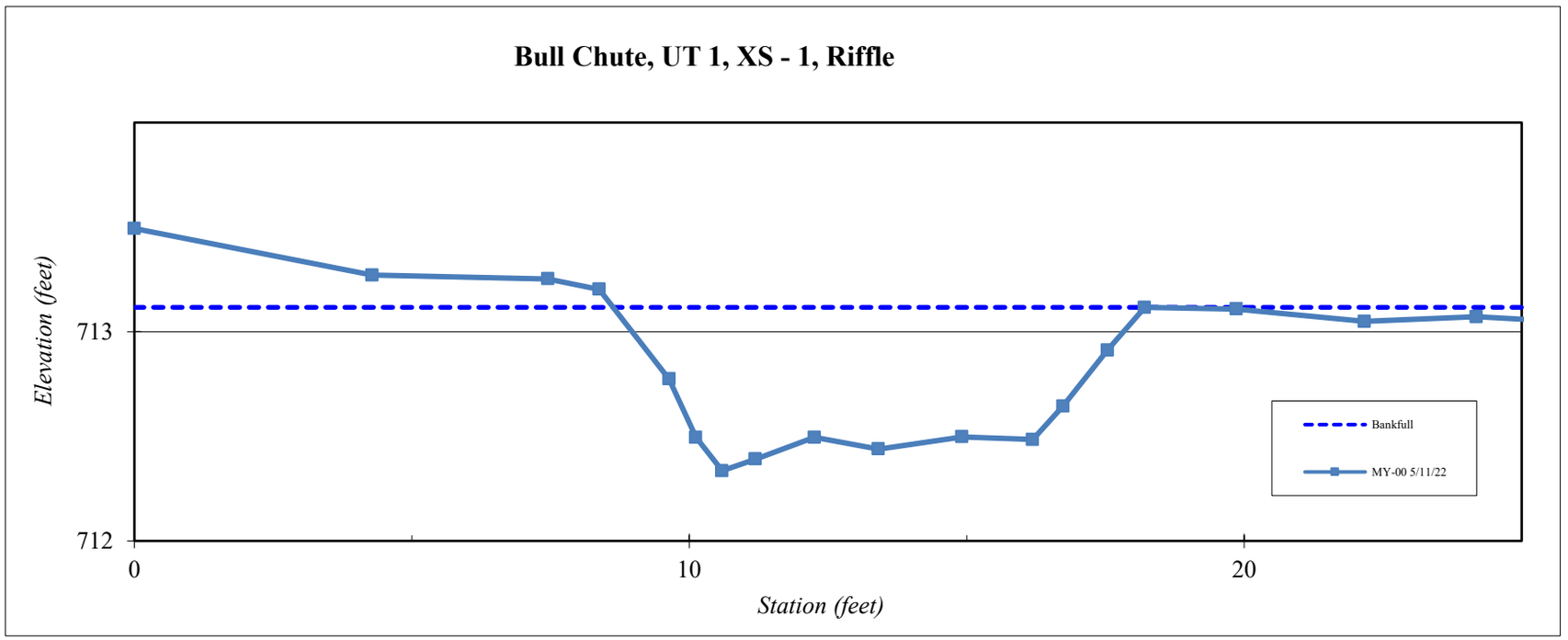
Cross-Sections with Annual Overlays
Longitudinal Profile
Table 9A-F. Baseline Stream Data Summary Tables
Table 10A-E. Cross-Section Morphology Monitoring Summary

Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -1
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	714.0
4.3	713.7
7.5	713.7
8.4	713.6
9.6	713.2
10.1	712.8
10.6	712.7
11.2	712.7
12.3	712.8
13.4	712.8
14.9	712.8
16.2	712.8
16.7	713.0
17.5	713.3
18.2	713.5
19.9	713.5
22.2	713.5
24.2	713.5
25.5	713.5

SUMMARY DATA	
Bankfull Elevation:	713.54
Bank Hieght Ratio:	1.00
Thalweg Elevation:	712.66
LTOB Elevation:	713.54
LTOB Max Depth:	0.88
LTOB Cross Sectional Area:	5.7

Stream Type	E/C 4

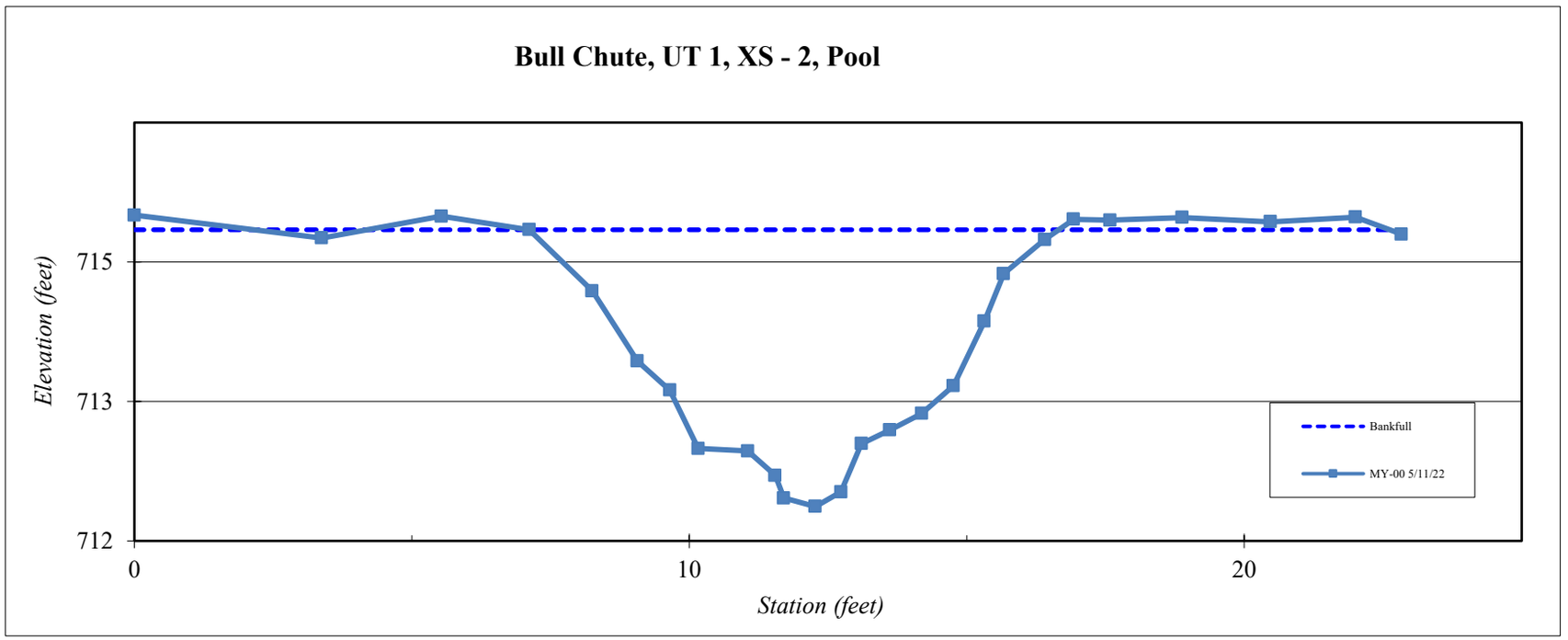


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -2
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	714.9
3.4	714.7
5.5	714.9
7.1	714.8
8.3	714.3
9.1	713.7
9.7	713.5
10.2	713.0
11.1	713.0
11.5	712.8
11.7	712.6
12.3	712.6
12.7	712.7
13.1	713.1
13.6	713.2
14.2	713.3
14.8	713.5
15.3	714.1
15.7	714.4
16.4	714.7
16.9	714.88
17.6	714.9
18.9	714.9
20.5	714.9
22.0	714.9
22.8	714.8

SUMMARY DATA	
Bankfull Elevation:	714.80
Bank Hieght Ratio:	1.00
Thalweg Elevation:	712.56
LTOB Elevation:	714.80
LTOB Max Depth:	2.24
LTOB Cross Sectional Area:	11.7

Stream Type	E/C 4

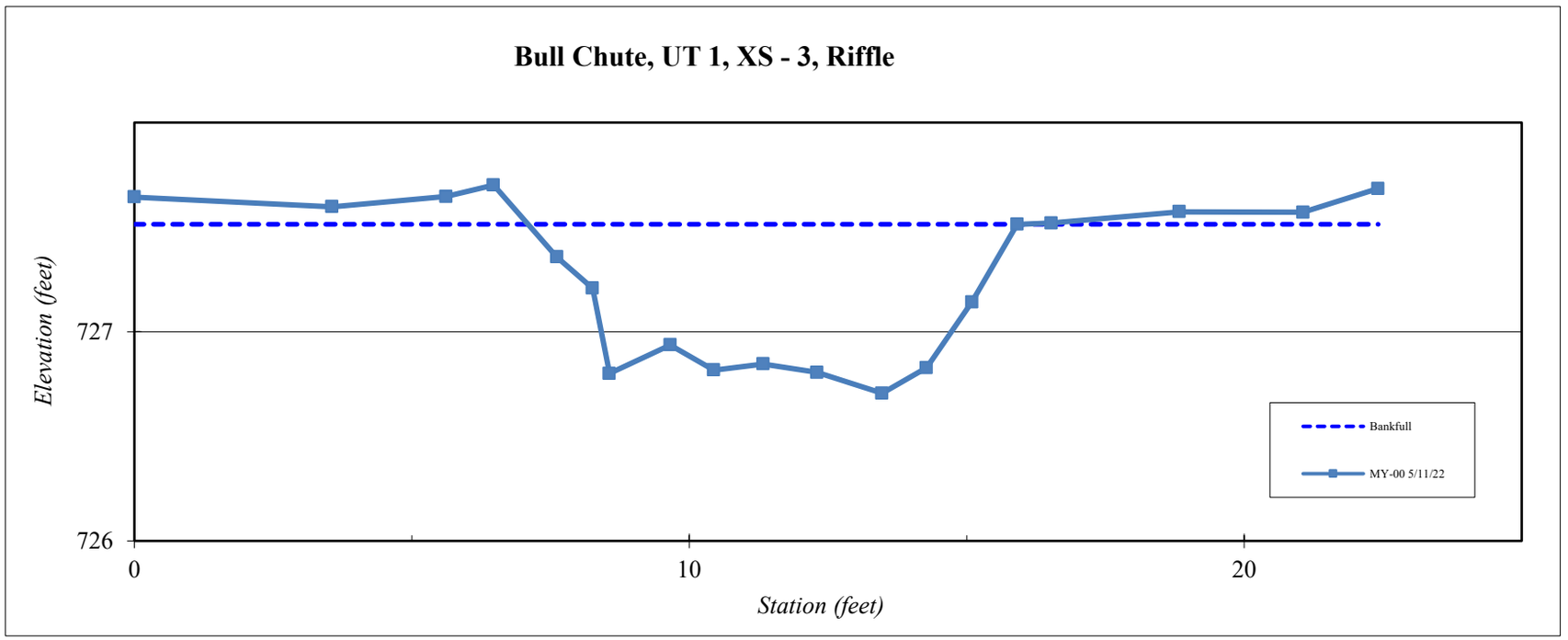


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -3
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	727.7
3.6	727.7
5.6	727.7
6.5	727.8
7.6	727.4
8.3	727.2
8.6	726.7
9.7	726.9
10.4	726.8
11.3	726.8
12.3	726.8
13.5	726.6
14.3	726.8
15.1	727.1
15.9	727.6
16.5	727.6
18.8	727.6
21.1	727.6
22.4	727.7

SUMMARY DATA	
Bankfull Elevation:	727.56
Bank Hieght Ratio:	1.00
Thalweg Elevation:	726.64
LTOB Elevation:	727.56
LTOB Max Depth:	0.91
LTOB Cross Sectional Area:	5.5

Stream Type	E/C 4

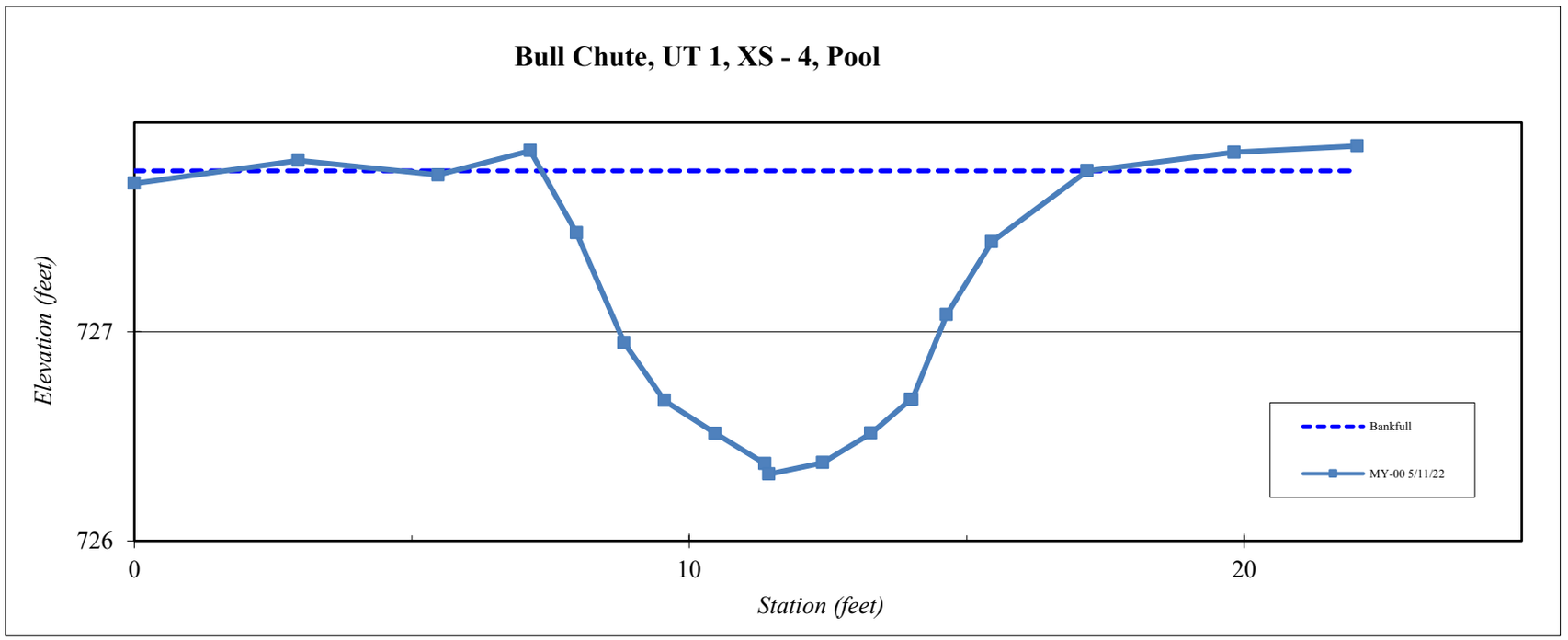


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -4
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	727.8
3.0	727.9
5.5	727.8
7.1	728.0
8.0	727.5
8.8	726.9
9.6	726.6
10.5	726.4
11.4	726.3
11.4	726.2
12.4	726.3
13.3	726.4
14.0	726.6
14.0	726.6
14.6	727.1
15.5	727.5
17.2	727.8
19.8	727.9
22.0	728.0

SUMMARY DATA	
Bankfull Elevation:	727.84
Bank Hieght Ratio:	1.00
Thalweg Elevation:	726.21
LTOB Elevation:	727.84
LTOB Max Depth:	1.64
LTOB Cross Sectional Area:	9.4

Stream Type	E/C 4

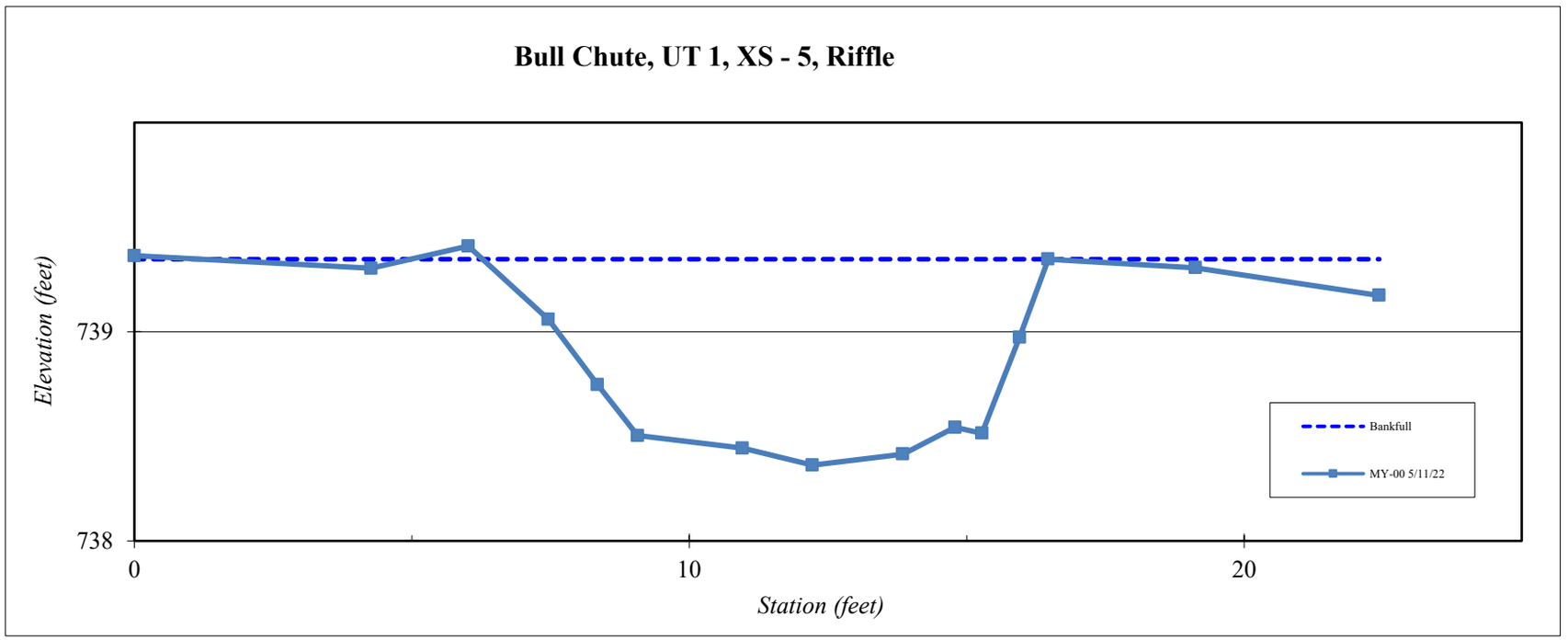


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -5
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	739.8
4.3	739.8
6.0	739.9
7.5	739.5
8.3	739.1
9.1	738.9
11.0	738.8
12.2	738.7
13.8	738.8
14.8	738.9
15.3	738.9
16.0	739.4
16.5	739.8
19.1	739.8
22.4	739.6

SUMMARY DATA	
Bankfull Elevation:	739.80
Bank Hieght Ratio:	1.00
Thalweg Elevation:	738.69
LTOB Elevation:	739.80
LTOB Max Depth:	1.11
LTOB Cross Sectional Area:	8.1

Stream Type	E/C 4

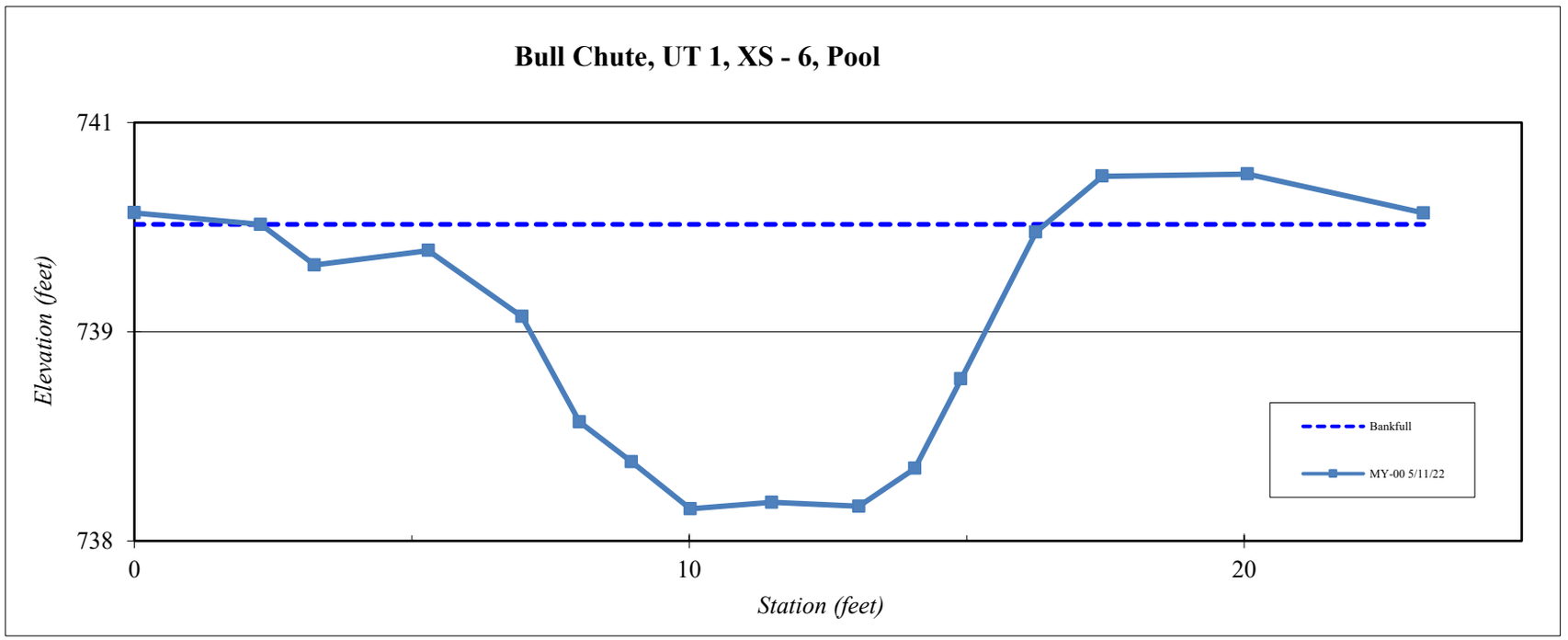


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -6
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	740.1
2.3	740.0
3.2	739.8
5.3	739.9
7.0	739.5
8.0	738.9
9.0	738.7
10.0	738.5
11.5	738.5
13.1	738.5
14.1	738.7
14.9	739.2
16.2	740.0
17.4	740.3
20.1	740.3
23.2	740.1

SUMMARY DATA	
Bankfull Elevation:	739.99
Bank Hieght Ratio:	1.00
Thalweg Elevation:	738.45
LTOB Elevation:	739.99
LTOB Max Depth:	1.54
LTOB Cross Sectional Area:	11.9

Stream Type	E/C 4

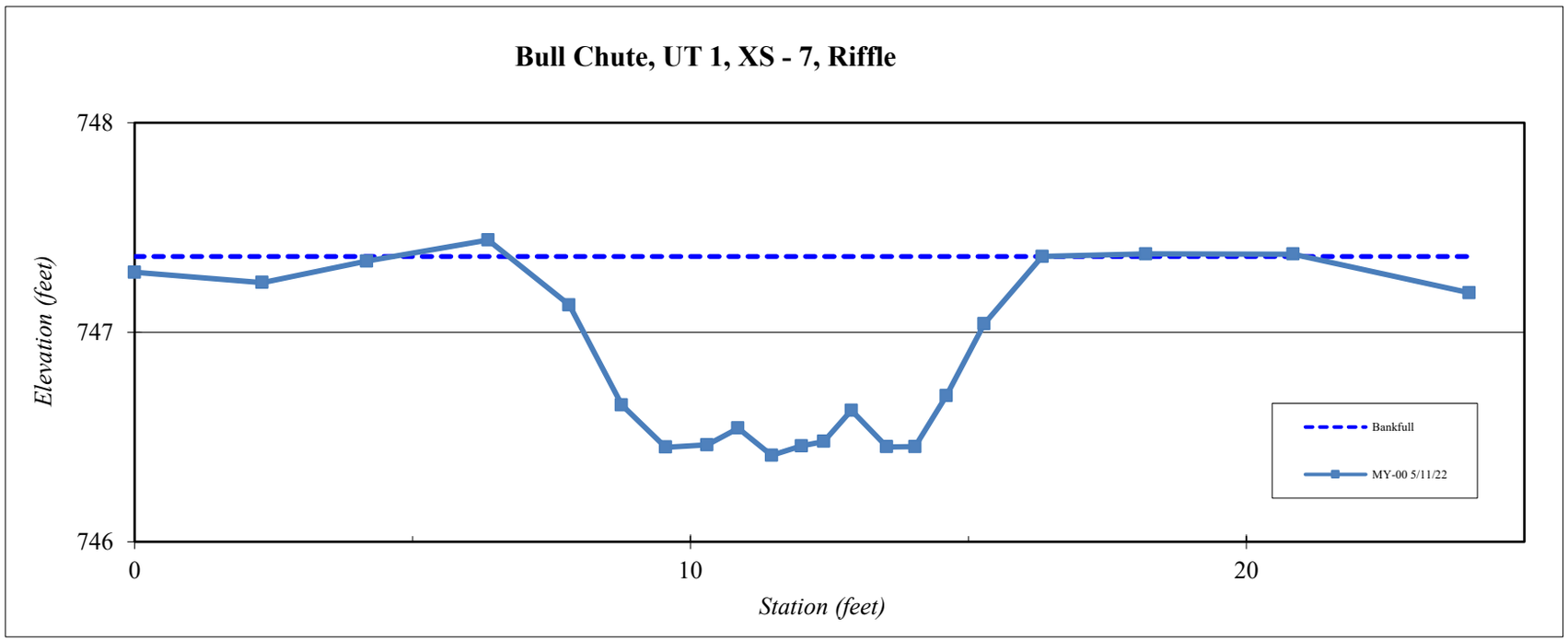


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -7
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	747.6
2.3	747.6
4.2	747.7
6.4	747.8
7.8	747.5
8.8	746.9
9.6	746.7
10.3	746.7
10.9	746.8
11.5	746.7
12.0	746.7
12.4	746.7
12.9	746.9
13.5	746.7
14.0	746.7
14.6	747.0
15.3	747.4
16.3	747.7
18.2	747.7
20.8	747.7
24.0	747.54

SUMMARY DATA	
Bankfull Elevation:	747.73
Bank Hieght Ratio:	1.00
Thalweg Elevation:	746.66
LTOB Elevation:	747.73
LTOB Max Depth:	1.07
LTOB Cross Sectional Area:	6.9

Stream Type	E/C 4

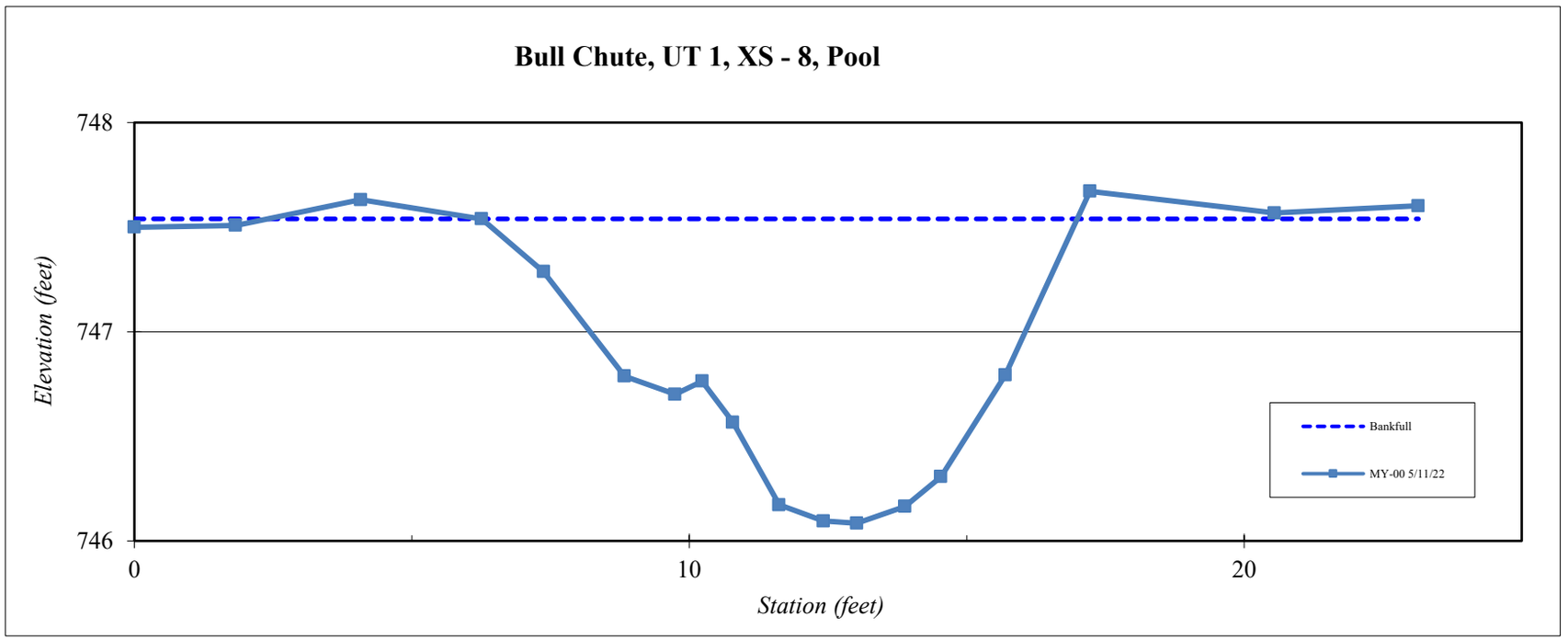


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -8
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	747.9
1.8	747.9
4.1	748.0
6.3	747.9
7.4	747.7
8.8	747.1
9.7	747.0
10.2	747.1
10.8	746.8
11.6	746.4
12.4	746.3
13.0	746.3
13.9	746.4
14.5	746.5
15.7	747.1
17.2	748.1
20.5	748.0
23.1	748.0

SUMMARY DATA	
Bankfull Elevation:	747.94
Bank Hieght Ratio:	1.00
Thalweg Elevation:	746.29
LTOB Elevation:	747.94
LTOB Max Depth:	1.64
LTOB Cross Sectional Area:	10.3

Stream Type	E/C 4

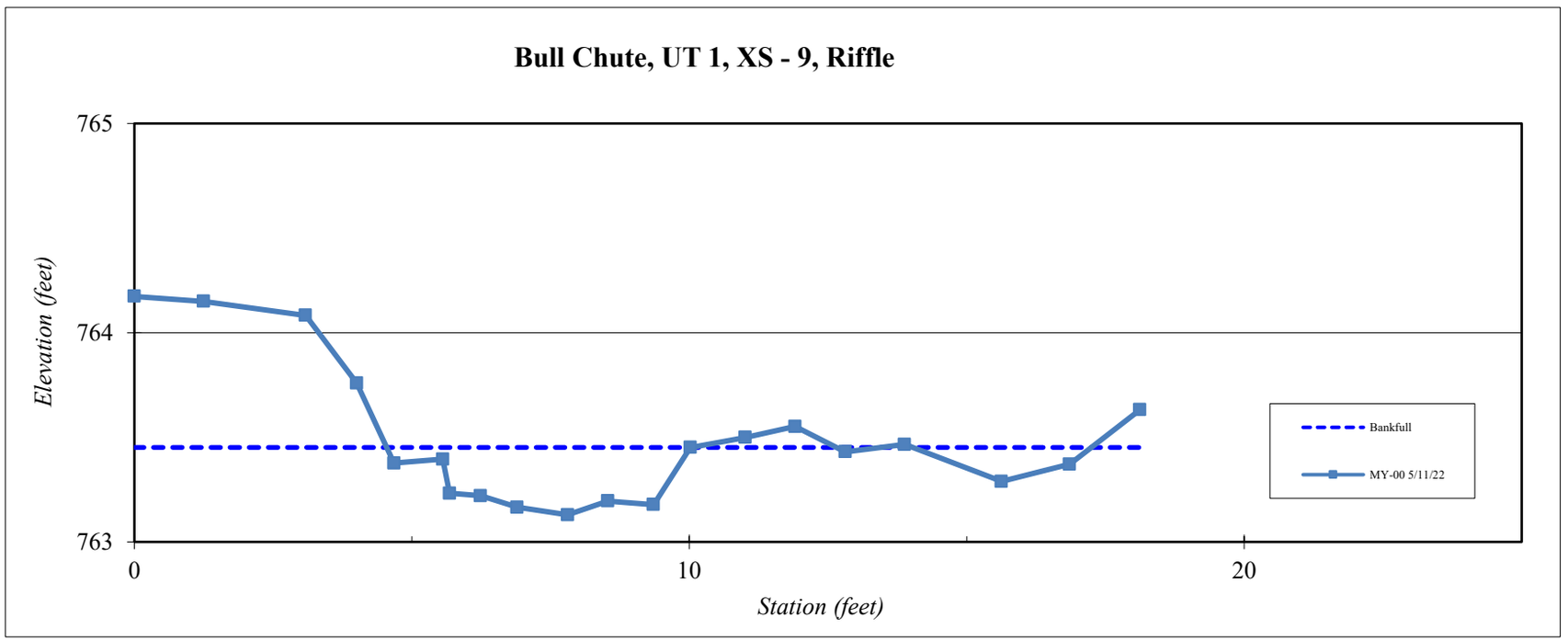


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -9
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	764.5
1.3	764.5
3.1	764.4
4.0	764.0
4.7	763.6
5.6	763.6
5.7	763.4
6.2	763.4
6.9	763.3
7.8	763.3
8.5	763.4
9.4	763.4
10.0	763.7
11.0	763.7
11.9	763.8
12.8	763.6
13.9	763.7
15.6	763.5
16.9	763.6
18.1	763.9

SUMMARY DATA	
Bankfull Elevation:	763.66
Bank Hieght Ratio:	1.00
Thalweg Elevation:	763.30
LTOB Elevation:	763.66
LTOB Max Depth:	0.36
LTOB Cross Sectional Area:	1.3

Stream Type	E/C 4

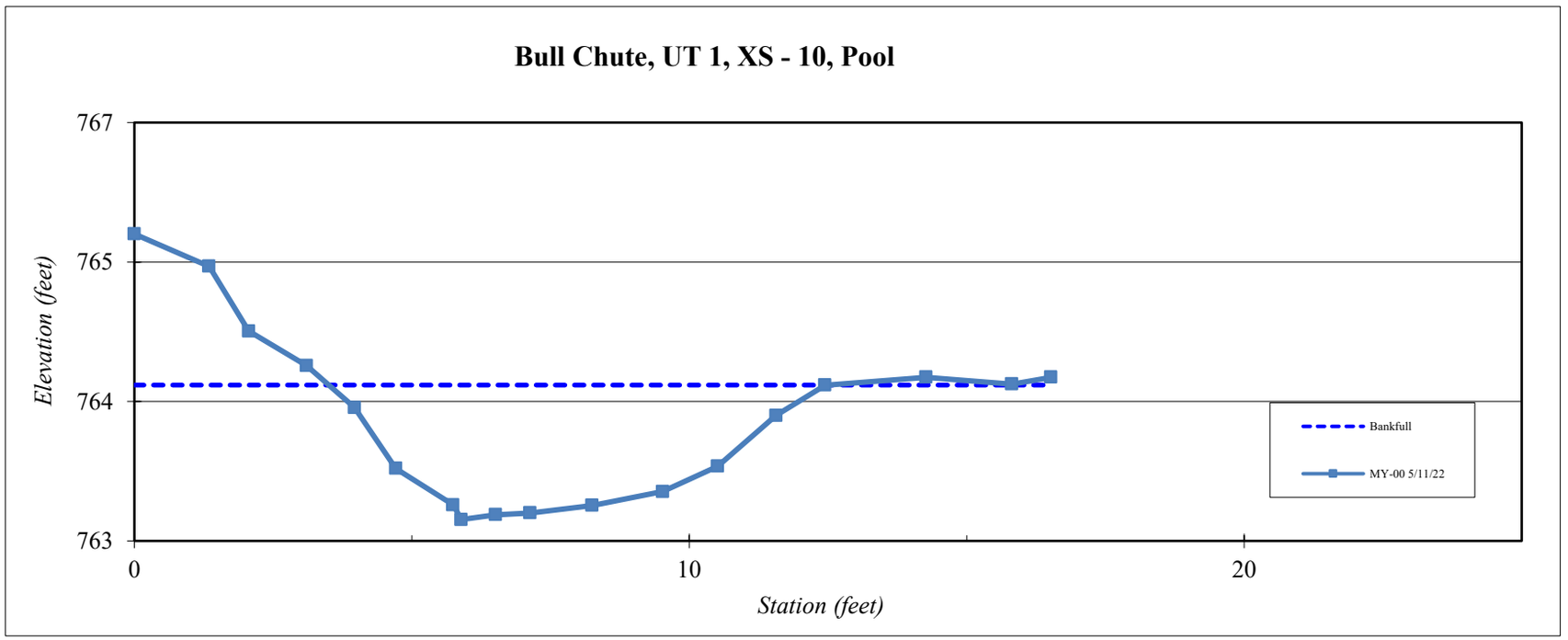


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT1, XS -10
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	765.6
1.3	765.4
2.1	764.9
3.1	764.6
4.0	764.2
4.7	763.7
5.7	763.4
5.9	763.3
6.5	763.4
7.1	763.4
8.3	763.4
9.5	763.6
10.5	763.8
11.6	764.2
12.4	764.4
14.3	764.5
15.8	764.4
16.5	764.5

SUMMARY DATA	
Bankfull Elevation:	764.42
Bank Hieght Ratio:	1.00
Thalweg Elevation:	763.33
LTOB Elevation:	764.42
LTOB Max Depth:	1.09
LTOB Cross Sectional Area:	6.3

Stream Type	E/C 4

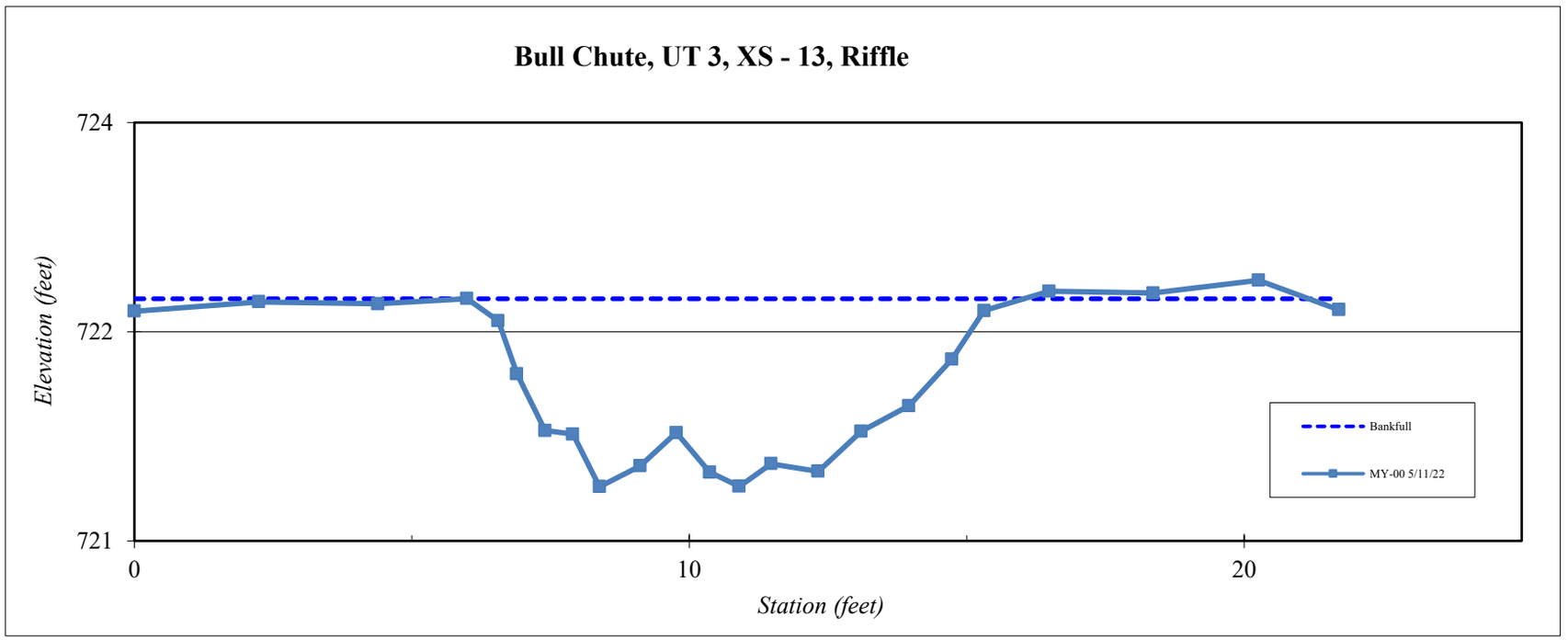


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -13
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	722.6
2.2	722.6
4.4	722.6
6.0	722.6
6.6	722.5
6.9	722.2
7.4	721.9
7.9	721.9
8.4	721.6
9.1	721.7
9.8	721.9
10.4	721.7
10.9	721.6
11.5	721.7
12.3	721.7
13.1	721.9
14.0	722.1
14.7	722.3
15.3	722.6
16.5	722.7
18.4	722.66
20.3	722.7
21.7	722.6

SUMMARY DATA	
Bankfull Elevation:	722.63
Bank Hieght Ratio:	1.00
Thalweg Elevation:	721.62
LTOB Elevation:	722.63
LTOB Max Depth:	1.02
LTOB Cross Sectional Area:	6.3

Stream Type	E/C 4

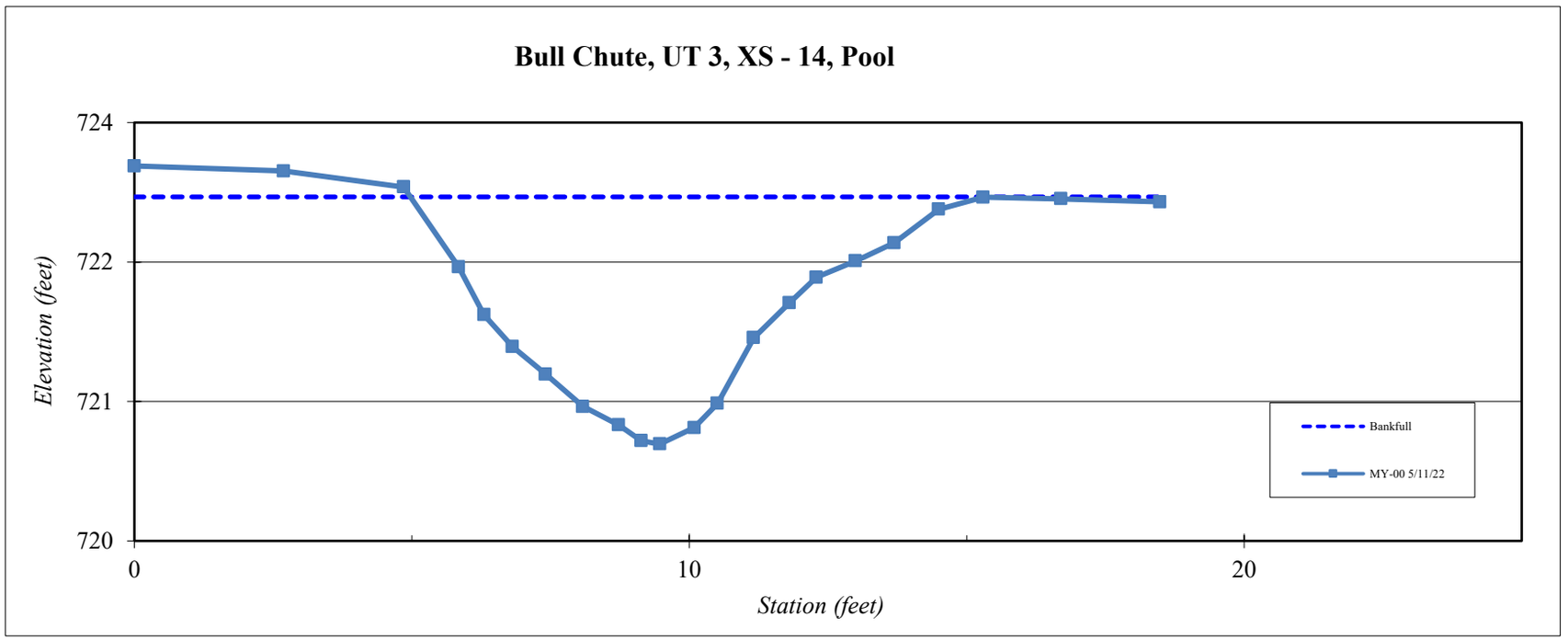


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -14
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	723.2
2.7	723.2
4.9	723.1
5.8	722.4
6.3	722.0
6.8	721.8
7.4	721.5
8.1	721.3
8.7	721.1
9.1	721.0
9.5	721.0
10.1	721.1
10.5	721.3
11.2	721.8
11.8	722.1
12.3	722.3
13.0	722.5
13.7	722.6
14.5	722.9
15.3	723.0
16.7	722.96
18.5	722.9

SUMMARY DATA	
Bankfull Elevation:	722.98
Bank Hieght Ratio:	1.00
Thalweg Elevation:	720.98
LTOB Elevation:	722.98
LTOB Max Depth:	2.00
LTOB Cross Sectional Area:	10.4

Stream Type	E/C 4

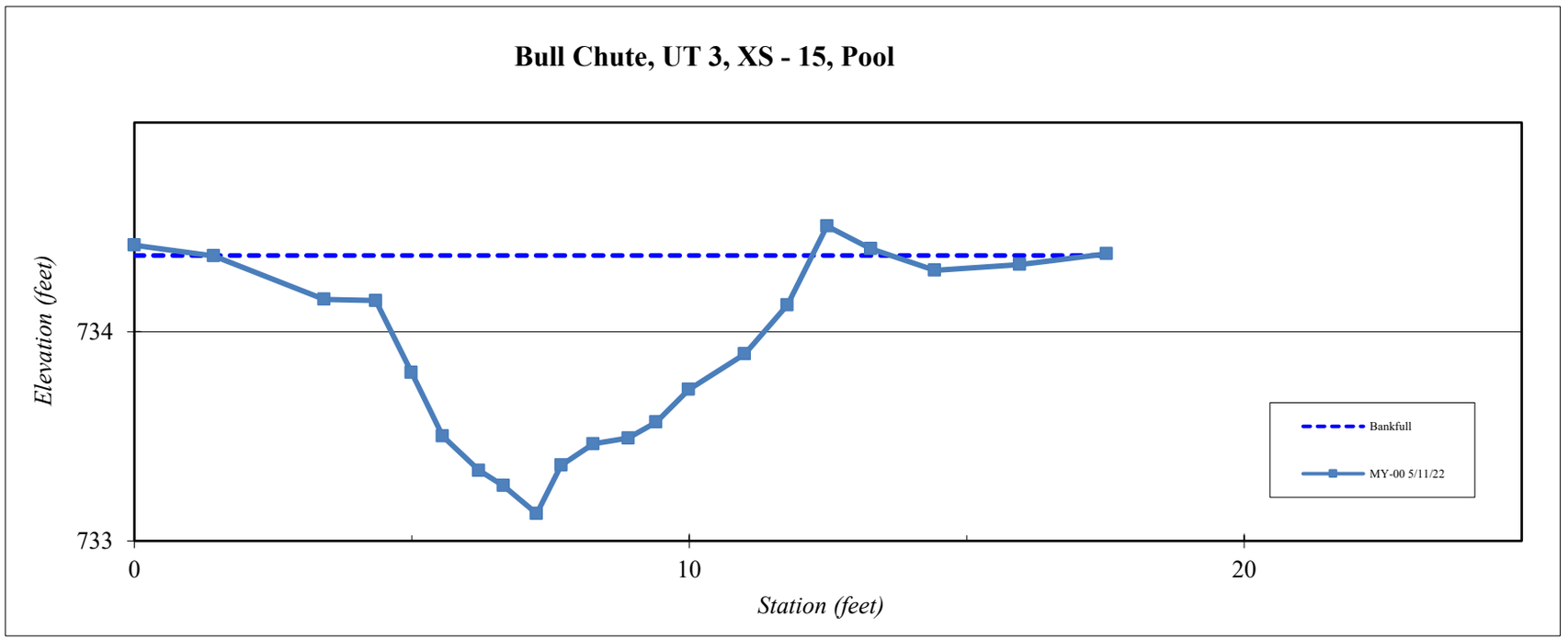


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -15
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	734.2
1.4	734.2
3.4	733.9
4.3	733.9
5.0	733.5
5.6	733.2
6.2	733.0
6.7	732.9
7.2	732.8
7.7	733.0
8.3	733.2
8.9	733.2
9.4	733.3
10.0	733.4
11.0	733.6
11.8	733.9
12.5	734.3
13.3	734.2
14.4	734.1
16.0	734.1
17.5	734.18

SUMMARY DATA	
Bankfull Elevation:	734.17
Bank Hieght Ratio:	1.00
Thalweg Elevation:	732.78
LTOB Elevation:	734.17
LTOB Max Depth:	1.39
LTOB Cross Sectional Area:	7.0

Stream Type	E/C 4

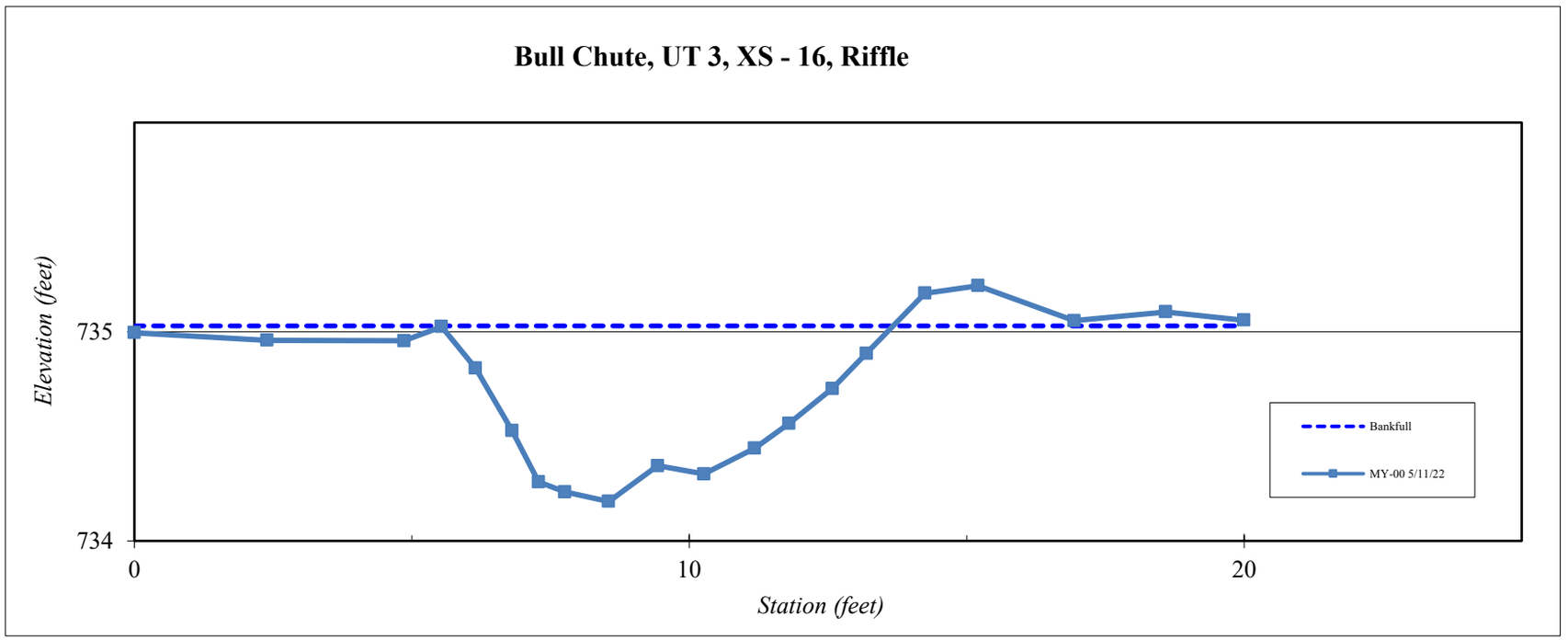


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -16
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	734.9
2.4	734.8
4.9	734.8
5.5	734.9
6.2	734.7
6.8	734.4
7.3	734.1
7.8	734.0
8.5	734.0
9.4	734.2
10.3	734.1
11.2	734.3
11.8	734.4
12.6	734.6
13.2	734.8
14.2	735.1
15.2	735.1
16.9	734.9
18.6	735.0
20.0	735.0

SUMMARY DATA	
Bankfull Elevation:	734.92
Bank Hieght Ratio:	1.00
Thalweg Elevation:	733.97
LTOB Elevation:	734.92
LTOB Max Depth:	0.95
LTOB Cross Sectional Area:	4.7

Stream Type	E/C 4

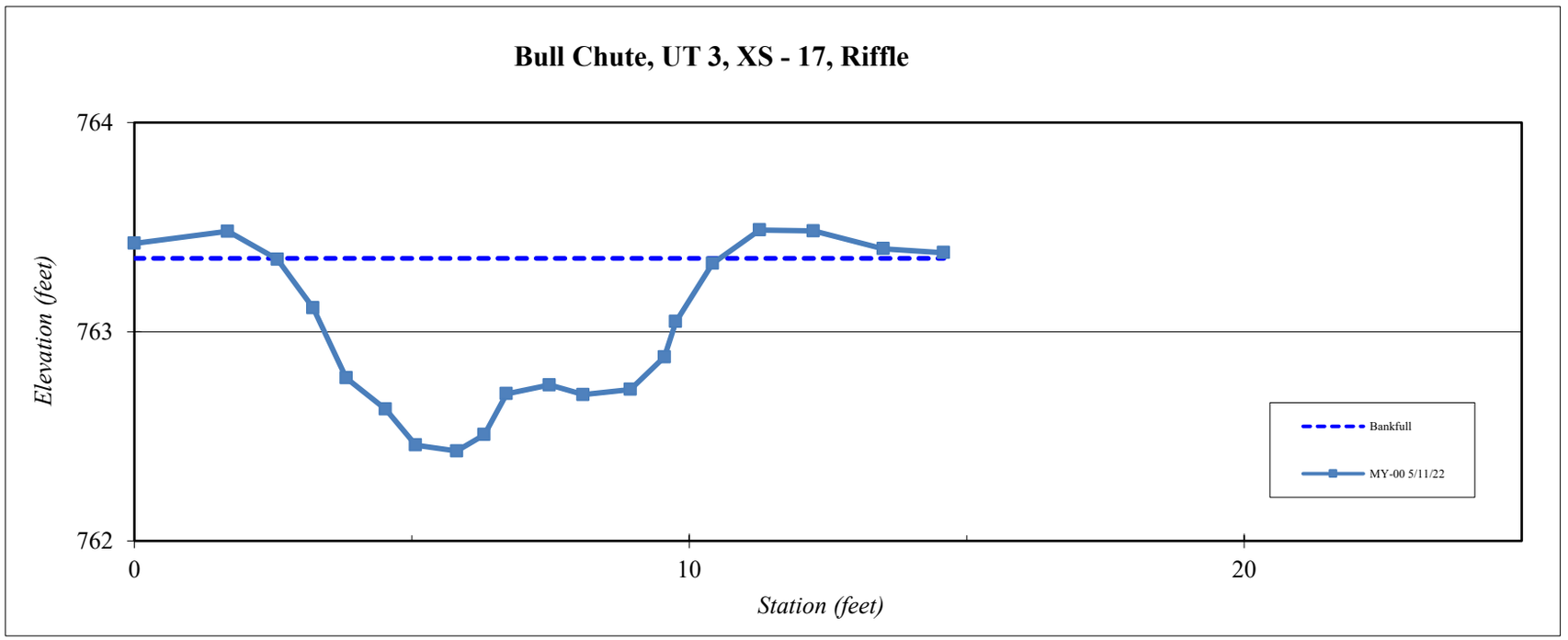


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -17
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	763.6
1.7	763.7
2.6	763.5
3.2	763.3
3.8	762.9
4.5	762.7
5.1	762.5
5.8	762.5
6.3	762.6
6.7	762.8
7.5	762.9
8.1	762.8
8.9	762.8
9.6	763.0
9.8	763.2
10.4	763.5
11.3	763.7
12.2	763.7
13.5	763.6
14.6	763.6

SUMMARY DATA	
Bankfull Elevation:	763.55
Bank Hieght Ratio:	0.98
Thalweg Elevation:	762.51
LTOB Elevation:	763.52
LTOB Max Depth:	1.01
LTOB Cross Sectional Area:	4.9

Stream Type	E/C 4

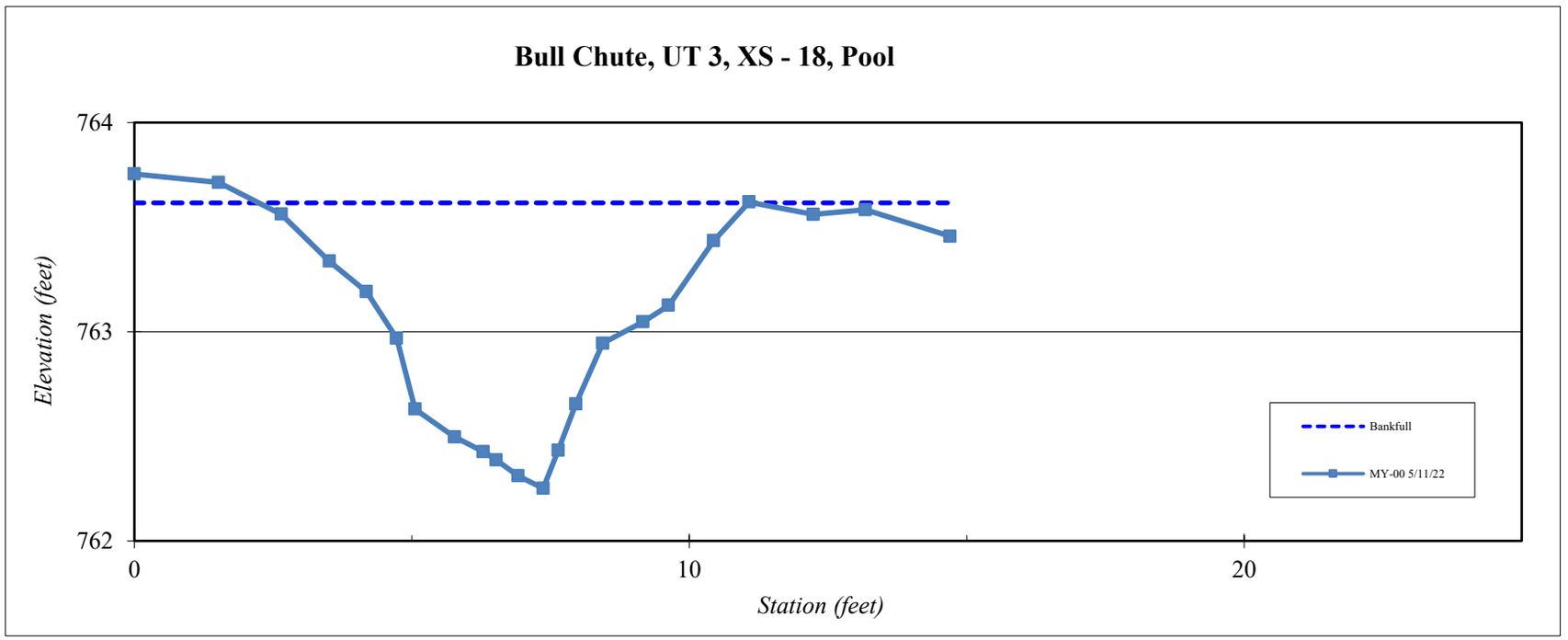


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT3, XS -18
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	764.0
1.5	764.0
2.6	763.8
3.5	763.5
4.2	763.4
4.7	763.1
5.1	762.7
5.8	762.6
6.3	762.5
6.5	762.5
6.9	762.4
7.4	762.3
7.6	762.5
8.0	762.8
8.4	763.1
9.2	763.2
9.6	763.3
10.4	763.6
11.1	763.9
12.2	763.8
13.2	763.81
14.7	763.7

SUMMARY DATA	
Bankfull Elevation:	763.85
Bank Hieght Ratio:	1.00
Thalweg Elevation:	762.31
LTOB Elevation:	763.85
LTOB Max Depth:	1.55
LTOB Cross Sectional Area:	6.6

Stream Type	E/C 4

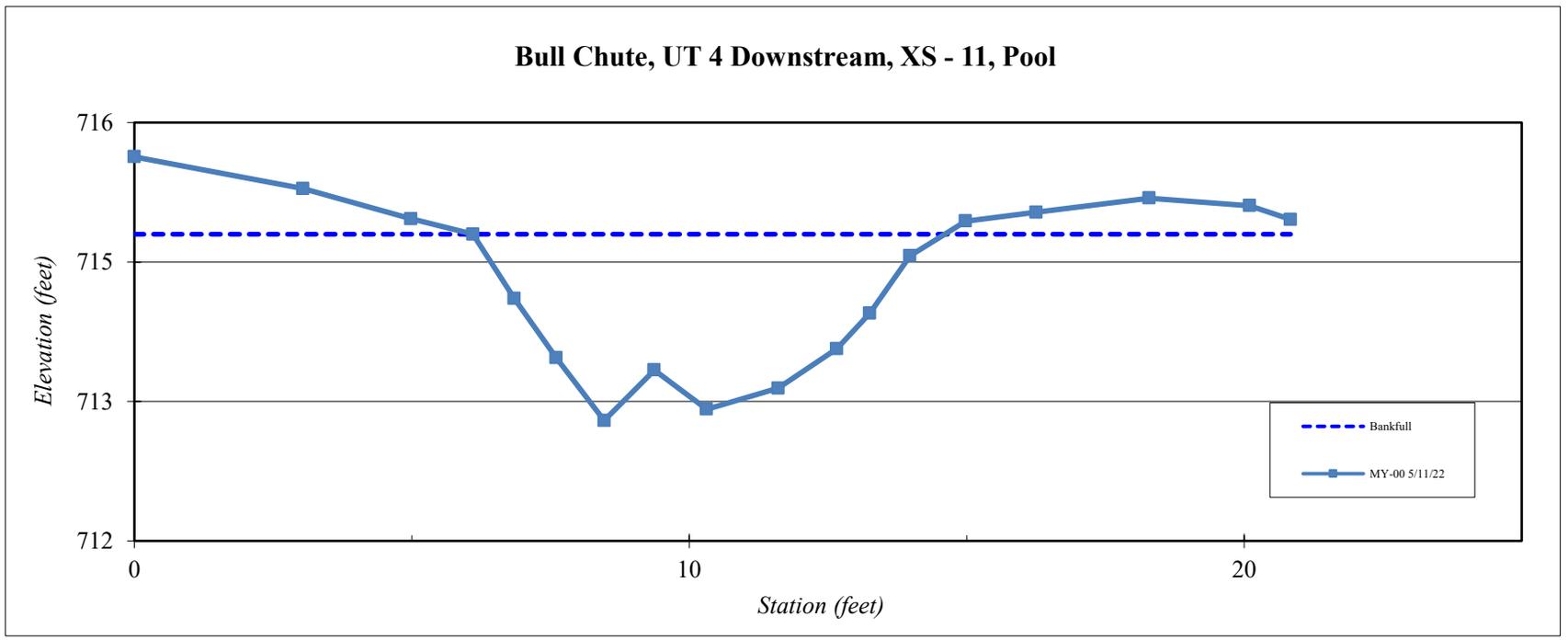


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT 4 Downstream, XS -11
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	715.4
3.0	715.1
5.0	714.9
6.1	714.8
6.8	714.2
7.6	713.8
8.5	713.3
9.4	713.7
10.3	713.3
11.6	713.5
12.7	713.8
13.3	714.1
14.0	714.6
15.0	714.9
16.3	714.9
18.3	715.1
20.1	715.0
20.8	714.9

SUMMARY DATA	
Bankfull Elevation:	714.76
Bank Hieght Ratio:	1.00
Thalweg Elevation:	713.25
LTOB Elevation:	714.76
LTOB Max Depth:	1.51
LTOB Cross Sectional Area:	7.9

Stream Type	E/C 4

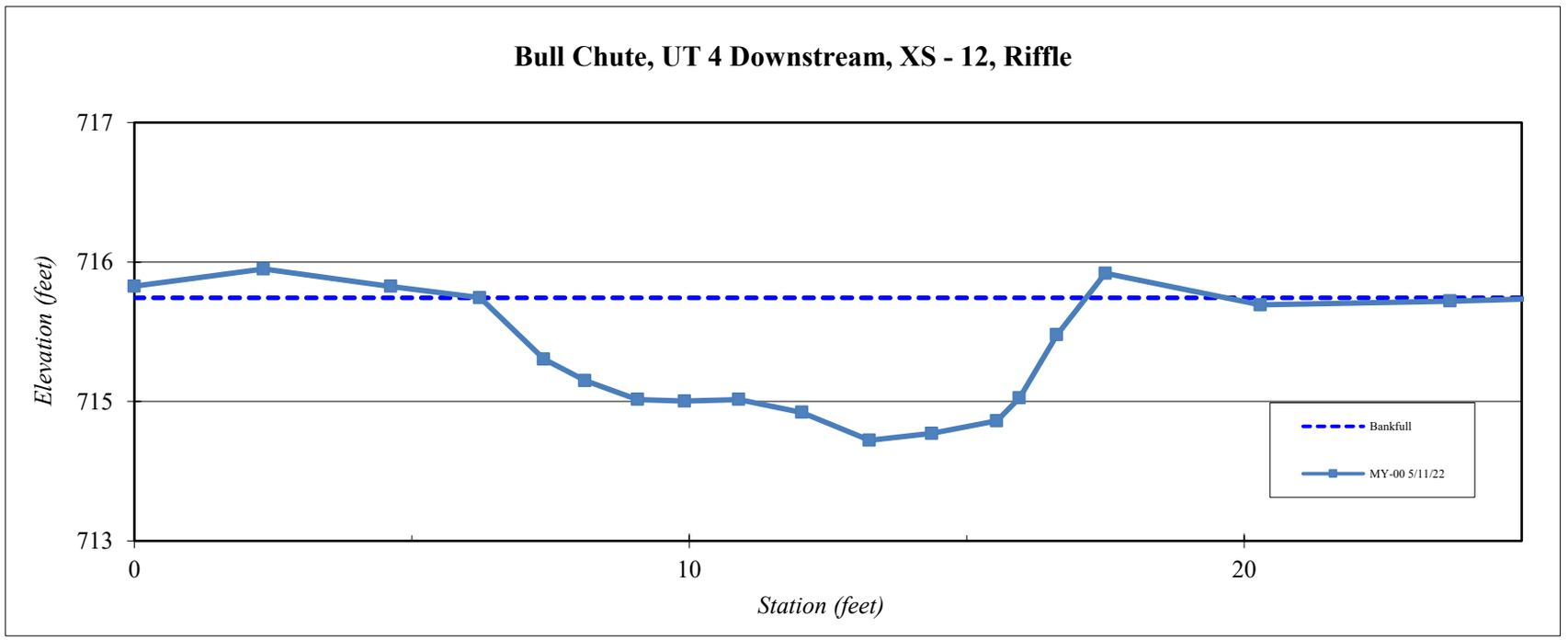


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4, XS -12
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	715.5
2.3	715.6
4.6	715.5
6.2	715.4
7.4	714.9
8.1	714.7
9.1	714.6
9.9	714.5
10.9	714.6
12.0	714.4
13.2	714.2
14.4	714.3
15.5	714.4
15.9	714.6
16.6	715.1
17.5	715.6
20.3	715.3
23.7	715.4
27.0	715.4

SUMMARY DATA	
Bankfull Elevation:	715.38
Bank Hieght Ratio:	1.00
Thalweg Elevation:	714.22
LTOB Elevation:	715.38
LTOB Max Depth:	1.15
LTOB Cross Sectional Area:	8.5

Stream Type	E/C 4

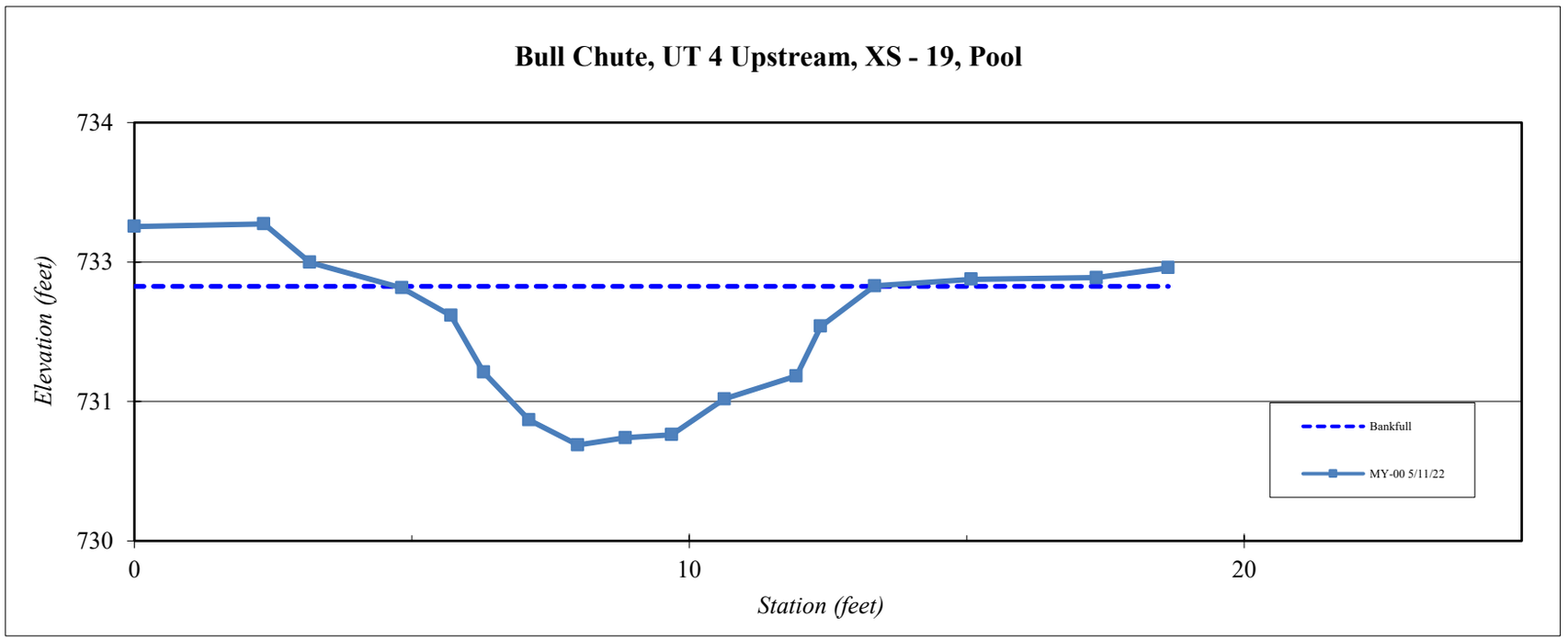


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4 Upstream, XS -19
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	732.9
2.3	732.9
3.2	732.6
4.8	732.4
5.7	732.2
6.3	731.7
7.1	731.3
8.0	731.1
8.9	731.2
9.7	731.2
10.6	731.5
11.9	731.7
12.4	732.1
13.3	732.4
15.1	732.5
17.3	732.5
18.6	732.6

SUMMARY DATA	
Bankfull Elevation:	732.43
Bank Hieght Ratio:	1.00
Thalweg Elevation:	731.14
LTOB Elevation:	732.43
LTOB Max Depth:	1.29
LTOB Cross Sectional Area:	6.7

Stream Type	E/C 4

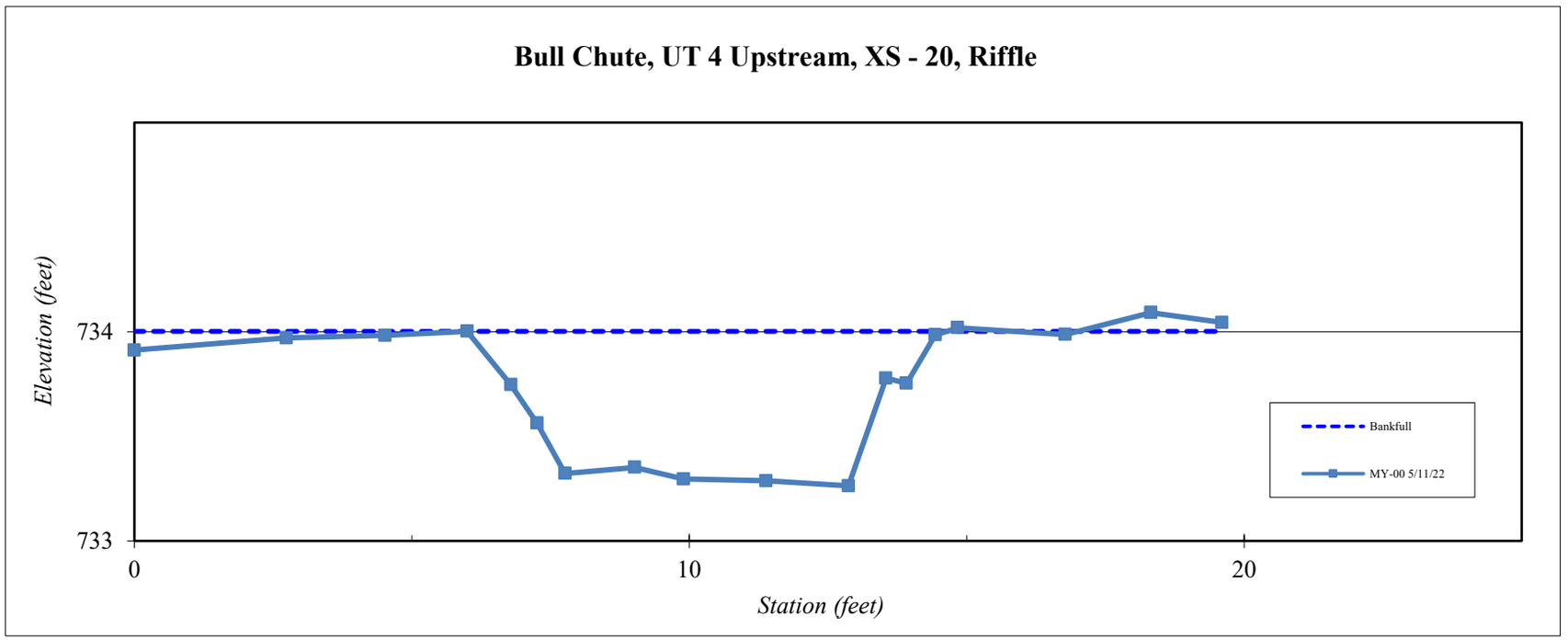


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4 Upstream, XS -20
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	733.7
2.7	733.7
4.5	733.7
6.0	733.8
6.8	733.5
7.3	733.3
7.8	733.0
9.0	733.0
9.9	733.0
11.4	733.0
12.9	732.9
13.5	733.5
13.9	733.5
14.4	733.7
14.8	733.8
16.8	733.7
18.3	733.9
19.6	733.8

SUMMARY DATA	
Bankfull Elevation:	733.76
Bank Hieght Ratio:	1.00
Thalweg Elevation:	732.93
LTOB Elevation:	733.76
LTOB Max Depth:	0.84
LTOB Cross Sectional Area:	5.2

Stream Type	E/C 4

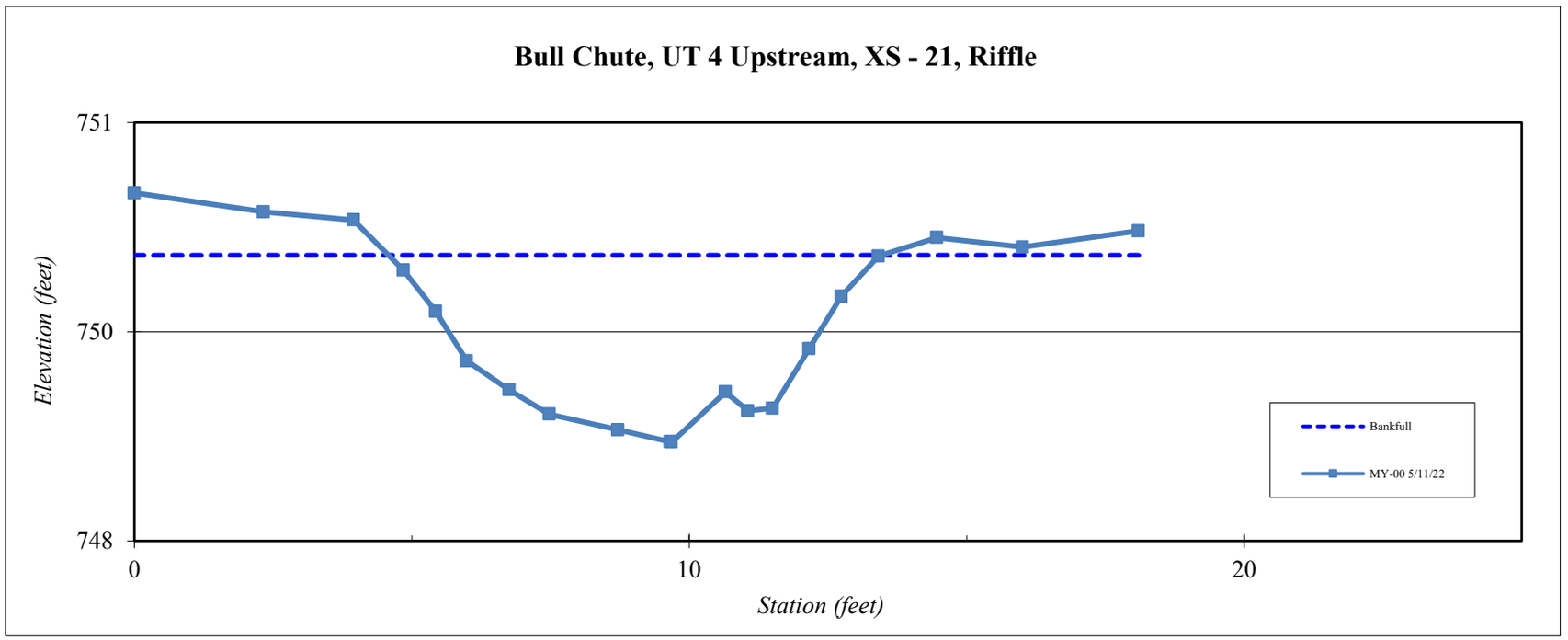


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4 Upstream, XS -21
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	750.3
2.3	750.2
3.9	750.2
4.8	749.9
5.4	749.7
6.0	749.4
6.8	749.3
7.5	749.1
8.7	749.1
9.7	749.0
9.7	749.0
10.7	749.3
11.1	749.2
11.5	749.2
12.2	749.5
12.7	749.8
13.4	750.0
14.5	750.1
16.0	750.0
18.1	750.1

SUMMARY DATA	
Bankfull Elevation:	750.00
Bank Hieght Ratio:	1.00
Thalweg Elevation:	748.99
LTOB Elevation:	750.00
LTOB Max Depth:	1.00
LTOB Cross Sectional Area:	5.7

Stream Type	E/C 4

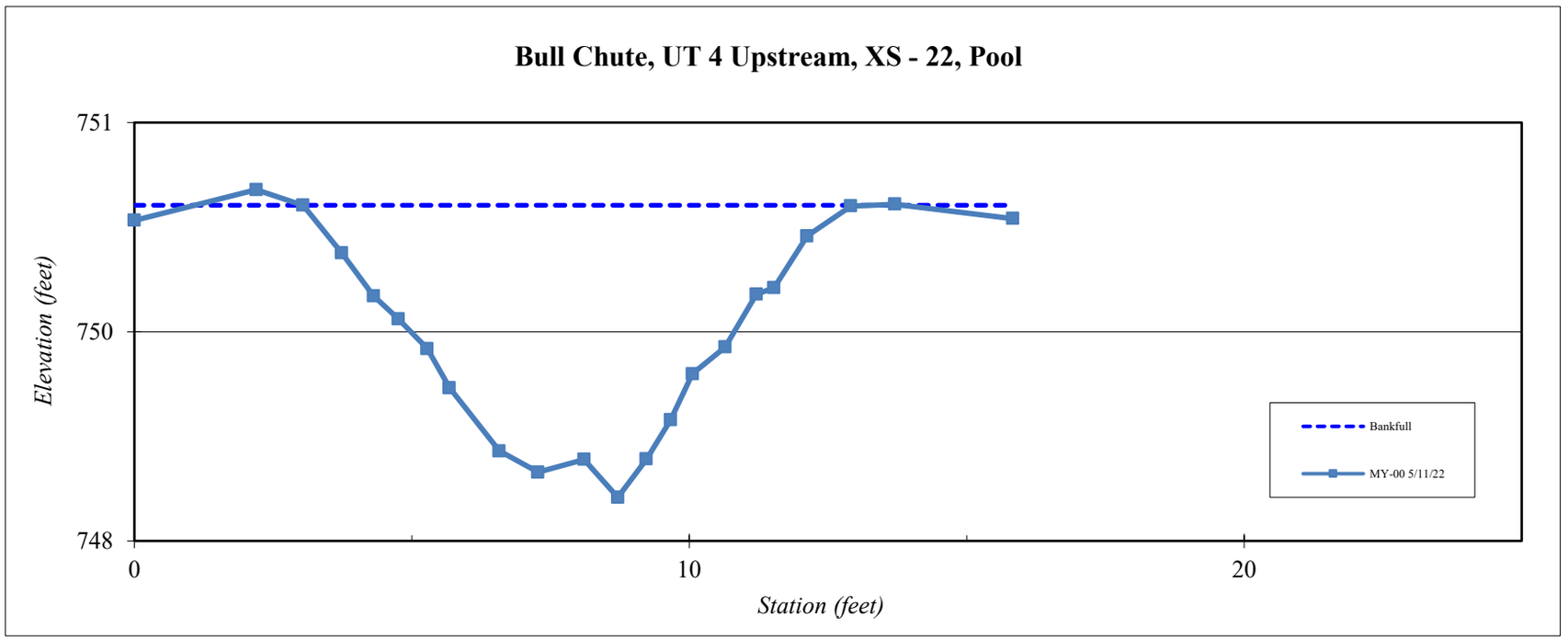


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4 Upstream, XS -22
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	750.2
2.2	750.4
3.0	750.3
3.7	750.0
4.3	749.8
4.8	749.7
5.3	749.5
5.7	749.3
6.6	748.9
7.3	748.8
8.1	748.9
8.7	748.7
9.2	748.9
9.7	749.1
10.1	749.4
10.6	749.5
11.2	749.8
11.5	749.8
12.1	750.1
12.9	750.3
13.7	750.28
15.8	750.2

SUMMARY DATA	
Bankfull Elevation:	750.27
Bank Hieght Ratio:	1.00
Thalweg Elevation:	748.69
LTOB Elevation:	750.27
LTOB Max Depth:	1.58
LTOB Cross Sectional Area:	8.3

Stream Type	E/C 4

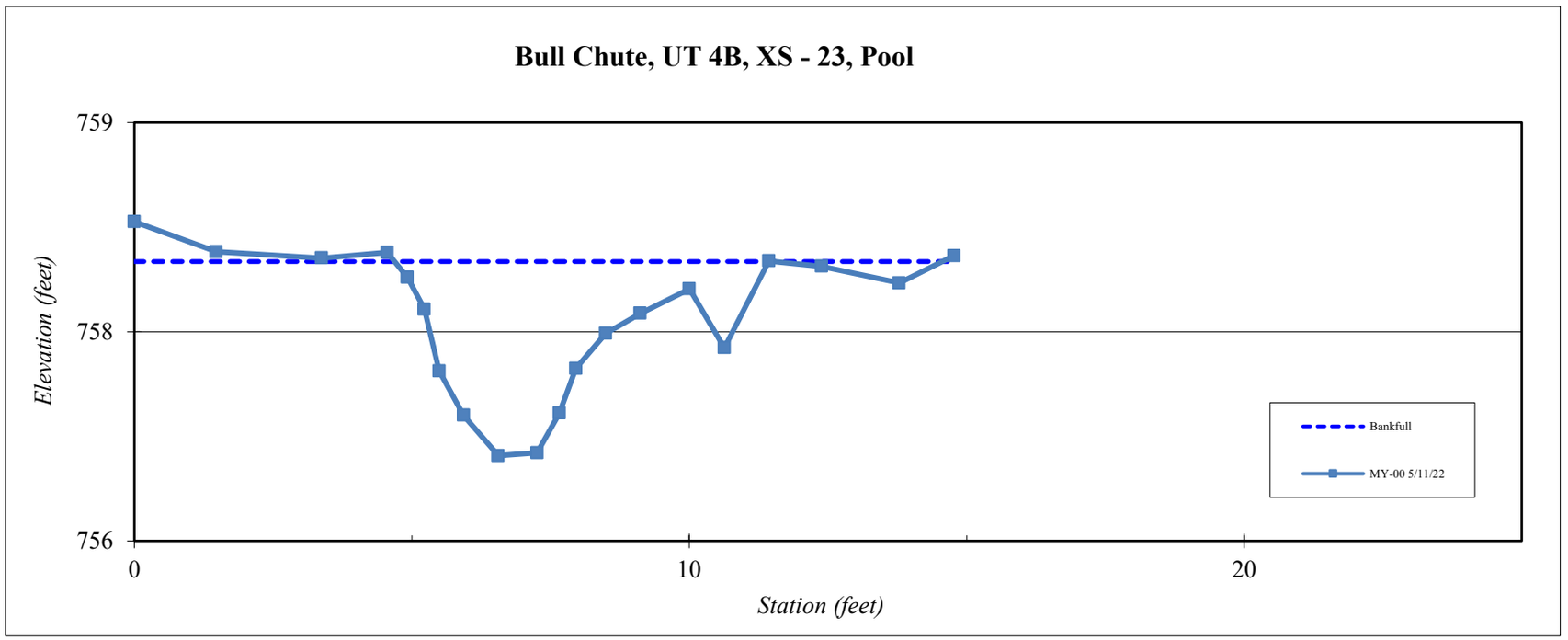


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4B, XS -23
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	758.1
1.5	757.9
3.4	757.9
4.6	757.9
4.9	757.8
5.2	757.6
5.5	757.3
5.9	757.0
6.6	756.8
7.3	756.8
7.7	757.1
8.0	757.3
8.5	757.5
9.1	757.6
10.0	757.7
10.6	757.4
11.4	757.9
12.4	757.9
13.8	757.8
14.8	757.9

SUMMARY DATA	
Bankfull Elevation:	757.88
Bank Hieght Ratio:	1.00
Thalweg Elevation:	756.83
LTOB Elevation:	757.88
LTOB Max Depth:	1.05
LTOB Cross Sectional Area:	3.4

Stream Type	E/C 4

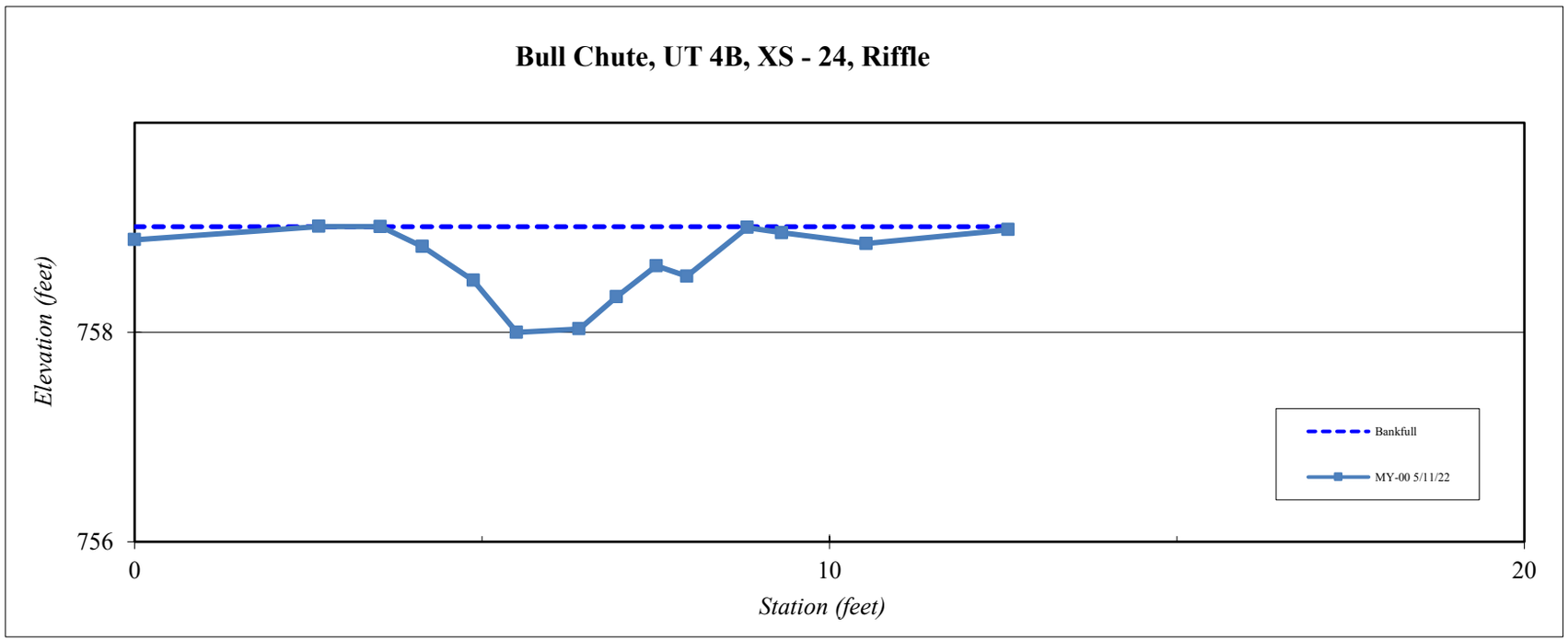


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4B, XS -24
Feature	Riffle
Date:	5/25/2022
Field Crew:	Lewis

Station	Elevation
0.0	758.0
2.7	758.1
3.5	758.1
4.1	758.0
4.9	757.8
5.5	757.5
6.4	757.5
6.9	757.7
7.5	757.9
7.9	757.8
8.8	758.1
9.3	758.0
10.5	758.0
12.6	758.1

SUMMARY DATA	
Bankfull Elevation:	758.07
Bank Hieght Ratio:	0.52
Thalweg Elevation:	757.50
LTOB Elevation:	758.07
LTOB Max Depth:	0.57
LTOB Cross Sectional Area:	1.6

Stream Type	E/C 4

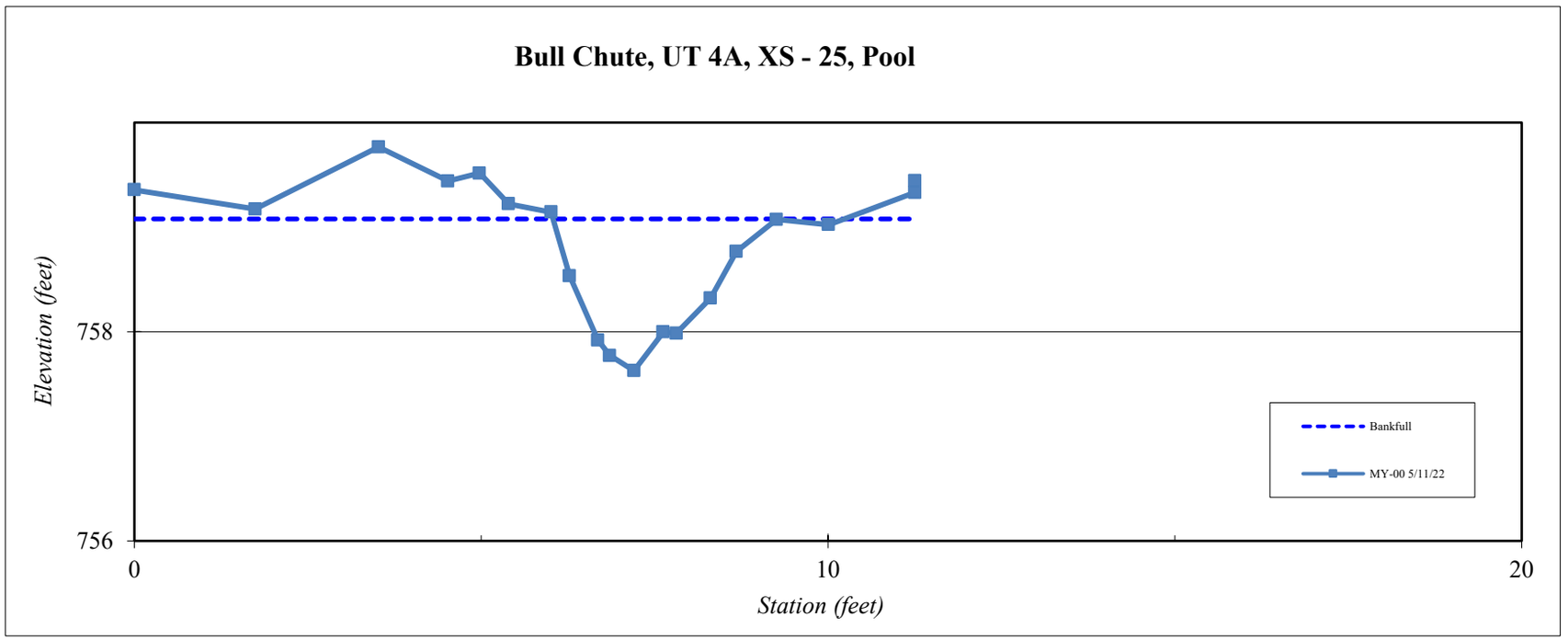


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4A, XS -25
Feature	Pool
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	758.3
1.7	758.2
3.5	758.5
4.5	758.3
5.0	758.4
5.4	758.2
6.0	758.1
6.3	757.8
6.7	757.5
6.9	757.4
7.2	757.3
7.6	757.5
7.8	757.5
8.3	757.7
8.7	757.9
9.3	758.1
10.0	758.1
11.3	758.3
11.3	758.3

SUMMARY DATA	
Bankfull Elevation:	758.11
Bank Hieght Ratio:	1.00
Thalweg Elevation:	757.29
LTOB Elevation:	758.11
LTOB Max Depth:	0.82
LTOB Cross Sectional Area:	1.5

Stream Type	E/C 4

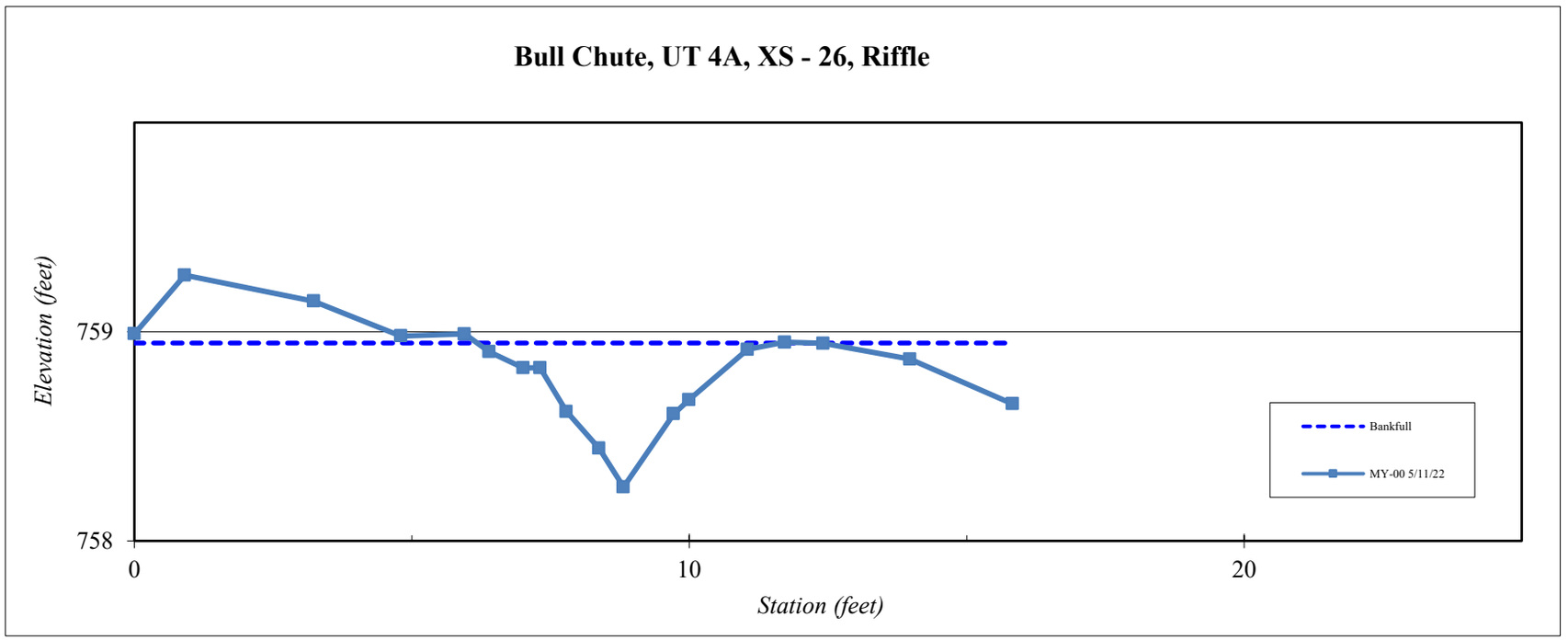


Site	Bull Chute Site
Watershed:	Yadkin River Basin, 03040103
XS ID	UT4A, XS -26
Feature	Riffle
Date:	5/11/2022
Field Crew:	Lewis

Station	Elevation
0.0	758.6
0.9	758.9
3.2	758.8
4.8	758.6
6.0	758.6
6.4	758.5
7.0	758.4
7.3	758.4
7.8	758.2
8.4	758.0
8.8	757.8
9.7	758.2
10.0	758.3
11.0	758.5
11.7	758.6
12.4	758.6
14.0	758.5
15.8	758.2

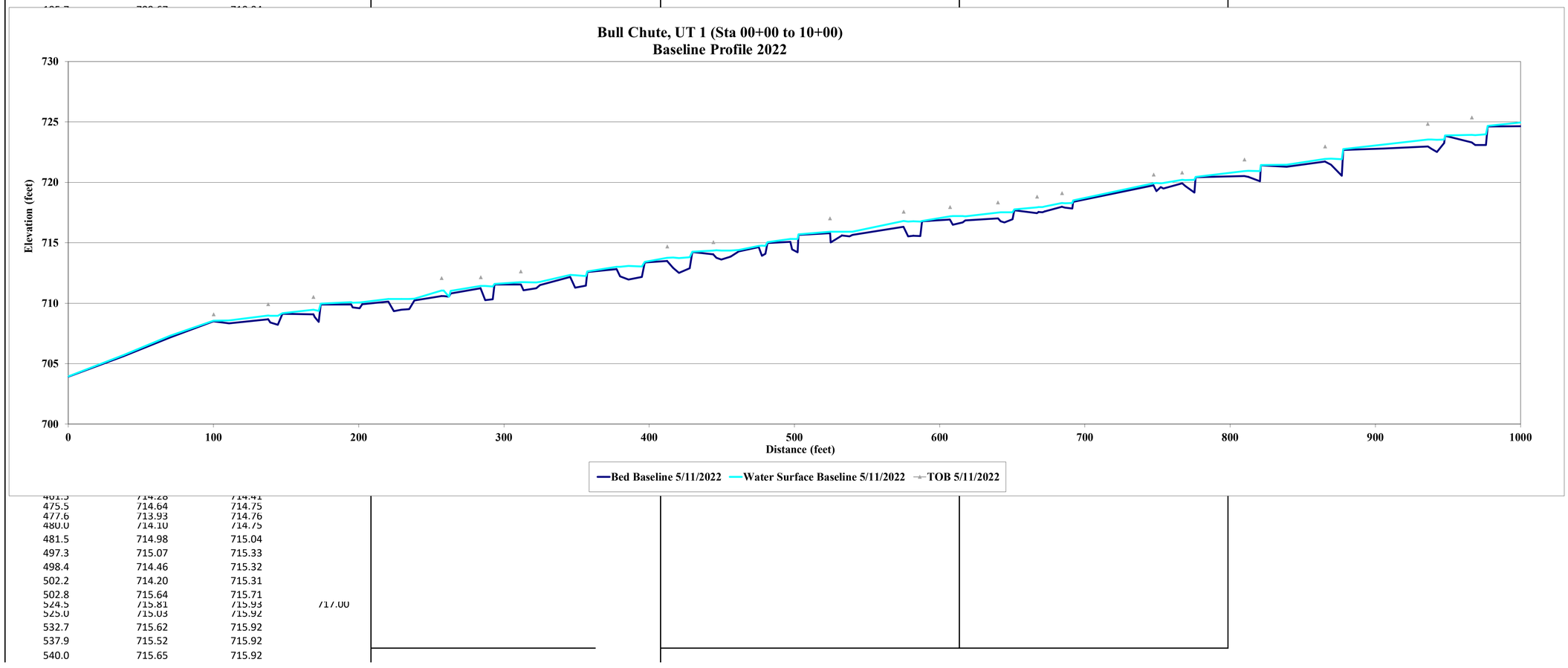
SUMMARY DATA	
Bankfull Elevation:	758.57
Bank Hieght Ratio:	1.00
Thalweg Elevation:	757.79
LTOB Elevation:	758.57
LTOB Max Depth:	0.78
LTOB Cross Sectional Area:	1.6

Stream Type	E/C 4



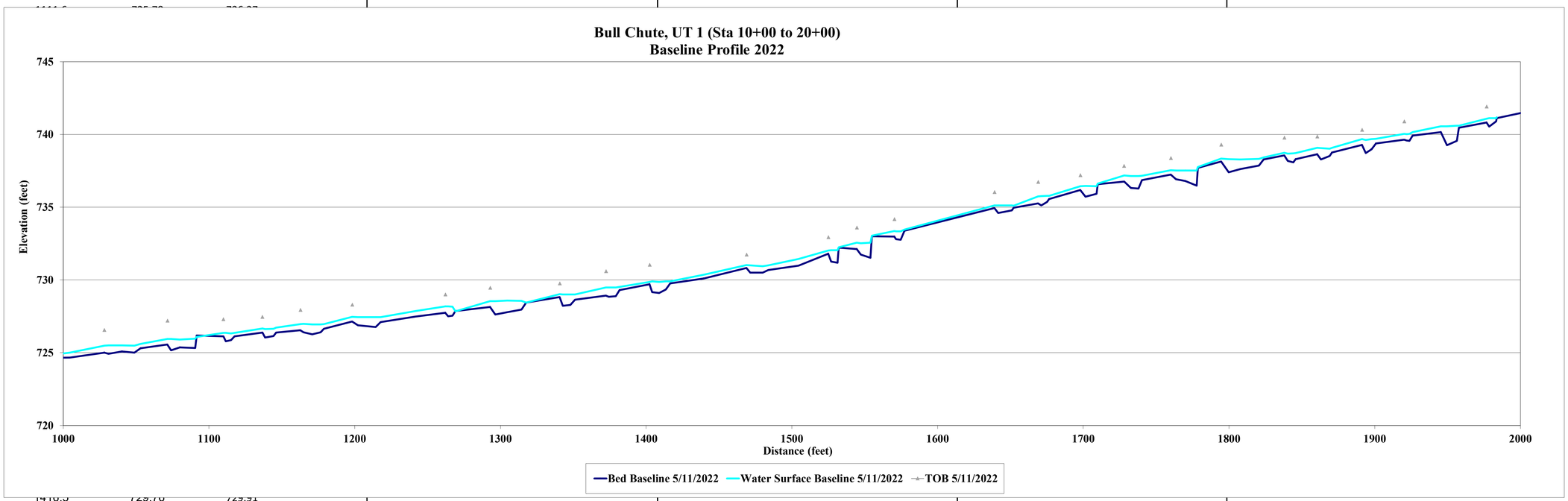
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 1 (Sta 00+00 to 10+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	703.92	703.94													
38.3	705.62	705.72													
70.0	707.17	707.30													
100.0	708.50	708.55	709.07												
110.6	708.32	708.59													
137.6	708.68	708.99	709.92												
139.2	708.40	708.96													
144.3	708.21	708.97													
147.5	709.13	709.17													
168.8	709.08	709.46	710.52												
169.7	708.87	709.43													
172.4	708.46	709.38													
173.8	709.89	709.96													
194.9	709.88	710.09													
461.5	714.28	714.41													
475.5	714.64	714.75													
477.6	713.93	714.76													
480.0	714.10	714.75													
481.5	714.98	715.04													
497.3	715.07	715.33													
498.4	714.46	715.32													
502.2	714.20	715.31													
502.8	715.64	715.71													
524.5	715.81	715.93	717.00												
525.0	715.03	715.92													
532.7	715.62	715.92													
537.9	715.52	715.92													
540.0	715.65	715.92													



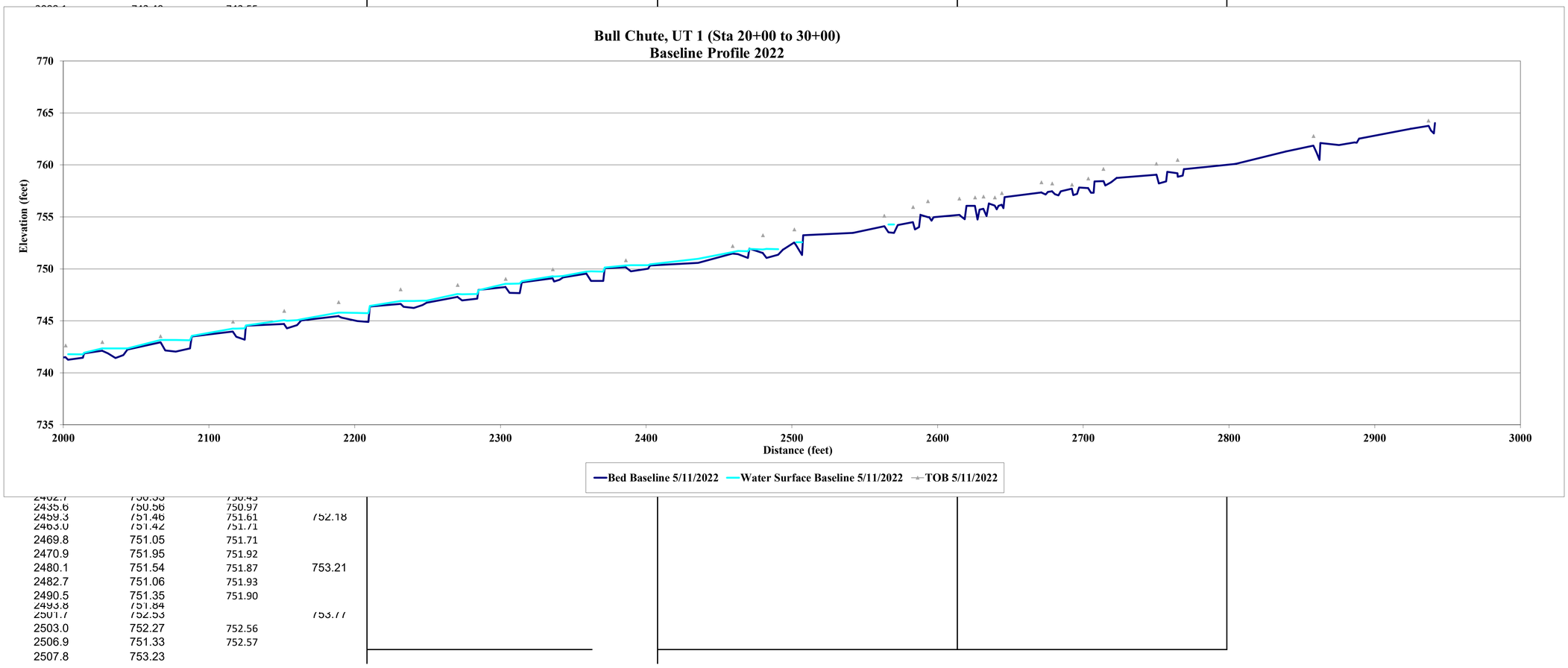
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 1 (Sta 10+00 to 20+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
976.1	723.09	723.97													
977.2	724.63	724.67													
1004.5	724.66	725.01													
1028.2	725.01	725.49	726.57												
1031.1	724.92	725.50													
1040.3	725.10	725.50													
1048.9	725.00	725.48													
1053.0	725.31	725.60													
1071.4	725.56	725.95	727.21												
1074.0	725.17	725.95													
1080.1	725.38	725.91													
1090.5	725.33	725.97													
1091.5	726.18	726.09													
1109.9	726.13	726.36	727.31												
1410.5	729.76	729.91													
1439.6	730.11	730.37													
1468.9	730.82	731.02	731.74												
1471.3	730.51	731.00													
1480.0	730.50	730.95													
1483.9	730.69	731.00													
1504.7	730.98	731.45													
1525.0	731.81	732.03	732.95												
1527.0	731.26	732.05													
1531.3	731.19	732.04													
1532.1	732.23	732.25													
1544.5	732.13	732.56	733.61												
1547.3	731.75	732.53													
1553.9	731.52	732.57													



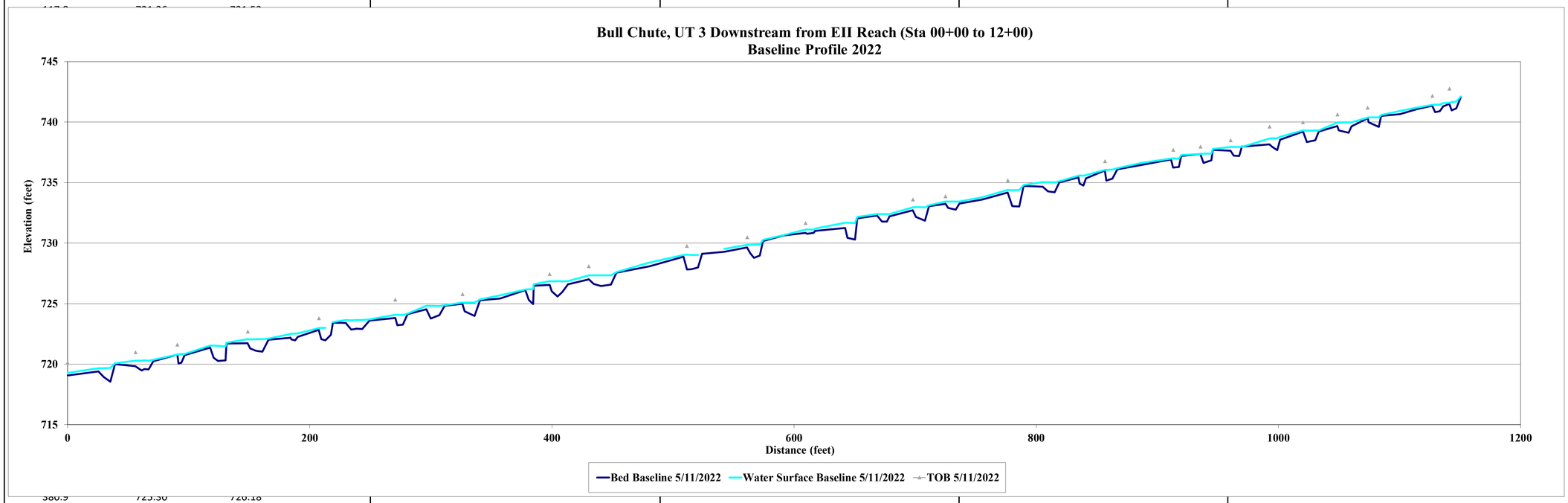
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 1 (Sta 20+00 to 30+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
1983.7	741.13	741.19													
2001.5	741.50		742.62												
2003.4	741.25	741.77													
2013.4	741.44	741.77													
2014.3	741.86	741.91													
2026.7	742.13	742.36	742.96												
2030.7	741.86	742.34													
2035.9	741.41	742.34													
2041.3	741.71	742.33													
2043.9	742.24	742.34													
2066.7	742.93	743.15	743.52												
2070.0	742.15	743.16													
2077.2	742.03	743.15													
2087.0	742.35	743.13													
2435.6	750.56	750.97													
2459.3	751.46	751.61	752.18												
2463.0	751.42	751.71													
2469.8	751.05	751.71													
2470.9	751.95	751.92													
2480.1	751.54	751.87	753.21												
2482.7	751.06	751.93													
2490.5	751.35	751.90													
2503.0	752.27	752.56													
2506.9	751.33	752.57													
2507.8	753.23														



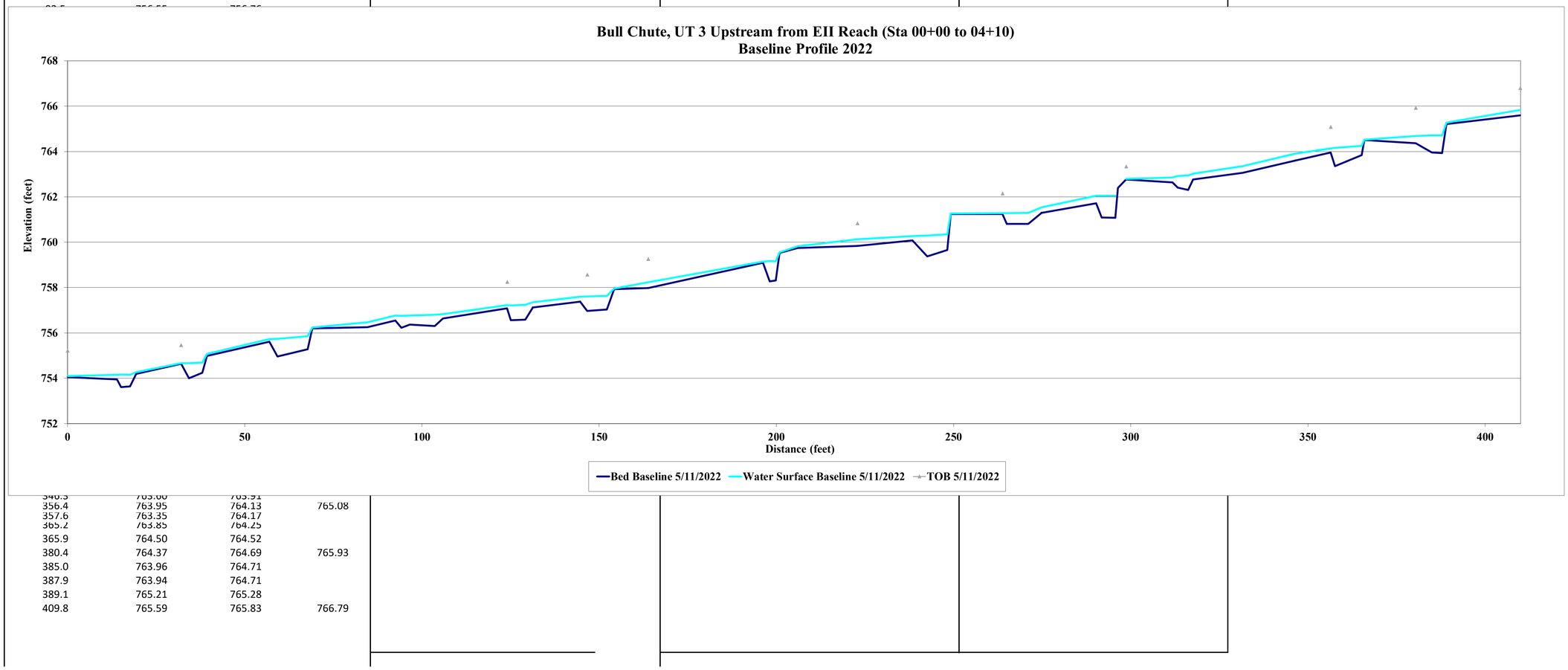
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 3 Downstream from EIII Reach (Sta 00+00 to 12+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	719.06	719.28	720.11												
25.5	719.39	719.66													
29.8	718.95	719.66													
35.3	718.55	719.68													
39.3	720.00	720.07													
56.0	719.84	720.28	720.99												
61.1	719.47	720.28													
63.3	719.59	720.30													
66.9	719.57	720.28													
70.9	720.25	720.36													
90.6	720.79	720.80	721.61												
91.6	720.05	720.81													
94.1	720.13	720.84													
96.7	720.74	720.83													
380.9	725.30	726.18													
384.6	724.98	726.19													
385.1	726.47	726.59													
398.1	726.54	726.85	727.43												
399.8	726.01	726.84													
404.8	725.60	726.86													
408.8	725.98	726.85													
413.4	726.60	726.86													
430.5	727.02	727.34	728.08												
434.7	726.61	727.33													
440.6	726.46	727.33													
448.7	726.57	727.35													
453.3	727.55	727.61													
480.7	728.08	728.39													



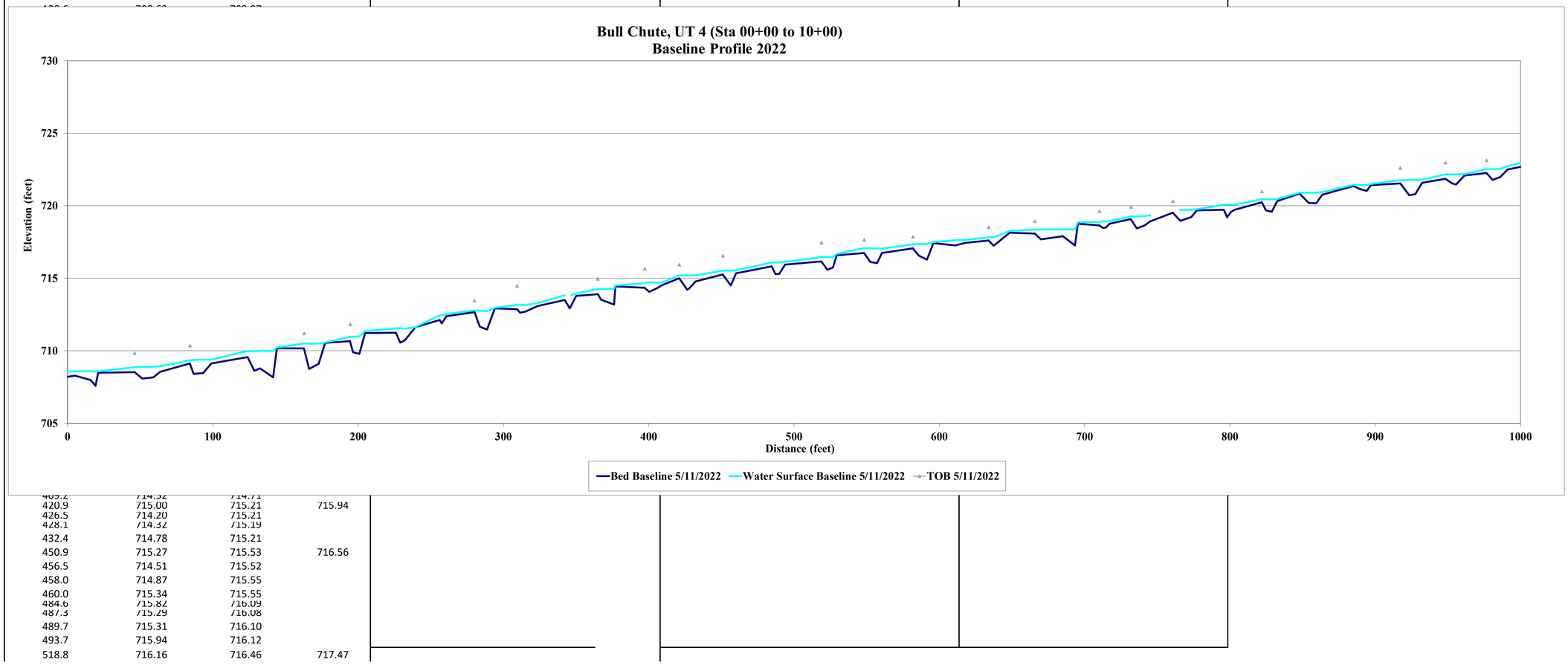
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 3 Upstream from EIII Reach (Sta 00+00 to 04+10)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	754.05	754.10	755.21												
13.9	753.95	754.15													
15.1	753.61	754.16													
17.6	753.64	754.15													
19.3	754.19	754.27													
32.0	754.65	754.67	755.45												
34.2	754.00	754.67													
38.0	754.25	754.69													
39.4	754.98	755.07													
57.0	755.61	755.73													
59.2	754.97	755.75													
67.7	755.28	755.85													
69.1	756.21	756.24													
84.6	756.25	756.47													
346.3	763.60	763.91													
356.4	763.95	764.13	765.08												
357.6	763.35	764.17													
365.2	763.85	764.25													
365.9	764.50	764.52													
380.4	764.37	764.69	765.93												
385.0	763.96	764.71													
387.9	763.94	764.71													
389.1	765.21	765.28													
409.8	765.59	765.83	766.79												



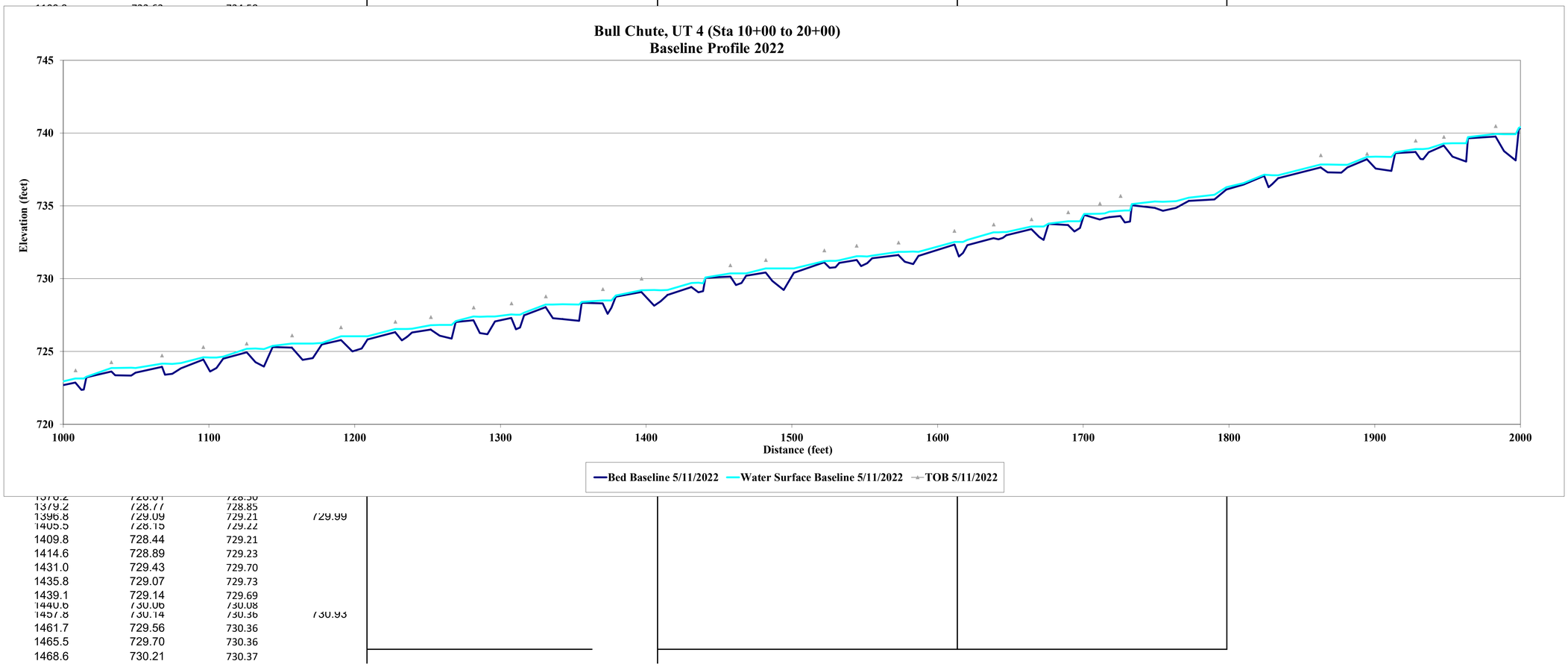
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 4 (Sta 00+00 to 10+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	708.20	708.57													
5.2	708.29	708.58													
15.8	707.98	708.59													
19.3	707.58	708.57													
21.0	708.49	708.59													
46.2	708.53	708.86	709.84												
51.5	708.08	708.88													
59.1	708.16	708.90													
63.7	708.54	708.93													
84.2	709.12	709.35	710.35												
86.8	708.40	709.37													
93.3	708.47	709.39													
99.0	709.13	709.40													
123.9	709.56	709.99													
409.2	714.32	714.71													
420.9	715.00	715.21	715.94												
426.5	714.20	715.21													
428.1	714.32	715.19													
432.4	714.78	715.21													
450.9	715.27	715.53	716.56												
456.5	714.51	715.52													
458.0	714.87	715.55													
460.0	715.34	715.55													
484.6	715.82	716.09													
487.3	715.29	716.08													
489.7	715.31	716.10													
493.7	715.94	716.12													
518.8	716.16	716.46	717.47												



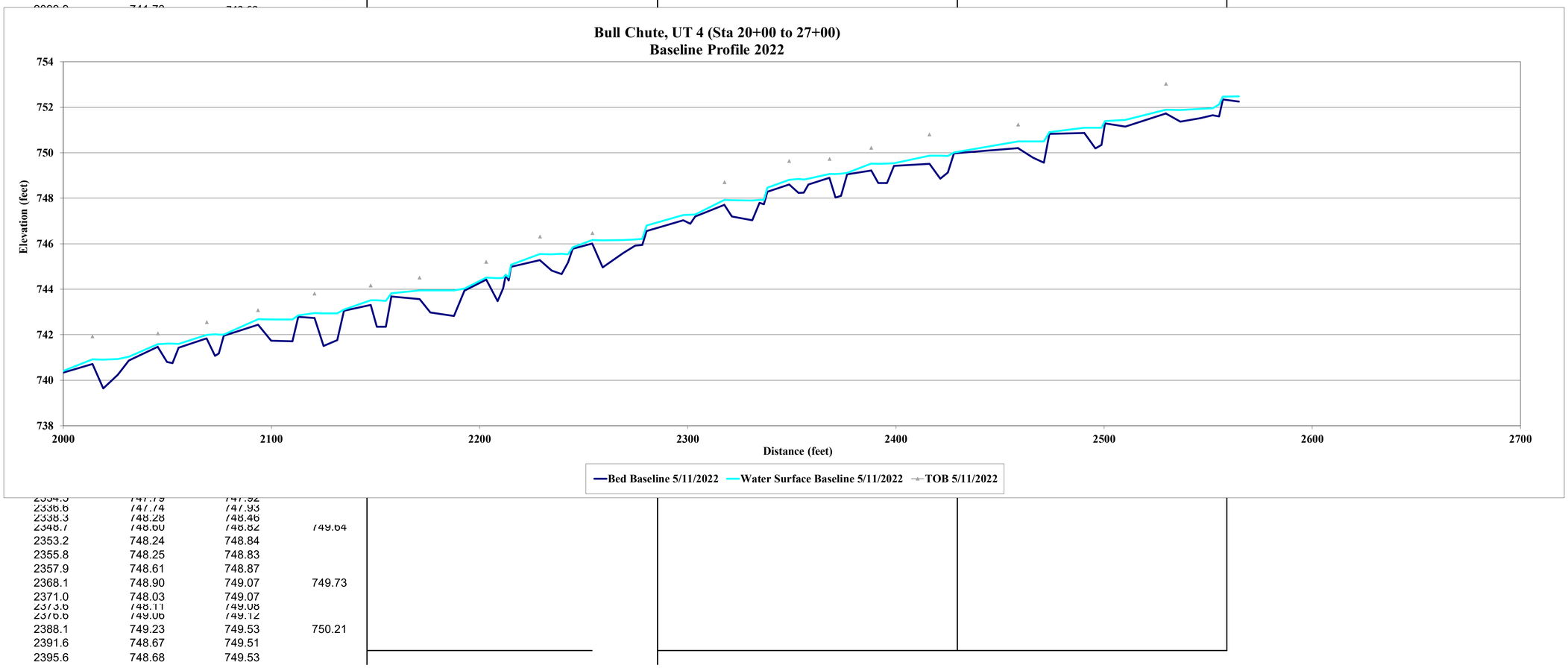
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 4 (Sta 10+00 to 20+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
991.2	722.50	722.74													
1008.4	722.87	723.15	723.70												
1012.5	722.36	723.15													
1014.1	722.38	723.15													
1015.9	723.23	723.27													
1033.0	723.63	723.86	724.25												
1035.6	723.37	723.86													
1046.7	723.35	723.88													
1049.7	723.54	723.86													
1067.8	723.95	724.16	724.72												
1069.9	723.41	724.18													
1074.8	723.47	724.15													
1080.8	723.85	724.21													
1096.1	724.46	724.60	725.30												
1379.2	728.77	728.85													
1396.8	729.09	729.21	729.99												
1405.5	728.15	729.22													
1409.8	728.44	729.21													
1414.6	728.89	729.23													
1431.0	729.43	729.70													
1435.8	729.07	729.73													
1439.1	729.14	729.69													
1440.6	730.06	730.08													
1457.8	730.14	730.36	730.93												
1461.7	729.56	730.36													
1465.5	729.70	730.36													
1468.6	730.21	730.37													



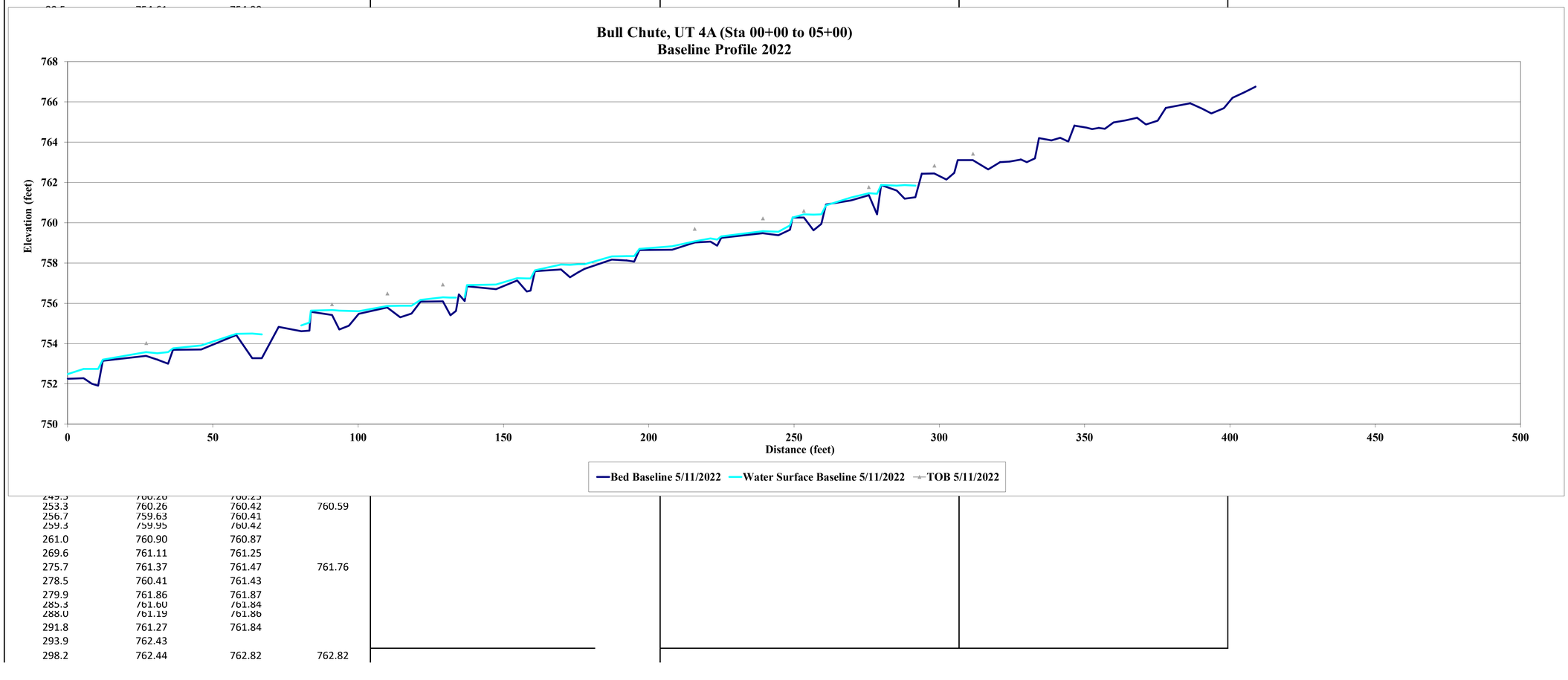
Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 4 (Sta 20+00 to 27+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
1998.9	740.31	740.37													
2014.0	740.71	740.92	741.92												
2019.3	739.64	740.90													
2026.2	740.25	740.93													
2031.5	740.87	741.04													
2045.4	741.47	741.58	742.06												
2049.8	740.81	741.60													
2052.6	740.75	741.60													
2055.4	741.43	741.60													
2068.9	741.83	741.99	742.56												
2072.9	741.07	742.02													
2074.8	741.18	742.01													
2077.1	741.95	742.00													
2093.6	742.44	742.69	743.08												
2334.5	747.79	747.92													
2336.6	747.74	747.93													
2338.3	748.28	748.46													
2348.7	748.60	748.82	749.64												
2353.2	748.24	748.84													
2355.8	748.25	748.83													
2357.9	748.61	748.87													
2368.1	748.90	749.07	749.73												
2371.0	748.03	749.07													
2373.6	748.11	749.08													
2376.6	749.06	749.12													
2388.1	749.23	749.53	750.21												
2391.6	748.67	749.51													
2395.6	748.68	749.53													



Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 4A (Sta 00+00 to 05+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	752.25	752.48													
5.5	752.28	752.75													
8.3	752.00	752.74													
10.5	751.91	752.74													
12.2	753.14	753.20													
27.1	753.39	753.58	754.02												
30.9	753.20	753.52													
34.6	753.00	753.57													
36.3	753.70	753.76													
46.0	753.70	753.90													
58.1	754.43	754.49													
63.5	753.28	754.49													
66.8	753.28	754.46													
72.7	754.83														
249.3	760.28	760.25													
253.3	760.26	760.42	760.59												
256.7	759.63	760.41													
259.3	759.95	760.42													
261.0	760.90	760.87													
269.6	761.11	761.25													
275.7	761.37	761.47	761.76												
278.5	760.41	761.43													
279.9	761.86	761.87													
285.3	761.60	761.84													
288.0	761.19	761.86													
291.8	761.27	761.84													
293.9	762.43														
298.2	762.44	762.82	762.82												



Project Name	Bull Chute - Baseline (2022) Profile
Reach	UT 4B (Sta 00+00 to 05+00)
Feature	Profile
Date	5/11/22
Crew	Lewis

2022 Baseline Survey				As needed				As needed				As needed			
Station	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**	**Station**	**Bed Elevation**	**Water Elevation**	**TOB**
0.0	752.25	752.48													
4.0	752.74	752.92													
9.4	752.51	752.90													
13.2	752.24	752.89													
15.1	753.12	753.15													
25.1	753.06	753.38													
39.8	753.54	753.78	754.58												
43.5	752.66	753.79													
45.6	754.25	754.45													
52.0	754.38	754.57													
56.1	754.37	754.57													
58.2	754.63														
70.3	755.19		755.96												
74.1	754.64														
248.8	760.66														
262.9	760.63														
276.1	761.06		761.97												
279.2	761.05														
281.9	761.01														
282.4	761.85														
297.0	762.10														
303.0	762.96														

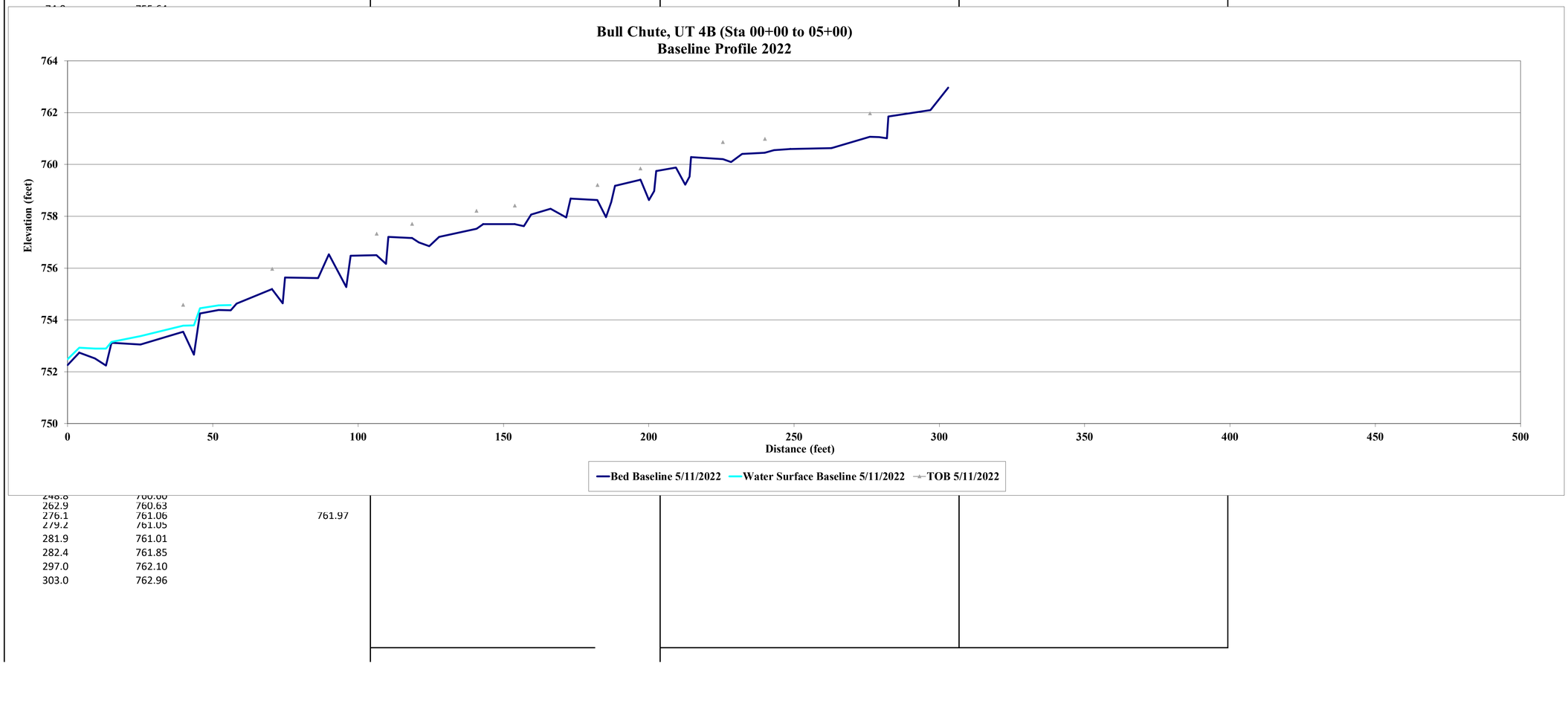


Table 9A. Baseline Stream Data Summary Bull Chute - UT 1										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5.6		8.5	16		8.5	9.8	5.5	10.2	5
Floodprone Width (ft)	10		14	100		50	150	25	100	5
Bankfull Mean Depth (ft)	0.4		0.7	1.1		0.6	0.7	0.2	0.8	5
Bankfull Max Depth (ft)	0.6		1.1	1.4		0.8	1.1	0.4	1.1	5
Bankfull Cross Sectional Area (ft^2)	6		6	6		6	6	1.3	8.1	5
Width/Depth Ratio	5.1		12.1	40		12	16	12.8	22.9	5
Entrenchment Ratio	1.1		1.4	15.9		5.9	15.3	4.6	11.4	5
Bank Height Ratio	**1.3**		**2.8**	**5**		**1**	**1.3**	**1**	**1**	5
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	22.9					22.9		22.9		
Sinuosity (ft)	1.03					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.0211					0.0189		0.0197		
Other										

Table 9B. Baseline Stream Data Summary Bull Chute - UT 3										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	3.3		5.1	7.1		6.7	7.7	8.0	10.0	2
Floodprone Width (ft)	7		9	50		50	100	75	75	2
Bankfull Mean Depth (ft)	0.5		0.7	1.1		0.5	0.6	0.6	0.6	2
Bankfull Max Depth (ft)	0.8		1	1.7		0.6	0.8	0.9	1.0	2
Bankfull Cross Sectional Area (ft^2)	3.7		3.7	3.7		3.7	3.7	4.8	6.4	2
Width/Depth Ratio	3		7.3	13.5		12	16	12.4	15.6	2
Entrenchment Ratio	1.1		1.5	13.5		7.5	13	7.5	9.4	2
Bank Height Ratio	**1.5**		**2.5**	**4**		**1**	**1.3**	1	1	**2**
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	13.7					13.7		13.7		
Sinuosity (ft)	1.02					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.0254					0.0225		0.0199		
Other										

Table 9C. Baseline Stream Data Summary Bull Chute - UT 4 Upstream										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5		8.3	10.4		7.2	8.3	8.5	8.9	2
Floodprone Width (ft)	6		11	24		50	100	75.0	75.0	2
Bankfull Mean Depth (ft)	0.4		0.6	0.9		0.5	0.6	0.6	0.6	2
Bankfull Max Depth (ft)	0.5		1.1	1.2		0.7	0.9	0.8	1.0	2
Bankfull Cross Sectional Area (ft^2)	4.3		4.3	4.3		4.3	4.3	5.1	5.8	2
Width/Depth Ratio	5.6		15.4	26		12	16	13.7	14.1	2
Entrenchment Ratio	1.1		1.3	2.6		7	12.1	8.4	8.8	2
Bank Height Ratio	**2.5**		**3.1**	**5.4**		**1**	**1.3**	1.0	1.0	**2**
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Fg 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	16.1					16.1		16.1		
Sinuosity (ft)	1.06					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.212					0.0196		0.0182		
Other										

Table 9D. Baseline Stream Data Summary Bull Chute - UT 4 Downstream										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	7.8		9.2	10		9.1	10.5	11.0	11.0	1
Floodprone Width (ft)	9		11	14		50	150	100.0	100.0	1
Bankfull Mean Depth (ft)	0.7		0.8	0.9		0.7	0.8	0.8	0.8	1
Bankfull Max Depth (ft)	0.9		1	1.1		0.8	1.1	1.2	1.2	1
Bankfull Cross Sectional Area (ft^2)	6.9		6.9	6.9		6.9	6.9	8.5	8.5	1
Width/Depth Ratio	6.8		9.7	12.6		12	16	14.0	14.0	1
Entrenchment Ratio	1.1		1.2	1.4		5.5	14.3	9.1	9.1	1
Bank Height Ratio	**4.7**		**5.3**	**5.9**		**1**	**1.3**	1.0	1.0	**1**
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	26.7					26.7		26.7		
Sinuosity (ft)	1.02					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.0165					0.0146		0.01484		
Other										

Table 9E. Baseline Stream Data Summary Bull Chute - UT 4A										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	2.3		3.3	4.5		3.9	4.6	4.7	4.7	1
Floodprone Width (ft)	6		8	12		20	50	35	35	1
Bankfull Mean Depth (ft)	0.3		0.4	0.5		0.3	0.3	0.3	0.3	1
Bankfull Max Depth (ft)	0.6		0.6	0.9		0.4	0.5	0.7	0.7	1
Bankfull Cross Sectional Area (ft^2)	1.3		1.3	1.3		1.3	1.3	1.4	1.4	1
Width/Depth Ratio	4.6		8.3	15		12	16	15.5	15.5	1
Entrenchment Ratio	1.3		3.5	3.6		5.1	11	7.5	7.5	1
Bank Height Ratio	**1.7**		**3**	**3.9**		**1**	**1.3**	**1**	**1**	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Eg 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	4.3					4.3		4.3		
Sinuosity (ft)	1.02					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.0444					0.0336		0.0356		
Other										

Table 9F. Baseline Stream Data Summary Bull Chute - UT 4B										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	3.1		5	6.9		3.9	4.6	5.3	5.3	1
Floodprone Width (ft)	9		14	18		20	50	35	35	1
Bankfull Mean Depth (ft)	0.2		0.3	0.4		0.3	0.3	0.3	0.3	1
Bankfull Max Depth (ft)	0.3		0.6	0.8		0.4	0.5	0.6	0.6	1
Bankfull Cross Sectional Area (ft^2)	1.2		1.2	1.2		1.3	1.3	1.6	1.6	1
Width/Depth Ratio	7.8		21.1	34.5		12	16	17.5	17.5	1
Entrenchment Ratio	1.3		3.6	5.8		5.1	11	6.6	6.6	1
Bank Height Ratio	**1.3**		**4.3**	**7.3**		**1**	**1.3**	1	1	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Cf 5					Ce 3/4		Ce 4		
Bankfull Discharge (cfs)	4.3					4.3		4.3		
Sinuosity (ft)	1.03					1.1		1.1		
Water Surface Slope (Channel) (ft/ft)	0.0359					0.0336		0.034		
Other										

Table 10A. Monitoring Data - Cross Section Morphology Monitoring Summary

(Bull Chute/ DMS:100137) UT 1

	UT 1 - Cross Section 1 (Riffle)							UT 1 - Cross Section 2 (Pool)							UT 1 - Cross Section 3 (Riffle)							UT 1 - Cross Section 4 (Pool)							UT 1 - Cross Section 5 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area	713.54							714.80							727.56							727.84							739.80						
Bank Height Ratio_Based on AB Bankfull [1] Area	1.00							1.00							1.00							1.00							1.00						
Thalweg Elevation	712.66							712.56							726.64							726.21							738.69						
LTOB [2] Elevation	713.54							714.80							727.56							727.84							739.80						
LTOB [2] Max Depth (ft)	0.88							2.24							0.91							1.64							1.11						
LTOB [2] Cross Sectional Area (ft^2)	5.7							11.7							5.5							9.4							8.1						

	UT 1 - Cross Section 6 (Pool)							UT 1 - Cross Section 7 (Riffle)							UT 1 - Cross Section 8 (Pool)							UT 1 - Cross Section 9 (Riffle)							UT 1 - Cross Section 10 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area	739.99							747.73							747.94							763.66							764.42						
Bank Height Ratio_Based on AB Bankfull [1] Area	1.00							1.00							1.00							1.00							1.00						
Thalweg Elevation	738.45							746.66							746.29							763.30							763.33						
LTOB [2] Elevation	739.99							747.73							747.94							763.66							764.42						
LTOB [2] Max Depth (ft)	1.54							1.07							1.65							0.36							1.09						
LTOB [2] Cross Sectional Area (ft^2)	12.0							6.9							10.3							1.3							6.3						

Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area							
Bank Height Ratio_Based on AB Bankfull [1] Area							
Thalweg Elevation							
LTOB [2] Elevation							
LTOB [2] Max Depth (ft)							
LTOB [2] Cross Sectional Area (ft^2)							

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankfull area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

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.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 10B. Monitoring Data - Cross Section Morphology Monitoring Summary

(Bull Chute/ DMS:100137) UT 3

	UT 3 - Cross Section 13 (Riffle)							UT 3 - Cross Section 14 (Pool)							UT 3 - Cross Section 15 (Pool)							UT 3 - Cross Section 16 (Riffle)							UT 3 - Cross Section 17 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area	722.63							722.98							734.17							734.92							763.55						
Bank Height Ratio_Based on AB Bankfull [1] Area	1.00							1.00							1.00							1.00							0.98						
Thalweg Elevation	721.62							720.98							732.78							733.97							762.51						
LTOB [2] Elevation	722.63							722.98							734.17							734.92							763.52						
LTOB [2] Max Depth (ft)	1.02							2.00							1.39							0.95							1.01						
LTOB [2] Cross Sectional Area (ft^2)	6.3							10.4							7.0							4.74							4.94						

	UT 3 - Cross Section 18 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area	763.85						
Bank Height Ratio_Based on AB Bankfull [1] Area	1.00						
Thalweg Elevation	762.31						
LTOB [2] Elevation	763.85						
LTOB [2] Max Depth (ft)	1.55						
LTOB [2] Cross Sectional Area (ft^2)	6.58						

Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area							
Bank Height Ratio_Based on AB Bankfull [1] Area							
Thalweg Elevation							
LTOB [2] Elevation							
LTOB [2] Max Depth (ft)							
LTOB [2] Cross Sectional Area (ft^2)							

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankfull area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

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.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 10C. Monitoring Data - Cross Section Morphology Monitoring Summary

(Bull Chute/ DMS:100137) UT 4

	UT 4 - Cross Section 11 (Pool)							UT 4 - Cross Section 12 (Riffle)							UT 4 - Cross Section 19 (Pool)							UT 4 - Cross Section 20 (Riffle)							UT 4 - Cross Section 21 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	714.76							715.38							732.43							733.76							750.00						
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00							1.00							1.00							1.00							1.00						
Thalweg Elevation	713.25							714.22							731.14							732.93							748.99						
LTOB[2] Elevation	714.76							715.38				`			732.43							733.76				`			750.00				`		
LTOB[2] Max Depth (ft)	1.51							1.16							1.29							0.84							1.00						
LTOB[2] Cross Sectional Area (ft^2)	7.9							8.5							6.7							5.2							5.7						

	UT 4 - Cross Section 22 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	750.27						
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00						
Thalweg Elevation	748.69						
LTOB[2] Elevation	750.27				`		
LTOB[2] Max Depth (ft)	1.58						
LTOB[2] Cross Sectional Area (ft^2)	8.3						

Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area							
Bank Height Ratio_Based on AB Bankfull[1] Area							
Thalweg Elevation							
LTOB[2] Elevation							
LTOB[2] Max Depth (ft)							
LTOB[2] Cross Sectional Area (ft^2)							

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

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.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 10D. Monitoring Data - Cross Section Morphology Monitoring Summary

(Bull Chute/ DMS:100137) UT 4A

	UT 4A - Cross Section 25 (Pool)							UT 4A - Cross Section 26 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area	758.11							758.57						
Bank Height Ratio_Based on AB Bankfull [1] Area	1.00							1.00						
Thalweg Elevation	757.29							757.79						
LTOB [2] Elevation	758.11							758.57						
LTOB [2] Max Depth (ft)	0.82							0.78						
LTOB [2] Cross Sectional Area (ft^2)	1.5							1.6						
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area														
Bank Height Ratio_Based on AB Bankfull [1] Area														
Thalweg Elevation														
LTOB [2] Elevation														
LTOB [2] Max Depth (ft)														
LTOB [2] Cross Sectional Area (ft^2)														
Bankfull Elevation (ft) - Based on AB-Bankfull [1] Area														
Bank Height Ratio_Based on AB Bankfull [1] Area														
Thalweg Elevation														
LTOB [2] Elevation														
LTOB [2] Max Depth (ft)														
LTOB [2] Cross Sectional Area (ft^2)														

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankfull area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

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.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 10E. Monitoring Data - Cross Section Morphology Monitoring Summary

(Bull Chute/ DMS:100137) UT 4B

	UT 4B - Cross Section 23 (Pool)							UT 4B - Cross Section 24 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	757.88							758.07						
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00							0.52						
Thalweg Elevation	756.83							757.50						
LTOB[2] Elevation	757.88							758.07				`		
LTOB[2] Max Depth (ft)	1.05							0.57						
LTOB[2] Cross Sectional Area (ft^2)	3.4							1.6						
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area														
Bank Height Ratio_Based on AB Bankfull[1] Area														
Thalweg Elevation														
LTOB[2] Elevation														
LTOB[2] Max Depth (ft)														
LTOB[2] Cross Sectional Area (ft^2)														
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area														
Bank Height Ratio_Based on AB Bankfull[1] Area														
Thalweg Elevation														
LTOB[2] Elevation														
LTOB[2] Max Depth (ft)														
LTOB[2] Cross Sectional Area (ft^2)														

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

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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.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Appendix D
Hydrologic Data

Groundwater Gauge Soil Profiles

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 1 (35.831389, -79.887733)**

Investigator: W. Grant Lewis

Soil Series: Wynott-Enon Complex

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-20	10 YR 4/2	70	10 YR 4/3	30	C	M	sandy clay loam

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 2 (35.832431, -79.885531)**

Investigator: W. Grant Lewis

Soil Series: Wynott-Enon Complex

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-2	10 YR 4/1	100					sandy clay loam
2-12	10 YR 5/1	95	10 YR 4/6	5	C	M	sandy clay loam
12-20	10 YR 4/3	90	10 YR 6/2	5	D	M	clay loam
			10YR 3/3	5	C	M	
20+	10YR 5/1	95	10 YR 4/6	5	C	M	sandy clay loam

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 3 (35.835164, -79.882049)**

Investigator: W. Grant Lewis

Soil Series: Wynott-Enon Complex

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-10	10 YR 5/1	95	10 YR 4/1	5	C	M	sandy clay loam
10-18	10 YR 6/2	90	10 YR 5/4	10	C	M	sandy clay loam
18-20	10 YR 5/1	90	10 YR 4/5	10	D	M	sandy clay loam
20+	Gley 6/1	95	10 YR 4/5	5	D	M	sandy clay loam

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

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919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 4 (35.836123, -79.881328)**

Investigator: W. Grant Lewis

Soil Series: Mecklenburg Clay Loam

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-9	10 YR 4/2	95	10 YR 5/4	5	C	M	loam
9-14	10 YR 4/2	90	10 YR 5/4	5	C	M	loam
			10 YR 3/2	5	C	M	
14-20	10 YR 5/1	60	10 YR 3/2	20	C	M	clay loam
			Gley 6/1	20			
20+	10 YR 6/1	85	10 YR 4/6	10	D	M	clay
			Gley 6/1	5	C	M	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

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218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 5 (35.833120, -79.888360)**

Investigator: W. Grant Lewis

Soil Series: Wynott-Enon Complex

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-10	10 YR 4/1	98	10 YR 4/6	2	C	M	loam
10+	Gley 1 3/104	100					clay loam

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/ Coordinates: **Soil Profile GW 6 (35.836651, -79.886569)**

Investigator: W. Grant Lewis

Soil Series: Wynott-Enon Complex

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-3	10 YR 5/1	100					sandy clay loam
3-15	10 YR 5/1	70	10 YR 6/1	20	C	M	sandy clay loam
			10 YR 5/6	10	C	M	
15-22	10 YR 7/1	60	10 YR 5/6	30	D	M	clay
			10 YR 5/1	10	C	M	
22+	10 YR 4/6	90	10 YR 5/1	10	D	M	clay

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 7 (35.833712, -79.889062)**

Investigator: W. Grant Lewis

Soil Series: Mecklenburg clay loam

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-3	10 YR 5/4	100					loam
3-12	10 YR 4/2	80	10 YR 5/6	20	C	M	loam
12-18	10 YR 4/1	95	10 YR 4/6	5	C	M	clay loam
18+	Gley 1 5/104	95	10 YR 4/6	5	C	M	clay loam

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

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Number: 1233

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Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 8 (35.834751, -79.889586)**

Investigator: W. Grant Lewis

Soil Series: Mecklenburg clay loam

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-12	10 YR 4/2	95	10 YR 4/4	5	C	M	sandy clay loam
12-20	10 YR 5/1	80	10 YR 4/3	15	C	M	clay loam
			10 YR 3/2	5	C	M	
20+	10 YR 6/1	90	10 YR 5/4	5	C	M	clay
			10 YR 4/6	5	D	M	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

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218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 9 (35.836685, -79.890433)**

Investigator: W. Grant Lewis

Soil Series: Mecklenburg loam

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-10	10 YR 5/1	95	10 YR 5/6	5	C	M	clay loam
10+	10 YR 6/5	90	10 YR 5/1	5	C	M	clay
			10 YR 5/4	5	C	M	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

AXIOM ENVIRONMENTAL, INC
218 Snow Avenue
Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

SOIL BORING LOG

Date: 4/4/2022

Project/Site: Bull Chute

County, State: Randolph County, NC

Sampling Point/
Coordinates: **Soil Profile GW 10 (35.837255, -79.889980)**

Investigator: W. Grant Lewis

Soil Series: Mecklenburg loam

Notes: Location is shown on Figure 4.

Depth (inches)	Matrix		Mottling				Texture
	Color	%	Color	%	Type	Location	
0-13	10 YR 5/1	95	10 YR 5/6	5	C	M	loam
13-22	Gley 6/5GY	70	10 YR 4/6	30	D	M	loam
22+	10 YR 6/1	90	10 YR 4/6	10	D	M	clay

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

Appendix E
Project Timeline and Contact Info

Table 11. Project Timeline
Table 12. Project Contacts

Table 11. Project Timeline

Activity or Deliverable	Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted	NA	Nov-19
Mitigation Plan Approved	NA	13-May-21
Construction (Grading) Completed	NA	8-Mar-22
Planting Completed	NA	18-Mar-22
As-built Survey Completed	Jun-22	Jun-22
MY-0 Baseline Report	May-22	Jul-22
MY1+ Monitoring Reports		
Remediation Items (e.g. beaver removal, supplements, repairs etc.)		
Encroachment		

Table 12. Project Contacts

Project Name/Number	
Provider	Clearwater Mitigation Solutions 604 Macon Pl. Raleigh, NC 27609
Mitigation Provider POC	Kevin Yates 919-624-6901
Designer	Axiom Environmental, Inc. 218 Snow Ave Raleigh, NC 27603
Primary project design POC	Grant Lewis 919-215-1693
Construction Contractor	KBS Earthworks, Inc. 5616 Coble Church Rd Julian, NC 27283
	Kory Strader 336-362-0289

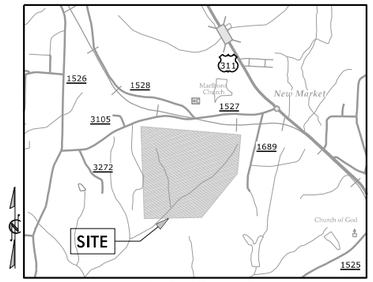
Appendix F
Record Drawings (As-Built Survey)

NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
AS–BUILT PLANS
BULL CHUTE SITE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BULL CHUTE SITE	1	

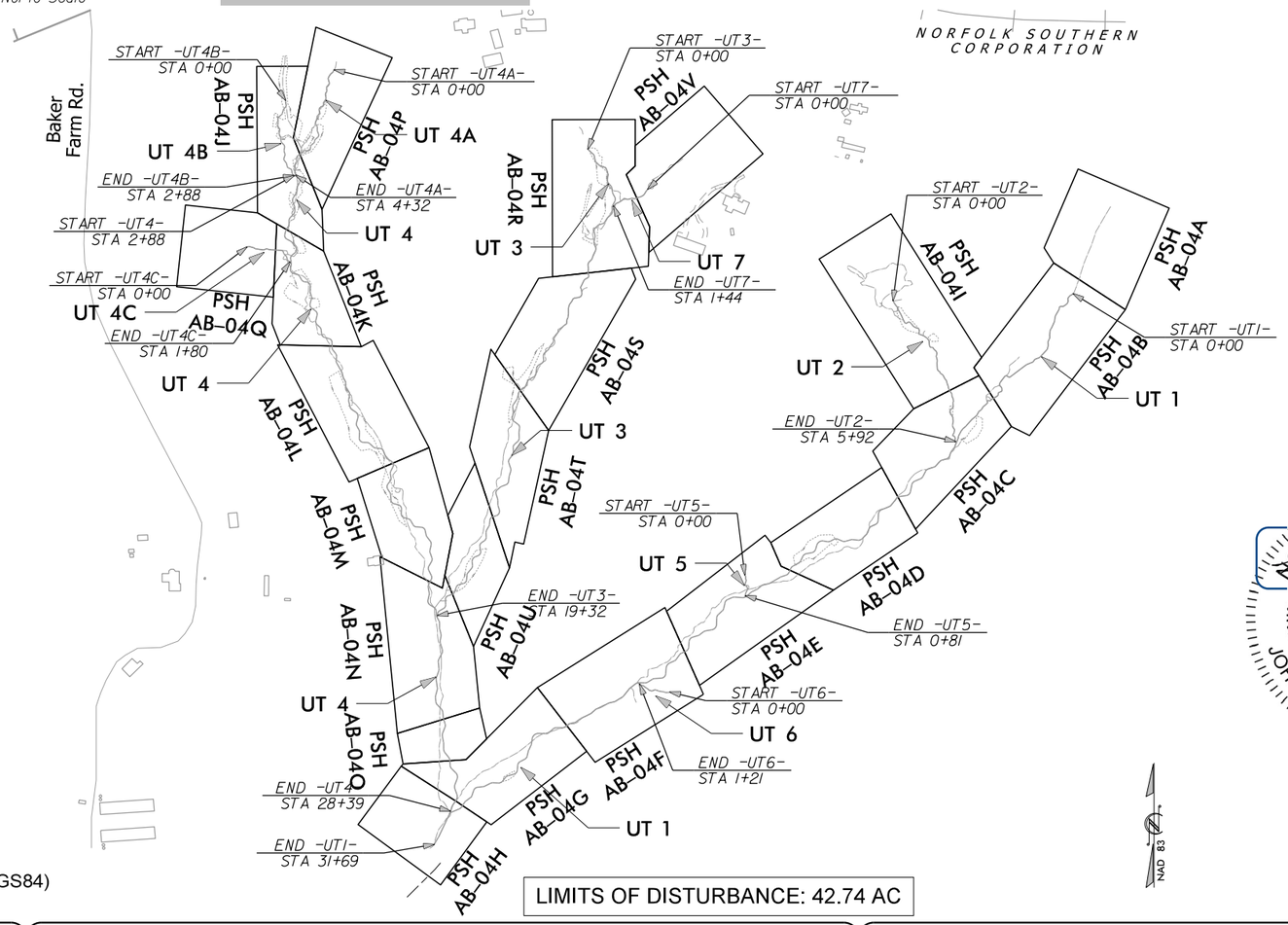
LOCATION: RANDOLPH COUNTY, NORTH CAROLINA

TYPE OF WORK: STREAM RESTORATION AND ENHANCEMENT (CLEARING, GRUBBING, GRADING, EROSION CONTROL AND PLANTING)



VICINITY MAP
Not to Scale

RECORD DRAWING



BULL CHUTE SITE

SITE #: 100137
YADKIN 03040105
RANDOLPH COUNTY
CONTRACT#: 7878-01
LATITUDE: 35.8325
LONGITUDE: -79.8879 (WGS84)

LIMITS OF DISTURBANCE: 42.74 AC

INDEX OF SHEETS

SURVEYORS CERTIFICATION(S)

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground utilities or any other features above, or below ground other than those shown. However, no visible evidence of cemeteries or utilities, aboveground or otherwise, was observed by the undersigned (other than those shown).

I certify that the survey is of an existing parcel or parcels of land or one or more existing easements and does not create a new street or change an existing street.

I JOHN A. RUDOLPH , certify that this plat was prepared under my supervision from an actual field survey made under my supervision, of as-built conditions.

That the boundaries not surveyed are clearly indicated as such and were plotted from information as referenced hereon; That the ratio of precision as calculated was 1:7,500+ and that the global navigational satellite system (GNSS) was used to perform this survey and the following information was used:
Class of Survey: CLASS B (HORIZONTAL) CLASS B (VERTICAL)
Positional Accuracy: 0.12 feet (HORIZONTAL)
Type of GPS field procedure: RTK
Dates of survey: May and June 2022
Datum/Epoch: NAD 1983(2011)
Published/Fixed Control Use: OPUS
Geoid Model: 2012B CONUS
Combined Grid Factor: 0.99995565 GROUND TO GRID
Units: US SURVEY FEET

That this plat meets the requirements of the standards of practice for land surveying in North Carolina. Witness my hand and seal this 12th day of July , 2022.

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH
DocuSigned by: A7CBB30246D54EC...

7/26/2022
Professional Land Surveyor — L-4194 License Number

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 5
PROFILE (VERTICAL)

PROPOSED LENGTH OF -UT 1- = 3169	PROPOSED LENGTH OF -UT 4B- = 288
PROPOSED LENGTH OF -UT 2- = 592	PROPOSED LENGTH OF -UT 4C- = 180
PROPOSED LENGTH OF -UT 3- = 1932	PROPOSED LENGTH OF -UT 5- = 81
PROPOSED LENGTH OF -UT 4- = 2555	PROPOSED LENGTH OF -UT 6- = 121
PROPOSED LENGTH OF -UT 4A- = 432	PROPOSED LENGTH OF -UT 7- = 144

TOTAL STREAM LENGTHS (LF) = 9494

RESTORATION LEVEL	STREAM (linear footage)	RIPARIAN WETLAND (acreage)	NONRIPARIAN WETLAND (acreage)
RESTORATION	6937	3.130 (Reestablishment)	0.000
ENHANCEMENT I	411	0.114 (Rehabilitation)	0.000
ENHANCEMENT II	333	1.4662 (Enhancement)	0.000
ENHANCEMENT III	50	0.000	0.000
TOTALS	7731	4.710	0.000

Axiom Environmental, Inc.
Axiom Environmental
218 Snow Ave
Raleigh, NC 27603
GRANT LEWIS
PROJECT DESIGNER

CLEARWATER MITIGATION SOLUTIONS
Clearwater Mitigation Solutions
604 Macon Place
Raleigh, NC 27609
KEVIN YATES
SITE CONSTRUCTION MANAGER

Prepared in the Office of:
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890
JOSHUA G. DALTON, P.E.
PROJECT ENGINEER

DocuSigned by: Josh Dalton 1089AD8C14994C3...
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON
7/26/2022
DATE:

CONTRACT: BULL CHUTE SITE

7/26/2022
Bull Chute_psh_AB-01.dgn
jharvey

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

RECORD DRAWING

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Fence Gate
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point

- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Conservation Easement — CE
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.
- Riffle Rip Rap
- Log Vane
- Log Cross Vane
- Step Pool Structure — Begin / End
- Stream Plug
- Floodplain Interceptor
- Proposed Fence
- Limits of Disturbance — LOD

AS-BUILT:

- Stream Centerline
- Stream Top of Bank
- Stream Gauge
- Groundwater Gauge — #
- Benthic & Water Quality Station — 1
- Origin Point on CVS Plots
- CVS Plots — #
- Cross Section — XS-10R
- Adjusted Stream Structure
- Not Constructed

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.1563
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

SYMBOLOGY

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-02

7/26/2022
Bull Chute_PSH_AB-02.dgn
harveu

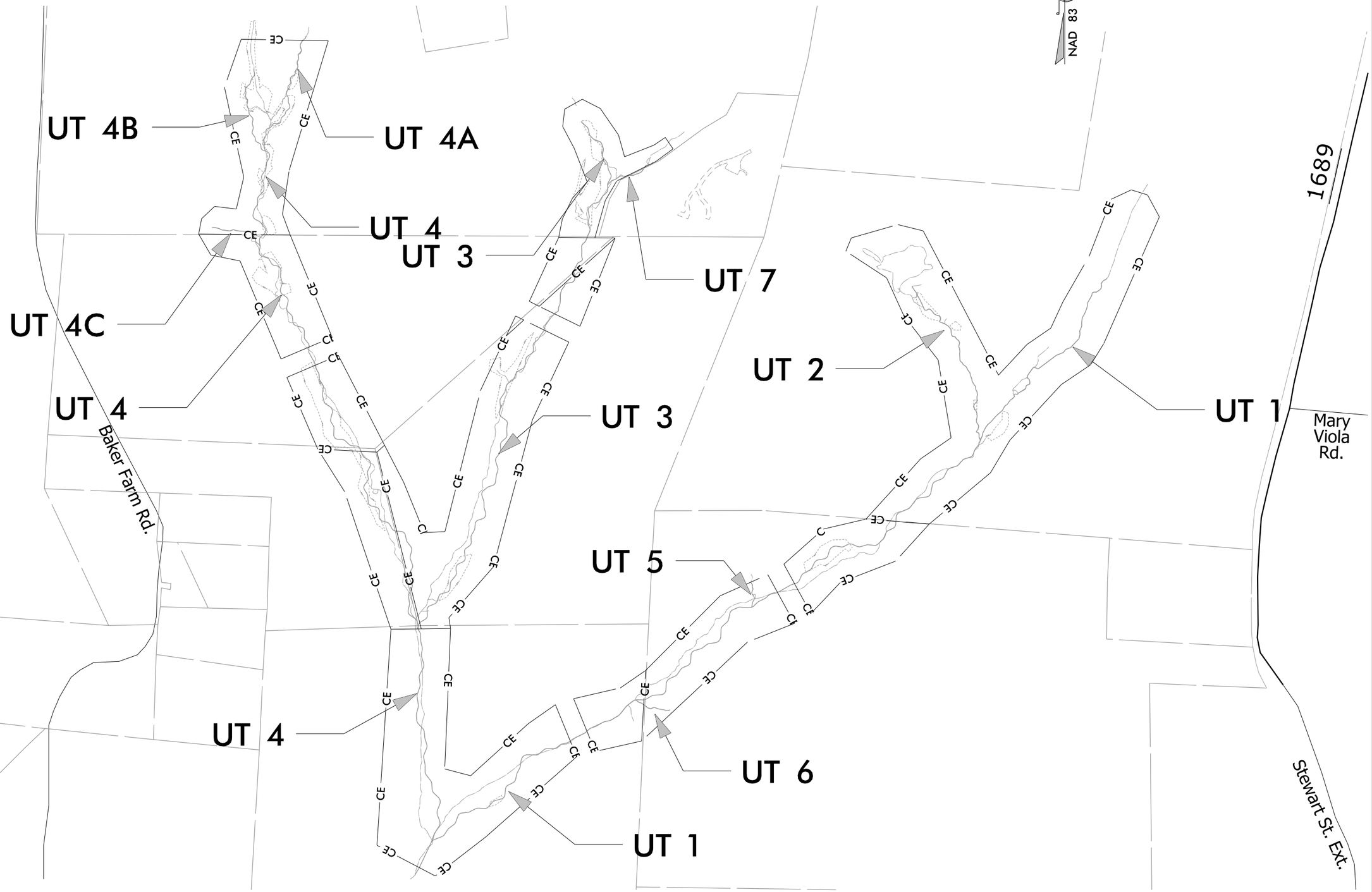
RECORD DRAWING

CONSERVATION EASEMENT —— CE ——

SURVEY INFORMATION
EASEMENT PROVIDED BY:
K2 DESIGN GROUP, P.A.
5688 U.S. HIGHWAY 70 EAST
GOLDSBORO, NC 27534

150′ 75′ 0 150′ 300′
SCALE: 1″ = 300′

NAD 83



SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.851.1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

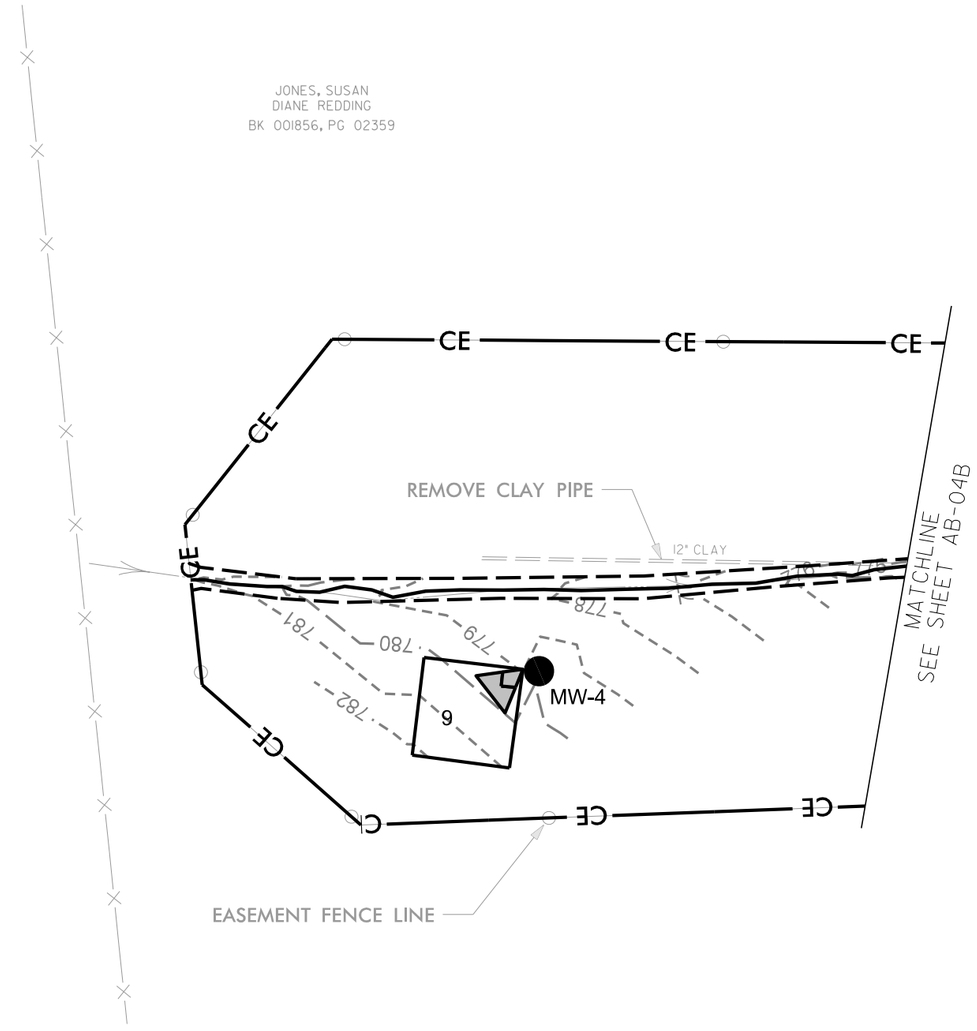
BULL CHUTE
RANDOLPH COUNTY, NC

EASEMENT

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–03

7/26/2022
Bull Chute_PSH_AB-03.dgn
jharvell



25' 12.5' 0 25' 50'

SCALE: 1" = 50'

NAD 83

RECORD DRAWING

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/26/2022

DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.0513
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :

DRAWING NAME:

DATE: 2022

DRAWN BY: JRH

REVIEWED BY: JGD

REVISIONS:

SHEET NO.
AB-04A

7/26/2022
Bull Chute_PSH_AB-04A.dgn
jharvell

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SCALE: 1" = 50'

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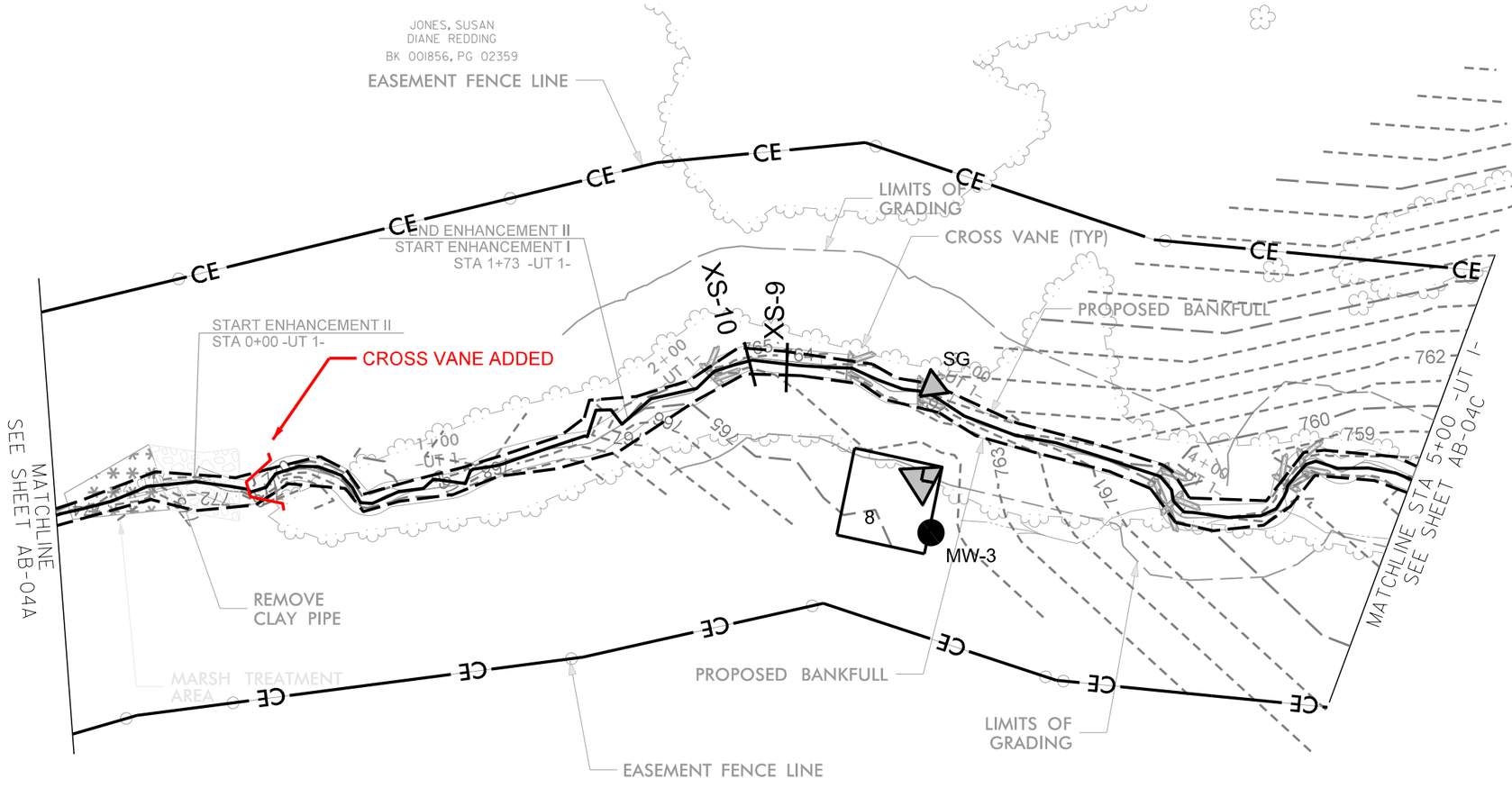

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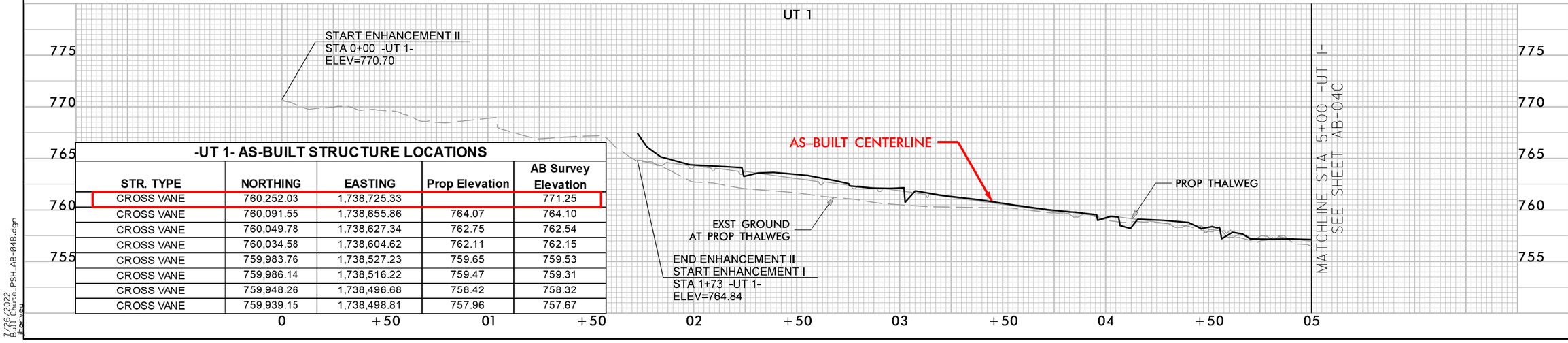
VERTICAL DATUM: NAVD 1988

DocuSigned by:
Josh Dalton
1089AD8C1494E3...

NORTH CAROLINA
PROFESSIONAL
SEAL
26971
ENGINEER
JOSHUA G. DALTON

7/26/2022
DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,252.03	1,738,725.33		771.25
CROSS VANE	760,091.55	1,738,655.86	764.07	764.10
CROSS VANE	760,049.78	1,738,627.34	762.75	762.54
CROSS VANE	760,034.58	1,738,604.62	762.11	762.15
CROSS VANE	759,983.76	1,738,527.23	759.65	759.53
CROSS VANE	759,986.14	1,738,516.22	759.47	759.31
CROSS VANE	759,948.26	1,738,496.68	758.42	758.32
CROSS VANE	759,939.15	1,738,498.81	757.96	757.67

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL 919.859.0523
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04B

7/26/2022
Bull Chute_PSH_AB-04B.dgn
jharvell

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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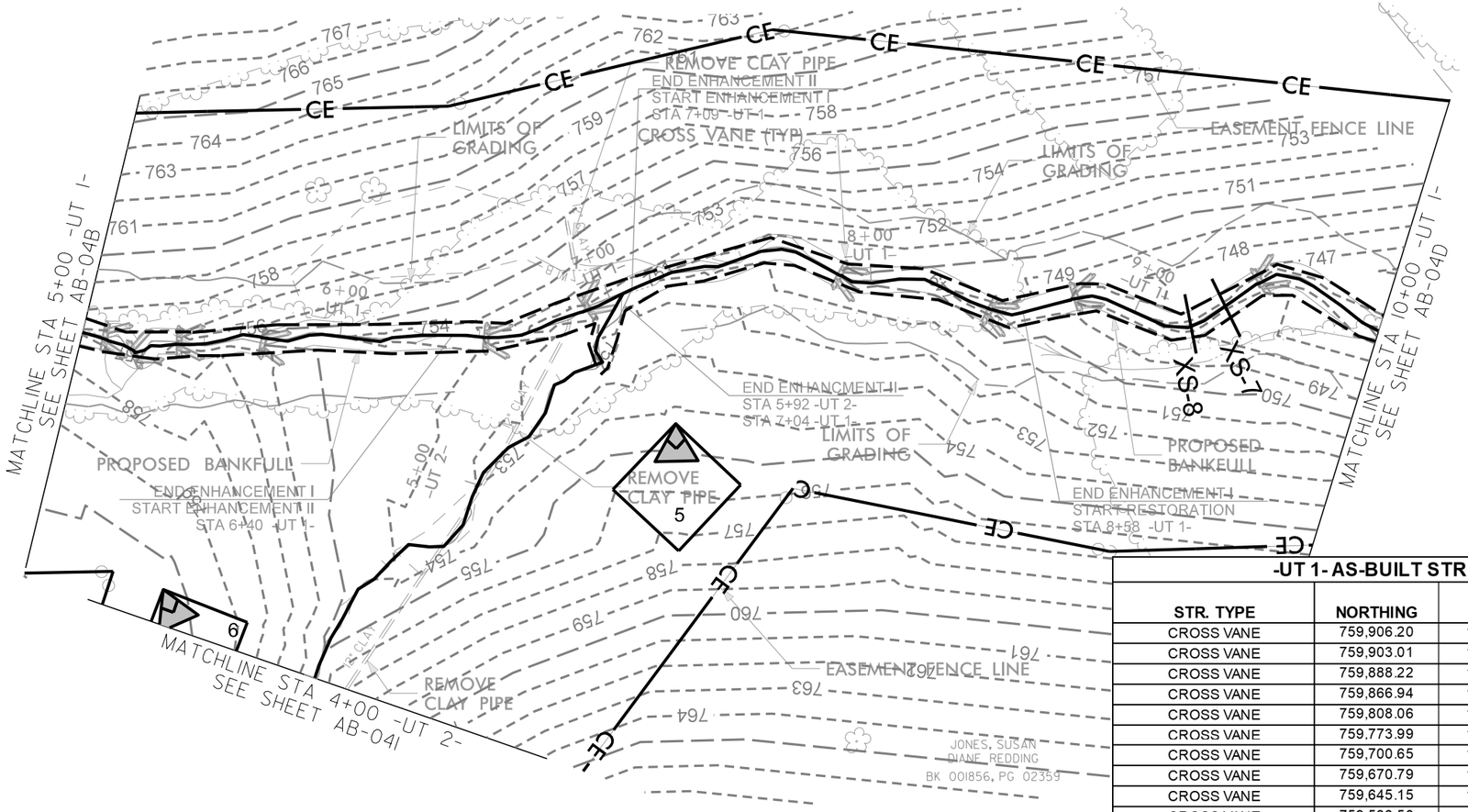
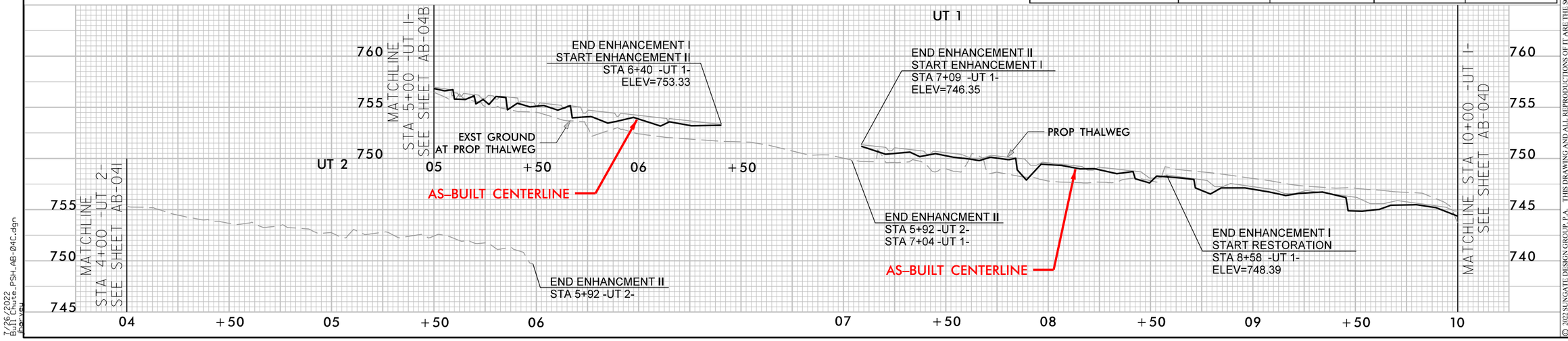
SCALE: 1″ = 50′

RECORD DRAWING



-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,906.20	1,738,462.97	756.73	756.73
CROSS VANE	759,903.01	1,738,451.12	756.20	756.13
CROSS VANE	759,888.22	1,738,443.24	755.90	755.96
CROSS VANE	759,866.94	1,738,421.87	755.03	755.17
CROSS VANE	759,808.06	1,738,367.26	753.07	753.34
CROSS VANE	759,773.99	1,738,350.14	752.00	751.27
CROSS VANE	759,700.65	1,738,295.33	749.94	750.02
CROSS VANE	759,670.79	1,738,248.75	748.69	748.73
CROSS VANE	759,645.15	1,738,230.62	747.85	747.95
CROSS VANE	759,593.50	1,738,188.44	746.19	746.18



DocuSigned by: Josh Dalton 1889AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/26/2022

DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.1353
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

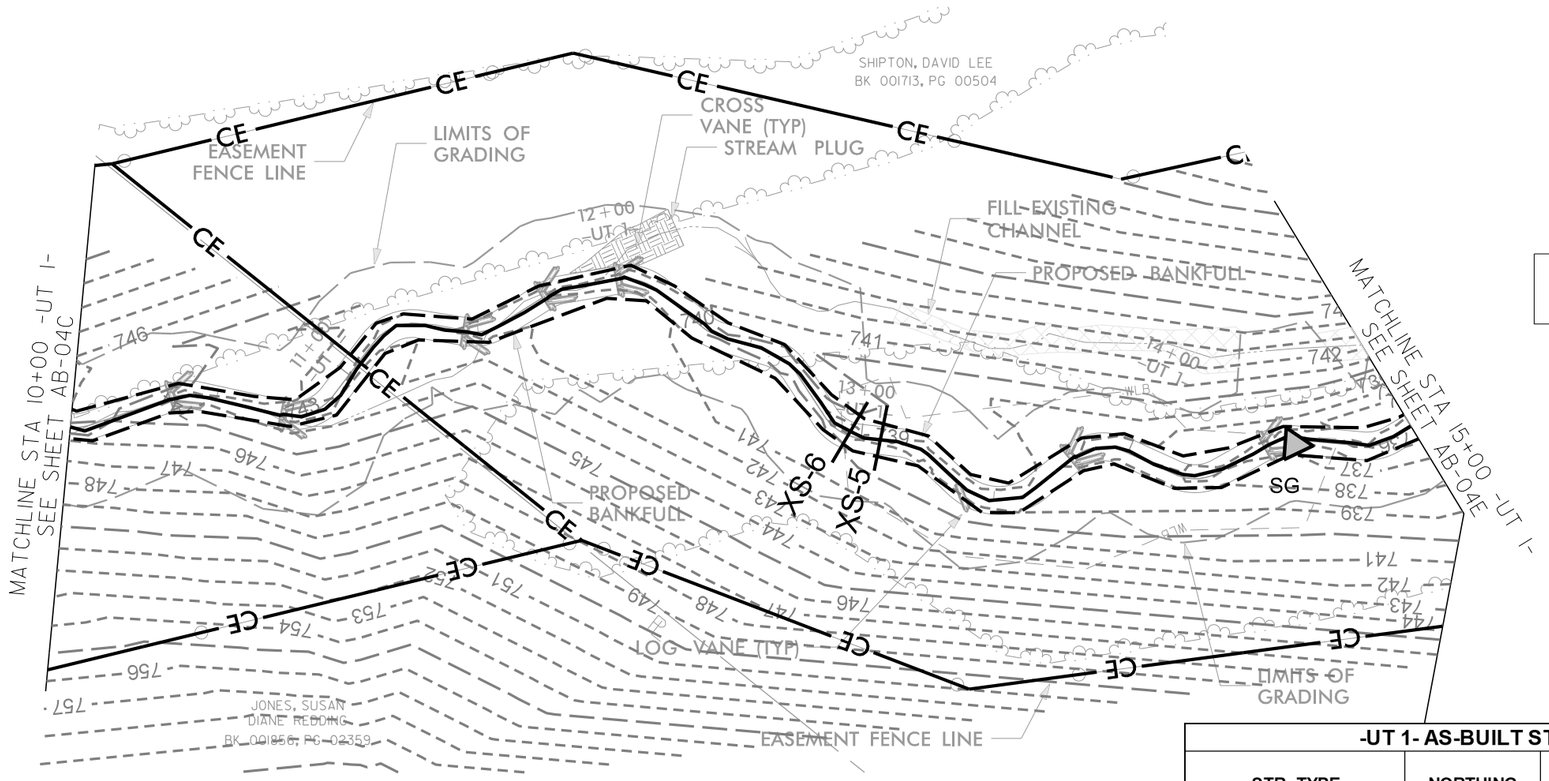
SHEET NO.
AB–04C

7/26/2022
Bull Chute_PSH_AB-04C.dgn
Darren

25' 12.5' 0 25' 50'
SCALE: 1" = 50'

RECORD DRAWING

NAD 83



DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA
PROFESSIONAL
SEAL
26971
ENGINEER
JOSHUA G. DALTON

7/26/2022

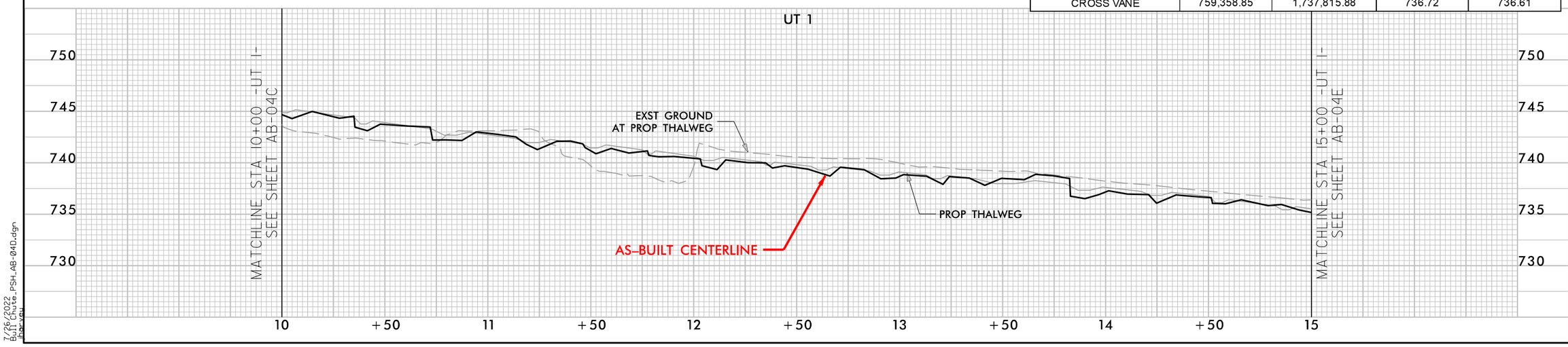
DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,548.37	1,738,123.70	744.37	744.53
CROSS VANE	759,532.46	1,738,090.18	743.28	743.47
CROSS VANE	759,476.12	1,738,055.80	741.84	741.84
CROSS VANE	759,451.74	1,738,040.70	741.25	741.16
CROSS VANE	759,433.59	1,738,023.53	740.63	740.38
LOG VANE	759,426.58	1,737,893.32	738.45	738.37
CROSS VANE	759,398.10	1,737,866.61	737.94	738.47
CROSS VANE	759,358.85	1,737,815.88	736.72	736.61



SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.851.1444
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04D

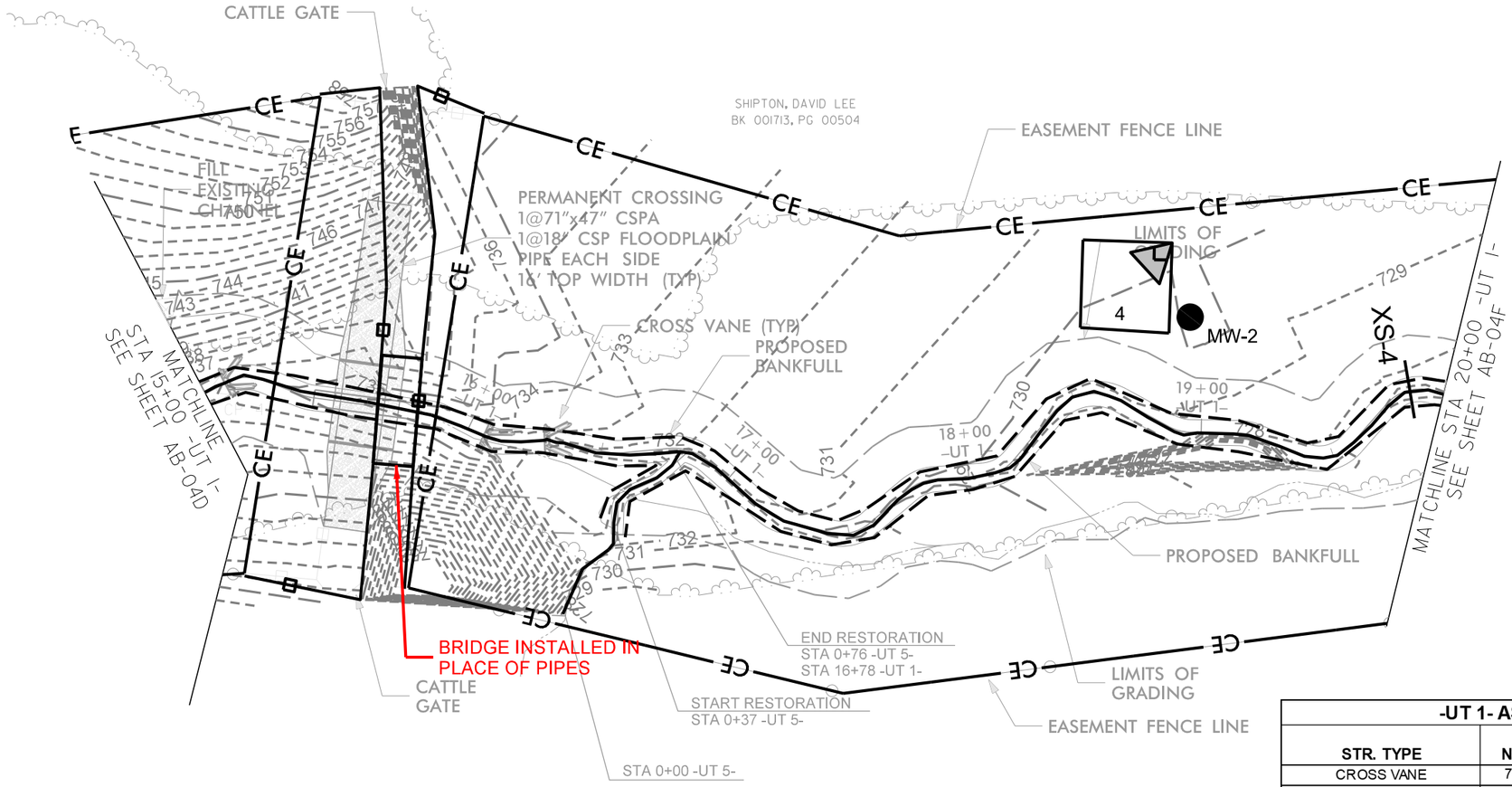
7/26/2022
Bull Chute_PSH_AB-04D.dgn
jharvey

25′ 12.5′ 0 25′ 50′

SCALE: 1″ = 50′

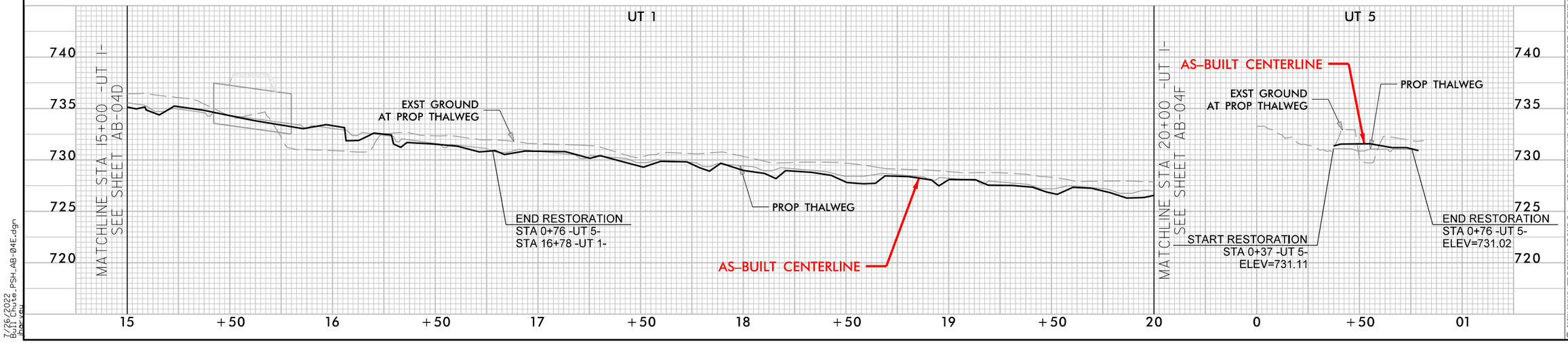
RECORD DRAWING

NAD 83



-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,318.86	1,737,775.95	735.28	735.16
CROSS VANE	759,277.20	1,737,689.03	732.84	733.14
CROSS VANE	759,264.29	1,737,670.60	732.23	732.43



DocuSigned by:
Josh Dalton
1089AD8C1494C3...

NORTH CAROLINA
PROFESSIONAL
SEAL
26971
ENGINEER
JOSHUA G. DALTON

7/26/2022
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HORIZONTAL DATUM: NAD 83 (2011)
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PH: 919.859.1353
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

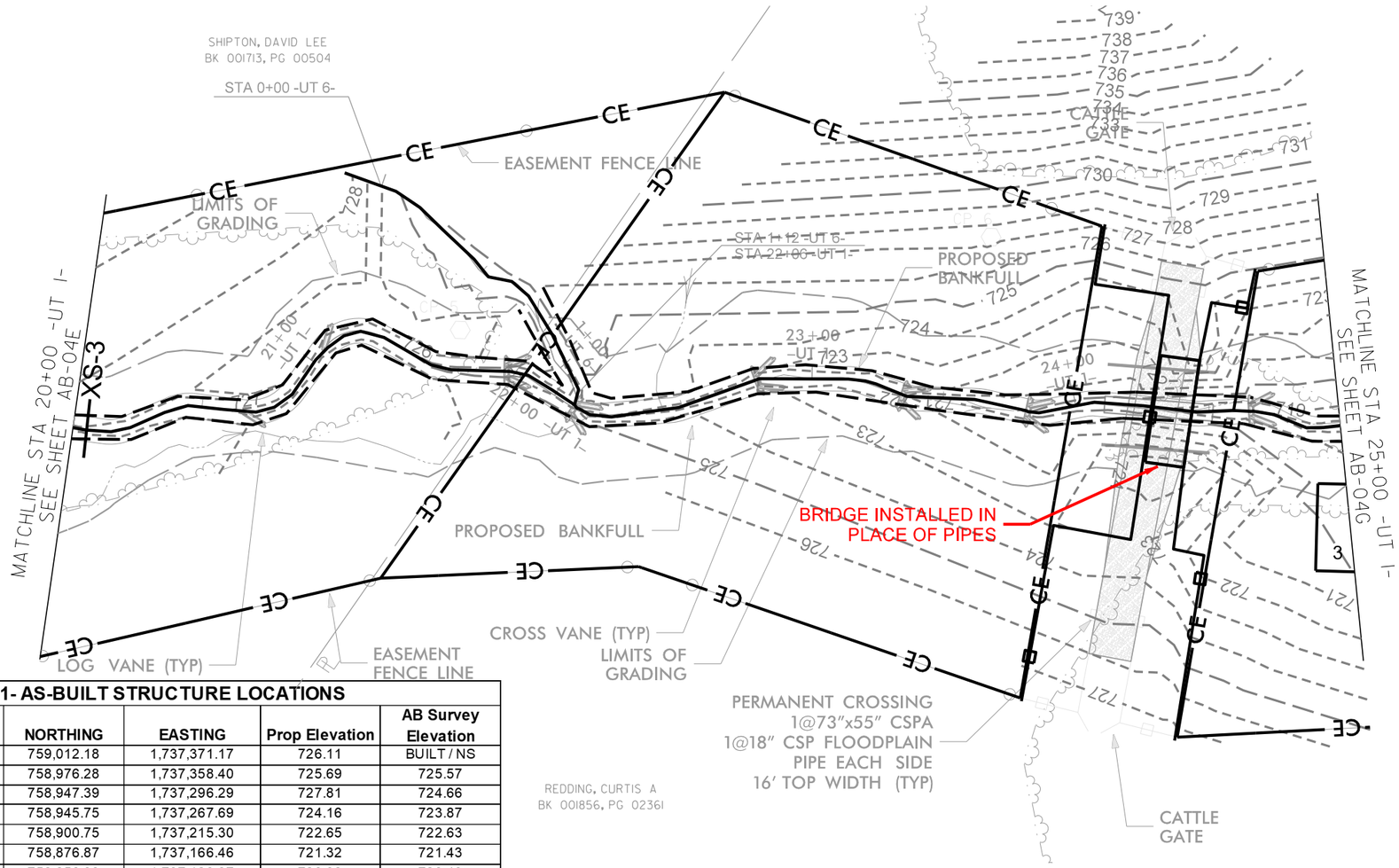
AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04E

7/26/2022
Bull Chute_PSH_AB-04E.dgn
Josh Dalton

RECORD DRAWING



25' 12.5' 0 25' 50'
SCALE: 1" = 50'

NAD 83

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Josh Dalton
1089A98C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA C. DALTON

7/26/2022

DATE:

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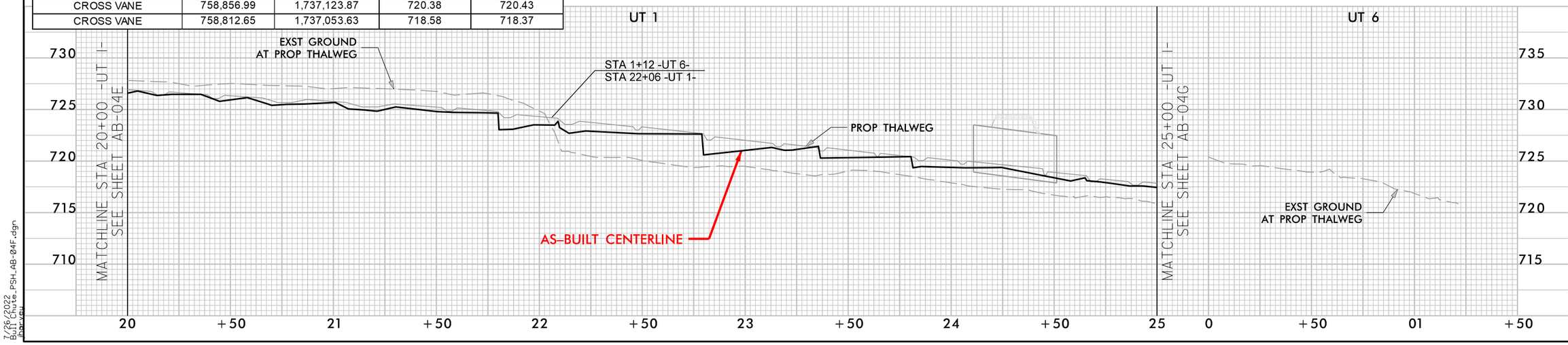
HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
LOG VANE	759,012.18	1,737,371.17	726.11	BUILT / NS
LOG VANE	758,976.28	1,737,358.40	725.69	725.57
CROSS VANE	758,947.39	1,737,296.29	727.81	724.66
CROSS VANE	758,945.75	1,737,267.69	724.16	723.87
CROSS VANE	758,900.75	1,737,215.30	722.65	722.63
CROSS VANE	758,876.87	1,737,166.46	721.32	721.43
CROSS VANE	758,856.99	1,737,123.87	720.38	720.43
CROSS VANE	758,812.65	1,737,053.63	718.58	718.37



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PH: 919.859.1353
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Axiom Environmental, Inc.

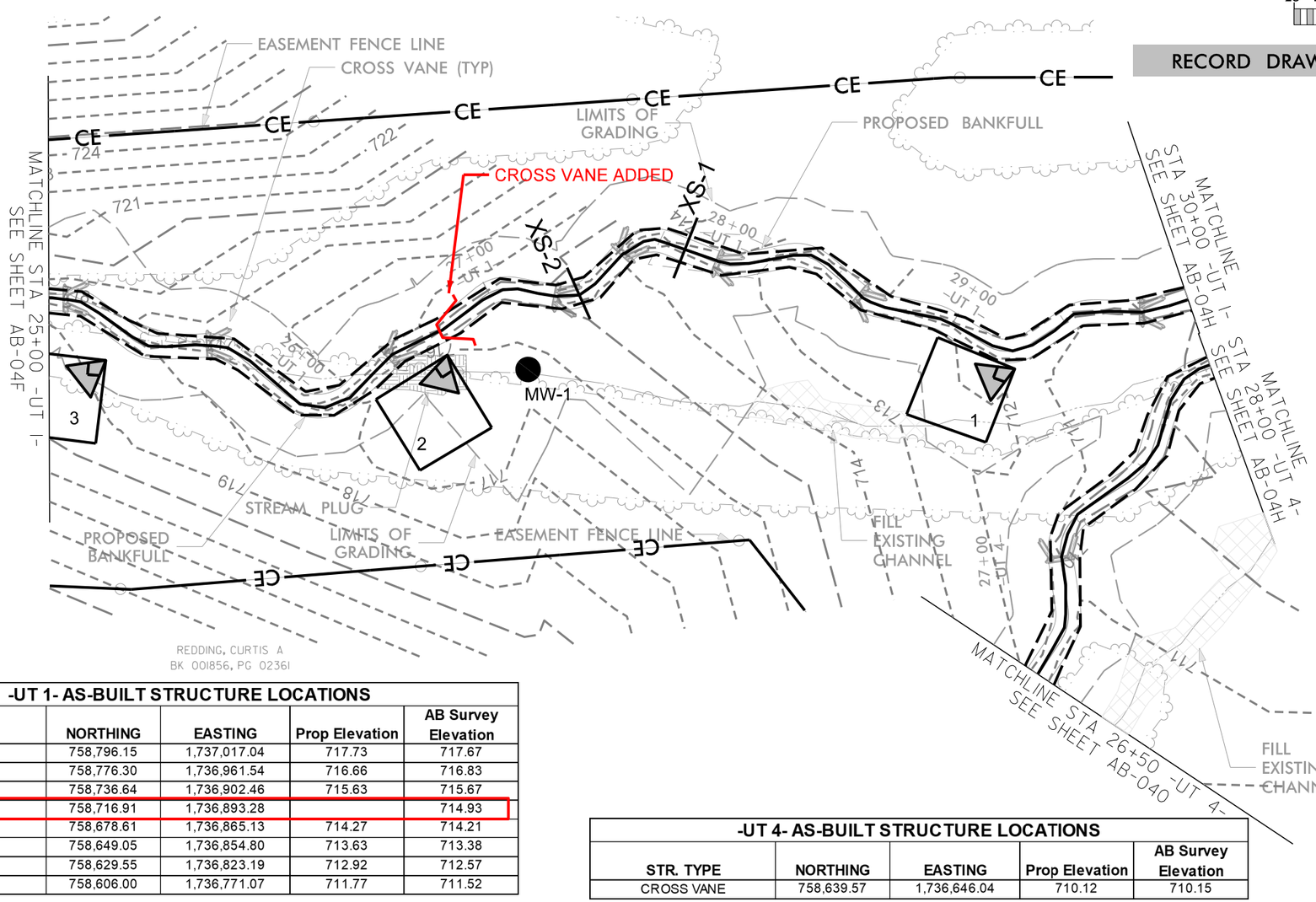
BULL CHUTE
RANDOLPH COUNTY, NC

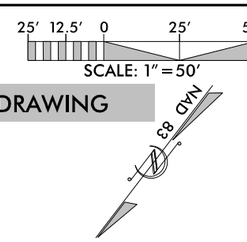
AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04F

7/26/2022
Bull Chute_PSH_AB-04F.dgn
Barrow





RECORD DRAWING

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7/26/2022

DATE:

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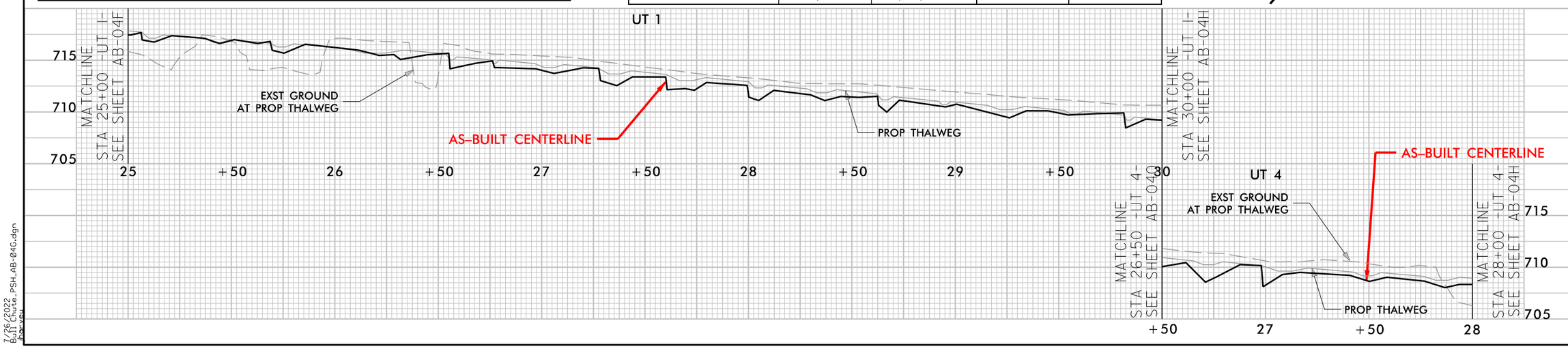
HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	758,796.15	1,737,017.04	717.73	717.67
CROSS VANE	758,776.30	1,736,961.54	716.66	716.83
CROSS VANE	758,736.64	1,736,902.46	715.63	715.67
CROSS VANE	758,716.91	1,736,893.28		714.93
CROSS VANE	758,678.61	1,736,865.13	714.27	714.21
CROSS VANE	758,649.05	1,736,854.80	713.63	713.38
CROSS VANE	758,629.55	1,736,823.19	712.92	712.57
CROSS VANE	758,606.00	1,736,771.07	711.77	711.52

-UT 4- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	758,639.57	1,736,646.04	710.12	710.15



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PH: (919) 859-0515
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

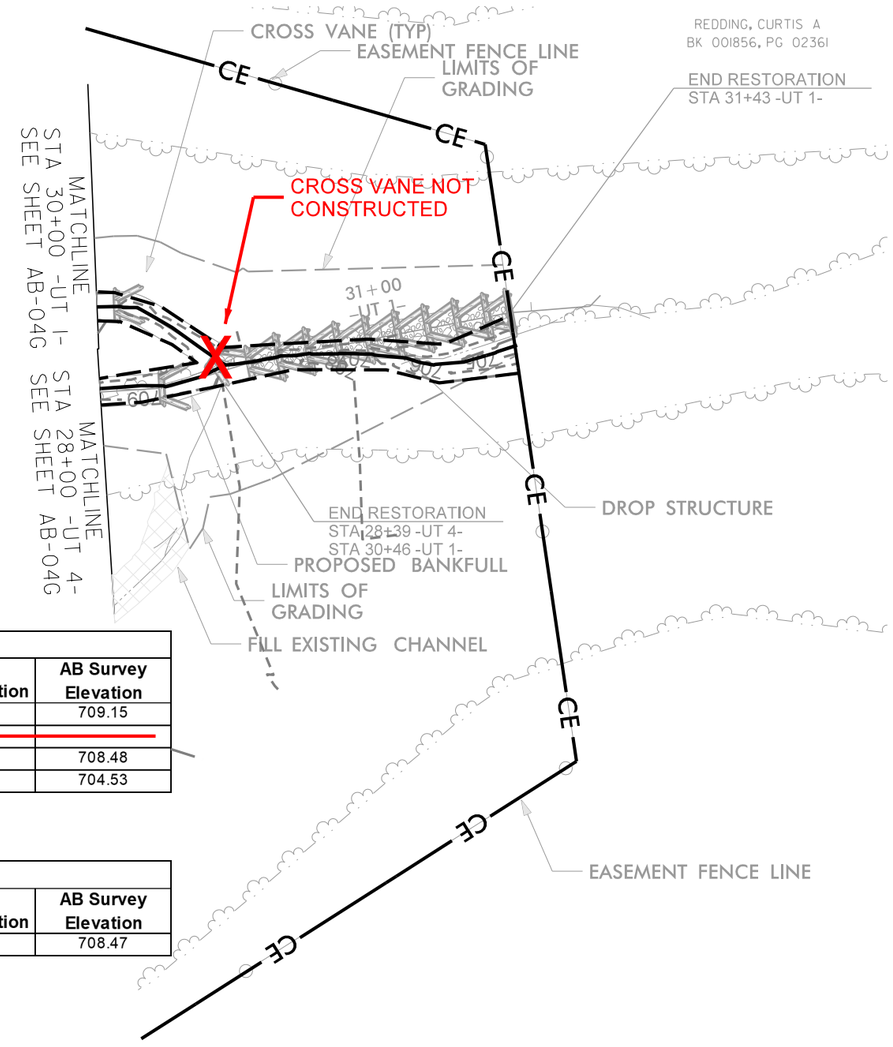
BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04G

7/26/2022
Bull Chute_PSH_AB-04G.dgn
jharvell



25' 12.5' 0 25' 50'
SCALE: 1" = 50'

NAD 83

RECORD DRAWING

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Josh Dalton
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NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/26/2022
DATE:

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HORIZONTAL DATUM: NAD 83 (2011)
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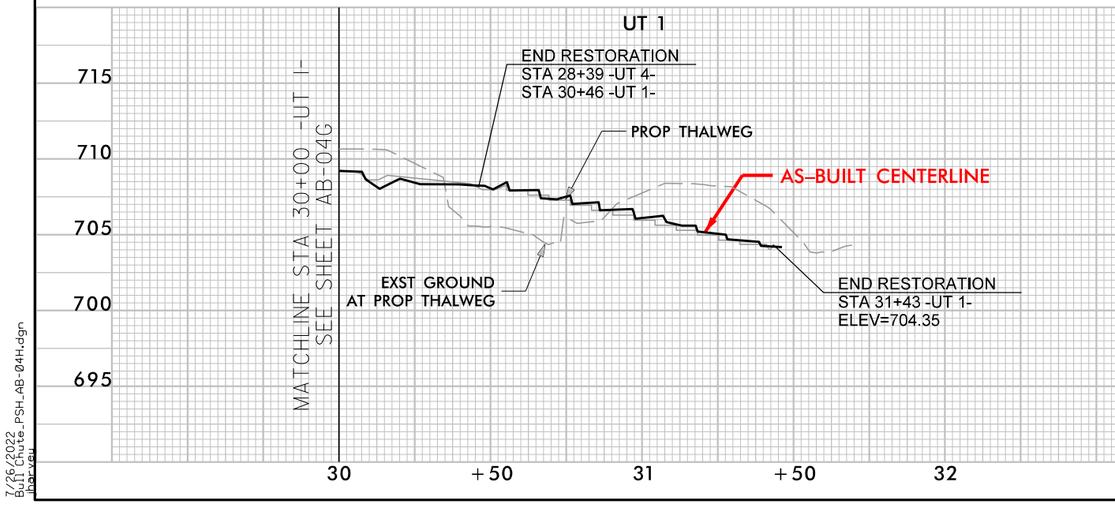
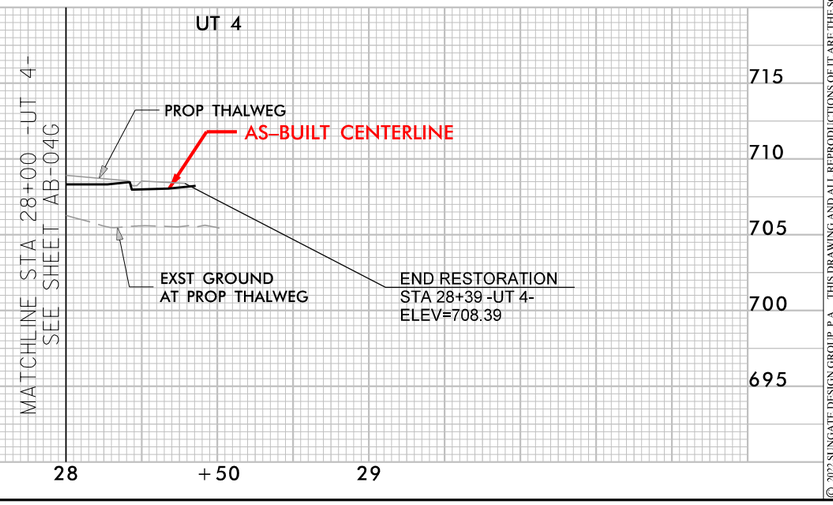
-UT 1- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	758,523.24	1,736,664.87	709.12	709.15
~~CROSS VANE~~	~~758,506.99~~	~~1,736,632.20~~	~~708.37~~	
DROP STRUCTURE	758,499.00	1,736,623.75	708.27	708.48
DROP STRUCTURE	758,419.84	1,736,586.29	704.36	704.53

-UT 4- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	758,527.25	1,736,634.01	708.56	708.47





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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04H

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jharvell

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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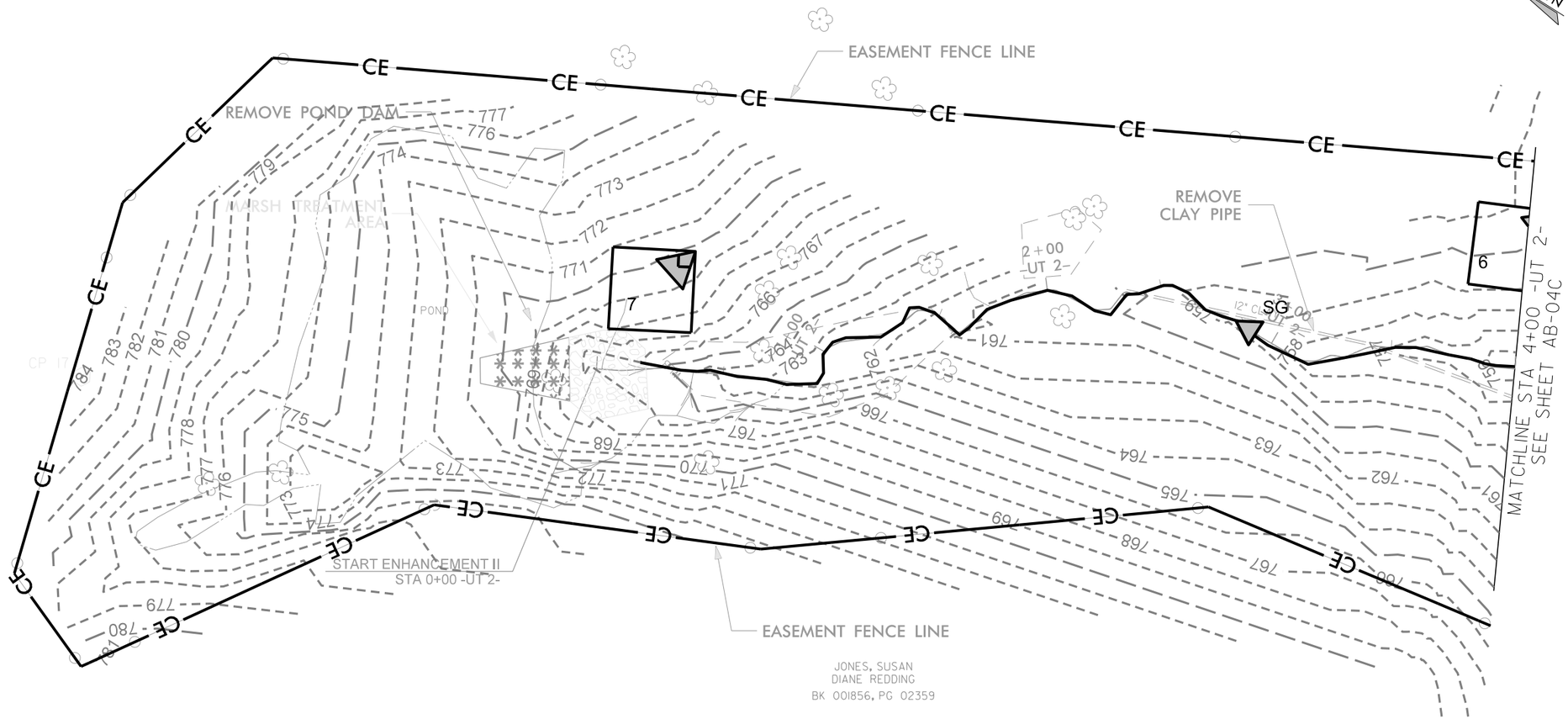
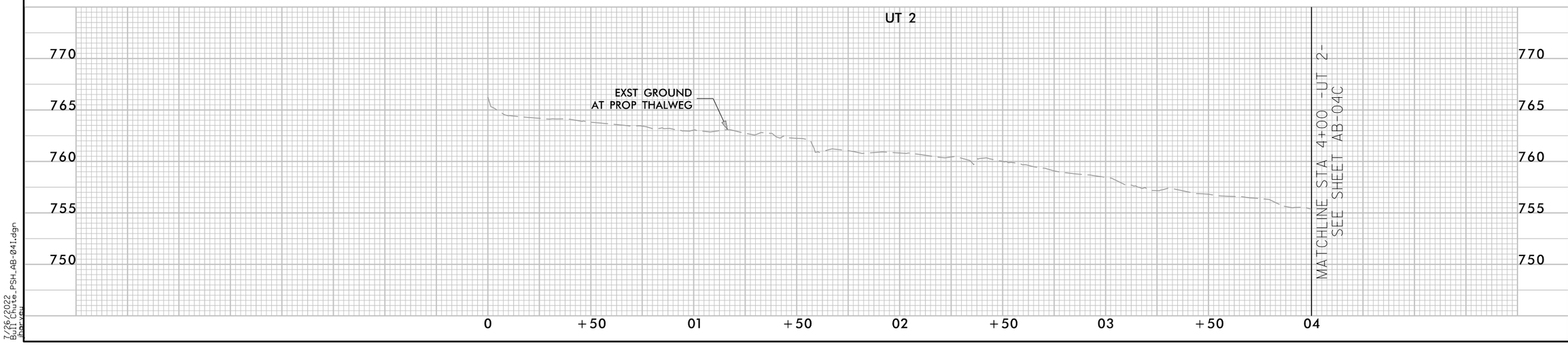
SCALE: 1" = 50'

RECORD DRAWING

NAD 83





DocuSigned by:
Josh Dalton
1089AD8C14094C8...

NORTH CAROLINA
PROFESSIONAL
SEAL
26971
ENGINEER
JOSHUA C. DALTON

7/26/2022

DATE:

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BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :	
DRAWING NAME:	
DATE:	2022
DRAWN BY:	JRH
REVIEWED BY:	JGD
REVISIONS:	
SHEET NO.	***AB–04I***

7/26/2022
Bull Chute_PSH_AB-041.dgn
Jarvau

-UT 4- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,907.01	1,736,070.30	761.77	761.92
CROSS VANE	760,848.88	1,736,043.28	760.27	BUILT / NS
CROSS VANE	760,838.72	1,736,042.06	759.78	759.84
CROSS VANE	760,824.39	1,736,047.63	759.21	759.27
CROSS VANE	760,809.92	1,736,046.94	758.67	758.70
CROSS VANE	760,752.71	1,736,063.38	757.19	757.26
SILL STEP	760,739.66	1,736,066.18	756.60	756.53
CROSS VANE	760,725.04	1,736,063.02	755.78	755.68
SILL STEP	760,709.27	1,736,070.63	755.16	754.99
SILL STEP	760,697.97	1,736,073.60	754.41	754.51
SILL STEP	760,674.66	1,736,090.56	753.41	753.13

-UT 4- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
SILL STEP	760,663.18	1,736,107.94	752.57	752.48
CROSS VANE	760,612.01	1,736,106.18	751.28	751.32
CROSS VANE	760,590.48	1,736,094.17	750.80	750.88
CROSS VANE	760,545.86	1,736,099.74	749.96	749.91
CROSS VANE	760,501.69	1,736,079.94	749.09	749.11

25' 12.5' 0 25' 50'
SCALE: 1" = 50'
NAD 83

RECORD DRAWING

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NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON
7/26/2022
DATE:

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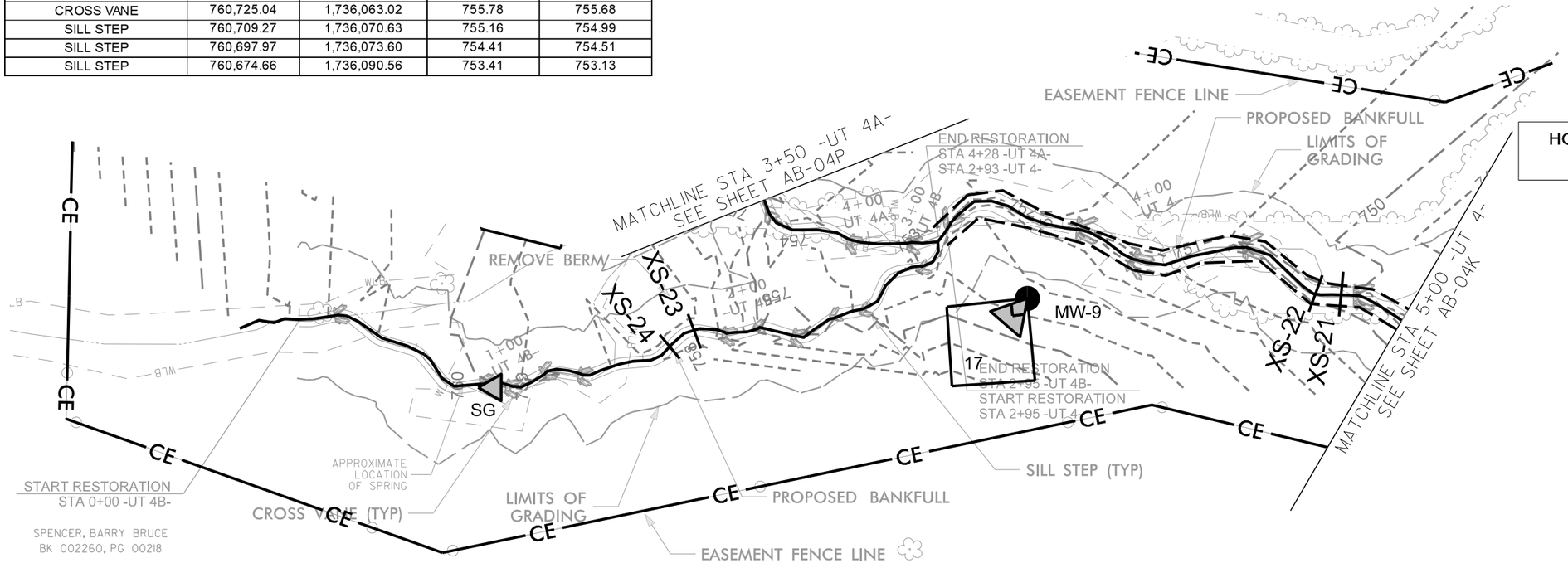
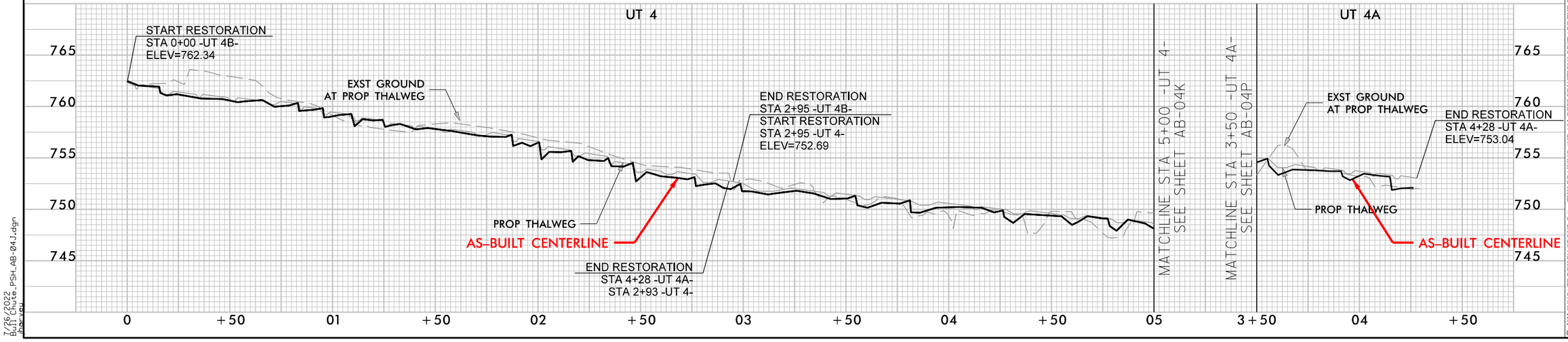
VERTICAL DATUM: NAVD 1988



-UT 4A- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
SILL STEP	760,734.86	1,736,111.78	754.86	754.92
CROSS VANE	760,703.01	1,736,100.80	753.79	753.71
CROSS VANE	760,679.25	1,736,100.09	753.29	753.16



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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04J

7/26/2022
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jharvell

-UT 4C- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,412.52	1,736,054.25	747.30	747.29
SILL STEP	760,404.05	1,736,061.52	747.16	BUILT / NS
SILL STEP	760,391.91	1,736,070.92	746.30	746.48
CROSS VANE	760,382.39	1,736,073.63	745.61	745.70

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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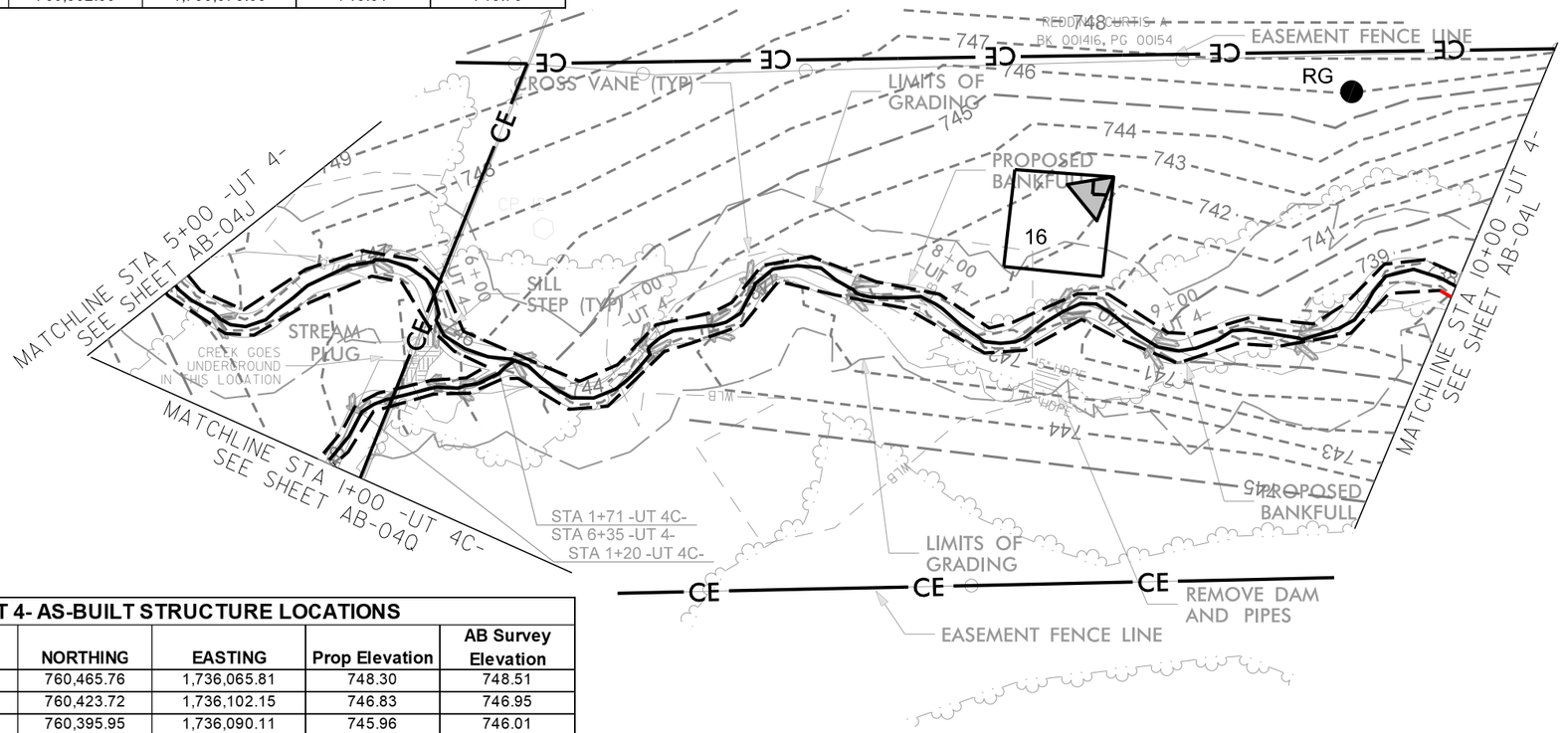
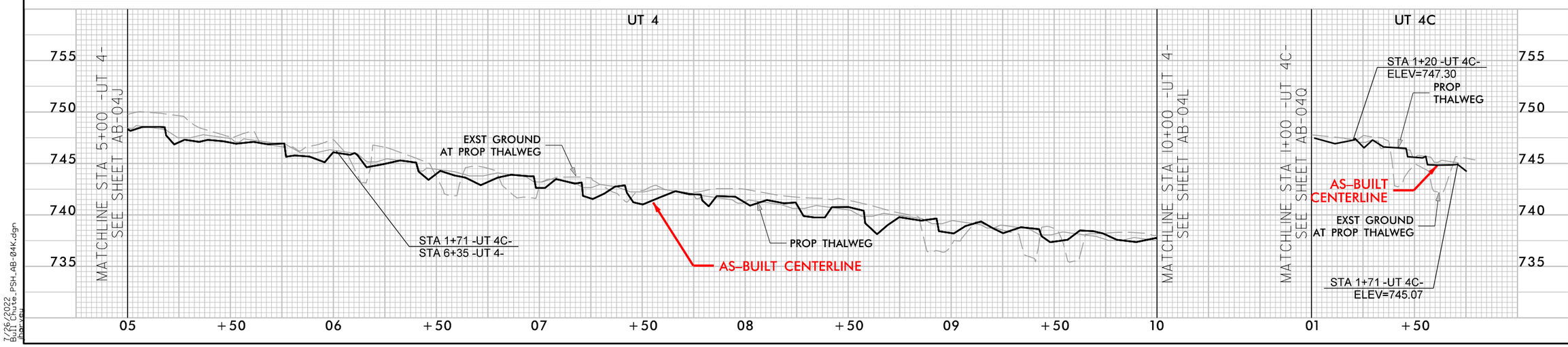
SCALE: 1" = 50'

NAD 83



-UT 4- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
SILL STEP	760,465.76	1,736,065.81	748.30	748.51
SILL STEP	760,423.72	1,736,102.15	746.83	746.95
SILL STEP	760,395.95	1,736,090.11	745.96	746.01
SILL STEP	760,368.77	1,736,087.71	745.06	745.09
CROSS VANE	760,330.29	1,736,108.30	743.70	743.75
CROSS VANE	760,313.02	1,736,122.72	743.16	743.16
CROSS VANE	760,304.88	1,736,140.57	742.74	742.88
CROSS VANE	760,273.67	1,736,151.67	742.07	741.97
CROSS VANE	760,206.95	1,736,169.90	740.46	740.41
CROSS VANE	760,174.41	1,736,170.89	739.64	739.65
CROSS VANE	760,129.49	760,129.49	738.65	738.61



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Josh Dalton
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7/26/2022

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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04K

7/26/2022
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harvey

-UT 4- AS-BUILT STRUCTURE LOCATIONS

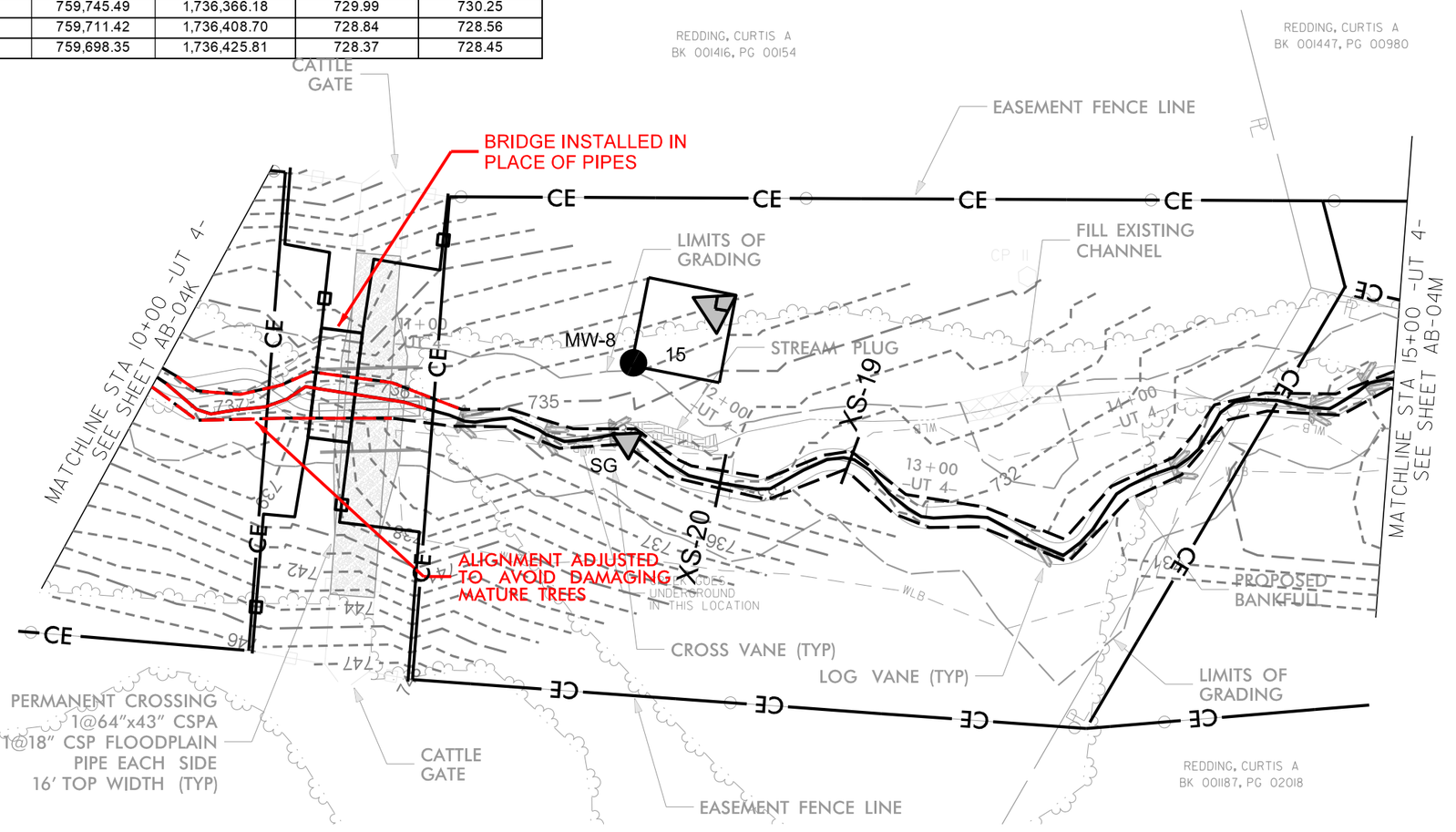
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,983.37	1,736,263.17	735.15	735.09
CROSS VANE	759,953.84	1,736,272.42	734.44	734.52
CROSS VANE	759,932.41	1,736,283.88	733.82	734.05
LOG VANE	759,776.05	1,736,318.22	730.79	730.64
CROSS VANE	759,745.49	1,736,366.18	729.99	730.25
CROSS VANE	759,711.42	1,736,408.70	728.84	728.56
CROSS VANE	759,698.35	1,736,425.81	728.37	728.45

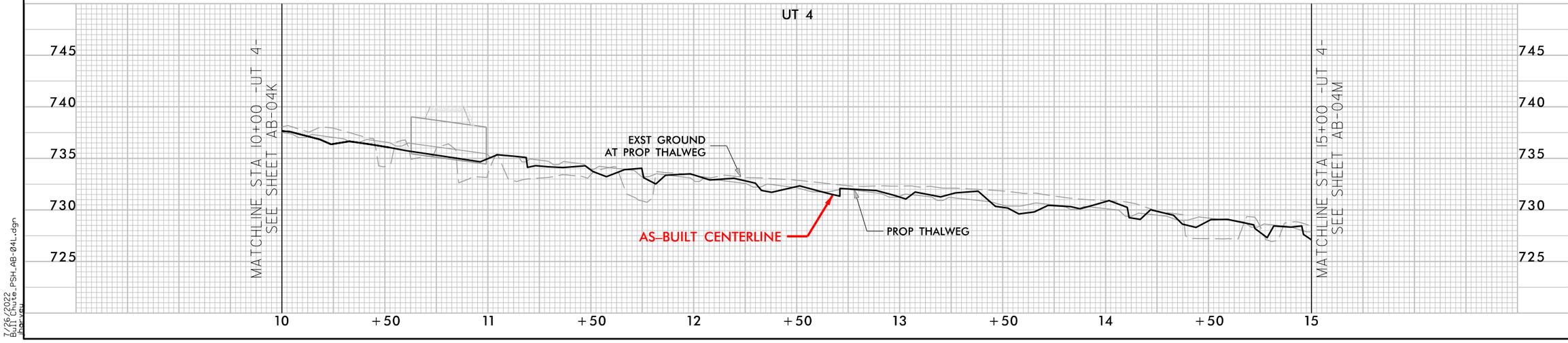
HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

25′ 12.5′ 0 25′ 50′
SCALE: 1″ = 50′

NAD 83

RECORD DRAWING





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Josh Dalton
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7/26/2022

DATE:

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RALEIGH, NORTH CAROLINA 27606
PHONE (919) 859-0515
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04L

7/26/2022
Bull Chute_PSH_AB-04L.dgn
jharden

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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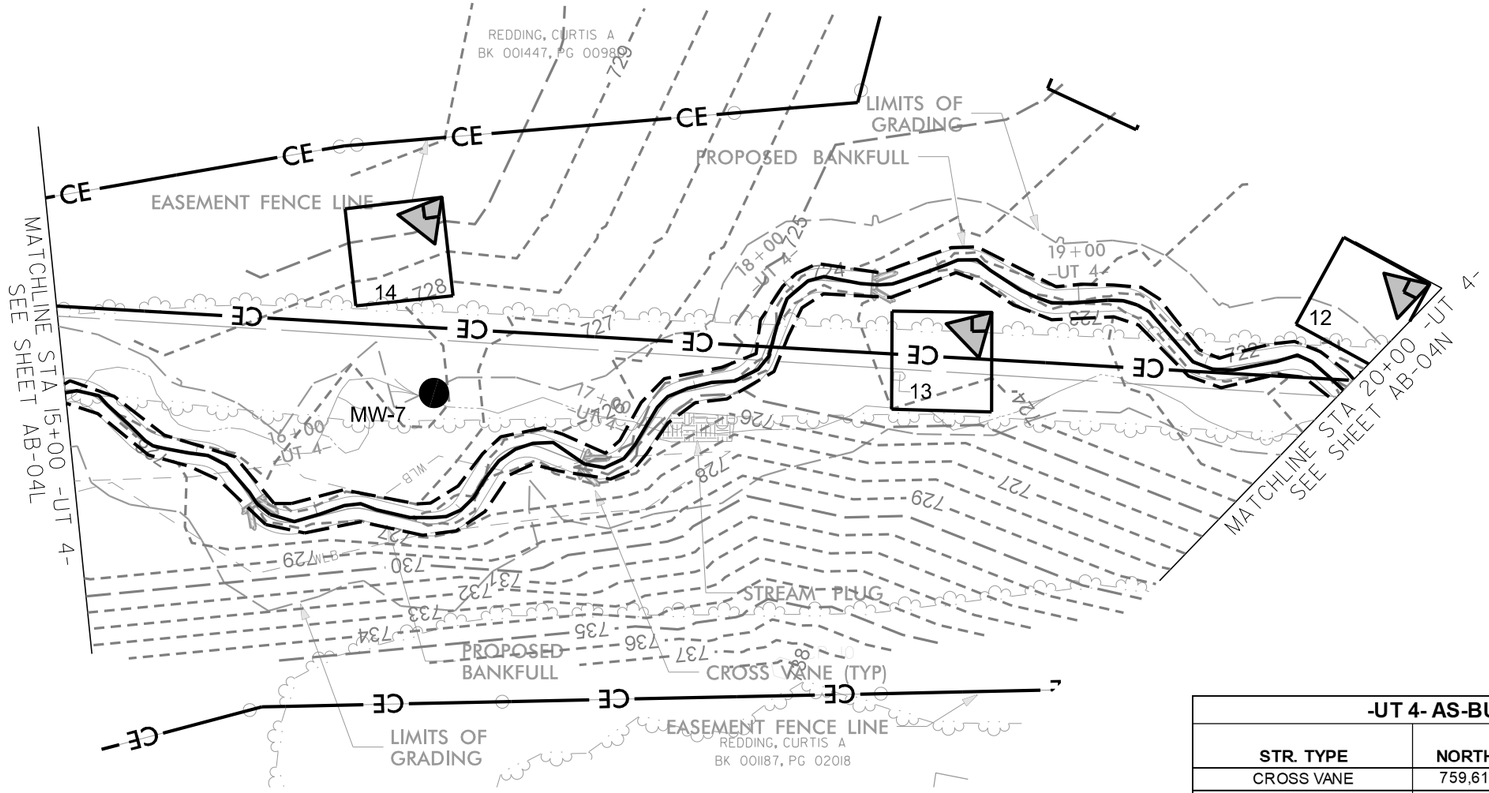
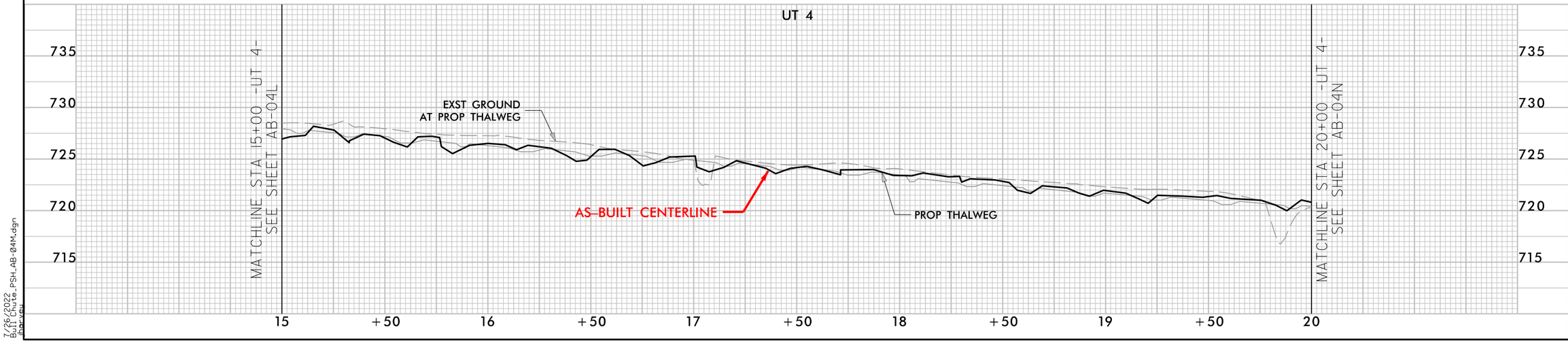
NAD 83



-UT 4- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,619.83	1,736,415.50	727.16	727.09
CROSS VANE	759,519.80	1,736,460.50	725.28	725.29
CROSS VANE	759,445.98	1,736,545.63	723.40	723.32



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Josh Dalton
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7/26/2022

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TEL: 919.852.1183
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04M

7/26/2022
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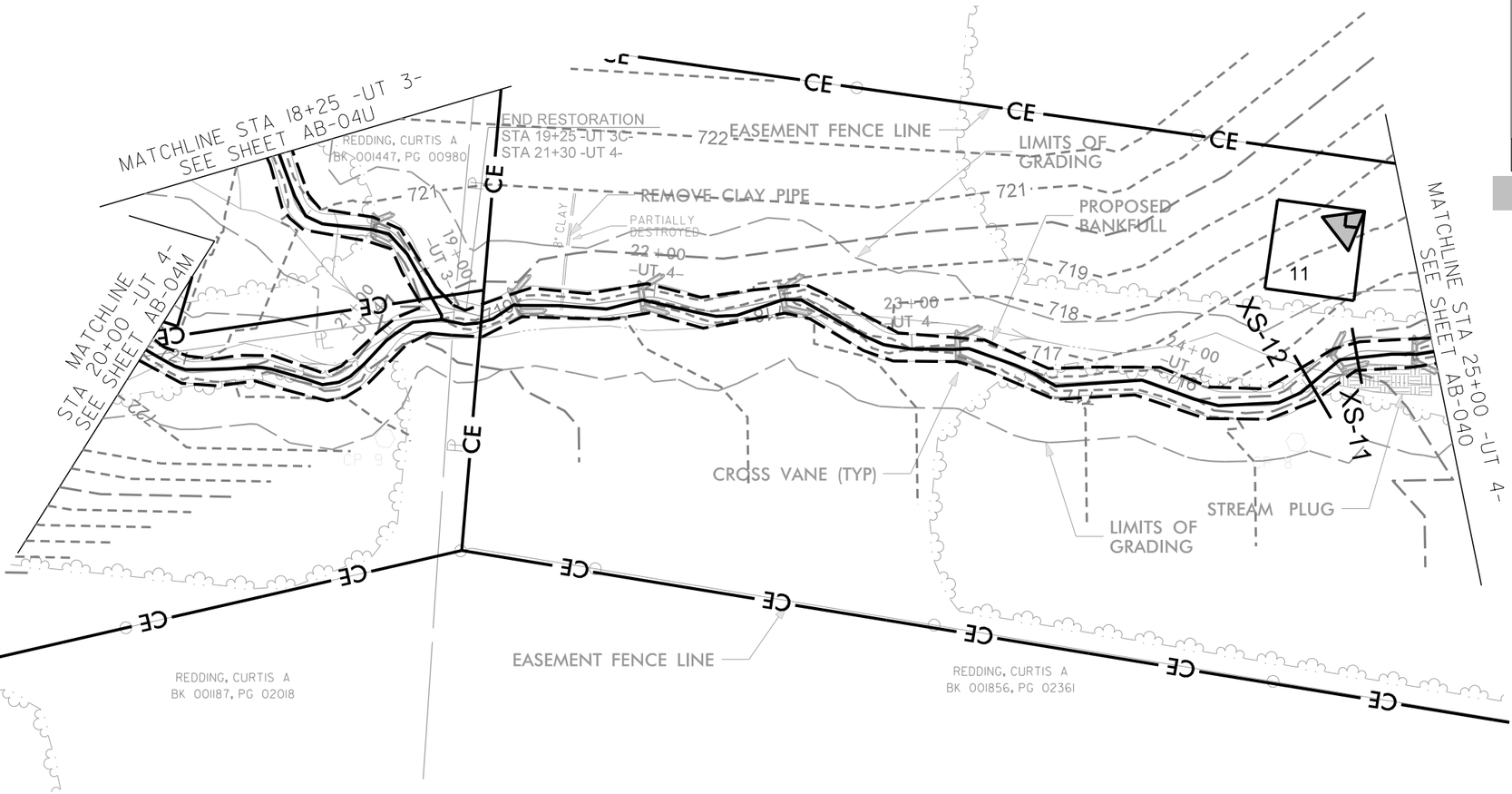
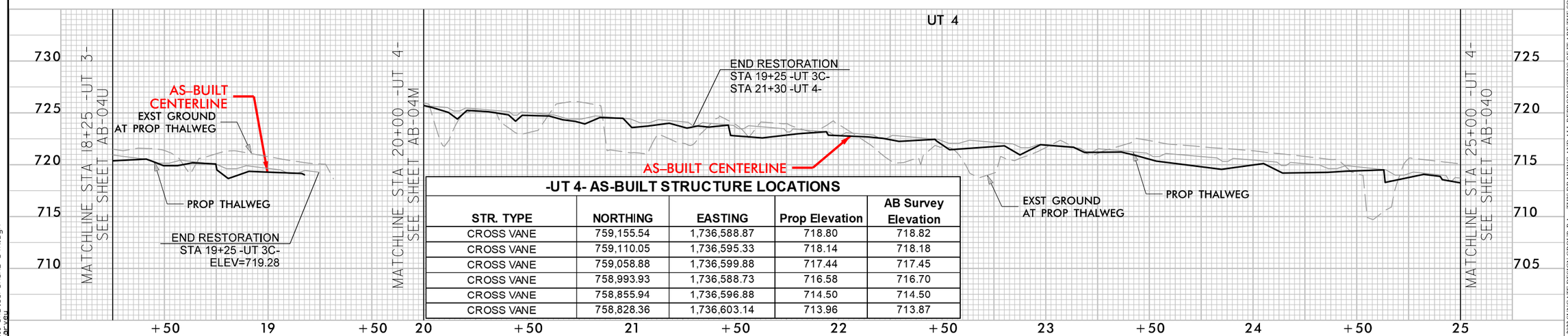
hartzell

-UT 3- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,209.75	1,736,611.53	720.01	720.07

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

25' 12.5' 0 25' 50'
SCALE: 1" = 50'
NAD 83





-UT 4- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,155.54	1,736,588.87	718.80	718.82
CROSS VANE	759,110.05	1,736,595.33	718.14	718.18
CROSS VANE	759,058.88	1,736,599.88	717.44	717.45
CROSS VANE	758,993.93	1,736,588.73	716.58	716.70
CROSS VANE	758,855.94	1,736,596.88	714.50	714.50
CROSS VANE	758,828.36	1,736,603.14	713.96	713.87

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7/26/2022

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ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04N

7/26/2022
Bull Chute_PSH_AB-04N.dgn
jharvell

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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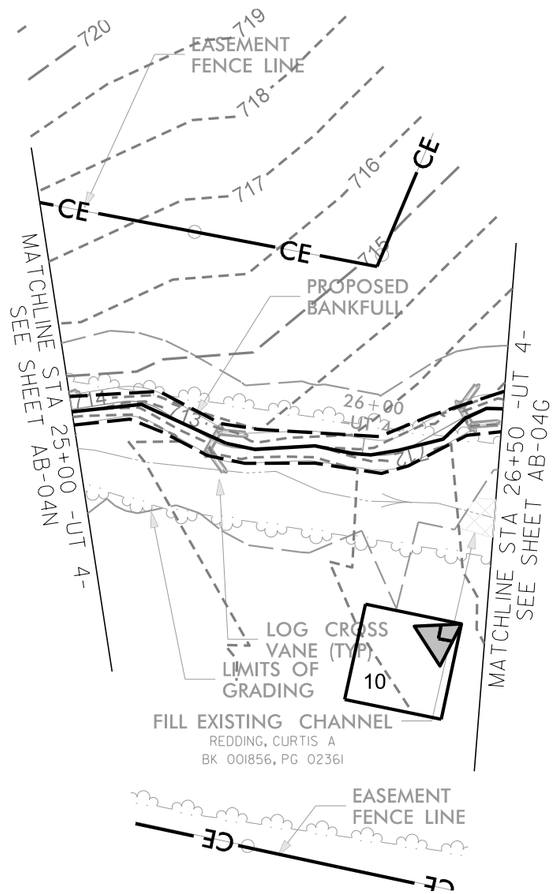
NAD 83



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Josh Dalton
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26971
ENGINEER
JOSHUA G. DALTON

7/26/2022
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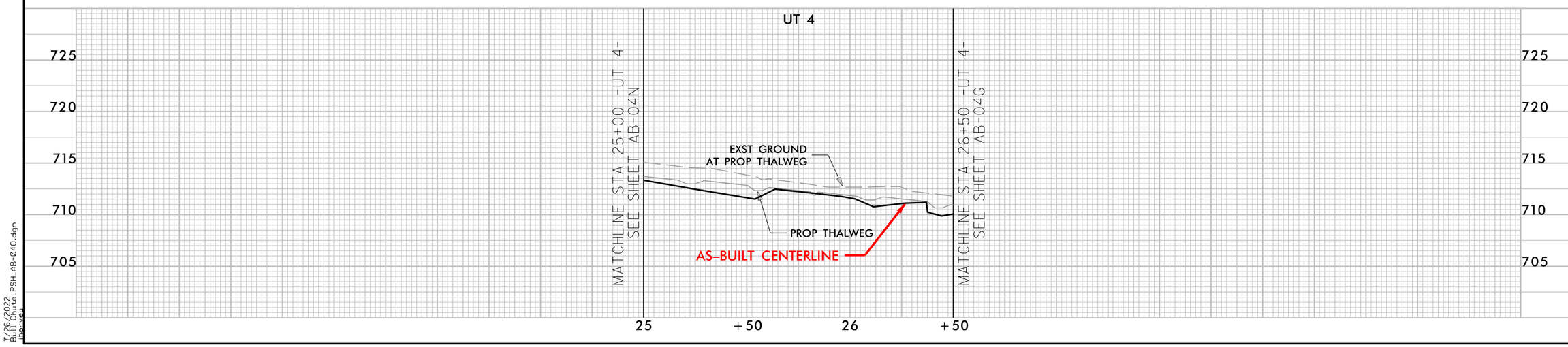
-UT 4- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	758,773.81	1,736,601.36	712.84	712.82
CROSS VANE	758,692.57	1,736,621.45	711.26	711.20



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BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04O

7/26/2022
Bull Chute-PSH-AB-040.dgn
Barker

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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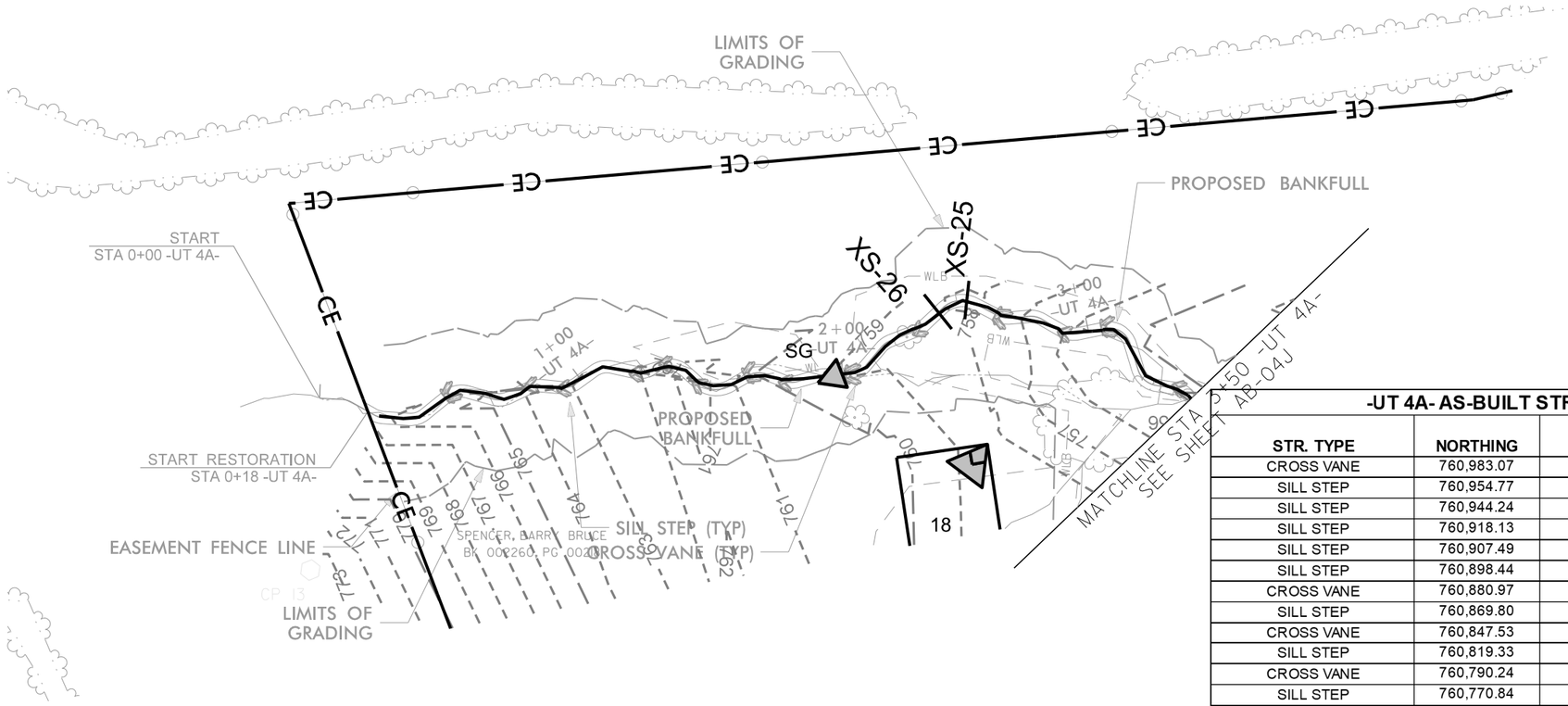
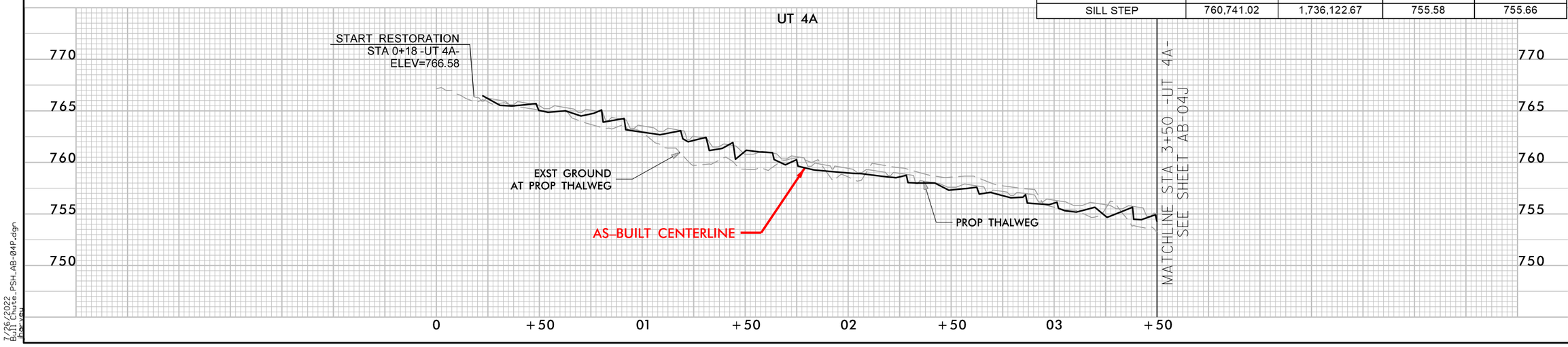
SCALE: 1″ = 50′

NAD 83



-UT 4A- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,983.07	1,736,216.46	765.54	765.71
SILL STEP	760,954.77	1,736,208.36	764.87	765.08
SILL STEP	760,944.24	1,736,204.22	764.11	764.27
SILL STEP	760,918.13	1,736,199.74	763.04	763.07
SILL STEP	760,907.49	1,736,197.75	762.30	762.43
SILL STEP	760,898.44	1,736,187.99	761.59	761.93
CROSS VANE	760,880.97	1,736,183.47	760.84	760.95
SILL STEP	760,869.80	1,736,177.10	760.43	760.27
CROSS VANE	760,847.53	1,736,170.65	759.30	BUILT / NS
SILL STEP	760,819.33	1,736,176.11	758.74	758.75
CROSS VANE	760,790.24	1,736,170.29	757.62	BUILT / NS
SILL STEP	760,770.84	1,736,156.55	756.85	756.88
CROSS VANE	760,756.77	1,736,152.03	756.17	756.14
SILL STEP	760,741.02	1,736,122.67	755.58	755.66



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7/26/2022

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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04P

7/26/2022
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jharvell

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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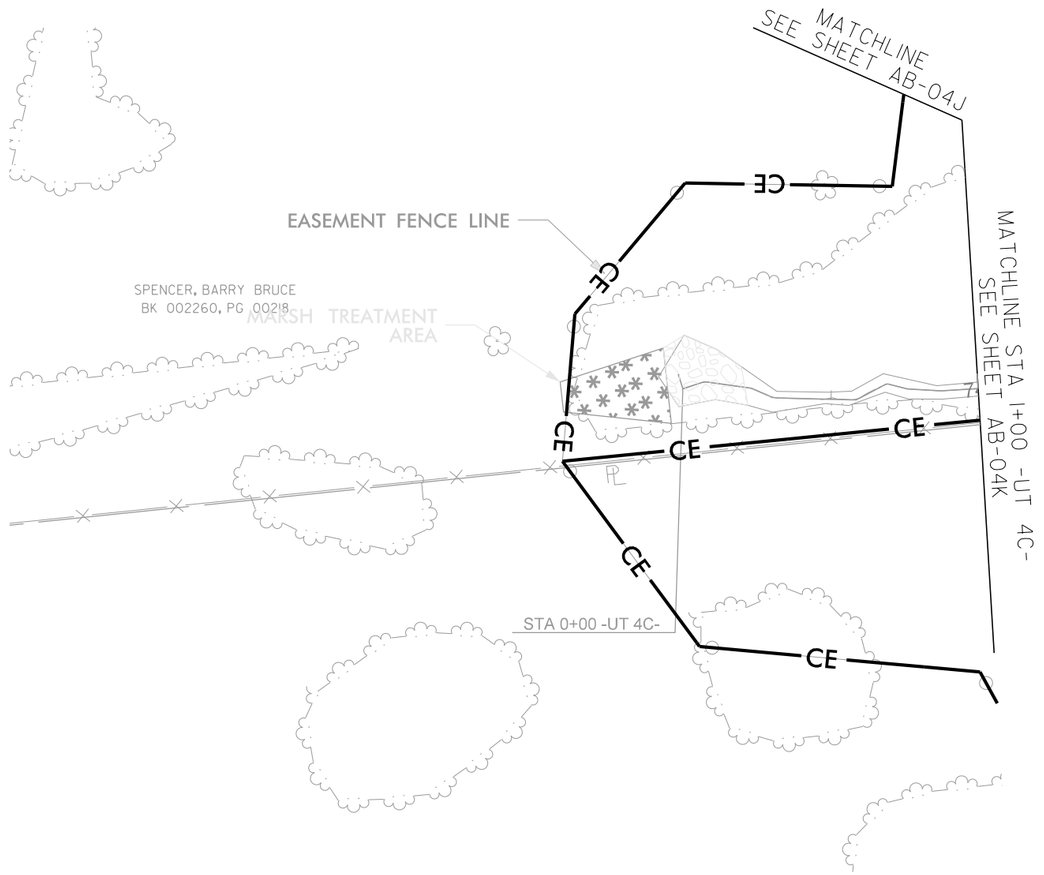
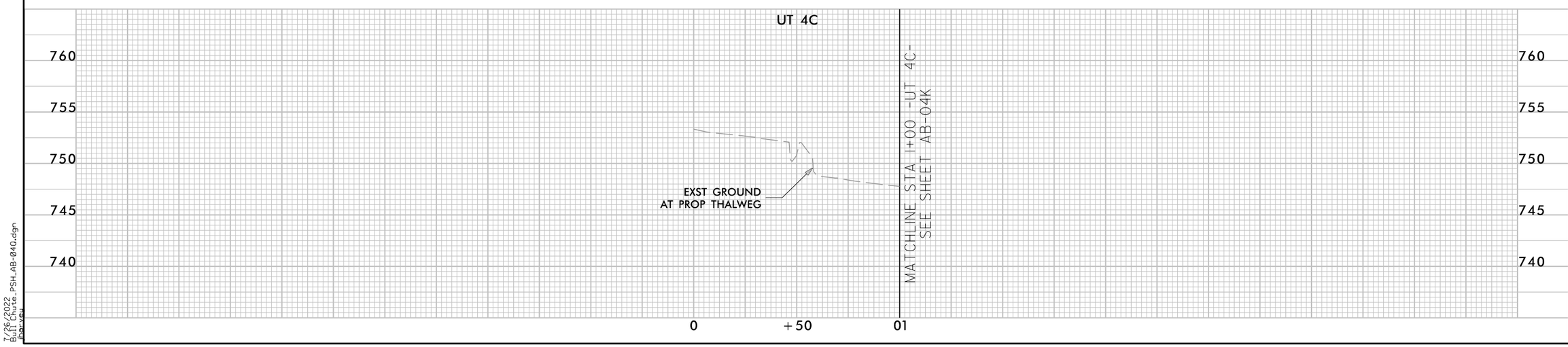
SCALE: 1″ = 50′





NAD 83

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JOSHUA G. DALTON

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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04Q

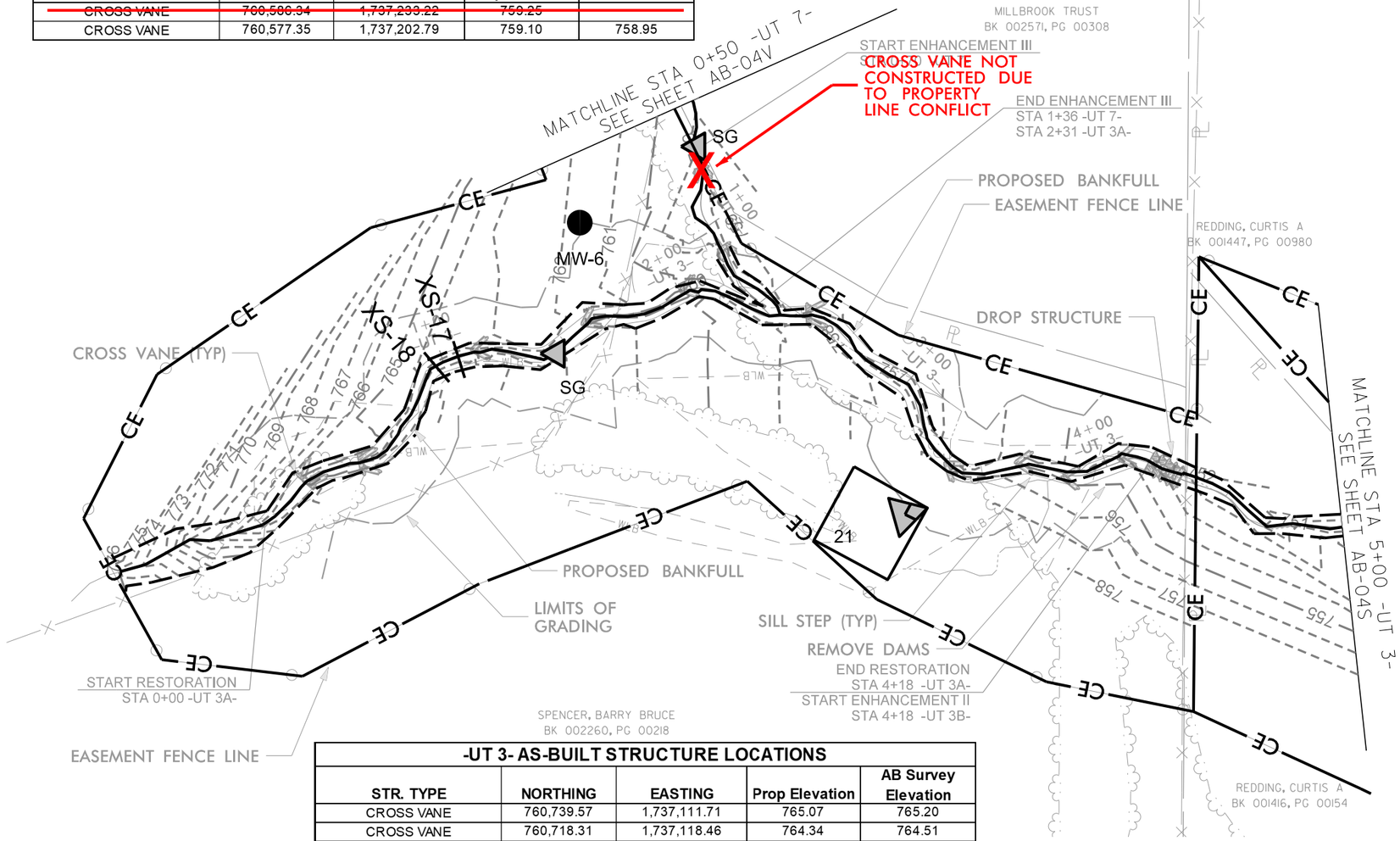
7/26/2022
Bull Chute_PSH_AB-040.dgn
jharvey

-UT 7- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
~~CROSS VANE~~	~~760,586.34~~	~~1,737,233.22~~	~~759.25~~	
CROSS VANE	760,577.35	1,737,202.79	759.10	758.95

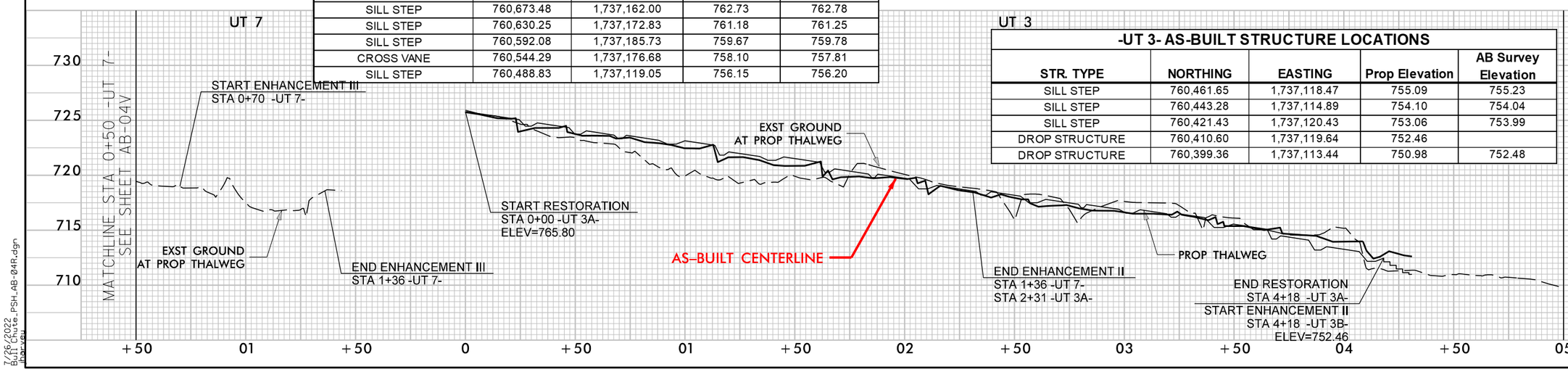
HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

25' 12.5' 0 25' 50'
SCALE: 1" = 50'
NAD 83



-UT 3- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,739.57	1,737,111.71	765.07	765.20
CROSS VANE	760,718.31	1,737,118.46	764.34	764.51
SILL STEP	760,673.48	1,737,162.00	762.73	762.78
SILL STEP	760,630.25	1,737,172.83	761.18	761.25
SILL STEP	760,592.08	1,737,185.73	759.67	759.78
CROSS VANE	760,544.29	1,737,176.68	758.10	757.81
SILL STEP	760,488.83	1,737,119.05	756.15	756.20



-UT 3- AS-BUILT STRUCTURE LOCATIONS

STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
SILL STEP	760,461.65	1,737,118.47	755.09	755.23
SILL STEP	760,443.28	1,737,114.89	754.10	754.04
SILL STEP	760,421.43	1,737,120.43	753.06	753.99
DROP STRUCTURE	760,410.60	1,737,119.64	752.46	
DROP STRUCTURE	760,399.36	1,737,113.44	750.98	752.48

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7/26/2022
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TEL: 919.851.1530
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04R

7/26/2022
Bull Chute_PSH_AB-04R.dgn
Darren

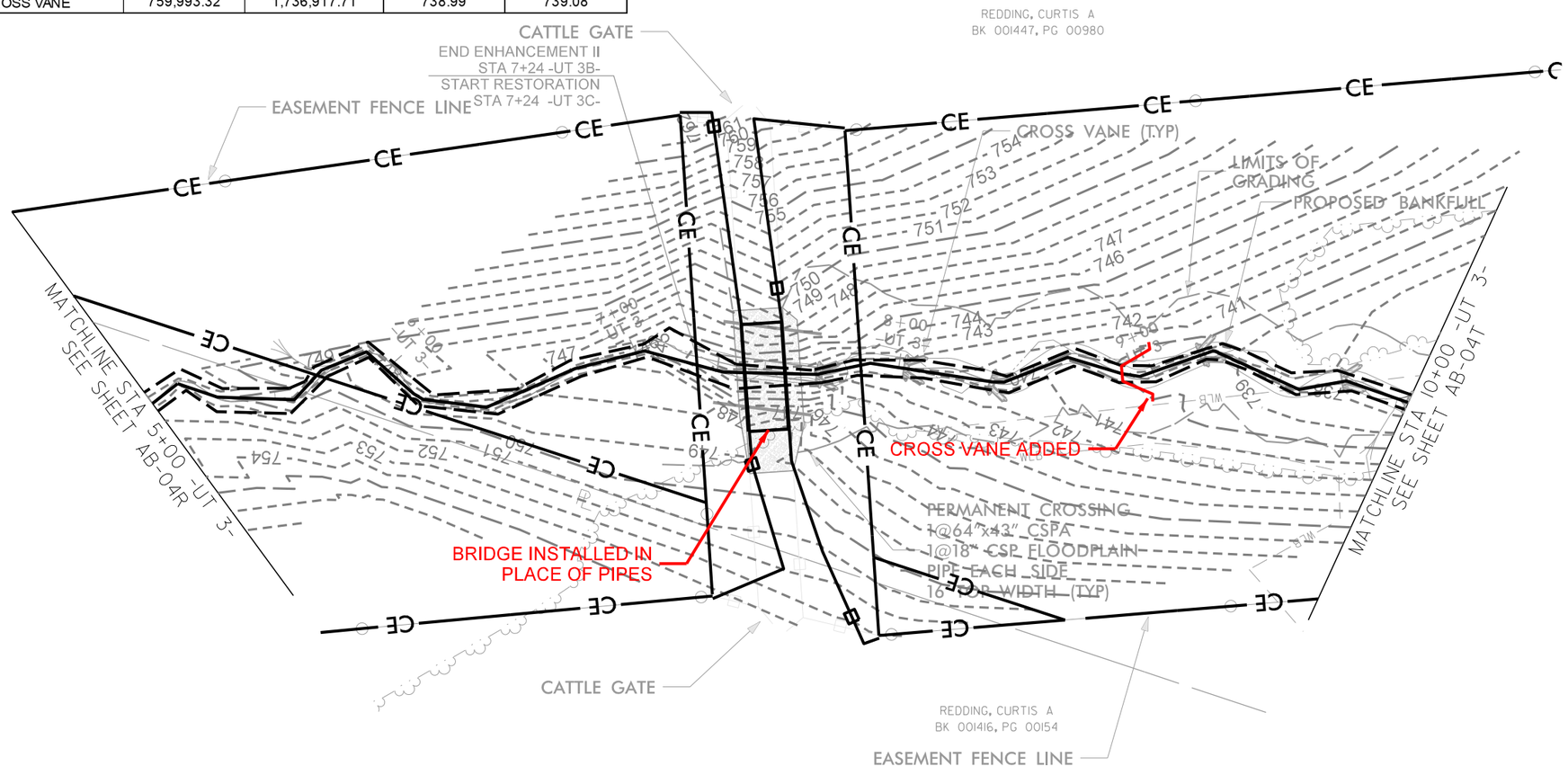
-UT 3- AS-BUILT STRUCTURE LOCATIONS

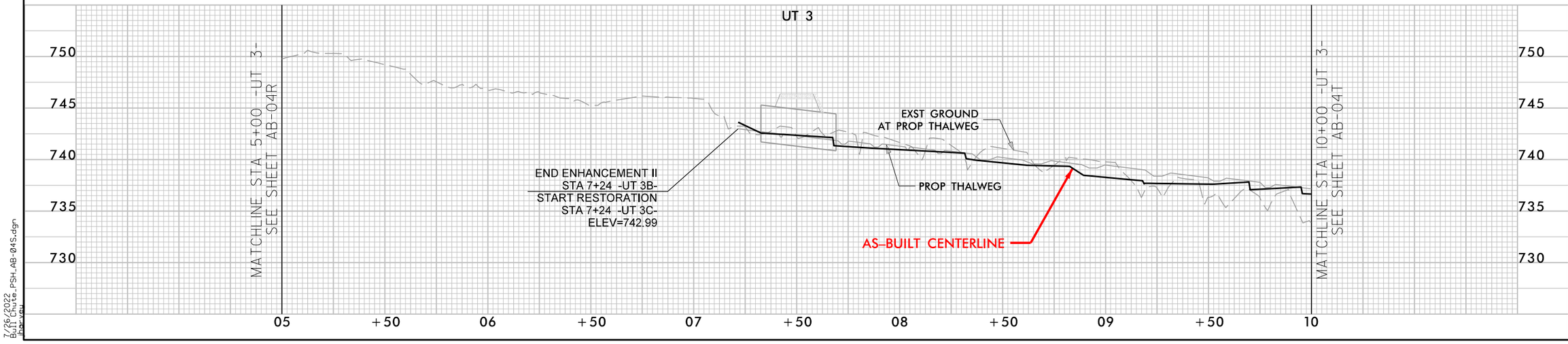
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	760,118.82	1,736,981.57	741.82	742.14
CROSS VANE	760,089.87	1,736,967.76	741.23	BUILT / NS
CROSS VANE	760,065.16	1,736,947.51	740.56	740.62
CROSS VANE	760,022.32	1,736,923.46		739.34
CROSS VANE	759,993.32	1,736,917.71	738.99	739.08

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

25' 12.5' 0 25' 50'
SCALE: 1" = 50'

NAD 83





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BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
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REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04S

7/26/2022
Bull Chute_PSH_AB-04S.dgn
jharden

-UT 3- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,936.81	1,736,864.49	737.15	737.33
CROSS VANE	759,822.33	1,736,856.80	734.75	734.88
CROSS VANE	759,754.48	1,736,844.82	733.19	733.13
CROSS VANE	759,704.27	1,736,827.61	731.98	732.10
CROSS VANE	759,628.21	1,736,824.97	730.23	730.27
CROSS VANE	759,599.83	1,736,786.35	729.13	729.14
CROSS VANE	759,532.58	1,736,793.78	727.61	727.63

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

25′ 12.5′ 0 25′ 50′
SCALE: 1″ = 50′

NAD 83

RECORD DRAWING

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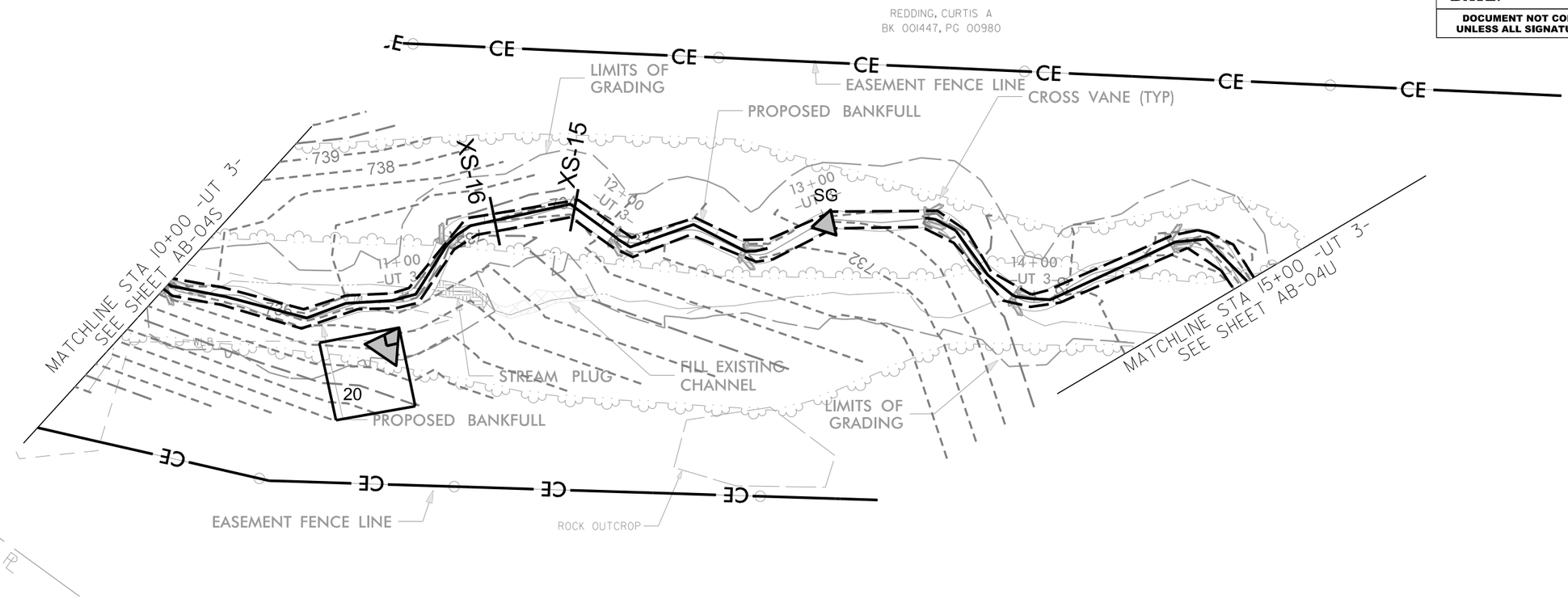

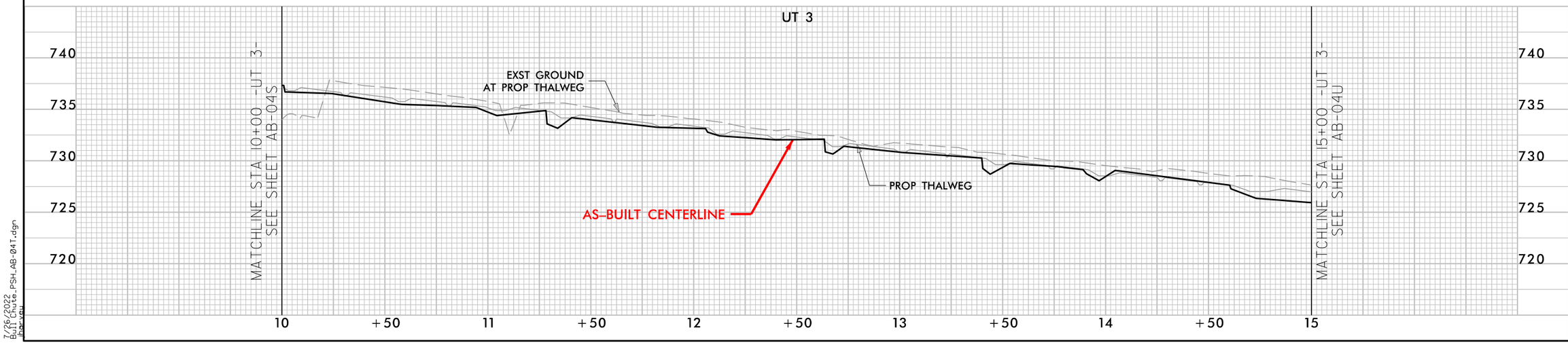

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BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

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AB-04T

7/26/2022
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jharvell

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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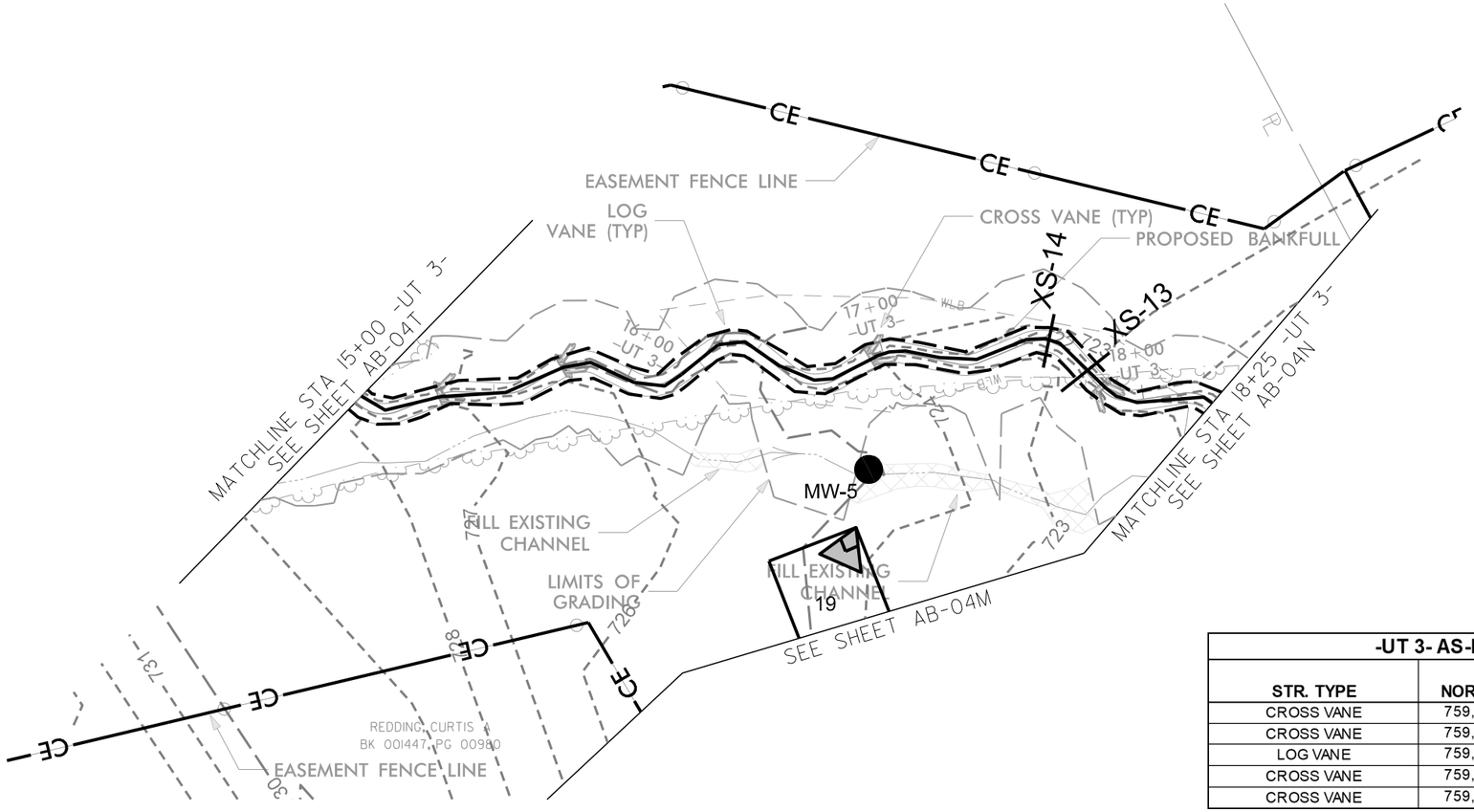
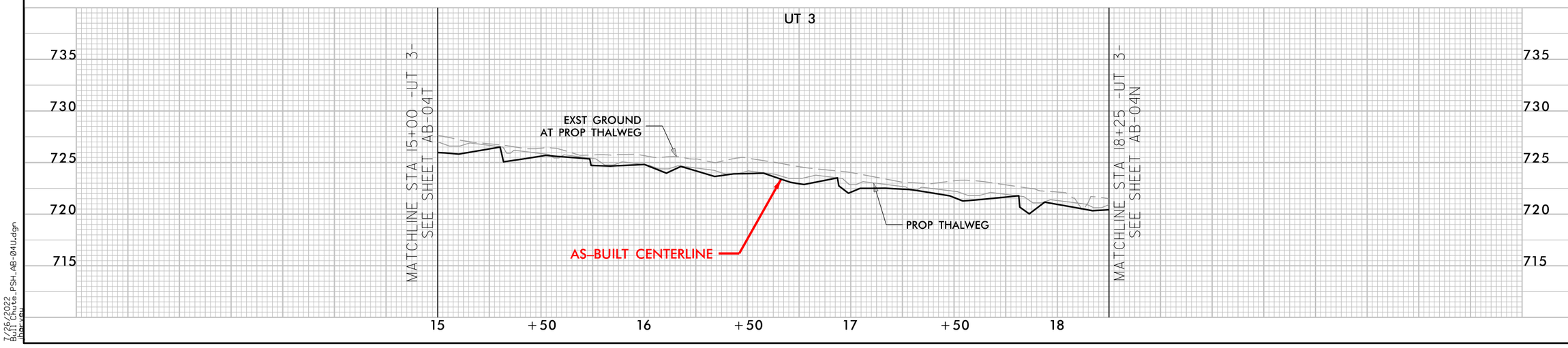
NAD 83



-UT 3- AS-BUILT STRUCTURE LOCATIONS				
STR. TYPE	NORTHING	EASTING	Prop Elevation	AB Survey Elevation
CROSS VANE	759,481.31	1,736,759.89	726.50	726.50
CROSS VANE	759,439.19	1,736,748.95	725.37	725.35
LOG VANE	759,391.08	1,736,730.12	724.25	BUILT / NS
CROSS VANE	759,343.33	1,736,702.44	723.46	723.51
CROSS VANE	759,278.39	1,736,656.57	721.70	721.78



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7/26/2022

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BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # :
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AB–04U

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harvey

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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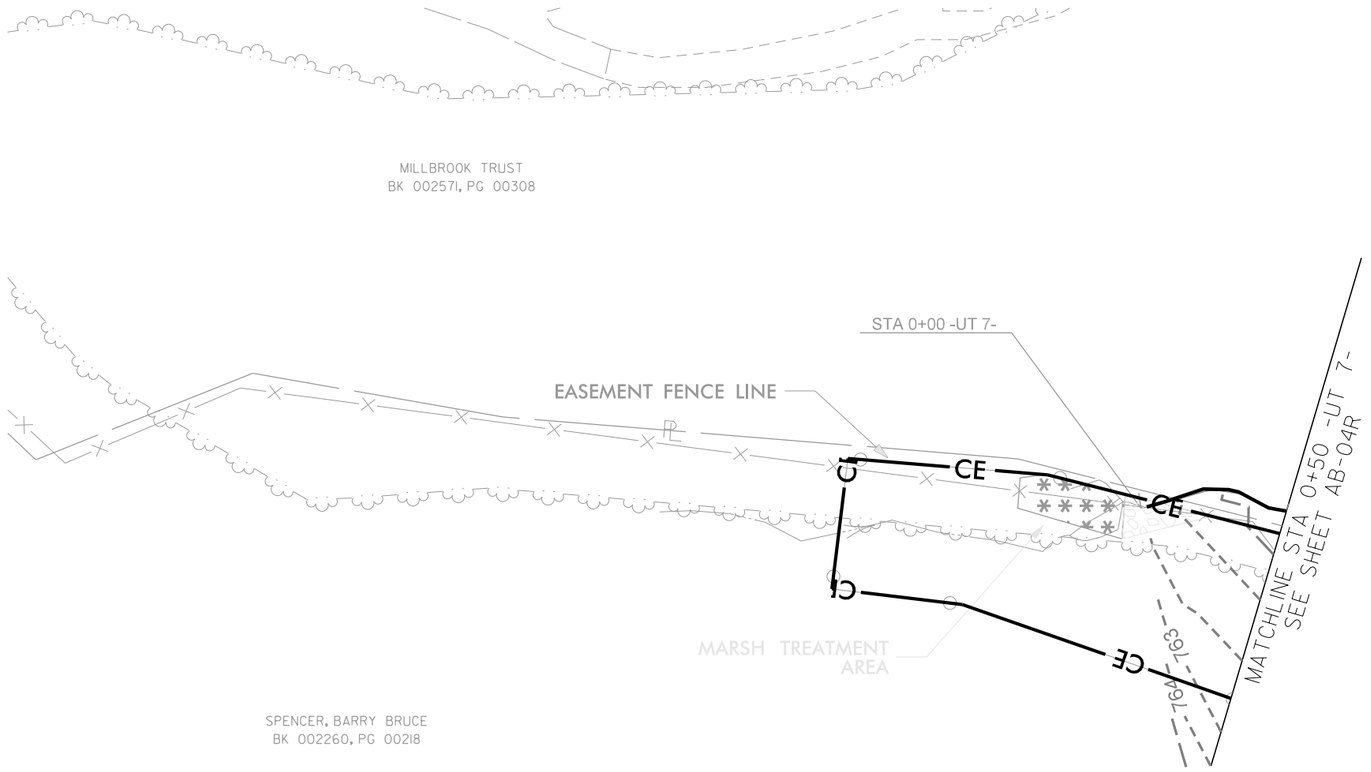

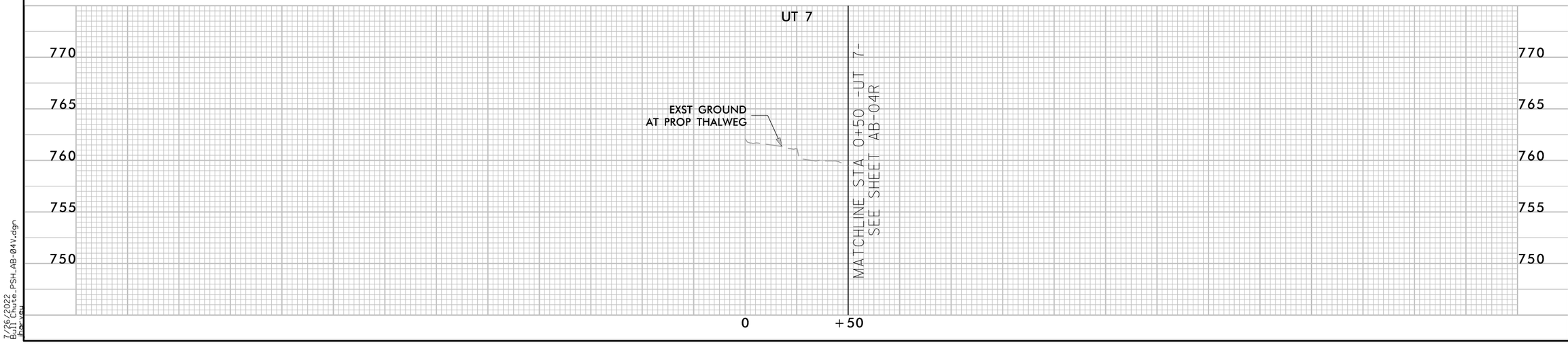

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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT STRUCTURES

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DRAWING NAME:	
DATE:	2022
DRAWN BY:	JRH
REVIEWED BY:	JGD
REVISIONS:	
SHEET NO.	***AB–04V***

7/26/2022
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JRH

RECORD DRAWING

DESIGN PLANTING TABLE

Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Stream-side Assemblage**		TOTAL
Area (acres)	16.3		6.2		6.0		28.5
Species	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted
Tag alder (*Alnus serrulata*)	--	--	--	--	2448	15	2448
River birch (*Betula nigra*)	1663	15	--	--	2448	15	4111
~~Ironwood (*Carpinus caroliniana*)~~			~~843~~	~~20~~			~~843~~
Red bud (*Cercis canadensis*)	--	--	632	15	--	--	632
Silky dogwood (*Cornus amomum*)	1663	15	--	--	3264	20	4927
Persimmon (*Diospyros virginiana*)	--	--	422	10	--	--	422
Mockernut hickory (*Carya tomentosa*)	--	--	211	5	--	--	211
Tulip poplar (*Liriodendron tulipifera*)	1663	15	--	--	--	--	1663
Sycamore (*Platanus occidentalis*)	2217	20	--	--	3264	20	5481
Black gum (*Nyssa sylvatica*)	--	--	632	15	--	--	632
Water oak (*Quercus nigra*)	2217	20	843	20	1632	10	4692
Willow oak (*Quercus phellos*)	1663	15	632	15	1632	10	3927
Black willow (*Salix nigra*)	--	--	--	--	1632	10	1632
TOTAL	11084	100	4216	100	16320	100	31620
* Planted at a density of 680 stems/acre.							
** Planted at a density of 2720 stems/acre.							

AS–BUILT PLANTING TABLE

Table 6A. Planted Bare Root Woody Vegetation
Bull Chute Stream and Riparian Wetland Mitigation Site

Species	Total
Acres	28.5
Alnus serrulata	2,500
Betula nigra	4,000
Cercis canadensis	600
Carya tomentosa	200
Cornus amomum	5,000
Diospyros virginiana	420
Liriodendron tulipifera	1,700
Nyssa sylvatica	600
Platanus occidentalis	5,500
Quercus nigra	5,500
Quercus phellos	4,000
Salix nigra	1,600
TOTALS	**31,620**
Average Stems/Acre	**1,110**

Table 6B. Permanent Seed Mix
Bull Chute Stream and Riparian Wetland Mitigation Site

Species	Percent of Total Mix
Redtop (*Agrostis gigantea*)	10%
VA Wild Rye (*Elymus virginicus*)	15%
Switchgrass (*Panicum virgatum*)	15%
Eastern Gammagrass (*Tripsacum dactyloides*)	5%
PA Smartweed (*Polygonum pensylvanicum*)	5%
Little Bluestem (*Schizachyrium scoparium*)	5%
Soft Rush (*Juncus effusus*)	5%
Bur Marigold (*Bidens cernua*)	10%
Lance-leaved Tickseed (*Coreopsis lanceolata*)	10%
Deertongue (*Dichanthelium clandestinum*)	10%
Big Bluestem (*Andropogon gerardii*)	5%
Indiangrass (*Sorghastrum nutans*)	5%
TOTAL	**100%**

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Axiom Environmental, Inc.

BULL CHUTE
RANDOLPH COUNTY, NC

AS-BUILT PLANTING LIST

PROJECT # :
DRAWING NAME:
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04W

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