As-built Baseline Monitoring Report

FINAL

Stewarts Creek Tributaries Stream Restoration Project

Surry County, North Carolina

Monitoring Year 0

Data Collection Period:
May 2020 – June 2020

Submission Date:
October 2020

NCDEQ Contract No. 7183
DMS ID No. 100023
USACE Action ID No. SAW-2017-01508
DWR ID No. 20171043

Prepared For:

NC Department of Environmental Quality
Division of Mitigation Services
217 West Jones Street; 3rd Floor
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Prepared By:

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Mr. Paul Wiesner
NCDEQ – Division of Mitigation Services
5 Ravencroft Dr., Suite 102
Asheville, NC 28801

October 9, 2020

RE: Response to Draft As-Built Baseline Monitoring Report (MY0) Comments dated August 18, 2020
Stewarts Creek Stream Restoration Project
Yadkin River Basin – CU# 03040101 – Surry County, North Carolina
NCDMS Project # 100023, Contract # 7183

Dear Mr. Wiesner,

Ecosystem Planning and Restoration (EPR) has reviewed the comments on the Draft As-Built Baseline Monitoring Report provided August 18, 2020. The comments have been addressed as described below and the Final Baseline Report and electronic deliverables have been revised in response to this review.

- *General & Table 1: There was a very minor rounding error in the IRT approved mitigation plan. The error is associated with Moores Fork (Reach 1); 1,573 linear feet @ 2.5:1 = 629.2 SMUs. Total project assets should be updated to 10,649.2 SMUs. Please update the report text (report wide) and Table I accordingly. A footnote should be added to Table I to explain the minor discrepancy.*
    - **Updated.**

- *Report Cover: Please include the project's DWR# on the report cover. DWR# 20171043*
    - **Updated.**

- *Report Cover: The report cover indicates that MY0 data was collected from April – July 2020. Table 2 notes that MY0 data was collected in March 2020. The report text notes that MY0 data was collected from May-June. Please review for consistency and update the cover, report and Table 2 as necessary.*
    - **Updated all accounts to indicate MY0 data was collected from May – June 2020.**

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- *Section 1.1 Goals and Objectives: The goals and objectives in the MY0 report should match the goals and objectives in the IRT approved mitigation plan. Please revise accordingly. DMS recommends utilizing Table 8 from the IRT approved mitigation plan in the final MY0 report for consistency.*
    - **Updated.**

- *CCPV Sheets-Moores Fork: Please explain why a portion of the project fencing is located inside the conservation easement on the south west portion of Moores Fork-Reach 2. Project fencing should be located outside of the conservation easement or on the easement line if no fencing maintenance (spraying/ cutting) is planned. Please review and confirm that all project fencing has been installed directly outside the conservation easement or on the easement line as required. If project fencing has been installed within the conservation easement, please provide a proposed resolution.*
    - **No fencing was installed in the conservation easement. What was indicated in the CCPV sheets was existing fencing that does not affect the success of the project. This existing fencing has been taken out of the CCPV maps.**

- *Table 7: In the Annual Means column, the "size (ACRES)" cell is currently 0.271821. Please QA/ QC the table and update as necessary. Electronic support files should also be updated.*
    - **Table 7 has been updated to match the electronic supporting files and stems per acre in the report have been adjusted.**

- *Longitudinal Profile: Please add the reach break for UT3 Reach1/ Reach 2.*
    - **Updated.**

- *Record Drawings: The general notes on sheet 2 indicate that construction was completed in April 2020 and the as-built completed in July 2020. This is not consistent with Table 2. As requested in the earlier comment, please review for consistently and update the Record Drawings, report and Table 2 as necessary.*
    - **Updated.**

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- *Record Drawings: The crossing on UT3 Reach 1 and the crossing upstream of UT2 appear to extend into the conservation easement. Please confirm that all project crossing pipes and associated rip rap aprons are located outside of the conservation easement. If crossings have been installed inside the conservation easement, an easement modification may be necessary. Project assets should also be reviewed if crossings extend into the conservation easement and updated accordingly. Please review and provide a proposed resolution if applicable.*
    - **Contractor located the pipe and associated rip rap in the easement break. This is portrayed in the updated record drawings.**

- *Record Drawings: Please include the as-built fencing line and as-built witness post locations on the Record Drawings and make sure the symbology matches what is presented on sheet 2. As requested in the earlier comment, please confirm that no fencing is located within the project conservation easement. If project fencing has been installed within the conservation easement, please provide a proposed resolution.*
    - **As-built fencing and as-built witness posts have been added to the Record Drawings. No fencing was installed in the conservation easement.**

- *Electronic Support Files: The following stream features have feature lengths that do not match the creditable footage reported in the project asset table, reported below as feature length vs. asset table length: Moores Fork R1: 1638 ft vs. 1573 ft and UT3 R2: 2452 ft vs. 2421*
    - **SCT_Stream.shp has been updated. The conversion between CADD and GIS still has some of the lengths off by one foot but that is because GIS cannot draw the arcs with the same precision as CADD.**

- *Electronic Support Files: Please reproduce Table 7 and re-submit the CVS entry tool, so that species counts are included in the table.*
    - **Table 7 has been reproduced. In the report Section 2.3.1 Baseline Vegetation Monitoring, EPR noted that species data will be collected during Monitoring Year 1.**

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- *Electronic Support Files: Please provide PDFs of any permits or associated permit correspondence acquired during design development that wasn't submitted during the Mitigation Plan development (i.e. FEMA Floodplain Compliance permit; DEQ Land Quality permit: etc.). This should include in a separate "Projects Permits" folder in final electronic submittal. The "Project Permits" folder was provided in the DRAFT support files but is currently empty.*
    - **Permits added to the folder.**

- *Electronic Support Files: Please provide the stand alone as-built .pdf and .dwg files with the final electronic submittal. This as-built survey should bear a Professional Land Surveyor (PLS) seal. The .dwg files appear to be included; however, the .pdf file/s are missing. Please review and update as necessary.*
    - **Included.**

- *Electronic Support Files: Please provide the final stand alone Ecosystem Planning & Restoration, PLLC (EPR) design plan .pdf and .dwg files with the final electronic submittal. The design plan should bear a Professional Engineer's seal.*
    - **Included.**

If you have any questions regarding the As-Built Baseline Report, please contact me at 919-388-0787 or via email at ebennett@eprusa.net.

Sincerely,

Erin M Bennett

Erin M. Bennett, PE

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TABLES

APPENDICES

1.0 PROJECT SUMMARY

Ecosystem Planning and Restoration, PLLC (EPR) implemented the Stewarts Creek Tributaries Stream Restoration Project (Project; Site) for the North Carolina Division of Mitigation Services (DMS) to provide 10,649.2 stream mitigation units (SMUs) in the Yadkin River Basin, Hydrologic Unit Code (HUC) 03040101. The Stewarts Creek Tributaries Stream Restoration Project was instituted via NCDEQ-DMS RFP #16-006993. As approved by the North Carolina Interagency Review Team (NCIRT), all projects contracted under the 16-006993 RFP have a cool or warm service type. Penalties will not be assessed for using these project mitigation credits to satisfy cool or warm requirements. The Project restored 9,498 linear feet and enhanced 1,573 linear feet of three Unnamed tributaries (UTs) to Stewarts Creek and Moores Fork within a 30-acre conservation easement. Mitigation assets are listed in Table 1 of Appendix A.

The Site is located in NC Division of Water Resources (NCDWR) sub-basin 03-07-03 and DMS targeted local watershed 03040101100010. The Site was historically utilized for agricultural and cattle practices. As such, wetlands and streams in the project area were adversely impacted by direct cattle access, farming activities, and stream channelization. The Site is situated on historic pastureland in a WS-IV watershed that is 49% agricultural land, 37% forest, 11% residential, and 1% impervious. Prior to construction activities, all project streams were incised, the UTs were straightened and had adjacent row crops, and Moores Fork suffered from cattle damage. Pre-construction, or pre-existing, site conditions are provided in Table 4 of Appendix A and the Baseline Stream Data Summary Tables in Appendix D. Photos and a more detailed description of Site conditions before restoration are available in the Mitigation Plan (Final version submitted May 2019).

1.1 Goals and Objectives

The Project goals were established based on an assessment of site conditions and restoration potential with careful consideration of the stressors identified in the Upper Yadkin Pee-Dee River Basin Restoration Priorities (RBRP) report (NCEEP, 2009) and Yadkin Pee-Dee Basinwide Water Quality Plan (NCDWQ, 2008). As such, the established project goals include:

- Reduce sediment inputs and stream turbidity;
- Reduce nutrient inputs;
- Reduce fecal coliform inputs;
- Restore/enhance degraded riparian buffers;
- Reduce urban/suburban stormwater runoff;
- Reduce stream channel and stream bank instability; and
- Implement structural agricultural BMPs in agricultural watersheds.

Site construction was completed in May 2020 and the as-built survey was completed in June 2020. Planting and baseline vegetation data collection occurred in May – June 2020. A detailed timeline of the Project activity and reporting history are provided in Table 2 of Appendix A. During construction, multiple grade control and lateral stability structures were added as a response to the lack of sod mats on site. These modifications had the added benefit of adding additional woody debris to the restored stream systems. Also, UT2 and UT3 profiles were adjusted to account for differences between the design elevation model and the actual ground surface during construction. All changes from the design are detailed below in Section 1.3.1. Baseline (MY0) profiles and cross-section dimensions closely match the design parameters with little variation. The Site was built as designed and is expected to meet the upcoming monitoring year's success criteria.

The proposed streams were broken into seven reaches for design purposes. UT1 and UT2 are comprised of one reach each, UT3 is broken into two reaches at the point where it merges with UT2, and Moores Fork is broken into three reaches. Moores Fork Reach 1 is an enhancement reach that includes creating a bankfull bench, sloping, and riparian buffer planting. Moores Fork Reach 2 and 3 are separated by the bridge at Race Track Road. The design criteria were based on surveys of multiple reference reaches, published reference reach data, and design criteria and monitoring data from past successful restoration projects performed throughout the Piedmont region of North Carolina. Restoration practices involved raising the streambeds of the project streams and restoring them back to their historic locations along the fall of the valley, thereby restoring historic flow dynamics and a healthy headwater stream complex. Buffers in excess of 30 feet were established along most reaches.

Ecological uplift will come from: 1) excluding livestock from all streams and buffers, 2) restoring the project streams to a stable, functioning condition, 3) restoring natural riparian vegetation, 4) conversion of row crops to forested buffer, and 5) protecting all areas with a conservation easement. The exclusion of livestock will remove a direct source of nutrients, fecal coliform, and sediment from the system. The Project has restored the plan form and bed form diversity to conditions similar to reference channels (Appendix D, Table 8). Functional uplift was achieved by incorporating woody structures throughout the reach and by planting a forested buffer that will serve as a source of large woody debris in the future. Additionally, lateral stability was improved in the short term by removing the cattle and reducing shear stresses in the channel. As the riparian buffer continues to establish, lateral stability should improve further and increase the resiliency of the restored channels.

1.2 Mitigation Components

The current condition plan view (CCPV) in Appendix B (Figure 2) shows the mitigation assets along with the location of monitoring features. Post-construction conditions (Appendix A, Table 1) at the Site generated 10,649.2 SMUs as a result of the following:

- 9,498 linear feet of Priority 1 and 2 stream restoration
- 1,573 linear feet of Enhancement 2

- 522 SMUs for riparian buffers outside of the required 30-foot stream buffers were protected and planted within the conservation easement.

As illustrated in the As-Built Plan Sheets in Appendix E, the plan form of the proposed streams did not deviate significantly from the proposed design and the stream lengths are unchanged from the approved mitigation plan.

Additional construction activities performed at the Site included the following:

- Planting approximately 6,800 live stakes and 16,300 bare root seedlings within the easement,
- Fencing of the conservation easement in locations with livestock,
- Installing a well, multiple cattle waterers, water lines, and fencing to support these facilities, and
- Treating agriculture drainage with BMPs.

1.3 Construction

Construction began in October 2019 and site earthwork was completed in May 2020. Construction progress was slow due to almost weekly precipitation during this time frame. During construction, there were multiple bankfull, or near bankfull, discharge events. Site visits frequently documented rack lines and recent sediment deposition in the floodplain of the newly built channels. The gage records at the Yadkin River in Elkin confirm that at least two events above bankfull occurred during construction.

Deviations from the design are shown in the As-Built Plan Sheets (Appendix E) and are described in detail within this section.

1.3.1 In-Stream Work and Floodplain Grading

The As-Built Plan Sheets (Appendix E) provide a visual markup of the design to show what was installed during construction. The Site was built as designed and is expected to meet the upcoming monitoring year's success criteria.

During construction, the Site experienced multiple bankfull flow events with minimal lateral and vertical adjustment. Additional structures were added throughout the UTs and Moores Fork to address any adjustments to the flood events and are listed in Appendix D in Table 11. The adjustments for the UT2 and UT3 profiles are depicted in the As-Built Plan Sheets (Appendix E).

As shown in Appendix D, the dimensions of the surveyed cross sections closely matched the design criteria. The location of some monitoring cross sections were moved from the Mitigation Plan proposed locations due to the additional structures that were added during construction. Monitoring locations were kept as close as possible to the locations shown in the Approved Mitigation Plan.

As shown in the As-built Plan Sheets in Appendix E, the centerline profile was built roughly to the planned dimensions.

1.4 Site Planting

Approximately 90% of the site planting occurred by March 31, 2020 with the rest being planted on May 3, 2020. All planting was completed according to the design and there were no deviations from the planting plan.

2.0 BASELINE DATA ASSESSMENT

This report establishes the baseline data that will be used to determine the success of the Stewarts Creek Stream Restoration Project. The performance criteria and as-built site conditions are described in the following sections to evaluate whether the project is meeting the success criteria in subsequent monitoring years.

2.1 Performance Criteria

Project success criteria were established in accordance with the *NCDMS Mitigation Plan Template* (ver. 06/2017), and *U.S. Army Corps of Engineers – Wilmington District Public Notice: Notification of Issuance of Guidance for Compensatory Stream and Wetland Mitigation Conducted for Wilmington District* (October 24, 2016). The monitoring plan for the site will follow this guidance. Table A details the USACE success criteria that evaluate whether project goals have been met throughout the monitoring period.

Table A. USACE Mitigation Success Criteria

Restored Stream Channels
• All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05. • Continuous surface flow must be documented each year for at least 30 consecutive days. • Bank height ratio (BHR) cannot exceed 1.2 for all measured cross sections on a given reach. • Entrenchment ratio (ER) must be above 2.2 for all measured riffle cross-sections on a given reach (for C and E streams). • BHR and ER should not change by more than 10% in any given year for all measured cross sections on a given reach. • Must document occurrence of at least 4 bankfull events in separate years during the monitoring period.
Riparian 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 4; 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. • Planted and volunteer stems are counted, provided they are included in the approved planting list for the site.

- Any single species can only account for 50% of the required stems per monitoring plot.

2.2 Stream Monitoring

Stream monitoring will include monitoring of the hydrologic and geomorphic functions of UT1, UT2, UT3, and Moores Fork. Monitored parameters, methods, schedule/frequency, and extent are summarized in Table B. These monitoring parameters follow USACE guidance, but will also allow for monitoring of other parameters to document site performance related to the project goals listed in Section 1.1. The locations of the established monitoring cross sections are shown in Figure 2 (Appendix B).

Table B. Stream Monitoring Summary

Parameter	Method	Schedule/ Frequency	Number/ Extent
Stream Profile	Full longitudinal survey	As-built only (unless otherwise required)	All restored and enhanced stream channels
Stream Dimension [A]	Cross sections	Years 1, 2, 3, 5, and 7	17 cross sections on UTs 9 cross sections on Moores Fork
Channel Stability	Photo Points	Yearly	38 photo points
	Visual Assessment	Yearly	All restored stream channels
	Additional Cross sections	Yearly	Only if instability is documented during monitoring
Stream Hydrology	Pressure transducers Precipitation recorder Photos of flood indicators	Continuous recording through monitoring period	Two gauges on UT1 and UT3; one gauge on UT2

[A] Parameters for stream dimension to be measured as described in the 2018 Standard Measurement of the bank height ratio monitoring parameter technical workgroup.

2.2.1 Stream Profile

A full longitudinal profile was surveyed for the entire length of the restored stream in May - June 2020 to document as-built conditions. This survey is tied to a permanent benchmark and includes thalweg, water surface, right bank, and left bank features. Profile measurements were taken at the head of each feature (e.g. riffle, pool) and at the max depth of pools. The locations of cross-sections are shown on the profile plot as well, which is included in Appendix D.

The data derived from the surveyed longitudinal profile shows that the constructed bedform features are consistent with the reference and design criteria. Table 8 in Appendix D summarizes the measured profile data. The longitudinal profile will not be surveyed in subsequent years unless vertical channel instability has been observed during monitoring and remedial actions or repairs are needed.

2.2.2 Stream Dimension

Permanent cross sections were installed across the site to monitor stream stability through dimension change. Of the 26 permanent cross sections installed, 9 were located on Moores Fork and 17 on the UTs with 12 permanent cross sections installed in riffles and 14 in pools. Each cross-section was marked using a length of rebar and PVC pipe on both streambanks. The location and elevation of each pin was recorded to facilitate data comparison from year to year. Cross-sections will be surveyed in Monitoring Years 1, 2, 3, 5, and 7 and reported data will include measurements of Bank Height Ratio (BHR) and Entrenchment Ratio (ER). Reference photos will be taken of both streambanks every year to provide a visual assessment of any changes that may occur.

The surveyed cross-sections indicate that the as-built stream dimensions are consistent with the reference and design criteria. The cross-section plots, photos, and data summary (Tables 8 and 9) are included in Appendix D. These two tables will be updated in subsequent monitoring years to facilitate comparison between monitoring years. There should be little change in the channel dimension data over the monitoring period, but if changes do take place they will be documented and evaluated to determine if they indicate a shift toward stability (potentially represented by settling, vegetative changes, or deposition on top of stream banks) or instability (represented by erosion and down-cutting). Any unstable areas will be assessed to determine whether they are systemic and repairs are needed.

2.2.3 Channel Stability

Channel stability will be assessed on a yearly basis using photographs to visually document the condition of the restored project streams. Photographs will be taken from the same location in the same direction each year. 38 photo points were established during baseline monitoring and are shown in the CCPV (Figure 2) and As-Built Plan Sheets (Appendix E).

Visual assessments of channel stability will also be made regularly throughout the monitoring year. Any potential issues with the site will be documented, photographed, and reported in the yearly monitoring report. Additional cross-sections will only be surveyed if instability is documented during monitoring.

2.2.4 Stream Hydrology

Five pressure transducers were installed on to UTs to document stream flow and the occurrence of bankfull events within the monitoring period. The locations of these gauges are shown in the CCPV (Figure 2 in Appendix B) and As-Built Plan Sheets (Appendix E). All gauges were installed in the downstream end of pools. The constructed bankfull elevation at each gauge was recorded. This elevation will be compared with the gauge readings to determine whether a bankfull event has occurred. Photos will be taken of flood indicators such as debris lines and sediment deposition on the floodplain whenever it is apparent that a bankfull event has occurred.

A tipping bucket rain gauge was also installed at an adjacent site to accurately document rainfall at the Site. The rainfall data will be compared to the flow gauge data to verify that high flows at the Site are correlated with rainfall events. The monitoring gauges will be downloaded regularly throughout each monitoring year and data will be presented in the annual monitoring reports.

2.3 Riparian Vegetation

Riparian vegetation monitoring will evaluate the establishment of planted and volunteer vegetation across the site. Monitored parameters, methods, schedule/frequency, and extent are summarized in Table C. These monitoring parameters follow USACE guidance, but will also allow for monitoring of other parameters to document site performance related to the project goals listed in Section 1.1.

Table C. Riparian Vegetation Monitoring Summary

Parameter	Method	Schedule/ Frequency	Number/ Extent	Data Collected
Vegetation establishment and vigor	Permanent vegetation plots, 0.02* acre in size (minimum)	Between July 1st and leaf drop. As-built, Years 1, 2, 3, 5, and 7	11 plots, spread across site	Species, height, location, planted vs. volunteer, and age.
	Annual random vegetation plots, 0.02* acre in size (minimum)	Between July 1st and leaf drop. Years 1, 2, 3, 5, and 7	11 plots, randomly selected each year	Species, and height.

* Plots will be between 0.020 and 0.024 acre in size, at a minimum.

2.3.1 Baseline Vegetation Monitoring

Baseline vegetation monitoring occurred in May - June 2020, soon after site planting was completed. Final vegetation plot location did not vary significantly from the locations suggested in the mitigation plan. The corners of the permanent vegetation plots were marked using steel t-posts and the location of each plot was recorded using GPS. The individual trees within each permanent plot were tagged and labeled to facilitate monitoring efforts in future years. The planted stems were counted and measured during baseline monitoring. Species data will be collected during Monitoring Year 1. In subsequent monitoring years, the location of the temporary random vegetation plots will be recorded using GPS and species and height data will be collected.

Planted stems per plot ranged from 9 to 19, or 364 to 769 stems per acre. The locations of the 11 permanent vegetation plots are shown in the CCPV (Figure 2).

3.0 REFERENCES

North Carolina Ecosystem Enhancement Program. 2009. Upper Yadkin Pee-Dee River Basin Restoration Priorities.

North Carolina Department of Environmental Quality, Division of Mitigation Services. 2017. As-built Baseline Monitoring Report Format, Data, and Content Requirement June 2017.

North Carolina Division of Water Quality. 2008. Yadkin Pee-Dee Basinwide Water Quality Plan.

U.S. Army Corps of Engineers. 2016. Wilmington District Public Notice: Notification of Issuance of Guidance for Compensatory Stream and Wetland Mitigation Conducted for Wilmington District.

Appendix A: Project Information Tables

Table 1. Mitigation Assets and Components

Stewarts Creek Tributaries Stream Restoration Project (NCDMS Project No. 100023)

Project Component (reach ID, etc.)[1]	Wetland Position and HydroType[2]	Existing Footage or Acreage	Stationing	Mitigation Plan Footage or Acreage	As-Built Footage or Acreage	Restoration Level	Approach Priority Level	Mitigation Ratio (X:1)	Mitigation Credits	Notes/Comments
UT 1		2,373	10+00 - 38+00	2,742	2,742	R	P1, P2	1	2742	Full Channel Restoration, Planted Buffer, Exclusion of Livestock, and Permanent Conservation Easement.
UT 2		397	10+00 -20+60	1,009	1,009	R	P1, P2	1	1009	
UT 3 R1		1,814	10+00 -19+95	944	944	R	P1, P2	1	944	
UT 3 R2		N/A	19+95 -44+81	2,421	2,421	R	P1, P2	1	2421	
Moores Fork R1		1,660	10+00 - 25+72.5	1,573	1,573	E2	E2	2.5	629.2*	Habitat Structures, Benching, Planted Buffer, Exclusion of Livestock, and Permanent Conservation Easement.
Moores Fork R2		2,007	25+72.5 - 47+67	1,998	1,998	R	P2	1	1998	Full Channel Restoration, Planted Buffer, Exclusion of Livestock, and Permanent Conservation Easement.
Moores Fork R3		380	47+67 - 52+19	384	384	R	P2	1	384	
Net Change in Credit from Buffers		-	-	-	-	-	-	-	522	Wilmington District Stream Buffer Credit Calculator (Updated 1/19/2018)
						Total Assets Summary: 10,649.2 SMUs				

Length and Area Summations by Mitigation Category

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)
		Riverine	Non-Riverine	
Restoration	9,498			
Enhancement				
Enhancement I				
Enhancement II	1,573			
Rehabilitation				
Preservation				
High Quality Pres				

Overall Assets Summary

Asset Category	**Overall Credits**
Stream	**10,649.2**

*Moores Fork R1 mitigation credits were miscalculated in the draft as-built monitoring report and have been updated.

Table 2. Project Activity and Reporting History
Stewarts Creek Tributaries Stream Restoration Project (NCDMS Project No. 100023)

Elapsed Time Since grading complete:	**0 yrs 3 months**
Elapsed Time Since planting complete:	**0 yrs 3 months**
Number of reporting Years:	**0**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Institution Date	NA	May-17
404 permit date	NA	Jul-19
Final Mitigation Plan	2017 to 2019	May-19
Final Design – Construction Plans	2017 to 2019	Sep-19
Site Earthwork	NA	May-20
As-Built Survey Performed	May - June 2020	Jun-20
Bare root plantings	NA	Mar-20
As-built monitoring report (Year 0 Monitoring – baseline)	Jun-20	Oct-20
Year 1 Monitoring	2020	Nov-20
Year 2 Monitoring	2021	Nov-21
Year 3 Monitoring	2022	Nov-22
Year 4 Monitoring	2023	Nov-23
Year 5 Monitoring	2024	Nov-24
Year 6 Monitoring	2025	Nov-25
Year 7 Monitoring	2026	Nov-26

Table 3. Project Contacts Table
Stewarts Creek Tributaries Stream Restoration Project (NCDMS Project No. 100023)

Designer Primary project design POC	Ecosystem Planning and Restoration, PLLC 1150 SE Maynard Road, Suite 140 Cary, NC 27511 Kevin Tweedy, PE (919) 388-0787
Construction Contractor Construction contractor POC	Carolina Environmental Contracting 150 Pine Ridge Rd, Mt Airy, NC 27030 Wayne Taylor
Survey Contractor Survey contractor POC	Turner Land Surveying, PLLC PO Box 148, Swannanoa, NC 28778 Lissa Turner (919) 827-0745
Planting Contractor Planting contractor POC	Bruton Natural Systems, Inc. Charlie Bruton
Seeding Contractor Contractor point of contact	Carolina Environmental Contracting 150 Pine Ridge Rd, Mt Airy, NC 27030 Wayne Taylor
Seed Mix Sources	Green Resource
Nursery Stock Suppliers	Dykes & Son Nursery (931) 668-8833
Monitoring Performers	Ecosystem Planning and Restoration, PLLC
Stream Monitoring POC	Erin Bennett, EPR (919) 388-0787
Vegetation Monitoring POC	Tom Barrett, EPR (919) 388-0787

Table 4. Project Background Information
Stewarts Creek Tributaries Stream Restoration Project (NCDMS Project No. 100023)

Project Background Information	
Project Name	Stewarts Creek Tributaries Stream Restoration Project
County	Surry
Project Area (acres)	30
Project Coordinates (latitude and longitude)	latitude 36 deg 30’ 55” N, longitude 80 deg 41’ 41” W and latitude 36 deg 30’ 37” N, longitude 80 deg 42’ 01” W
Planted Acreage (Acres of Woody Stems Planted)	30
Project Watershed Summary Information	
Physiographic Province	Piedmont
River Basin	Yadkin Pee-Dee
USGS Hydrologic Unit 8-digit/14-digit	03040101/3040101100010
DWR Sub-basin	03-07-03
Project Drainage Area (Acres and Square Miles)	3001 acres/ 4.69 Sq.Mi. (Total)
Project Drainage Area Percentage of Impervious Area	Average 1%
Project Stream Thermal Regime	Cool
CGIA Land Use Classification	Average 35% Agriculture 50% Forested/Scrubland 11% Residential

Reach Summary Information

Parameters	Moores Fork	UT 1	UT 2	UT 3
Length of reach (linear feet)	3955	2742	1009	3365
Valley confinement	Unconfined	Unconfined	Unconfined	Unconfined
Drainage area (Acres and Square Miles)	4.4 Sq.Mi., 2816 Ac	0.11 Sq.Mi., 70 Ac	0.07 Sq.Mi., 45 Ac	0.11 Sq.Mi., 70 Ac
Perennial, Intermittent, Ephemeral	Perennial	Perennial	Perennial	Perennial
NCDWR Water Quality Classification	47	39	38	37
Stream Classification (existing)	F4	G4 -> F4	Channelized E4	F4
Stream Classification (proposed)	C4	C4	C4	C4
Evolutionary trend (Simon)	V	IV	IV	IV
FEMA classification	AE	AE	AE	AE

Regulatory Considerations

Parameters	Applicable?	Resolved?	Supporting Docs?
Water of the United States - Section 404	Yes	Yes	SAW-2017-01508
Water of the United States - Section 401	Yes	Yes	DWR #17-1043
Endangered Species Act	Yes	Yes	Categorical Exclusion Packet
Historic Preservation Act	No	Yes	Categorical Exclusion Packet
Coastal Zone Management Act (CZMA or CAMA)	No	NA	NA
FEMA Floodplain Compliance	Yes	Yes	CLOMR 19-04-3237R and Floodplain Development Permit PL201900063
Essential Fisheries Habitat	No	NA	NA

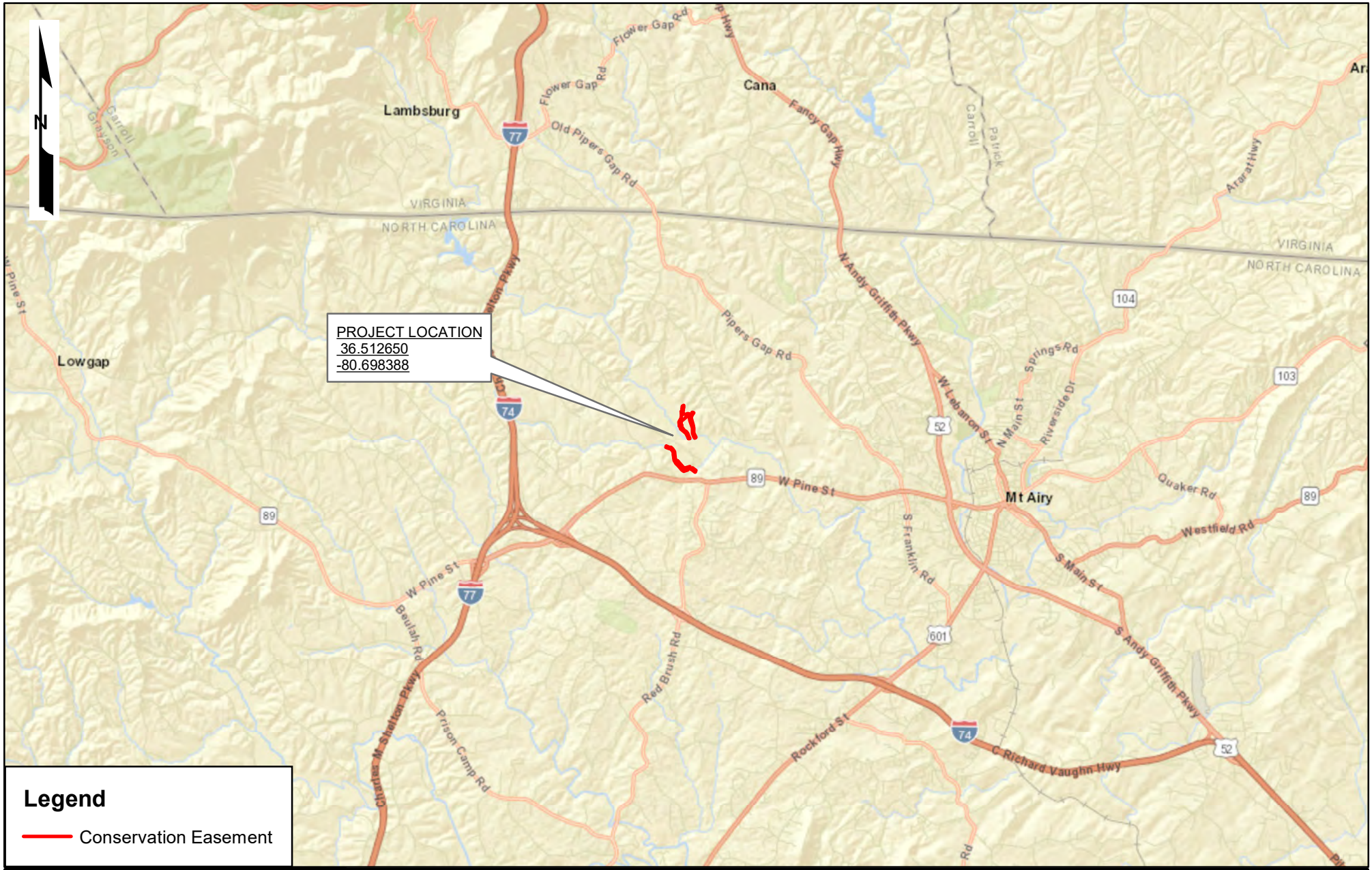
Appendix B: Visual Exhibits and Guidance

Figure 1. Vicinity Map

Figure 2. Current Condition Plan View (CCPV)

Baseline Photo Log

Vegetation Photo Log



STEWARTS CREEK TRIBUTARIES

VICINITY MAP

PREPARED FOR:

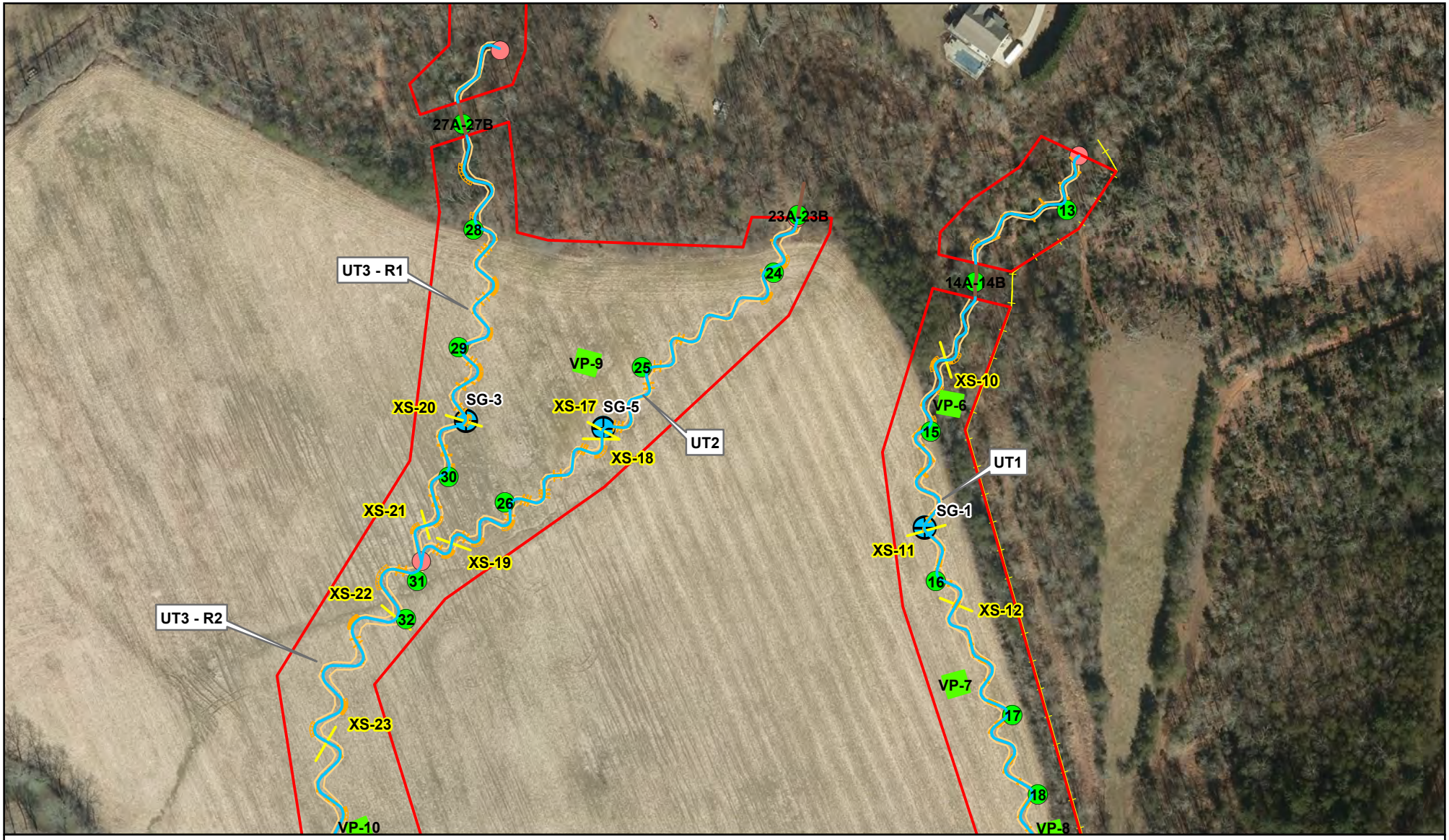
NCDEQ
DIVISION OF
MITIGATION SERVICES

FIGURE 1

SURRY COUNTY, NC

PREPARED BY:

Ecosystem Planning & Restoration



Streams - Enhancement
Streams - Restoration
No Credit
Conservation Easement
Structures
Top of Bank
Photo Points
Stream Gauges
Cross Sections
Veg Plots
Reach Breaks
Fence

NC OneMap Orthoimagery (2018)

0 100 200 Feet
1 inch = 200 feet

N

STEWARTS CREEK TRIBUTARIES STREAM RESTORATION PROJECT

Current Condition Plan View: Asset Map
MY0: 2020

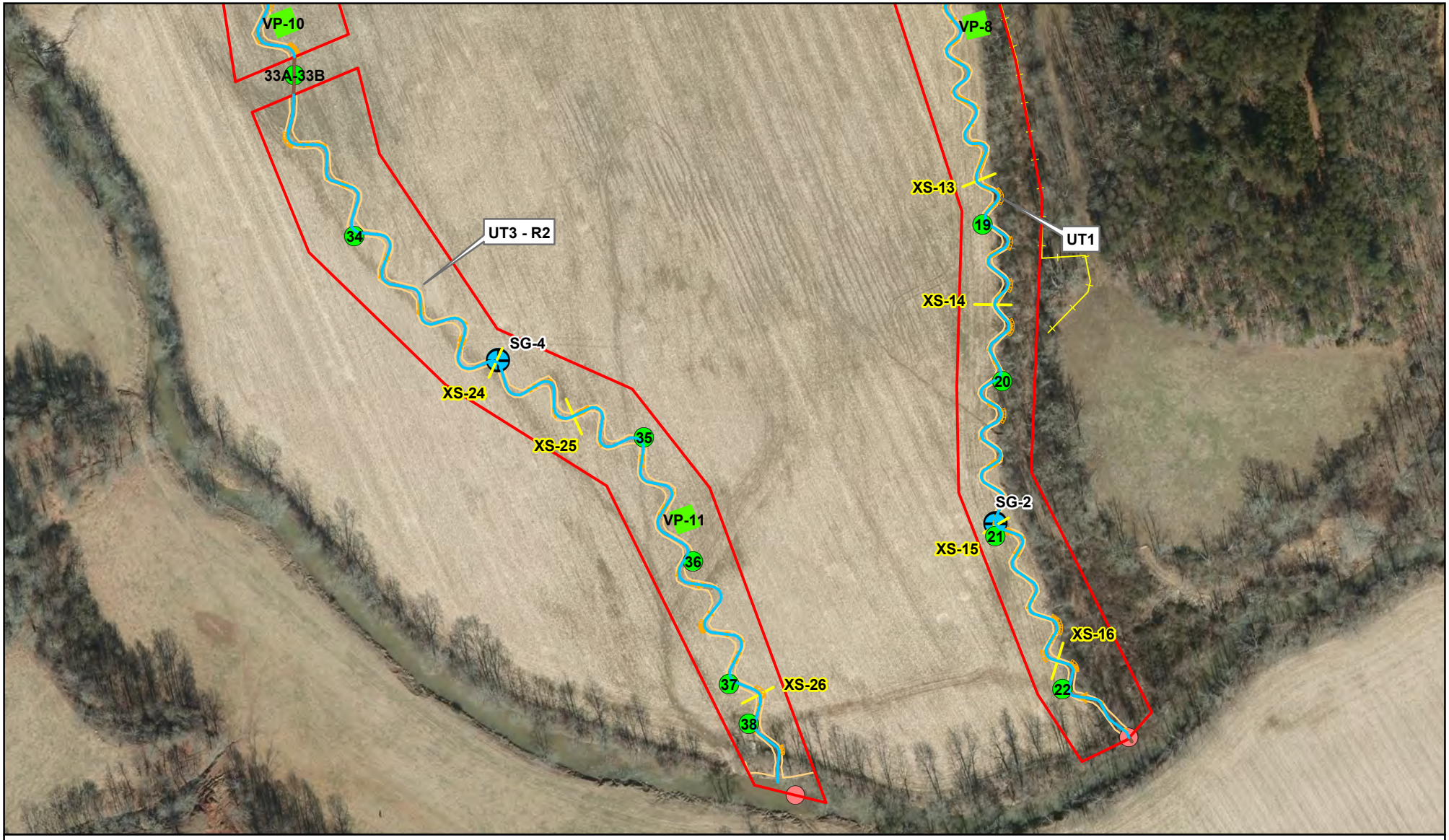
DMS Project ID# 100023
October 2020

FIGURE 2A

Surry County, NC

Mitigation Services Environmental Quality

Ecosystem Planning & Restoration



STEWARTS CREEK TRIBUTARIES STREAM RESTORATION PROJECT

CURRENT CONDITION PLAN VIEW: ASSET MAP
MY0: 2020

DMS PROJECT ID# 100023

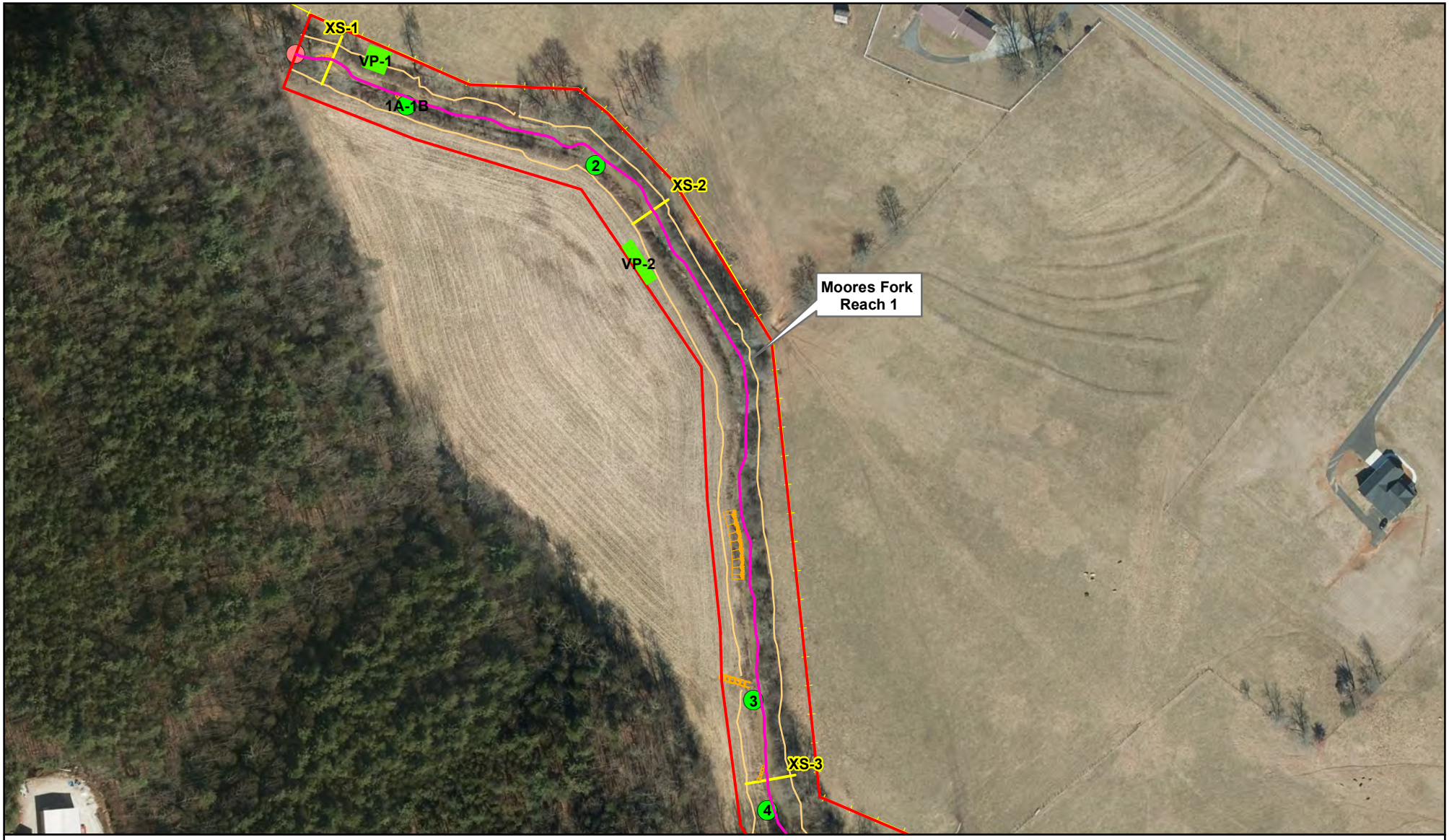
OCTOBER 2020

FIGURE 2B

SURRY COUNTY, NC

Mitigation Services ENVIRONMENTAL QUALITY

ECOSYSTEM PLANNING & RESTORATION



Streams - Enhancement
Streams - Restoration
No Credit
Conservation Easement
Structures
Top of Bank
Photo Points
Stream Gauges
Cross Sections
Veg Plots
Reach Breaks
Fence

NC OneMap Orthoimagery (2018)

0 100 200 Feet

1 inch = 200 feet

N

STEWARTS CREEK TRIBUTARIES STREAM RESTORATION PROJECT

Current Condition Plan View: Asset Map

MY0: 2020

DMS Project ID# 100023

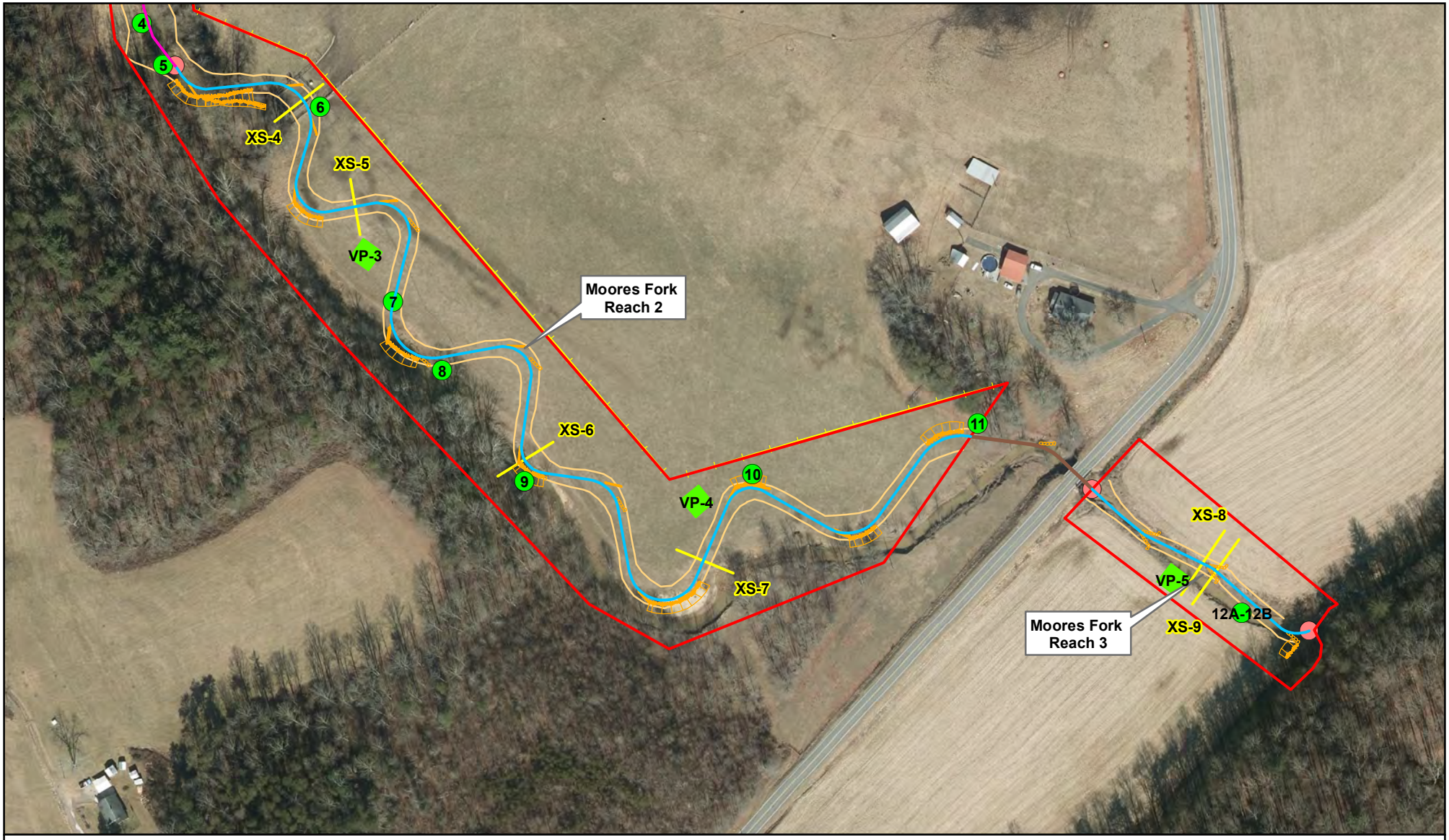
October 2020

FIGURE 2C

Surry County, NC

Mitigation Services Environmental Quality

Ecosystem Planning & Restoration



Streams - Enhancement
Streams - Restoration
No Credit
Conservation Easement
Structures
Top of Bank
Photo Points
Stream Gauges
Cross Sections
Veg Plots
Reach Breaks
Fence

NC OneMap Orthoimagery (2018)

0 100 200 Feet

1 inch = 200 feet

N

STEWARTS CREEK TRIBUTARIES STREAM RESTORATION PROJECT

CURRENT CONDITION PLAN VIEW: ASSET MAP

MY0: 2020

DMS PROJECT ID# 100023

OCTOBER 2020

FIGURE 2D

SURRY COUNTY, NC

Mitigation Services ENVIRONMENTAL QUALITY

ECOSYSTEM PLANNING & RESTORATION

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 1A – Moores Fork Reach 1, Sta. 11+81
Facing Upstream (6/11/2020)

Photo Point 1B – Moores Fork Reach 1, Sta. 11+81
Facing Downstream (6/11/2020)

Photo Point 2 – Moores Fork Reach 1, Sta. 14+79
Facing Downstream (6/11/2020)

Photo Point 3 – Moores Fork Reach 1, Sta. 23+37
Facing Downstream (6/11/2020)

Photo Point 4 – Moores Fork Reach 1, Sta. 24+96
Facing Upstream (6/11/2020)

Photo Point 5 – Moores Fork Reach 2, Sta. 25+61
Facing Downstream (6/11/2020)

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 6 – Moores Fork Reach 2, Sta. 27+97
Facing Downstream (6/11/2020)

Photo Point 7 – Moores Fork Reach 2, Sta. 32+21
Facing Upstream (6/11/2020)

Photo Point 8 – Moores Fork Reach 2, Sta. 33+48
Facing Upstream (6/11/2020)

Photo Point 9 – Moores Fork Reach 2, Sta. 36+47
Facing Upstream (6/11/2020)

Photo Point 10 – Moores Fork Reach 2, Sta. 41+77
Facing Upstream (6/11/2020)

Photo Point 11A – Moores Fork Reach 2, Sta. 45+79
Facing Upstream (6/11/2020)

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 11B – Moores Fork Reach 2, Sta. 45+79
Facing Downstream (6/11/2020)

Photo Point 12A – Moores Fork Reach 3, Sta. 50+54
Facing Upstream (6/11/2020)

Photo Point 12B – Moores Fork Reach 3, Sta. 50+54
Facing Downstream (6/11/2020)

Photo Point 13 – UT1, Sta. 10+84
Facing Upstream (6/11/2020)

Photo Point 14A – UT1, Sta. 12+91
Facing Upstream (6/11/2020)

Photo Point 14B – UT1, Sta. 12+91
Facing Downstream (6/11/2020)

ECOSYSTEM PLANNING & RESTORATION

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 15 – UT1, Sta. 15+52
Facing Upstream (6/11/2020))

Photo Point 16 – UT1, Sta. 18+34
Facing Upstream (6/11/2020)

Photo Point 17 – UT1, Sta. 21+12
Facing Upstream (6/11/2020)

Photo Point 18 – UT1, Sta. 22+81
Facing Upstream (6/11/2020)

Photo Point 19 – UT1, Sta. 27+39
Facing Upstream (6/11/2020)

Photo Point 20 – UT1, Sta. 30+35
Facing Upstream (6/11/2020)

ECOSYSTEM PLANNING & RESTORATION

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 21 – UT1, Sta. 33+42
Facing Upstream (6/11/2020)

Photo Point 22 – UT1, Sta. 36+73
Facing Downstream (6/11/2020)

Photo Point 23A – UT2, Sta. 10+47
Facing Upstream (6/11/2020)

Photo Point 23B – UT2, Sta. 10+47
Facing Downstream (6/11/2020)

Photo Point 24 – UT2, Sta. 11+57
Facing Upstream (6/11/2020)

Photo Point 25 – UT2, Sta. 14+65
Facing Upstream (6/11/2020)

ECOSYSTEM PLANNING & RESTORATION

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 26 – UT2, Sta. 18+32
Facing Upstream (6/11/2020)

Photo Point 27A – UT3 Reach 1, Sta. 11+51
Facing Upstream (6/11/2020)

Photo Point 27B – UT3 Reach 1, Sta. 11+51
Facing Downstream (6/11/2020)

Photo Point 28 – UT3 Reach 1, Sta. 13+35
Facing Upstream (6/11/2020)

Photo Point 29 – UT3 Reach 1, Sta. 15+88
Facing Upstream (6/11/2020)

Photo Point 30 – UT3 Reach 1, Sta. 18+28
Facing Upstream (6/11/2020)

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 31 – UT3 Reach 2, Sta. 20+10
Facing Upstream (6/11/2020)

Photo Point 32 – UT3 Reach 2, Sta. 21+27
Facing Upstream (6/11/2020)

Photo Point 33A – UT3 Reach 2, Sta. 27+44
Facing Upstream (6/11/2020)

Photo Point 33B – UT3 Reach 2, Sta. 27+44
Facing Downstream (6/11/2020)

Photo Point 34 – UT3 Reach 2, Sta. 30+47
Facing Upstream (6/11/2020)

Photo Point 35 – UT3 Reach 2, Sta. 37+79
Facing Upstream (6/11/2020)

Stewarts Creek Tributaries Stream Restoration Project
Baseline - Photo Log

Photo Point 36 – UT3 Reach 2, Sta. 40+06
Facing Upstream (6/11/2020)

Photo Point 37 – UT3 Reach 2, Sta. 42+81
Facing Upstream (6/11/2020)

Photo Point 38 – UT3 Reach 2, Sta. 43+70
Facing Downstream (6/11/2020)

Stewarts Creek Tributaries Stream Restoration Project
Vegetation Photo Log

Veg Plot 1 – E Corner (5/26/2020)

Veg Plot 2 – NW Corner (5/26/2020)

Veg Plot 3 – N Corner (6/11/2020)

Veg Plot 4 – S Corner (6/11/2020)

Veg Plot 5 – S Corner (6/11/2020)

Veg Plot 6 –SE Corner (6/11/2020)

Veg Plot 7 – SE Corner (6/11/2020)

Veg Plot 8 – SW Corner (6/11/2020)

Veg Plot 9 – SE Corner (6/11/2020)

Veg Plot 10 – N Corner (6/11/2020)

Veg Plot 11 – SW Corner (6/11/2020)

Appendix C: Vegetation Plot Data

Table 5. Vegetation Planting Information

Table 6. Riparian Buffer Vegetation Totals

Table 7. Stem Count by Plot

Table 5. Vegetation Planting Information
Stewarts Creek Tributaries Stream Restoration Project (DMS No.100023)

Zone 1 - Livestake Planting (2.4 acres)			
Scientific Name	**Common Name**	**% by Species**	**Approx. Stem Count**
Cornus amomum	Silky Dogwood	40%	2722
Salix sericea	Silky Willow	30%	2041
Salix nigra	Black Willow	20%	1361
Sambucus canadensis	Elderberry	10%	680
	Total	100%	6804

Zone 2 - Riparian Vegetation (8'x8' spacing, 680 stems/acre)				
Scientific Name	**Common Name**	**% by Species**	**Approx. Stem Count**	**Wetland Indicator Status**
Betula nigra	River Birch	15%	2224	FACW
Carpinus caroliniana	Ironwood	10%	1482	FAC
Celtis laevigata	Sugarberry	5%	741	FACW
Diospryos virginiana	Persimmon	10%	1482	FAC
Fraxinus pennsylvanica	Green Ash	5%	741	FACW
Platanus occidentalis	Sycamore	20%	2965	FACW
Quercus nigra	Water Oak	10%	1482	FAC
Quercus phellos	Willow Oak	15%	2224	FAC
Ulmus americana	American Elm	10%	1482	FACW
	Total	100%	14824	

Zone 3 - Upland Vegetation (8'x8' spacing, 680 stems/acre)				
Scientific Name	**Common Name**	**% by Species**	**Approx. Stem Count**	**Wetland Indicator Status**
Carya glabra	Pignut Hickory	10%	150	FACU
Carya tomentosa	Mockernut Hickory	10%	150	NI
Cercis canadensis	Redbud	5%	75	FACU
Cornus florida	Flowering Dogwood	5%	75	FACU
Diospyros virginiana	Persimmon	10%	150	FAC
Ilex opaca	American Holly	5%	75	FACU
Juniperus virginiana	Eastern Red Cedar	5%	75	FACU
Liriodendron tulipifera	Tulip Poplar	10%	150	FACU
Oxydendrum arboreum	Sourwood	5%	75	UPL
Prunus serotina	Black Cherry	5%	75	FACU
Quercus alba	White Oak	10%	150	FACU
Quercus falcata	Southern Red Oak	10%	150	FACU
Quercus rubra	Northern Red Oak	10%	150	FACU
	Total	100%	1496	

Table 6. Riparian Buffer Vegetation Totals

Plot #	Total Stems per Acre	Success Criteria Met?
1	728	Yes
2	769	Yes
3	364	Yes
4	688	Yes
5	486	Yes
6	688	Yes
7	688	Yes
8	607	Yes
9	567	Yes
10	526	Yes
11	567	Yes
Project Avg	607	Yes

Table 7. Stem Count By Plot
Stewarts Creek Tributaries Stream Restoration Project (DMS No.100023)

Scientific Name	Common Name	Species Type	Current Plot Data (MY0 2020)																	
			VP-1			VP-2			VP-3			VP-4			VP-5			VP-6		
			Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total
Betula nigra	River Birch	Tree																		
Carpinus caroliniana	Ironwood	Tree																		
Carya glabra	Pignut Hickory	Tree																		
Carya tomentosa	Mockernut Hickory	Tree																		
Celtis laevigata	Sugarberry	Tree																		
Cercis canadensis	Redbud	Tree																		
Cornus florida	Flowering Dogwood	Tree																		
Diospryos virginiana	Persimmon	Tree																		
Fraxinus pennsylvanica	Green Ash	Tree																		
Ilex opaca	American Holly	Tree																		
Juniperus virginiana	Eastern Red Cedar	Tree																		
Liriodendron tulipifera	Tulip Poplar	Tree																		
Oxydendrum arboreum	Sourwood	Tree																		
Platanus occidentalis	Sycamore	Tree																		
Prunus serotina	Black Cherry	Tree																		
Quercus alba	White Oak	Tree																		
Quercus falcata	Southern Red Oak	Tree																		
Quercus nigra	Water Oak	Tree																		
Quercus phellos	Willow Oak	Tree																		
Quercus rubra	Northern Red Oak	Tree																		
Ulmus americana	American Elm	Tree																		
Initial count of bare root planted stems, species TBD			18	0	18	19	0	19	9	0	9	17	0	17	12	0	12	17	0	17
Stem count			18	0	18	19	0	19	9	0	9	17	0	17	12	0	12	17	0	17
size (ares)			1			1			1			1			1			1		
size (ACRES)			0.024710			0.024710			0.024710			0.024710			0.024710			0.024710		
Species count			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Stems per ACRE			728	0	728	769	0	769	364	0	364	688	0	688	486	0	486	688	0	688

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer Species Included in Total

Table 7. Stem Count By Plot (continued)
Stewarts Creek Tributaries Stream Restoration Project (DMS No.100023)

Scientific Name	Common Name	Species Type	Current Plot Data (MY0 2020)															Annual Means		
			VP-7			VP-8			VP-9			VP-10			VP-11			MY0 (2020)		
			Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total	Planted	Vol	Total
Betula nigra	River Birch	Tree																0	0	0
Carpinus caroliniana	Ironwood	Tree																0	0	0
Carya glabra	Pignut Hickory	Tree																0	0	0
Carya tomentosa	Mockernut Hickory	Tree																0	0	0
Celtis laevigata	Sugarberry	Tree																0	0	0
Cercis canadensis	Redbud	Tree																0	0	0
Cornus florida	Flowering Dogwood	Tree																0	0	0
Diospryos virginiana	Persimmon	Tree																0	0	0
Fraxinus pennsylvanica	Green Ash	Tree																0	0	0
Ilex opaca	American Holly	Tree																0	0	0
Juniperus virginiana	Eastern Red Cedar	Tree																0	0	0
Liriodendron tulipifera	Tulip Poplar	Tree																0	0	0
Oxydendrum arboreum	Sourwood	Tree																0	0	0
Platanus occidentalis	Sycamore	Tree																0	0	0
Prunus serotina	Black Cherry	Tree																0	0	0
Quercus alba	White Oak	Tree																0	0	0
Quercus falcata	Southern Red Oak	Tree																0	0	0
Quercus nigra	Water Oak	Tree																0	0	0
Quercus phellos	Willow Oak	Tree																0	0	0
Quercus rubra	Northern Red Oak	Tree																0	0	0
Ulmus americana	American Elm	Tree																0	0	0
Initial count of bare root planted stems, species TBD			17	0	17	15	0	15	14	0	14	13	0	13	14	0	14	165	0	165
Stem count			17	0	17	15	0	15	14	0	14	13	0	13	14	0	14	165	0	165
size (ares)			1			1			1			1			1			11		
size (ACRES)			0.024710			0.024710			0.024710			0.024710			0.024710			0.271813		
Species count			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Stems per ACRE			688	0	688	607	0	607	567	0	567	526	0	526	567	0	567	607	0	607

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer Species Included in Total

Appendix D: Stream Measurements and Geomorphology Data

Table 8a. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT 1 (2742 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	4	7	4.6	4.3	5.0	5.1	5.7	0.6	4	5.6	6.1	-	6.6	-	-	5.6	6.1	6.6	6.0	6.6	7.0	7.0	-	3
Floodprone Width (ft)				5.7	7.3	7.0	9.7	1.9	4	13.4	18.9	-	24.4	-	-	13.4	18.9	24.4	49.7	52.1	52.2	54.3	-	3
Bankfull Mean Depth (ft)	0.5	0.8	0.7	0.5	0.5	0.5	0.6	0.1	4	0.4	0.6	-	0.7	-	-	0.4	0.5	0.7	0.6	0.6	0.6	0.6	-	3
[1]Bankfull Max Depth (ft)				0.7	0.7	0.7	0.8	0.1	4	1.2	1.3	-	1.4	-	-	0.6	0.7	0.8	0.8	0.9	0.8	1.0	-	3
Bankfull Cross Sectional Area (ft^2)	3.1	4.8	3.1	2.0	2.6	2.7	3.1	0.5	4	2.2	3.4	-	4.6	-	-	3.2	3.2	3.2	3.7	3.8	3.9	3.9	-	3
Width/Depth Ratio				8.5	10.0	9.7	12.0	1.5	4	10.0	12.0	-	14	-	-	10.0	12.0	14.0	9.6	11.6	12.5	12.6	-	3
Entrenchment Ratio				1.2	1.5	1.4	1.9	0.3	4	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	7.1	7.9	7.5	9.1	-	3
[1]Bank Height Ratio				5.6	8.4	7.7	12.5	3.1	4	1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.0	1.0	1.0	1.1	-	3
Profile																								
Riffle Length (ft)				5.0	26.2	20.7	94.4	23.0	13	Total riffle length 60-70% of reach length						5.0	29.0	41.0	5.3	15.1	14.3	39.1	6.2	56
Riffle Slope (ft/ft)				0.012	0.044	0.038	0.084	0.025	13	-	-	-	-	-	-	0.009	0.024	0.075	0.008	0.037	0.034	0.086	0.019	56
Pool Length (ft)				5.8	11.3	9.5	22.0	4.6	13	Total pool length 30-40% of reach length						3.0	11.0	16.0	7.4	21.2	20.9	39.1	8.0	56
Pool Max depth (ft)				0.8	1.0	1.0	1.4	0.1	4	0.8	1.6	-	2.5	-	-	1.1	1.2	1.9	1.0	1.5	1.4	2.2	0.3	57
Pool Spacing (ft)				9.6	24.00	20.3	59.9	12.7	25	18	33.5	-	49	-	-	18.0	33.5	49.0	19.0	38.4	40.0	71.3	8.8	72
Pattern																								
Channel Beltwidth (ft)				6.2	16.9	16.5	34.1	7.5	18	18.3	27.5	-	36.6	-	-	18.3	27.5	36.6	12.7	28.4	30.4	37.0	6.5	67
Radius of Curvature (ft)				5.3	11.1	12.3	18.3	3.6	20	12.2	16.8	-	21.4	-	-	12.2	16.8	21.4	9.3	14.8	14.3	21.3	2.1	69
Rc:Bankfull width (ft/ft)				1.1	2.2	2.4	3.6	0.7	20	2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	1.4	2.2	2.2	3.2	0.4	69
Meander Wavelength (ft)				24.3	45.7	41.8	79.0	14.2	18	42.7	58.0	-	73.2	-	-	30.5	51.9	73.2	35.7	60.0	61.4	73.4	8.9	71
Meander Width Ratio				4.8	9.1	8.3	15.7	14.2	18	3.0	4.5	-	6.0	-	-	3.0	4.5	6.0	1.9	4.3	4.6	5.6	1.5	67
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				0.66												0.56			0.65					
Max part size (mm) mobilized at bankfull				72												72			111					
Stream Power (transport capacity) lb/s				10												9			9					
Additional Reach Parameters																								
Rosgen Classification				G4->F4						C4						Cb4			C4					
Bankfull Velocity (fps)	1.0	10.8	5.8	3.2												2.5			2.1					
Bankfull Discharge (cfs)	4	40	18.1	8 to 16												8								
Valley length (ft)				1840						-						2158								
Channel Thalweg length (ft)				2373						-						2805			2805					
Sinuosity (ft)				1.29						1.2 to 1.4						1.3			1.3					
Water Surface Slope (Channel) (ft/ft)				0.021						-						0.018			0.018					
BF slope (ft/ft)				0.021						-						0.018			0.018					
[3]Bankfull Floodplain Area (acres)				0.310						-						0.9			0.9					
[4]% of Reach with Eroding Banks				80%						-														
Channel Stability or Habitat Metric				0.58						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8b. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT 2 (1009 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	4	7	3.8	2.5	3.5	3.5	4.5	-	2	4.7	5.1	-	5.5	-	-	4.7	5.1	5.5	5.5	5.8	5.8	6.1	-	2
Floodprone Width (ft)				6.5	9.3	9.3	12.0	-	2	11.2	15.8	-	20.4	-	-	11.2	15.8	20.4	50.8	51.4	51.4	52.0	-	2
Bankfull Mean Depth (ft)	0.5	0.8	0.6	0.5	0.7	0.7	0.9	-	2	0.3	0.5	-	0.6	-	-	0.3	0.4	0.6	0.4	0.5	0.5	0.5	-	2
[1]Bankfull Max Depth (ft)				0.7	0.9	0.9	1.0	-	2	1.1	1.8	-	2.4	-	-	0.5	0.6	0.7	0.7	0.7	0.7	0.7	-	2
Bankfull Cross Sectional Area (ft^2)	2	3	2.2	2.1	2.2	2.2	2.3	-	2	1.4	2.4	-	3.3	-	-	11.2	15.8	20.4	2.4	2.8	2.8	3.1	-	2
Width/Depth Ratio				2.8	6.2	6.2	9.5	-	2	10.0	12.0	-	14	-	-	10.0	12.0	14.0	12.0	12.2	12.2	12.5	-	2
Entrenchment Ratio				1.5	3.2	3.2	4.8	-	2	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	8.3	8.9	8.9	9.5	-	2
[1]Bank Height Ratio				4.0	7.5	7.5	10.9	-	2	1.0	1.0	-	1.0	-	-	1.0	1.0	1.1	1.0	1.1	1.1	1.1	-	2
Profile																								
Riffle Length (ft)				6.6	19.3	14.0	35.9	11.8	7	Total riffle length 60-70% of reach length						22.0	25.0	32.0	5.0	16.4	18.0	27.1	6.0	25
Riffle Slope (ft/ft)				0.015	0.027	0.023	0.047	0.011	7	-	-	-	-	-	-	0.011	0.027	0.045	0.02	0.045	0.043	0.083	0.017	25
Pool Length (ft)				7.1	10.6	8.5	20.3	4.7	8	Total pool length 30-40% of reach length						6.0	10.0	21.0	5.1	14.5	14.3	21.9	4.2	26
Pool Max depth (ft)				0.7	0.8	0.8	1.5	-	2	0.6	1.4	-	2.1	-	-	0.9	1.0	1.6	0.8	1.2	1.1	1.8	0.2	26
Pool Spacing (ft)				13.3	23.6	18.9	44.8	10.3	15	20.4	28.1	-	35.7	-	-	15.3	28.1	40.8	24.9	36.0	35.0	42.0	2.8	27
Pattern																								
Channel Beltwidth (ft)				4.8	7.9	7.3	12.3	2.2	15	15.3	23.0	-	30.6	-	-	15.3	23.0	30.6	23.2	27.2	27.5	32.6	2.5	27
Radius of Curvature (ft)				4.8	8.0	7.8	13.8	2.1	16	10.2	14.0	-	17.9	-	-	10.2	14.1	17.9	10.6	12.7	12.4	15.9	1.7	28
Rc:Bankfull width (ft/ft)				1.4	2.3	2.2	3.9	0.6	16	2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	1.8	2.2	2.1	2.7	0.3	28
Meander Wavelength (ft)				13.6	37.4	37.0	68.3	18.7	15	35.7	48.5	-	61.2	-	-	25.5	43.4	61.2	40.4	54.4	52.9	92.0	9.2	28
Meander Width Ratio				3.9	10.7	10.6	19.5	18.7	15	3.0	4.5	-	6.0	-	-	3.0	4.5	6.0	4.0	4.7	4.7	5.6	1.5	27
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				1.1												0.5			0.62					
Max part size (mm) mobilized at bankfull				67												67			107					
Stream Power (transport capacity) lb/s				13												10			10					
Additional Reach Parameters																								
Rosgen Classification				Channelized E4						Cb						Cb4			Cb4					
Bankfull Velocity (fps)	1.0	10.8	5.9	3.7												3.6			2.9					
Bankfull Discharge (cfs)	4	40	13.0	8												8								
Valley length (ft)				374						-						1358								
Channel Thalweg length (ft)				397						-						1060			1060					
Sinuosity (ft)				1.06						1.2 to 1.4						1.34			1.3					
Water Surface Slope (Channel) (ft/ft)				0.026						-						0.022			0.0208					
BF slope (ft/ft)				0.026						-						0.022			0.0208					
[3]Bankfull Floodplain Area (acres)				0.1						-						0.5			0.5					
[4]% of Reach with Eroding Banks				70%						-														
Channel Stability or Habitat Metric				0.24						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8c. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT 3 R1 (994 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	4	7	4.6	4.1	4.9	4.9	5.8	-	3	4.7	5.1	-	5.5	-	-	5.6	6.1	6.6	5.9	5.9	5.9	5.9	-	1
Floodprone Width (ft)				5.8	11.4	7.6	20.7	-	3	11.2	15.8	-	20.4	-	-	13.4	18.9	24.4	41.6	41.6	41.6	41.6	-	1
Bankfull Mean Depth (ft)	0.5	0.8	0.7	0.4	0.6	0.7	0.7	-	3	0.3	0.5	-	0.6	-	-	0.4	0.5	0.7	0.5	0.5	0.5	0.5	-	1
[1]Bankfull Max Depth (ft)				0.6	1.0	1.0	1.4	-	3	1.1	1.8	-	2.4	-	-	0.6	0.7	0.8	0.7	0.7	0.7	0.7	-	1
Bankfull Cross Sectional Area (ft^2)	3.1	4.8	3.1	2.3	3.0	2.9	3.7	-	3	1.4	2.4	-	3.3	-	-	3.2	3.2	3.2	3.2	3.2	3.2	3.2	-	1
Width/Depth Ratio				5.9	9.0	6.6	14.4	-	3	10.0	12.0	-	14	-	-	10.0	12.0	14.0	11.1	11.1	11.1	11.1	-	1
Entrenchment Ratio				1.0	2.5	1.6	5.0	-	3	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	7.1	7.1	7.1	7.1	-	1
[1]Bank Height Ratio				2.7	4.2	4.0	5.8	-	3	1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.1	1.1	1.1	1.1	-	1
Profile																								
Riffle Length (ft)				9.1	34.4	32.4	89.8	25.6	10	Total riffle length 60-70% of reach length						11.0	31.0	46.0	6.4	16.6	14.7	32.3	8.1	22
Riffle Slope (ft/ft)				0.001	0.029	0.030	0.051	0.015	10	-	-	-	-	-	-	0.016	0.027	0.064	0.020	0.047	0.044	0.089	0.018	22
Pool Length (ft)				7.7	17.9	16.3	29.8	7.5	10	Total pool length 30-40% of reach length						7.0	11.0	18.0	5.0	13.6	13.1	25.6	5.3	23
Pool Max depth (ft)				0.9	1.0	1.0	1.0	-	3	0.6	1.4	-	2.1	-	-	1.1	1.2	1.9	0.8	1.3	1.3	1.7	0.3	23
Pool Spacing (ft)				14.5	27.2	22.8	55.6	12.2	23	20.4	28.1	-	35.7	-	-	18.0	33.5	49.0	33.0	45.1	44.0	56.0	6.1	18
Pattern																								
Channel Beltwidth (ft)				6.0	12.8	8.7	37.0	8.6	21	15.3	23.0	-	30.6	-	-	18.3	27.5	36.6	16.4	31.0	32.4	39.3	5.5	20
Radius of Curvature (ft)				5.7	11.0	11.7	22.7	4.1	27	10.2	14.0	-	17.9	-	-	12.2	16.8	21.4	12.4	15.0	14.9	20.9	2.2	21
Rc:Bankfull width (ft/ft)				1.2	2.2	2.4	4.6	0.8	27	2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	2.1	2.6	2.5	3.6	0.4	21
Meander Wavelength (ft)				16.7	34.9	31.7	68.3	14.7	23	35.7	48.5	-	61.2	-	-	30.5	51.9	73.2	57.6	73.3	70.0	117.0	14.3	20
Meander Width Ratio				3.4	7.1	6.4	13.8	14.7	23	3.0	4.5	-	6.0	-	-	3.0	4.5	6.0	2.8	5.3	5.5	6.7	2.3	20
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				0.58												0.62			0.69					
Max part size (mm) mobilized at bankfull				62												62			116					
Stream Power (transport capacity) lb/s				9												11			12					
Additional Reach Parameters																								
Rosgen Classification				F4						Cb						Cb4			Cb4					
Bankfull Velocity (fps)	1.0	10.8	4.2	3												2.8			2.9					
Bankfull Discharge (cfs)	4	40	13.0	9												9								
Valley length (ft)				1385						-						802								
Channel Thalweg length (ft)				1814						-						994			994					
Sinuosity (ft)				1.31						1.2 to 1.4						1.24			1.2					
Water Surface Slope (Channel) (ft/ft)				0.016						-						0.02			0.0209					
BF slope (ft/ft)				0.016						-						0.02			0.0209					
[3]Bankfull Floodplain Area (acres)				0.4						-						0.3			0.3					
[4]% of Reach with Eroding Banks				60%						-														
Channel Stability or Habitat Metric				0.55						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8d. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT 3 R2 (2421 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	5	9	5.7							4.7	5.1	-	5.5	-	-	6.8	7.3	7.8	7.2	7.7	7.7	8.2	-	2
Floodprone Width (ft)										11.2	15.8	-	20.4	-	-	16.1	22.6	29.2	55.6	56.0	56.0	56.3	-	2
Bankfull Mean Depth (ft)	0.8	1.2	0.9							0.3	0.5	-	0.6	-	-	0.5	0.6	0.8	0.6	0.6	0.6	0.6	-	2
[1]Bankfull Max Depth (ft)										1.1	1.8	-	2.4	-	-	0.7	0.8	0.9	0.9	1.0	1.0	1.0	-	2
Bankfull Cross Sectional Area (ft^2)	4	5	4.4							1.4	2.4	-	3.3	-	-	4.4	4.4	4.4	4.5	4.7	4.7	4.9	-	2
Width/Depth Ratio										10.0	12.0	-	14	-	-	10.0	12.0	14.0	11.5	12.7	12.7	13.9	-	2
Entrenchment Ratio										2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	6.9	7.3	7.3	7.7	-	2
[1]Bank Height Ratio										1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.0	1.1	1.1	1.1	-	2
Profile																								
Riffle Length (ft)										Total riffle length 60-70% of reach length						12.0	41.0	57.0	5.0	18.1	16.2	39.3	9.8	40
Riffle Slope (ft/ft)										-	-	-	-	-	-	0.004	0.01	0.018	0.004	0.022	0.018	0.063	0.016	40
Pool Length (ft)										Total pool length 30-40% of reach length						8.0	15.0	22.0	7.9	17.4	16.2	38.3	6.4	41
Pool Max depth (ft)										0.6	1.4	-	2.1	-	-	1.3	1.4	2.2	1.2	1.6	1.6	2.5	0.2	41
Pool Spacing (ft)										20.4	28.1	-	35.7	-	-	29.2	86.0	58.4	43.0	55.6	56.0	70.0	6.0	43
Pattern																								
Channel Beltwidth (ft)										15.3	23.0	-	30.6	-	-	25.6	42	58.4	26.5	42.1	42.1	56.6	6.9	43
Radius of Curvature (ft)										10.2	14.0	-	17.9	-	-	14.6	20.1	25.6	15.7	18.6	19.0	23.0	1.7	45
Rc:Bankfull width (ft/ft)										2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	2.0	2.4	2.5	3.0	0.3	45
Meander Wavelength (ft)										35.7	48.5	-	61.2	-	-	51.1	69.4	87.6	66.9	81.9	81.2	130.3	10.9	44
Meander Width Ratio										3.0	4.5	-	6.0	-	-	3.5	5.8	8.0	3.4	5.4	5.5	7.3	1.8	43
Transport parameters																								
Reach Shear Stress (competency) lb/f^2																0.25			0.24					
Max part size (mm) mobilized at bankfull																62			54					
Stream Power (transport capacity) lb/s																7			7					
Additional Reach Parameters																								
Rosgen Classification										C4						C4			C4					
Bankfull Velocity (fps)	2.3	22.5	5.9													3.9			3.6					
Bankfull Discharge (cfs)	9	90	25.8													17								
Valley length (ft)										-						1802								
Channel Thalweg length (ft)										-						2523			2523					
Sinuosity (ft)										1.2 to 1.4						1.4			1.4					
Water Surface Slope (Channel) (ft/ft)										-						0.0067			0.0063					
BF slope (ft/ft)										-						0.0067			0.0063					
[3]Bankfull Floodplain Area (acres)										-						0.9			0.9					
[4]% of Reach with Eroding Banks										-														
Channel Stability or Habitat Metric										-														
Biological or Other										-														

No Existing Stream

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8e. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R1 (1573 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	20	30	22.5	30.7	30.7	30.7	30.7	-	1	21.9	23.9	-	25.9	-	-	21.9	23.9	25.9	33.2	33.2	33.2	33.2	-	1
Floodprone Width (ft)				35.0	35.0	35.0	35.0	-	1	52.6	74.1	-	95.6	-	-	52.6	74.1	95.6	43.0	43.0	43.0	43.0	-	1
Bankfull Mean Depth (ft)	1.8	3	2.4	1.7	1.7	1.7	1.7	-	1	1.6	2.1	-	2.6	-	-	1.6	2.1	2.6	1.8	1.8	1.8	1.8	-	1
[1]Bankfull Max Depth (ft)				2.7	2.7	2.7	2.7	-	1	1.2	1.3	-	1.4	-	-	2.3	3.0	3.8	2.4	2.4	2.4	2.4	-	1
Bankfull Cross Sectional Area (ft^2)	40	50	47.8	51.6	51.6	51.6	51.6	-	1	35.0	51.2	-	67.3	-	-	47.7	47.7	47.7	61.1	61.1	61.1	61.1	-	1
Width/Depth Ratio				18.2	18.2	18.2	18.2	-	1	10.0	12.0	-	14	-	-	10.0	12.0	14.0	18.1	18.1	18.1	18.1	-	1
Entrenchment Ratio				1.1	1.1	1.1	1.1	-	1	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	1.3	1.3	1.3	1.3	-	1
[1]Bank Height Ratio				3.2	3.2	3.2	3.2	-	1	1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.2	1.2	1.2	1.2	-	1
Profile																								
Riffle Length (ft)				20.3	48.1	32.0	126.8	36.5	8	Total riffle length 60-70% of reach length						20.3	32.0	126.8	79	108.3	89	190	38.77	7
Riffle Slope (ft/ft)				0.002	0.013	0.013	0.025	0.007	8	-	-	-	-	-	-	0.002	0.013	0.025	0.002	0.005	0.004	0.009	0.002	7
Pool Length (ft)				30.9	61.8	55.4	98.0	20.8	8	Total pool length 30-40% of reach length						30.9	55.4	98.0	40	94.57	97	150	30.77	7
Pool Max depth (ft)				0.8	3.4	3.4	1.4	-	1	3.2	6.2	-	9.1	-	-	0.8	3.4	1.4	5.11	6.14	6.17	7.28	0.792	7
Pool Spacing (ft)				16.3	76.5	64.6	199.2	41.0	21	95.6	131.5	-	167.3	-	-	16.3	64.6	199.2	111	206.1	187.2	330.6	71.09	6
Pattern																								
Channel Beltwidth (ft)				31.2	37.9	35.5	85.1	8.1	44	83.7	137.4	-	191.2	-	-	31.2	35.5	85.1	31.2	37.9	35.5	85.1	8.1	44
Radius of Curvature (ft)				18.1	32.0	26.6	85.1	15.9	47	47.8	65.7	-	83.7	-	-	18.1	26.6	85.1	18.1	32.0	26.6	85.1	15.9	47
Rc:Bankfull width (ft/ft)				0.6	1.0	0.9	2.8	0.5	47	2.0	2.8	-	3.5	-	-	0.6	0.9	2.8	0.6	0.96	0.9	2.8	0.5	47
Meander Wavelength (ft)				14.8	76.4	52.6	281.1	66.0	45	167.3	227.1	-	286.8	-	-	14.8	52.6	281.1	14.8	76.4	52.6	281.1	66.0	45
Meander Width Ratio				0.5	2.5	1.7	9.2	2.1	45	3.5	5.8	-	8.0	-	-	0.5	1.7	9.2	0.5	2.3	1.7	9.2	2.0	45
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				0.4												0.46			0.26					
Max part size (mm) mobilized at bankfull				90												90			56					
Stream Power (transport capacity) lb/s				37												35			22					
Additional Reach Parameters																								
Rosgen Classification				F4						C4						C4			B4					
Bankfull Velocity (fps)	2.5	20.0	5.4	3.1												3.1			2.5					
Bankfull Discharge (cfs)	100	800	259.8	150												150								
Valley length (ft)				1470						-						1470								
Channel Thalweg length (ft)				1573						-						1573			1573					
Sinuosity (ft)				1.07						1.2 to 1.4						1.07			1.07					
Water Surface Slope (Channel) (ft/ft)				0.003						-						0.003			0.0023					
BF slope (ft/ft)				0.003						-						0.003			0.0023					
[3]Bankfull Floodplain Area (acres)				1.2						-						2.5			2.5					
[4]% of Reach with Eroding Banks				33%						-														
Channel Stability or Habitat Metric				0.20						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8f. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R2 (1998 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	20	30	22.5	28.5	30.8	30.8	33.0	-	2	21.9	23.9	-	25.9	-	-	21.9	23.9	25.9	20.2	20.7	20.7	21.3		2
Floodprone Width (ft)				45.0	45.5	45.5	46.0	-	2	52.6	74.1	-	95.6	-	-	52.6	74.1	95.6	81.2	>88.6	>88.6	>88.6		2
Bankfull Mean Depth (ft)	1.8	3	2.4	1.4	1.6	1.6	1.7	-	2	1.6	2.1	-	2.6	-	-	1.6	2.1	2.6	1.6	1.6	1.6	1.7		2
[1]Bankfull Max Depth (ft)				2.1	2.3	2.3	2.5	-	2	1.2	1.3	-	1.4	-	-	2.3	3.0	3.8	2.4	2.5	2.5	2.5		2
Bankfull Cross Sectional Area (ft^2)	40	50	47.8	47.0	47.9	47.9	48.8	-	2	35.0	51.2	-	67.3	-	-	47.7	47.7	47.7	33.7	33.9	33.9	34.1		2
Width/Depth Ratio				16.6	19.9	19.9	23.2	-	2	10.0	12.0	-	14	-	-	10.0	12.0	14.0	12.0	12.7	12.7	13.4		2
Entrenchment Ratio				1.4	1.5	1.5	1.6	-	2	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	4.0	>4.14	>4.14	>4.14		2
[1]Bank Height Ratio				2.7	2.9	2.9	3.0	-	2	1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.0	1.1	1.1	1.1		2
Profile																								
Riffle Length (ft)				15.3	66.6	53.7	179.0	50.1	9	Total riffle length 60-70% of reach length						29.0	121.0	167.0	73.6	113.0	118.1	169.4	28.7	13
Riffle Slope (ft/ft)				0.006	0.011	0.007	0.024	0.007	9	-	-	-	-	-	-	0.004	0.005	0.007	0.004	0.005	0.006	0.007	7.7E-04	13
Pool Length (ft)				15.3	71.2	71.6	147.0	38.6	9	Total pool length 30-40% of reach length						26.0	45.0	67.0	38.0	57.5	59.0	67.0	7.1	13
Pool Max depth (ft)				0.8	3.1	3.1	1.4	0.2	2	3.2	6.2	-	9.1	-	-	4.2	4.6	7.3	2.7	3.3	3.4	3.8	0.3	13
Pool Spacing (ft)				54.0	122.7	89.1	287.6	70.2	13	95.6	131.5	-	167.3	-	-	96.0	143.5	191.0	134.0	178.7	173.0	271.0	36.6	12
Pattern																								
Channel Beltwidth (ft)				47.4	85.9	75.3	174.1	40.2	9	83.7	137.4	-	191.2	-	-	83.7	137.5	191.2	83.7	126.2	126.7	176.7	24.8	10
Radius of Curvature (ft)				33.7	86.3	88.7	159.1	37.1	9	47.8	65.7	-	83.7	-	-	47.8	65.8	83.7	46.4	60.8	60.4	81.4	12.0	13
Rc:Bankfull width (ft/ft)				1.1	2.8	2.9	5.2	1.2	9	2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	2.2	2.9	2.9	3.9	0.6	13
Meander Wavelength (ft)				214.5	296.9	303.9	414.1	75.2	9	167.3	227.1	-	286.8	-	-	167.3	138.1	286.8	188.0	246.7	243.5	304.0	33.2	10
Meander Width Ratio				7.0	9.7	9.9	13.5	2.4	9	3.5	5.8	-	8.0	-	-	3.5	5.8	8.0	4.0	6.1	6.1	8.5	1.6	10
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				0.4												0.46			0.39					
Max part size (mm) mobilized at bankfull				90												90			76					
Stream Power (transport capacity) lb/s				37												35			37					
Additional Reach Parameters																								
Rosgen Classification				F4						C4						C4			C4					
Bankfull Velocity (fps)	2.5	20.0	5.4	3.1												3.1			4.4					
Bankfull Discharge (cfs)	100	800	259.8	150												150								
Valley length (ft)				1808						-						1700								
Channel Thalweg length (ft)				2007						-						2176			2176					
Sinuosity (ft)				1.11						1.2 to 1.4						1.28			1.28					
Water Surface Slope (Channel) (ft/ft)				0.004						-						0.0037			0.0039					
BF slope (ft/ft)				0.004						-						0.0037			0.0039					
[3]Bankfull Floodplain Area (acres)				1.9						-						2.9			2.9					
[4]% of Reach with Eroding Banks				30%						-														
Channel Stability or Habitat Metric				0.26						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 8g. Baseline Stream Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R3 (384 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	20	30	22.5	22.8	22.8	22.8	22.8	-	1	21.9	23.9	-	25.9	-	-	21.9	23.9	25.9	20.9	20.9	20.9	20.9	-	1
Floodprone Width (ft)				144.4	144.4	144.4	144.4	-	1	52.6	74.1	-	95.6	-	-	52.6	74.1	95.6	106.9	106.9	106.9	106.9	-	1
Bankfull Mean Depth (ft)	1.8	3	2.4	2.3	2.3	2.3	2.3	-	1	1.6	2.1	-	2.6	-	-	1.6	2.1	2.6	1.6	1.6	1.6	1.6	-	1
[1]Bankfull Max Depth (ft)				3.2	3.2	3.2	3.2	-	1	1.2	1.3	-	1.4	-	-	2.3	3.0	3.8	2.6	2.6	2.6	2.6	-	1
Bankfull Cross Sectional Area (ft^2)	40	50	47.8	52.4	52.4	52.4	52.4	-	1	35.0	51.2	-	67.3	-	-	47.7	47.7	47.7	33.7	33.7	33.7	33.7	-	1
Width/Depth Ratio				9.9	9.9	9.9	9.9	-	1	10.0	12.0	-	14	-	-	10.0	12.0	14.0	13.0	13.0	13.0	13.0	-	1
Entrenchment Ratio				6.3	6.3	6.3	6.3	-	1	2.2	3.1	-	4.0	-	-	2.2	3.1	4.0	5.0	5.0	5.0	5.0	-	1
[1]Bank Height Ratio				1.4	1.4	1.4	1.4	-	1	1.0	1.0	-	1	-	-	1.0	1.05	1.1	1.0	1.0	1.0	1.0	-	1
Profile																								
Riffle Length (ft)				24.5	45.0	44.1	67.2	21.3	4	Total riffle length 60-70% of reach length						29.0	121.0	167.0	20.0	63.7	54.2	126.7	41.7	4
Riffle Slope (ft/ft)				0.003	0.009	0.008	0.016	0.006	4	-	-	-	-	-	-	0.004	0.005	0.007	0.004	0.006	0.005	0.011	0.003	4
Pool Length (ft)				16.4	41.4	33.6	92.0	30.0	5	Total pool length 30-40% of reach length						26.0	45.0	67.0	30	40	40	50	8.6	4
Pool Max depth (ft)				0.8	4.6	4.6	1.4	-	1	3.2	6.2	-	9.1	-	-	4.2	4.6	7.3	2.1	3.2	3.4	4.0	0.7	4
Pool Spacing (ft)				21.6	67.1	70.2	101.5	30.6	8	95.6	131.5	-	167.3	-	-	96.0	143.5	191.0	77.0	107.5	100.0	153.0	28.5	4
Pattern																								
Channel Beltwidth (ft)				23.2	30.8	28.1	53.7	8.9	10	83.7	137.4	-	191.2	-	-	83.7	137.5	191.2	63.9	63.9	63.9	63.9	-	1
Radius of Curvature (ft)				17.0	26.5	26.5	47.1	7.5	13	47.8	65.7	-	83.7	-	-	47.8	65.8	83.7	50.5	63.8	70.5	70.5	-	3
Rc:Bankfull width (ft/ft)				0.7	1.2	1.2	2.1	0.3	13	2.0	2.8	-	3.5	-	-	2.0	2.8	3.5	2.4	3.1	3.4	3.4	-	3
Meander Wavelength (ft)				18.0	82.0	84.2	139.5	36.6	12	167.3	227.1	-	286.8	-	-	167.3	138.1	286.8	241.0	241.0	241.0	241.0	-	1
Meander Width Ratio				0.8	3.6	3.7	6.1	1.6	12	3.5	5.8	-	8.0	-	-	3.5	5.8	8.0	3.1	3.1	3.1	3.1	-	1
Transport parameters																								
Reach Shear Stress (competency) lb/f^2				0.4												0.46			0.27					
Max part size (mm) mobilized at bankfull				90												90			58					
Stream Power (transport capacity) lb/s				37												35			25					
Additional Reach Parameters																								
Rosgen Classification				F4						C4						C4			C4					
Bankfull Velocity (fps)	2.5	20.0	5.4	3.1												3.1			4.5					
Bankfull Discharge (cfs)	100	800	259.8	150												150								
Valley length (ft)				373						-						373								
Channel Thalweg length (ft)				380						-						384			384					
Sinuosity (ft)				1.02						1.2 to 1.4						1.03			1.03					
Water Surface Slope (Channel) (ft/ft)				0.0076						-						0.0037			0.0027					
BF slope (ft/ft)				0.0076						-						0.0037			0.0027					
[3]Bankfull Floodplain Area (acres)				1.2						-						0.6			0.6					
[4]% of Reach with Eroding Banks				25%						-														
Channel Stability or Habitat Metric				0.14						-														
Biological or Other				-						-														

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 9. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023)

	MF R1															MF R2														
	Cross Section 1 (Pool)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)							Cross Section 4 (Pool)							Cross Section 5 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1097.06							1094.84							1088.77							1087.94							1087.06						
Bankfull Width (ft)	33.2							33.2							29.1							25.6							20.2						
Floodprone Width (ft)	N/A							43.0							N/A							N/A							>81.2						
Bankfull Mean Depth (ft)	2.2							1.8							1.6							1.8							1.7						
Bankfull Max Depth (ft)	3.0							2.4							2.6							3.3							2.4						
Bankfull Cross Sectional Area (ft^2)	71.8							61.1							45.1							47.1							34.1						
Bankfull Width/Depth Ratio	15.4							18.1							18.8							13.9							12.0						
Bankfull Entrenchment Ratio	N/A							1.3							N/A							N/A							>4.01						
Bankfull Bank Height Ratio	1.2							1.2							1.0							1.0							1.1						

	MF R2														MF R3														UT1						
	Cross Section 6 (Pool)							Cross Section 7 (Riffle)							Cross Section 8 (Riffle)							Cross Section 9 (Pool)							Cross Section 10 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1084.62							1083.10							1079.96							1080.16							1111.02						
Bankfull Width (ft)	33.6							21.3							20.9							29.2							7.0						
Floodprone Width (ft)	N/A							>88.6							106.9							N/A							52.2						
Bankfull Mean Depth (ft)	1.6							1.6							1.6							4.8							0.6						
Bankfull Max Depth (ft)	2.7							2.5							2.6							4.0							0.8						
Bankfull Cross Sectional Area (ft^2)	53.6							33.7							33.7							52.6							3.9						
Bankfull Width/Depth Ratio	21.0							13.4							13.0							16.2							12.6						
Bankfull Entrenchment Ratio	N/A							>4.14							5.1							N/A							7.5						
Bankfull Bank Height Ratio	1.0							1.0							1.0							1.0							1.1						

	UT1																																		
	Cross Section 11 (Pool)							Cross Section 12 (Riffle)							Cross Section 13 (Pool)							Cross Section 14 (Pool)							Cross Section 15 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1104.40							1102.01							1088.55							1085.64							1080.95						
Bankfull Width (ft)	9.0							7.0							8.9							9.3							16.2						
Floodprone Width (ft)	N/A							49.7							N/A							N/A							N/A						
Bankfull Mean Depth (ft)	0.6							0.6							0.6							0.5							0.4						
Bankfull Max Depth (ft)	1.3							0.8							1.2							1.1							1.5						
Bankfull Cross Sectional Area (ft^2)	5.5							3.9							5.5							4.6							6.9						
Bankfull Width/Depth Ratio	14.8							12.5							14.3							18.6							37.7						
Bankfull Entrenchment Ratio	N/A							7.1							N/A							N/A							N/A						
Bankfull Bank Height Ratio	1.0							1.0							1.1							1.0							1.0						

Table 9. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections) (continued)
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023)

	UT1							UT2																			UT3 R1						
	Cross Section 16 (Riffle)							Cross Section 17 (Pool)							Cross Section 18 (Riffle)							Cross Section 19 (Riffle)							Cross Section 20 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1078.41							1098.12							1097.77							1092.07							1095.67						
Bankfull Width (ft)	6.0							8.3							5.5							6.1							11.2						
Floodprone Width (ft)	54.3							N/A							52.0							50.8							N/A						
Bankfull Mean Depth (ft)	0.6							0.7							0.4							0.5							0.5						
Bankfull Max Depth (ft)	1.0							1.4							0.7							0.7							1.2						
Bankfull Cross Sectional Area (ft^2)	3.7							5.4							2.4							3.1							5.7						
Bankfull Width/Depth Ratio	9.6							12.8							12.5							12.0							21.9						
Bankfull Entrenchment Ratio	9.1							N/A							9.5							8.3							N/A						
Bankfull Bank Height Ratio	1.0							1.0							1.0							1.1							1.0						

	UT3 R1							UT3 R2																									
	Cross Section 21 (Riffle)							Cross Section 22 (Pool)							Cross Section 23 (Riffle)							Cross Section 24 (Pool)							Cross Section 25 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1092.21							1089.56							1087.39							1081.92							1081.58						
Bankfull Width (ft)	5.9							11.3							8.22							9.2							7.2						
Floodprone Width (ft)	41.6							N/A							56.3							N/A							55.6						
Bankfull Mean Depth (ft)	0.5							0.6							0.6							0.8							0.6						
Bankfull Max Depth (ft)	0.7							1.3							0.9							1.4							1.0						
Bankfull Cross Sectional Area (ft^2)	3.2							6.9							4.9							7.1							4.5						
Bankfull Width/Depth Ratio	11.1							18.4							13.9							12.0							11.5						
Bankfull Entrenchment Ratio	7.1							N/A							6.9							N/A							7.7						
Bankfull Bank Height Ratio	1.1							1.0							1.1							1.1							1.0						

	UT3 R2						
	Cross Section 26 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	1077.31						
Bankfull Width (ft)	9.8						
Floodprone Width (ft)	N/A						
Bankfull Mean Depth (ft)	0.8						
Bankfull Max Depth (ft)	1.4						
Bankfull Cross Sectional Area (ft^2)	7.6						
Bankfull Width/Depth Ratio	12.8						
Bankfull Entrenchment Ratio	N/A						
Bankfull Bank Height Ratio	1.0						

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 10a. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT1 (2742 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	6.0	6.6	7.0	7.0	-	3																														
Floodprone Width (ft)	49.7	52.1	52.2	54.3	-	3																														
Bankfull Mean Depth (ft)	0.6	0.6	0.6	0.6	-	3																														
[1]Bankfull Max Depth (ft)	0.8	0.9	0.8	1.0	-	3																														
Bankfull Cross Sectional Area (ft^2)	3.7	3.8	3.9	3.9	-	3																														
Width/Depth Ratio	9.6	11.6	12.5	12.6	-	3																														
Entrenchment Ratio	7.1	7.9	7.5	9.1	-	3																														
[1]Bank Height Ratio	1.0	1.0	1.0	1.1	-	3																														
Profile																																				
Riffle Length (ft)	5.3	15.1	14.3	39.1	6.2	56																														
Riffle Slope (ft/ft)	0.008	0.037	0.034	0.086	0.019	56																														
Pool Length (ft)	7.4	21.2	20.9	39.1	8.0	56																														
Pool Max depth (ft)	1.0	1.5	1.4	2.2	0.3	57																														
Pool Spacing (ft)	19.0	38.4	40.0	71.3	8.8	72																														
Pattern																																				
Channel Beltwidth (ft)	12.674	28.445	30.41	37.04	6.4567	67																														
Radius of Curvature (ft)	9.315	14.753	14.315	21.315	2.1451	69																														
Rc:Bankfull width (ft/ft)	1.4	2.2	2.2	3.2	0.4	69																														
Meander Wavelength (ft)	35.65	60.001	61.42	73.4	8.9143	71																														
Meander Width Ratio	1.9	4.3	4.6	5.6	1.5	67																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg length (ft)	2805																																			
Sinuosity (ft)	1.30																																			
Water Surface Slope (Channel) (ft/ft)	0.0180																																			
BF slope (ft/ft)	0.0180																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10b. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT2 (1009 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	5.5	5.8	5.8	6.1	-	2																														
Floodprone Width (ft)	50.8	51.4	51.4	52.0	-	2																														
Bankfull Mean Depth (ft)	0.4	0.5	0.5	0.5	-	2																														
[1]Bankfull Max Depth (ft)	0.7	0.7	0.7	0.7	-	2																														
Bankfull Cross Sectional Area (ft^2)	2.4	2.8	2.8	3.1	-	2																														
Width/Depth Ratio	12.0	12.2	12.2	12.5	-	2																														
Entrenchment Ratio	8.3	8.9	8.9	9.5	-	2																														
[1]Bank Height Ratio	1.0	1.1	1.1	1.1	-	2																														
Profile																																				
Riffle Length (ft)	5.0	16.4	18.0	27.1	6.0	25																														
Riffle Slope (ft/ft)	0.020	0.045	0.043	0.083	0.017	25																														
Pool Length (ft)	5.1	14.5	14.3	21.9	4.2	26																														
Pool Max depth (ft)	0.8	1.2	1.1	1.8	0.2	26																														
Pool Spacing (ft)	24.9	36.0	35.0	42.0	2.8	27																														
Pattern																																				
Channel Beltwidth (ft)	23.215	27.239	27.475	32.565	2.5416	27																														
Radius of Curvature (ft)	10.598	12.676	12.398	15.898	1.6699	28																														
Rc:Bankfull width (ft/ft)	1.8	2.2	2.1	2.7	0.3	28																														
Meander Wavelength (ft)	40.4	54.356	52.93	92.0	9.2424	28																														
Meander Width Ratio	4.0	4.7	4.7	5.6	1.5	27																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	Cb4																																			
Channel Thalweg length (ft)	1060																																			
Sinuosity (ft)	1.34																																			
Water Surface Slope (Channel) (ft/ft)	0.0208																																			
BF slope (ft/ft)	0.0208																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10c. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT3 R1 (994 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	5.9	5.9	5.9	5.9	-	1																														
Floodprone Width (ft)	41.6	41.6	41.6	41.6	-	1																														
Bankfull Mean Depth (ft)	0.5	0.5	0.5	0.5	-	1																														
[1]Bankfull Max Depth (ft)	0.7	0.7	0.7	0.7	-	1																														
Bankfull Cross Sectional Area (ft^2)	3.2	3.2	3.2	3.2	-	1																														
Width/Depth Ratio	11.1	11.1	11.1	11.1	-	1																														
Entrenchment Ratio	7.1	7.1	7.1	7.1	-	1																														
[1]Bank Height Ratio	1.1	1.1	1.1	1.1	-	1																														
Profile																																				
Riffle Length (ft)	6.4	16.6	14.7	32.3	8.1	22																														
Riffle Slope (ft/ft)	0.020	0.047	0.044	0.089	0.018	22																														
Pool Length (ft)	5.0	13.6	13.1	25.6	5.3	23																														
Pool Max depth (ft)	0.8	1.3	1.3	1.7	0.3	23																														
Pool Spacing (ft)	33.0	45.1	44.0	56.0	6.1	18																														
Pattern																																				
Channel Beltwidth (ft)	16.43	30.986	32.365	39.27	5.4868	20																														
Radius of Curvature (ft)	12.445	15.04	14.945	20.945	2.1658	21																														
Rc:Bankfull width (ft/ft)	2.1	2.6	2.5	3.6	0.4	21																														
Meander Wavelength (ft)	57.58	73.258	70.025	116.98	14.31	20																														
Meander Width Ratio	2.8	5.3	5.5	6.7	2.3	20																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	Cb4																																			
Channel Thalweg length (ft)	994																																			
Sinuosity (ft)	1.24																																			
Water Surface Slope (Channel) (ft/ft)	0.0209																																			
BF slope (ft/ft)	0.0209																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10d. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - UT3 R2 (2421 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	7.2	7.7	7.7	8.2	-	2																														
Floodprone Width (ft)	55.6	56.0	56.0	56.3	-	2																														
Bankfull Mean Depth (ft)	0.6	0.6	0.6	0.6	-	2																														
[1]Bankfull Max Depth (ft)	0.9	1.0	1.0	1.0	-	2																														
Bankfull Cross Sectional Area (ft^2)	4.5	4.7	4.7	4.9	-	2																														
Width/Depth Ratio	11.5	12.7	12.7	13.9	-	2																														
Entrenchment Ratio	6.9	7.3	7.3	7.7	-	2																														
[1]Bank Height Ratio	1.0	1.1	1.1	1.1	-	2																														
Profile																																				
Riffle Length (ft)	5.0	18.1	16.2	39.3	9.8	40																														
Riffle Slope (ft/ft)	0.004	0.022	0.018	0.063	0.016	40																														
Pool Length (ft)	7.9	17.4	16.2	38.3	6.4	41																														
Pool Max depth (ft)	1.2	1.6	1.6	2.5	0.2	41																														
Pool Spacing (ft)	43.0	55.6	56.0	70.0	6.0	43																														
Pattern																																				
Channel Beltwidth (ft)	26.545	42.079	42.125	56.565	6.8631	43																														
Radius of Curvature (ft)	15.7	18.6	19.0	23.0	1.7	45																														
Rc:Bankfull width (ft/ft)	2.0	2.4	2.5	3.0	0.3	45																														
Meander Wavelength (ft)	66.94	81.913	81.155	130.29	10.927	44																														
Meander Width Ratio	3.4	5.4	5.5	7.3	1.8	43																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg length (ft)	2523																																			
Sinuosity (ft)	1.40																																			
Water Surface Slope (Channel) (ft/ft)	0.0063																																			
BF slope (ft/ft)	0.0063																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10e. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R1 (1573 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	33.2	33.2	33.2	33.2	-	1																														
Floodprone Width (ft)	43.0	43.0	43.0	43.0	-	1																														
Bankfull Mean Depth (ft)	1.8	1.8	1.8	1.8	-	1																														
[1]Bankfull Max Depth (ft)	2.4	2.4	2.4	2.4	-	1																														
Bankfull Cross Sectional Area (ft^2)	61.1	61.1	61.1	61.1	-	1																														
Width/Depth Ratio	18.1	18.1	18.1	18.1	-	1																														
Entrenchment Ratio	1.3	1.3	1.3	1.3	-	1																														
[1]Bank Height Ratio	1.2	1.2	1.2	1.2	-	1																														
Profile																																				
Riffle Length (ft)	79.0	108.3	89.0	190.0	38.8	7																														
Riffle Slope (ft/ft)	0.002	0.005	0.004	0.009	0.002	7																														
Pool Length (ft)	40.0	94.6	97.0	150.0	30.8	7																														
Pool Max depth (ft)	5.1	6.1	6.2	7.3	0.8	7																														
Pool Spacing (ft)	111.0	206.1	187.2	330.6	71.1	6																														
Pattern																																				
Channel Beltwidth (ft)	31.2	37.9	35.5	85.1	8.1088	44																														
Radius of Curvature (ft)	18.1	31.95	26.6	85.1	15.917	47																														
Rc:Bankfull width (ft/ft)	0.6	1.0	0.9	2.8	0.5	47																														
Meander Wavelength (ft)	14.8	76.4	52.6	281.1	66.037	45																														
Meander Width Ratio	0.5	2.3	1.7	9.2	2.0	45																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	B4																																			
Channel Thalweg length (ft)	1573																																			
Sinuosity (ft)	1.07																																			
Water Surface Slope (Channel) (ft/ft)	0.0023																																			
BF slope (ft/ft)	0.0023																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10f. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R2 (1998 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	20.2	20.7	20.7	21.3	-	2																														
Floodprone Width (ft)	81.2	>88.6	>88.6	>88.6	-	2																														
Bankfull Mean Depth (ft)	1.6	1.6	1.6	1.7	-	2																														
[1]Bankfull Max Depth (ft)	2.4	2.5	2.5	2.5	-	2																														
Bankfull Cross Sectional Area (ft^2)	33.7	33.9	33.9	34.1	-	2																														
Width/Depth Ratio	12.0	12.7	12.7	13.4	-	2																														
Entrenchment Ratio	4.0	>4.14	>4.14	>4.14	-	2																														
[1]Bank Height Ratio	1.0	1.1	1.1	1.1	-	2																														
Profile																																				
Riffle Length (ft)	73.6	113.0	118.1	169.4	28.7	13																														
Riffle Slope (ft/ft)	0.004	0.005	0.006	0.007	0.001	13																														
Pool Length (ft)	38.0	57.5	59.0	67.0	7.1	13																														
Pool Max depth (ft)	2.7	3.3	3.4	3.8	0.3	13																														
Pool Spacing (ft)	134.0	178.7	173.0	271.0	36.6	12																														
Pattern																																				
Channel Beltwidth (ft)	83.7	126.2	126.7	176.7	24.771	10																														
Radius of Curvature (ft)	46.35	60.812	60.35	81.35	11.963	13																														
Rc:Bankfull width (ft/ft)	2.2	2.9	2.9	3.9	0.6	13																														
Meander Wavelength (ft)	188.0	246.7	243.5	304.0	33.213	10																														
Meander Width Ratio	4.0	6.1	6.1	8.5	1.6045	10																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg length (ft)	2176																																			
Sinuosity (ft)	1.28																																			
Water Surface Slope (Channel) (ft/ft)	0.0039																																			
BF slope (ft/ft)	0.0039																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 10g. Monitoring Data - Stream Reach Data Summary
Stewarts Creek Tributaries Stream Restoration Project (DMS No. 100023) - Moores Fork R3 (384 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	20.9	20.9	20.9	20.9	-	1																														
Floodprone Width (ft)	106.9	106.9	106.9	106.9	-	1																														
Bankfull Mean Depth (ft)	1.6	1.6	1.6	1.6	-	1																														
[1]Bankfull Max Depth (ft)	2.6	2.6	2.6	2.6	-	1																														
Bankfull Cross Sectional Area (ft^2)	33.7	33.7	33.7	33.7	-	1																														
Width/Depth Ratio	13.0	13.0	13.0	13.0	-	1																														
Entrenchment Ratio	5.0	5.0	5.0	5.0	-	1																														
[1]Bank Height Ratio	1.0	1.0	1.0	1.0	-	1																														
Profile																																				
Riffle Length (ft)	20.0	63.7	54.2	126.7	41.7	4																														
Riffle Slope (ft/ft)	0.004	0.006	0.005	0.011	0.003	4																														
Pool Length (ft)	30.0	40.0	40.0	50.0	8.6	4																														
Pool Max depth (ft)	2.1	3.2	3.4	4.0	0.7	4																														
Pool Spacing (ft)	77.0	107.5	100.0	153.0	28.5	4																														
Pattern																																				
Channel Beltwidth (ft)	63.9	63.9	63.9	63.9	-	1																														
Radius of Curvature (ft)	50.45	63.783	70.45	70.45	-	3																														
Rc:Bankfull width (ft/ft)	2.4	3.1	3.4	3.4	-	3																														
Meander Wavelength (ft)	241.0	241.0	241.0	241.0	-	1																														
Meander Width Ratio	3.1	3.1	3.1	3.1	-	1																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C4																																			
Channel Thalweg length (ft)	384																																			
Sinuosity (ft)	1.03																																			
Water Surface Slope (Channel) (ft/ft)	0.0027																																			
BF slope (ft/ft)	0.0027																																			
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 11. Structure Changes Summary

Table 11a. Moores Fork Log Vanes

Note	Station (ft)	
	Point 1	Point 2
Changed to Rock Vanes	36+51.00	36+74.00
Changed to Rock Vanes	37+75.00	37+98.00

Table 11b. UT 1 Constructed Riffles

Note	Point 1	Point 2
	Station	Station
Added	11+82.00	12+06.00
Added	13+53.00	13+62.00
Added	14+23.00	14+34.00
Added	14+86.00	15+03.00
Added	16+70.00	16+75.00
Added	16+83.00	16+88.00
Added	24+53.00	24+71.00
Added	29+14.00	29+38.00
Added	32+58.00	32+64.00
Added	32+77.00	32+83.00

Table 11c. UT 2 Constructed Riffles

Note	Point 1	Point 2
	Station	Station
Additonal Length	11+80.00	11+95.00
Added	12+86.00	13+07.00
Added	16+51.00	16+55.00
Added	16+84.00	17+02.00
Changed from Woody Riffle	17+24.00	17+35.00
Changed from Woody Riffle	18+42.00	18+50.00
Added	18+72.00	18+91.00
Added	19+11.00	19+27.00
Added	19+78.00	19+92.00

Table 11d. UT 3 Constructed Riffles

Note	Point 1	Point 2
	Station	Station
Added	12+41.00	12+58.00
Added	16+01.00	16+07.00
Added	18+29.00	18+47.00
Added	19+18.00	19+36.00
Added	24+50.00	24+75.00
Added	26+11.00	26+36.00
Added	28+10.00	28+27.00
Added	42+88.00	43+12.00
Added	43+85.00	44+12.00

Table 11e. UT 1 Toewood

Toe Wood Dimensions		
STA Length (ft)	Begin Station (ft)	End Station (ft)
Added	36+81.00	36+87.00

Table 11f.UT 3 Toewood

Toe Wood Dimensions		
STA Length (ft)	Begin Station (ft)	End Station (ft)
Added	12+13.00	12+41.00
Added	14+40.00	14+66.00
Added	20+00.00	20+25.00
Additonal Length	20+39.00	20+80.00

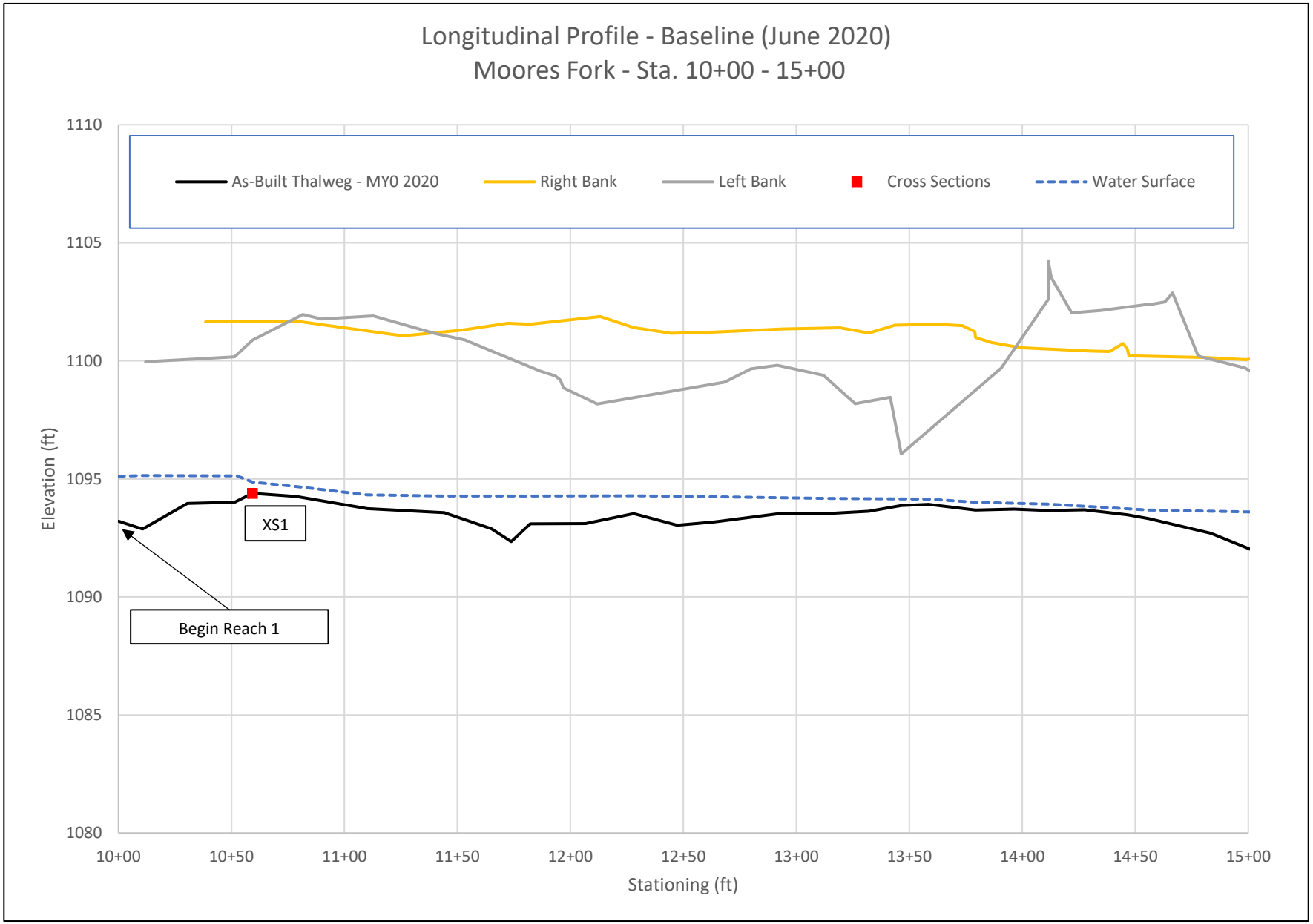
Table 11g. Moores Fork Toewood

Toe Wood Dimensions		
Note	Begin Station (ft)	End Station (ft)
Additonal Length	25+88.00	26+56.00

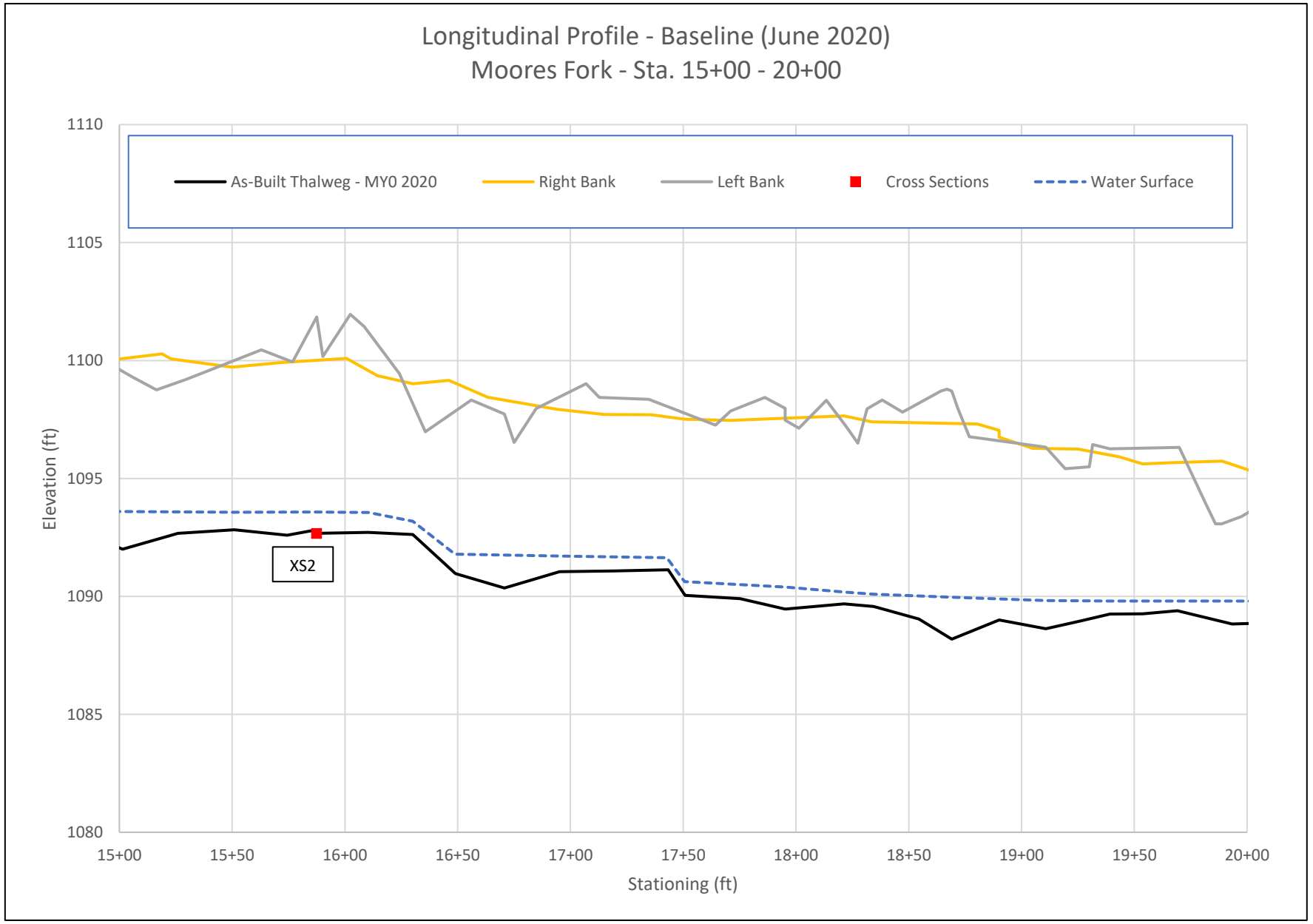
Table 11h. UT 1 Woody Riffles

Type	Point 1	Point 2
	Station	Station
Added	26+12.00	26+44.00

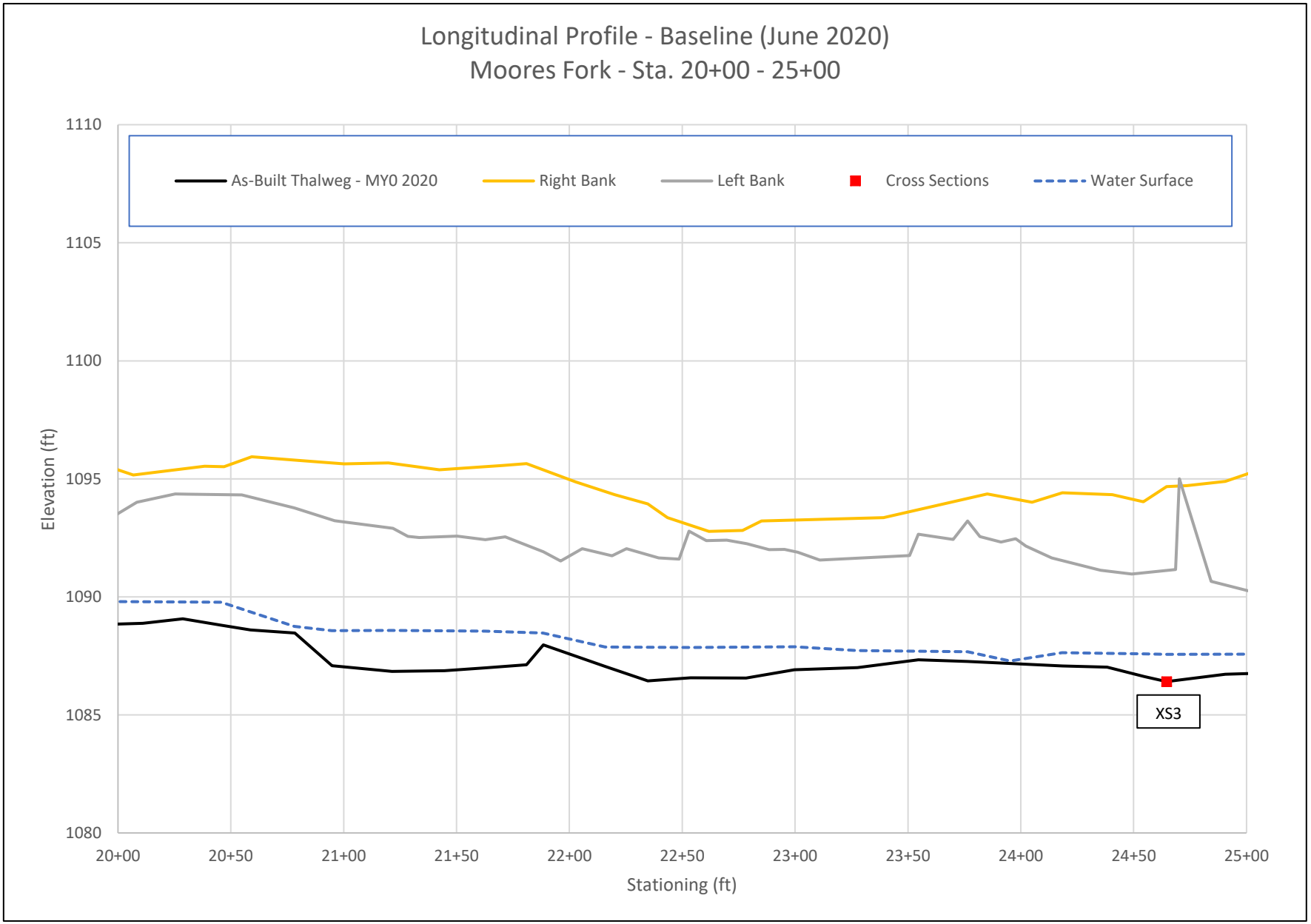
***Note that all sod mats from the design were removed from the UTs.**



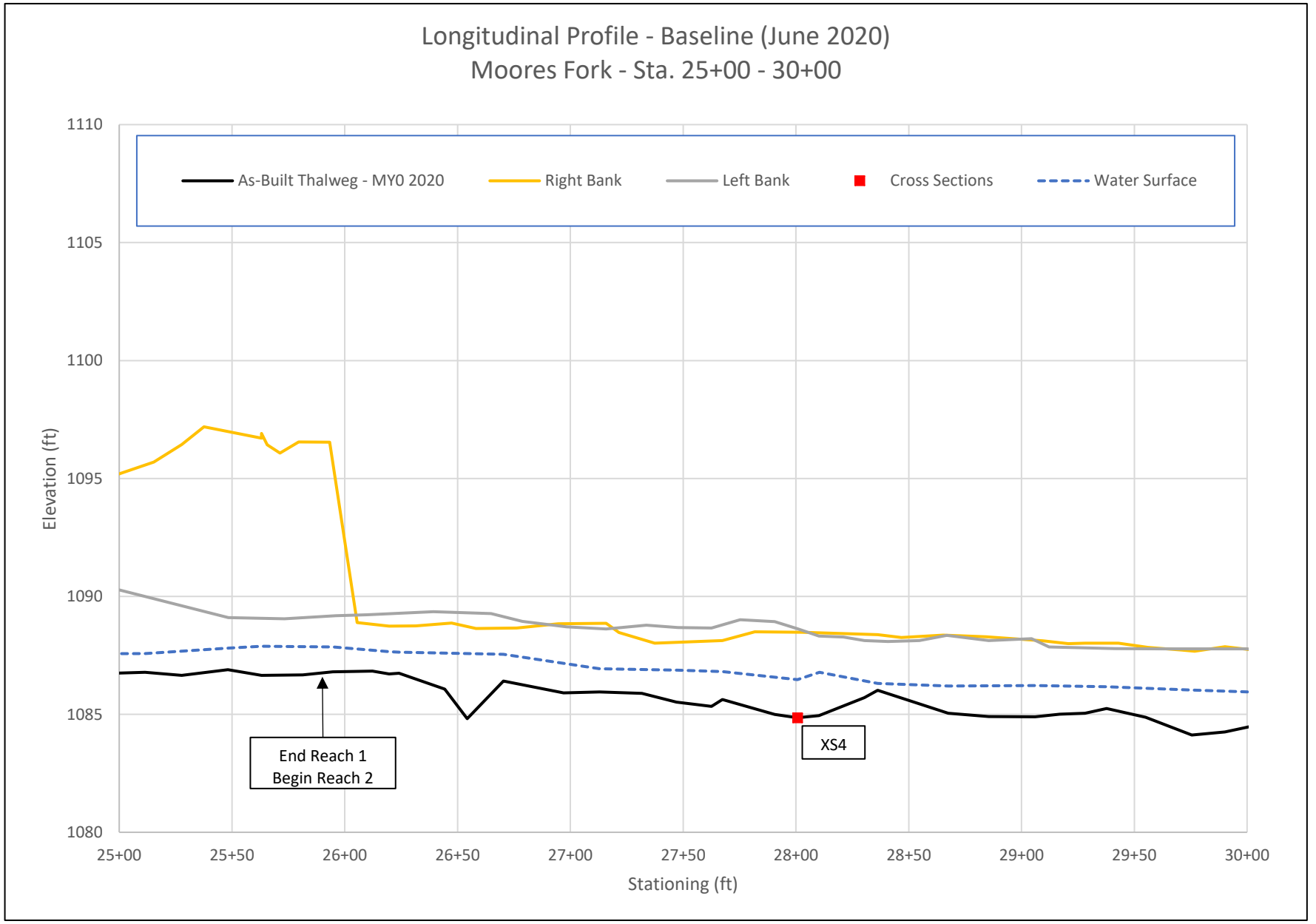
ECOSYSTEM PLANNING & RESTORATION

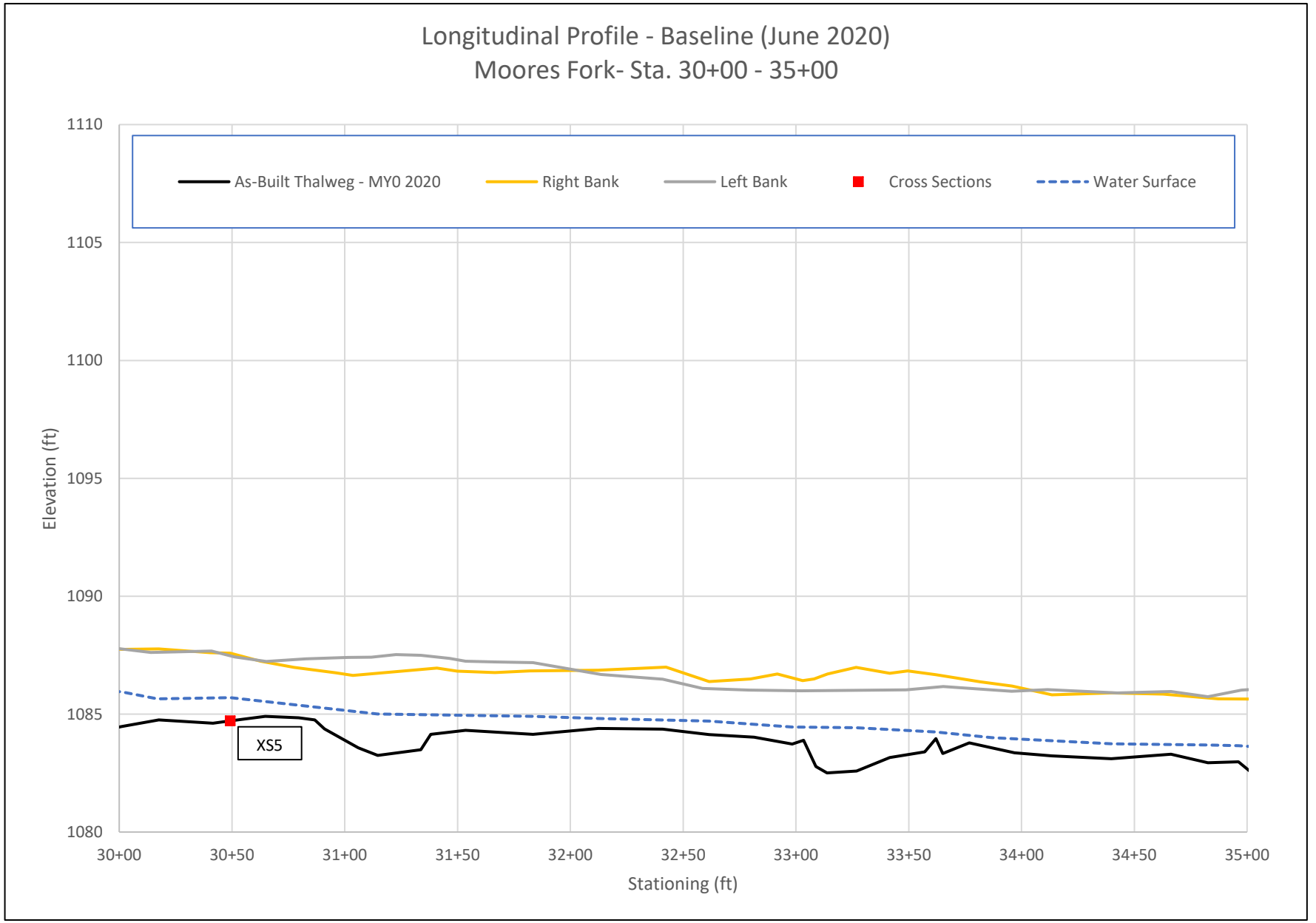


ECOSYSTEM PLANNING & RESTORATION

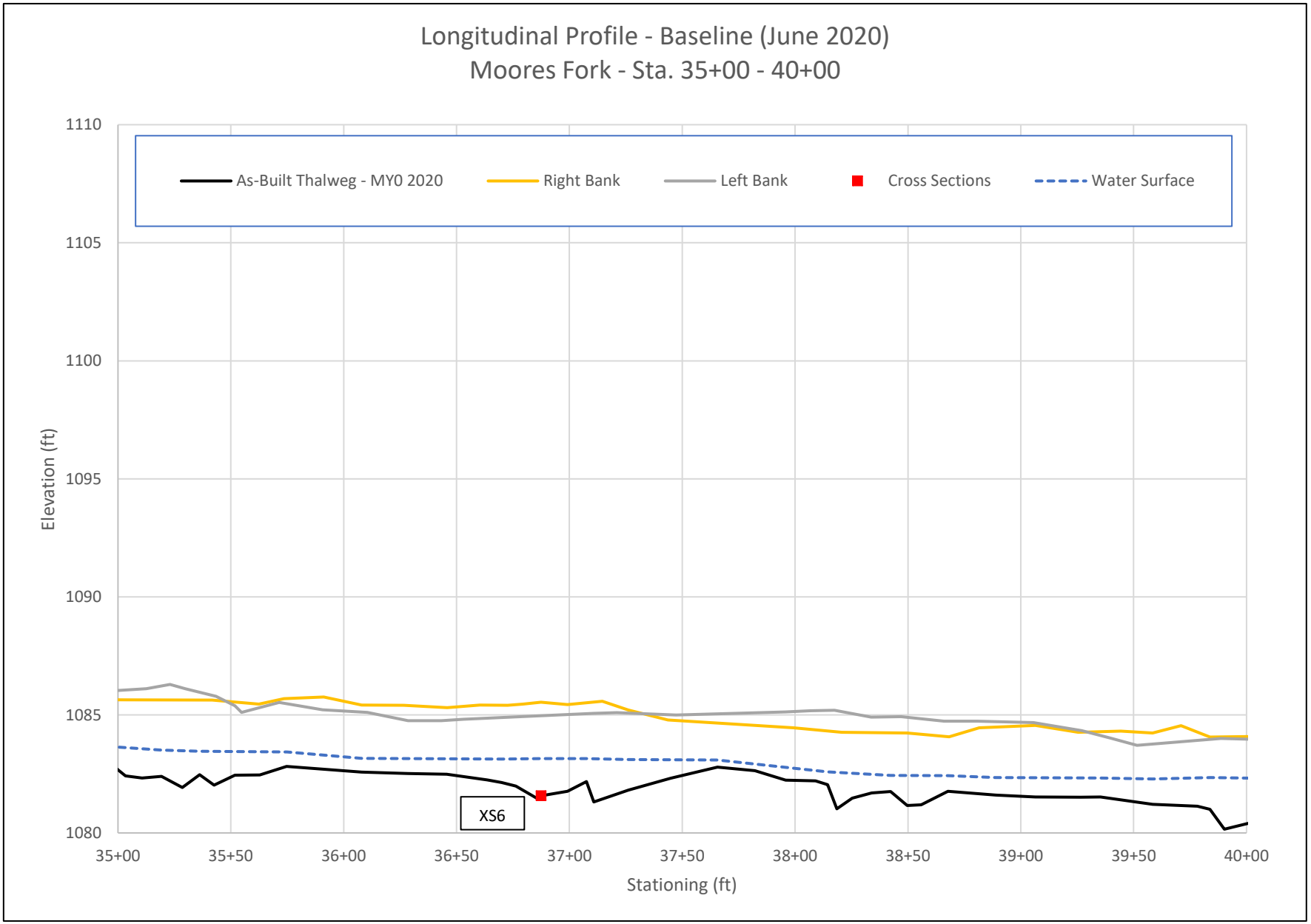


ECOSYSTEM PLANNING & RESTORATION

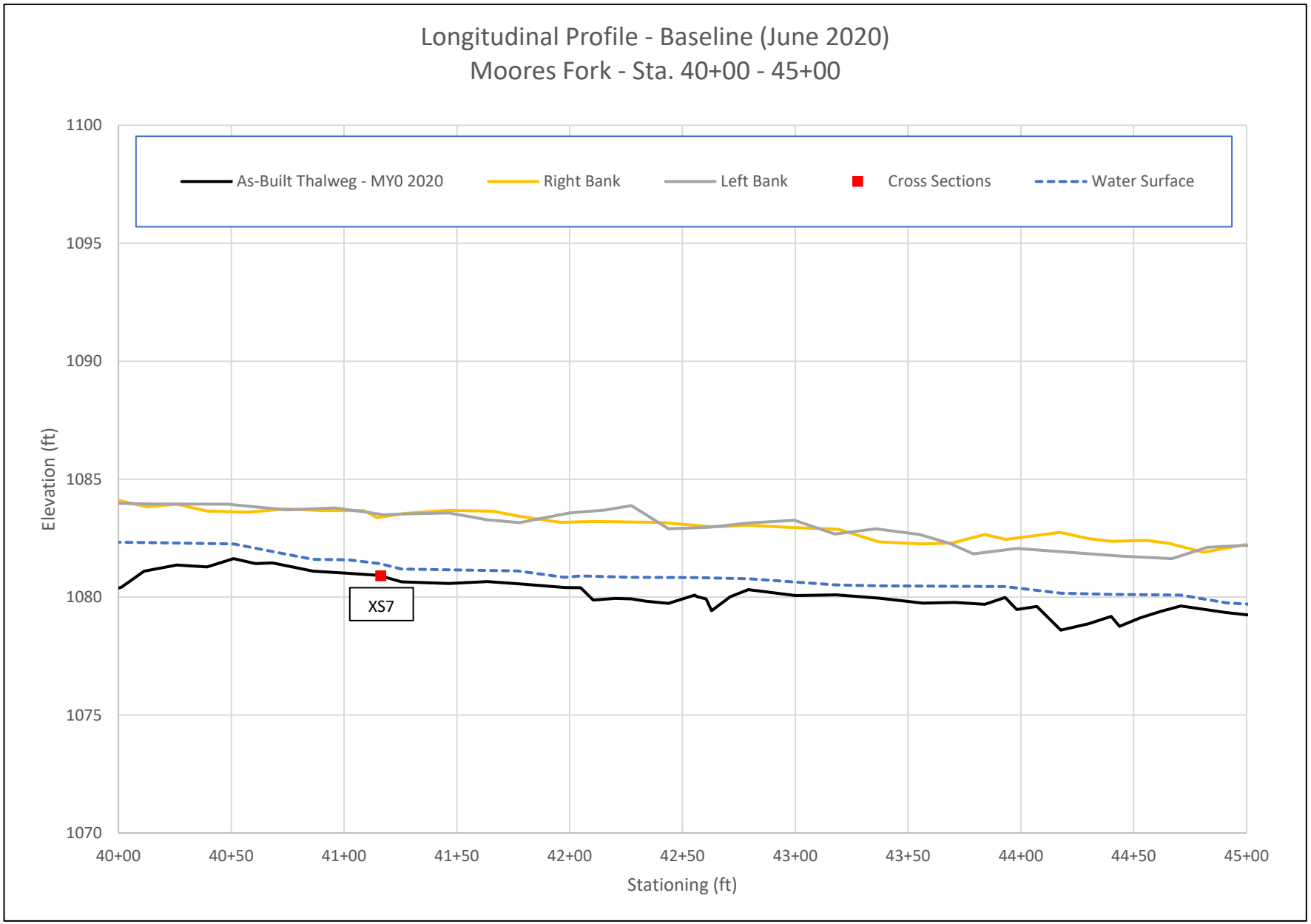

Longitudinal Profile - Baseline (June 2020)
Moores Fork - Sta. 25+00 - 30+00
As-Built Thalweg - MY0 2020
Right Bank
Left Bank
Cross Sections
Water Surface
Elevation (ft)
1110
1105
1100
1095
1090
1085
1080
25+00
25+50
26+00
26+50
27+00
27+50
28+00
28+50
29+00
29+50
30+00
Stationing (ft)
End Reach 1
Begin Reach 2
XS4



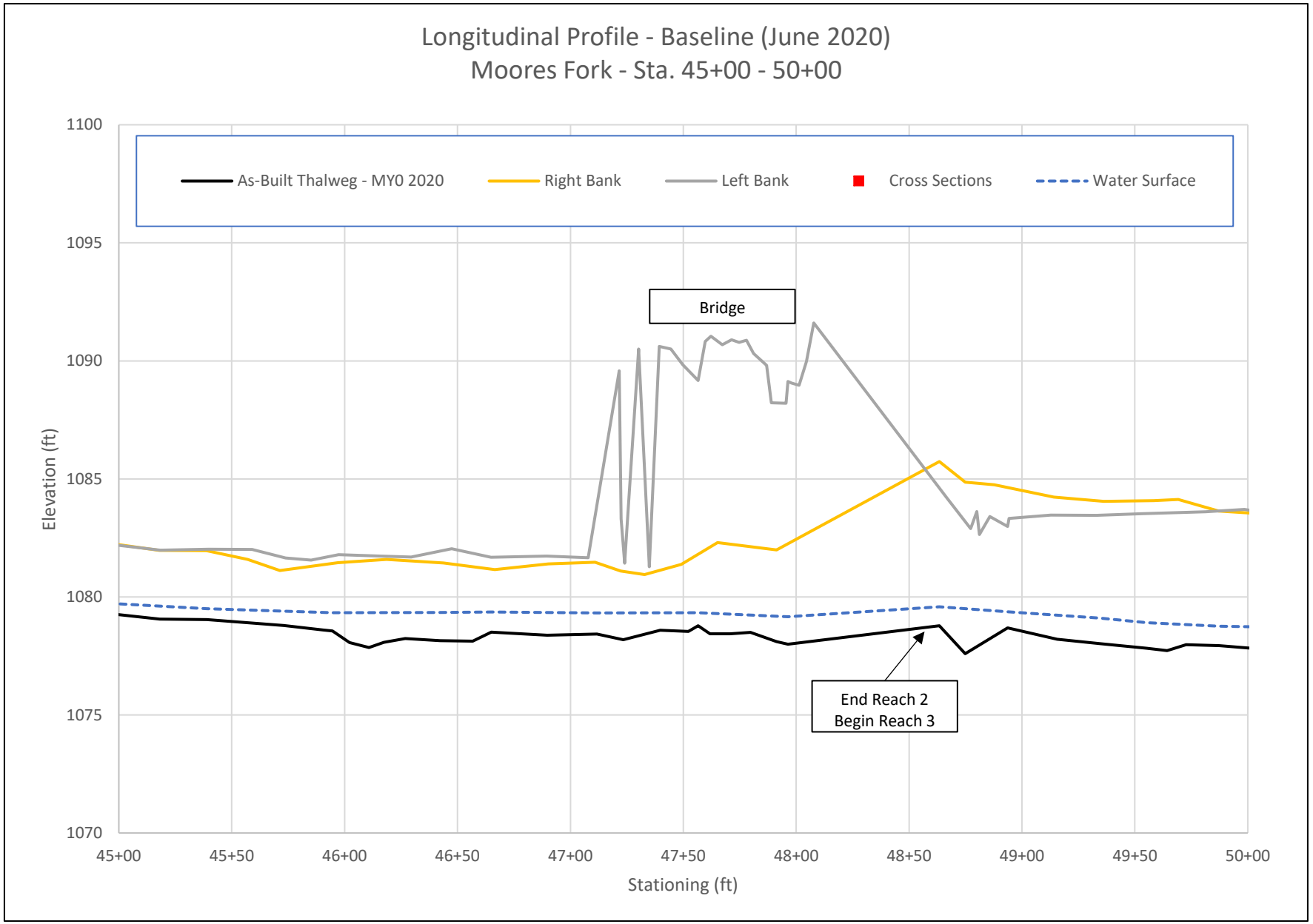
ECOSYSTEM PLANNING & RESTORATION



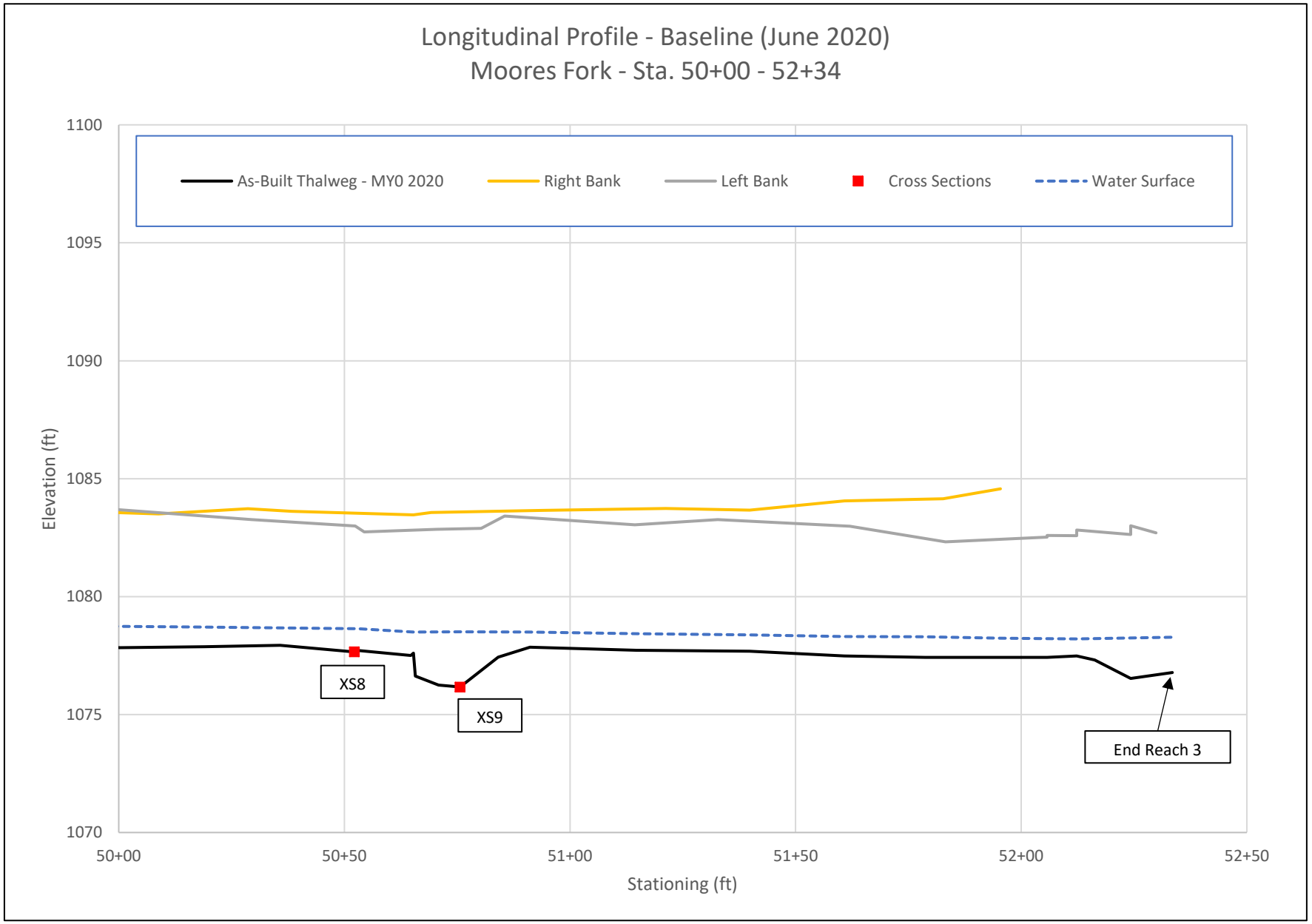
ECOSYSTEM PLANNING & RESTORATION



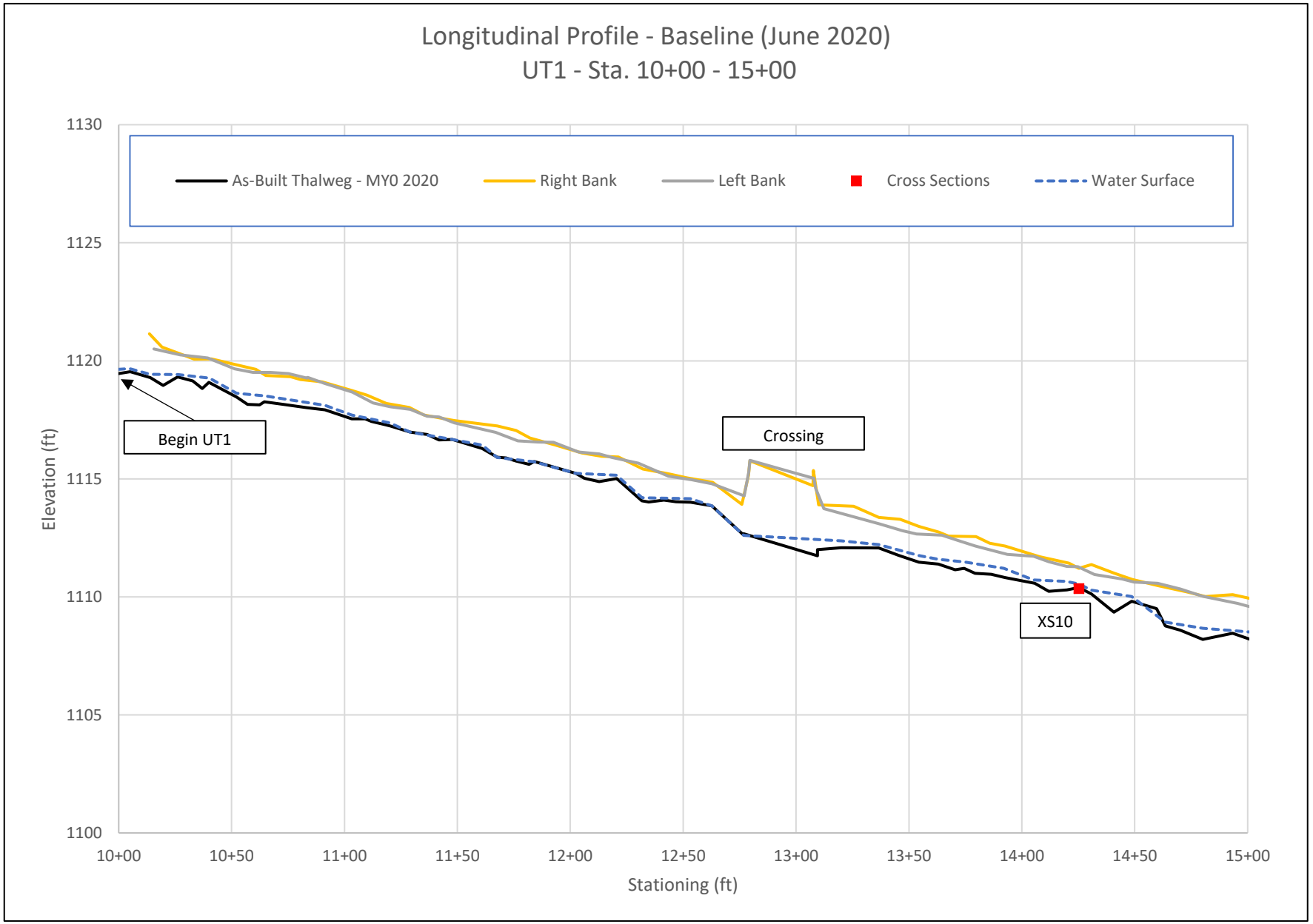
ECOSYSTEM PLANNING & RESTORATION

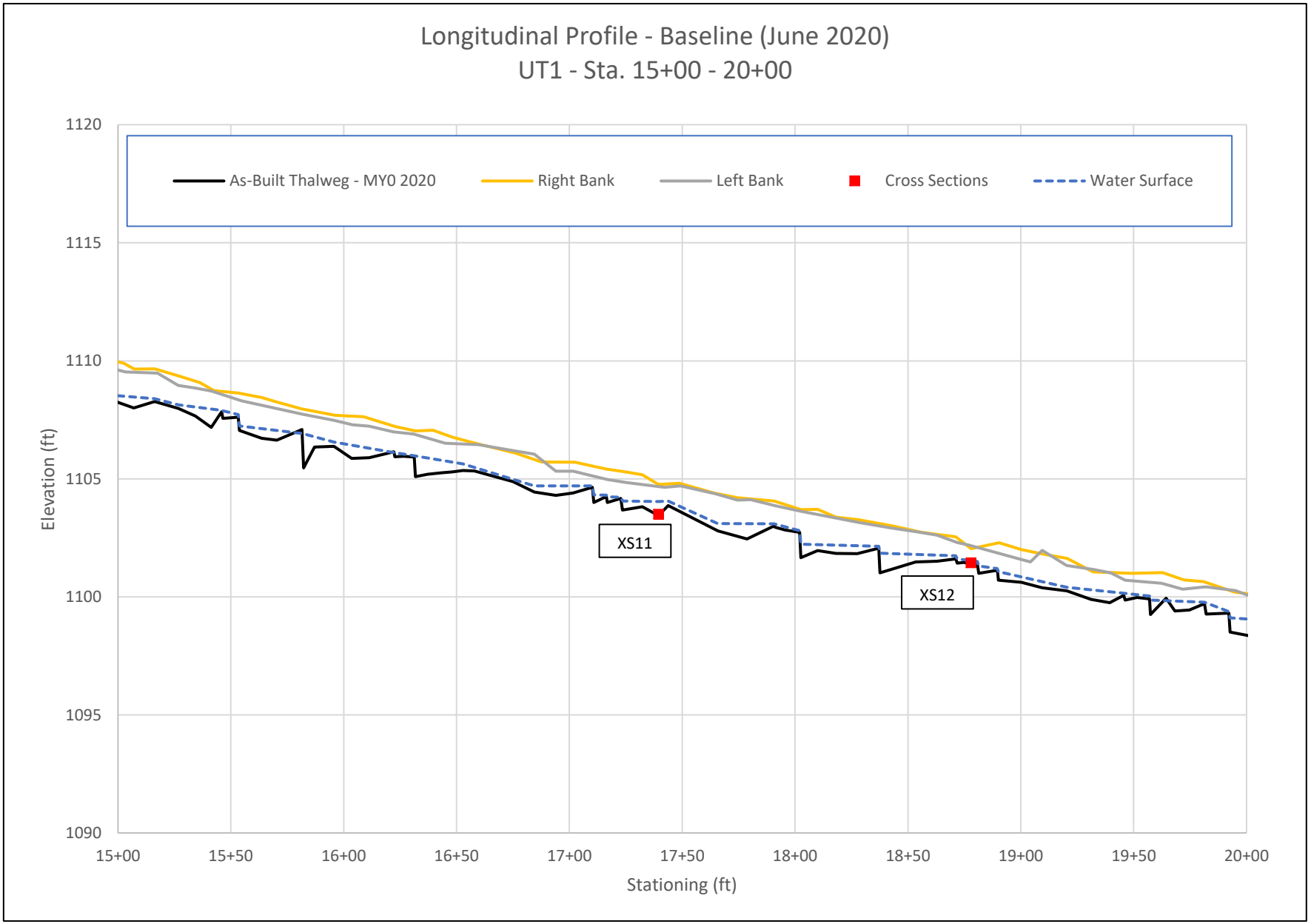


ECOSYSTEM PLANNING & RESTORATION

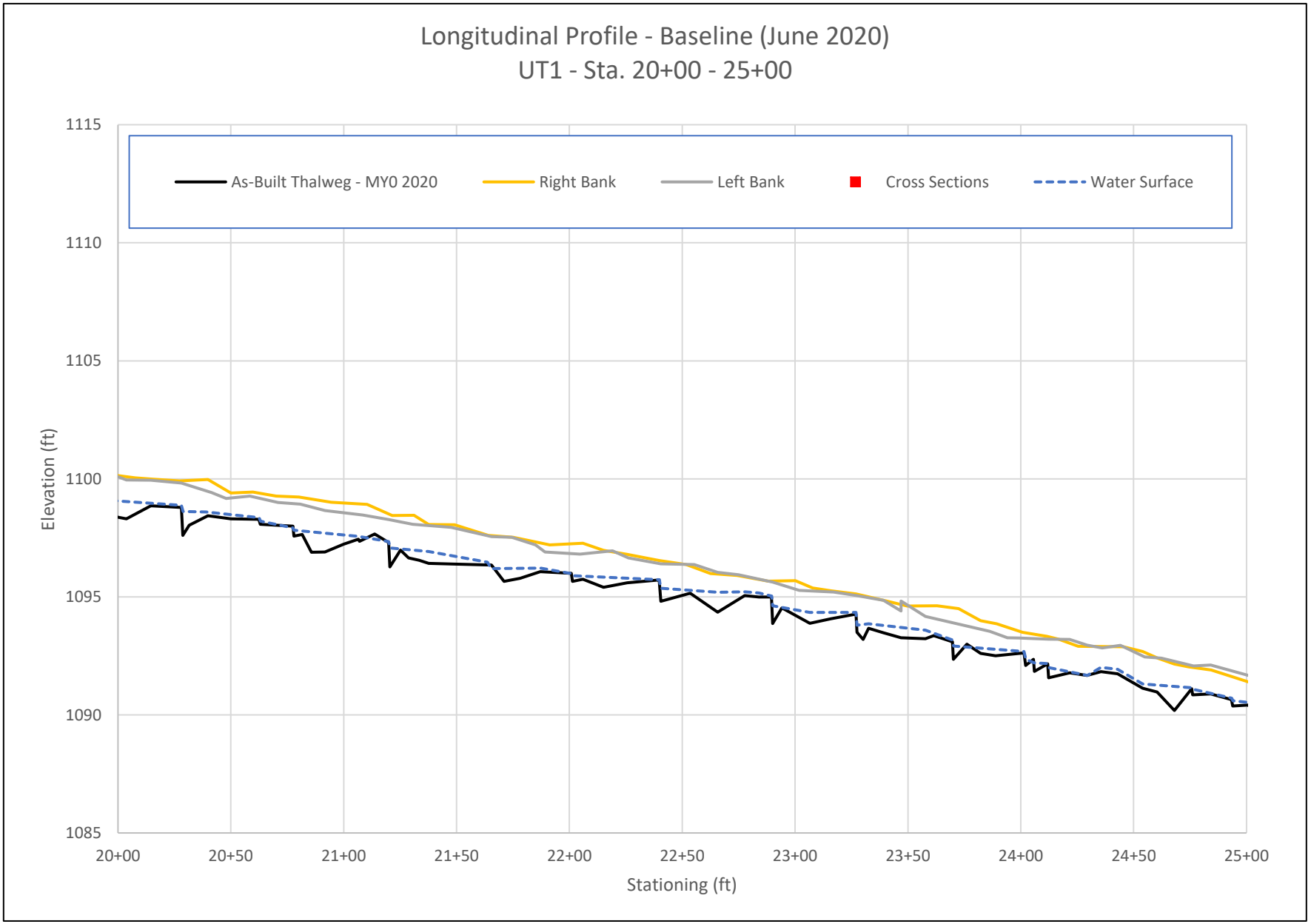


ECOSYSTEM PLANNING & RESTORATION

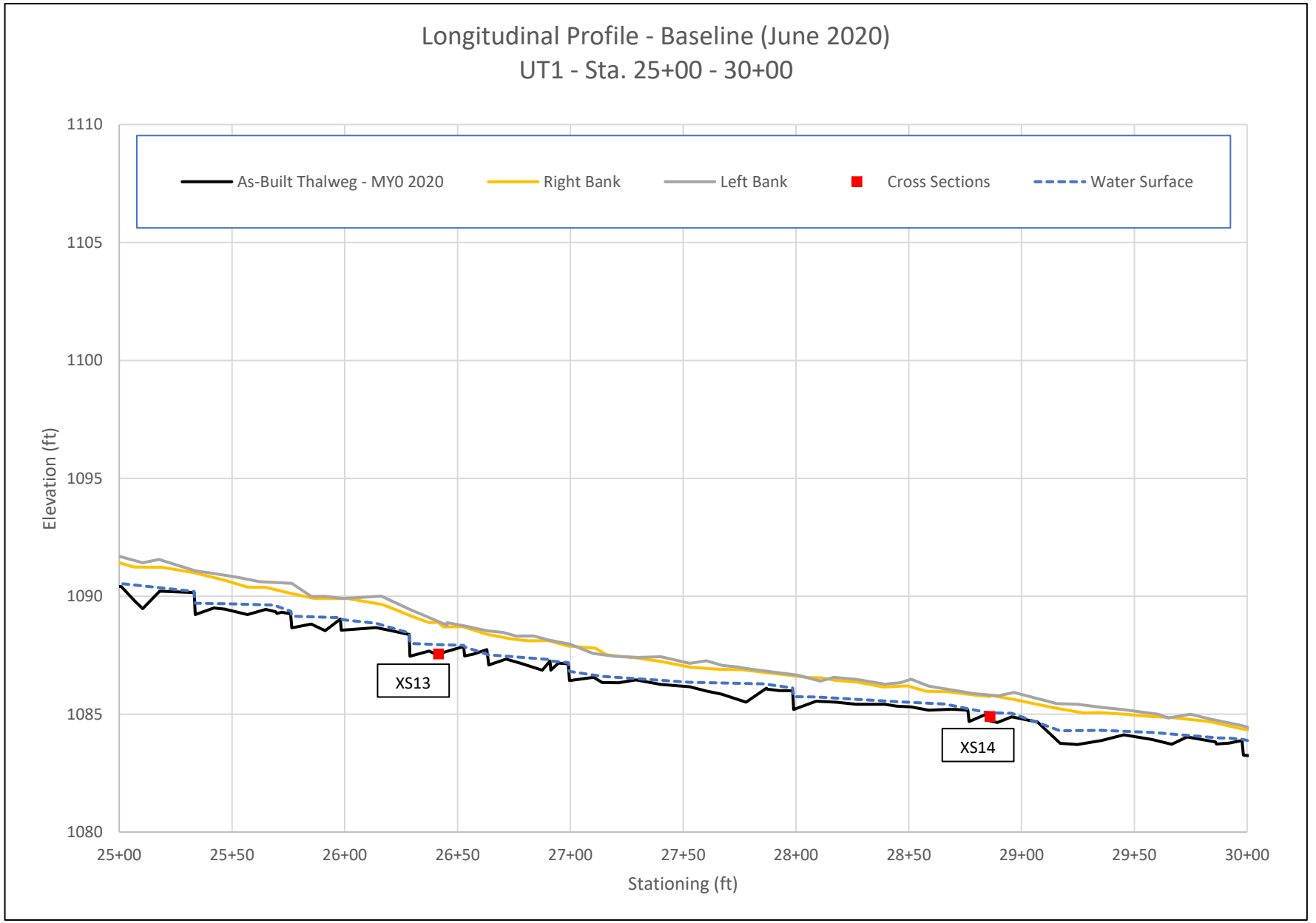

Longitudinal Profile - Baseline (June 2020)
UT1 - Sta. 10+00 - 15+00
As-Built Thalweg - MY0 2020
Right Bank
Left Bank
Cross Sections
Water Surface
Begin UT1
Crossing
XS10
Elevation (ft)
Stationing (ft)
1130
1125
1120
1115
1110
1105
1100
10+00
10+50
11+00
11+50
12+00
12+50
13+00
13+50
14+00
14+50
15+00

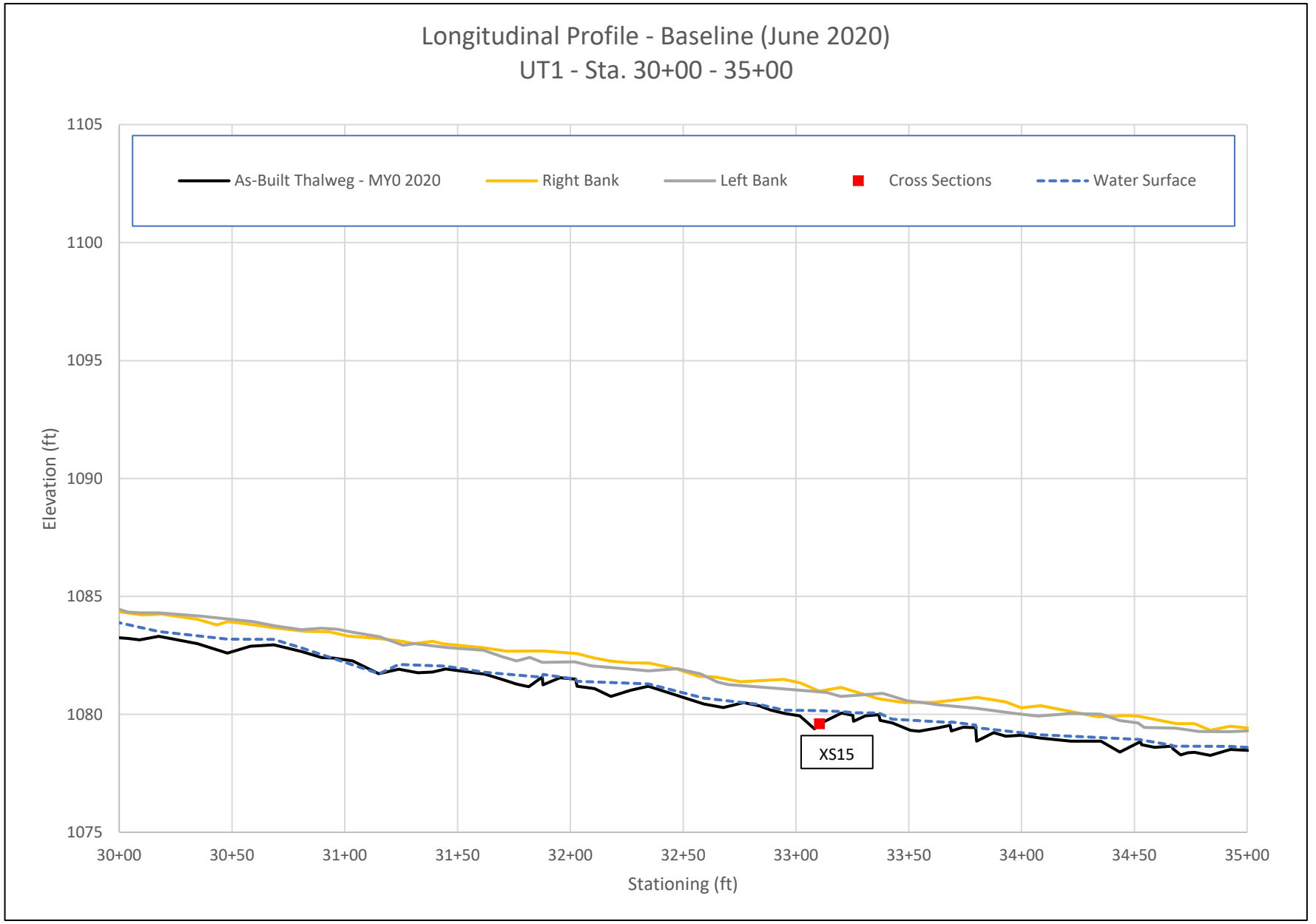


ECOSYSTEM PLANNING & RESTORATION

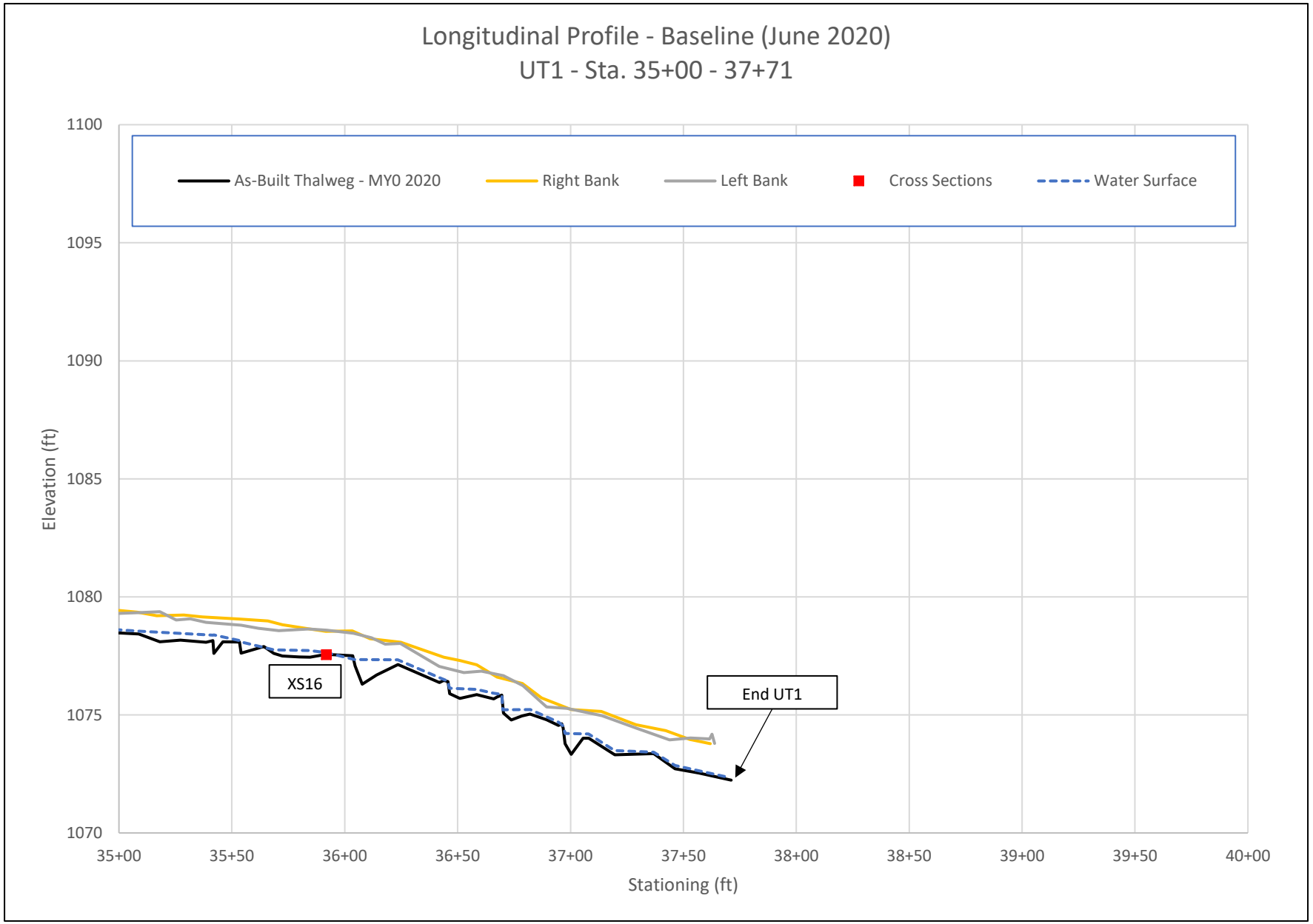


ECOSYSTEM PLANNING & RESTORATION

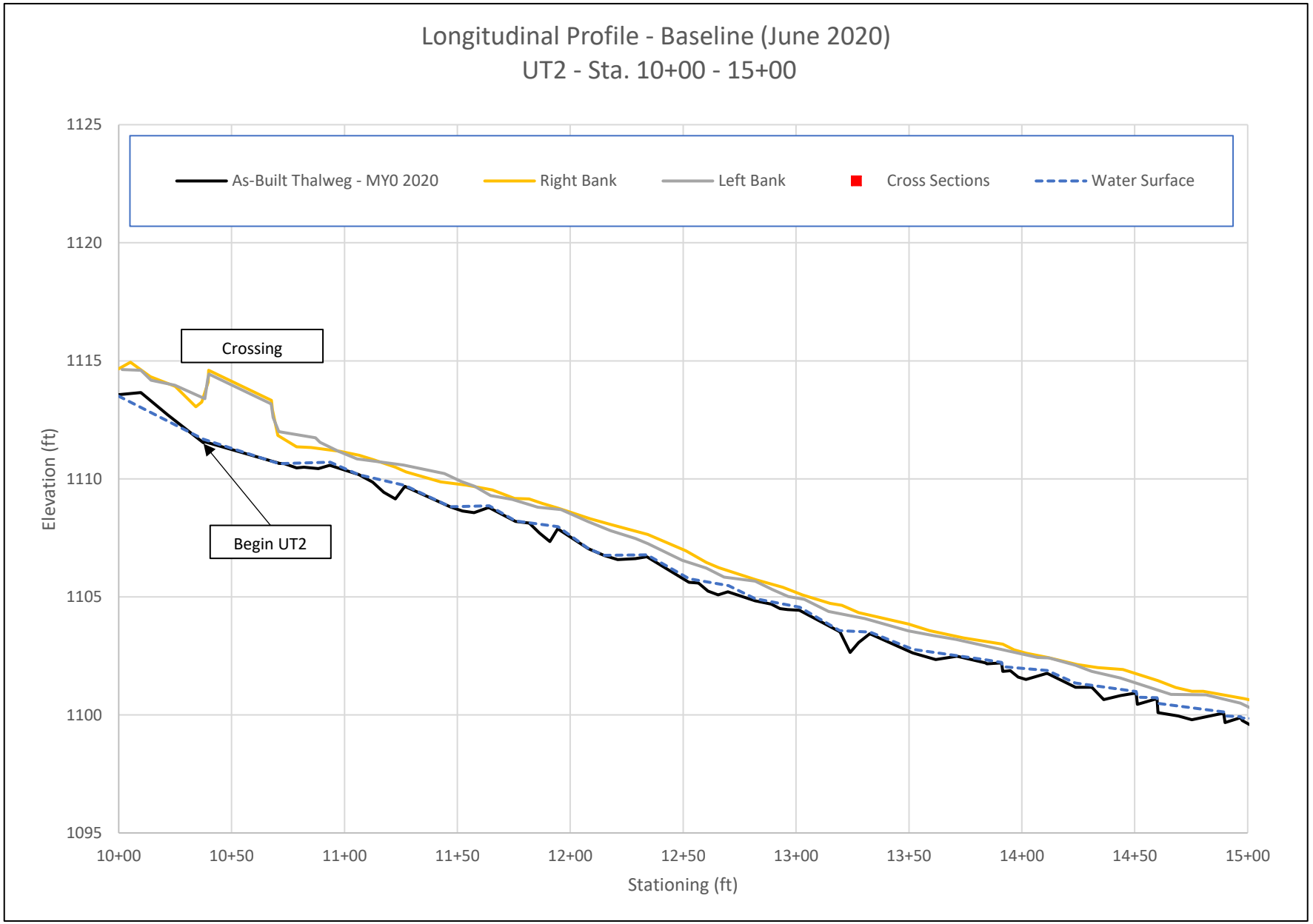

Longitudinal Profile - Baseline (June 2020)
UT1 - Sta. 25+00 - 30+00
As-Built Thalweg - MY0 2020
Right Bank
Left Bank
Cross Sections
Water Surface
XS13
XS14
Elevation (ft)
Stationing (ft)
1110
1105
1100
1095
1090
1085
1080
25+00
25+50
26+00
26+50
27+00
27+50
28+00
28+50
29+00
29+50
30+00



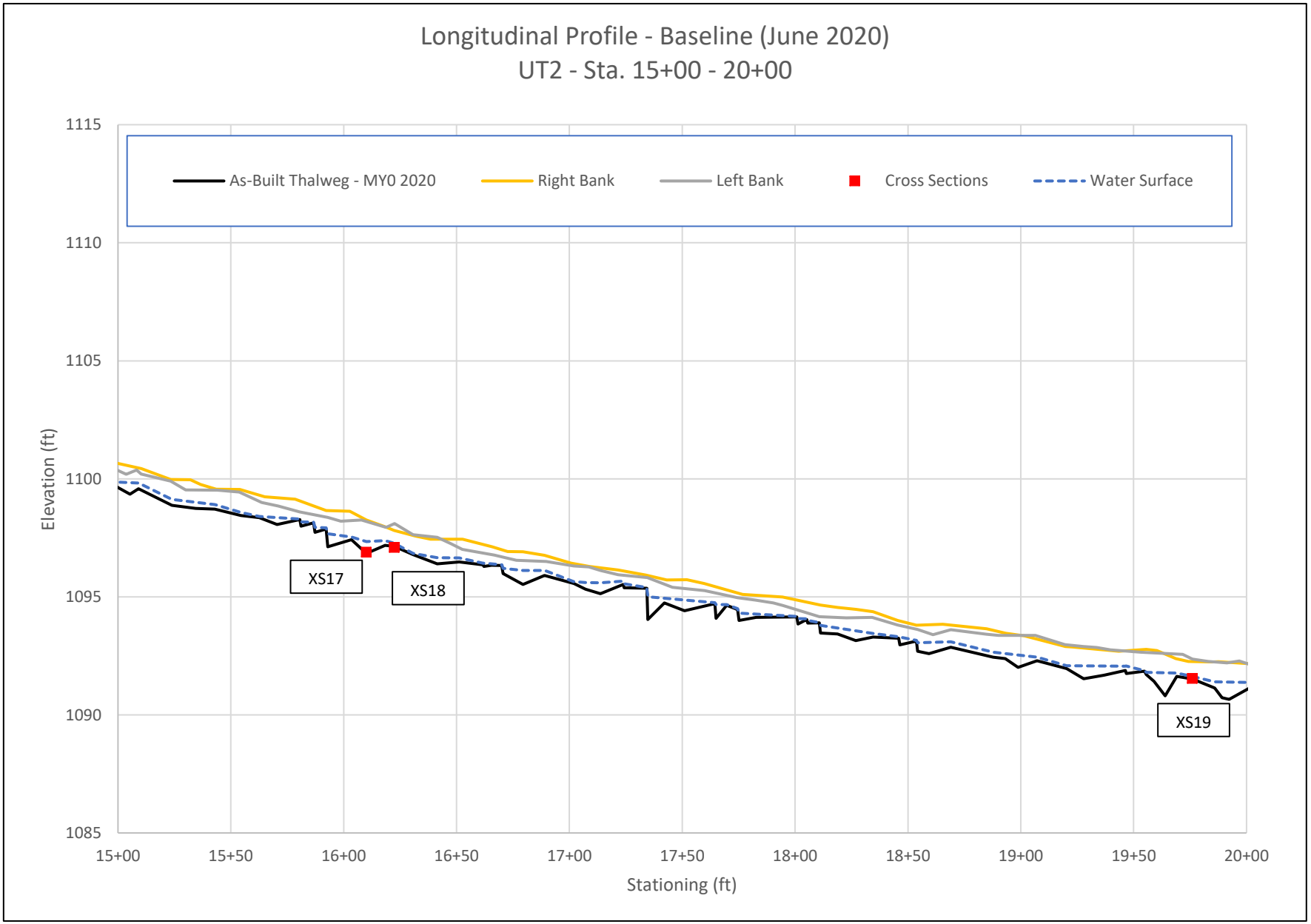
ECOSYSTEM PLANNING & RESTORATION

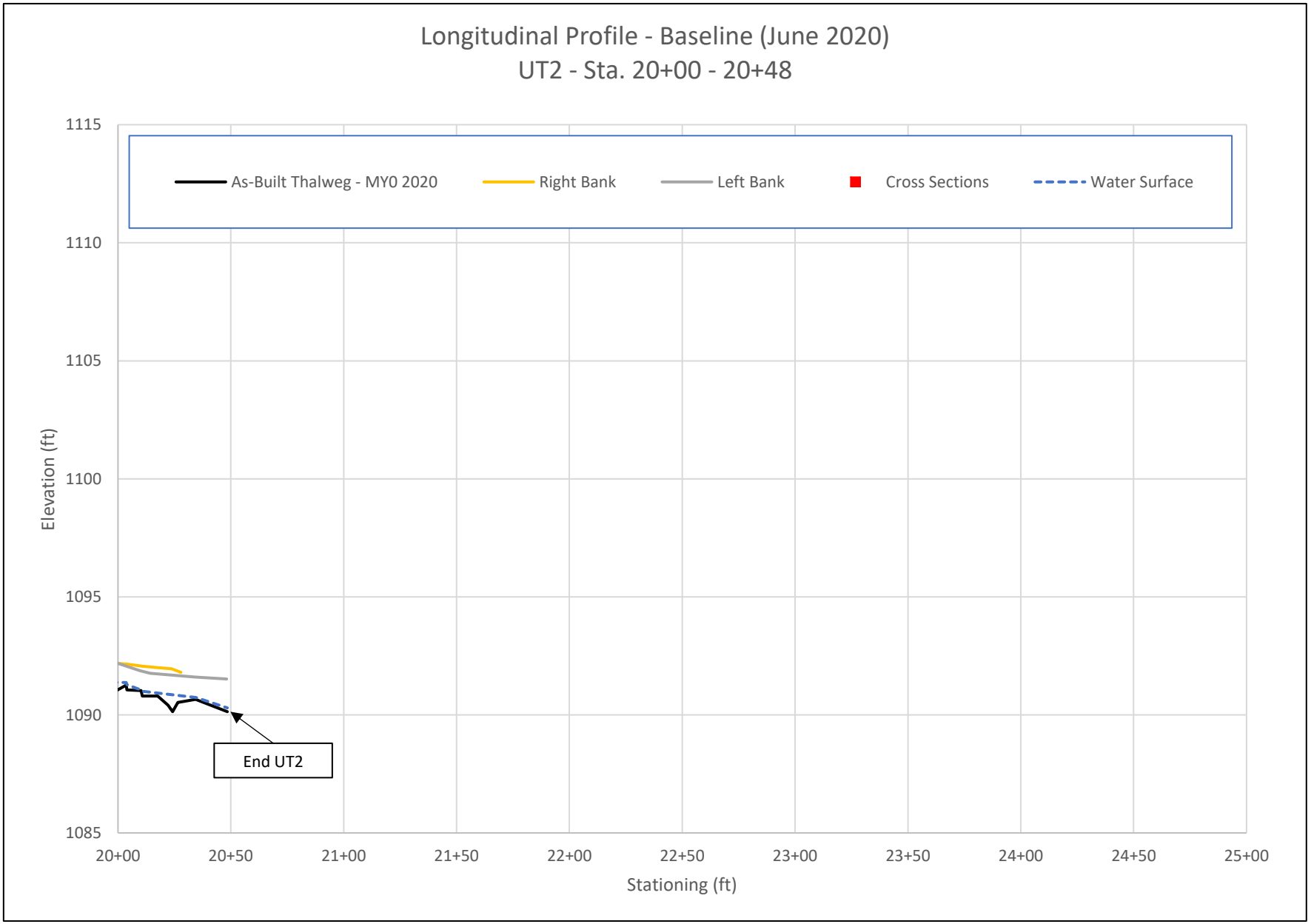


ECOSYSTEM PLANNING & RESTORATION

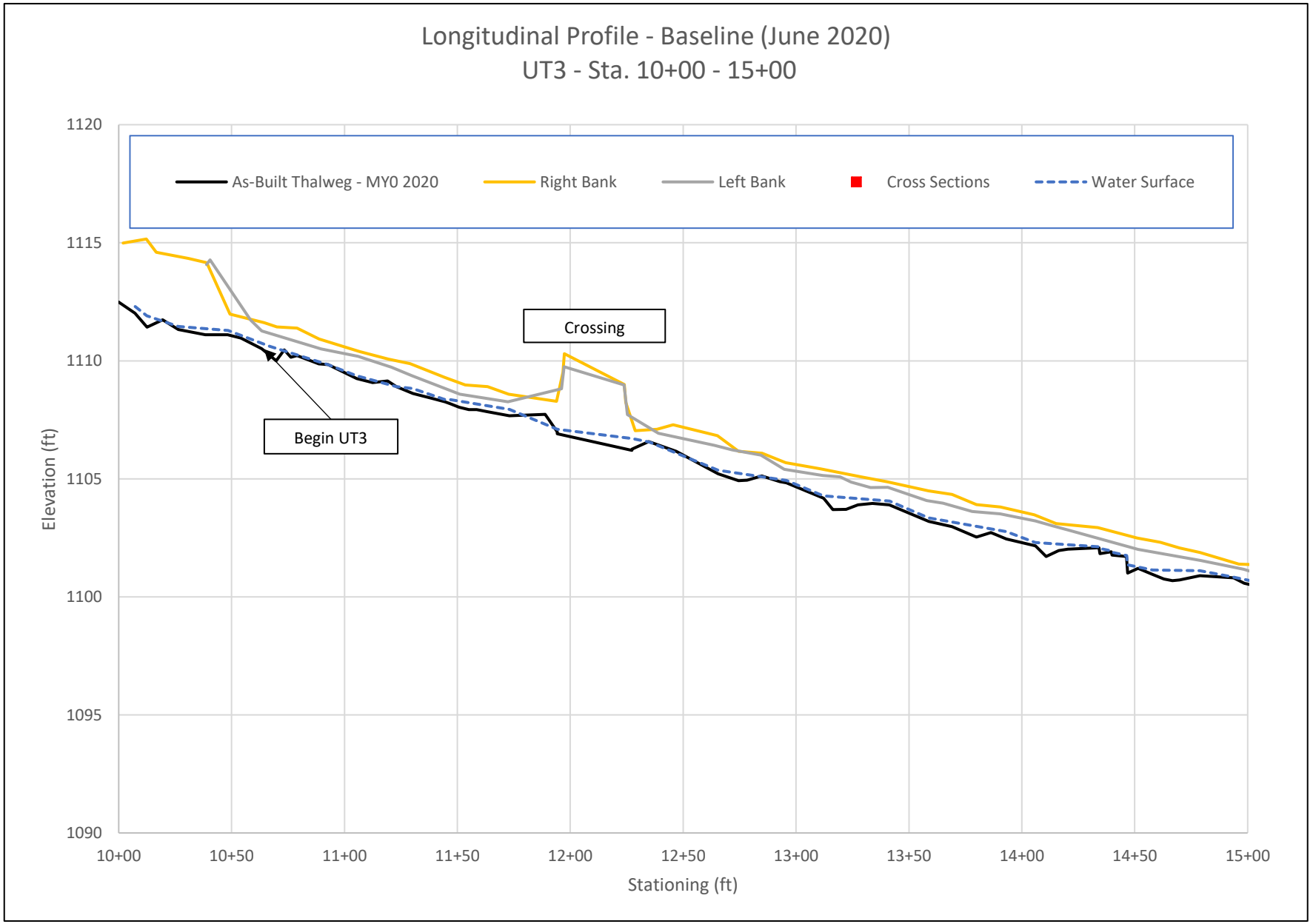


ECOSYSTEM PLANNING & RESTORATION

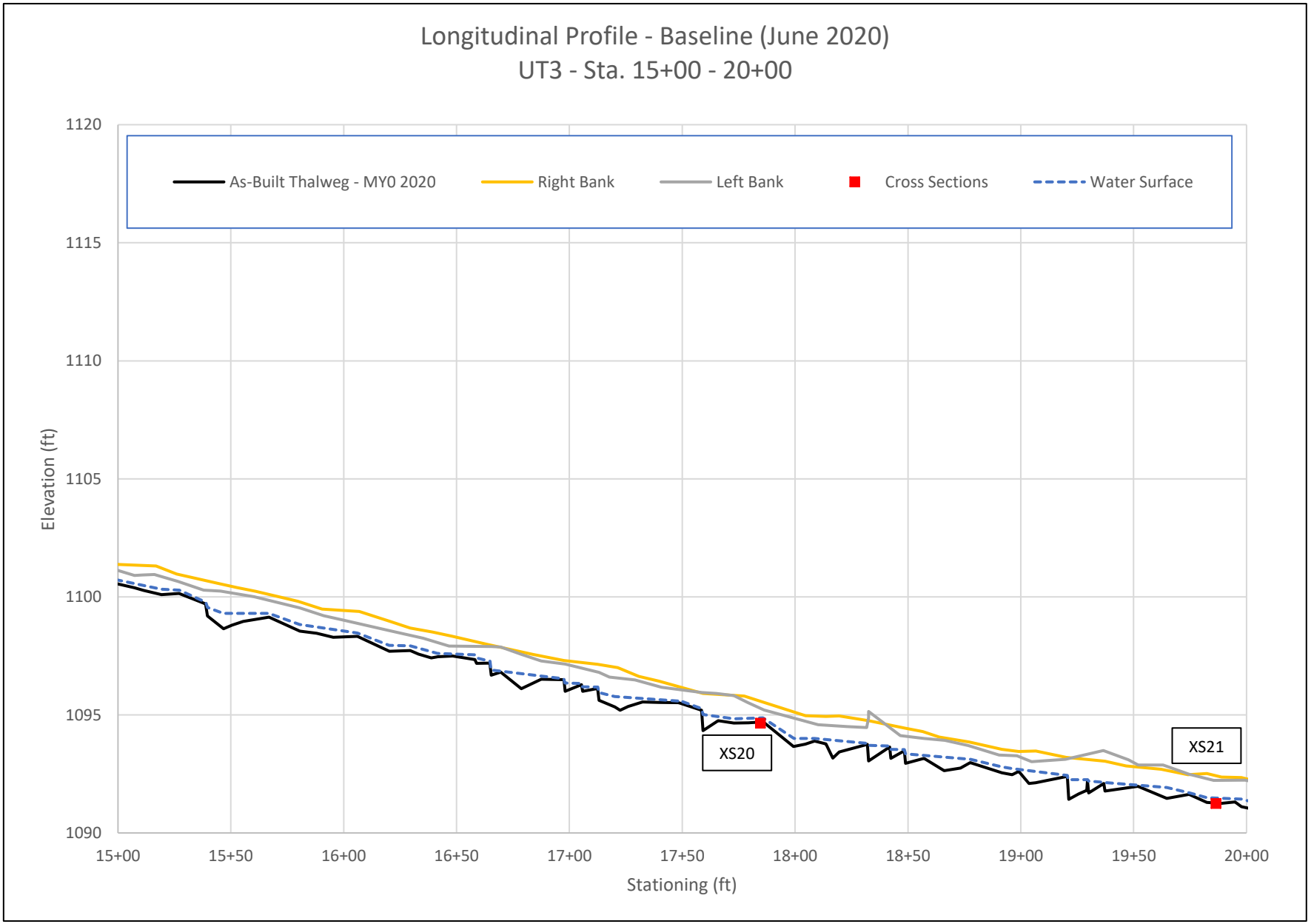

Longitudinal Profile - Baseline (June 2020)
UT2 - Sta. 15+00 - 20+00
As-Built Thalweg - MY0 2020
Right Bank
Left Bank
Cross Sections
Water Surface
Elevation (ft)
1115
1110
1105
1100
1095
1090
1085
XS17
XS18
XS19
15+00
15+50
16+00
16+50
17+00
17+50
18+00
18+50
19+00
19+50
20+00
Stationing (ft)



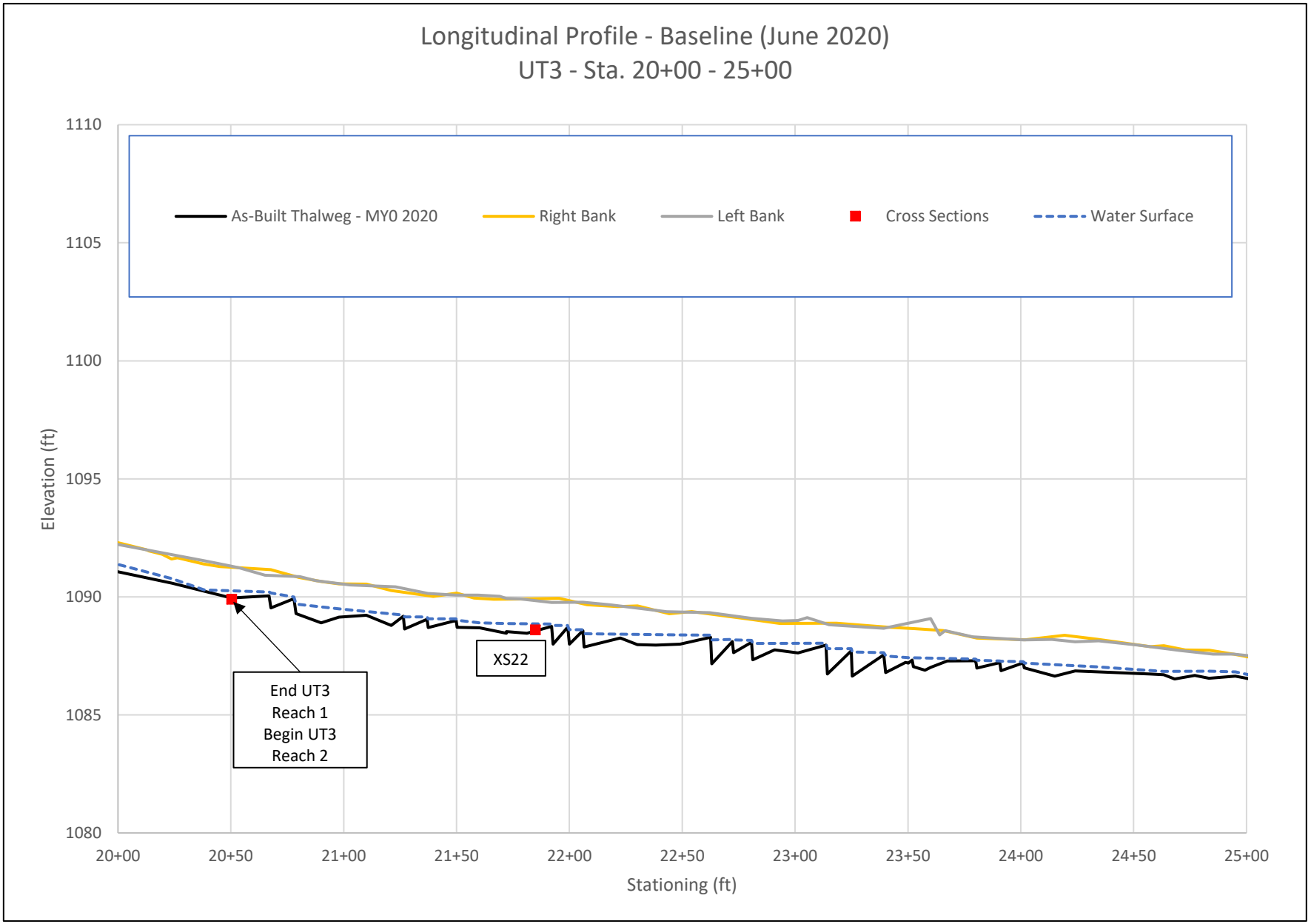
ECOSYSTEM PLANNING & RESTORATION

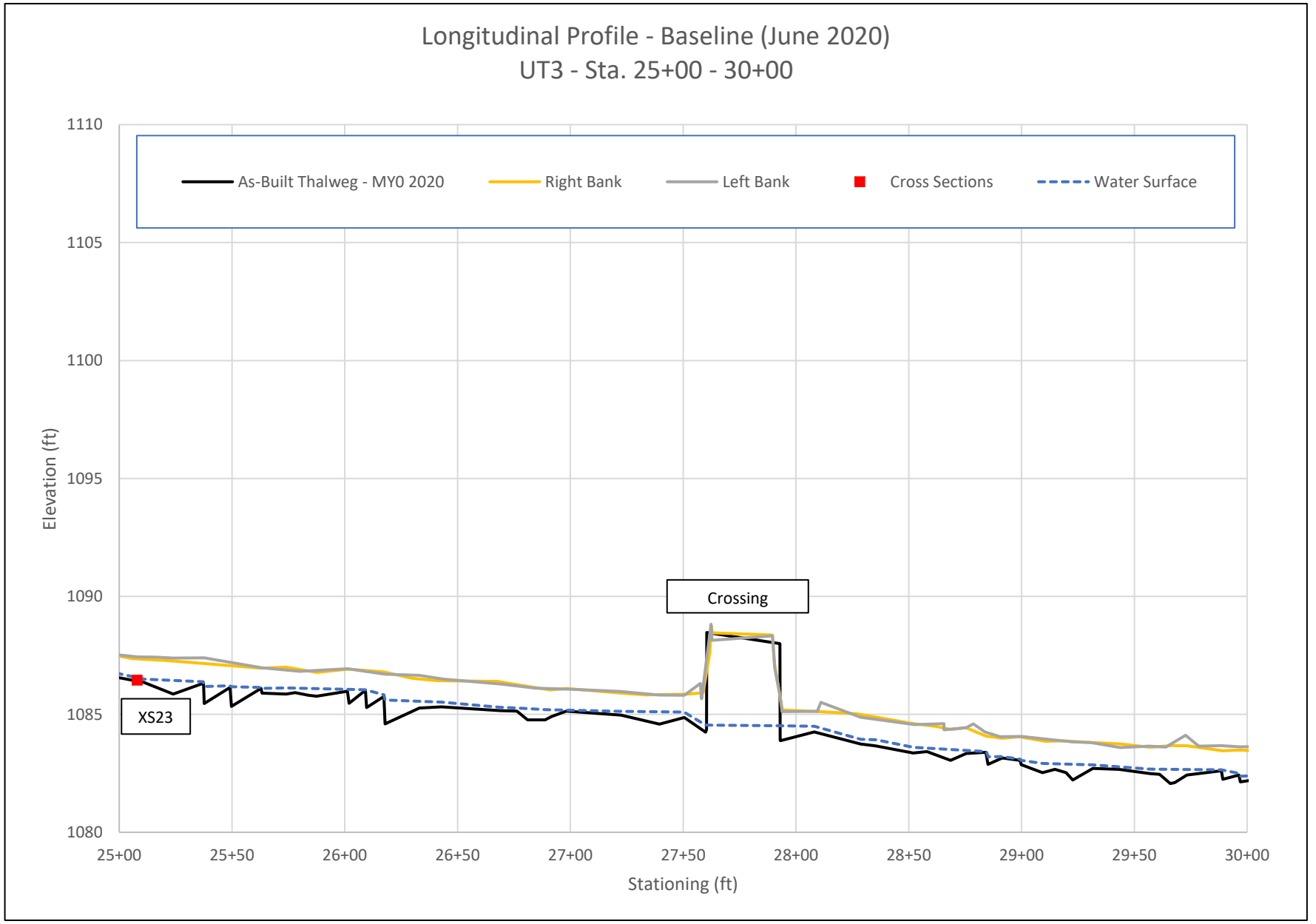


ECOSYSTEM PLANNING & RESTORATION

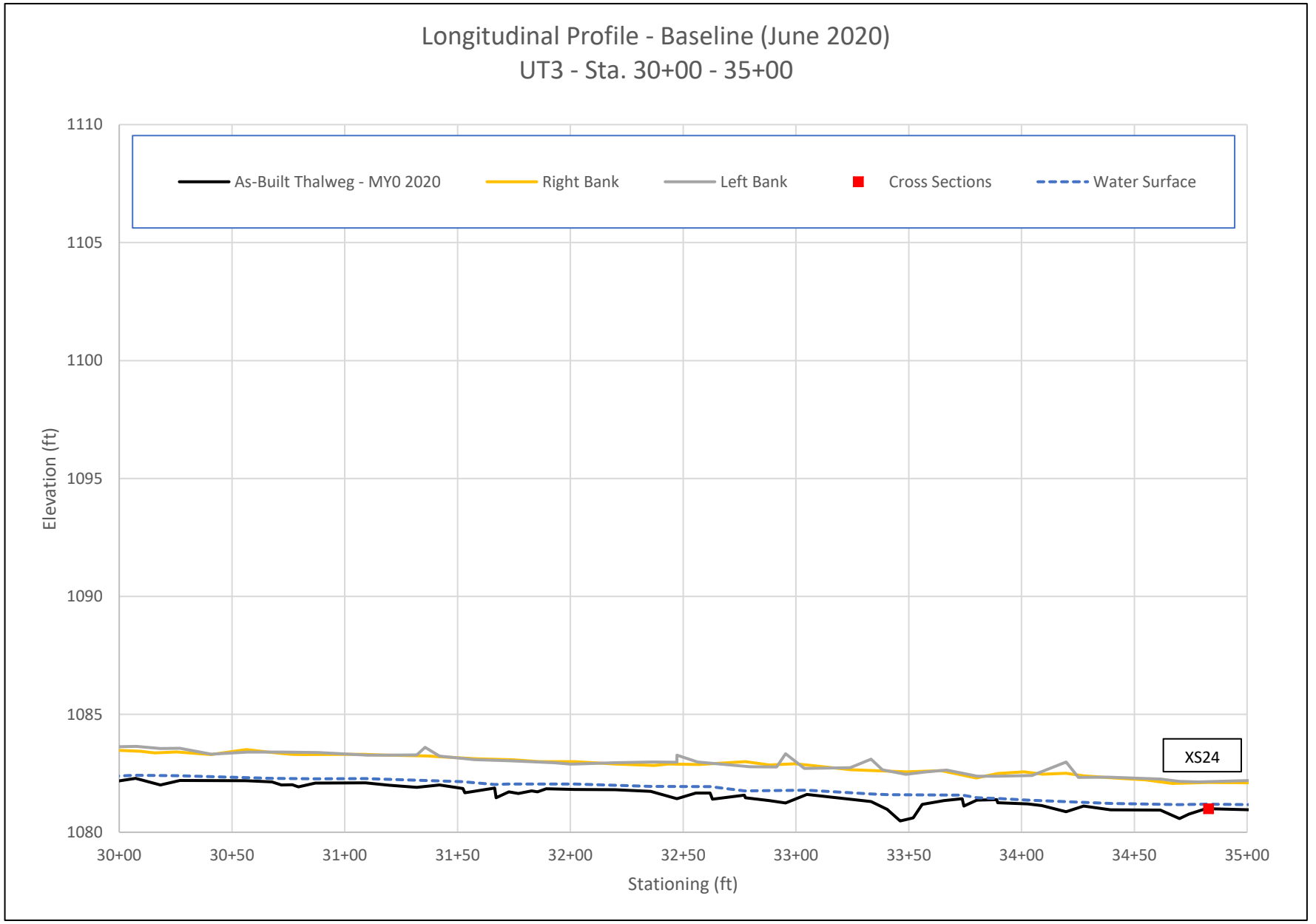


ECOSYSTEM PLANNING & RESTORATION

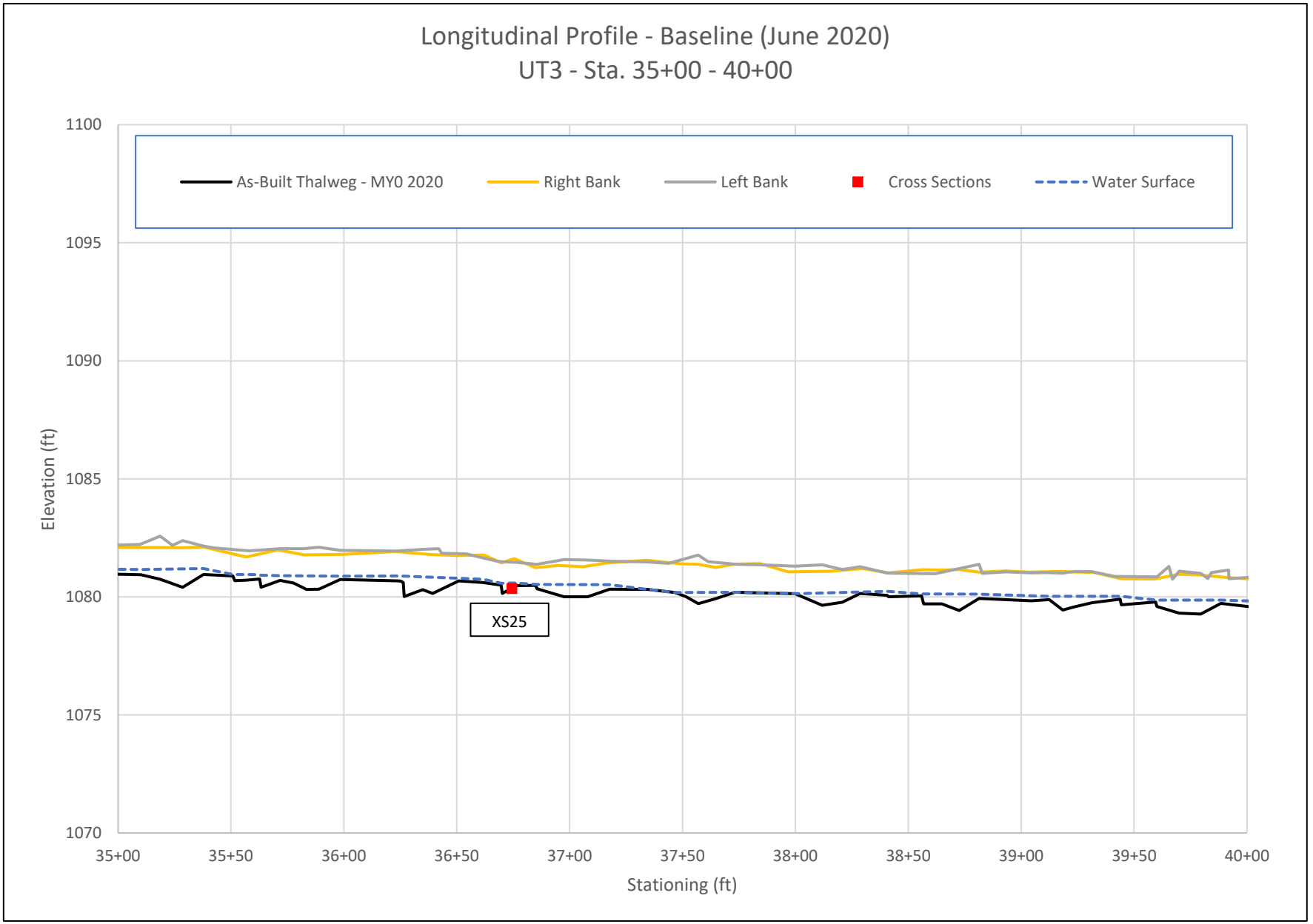

Longitudinal Profile - Baseline (June 2020)
UT3 - Sta. 20+00 - 25+00
As-Built Thalweg - MY0 2020
Right Bank
Left Bank
Cross Sections
Water Surface
Elevation (ft)
1110
1105
1100
1095
1090
1085
1080
20+00
20+50
21+00
21+50
22+00
22+50
23+00
23+50
24+00
24+50
25+00
Stationing (ft)
XS22
End UT3
Reach 1
Begin UT3
Reach 2



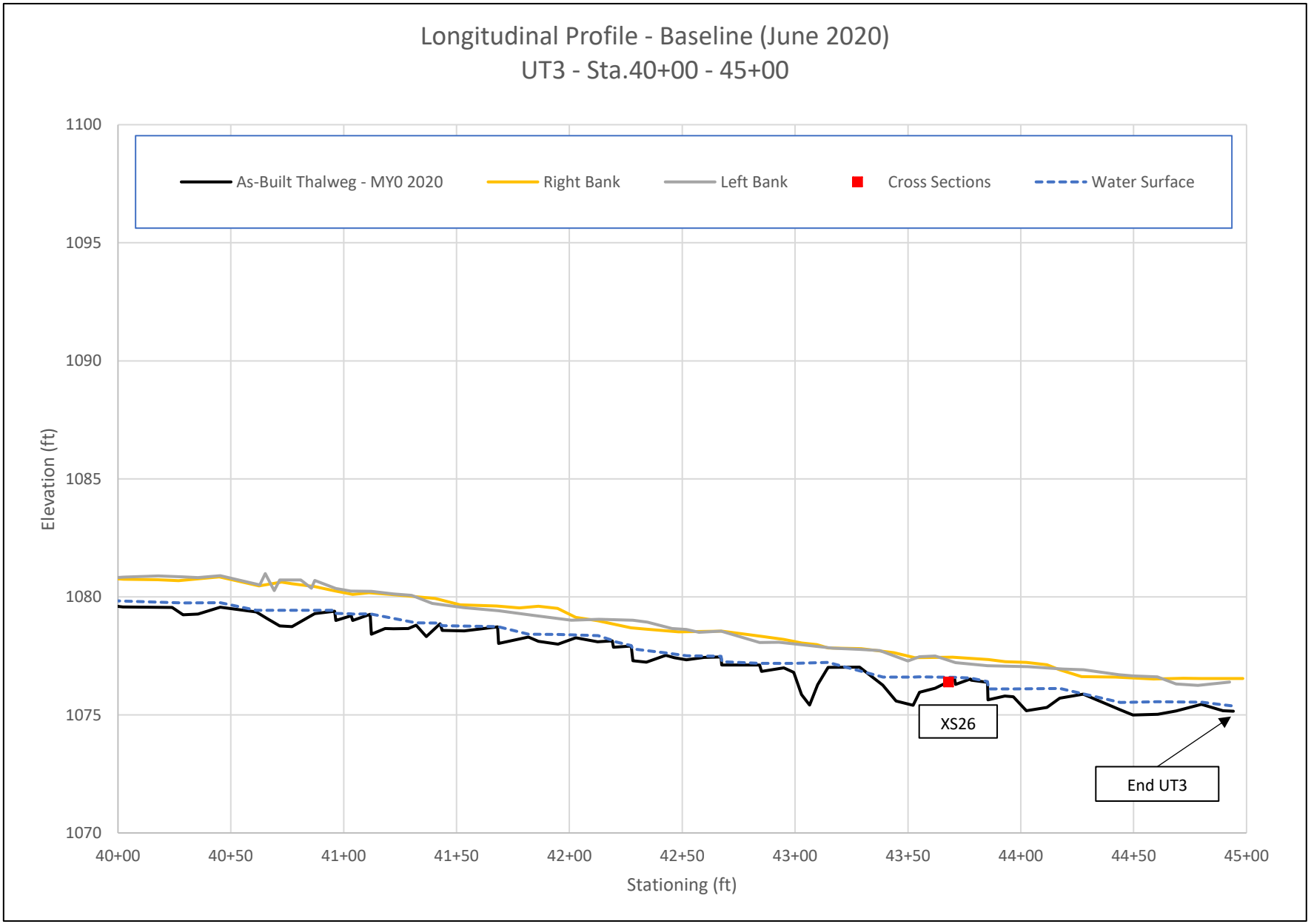
ECOSYSTEM PLANNING & RESTORATION



ECOSYSTEM PLANNING & RESTORATION



ECOSYSTEM PLANNING & RESTORATION



ECOSYSTEM PLANNING & RESTORATION

Cross Section Plot - Baseline - June 2020

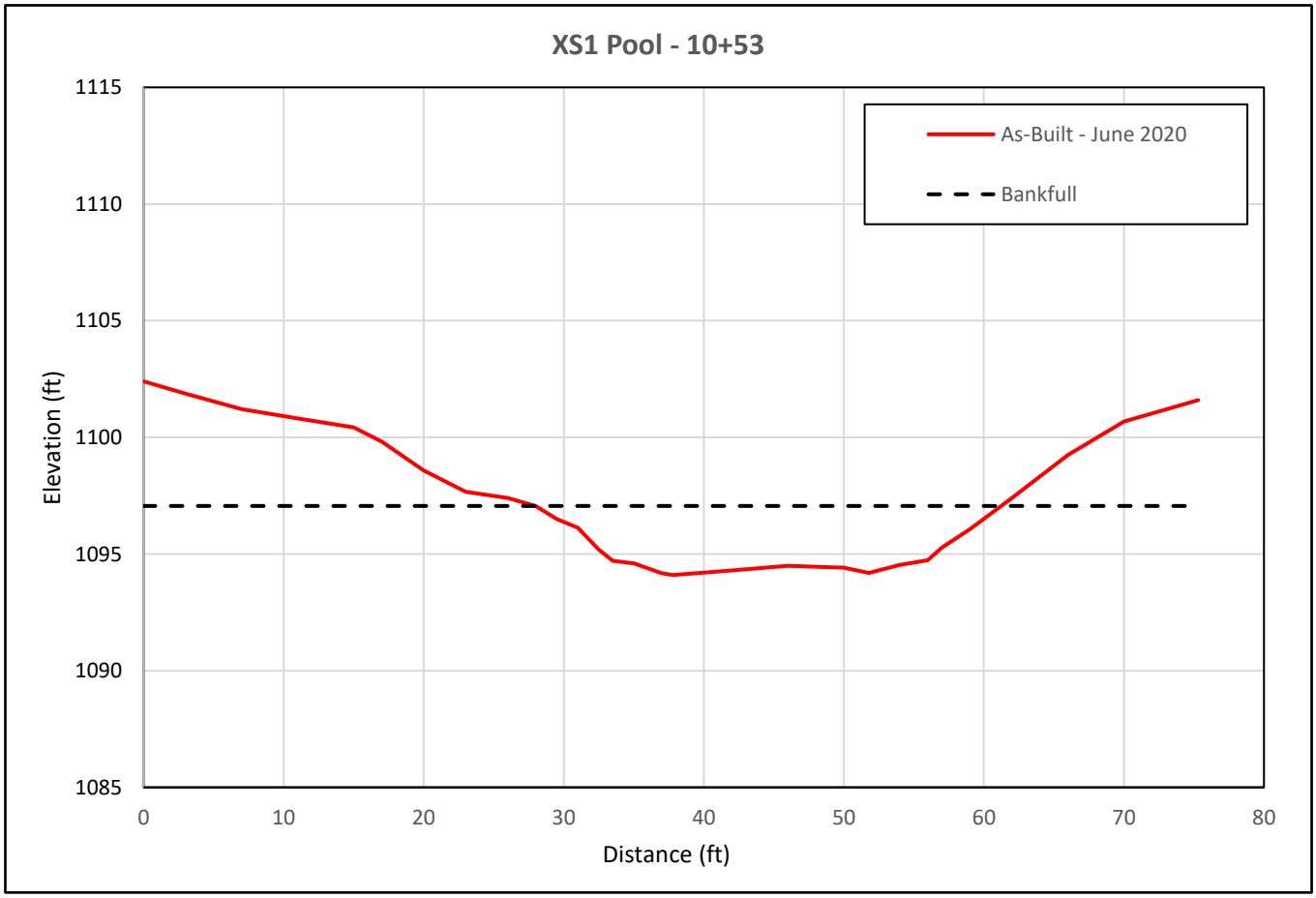
XS1 - Moores Fork Reach 1

Station 10+53 - Pool

XS1 looking upstream

XS1 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1097.06	71.8	33.2	N/A	N/A	2.96	2.16	15.39	N/A	1.2



Cross Section Plot - Baseline - June 2020

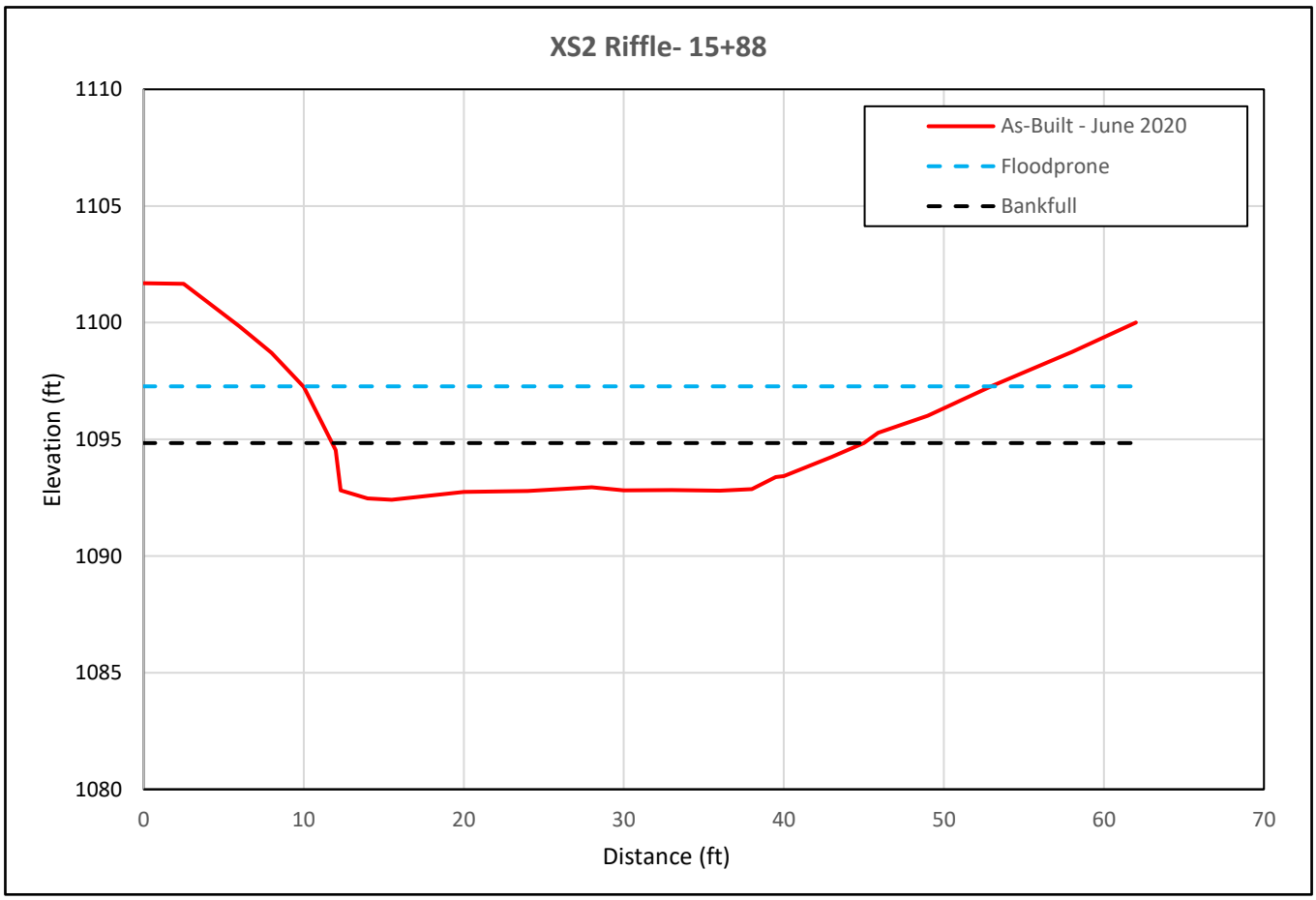
XS2 - Moores Fork Reach 1

Station 15+88 - Riffle

XS2 looking upstream

XS2 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1094.84	61.1	33.22	1094.27	42.97	2.43	1.84	18.05	1.29	1.2



Cross Section Plot - Baseline - June 2020

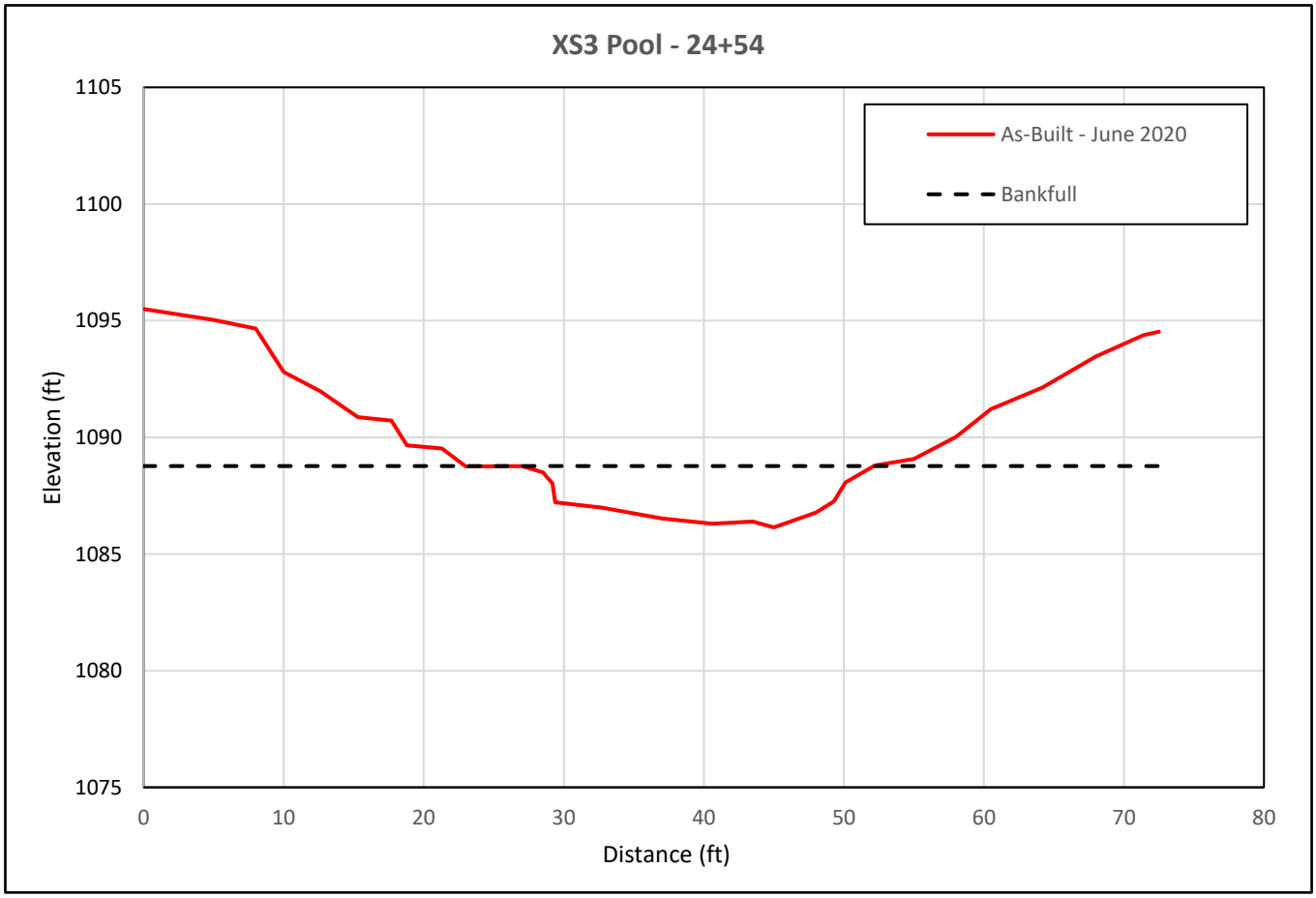
XS3 - Moores Fork Reach 1

Station 24+54 - Pool

XS3 looking upstream

XS3 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1088.77	45.1	29.1	N/A	N/A	2.63	1.55	18.8	N/A	1.0



Cross Section Plot - Baseline - June 2020

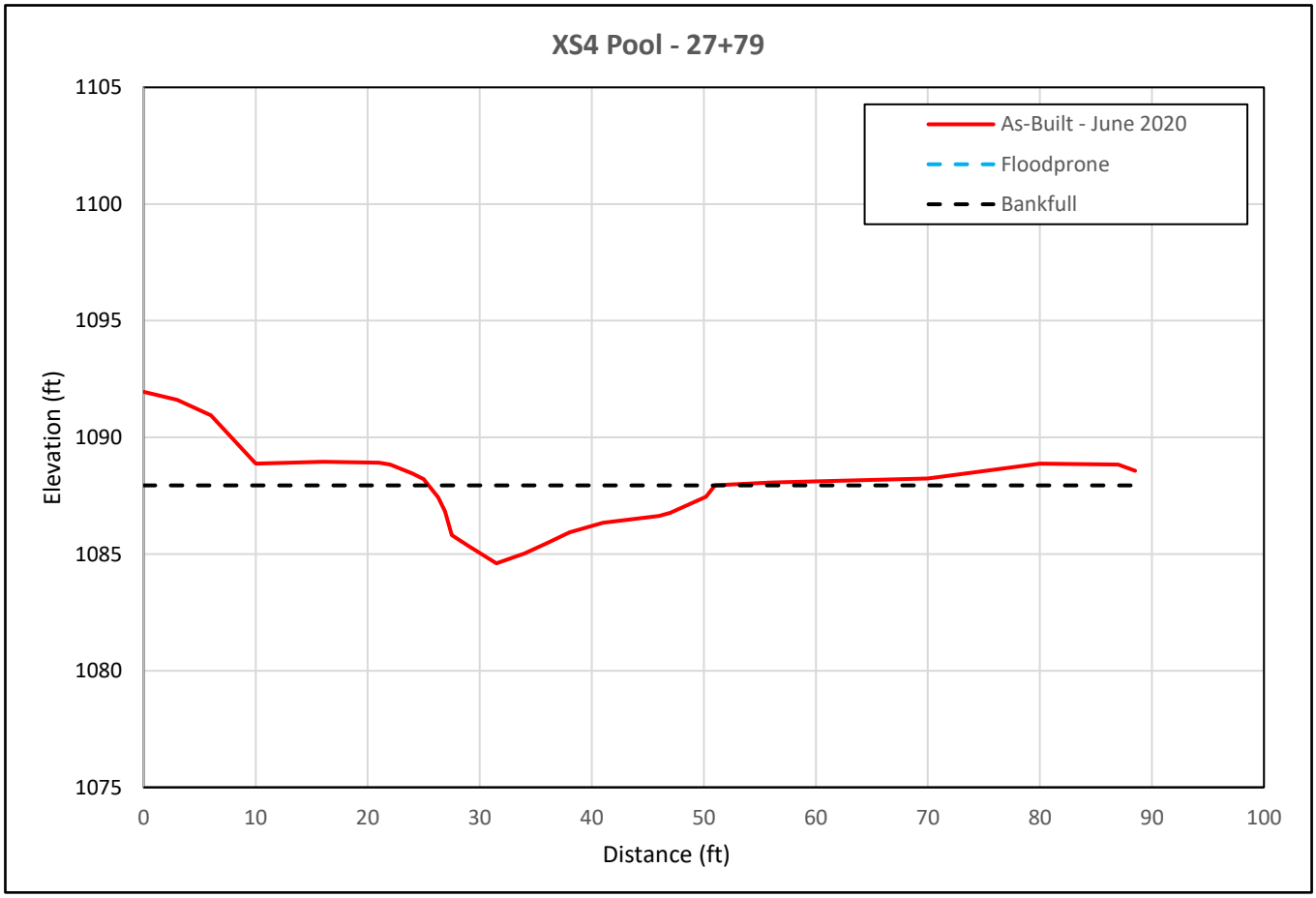
XS4 - Moores Fork Reach 2

Station 27+79 - Pool

XS4 looking upstream

XS4 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1087.94	47.12	25.55	N/A	N/A	3.34	1.84	13.89	N/A	1.0



Cross Section Plot - Baseline - June 2020

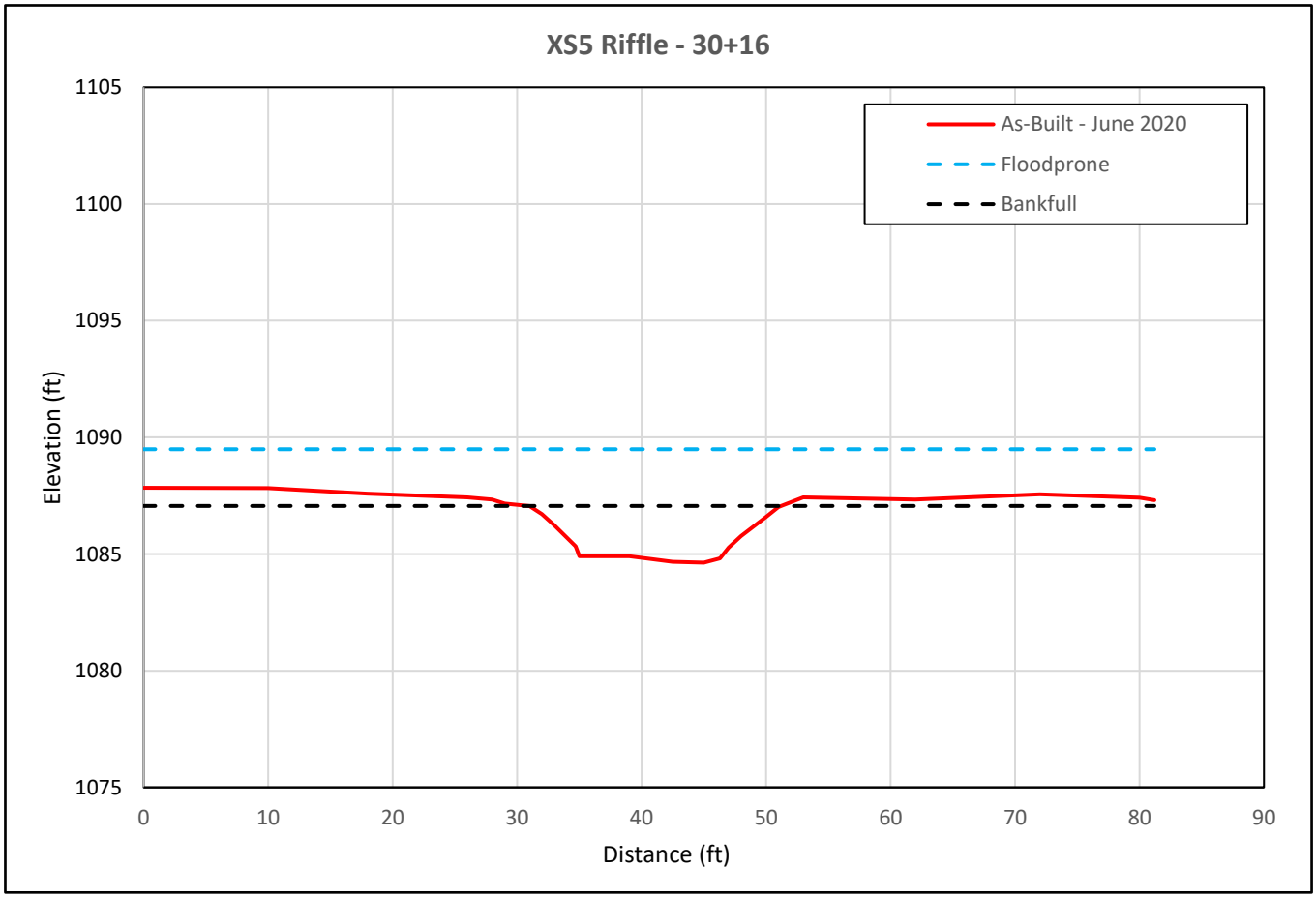
XS5 - Moores Fork Reach 2

Station 30+16 - Riffle

XS5 looking upstream

XS5 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1087.06	34.13	20.24	1089.49	>81.2	2.43	1.69	11.98	>4.01	1.12



Cross Section Plot - Baseline - June 2020

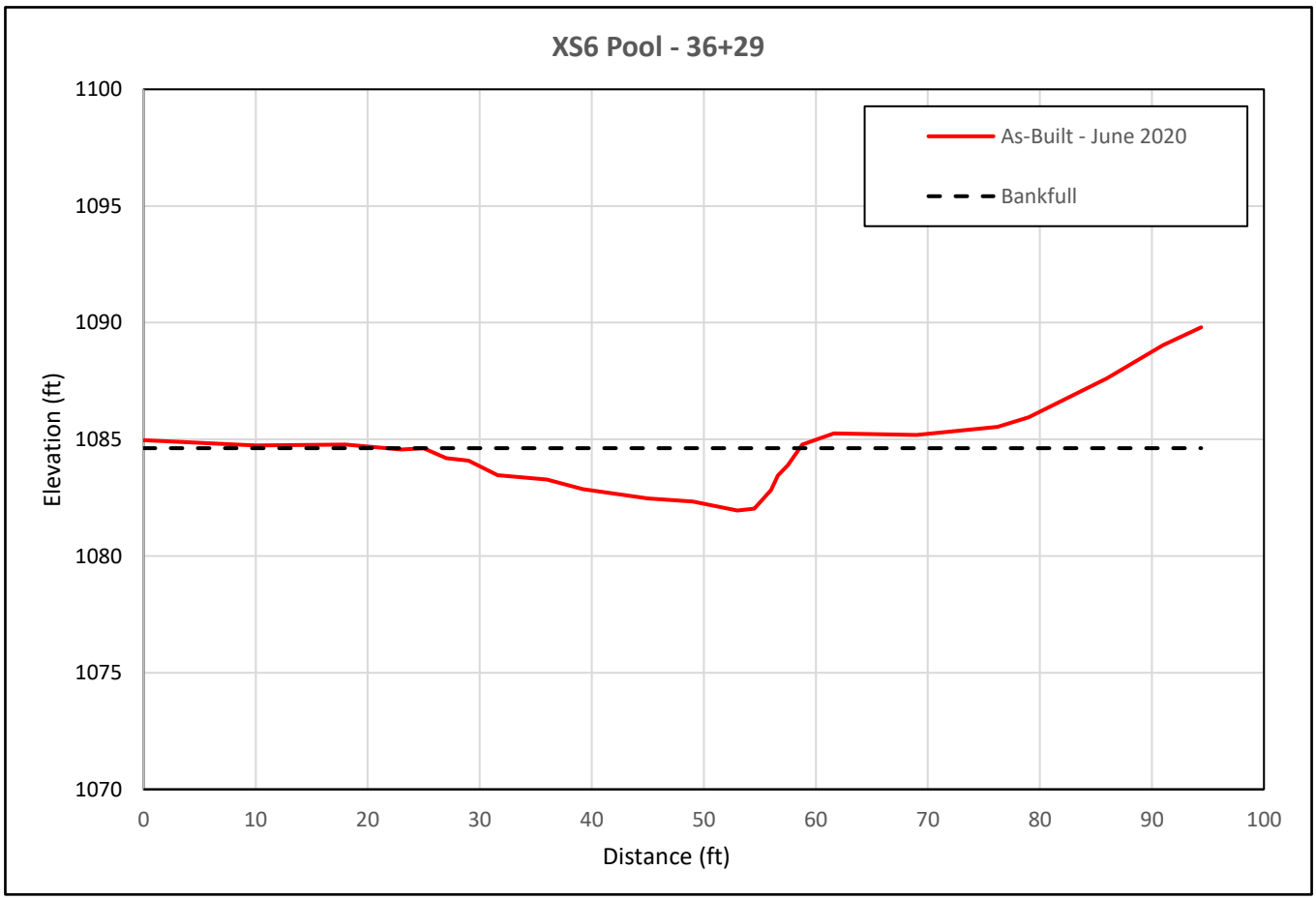
XS6 - Moores Fork Reach 2

Station 36+29 - Pool

XS6 looking upstream

XS6 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1084.62	53.58	33.56	N/A	N/A	2.67	1.6	20.98	N/A	1.0



Cross Section Plot - Baseline - June 2020

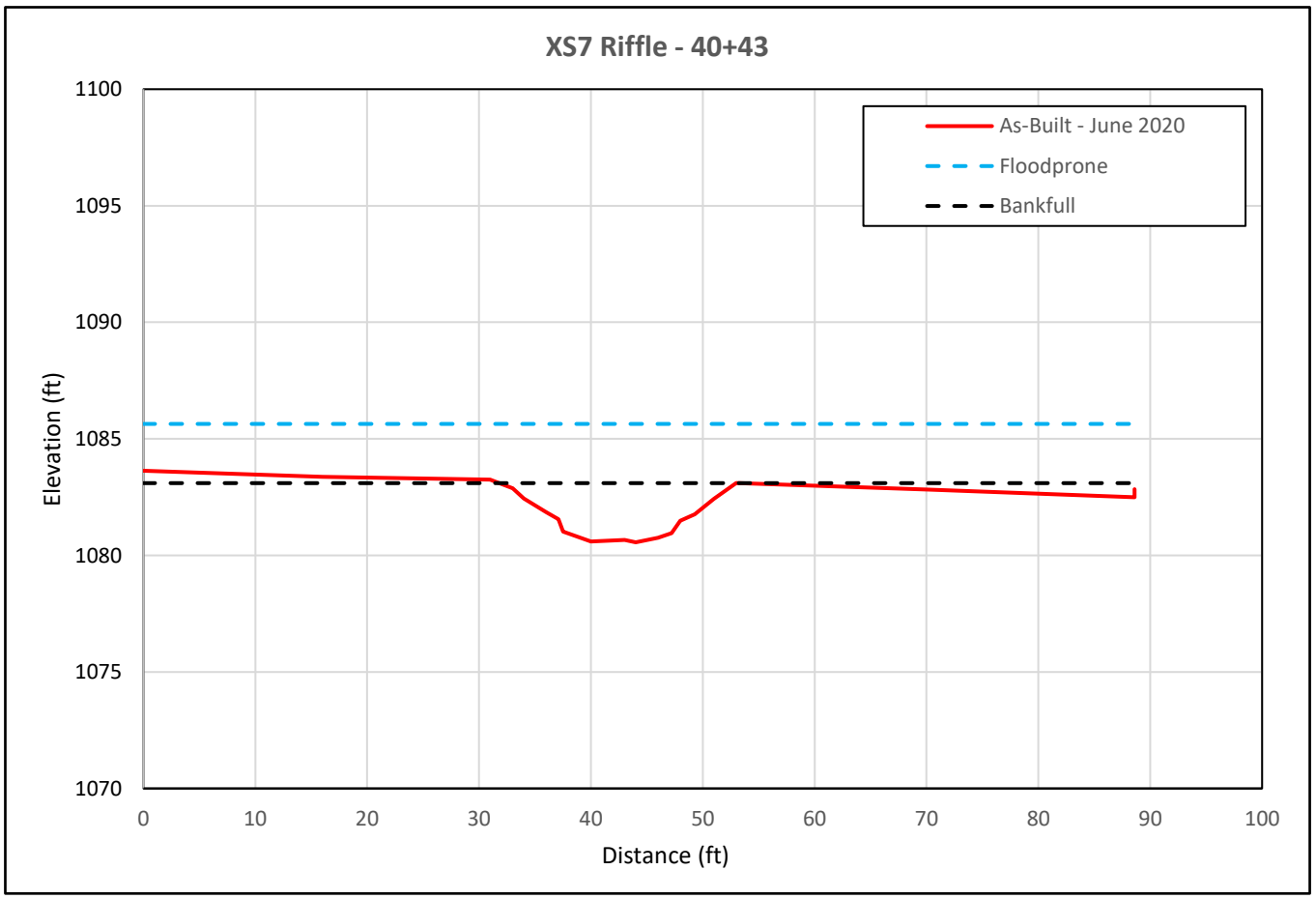
XS7 - Moores Fork Reach 2

Station 40+43 - Riffle

XS7 looking upstream

XS7 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1083.1	33.72	21.25	1085.64	>88.6	2.54	1.59	13.36	>4.14	1.0



Cross Section Plot - Baseline - June 2020

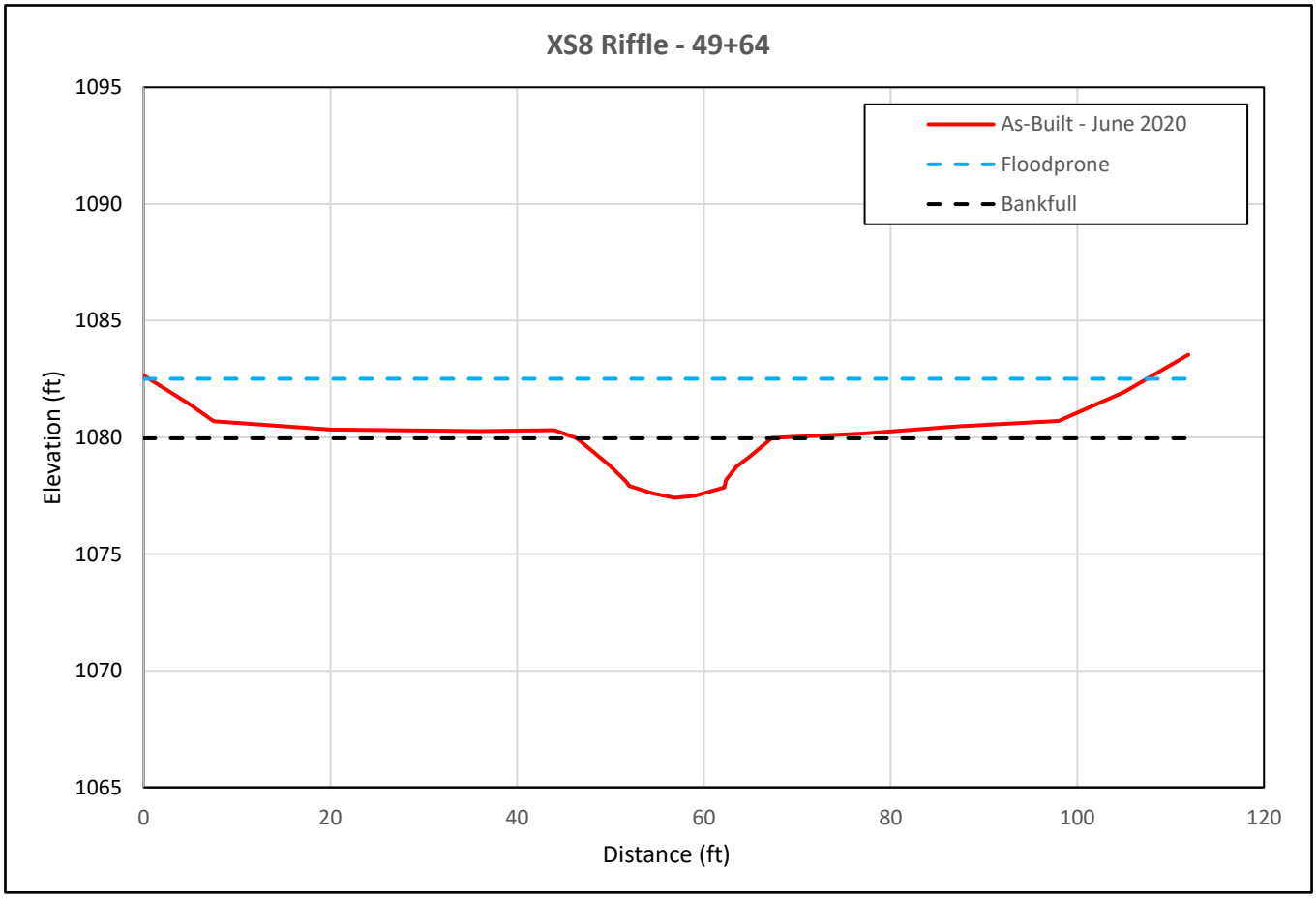
XS8 - Moores Fork Reach 3

Station 49+64 - Riffle

XS8 looking upstream

XS8 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1079.96	33.68	20.87	1082.51	106.9	2.55	1.61	12.96	5.12	1.0



Cross Section Plot - Baseline - June 2020

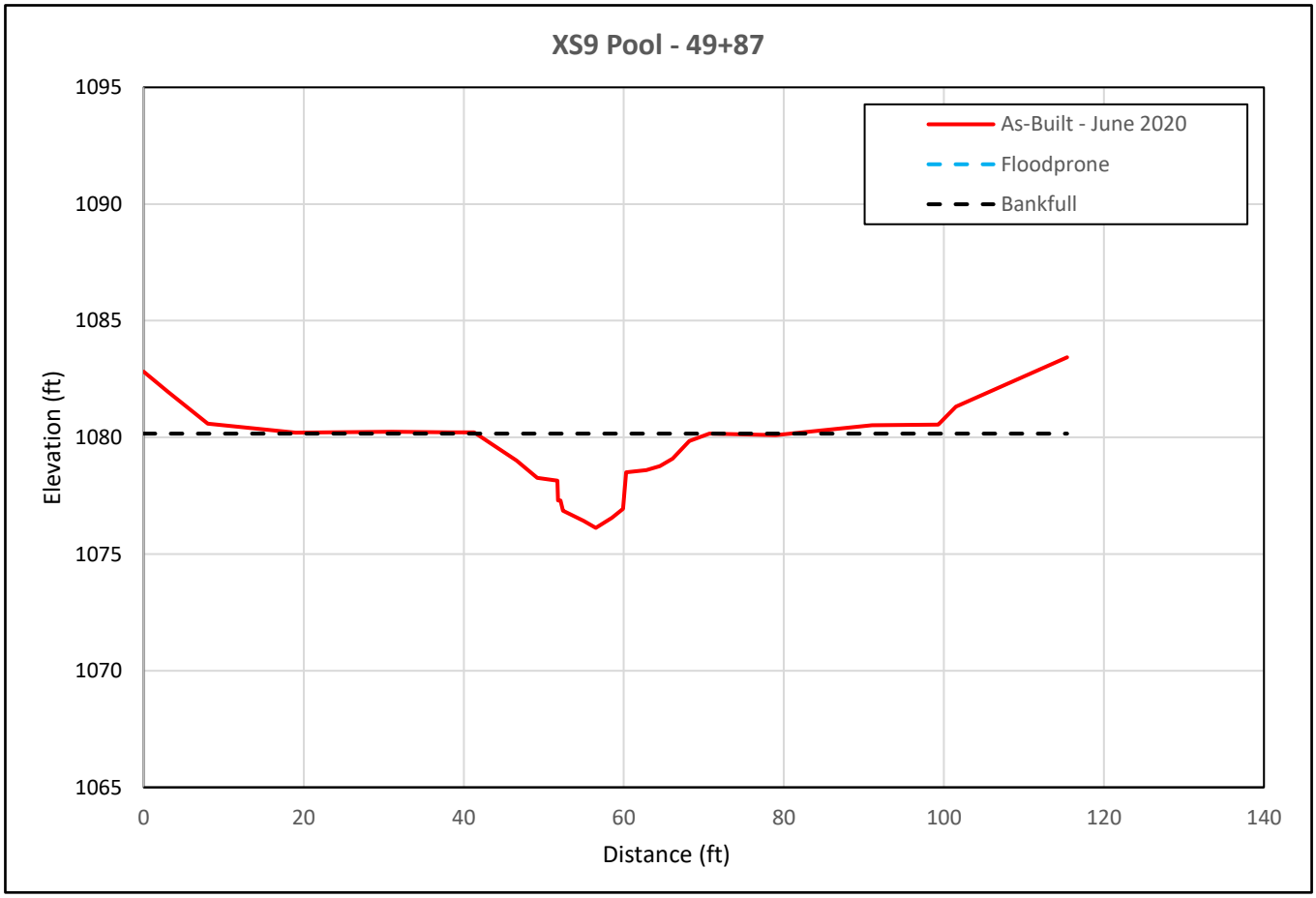
XS9 - Moores Fork Reach 3

Station 49+87 - Pool

XS9 looking upstream

XS9 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1080.16	52.58	29.24	N/A	N/A	4.04	4.8	16.24	N/A	1.0



Cross Section Plot - Baseline - June 2020

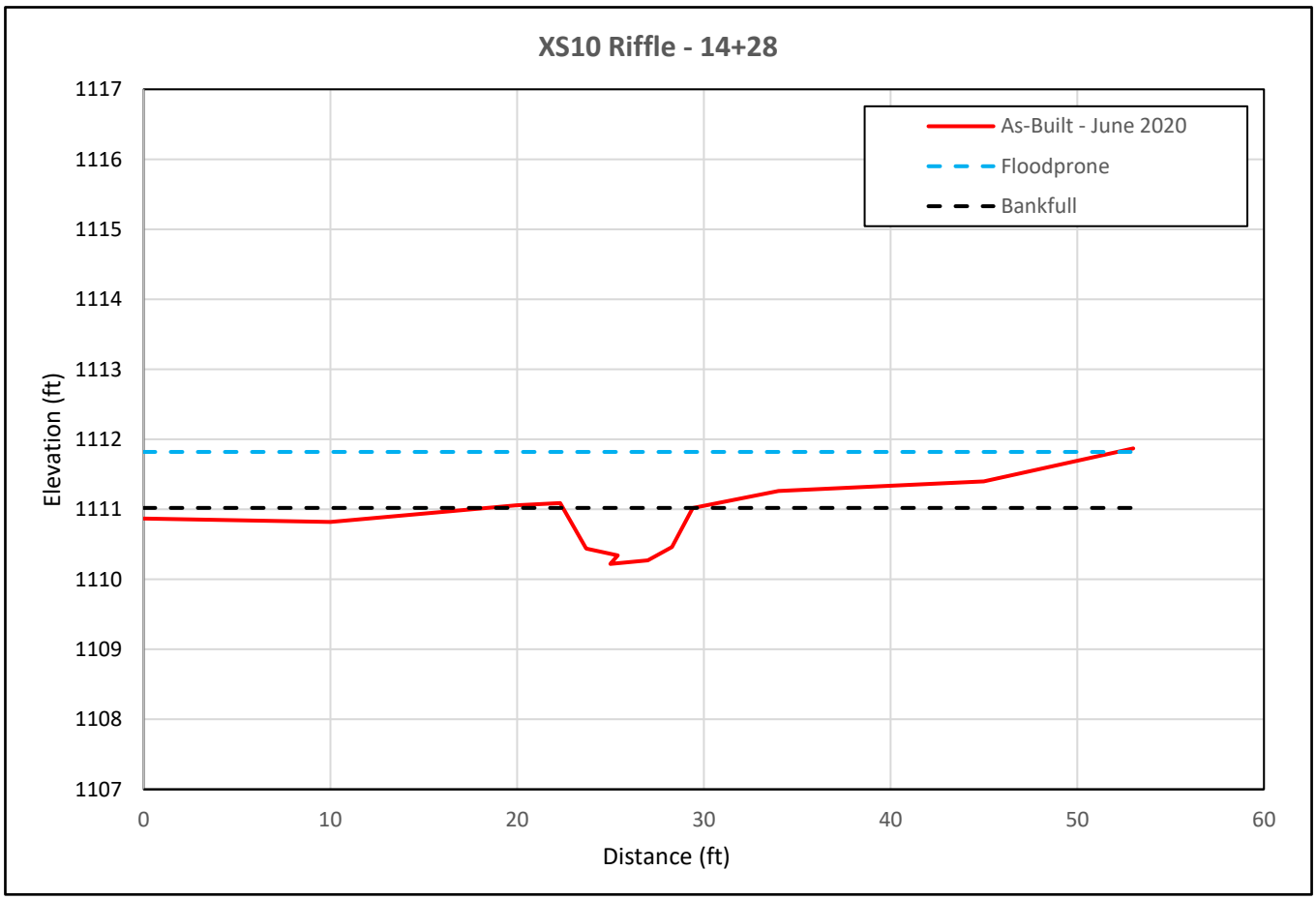
XS10 - UT1

Station 14+28 - Riffle

XS10 looking upstream

XS10 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1111.02	3.85	6.95	1111.82	52.15	0.8	0.6	12.64	7.5	1.1



Cross Section Plot - Baseline - June 2020

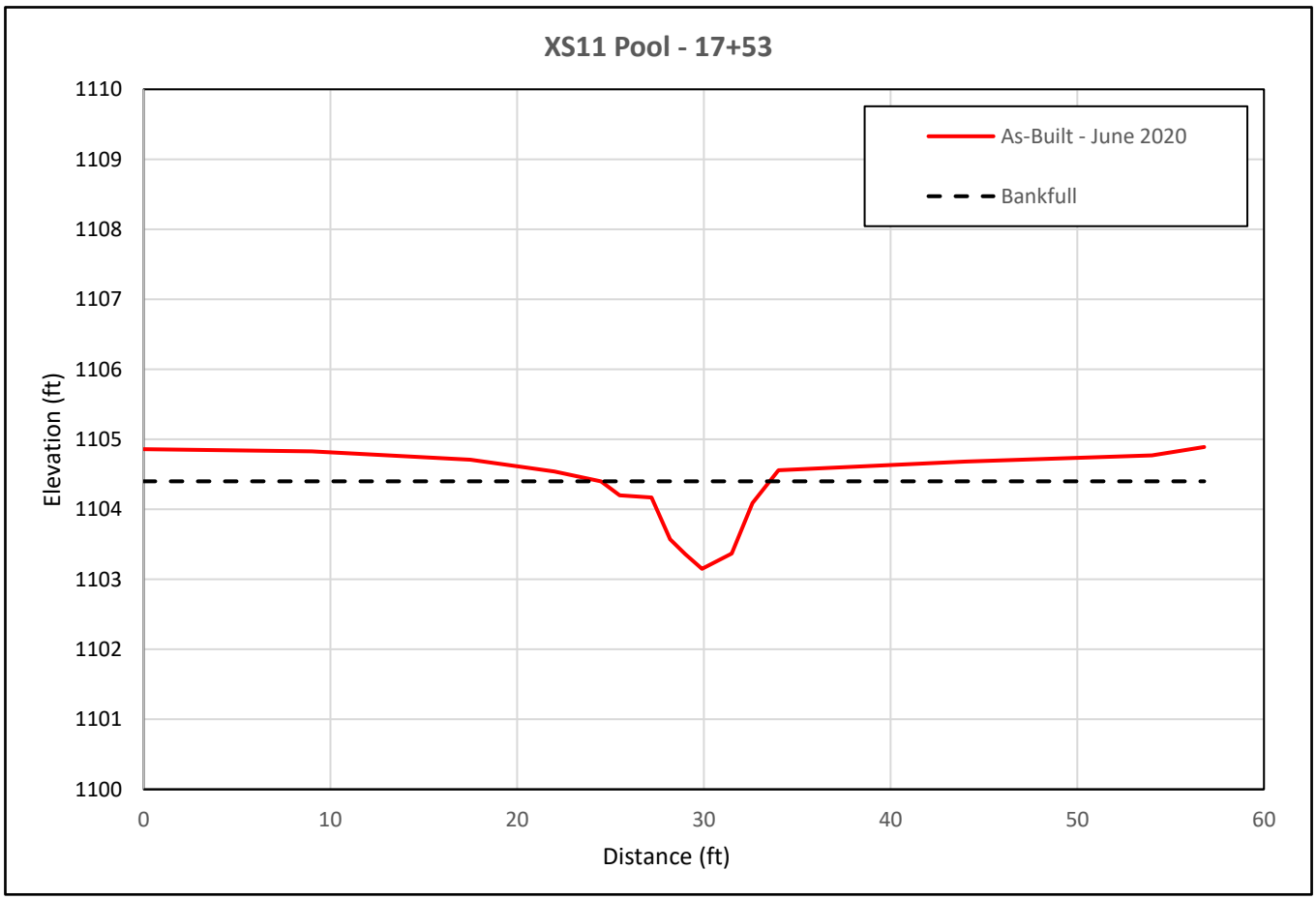
XS11 - UT1

Station 17+53 - Pool

XS11 looking upstream

XS11 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1104.4	5.48	9.02	N/A	N/A	1.25	0.61	14.79	N/A	1.0



Cross Section Plot - Baseline - June 2020

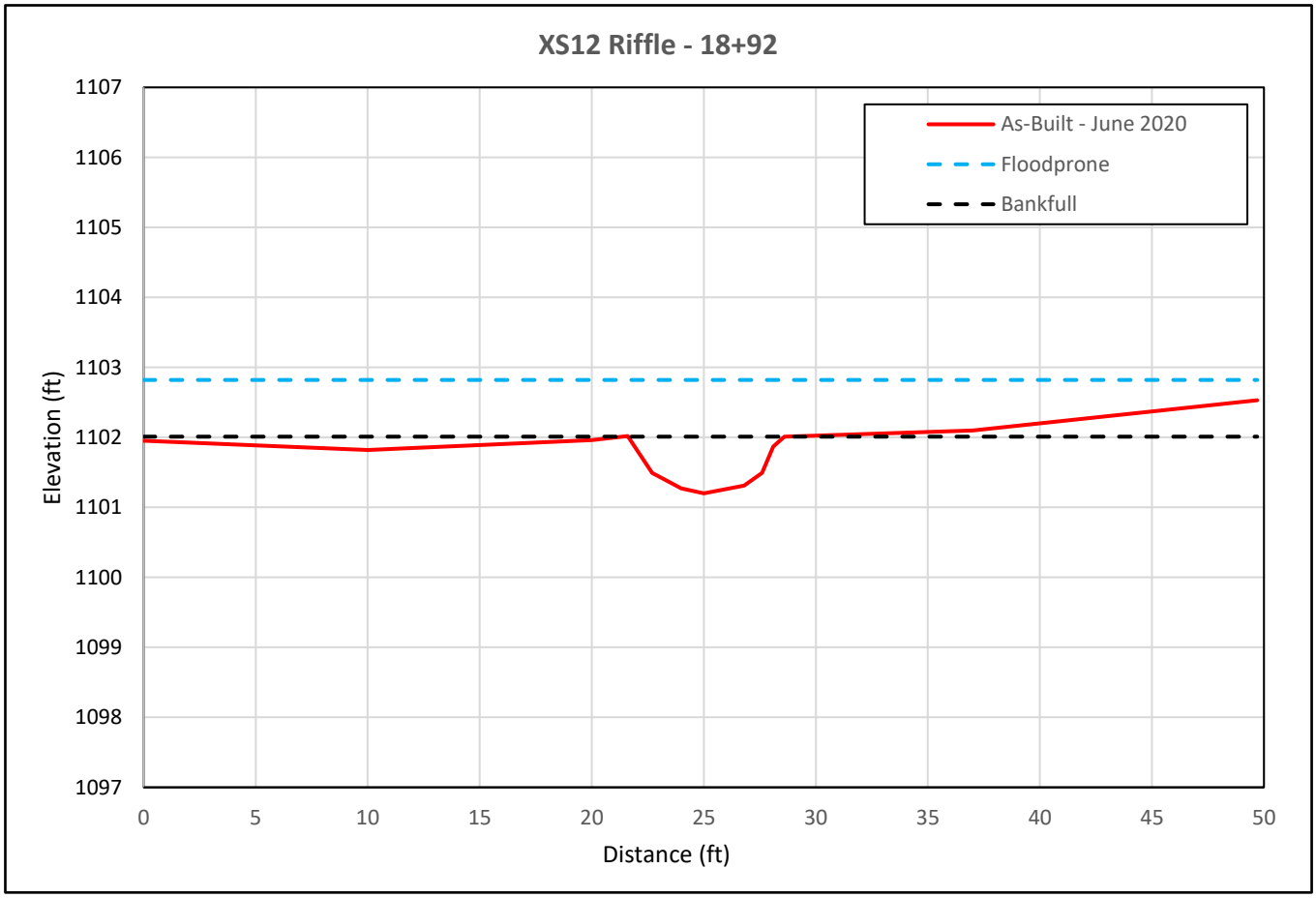
XS12 - UT1

Station 18+92 - Riffle

XS12 looking upstream

XS12 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1102.01	3.92	6.98	1102.82	49.7	0.81	0.56	12.46	7.12	1.0



Cross Section Plot - Baseline - June 2020

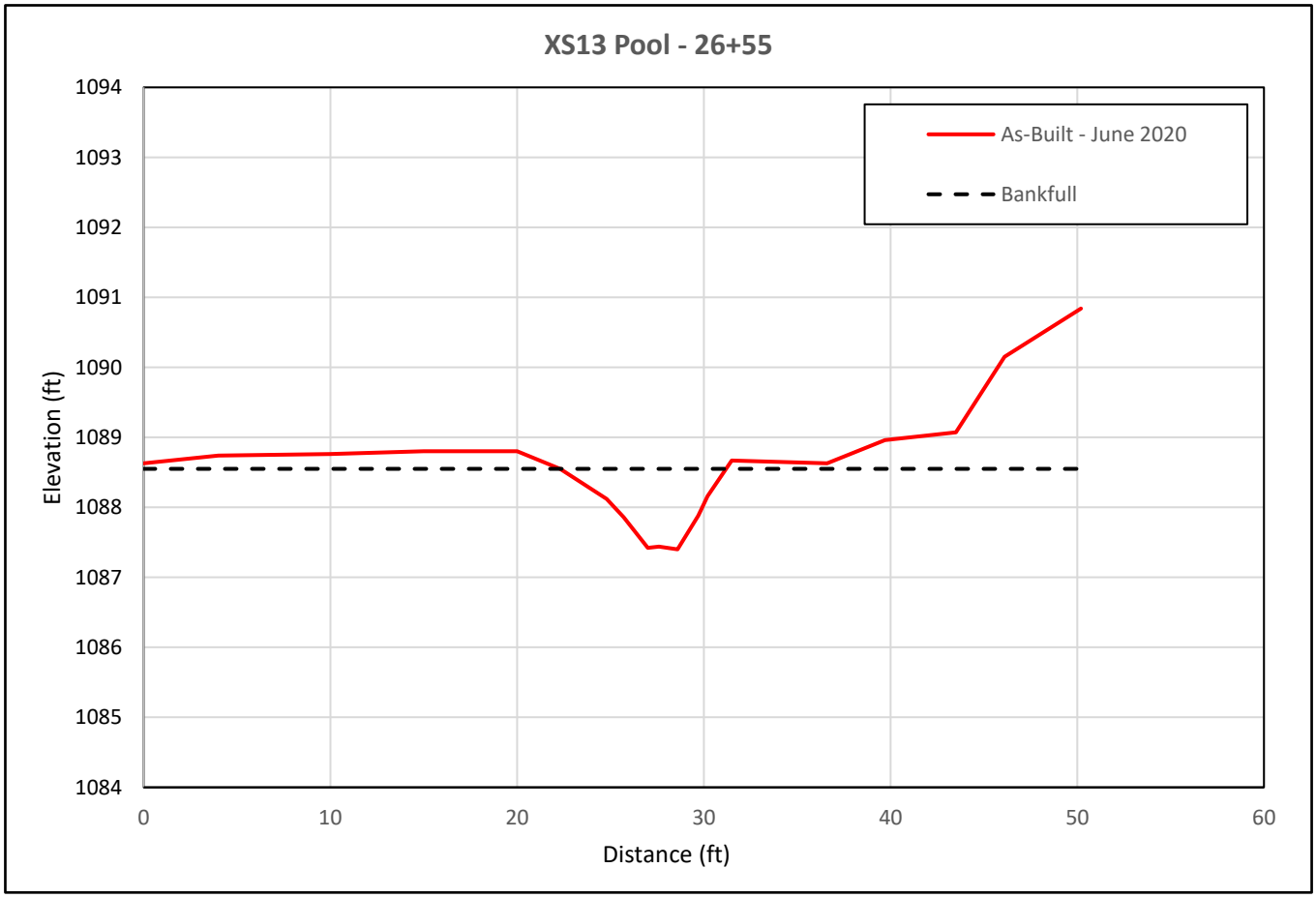
XS13 - UT1

Station 26+55 - Pool

XS13 looking upstream

XS13 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1088.55	5.49	8.89	N/A	N/A	1.15	0.62	14.34	N/A	1.1



Cross Section Plot - Baseline - June 2020

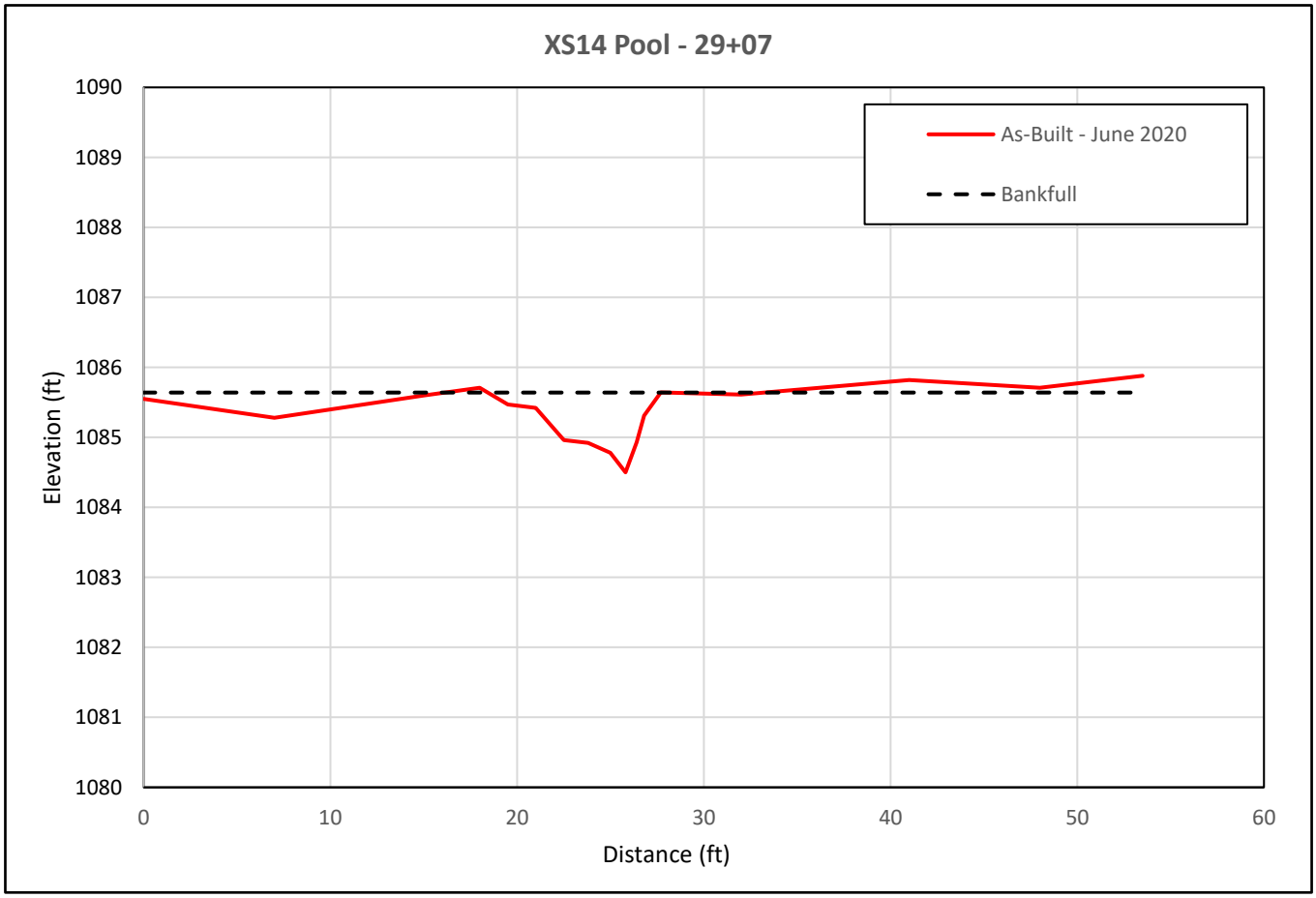
XS14 - UT1

Station 29+07 - Pool

XS14 looking upstream

XS14 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1085.64	4.63	9.31	N/A	N/A	1.14	0.5	18.62	N/A	1.0



Cross Section Plot - Baseline - June 2020

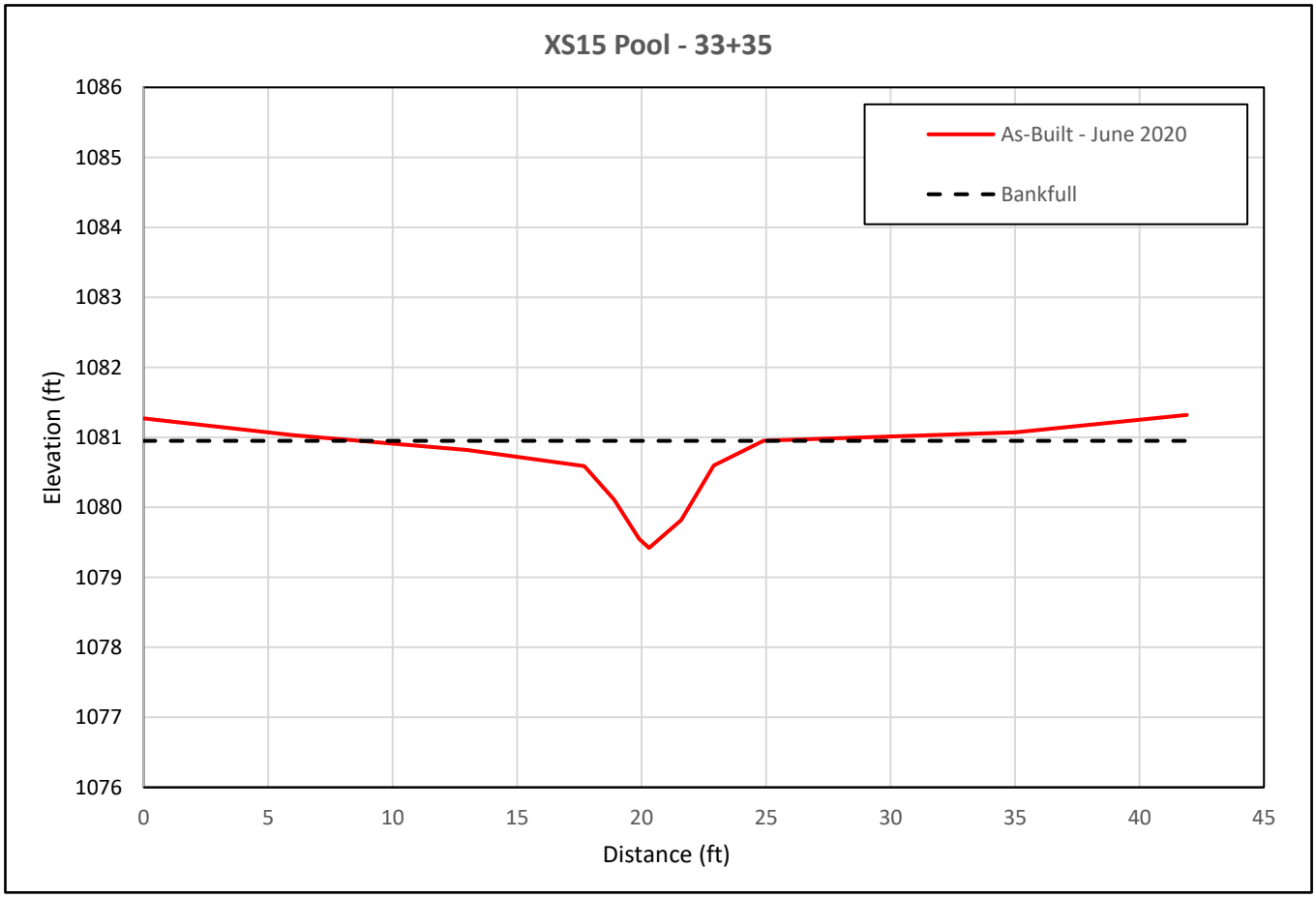
XS15 - UT1

Station 33+35 - Pool

XS15 looking upstream

XS15 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1080.95	6.9	16.23	N/A	N/A	1.53	0.43	37.74	N/A	1.0



Cross Section Plot - Baseline - June 2020

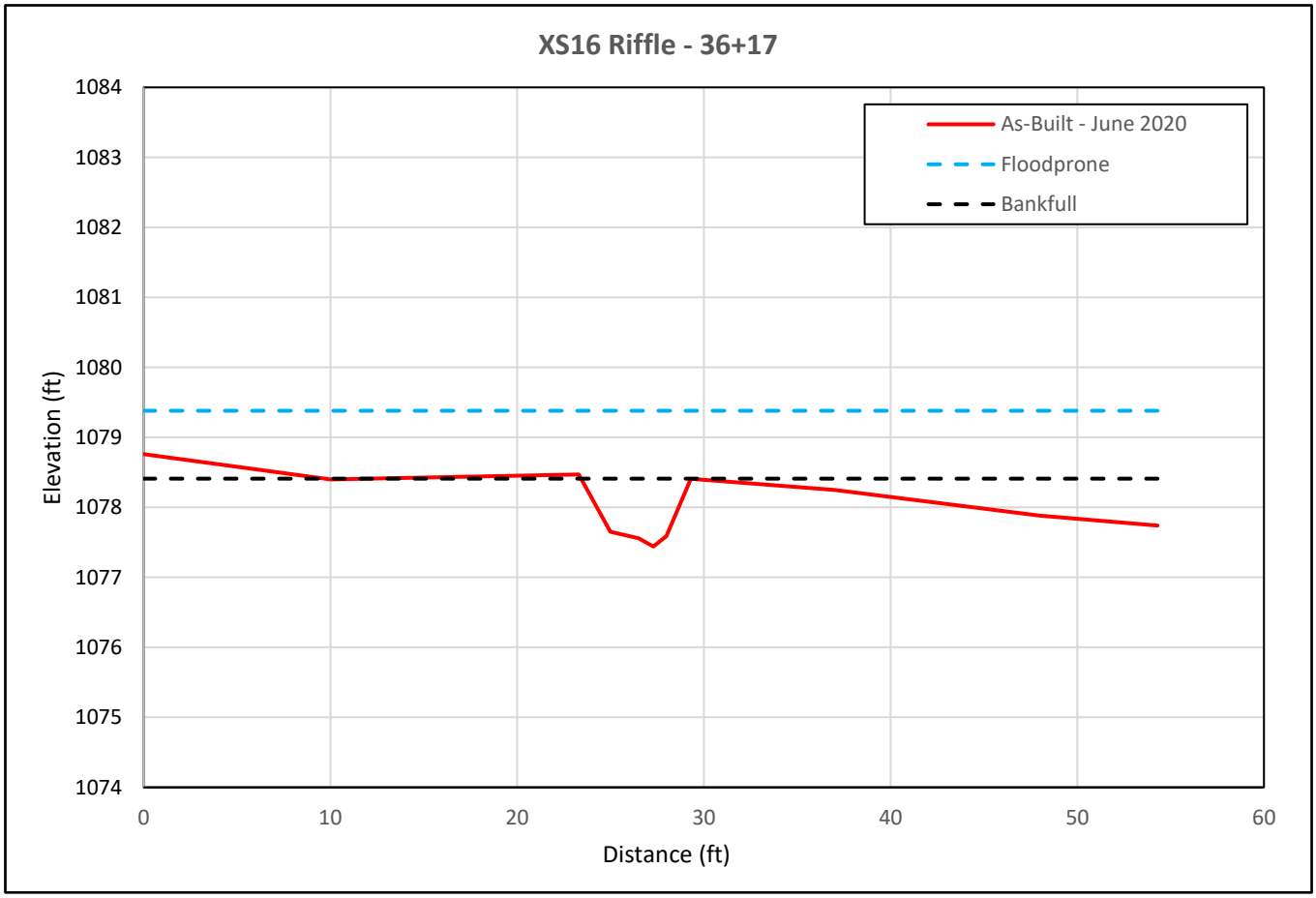
XS16 - UT1

Station 36+17 - Riffle

XS16 looking upstream

XS16 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1078.41	3.69	5.96	1079.38	54.3	0.97	0.62	9.61	9.12	1.0



Cross Section Plot - Baseline - June 2020

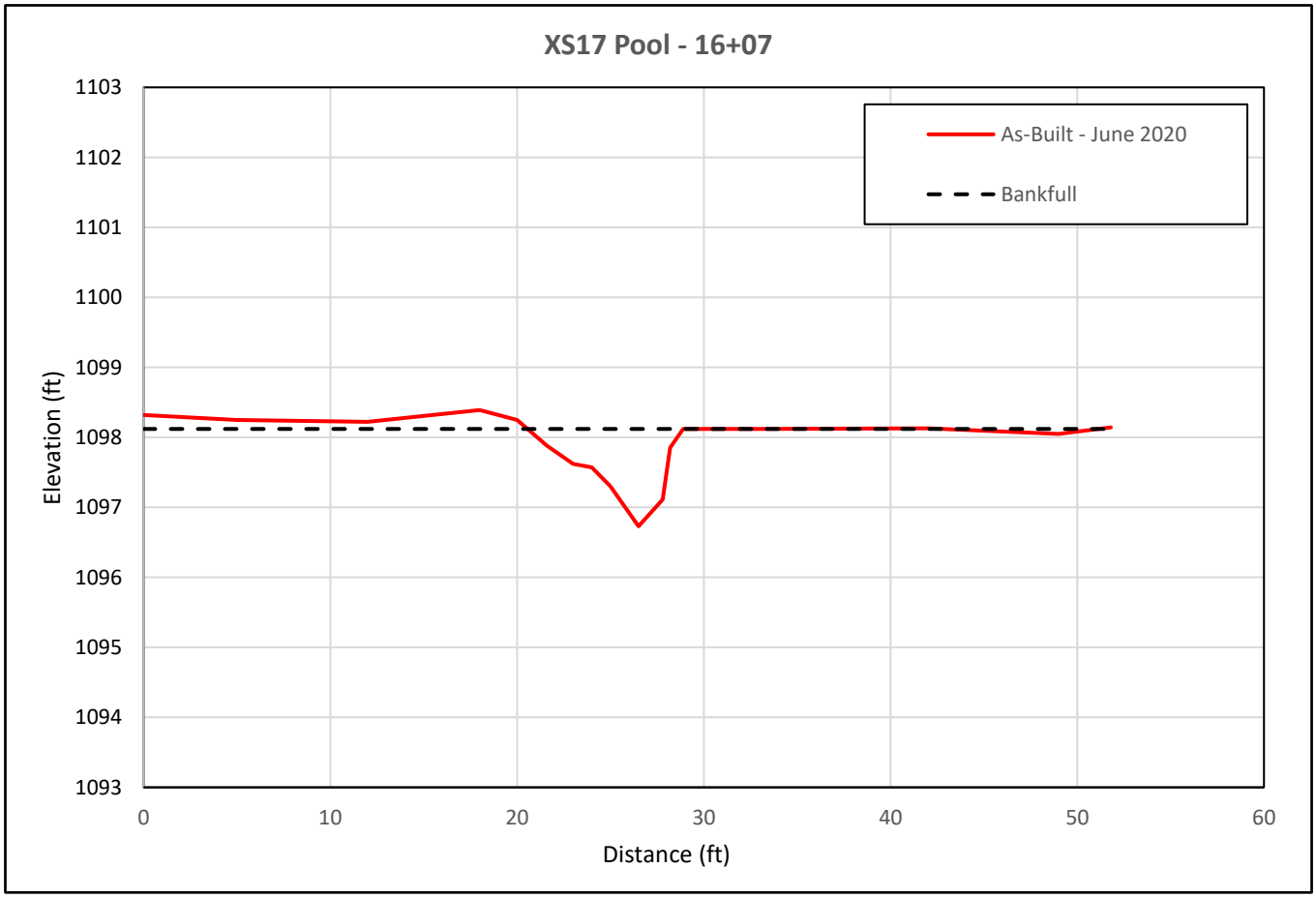
XS17 - UT2

Station 16+07 - Pool

XS17 looking upstream

XS17 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1098.12	5.42	8.33	N/A	N/A	1.39	0.65	12.82	N/A	1.0



Cross Section Plot - Baseline - June 2020

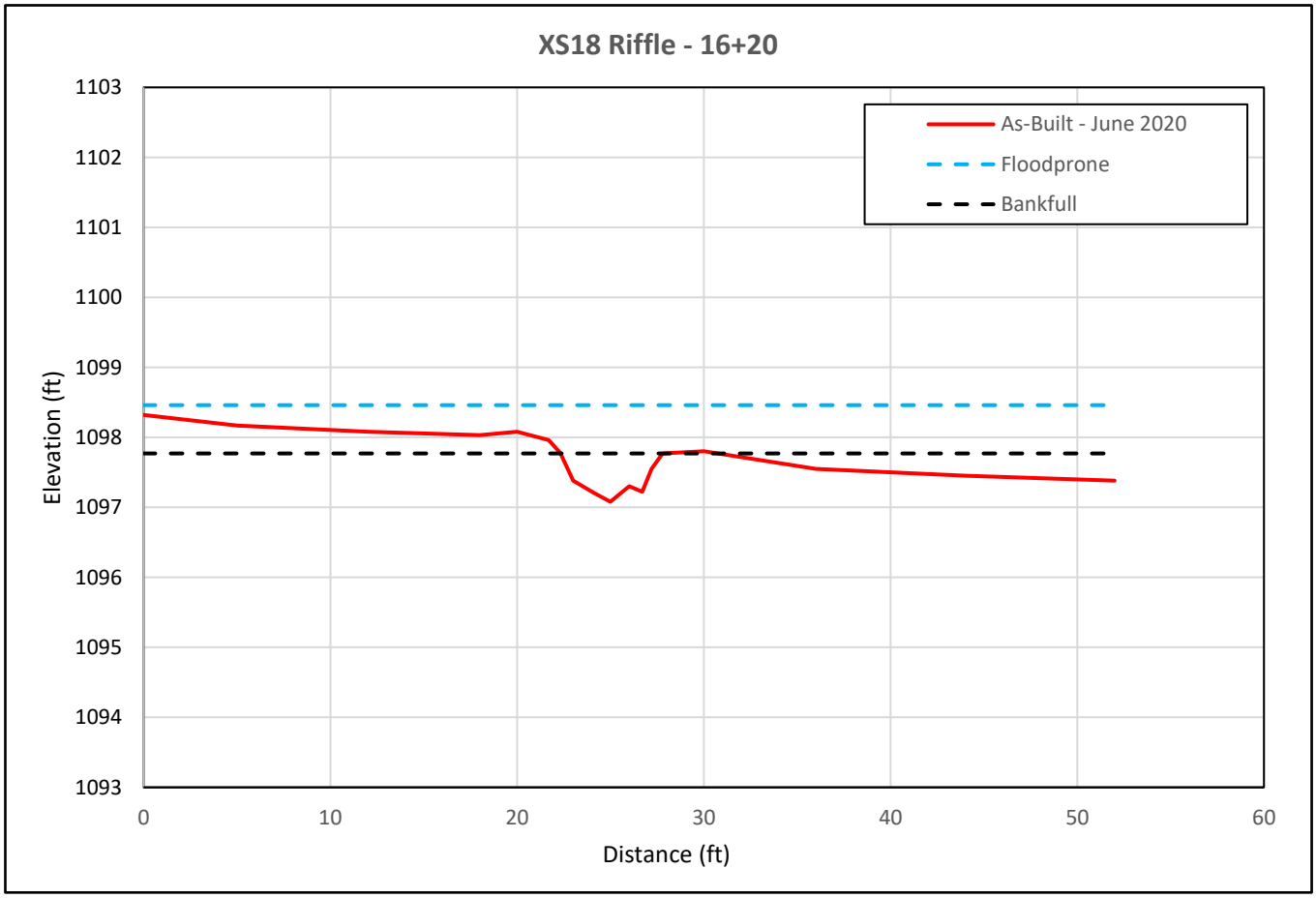
XS18 - UT2

Station 16+20 - Riffle

XS18 looking upstream

XS18 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1097.77	2.41	5.48	1098.46	52	0.69	0.44	12.45	9.48	1.0



Cross Section Plot - Baseline - June 2020

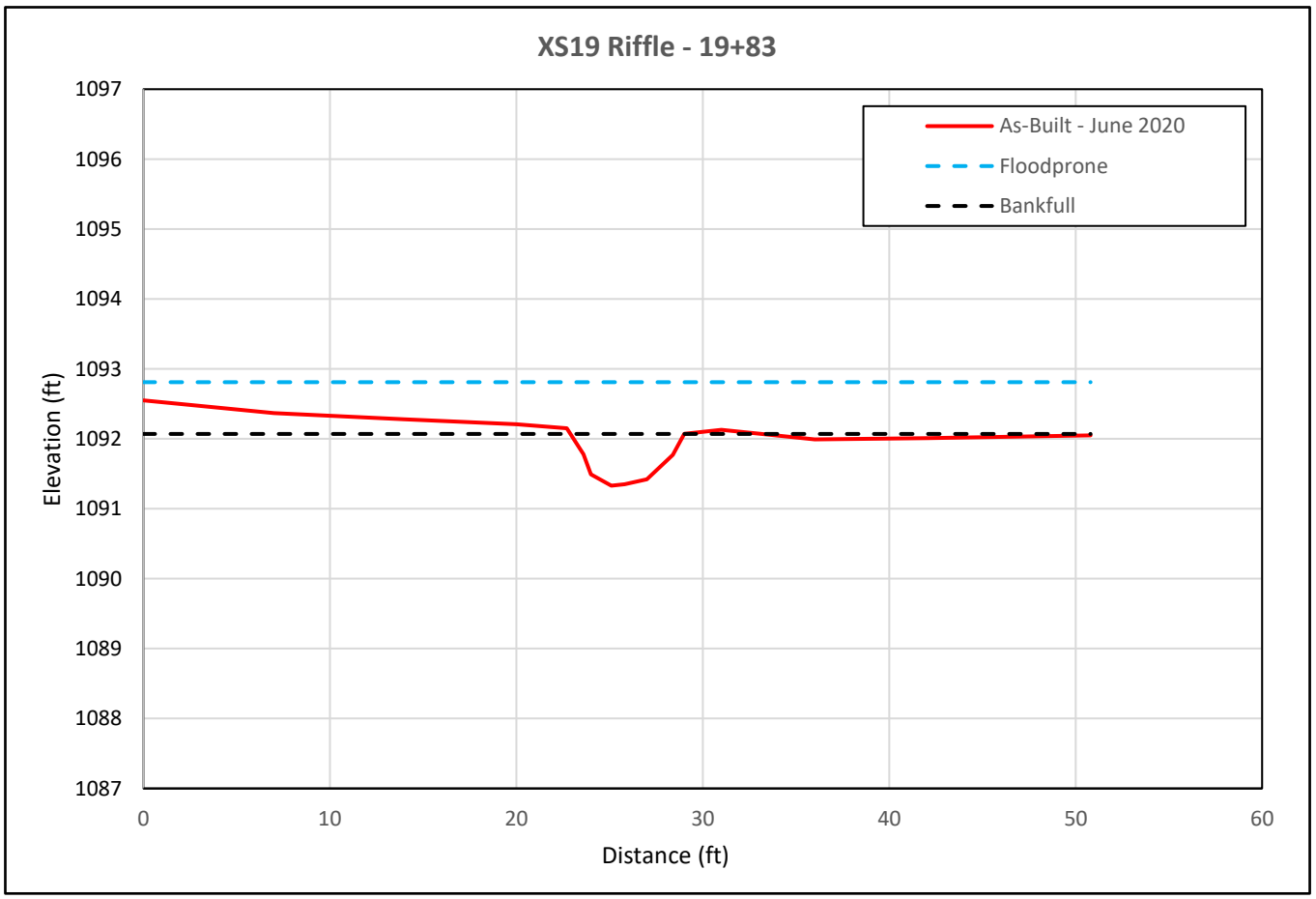
XS19 - UT2

Station 19+83 - Riffle

XS19 looking upstream

XS19 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1092.07	3.09	6.11	1092.81	50.8	0.74	0.51	11.98	8.32	1.1



Cross Section Plot - Baseline - June 2020

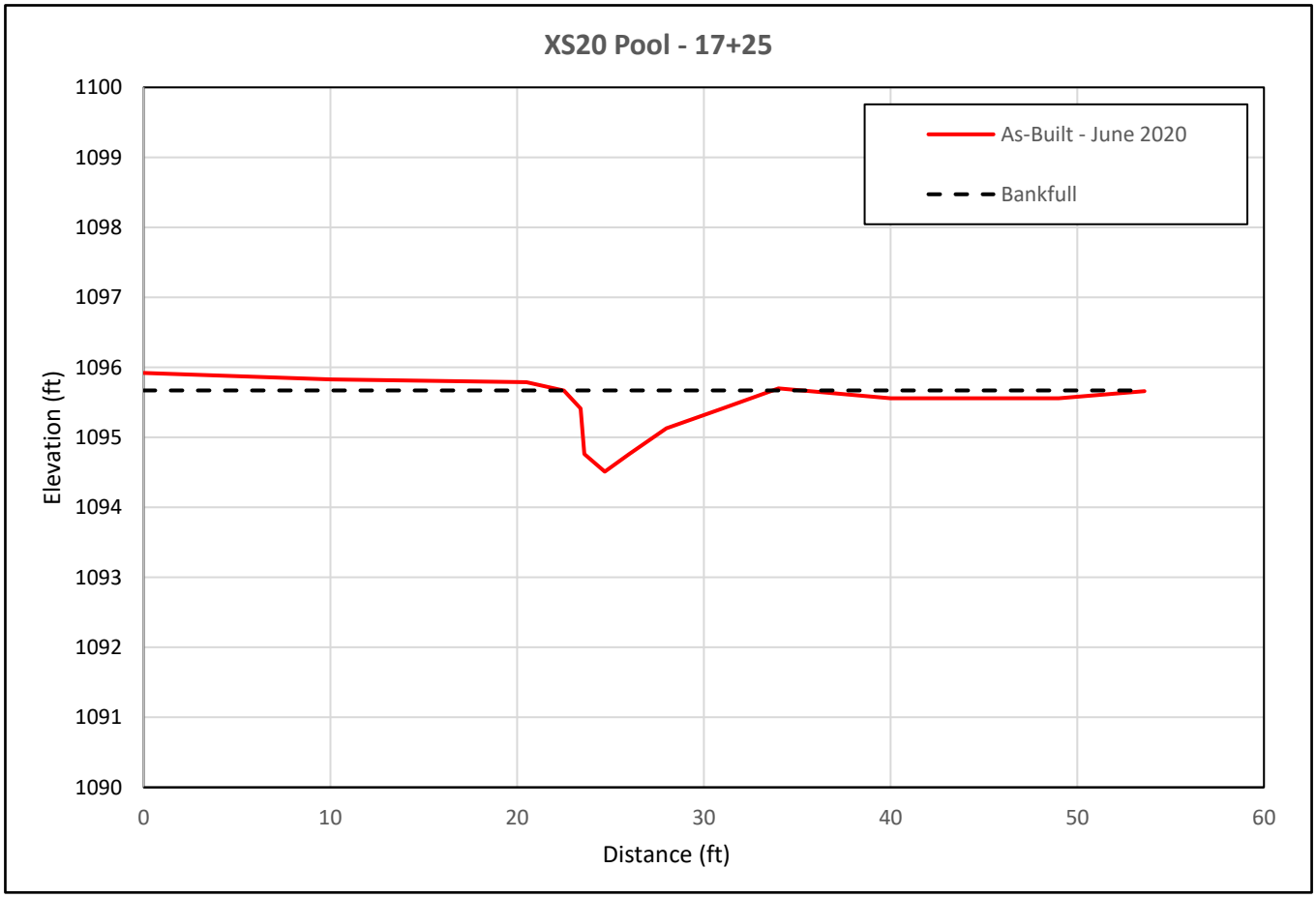
XS20 - UT3 Reach 1

Station 17+25 - Pool

XS20 looking upstream

XS20 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1095.67	5.72	11.19	N/A	N/A	1.16	0.51	21.94	N/A	1.0



Cross Section Plot - Baseline - June 2020

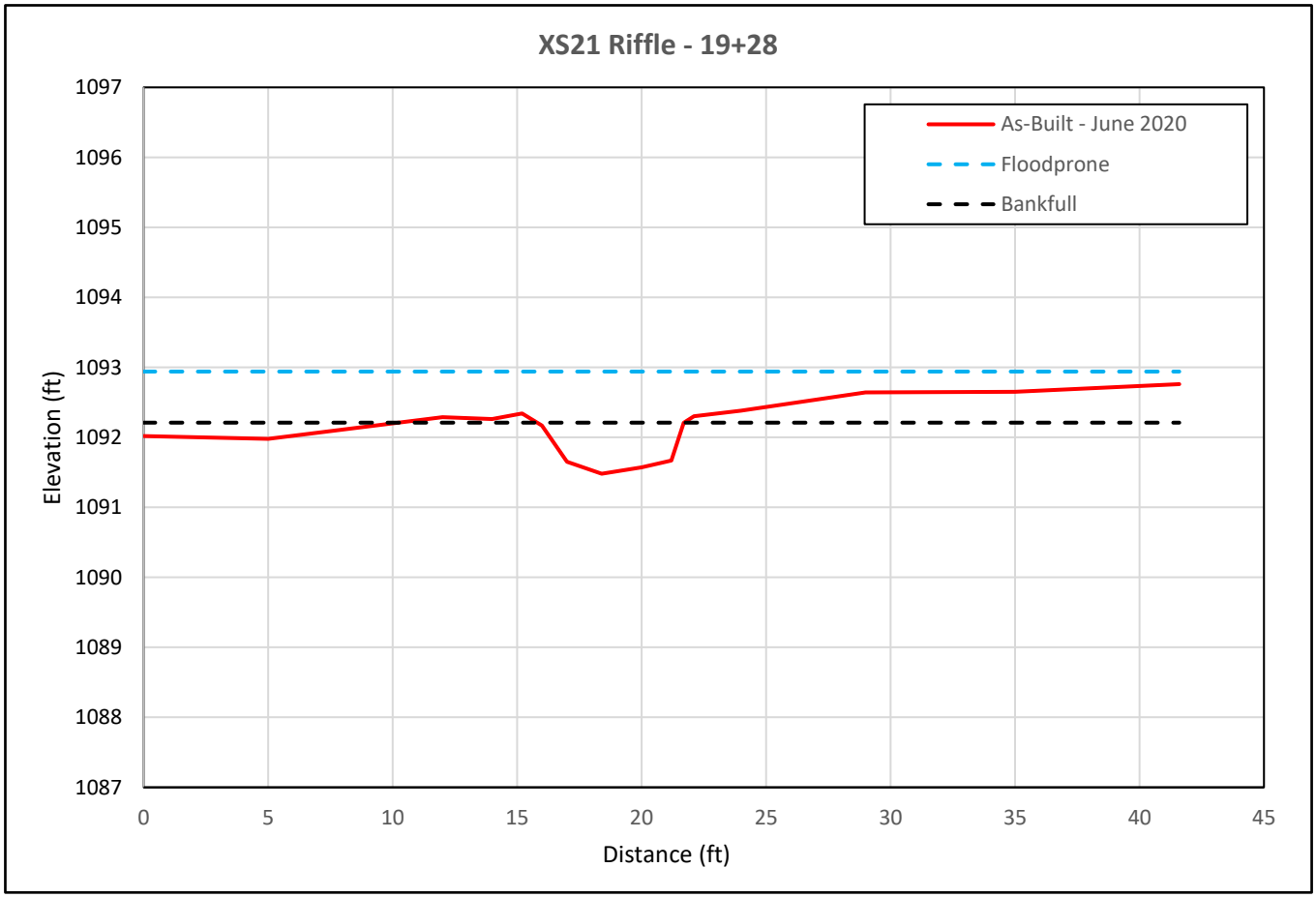
XS21 - UT3 Reach 1

Station 19+28 - Riffle

XS21 looking upstream

XS21 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1092.21	3.15	5.89	1092.94	41.6	0.73	0.53	11.11	7.06	1.1



Cross Section Plot - Baseline - June 2020

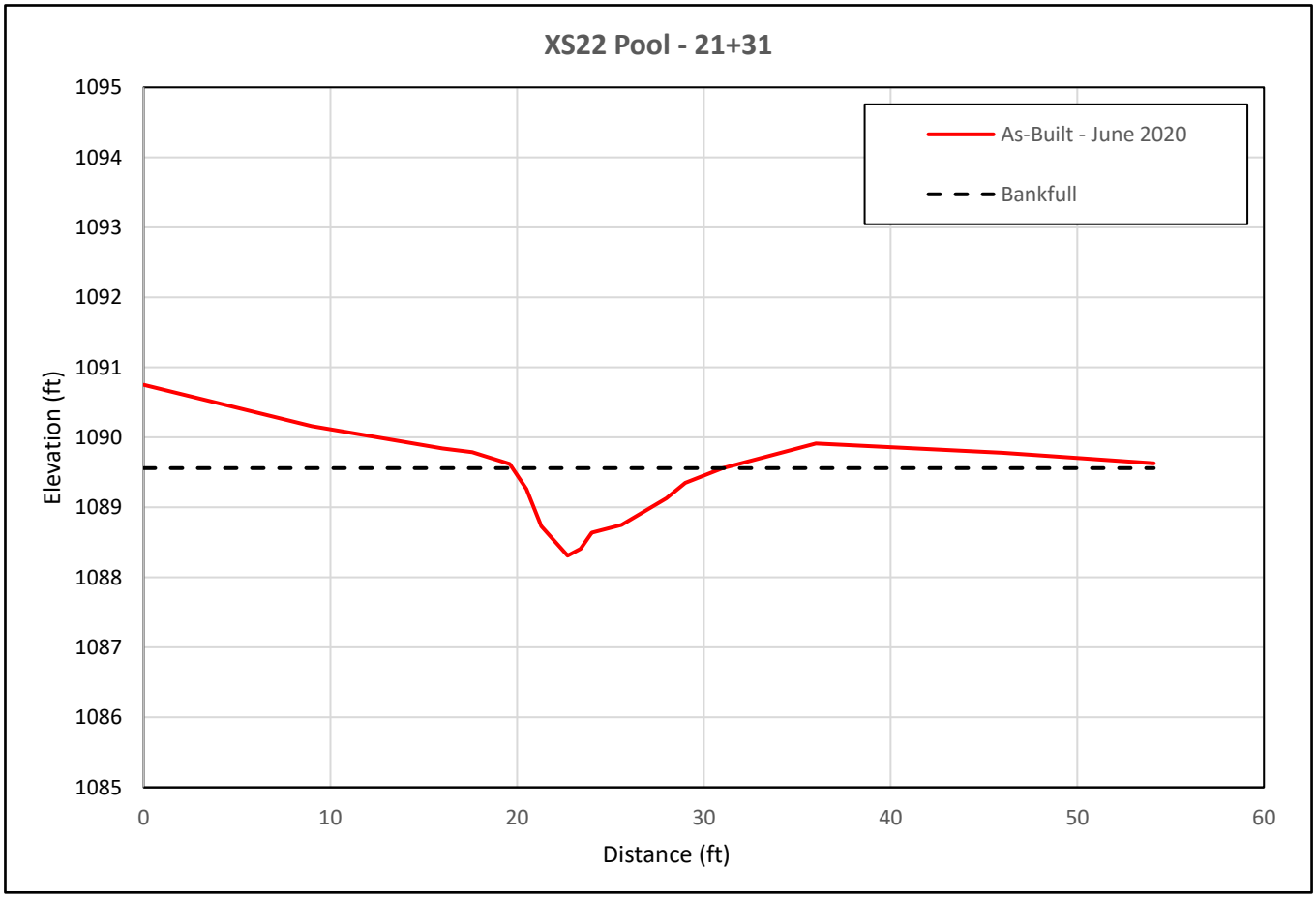
XS22 - UT3 Reach 2

Station 21+31 - Pool

XS22 looking upstream

XS22 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1089.56	6.88	11.25	N/A	N/A	1.25	0.61	18.44	N/A	1.0



Cross Section Plot - Baseline - June 2020

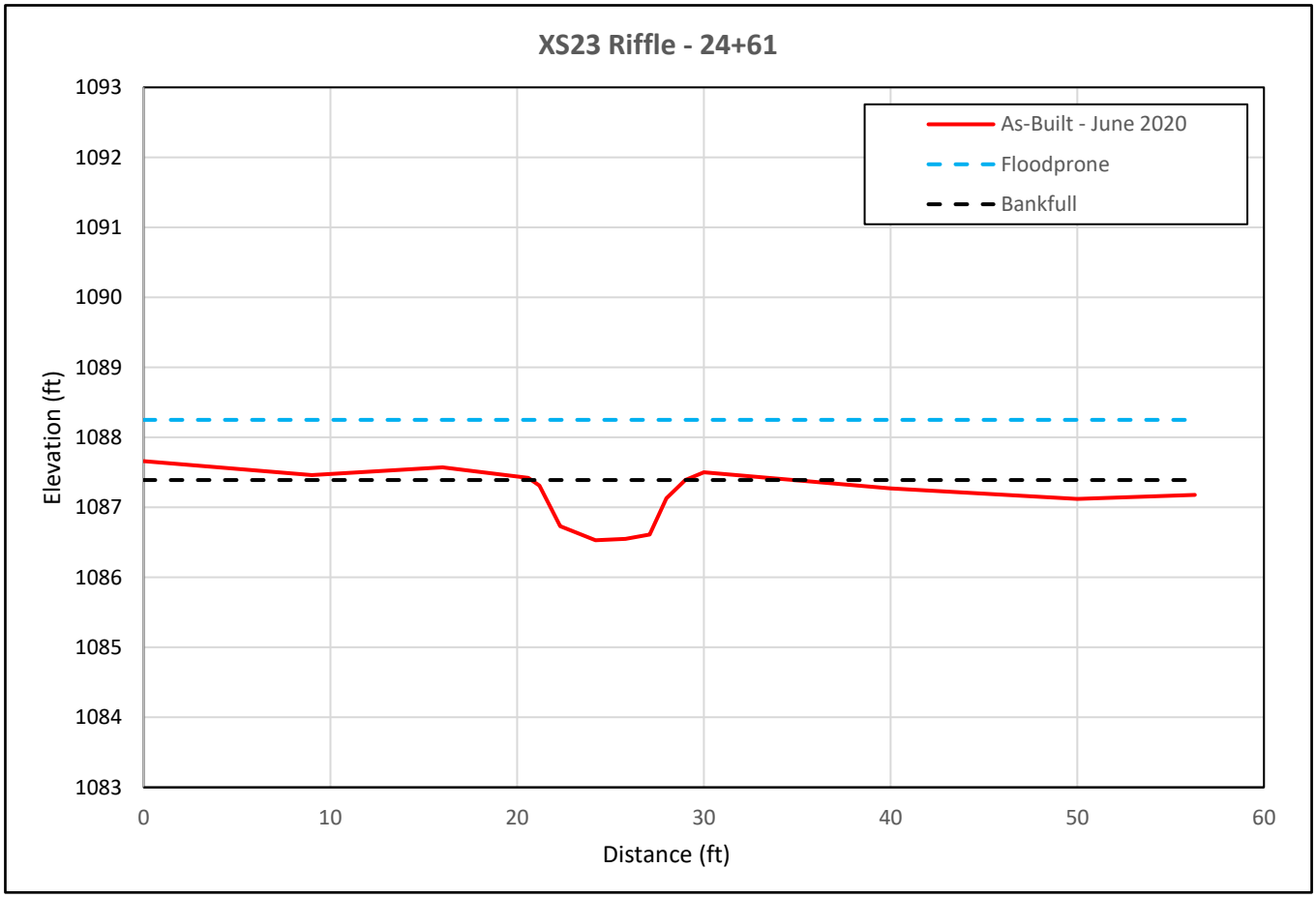
XS23- UT3 Reach 2

Station 24+61 - Riffle

XS23 looking upstream

XS23 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1087.39	4.88	8.22	1088.25	56.3	0.86	0.59	13.93	6.85	1.1



Cross Section Plot - Baseline - June 2020

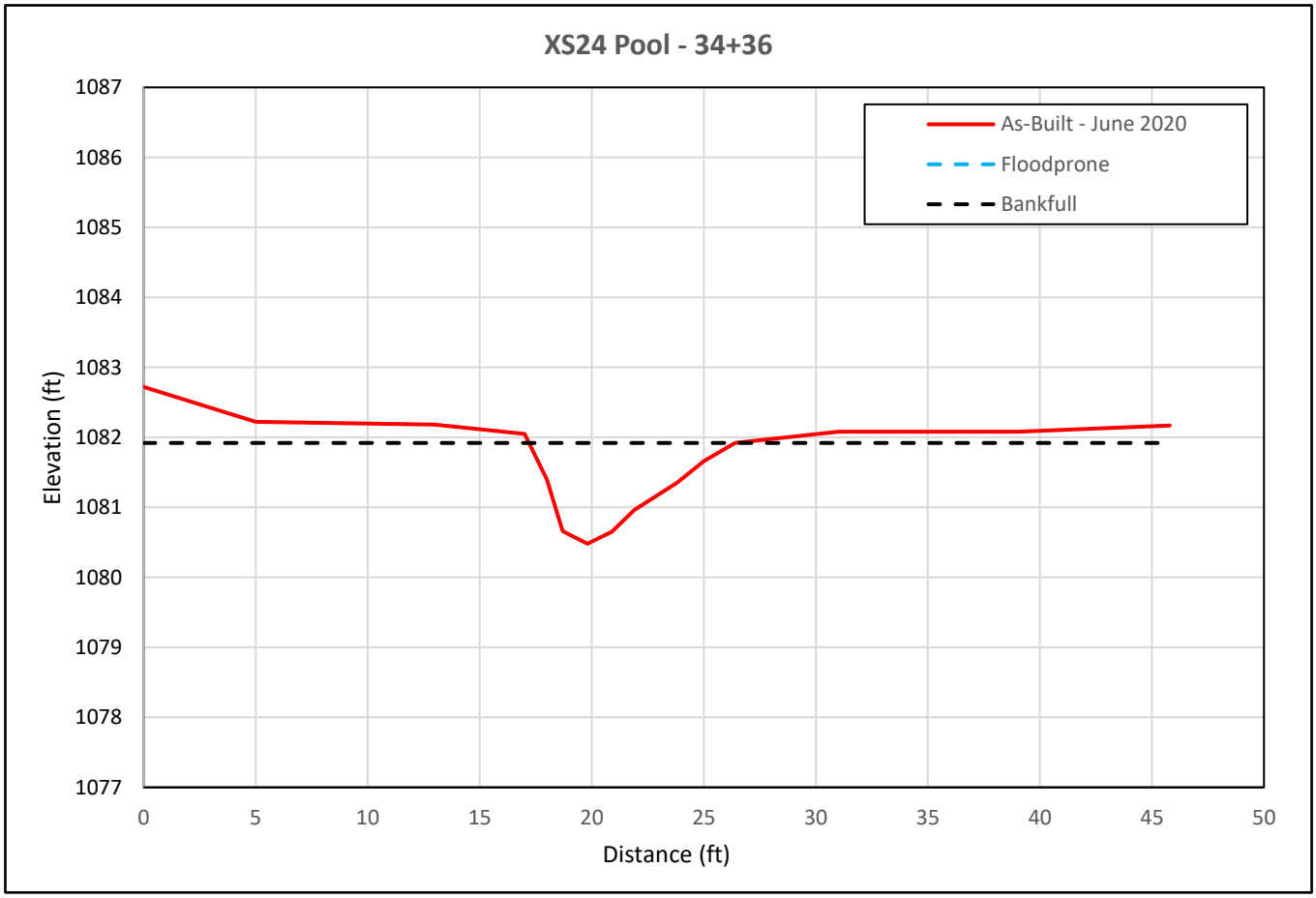
XS24 - UT3 Reach 2

Station 34+36 - Pool

XS24 looking upstream

XS24 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1081.92	7.06	9.2	N/A	N/A	1.44	0.77	11.95	N/A	1.1



Cross Section Plot - Baseline - June 2020

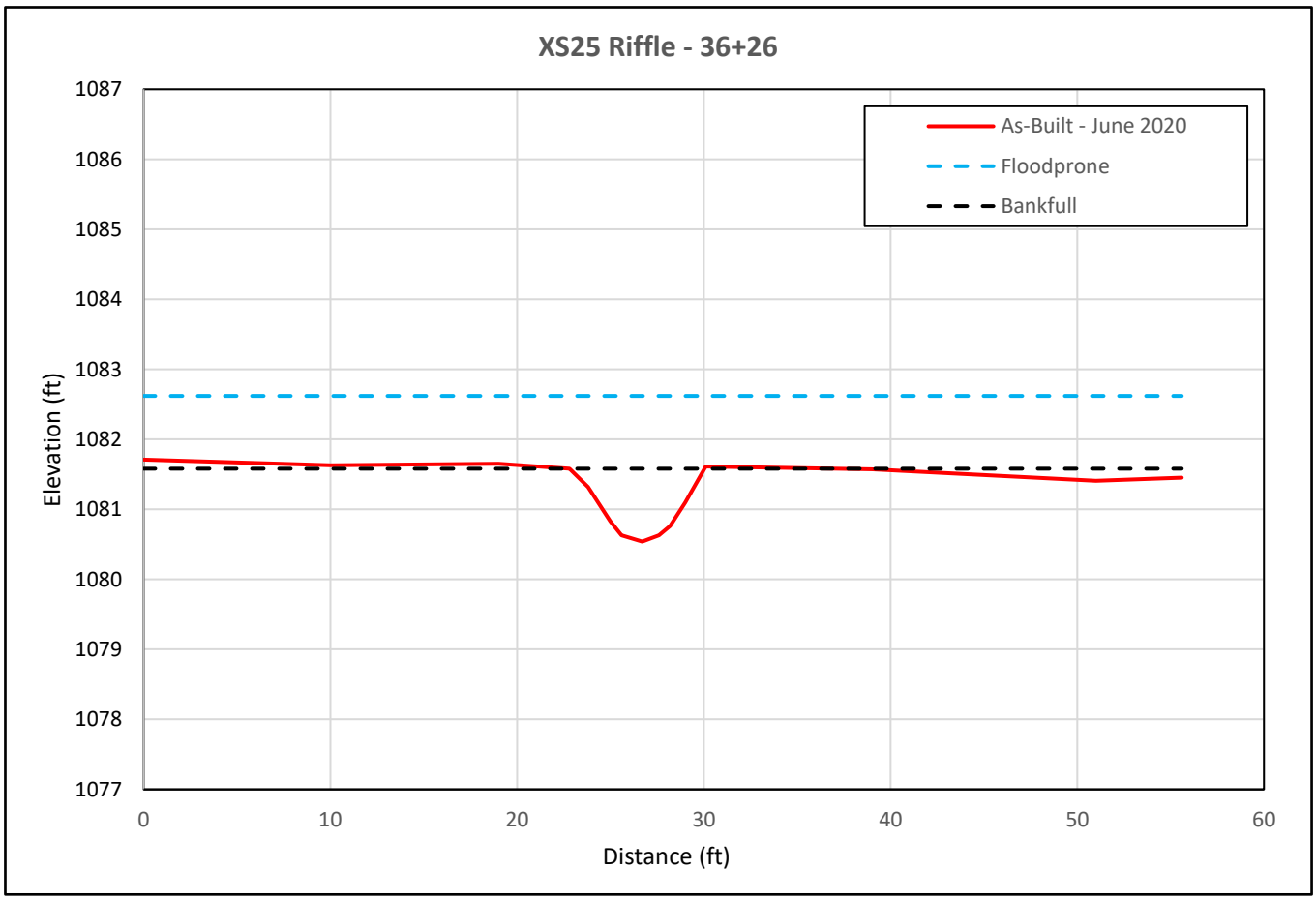
XS25 - UT3 Reach 2

Station 36+26 - Riffle

XS25 looking upstream

XS25 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1081.58	4.54	7.23	1082.62	55.6	1.04	0.63	11.48	7.7	1.0



Cross Section Plot - Baseline - June 2020

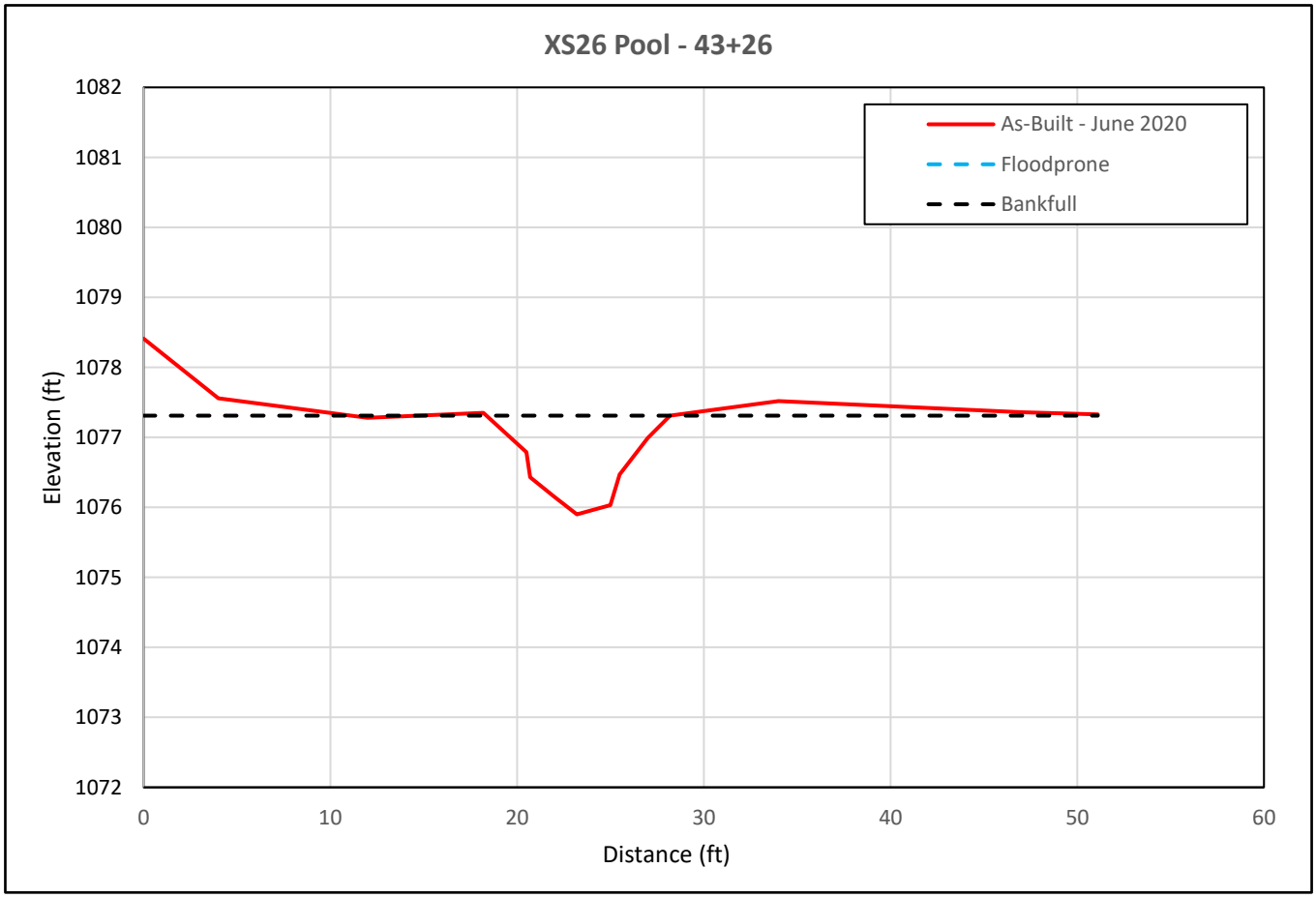
XS26 - UT3 Reach 2

Station 43+26 - Pool

XS26 looking upstream

XS26 looking downstream

Bankfull Elevation (ft)	Bankfull Area (ft^2)	Bankfull Width (ft)	Floodprone Elevation (ft)	Floodprone Width (ft)	Max Depth (ft)	Mean Depth (ft)	W/D Ratio	ER	Bank Height Ratio
1077.31	7.58	9.84	N/A	N/A	1.41	0.77	12.78	N/A	1.0



Appendix E: As-Built Drawings

PROJECT: STEWARTS CREEK TRIBUTARIES

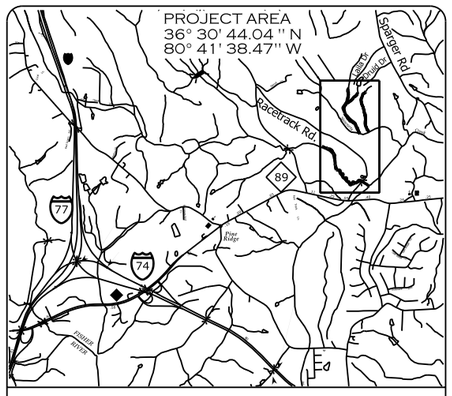
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES

SURRY COUNTY

LOCATION: SURRY COUNTY, NC

TYPE OF WORK: RECORD DRAWINGS

STATE	PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	083	1	30



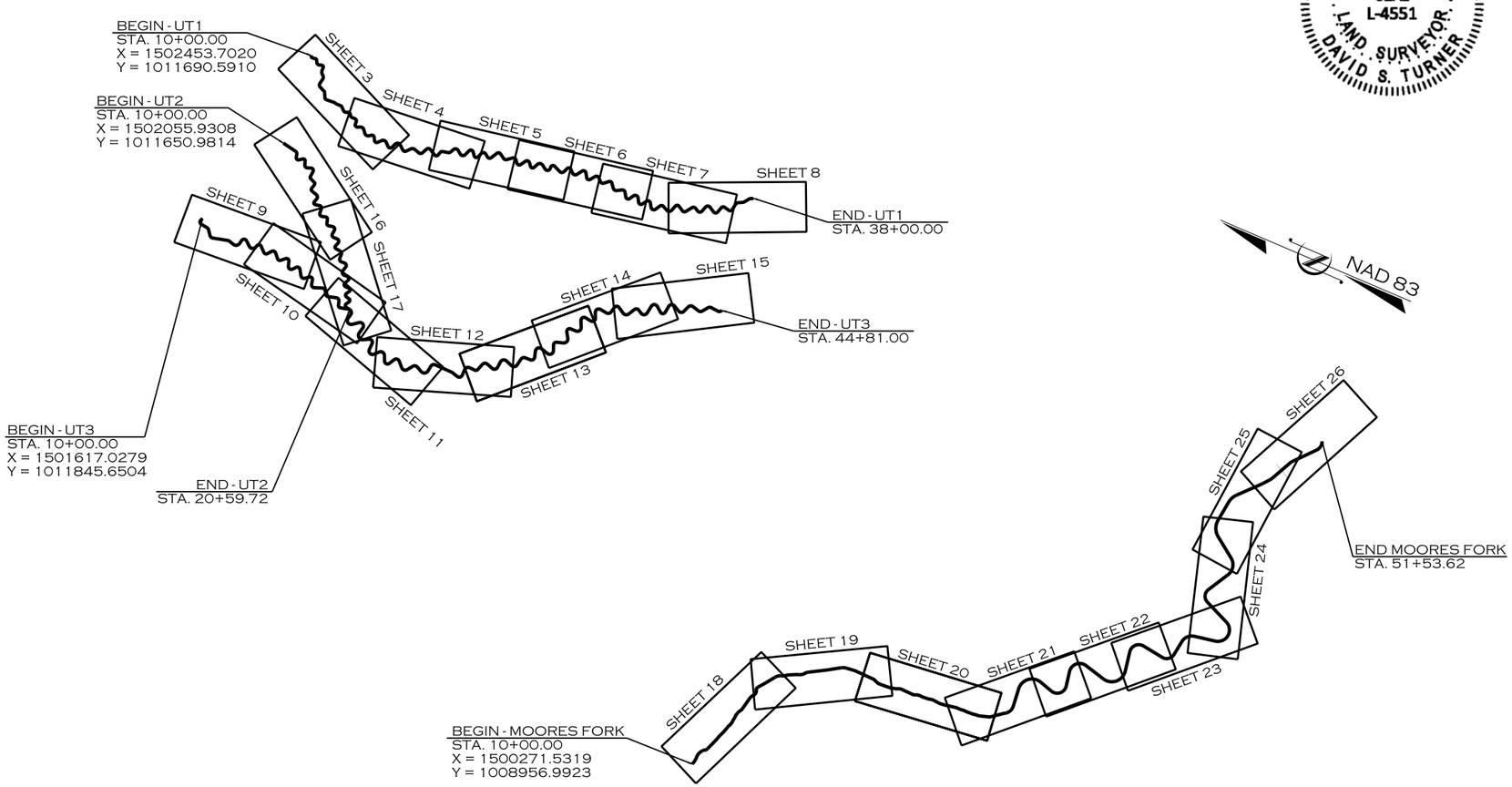
VICINITY MAP

INDEX OF SHEETS

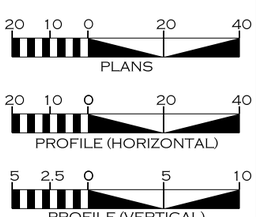
I, DAVID S. TURNER, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE SURVEY DATA SHOWN WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THUS ARE AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS- MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 9th DAY OF OCTOBER, 2020.

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

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



GRAPHIC SCALES



REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:

Mitigation Services ENVIRONMENTAL QUALITY

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

PAUL WIESNER
PROJECT MANAGER

PREPARED IN THE OFFICE OF:

ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD
SUITE 140
CARY, NC 27511
LICENSE # P-1182

SPRING 2020
COMPLETION DATE:

ERIN BENNETT, PE
PROJECT ENGINEER

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

SIGNATURE: P.E.

STREAM CONVENTIONAL SYMBOLS

PROJECT # 083 | SHEET NO. 2

SYMBOLOGY / NOTES

- ROCK J-HOOK (JH)
- ROCK VANE (RV)
- OFFSET ROCK CROSS VANE (OV)
- ROCK CROSS VANE (XV)
- TEMPORARY SILT CHECK
- ROOT WAD (RW)
- GRADE CONTROL LOG J-HOOK (LJH)
- LOG VANE (LV)
- LOG STEP (LS)
- ROCK STEP (RS)
- LOG CROSS VANE (XV)
- CONSTRUCTED CASCADE (CC)
- CONSTRUCTED RIFFLE (CR)
- BOULDER CLUSTER
- LOG ROLLER (LR)
- GRADE CONTROL WOODY RIFFLE (WR)
- TOEWOOD WITH GEOLIFT (TW)
- SOD MAT (SM)
- DEBRIS JAM (DJ-T#)
- SINGLE WING DEFLECTOR (SW)
- DOUBLE WING DEFLECTOR (DW)
- FLOODPLAIN SILLS

- SF — SAFETY FENCE
- TP — TAPE FENCE
- SILT FENCE
- CE — CONSERVATION EASEMENT
- 20 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- LIMITS OF DISTURBANCE
- BANKFULL BENCH (GRADE)
- PROPERTY LINE
- ACCESS ROAD
- 10+00 STREAM THALWEG
- STREAM TOP OF BANKS
- FOOT BRIDGE
- TEMPORARY STREAM CROSSING
- PERMANENT FORD STREAM CROSSING (PFC)
- TRANSPLANTED VEGETATION
- TREE REMOVAL
- TREE PROTECTION
- GEOLIFT
- CHANNEL FILL / DITCH PLUG
- GRADE BANK 2:1 OR FLATTER
- EXISTING WETLANDS
- EXISTING BEDROCK
- OUTLET PROTECTION (OP)
- IMPERVIOUS DIKE
- FENCING
- WITNESS POST
- EXISTING FENCE REMOVAL

MONITORING FEATURES

- VP — VEGETATION MONITORING PLOT
- MONITORING GAUGE
- PHOTO POINT
- XS — MONITORING CROSS SECTION

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

GENERAL NOTES

1. CONSTRUCTION WAS COMPLETED IN MAY 2020.
2. TOPOGRAPHIC SURVEY WAS COMPLETED BY TURNER LAND SURVEYING IN JUNE 2020 AND OCTOBER 2020.
3. NO SOD MATS WERE CONSTRUCTED AND OTHER STRUCTURES WERE ADDED PER DIRECTION OF THE ENGINEER.
4. SURVEYED ASBUILT FEATURES ARE SHOWN IN DARK BLACK, DESIGN FEATURES ARE SHOWN IN GREY, AND ANY FIELD CHANGES THAT WERE MADE DURING CONSTRUCTION ARE SHOWN IN RED. THE CONTOURS SHOWN ARE ASBUILT CONTOURS.

REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC Mitigation Services
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

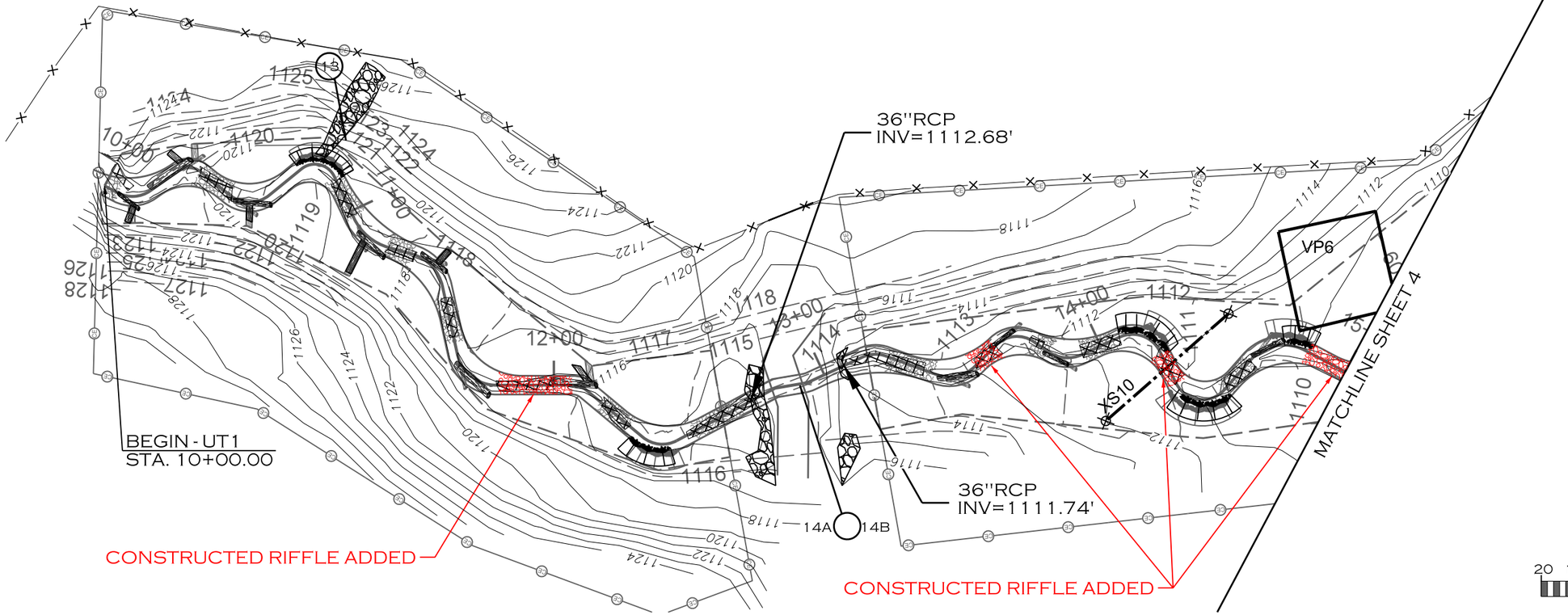
PREPARED IN THE OFFICE OF:
EPR ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
R:\PROJECTS\RDU0083_NCDEQ_STEWARTS CREEK_FD\CADD\PLANS\ASBUILT\MF_ASB_PSH_02.DGN
MKOEN

PROJECT # 083 | SHEET NO. 3

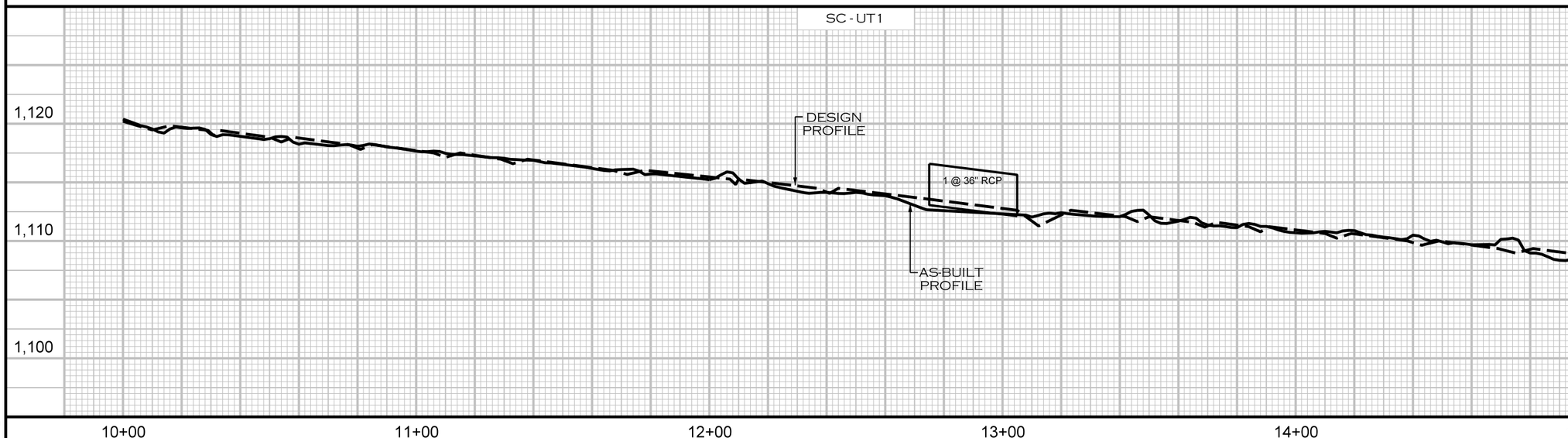
PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER
10/09/20
ERIN M. BENNETT

NAD 83

20 10 0 20 40
SCALE (FT)



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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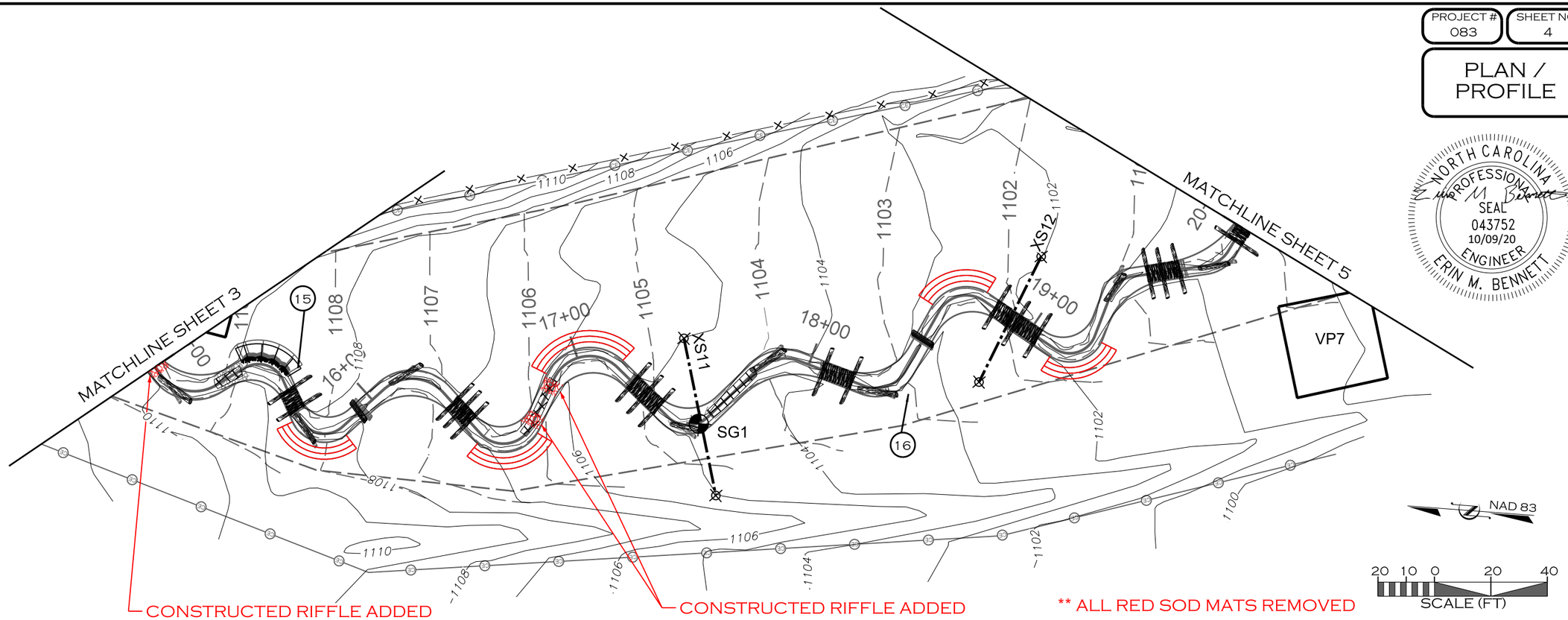
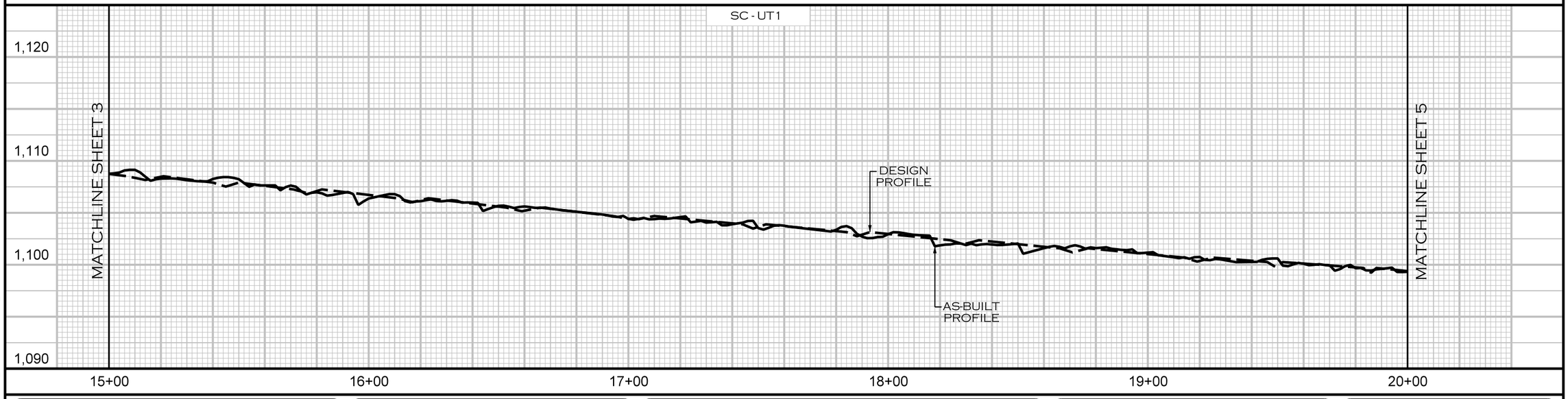
PROJECT # 083 | SHEET NO. 4

PLAN / PROFILE





REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

10/8/2020
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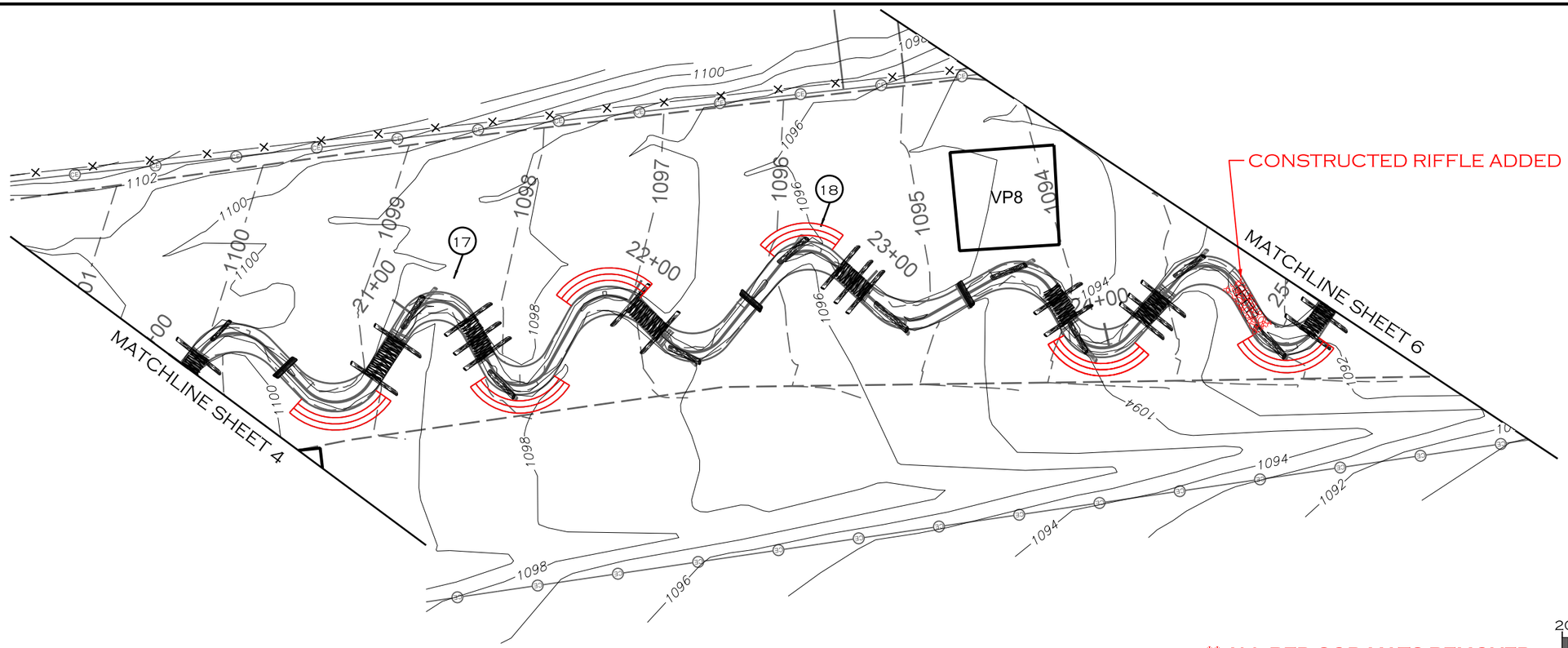
MKOCH

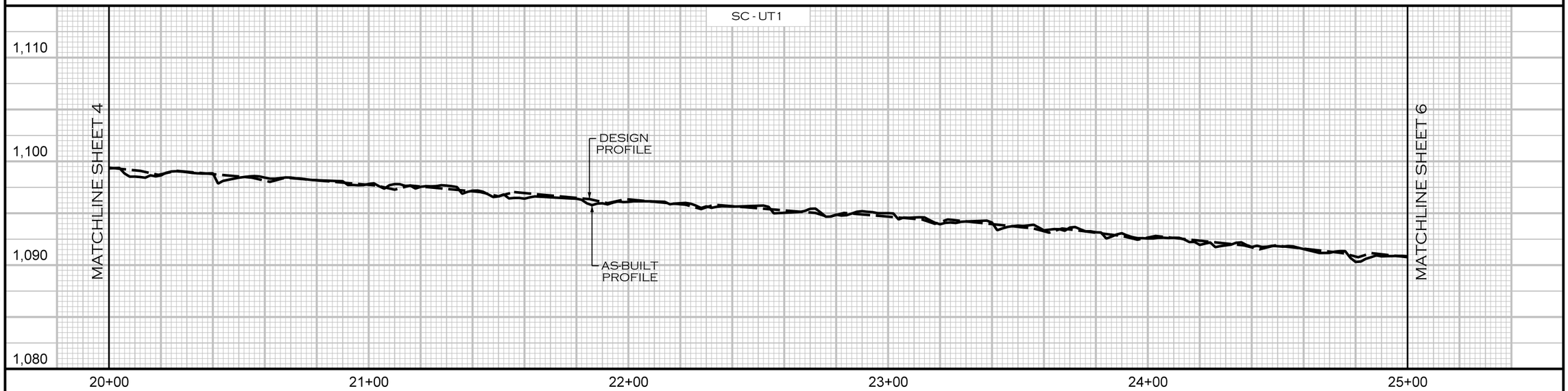
PROJECT # 083 | SHEET NO. 5

PLAN / PROFILE



** ALL RED SOD MATS REMOVED

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

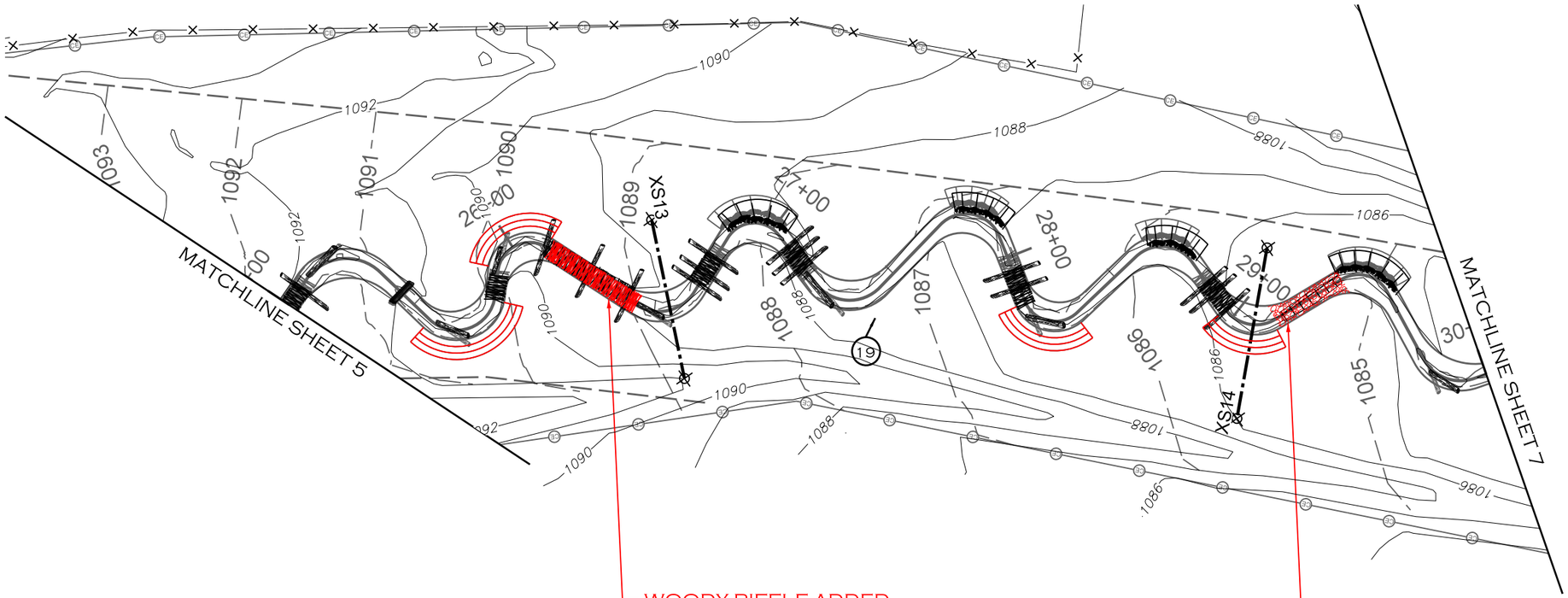
PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

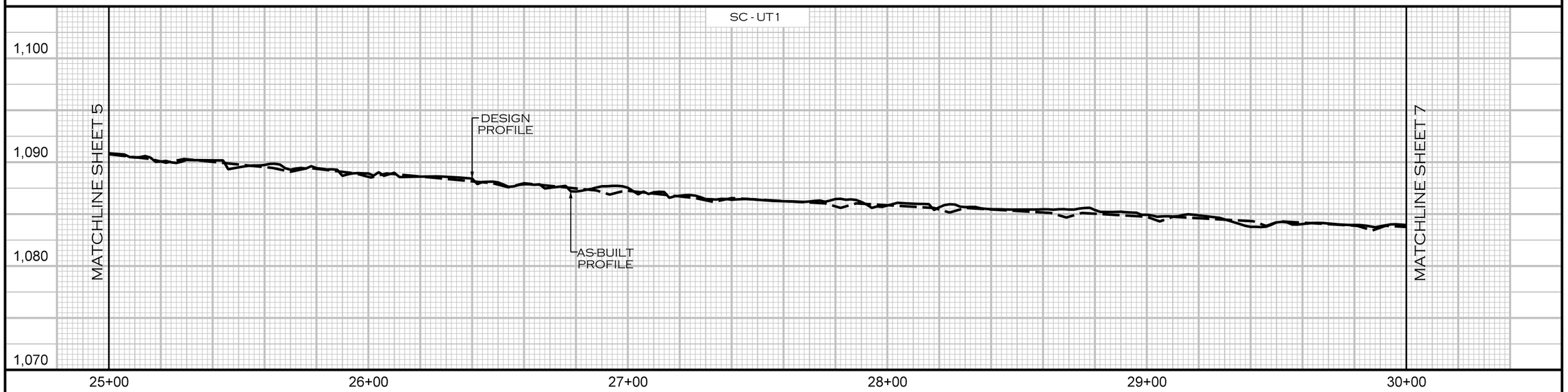
10/8/2020
R:\PROJECTS\RDU0083_NCDEQ_STEWARTS CREEK_FD\CADD\PLANS\AS-BUILT\MF_ASB_PSH_05.DGN
JBROWN

PROJECT #	SHEET NO.
083	6

PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT
10/09/20



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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PROJECT ENGINEER

10/8/2020
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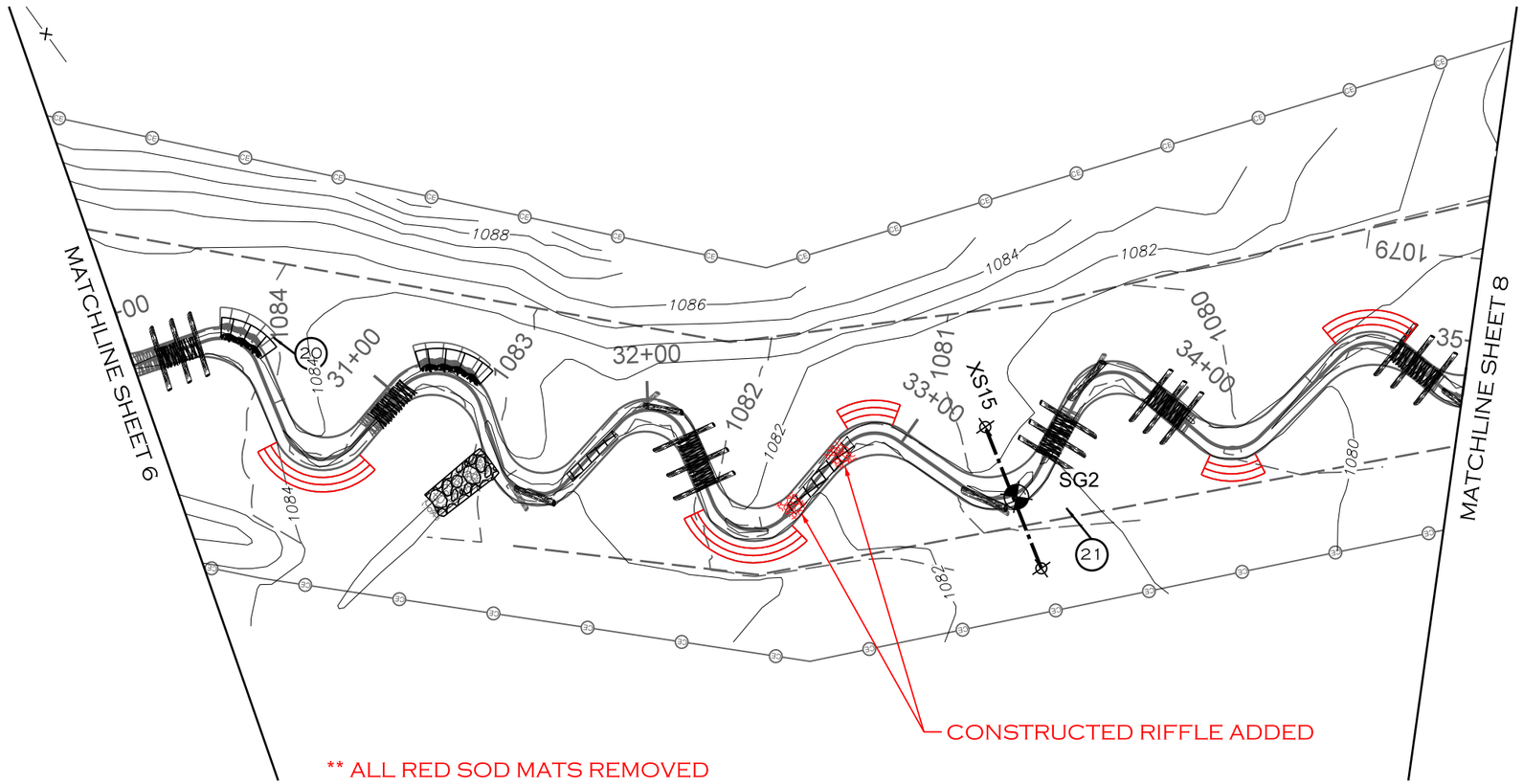
JRICCIN



PROJECT # 083 | SHEET NO. 7

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NAD 83

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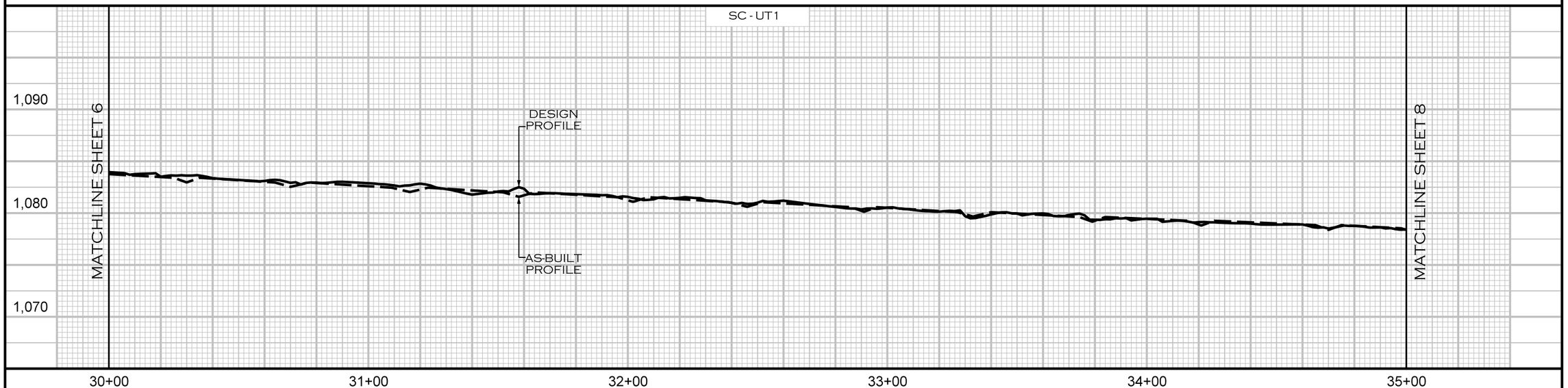
SCALE (FT)



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD. SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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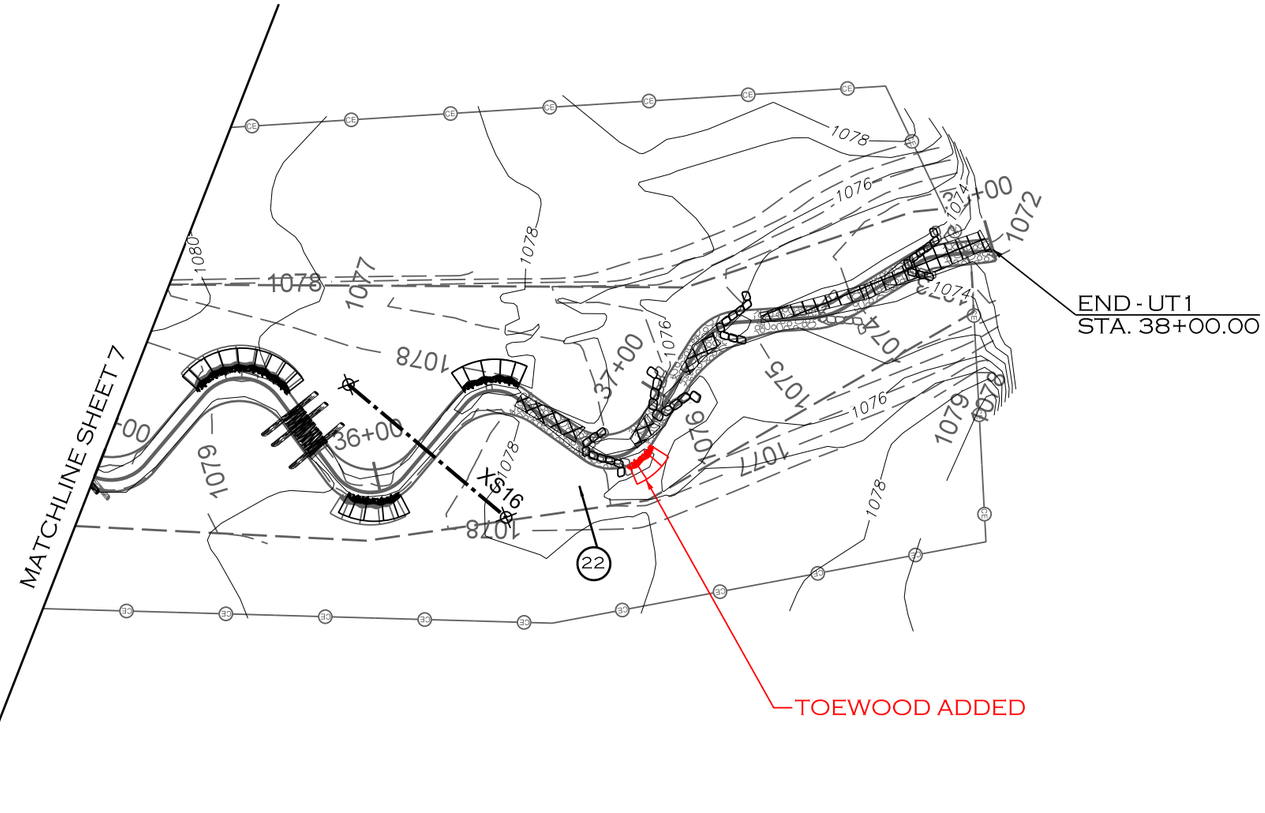
MKOEN

PROJECT # 083 | SHEET NO. 8

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT 10/09/20



NAD 83

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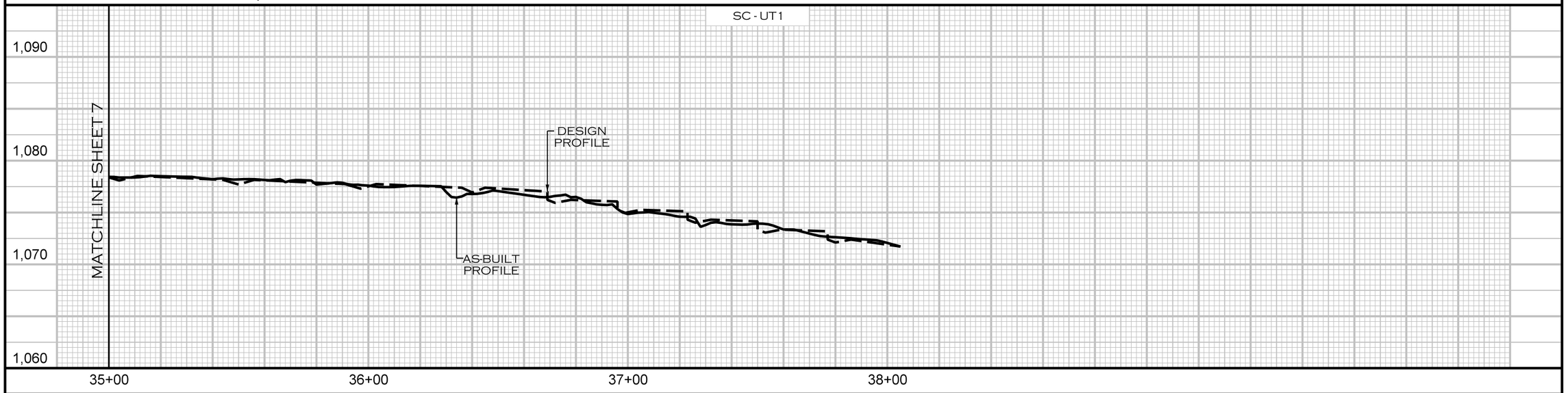
SCALE (FT)



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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1150 SE MAYNARD RD, SUITE 140
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LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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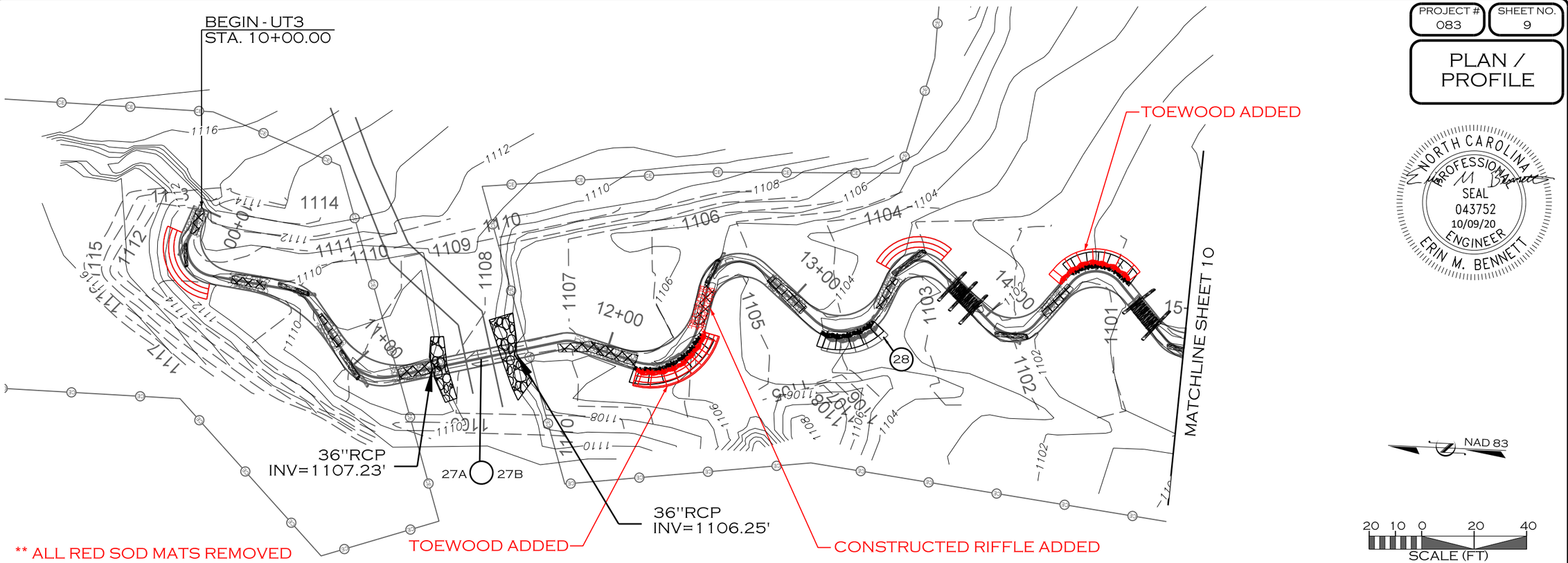
JBROWN

PROJECT #	SHEET NO.
083	9

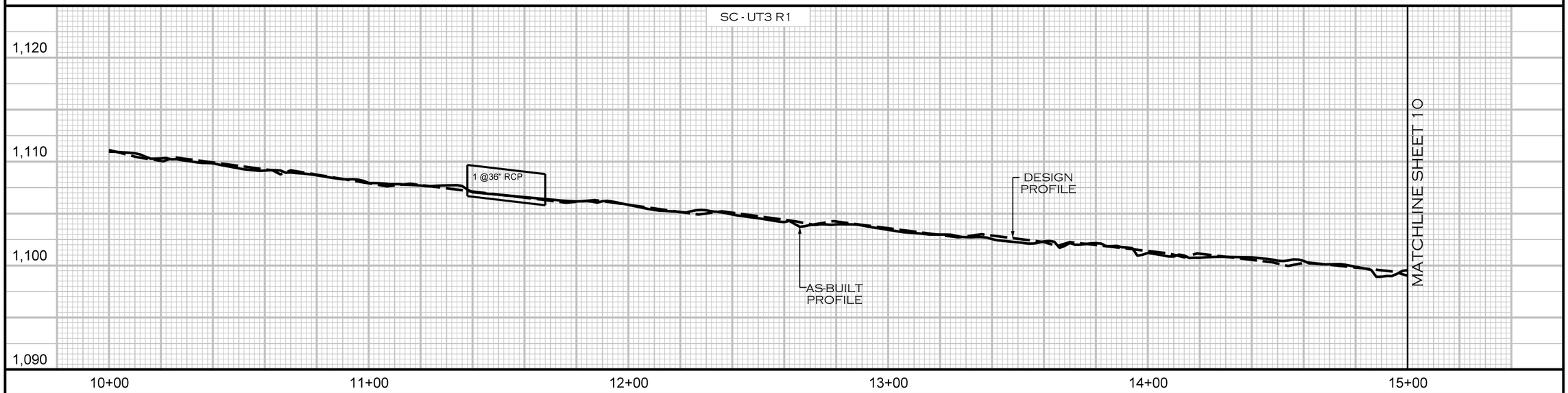
PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NAD 83

SCALE (FT) 20 10 0 20 40



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
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SURRY COUNTY, NC

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1150 SE MAYNARD RD, SUITE 140
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LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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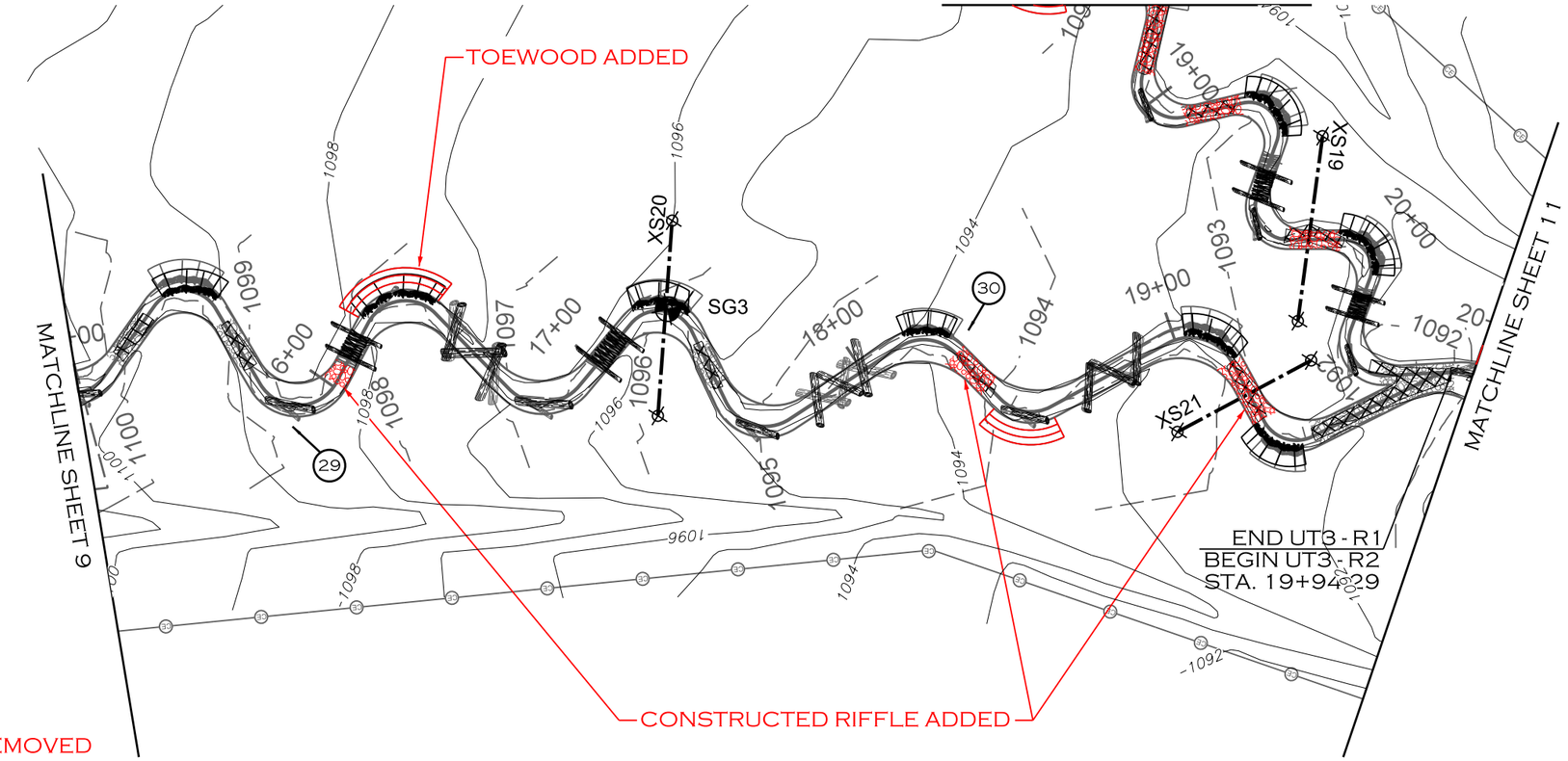
JKEDEN

PROJECT # 083 | SHEET NO. 10

PLAN / PROFILE



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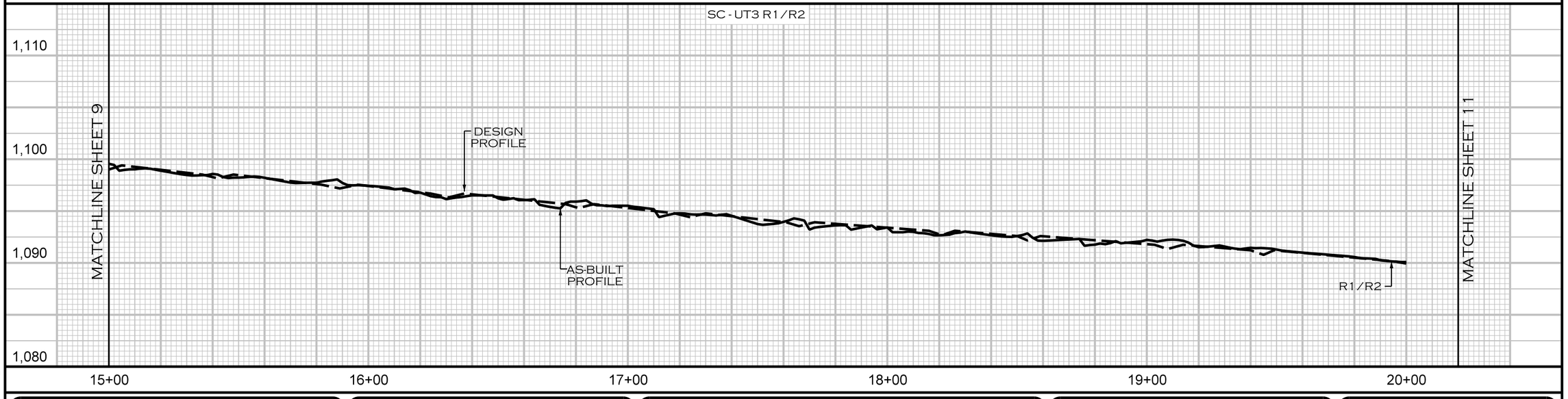
SCALE (FT): 20 10 0 20 40



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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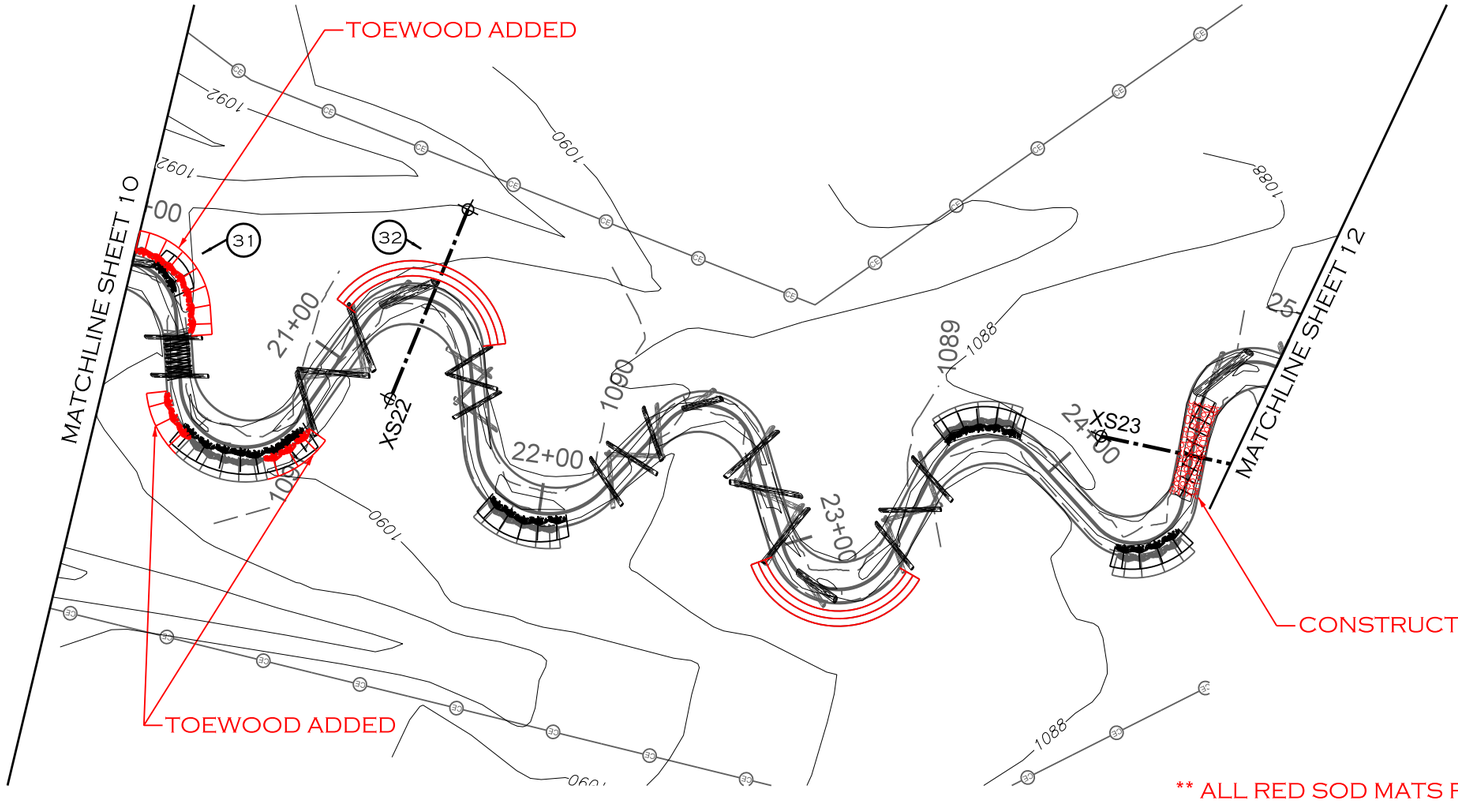
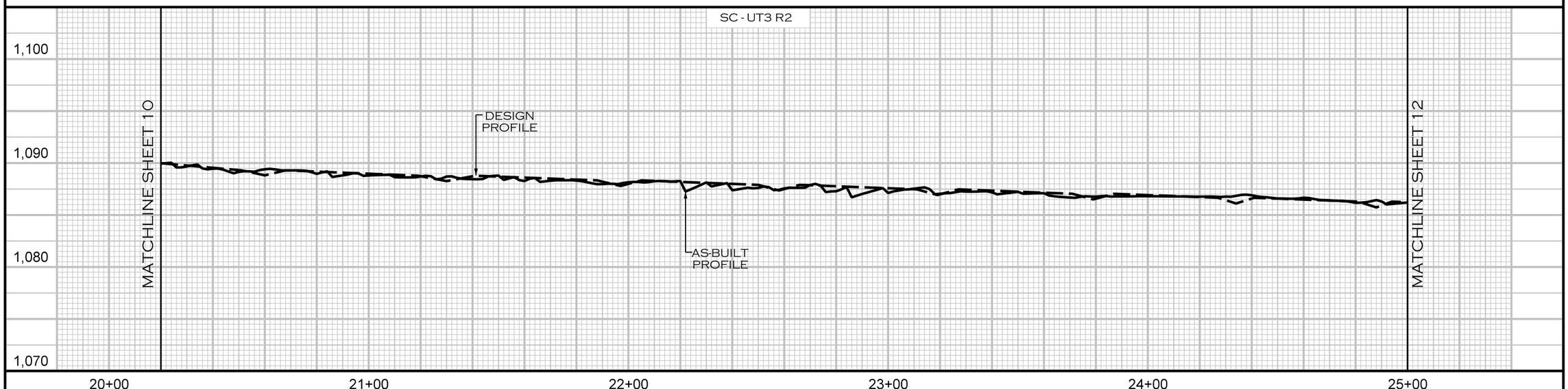
MKCOX

PROJECT # 083 | SHEET NO. 11

PLAN / PROFILE





REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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SURRY COUNTY, NC

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CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT
10/09/20

10/8/2020
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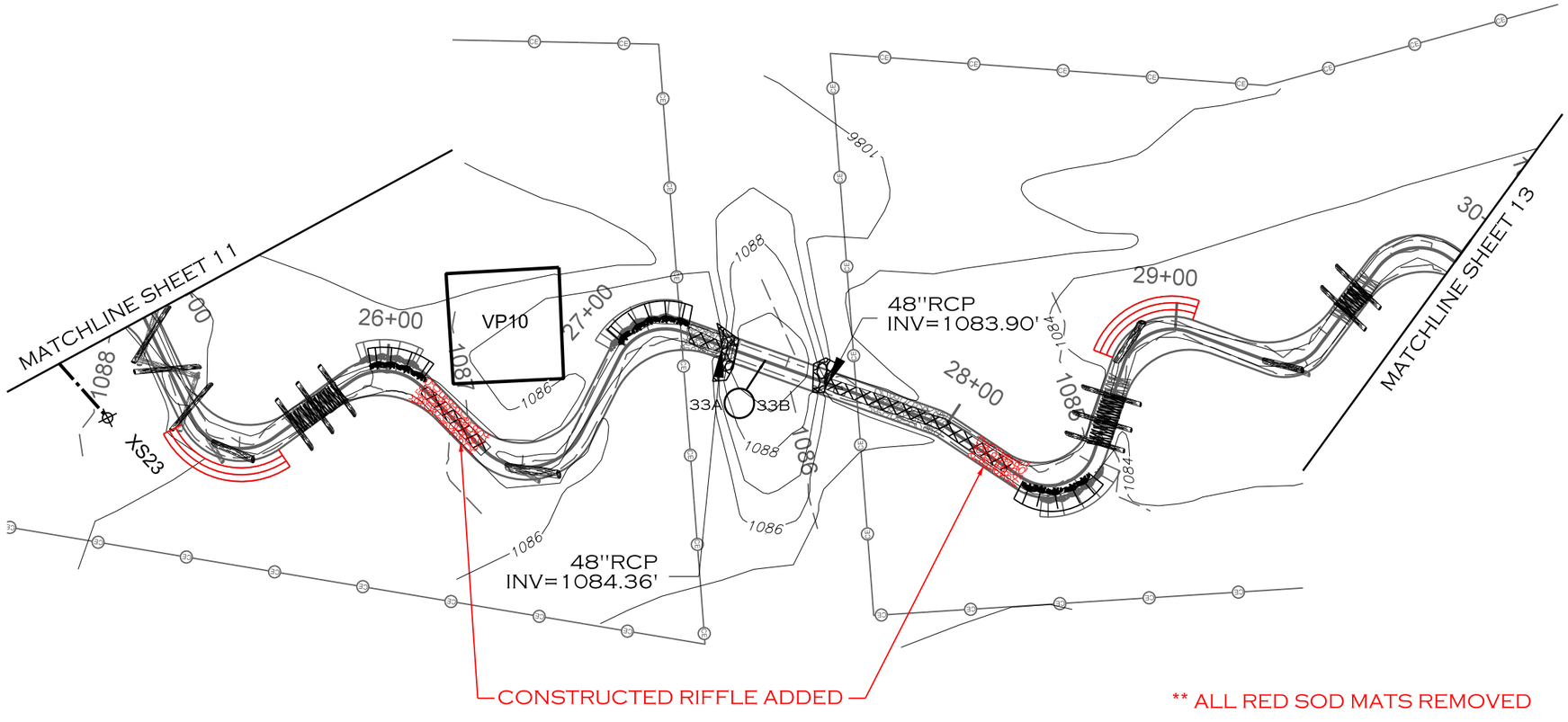
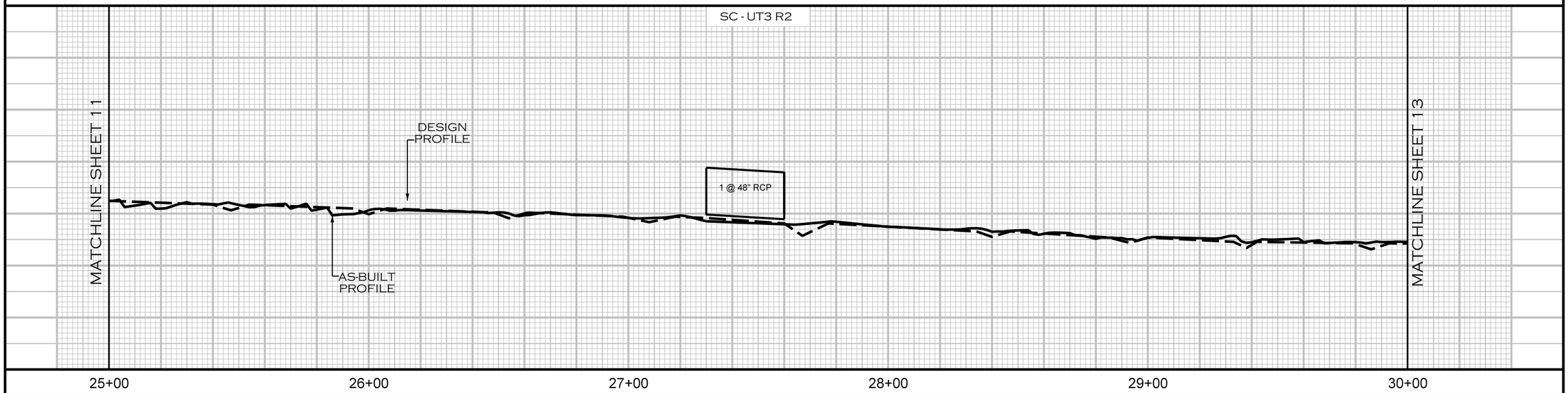
JKEDEN

PROJECT # 083 | SHEET NO. 12

PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT 10/09/20



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
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SURRY COUNTY, NC

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1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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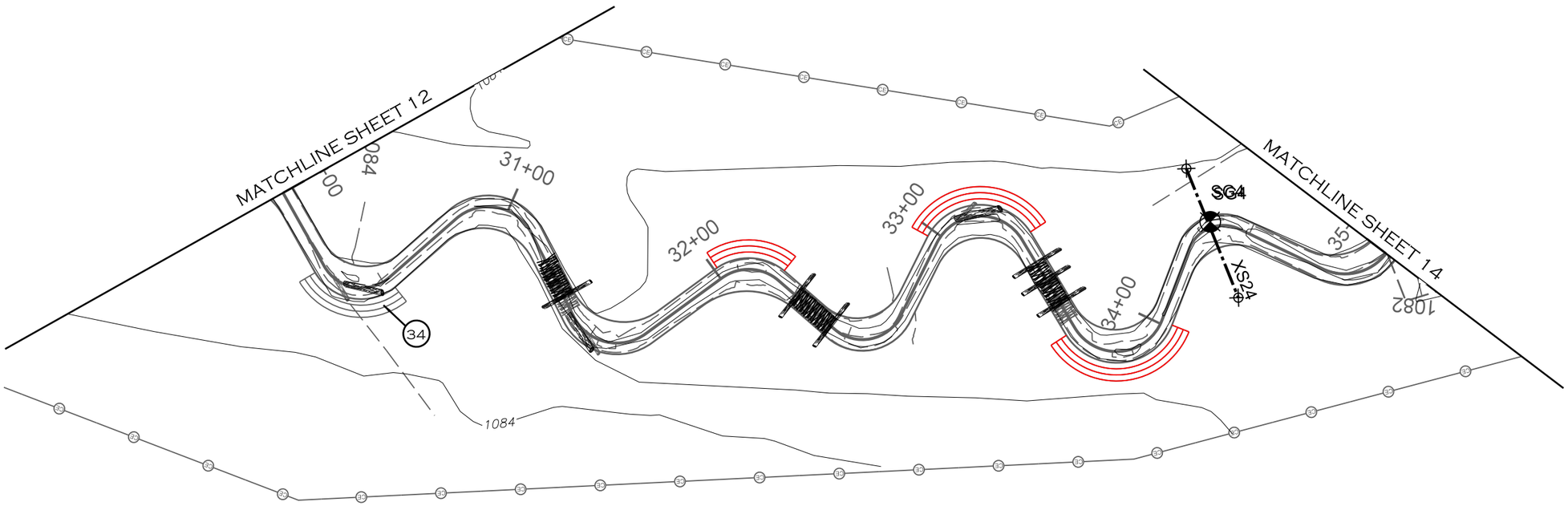
JBROWN

PROJECT # 083 | SHEET NO. 13

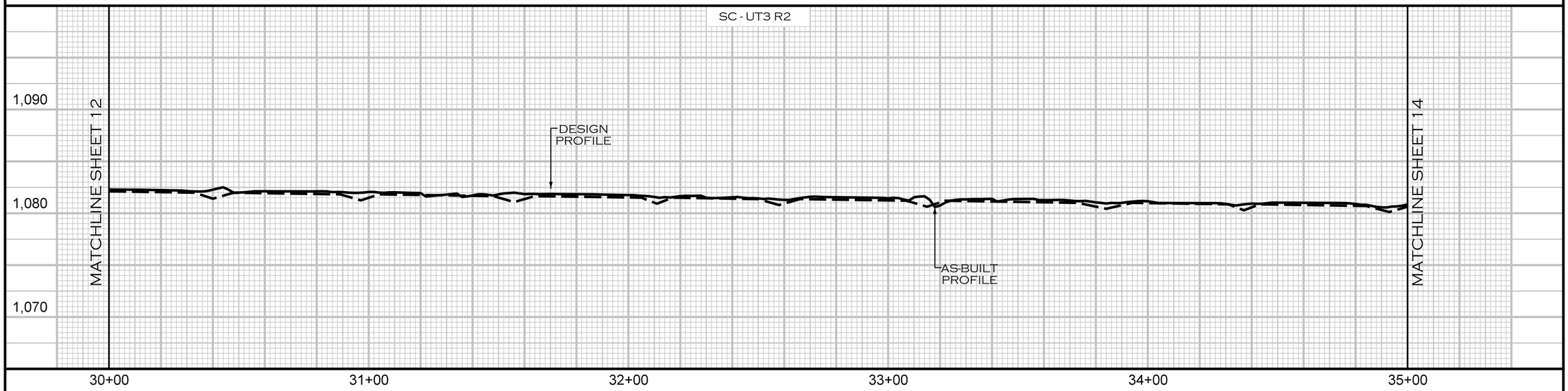
PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT



** ALL RED SOD MATS REMOVED

20 10 0 20 40
SCALE (FT)



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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1150 SE MAYNARD RD, SUITE 140
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LICENSE # P-1182

PROJECT ENGINEER

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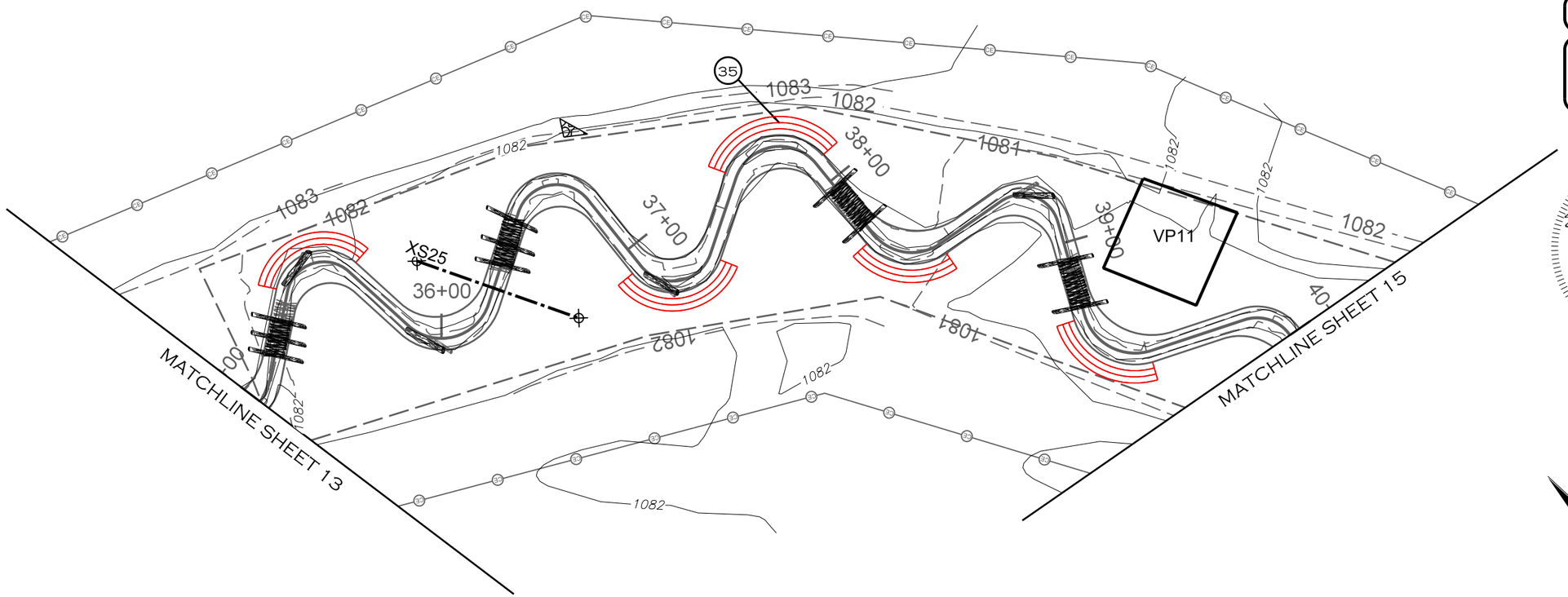
JKEDEN

PROJECT # 083 | SHEET NO. 14

PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NAD 83

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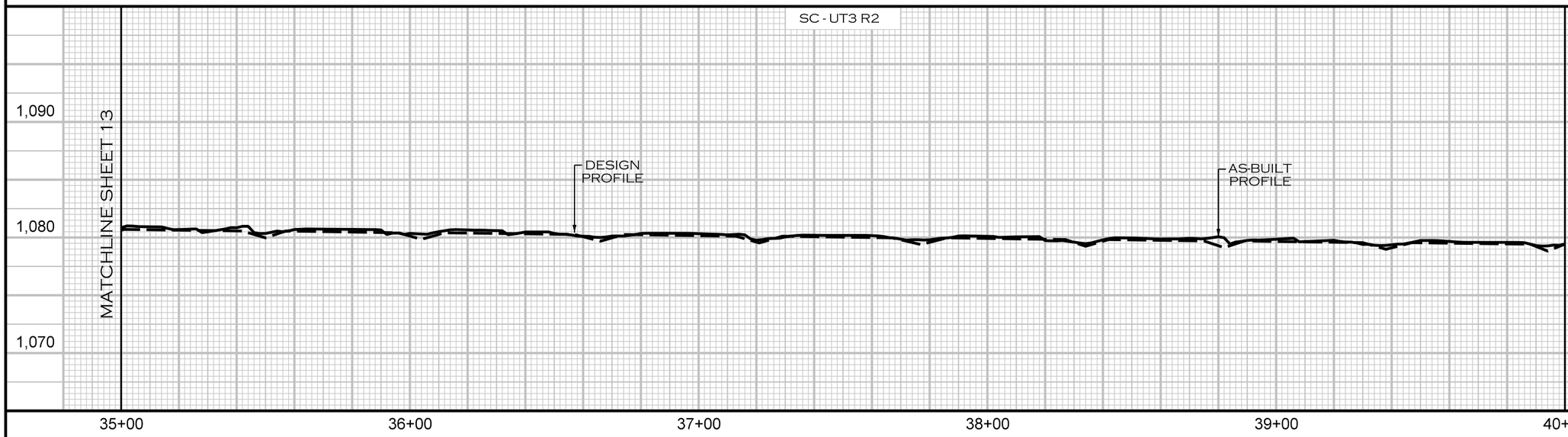
SCALE (FT)

** ALL RED SOD MATS REMOVED



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
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1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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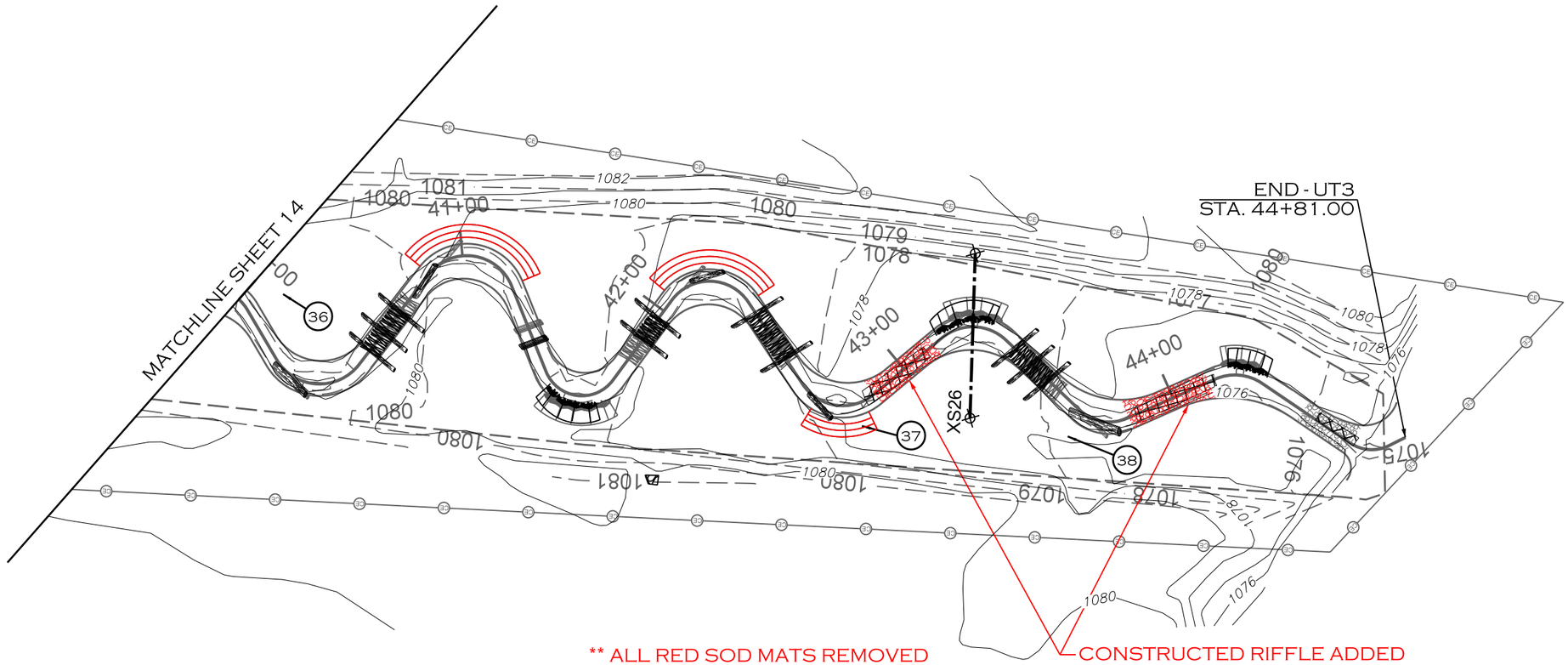
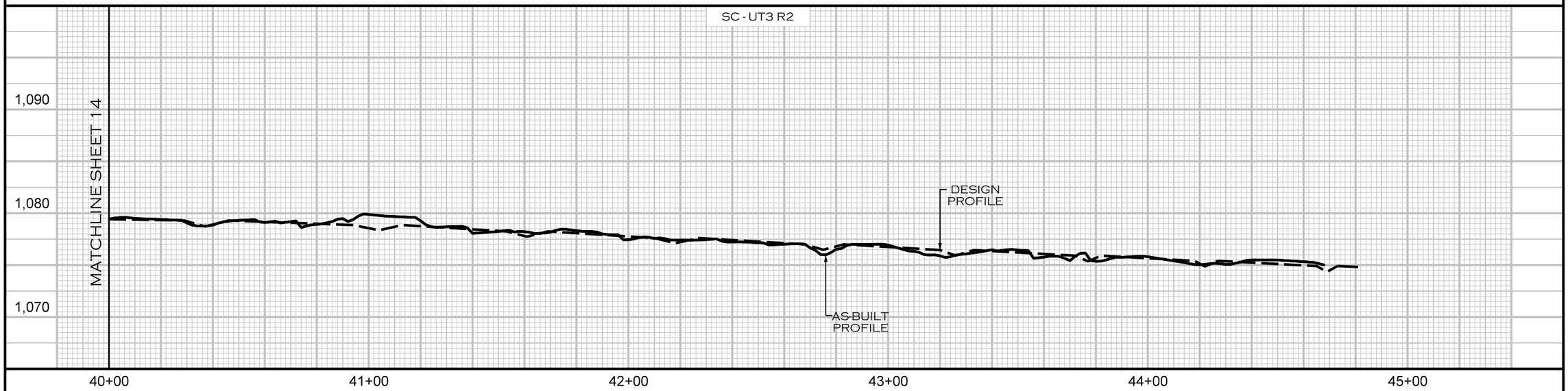
JKEDEN

PROJECT # 083 | SHEET NO. 15

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT





REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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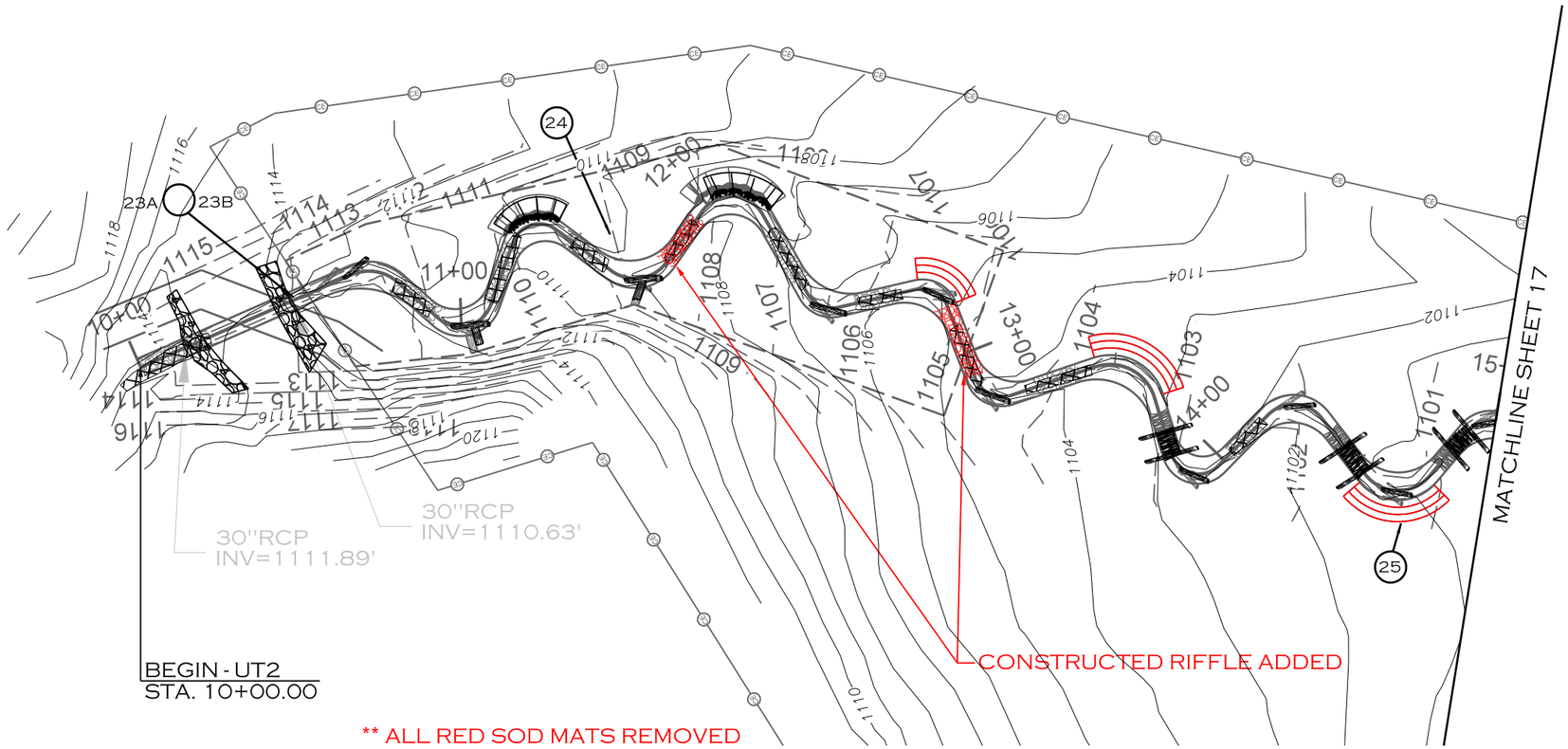
JBROOKS

PROJECT # 083 | SHEET NO. 16

PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NAD 83

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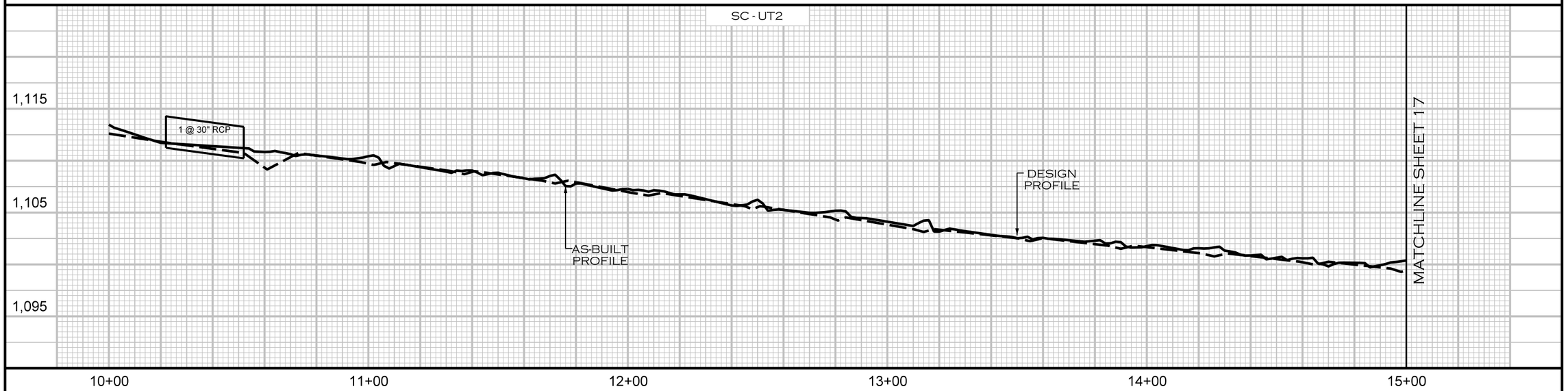

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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ECOSYSTEM PLANNING & RESTORATION
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CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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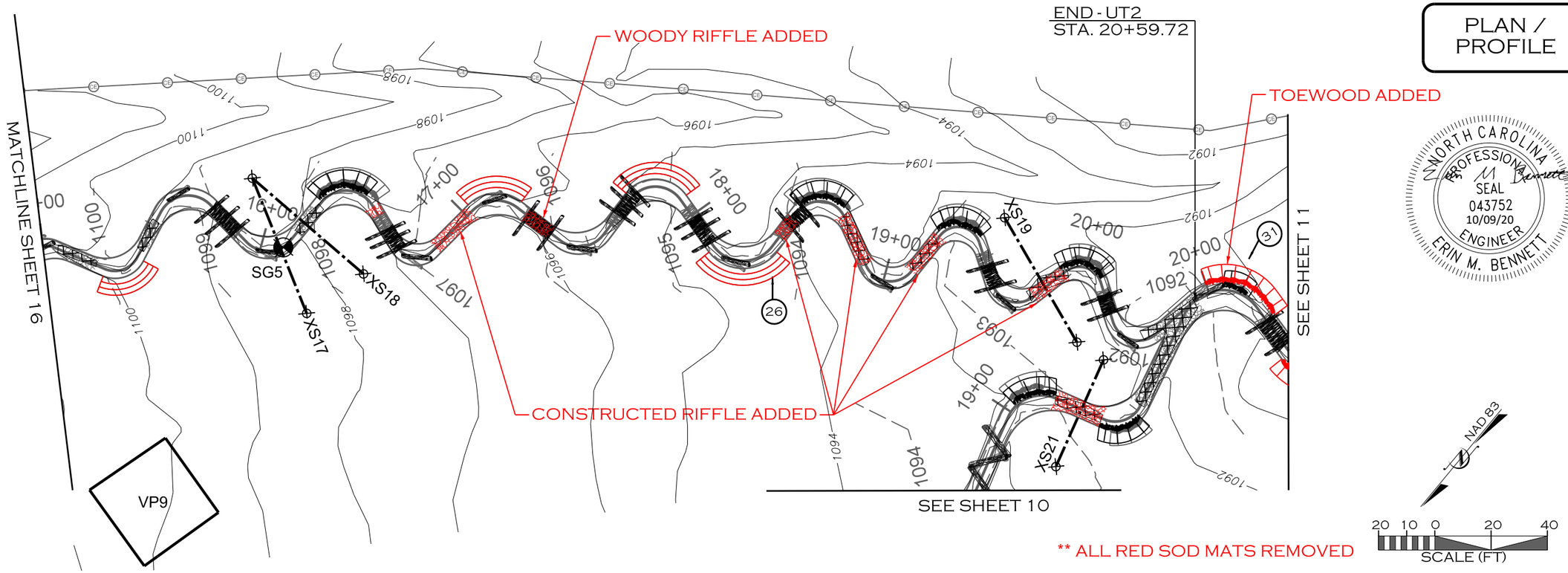
MKOPAN

PROJECT # 083 | SHEET NO. 17

PLAN / PROFILE



** ALL RED SOD MATS REMOVED

NAD 83

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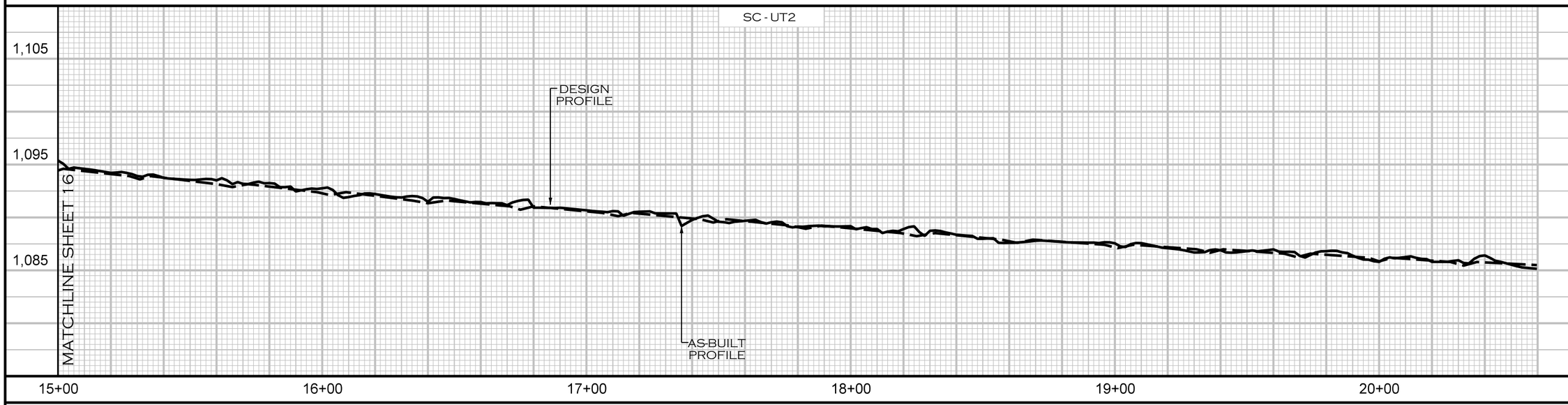
SCALE (FT)

NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT 10/09/20



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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1150 SE MAYNARD RD, SUITE 140
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LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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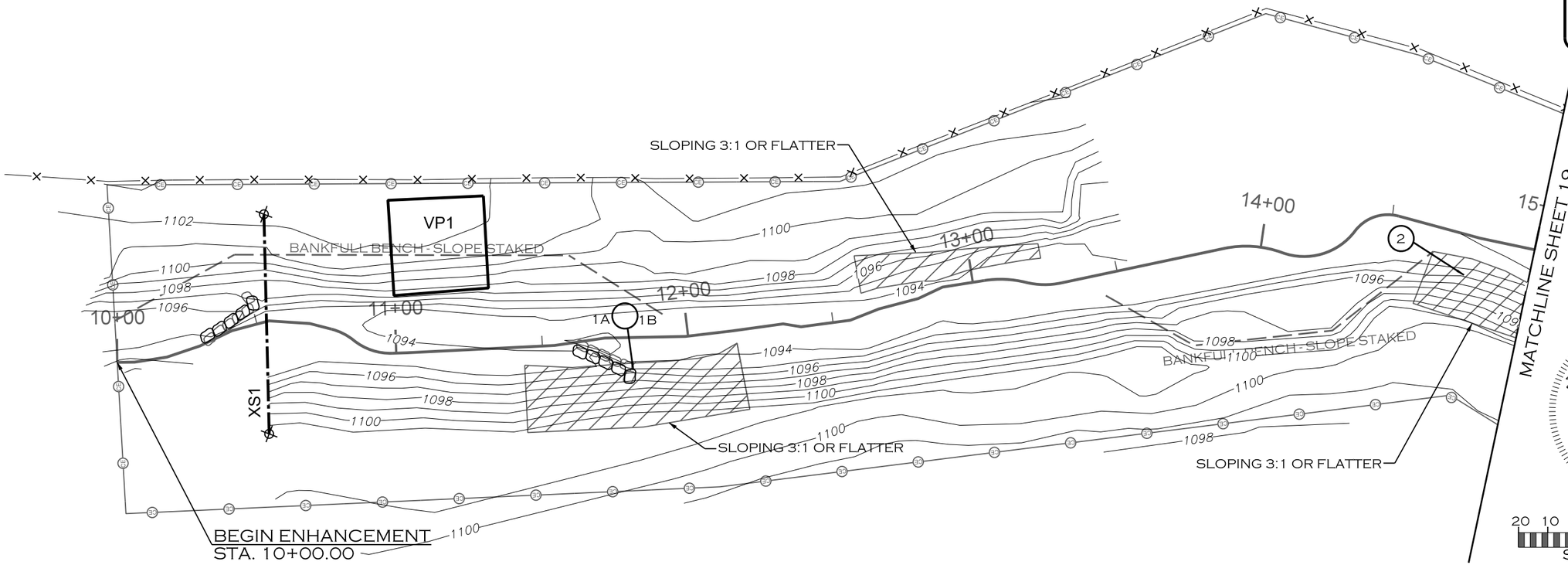
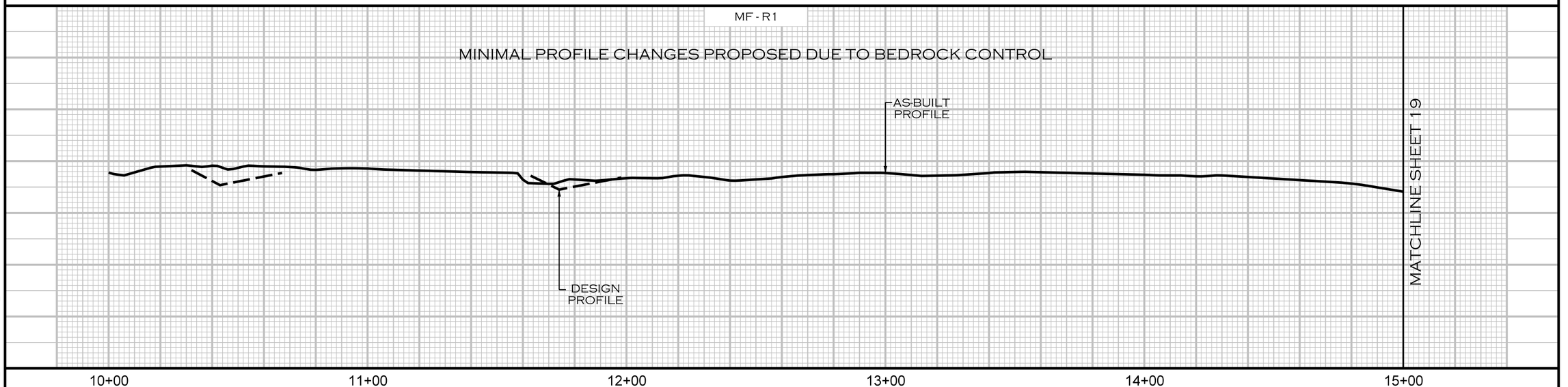
MKOCH

PROJECT #	SHEET NO.
083	18

PLAN / PROFILE



NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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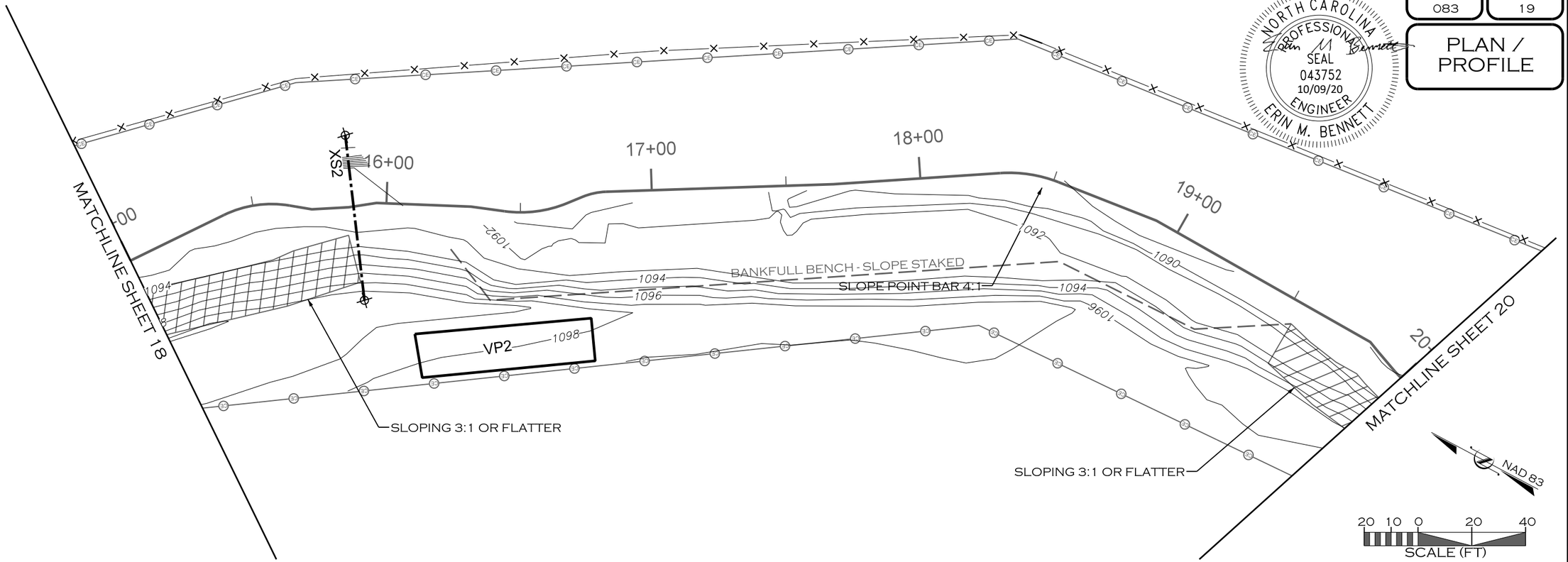
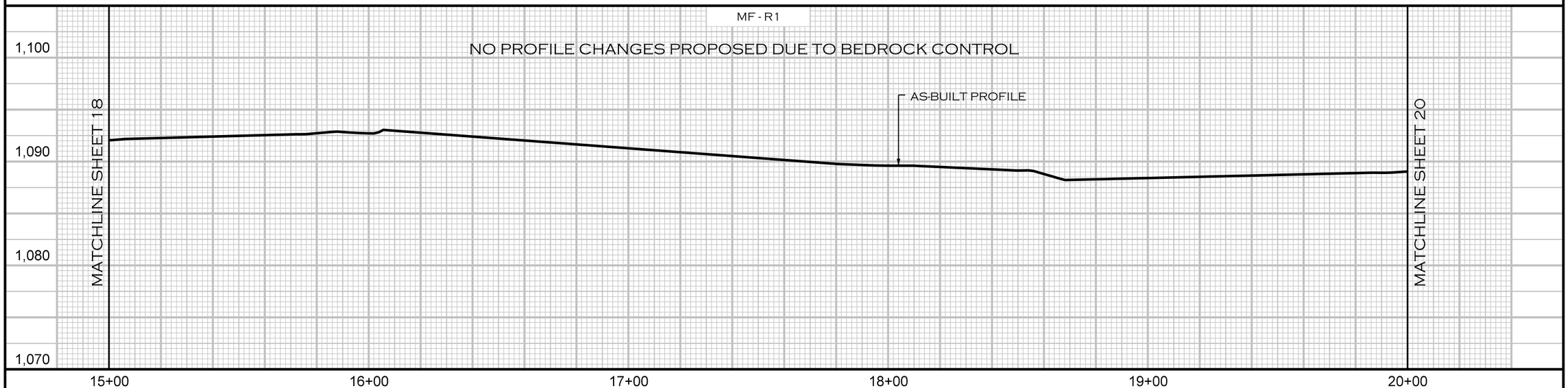
PROJECT # 083 | SHEET NO. 19

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT





REVISIONS				
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1	RECORD DRAWINGS	EMB	KLT	10/9/20

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10/8/2020
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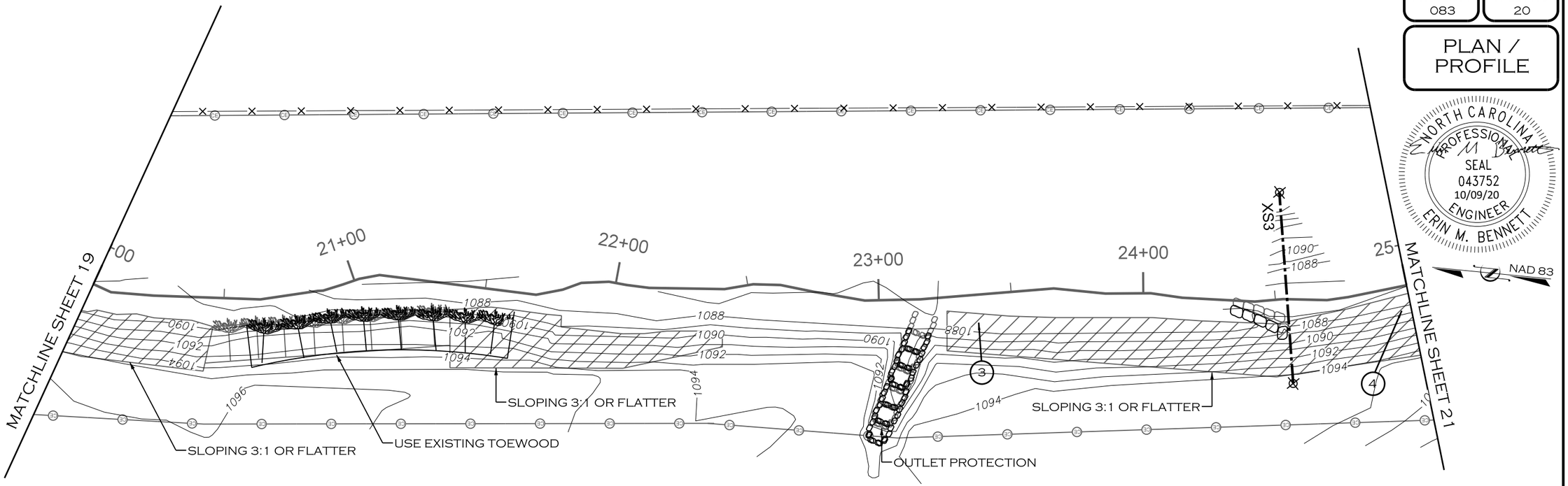
PROJECT # 083 | SHEET NO. 20

PLAN / PROFILE

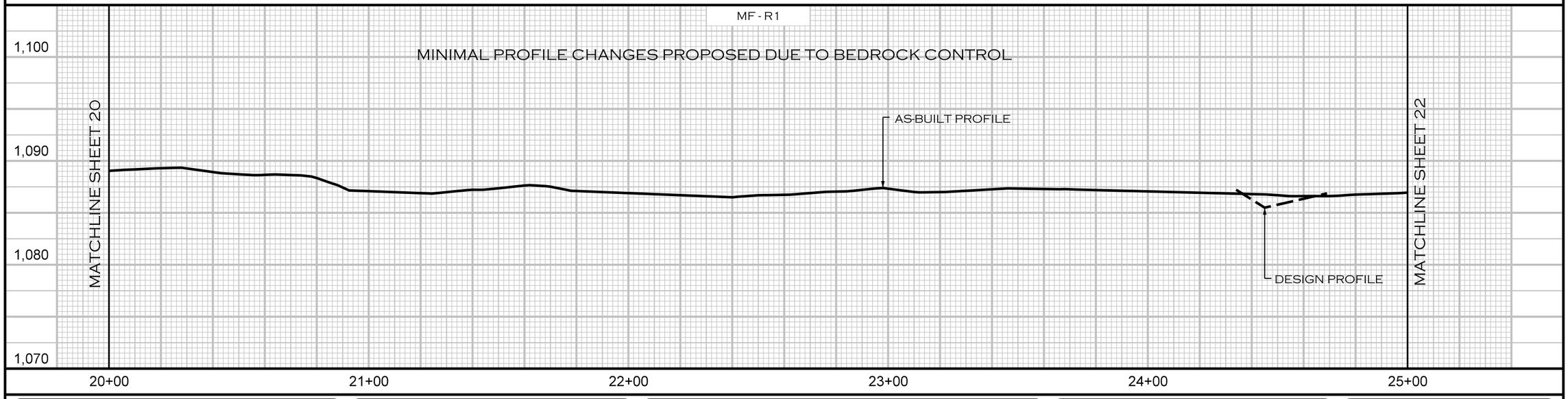
NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NAD 83



NOTE:
1. POOL DEPTHS MAY VARY DUE TO BEDROCK.

20 10 0 20 40
SCALE (FT)



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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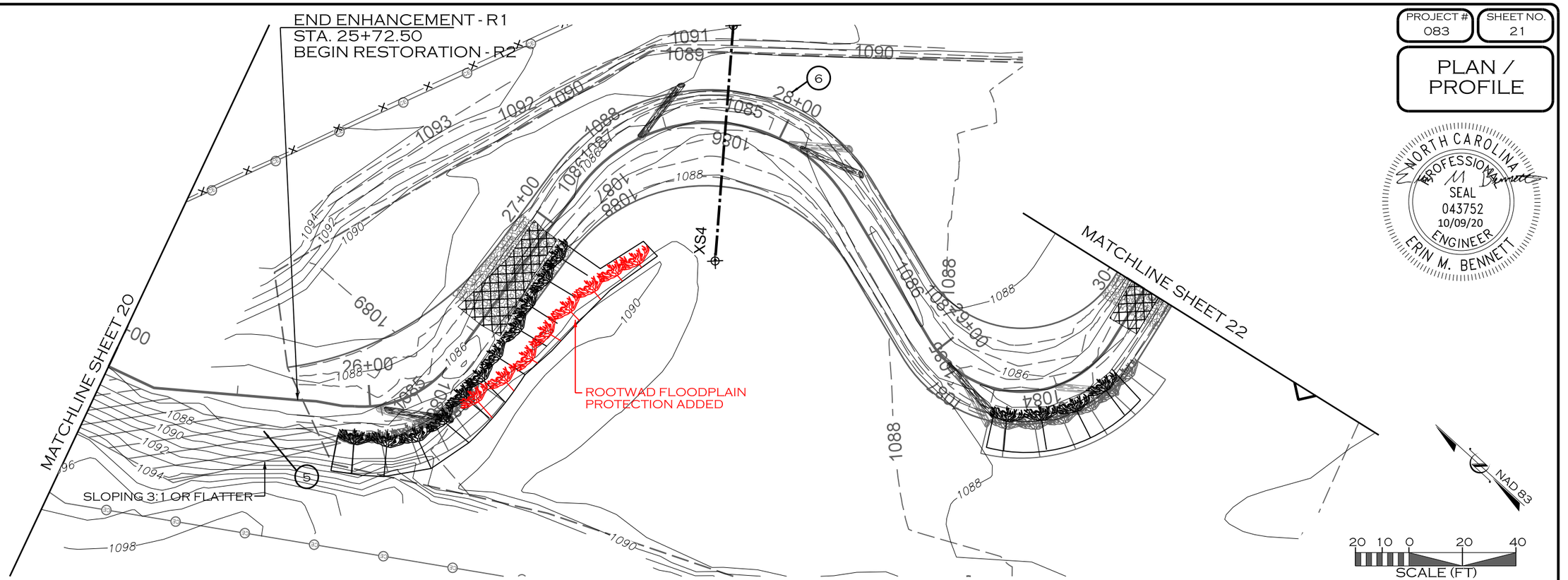

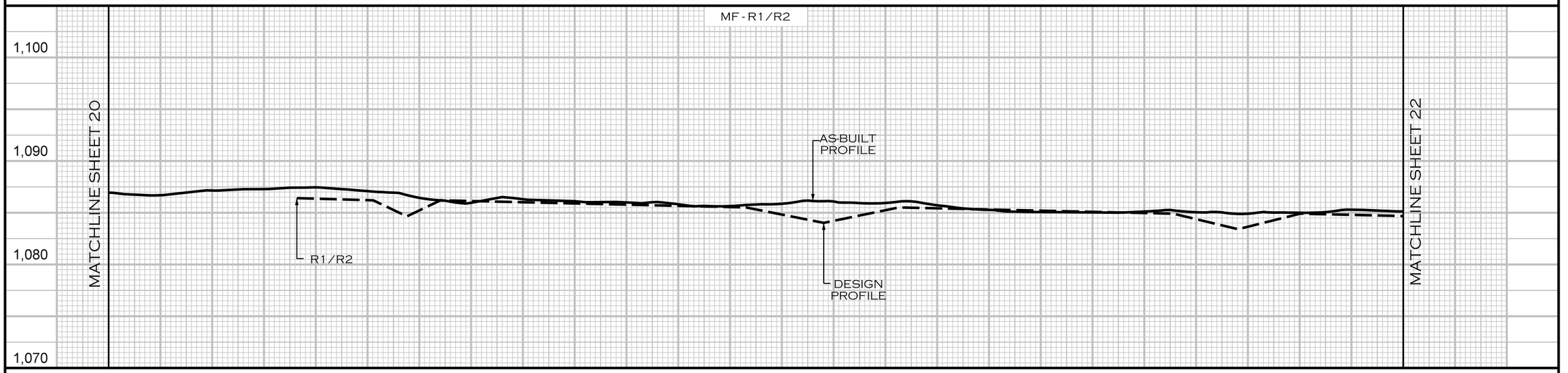

PROJECT # 083 | SHEET NO. 21

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
ECOSYSTEM PLANNING & RESTORATION
1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

PROJECT ENGINEER

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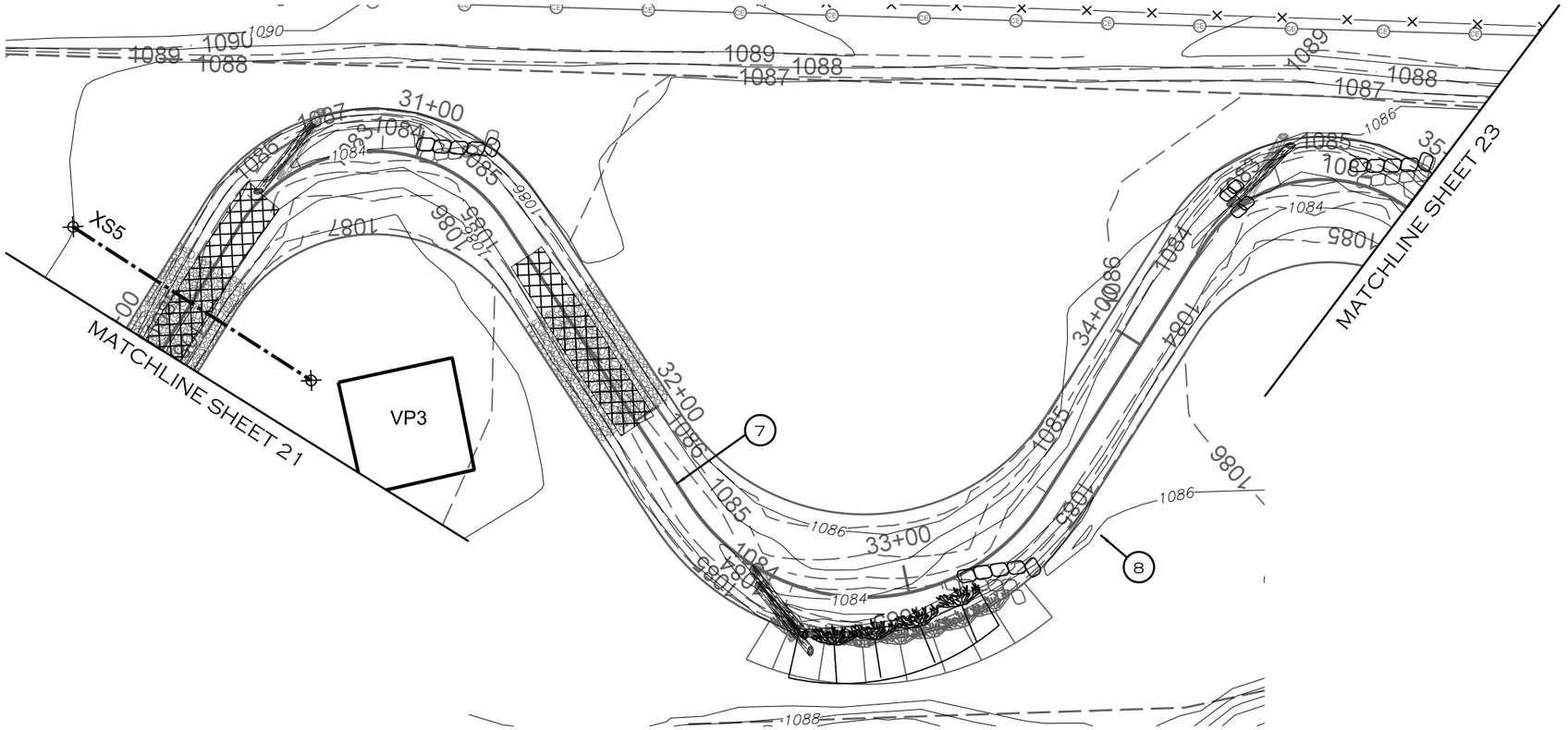
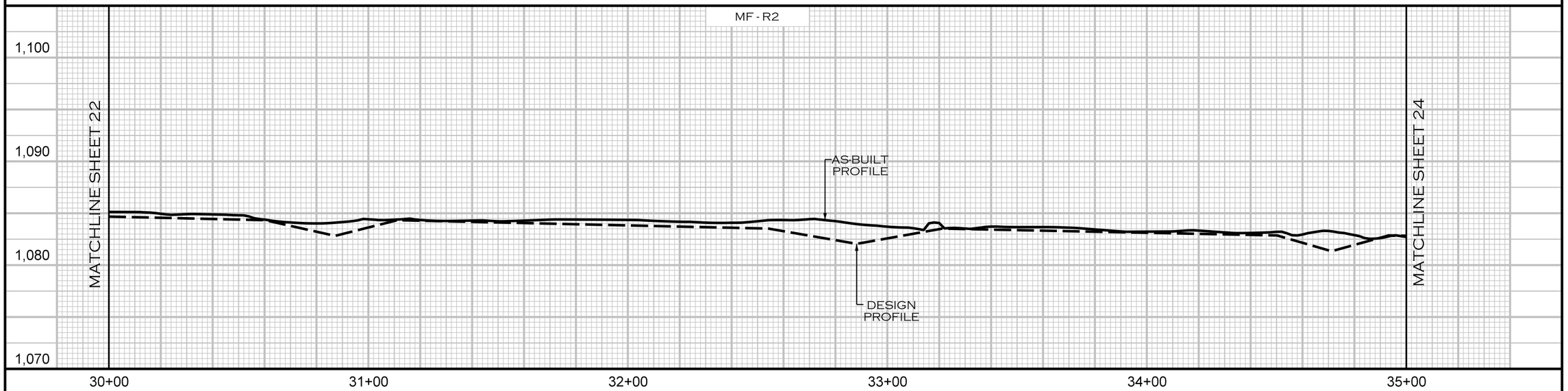
JKOON

PROJECT #	SHEET NO.
083	22

PLAN / PROFILE





NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

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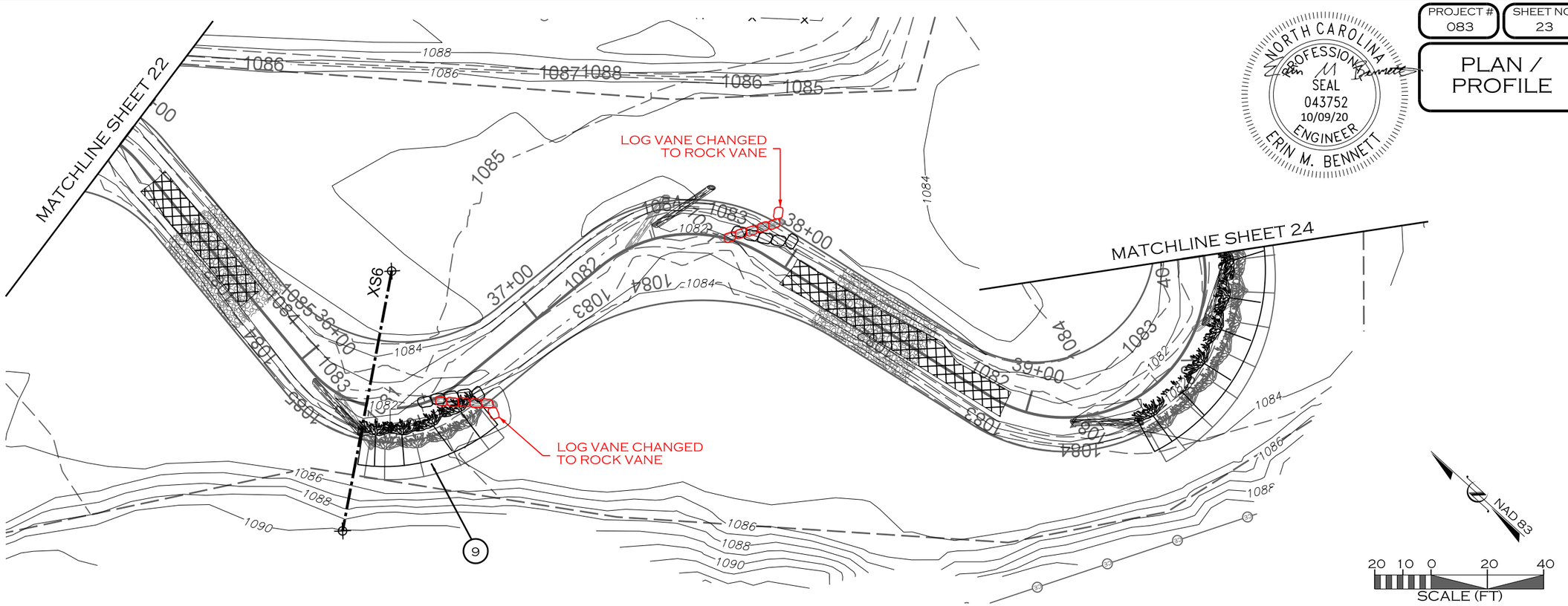
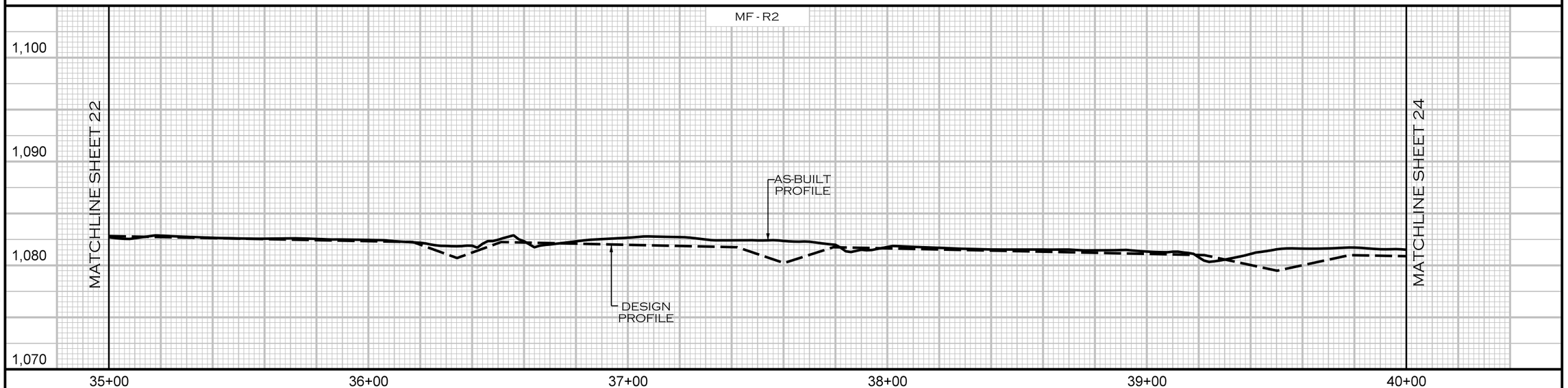
JKOON

PROJECT # 083 | SHEET NO. 23

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT





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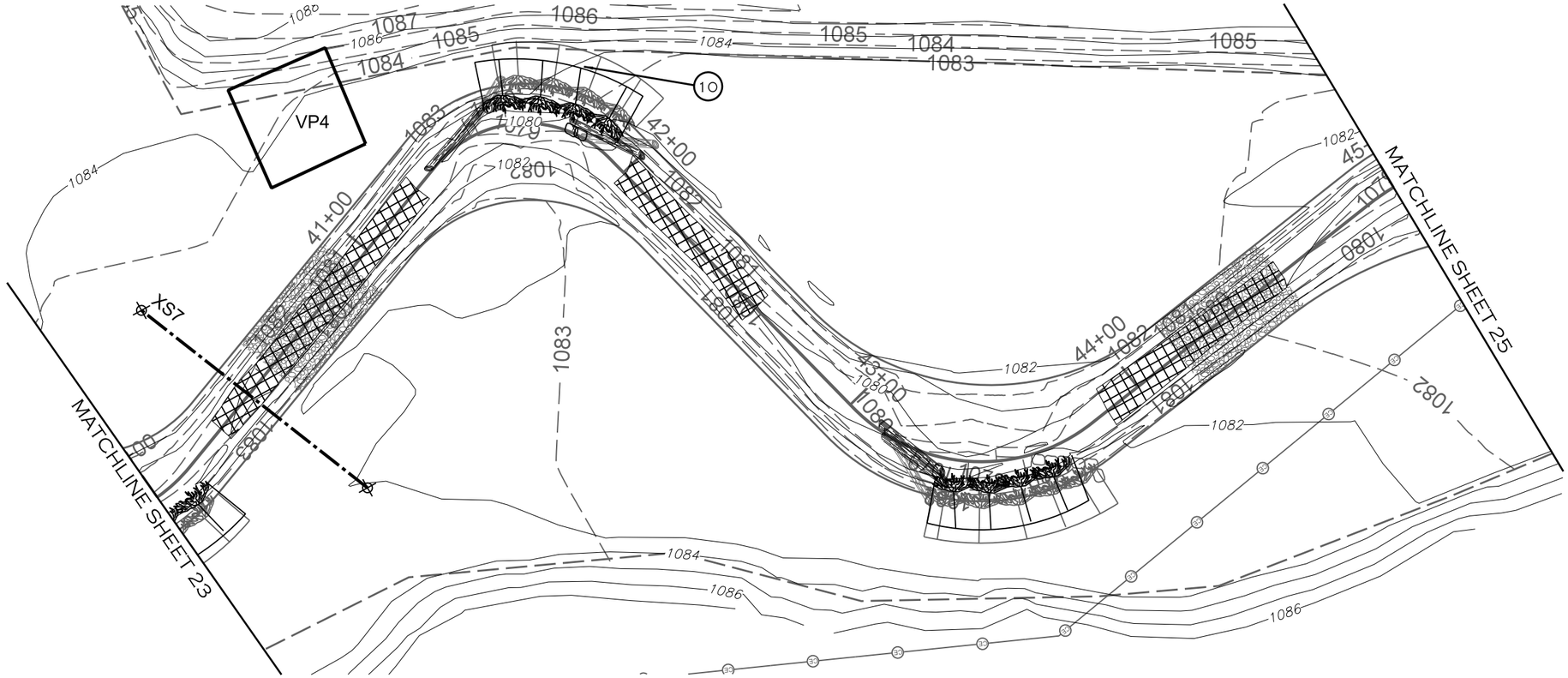
PROJECT # 083 | SHEET NO. 24

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT



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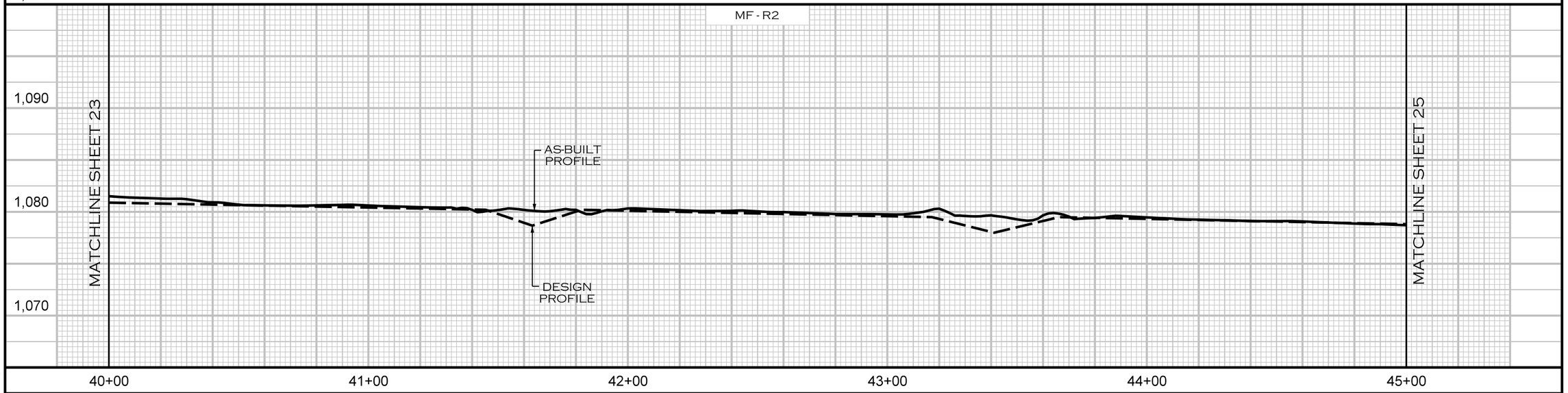

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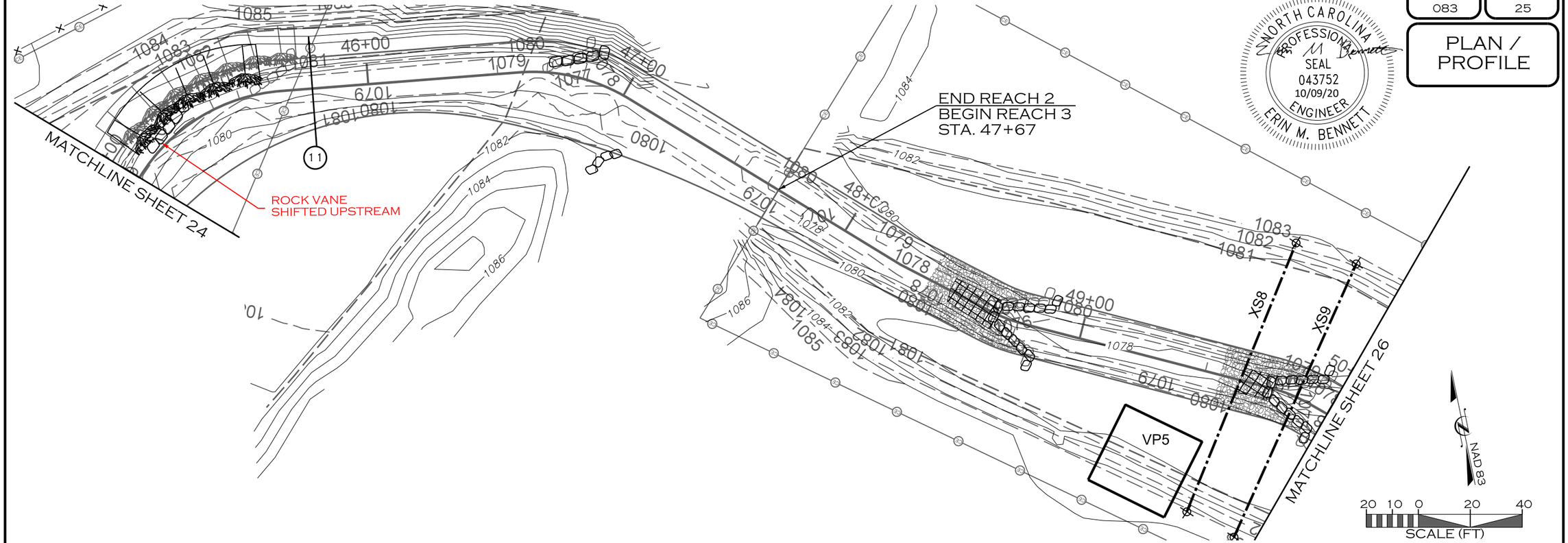
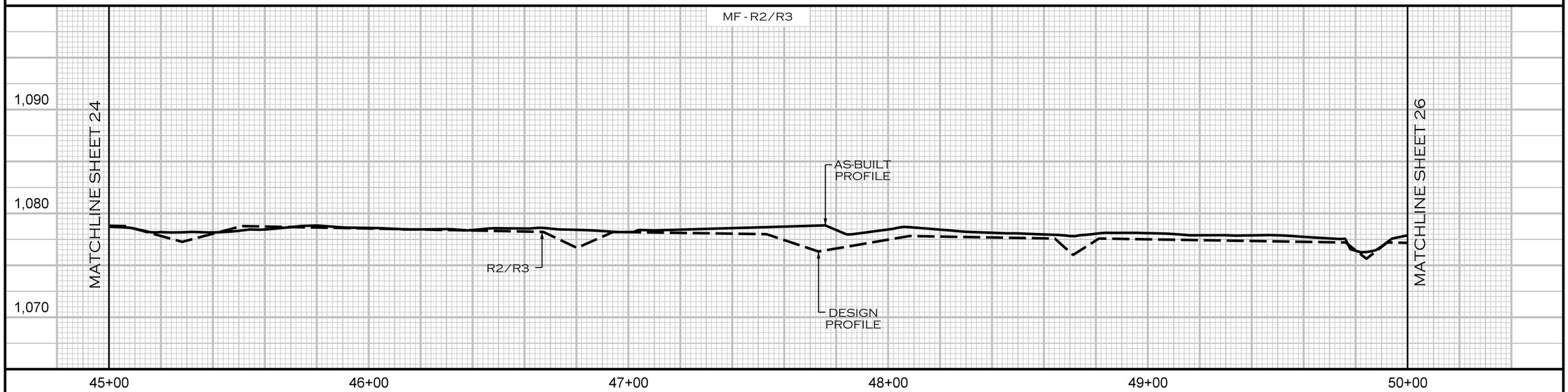
PROJECT # 083 | SHEET NO. 25

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT





REVISIONS				
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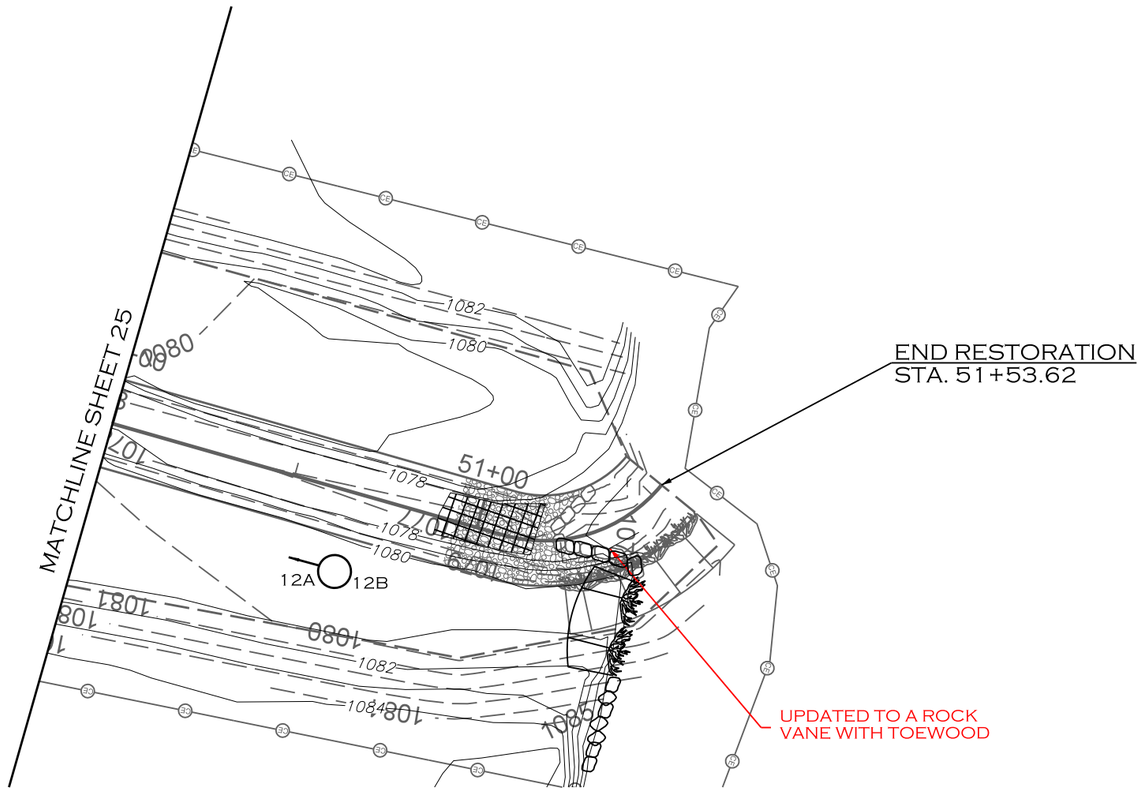
PROJECT # 083 | SHEET NO. 26

PLAN / PROFILE

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT



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SCALE (FT)

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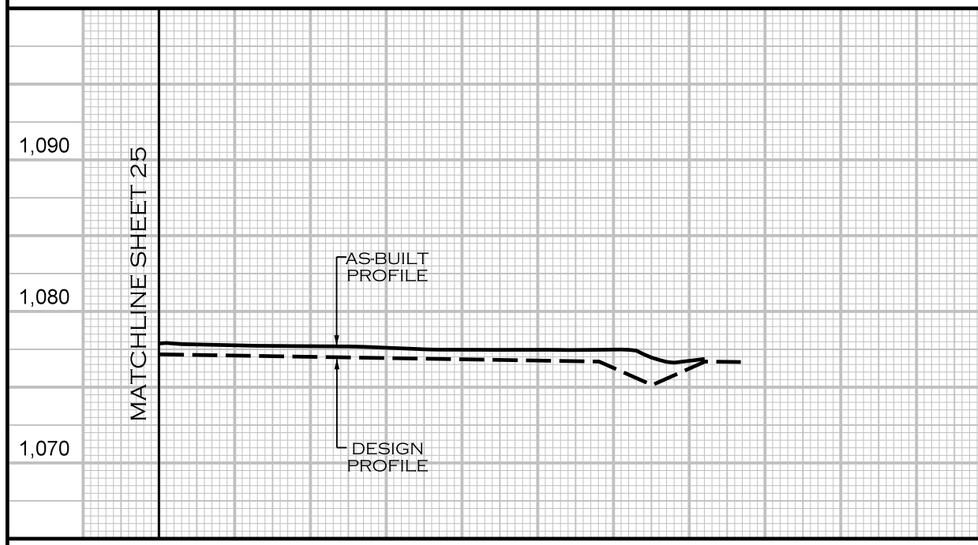

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
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1150 SE MAYNARD RD, SUITE 140
CARY, NC 27511
LICENSE # P-1182

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JKOON

MATCHLINE SHEET 28

PROJECT # 083

SHEET NO. 27

VEGETATION AND FENCING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 043752 10/09/20 ENGINEER ERIN M. BENNETT

NOTE:
ALL PLANTING WAS COMPLETED ACCORDING TO THE DESIGN AND THERE WERE NO DEVIATIONS FROM THE PLANTING PLAN.

ZONE 1 - STREAMBANKS

ZONE 2 - RIPARIAN BUFFER

ZONE 3 - UPLANDS

ZONE 4 - PERMANENT SEEDING - AREA OUTSIDE EASEMENT

NAD 83

100 50 0 100 200
SCALE (FT)

REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

PREPARED IN THE OFFICE OF:
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LICENSE # P-1182

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MKOPAN

PROJECT # 083 | SHEET NO. 28

VEGETATION AND FENCING PLAN

NOTE:
ALL PLANTING WAS COMPLETED ACCORDING TO THE DESIGN AND THERE WERE NO DEVIATIONS FROM THE PLANTING PLAN.

ZONE 1 - STREAMBANKS

ZONE 2 - RIPARIAN BUFFER

ZONE 3 - UPLANDS

ZONE 4 - PERMANENT SEEDING - AREA OUTSIDE EASEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043752 10/09/20 ERIN M. BENNETT

NAD 83

100 50 0 100 200
SCALE (FT)

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

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PROJECT ENGINEER

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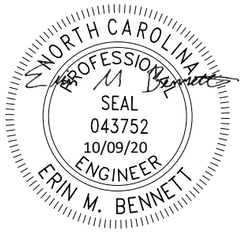
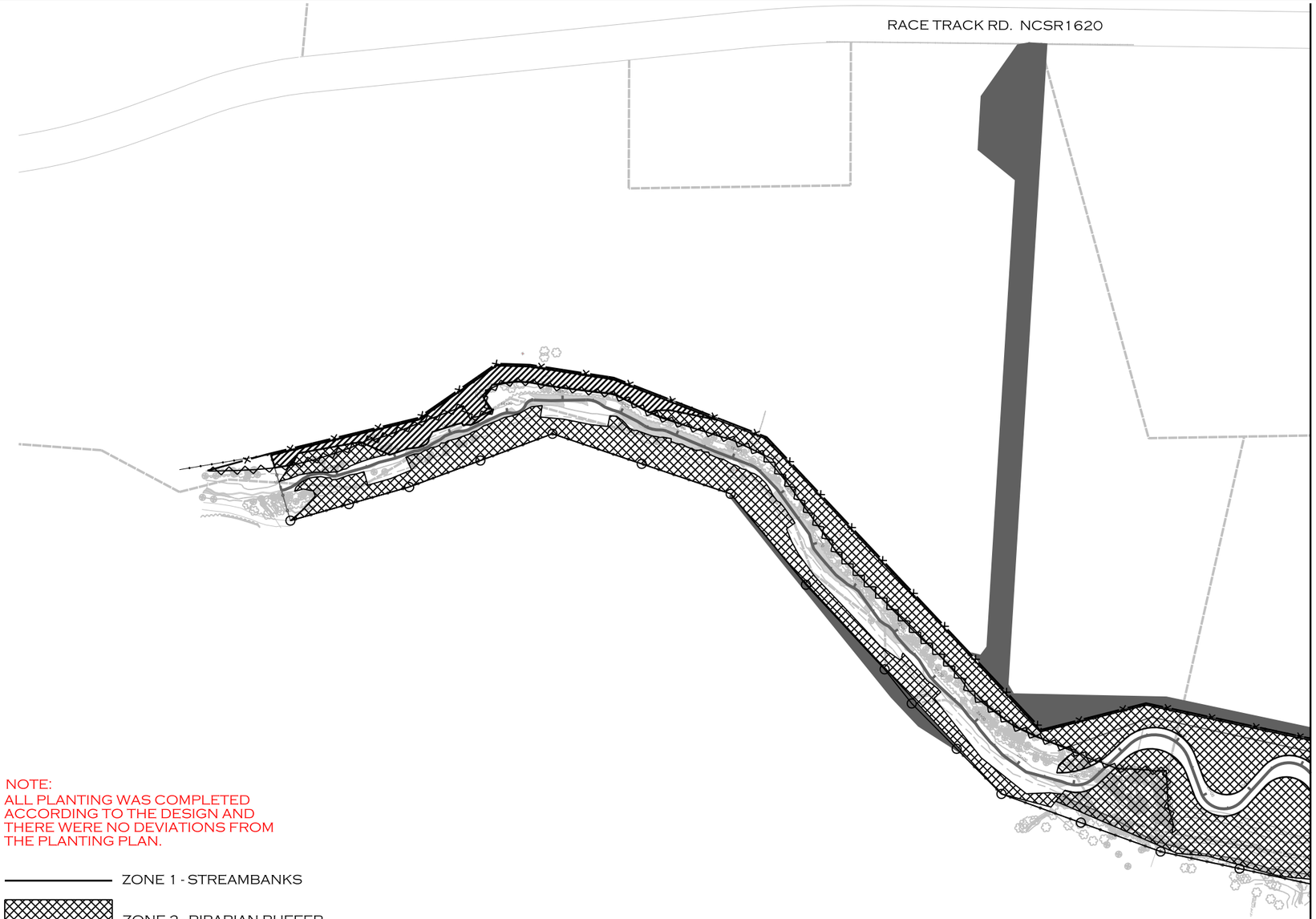
MKOPEN

PROJECT # 083 | SHEET NO. 29

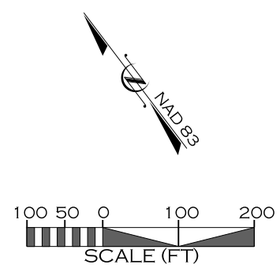
VEGETATION AND FENCING PLAN





NOTE:
ALL PLANTING WAS COMPLETED ACCORDING TO THE DESIGN AND THERE WERE NO DEVIATIONS FROM THE PLANTING PLAN.

- ZONE 1 - STREAMBANKS
- ZONE 2 - RIPARIAN BUFFER
- ZONE 3 - UPLANDS
- ZONE 4 - PERMANENT SEEDING - AREA OUTSIDE EASEMENT



REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	RECORD DRAWINGS	EMB	KLT	10/9/20

PREPARED FOR:
NC DEPARTMENT OF ENVIRONMENTAL QUALITY
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STEWARTS CREEK TRIBUTARIES PROJECT
SURRY COUNTY, NC

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LICENSE # P-1182

PROJECT ENGINEER

10/8/2020
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MKOCH

PROJECT # 083 | SHEET NO. 30

VEGETATION AND FENCING PLAN

NOTE:
ALL PLANTING WAS COMPLETED ACCORDING TO THE DESIGN AND THERE WERE NO DEVIATIONS FROM THE PLANTING PLAN.

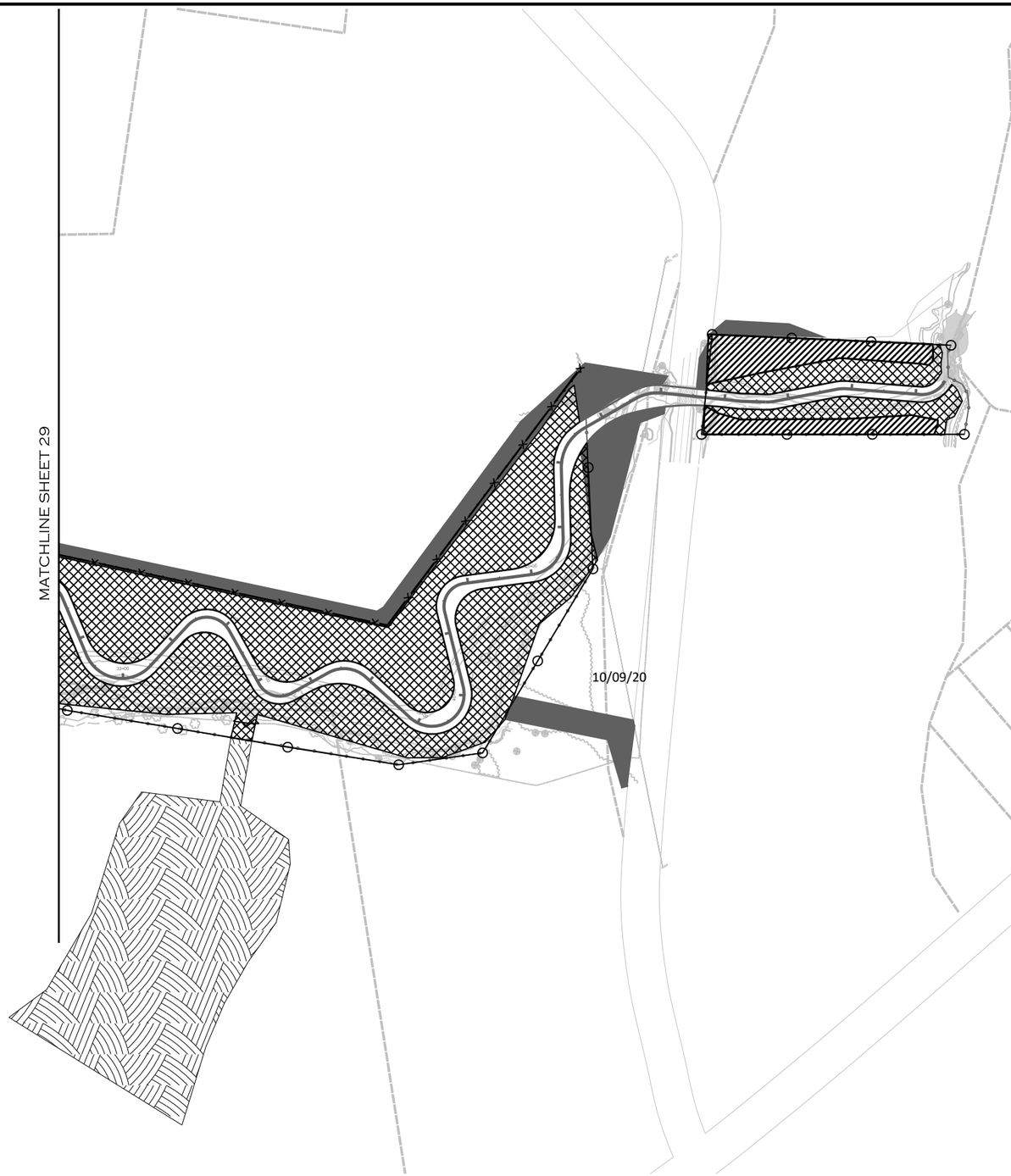
ZONE 1 - STREAMBANKS

ZONE 2 - RIPARIAN BUFFER

ZONE 3 - UPLANDS

ZONE 4 - PERMANENT SEEDING - AREA OUTSIDE EASEMENT

ZONE 5 - TEMPORARY SEEDING - STOCKPILE AREA



NORTH CAROLINA PROFESSIONAL SEAL 043752 ENGINEER ERIN M. BENNETT
10/09/20

NAD 83

100 50 0 100 200
SCALE (FT)

REVISIONS				
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