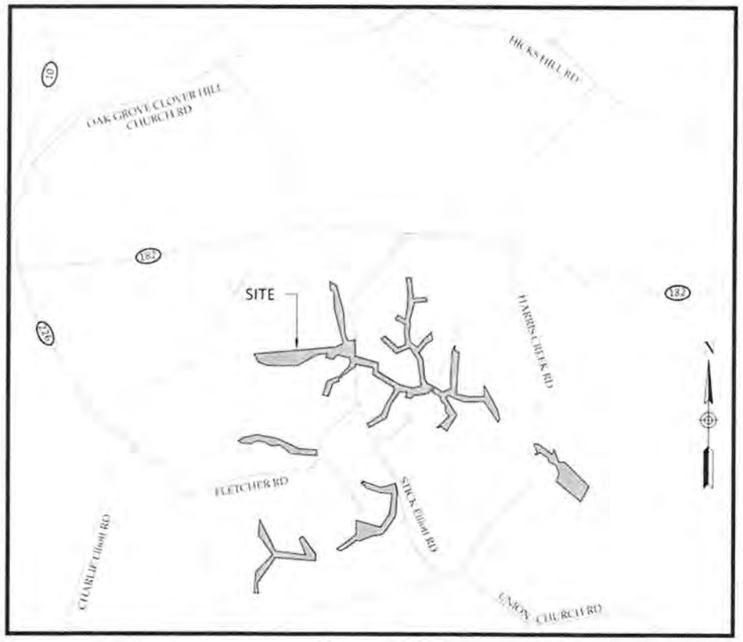
Big Harris Creek Mitigation Site

Cleveland County, North Carolina

for

NC DEQ

Division of Mitigation Services



Vicinity Map
Not to Scale

Project Directory

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

Surveying:
Kee Mapping and Surveying
88 Central Avenue
Asheville, NC 28801
Nolan Carmack, PLS
828-575-9021

Owner:
NC DEQ Division of Mitigation Services
5 Ravenscroft Dr, Suite 102
Asheville, NC 28801
DMS Project Manager:
Paul Wiesner
828-273-1673

DEQ Contract No. 6256

DMS ID No. 739

BEFORE YOU DIG!
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N.C. ONE-CALL CENTER
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Environmental Quality

ISSUED AUGUST 21, 2018
RECORD DRAWINGS

CERTIFICATE OF SURVEY AND ACCURACY

I, NOLAN R. CARMACK, CERTIFY THAT THE GROUND TOPOGRAPHIC SURVEY PORTION OF THIS PROJECT WAS COMPLETED UNDER MY DIRECT SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY DIRECT SUPERVISION, THAT THE RECORD DRAWINGS WERE PREPARED BY WILDLANDS ENGINEERING, INC FROM DIGITAL FILES PROVIDED BY KEE MAPPING AND SURVEYING, PA AS SHOWN ON SURVEYS FOR "THE STATE OF NC, DIVISION OF MITIGATION SERVICES" DATED:
10/11/17, 12/5/17, 4/20/18, 5/16/18, 5/22/18, 5/24/18, & 6/11/18;
THAT THESE SURVEYS WERE PERFORMED AT THE 95% CONFIDENCE LEVEL TO MEET THE FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS FOR A TOPOGRAPHIC SURVEY TO THE ACCURACY OF CLASS A HORIZONTAL AND CLASS C VERTICAL WHERE APPLICABLE; THAT THE ORIGINAL DATA WAS OBTAINED BETWEEN THE DATES OF 09/18/17-05/16/18; THAT THE CONTOURS SHOWN AS BROKEN LINES MAY NOT MEET THE STATED STANDARD AND ALL COORDINATES ARE BASED ON NAD 83 (NSRS 2011) AND ALL ELEVATIONS ARE BASE ON NAVD 88; THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED AND DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 30th DAY OF August, 2018

OFFICIAL SEAL

NORTH CAROLINA PROFESSIONAL SEAL L-5078 LAND SURVEYOR NOLAN R. CARMACK

NOLAN R. CARMACK, PLS L-5078

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NORTH CAROLINA PROFESSIONAL SEAL 5078 LAND SURVEYOR NOLAN R. CARMACK
8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Title Sheet

Date	August 21, 2018
D/P Number	16-06123
Drawn By	FGR, AA
Designed By	PS
Project Mgr.	EGR
Reviewed By	KK

0.1

AS-BUILT DRAWINGS
Deviations from the design will be shown in red

Existing/Design Features

- Property Line
- CE — CE — CE — Conservation Easement
- 100 — Design Major Contour (5' Interval)
- Design Minor Contour
- OHE — OHE — OHE — Existing Overhead Electric Utility
- E — E — E — Existing Utility Maintenance Corridor
- Existing Storm Drain
- Existing Wetland
- Existing Bedrock
- Existing Rip-Rap
- Existing Power Pole
- Proposed Vegetated Swale
- Proposed Stabilization for Existing Concentrated Flow Path
- Proposed Various Constructed Riffle per Plans
- Proposed Brush Mattress
- Proposed Brush Toe
- Proposed Bench and Grade
- Proposed Bank Grading
- Proposed Roller Brush

As-Built Features

- 10+00 — As-Built/Design Thalweg Alignment
- 100 — As-Built Major Contour (5' Interval)
- As-Built Minor Contour
- As-Built Storm Drain
- X — X — X — As-Built Fence (GPS survey by Wildlands)
- As-Built Riffle
- As-Built Brush Mattress
- As-Built Brush Toe
- As-Built Boulder Toe
- As-Built Bench and Grade
- As-Built Bank Grading
- As-Built Roller Brush

Monitoring Features

- XS# — Cross Section
- Stream Gage
- Photo Point
- VP — Vegetation Plots

Design Structures

- Proposed Log Sill
- Proposed Lunker Log
- Proposed Log J-Hook
- Proposed Rock J-Hook with Sill
- Proposed Rock Sill
- Proposed Rock Cascade
- Proposed Step-Pool Sequence
- Proposed Step-Pool Stormwater Conveyance (SPSC)
- Proposed Rock Cross Vane
- Proposed Log Vane
- Proposed Log Vane - Both Sides of Channel
- Proposed Culvert Crossing
- Proposed Ford Crossing with Pig Slats
- Proposed Ford Crossing

As-Built Structures

- As-Built Log Sill
- As-Built Lunker Log
- As-Built Log J-Hook
- As-Built Rock J-Hook with Sill
- As-Built Rock Sill
- As-Built Rock Cascade
- As-Built Step-Pool Sequence
- As-Built Step-Pool Stormwater Conveyance (SPSC)
- As-Built Rock Cross Vane
- As-Built Log Vane
- As-Built Log Vane - Both Sides of Channel
- As-Built Culvert Crossing

PROJECT NOTES:

1. As-Built survey was completed by Kee Mapping and Survey in May 2018. Topographic data was collected for restoration reaches and channel re-alignment sections only. Areas of isolated enhancement work (bank grading, structures, and BMPs) have been indicated by the engineer on the record drawings from construction phase notation.
2. Topographic survey was completed by Stantec Engineering in 2008. Supplemental topographic survey completed by Kee Mapping and Survey in August 2015.
3. A Conservation Easement has been recorded for the project. The easement is shown throughout the plan set.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

General Notes and Symbols

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	ECR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 0.2

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Project Overview

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Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Project Overview - Area A

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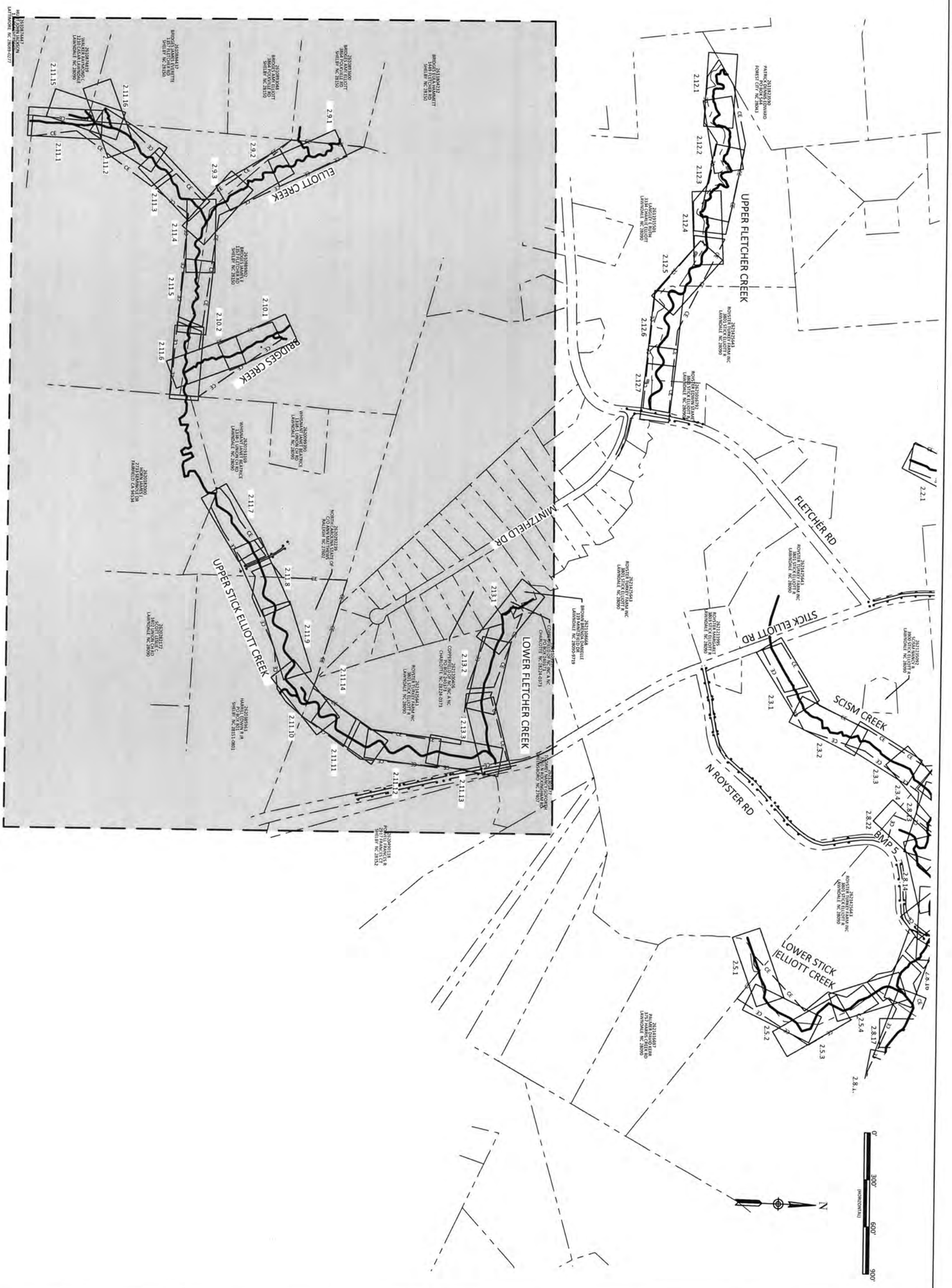
August 20, 2018



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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Project Overview - Area B

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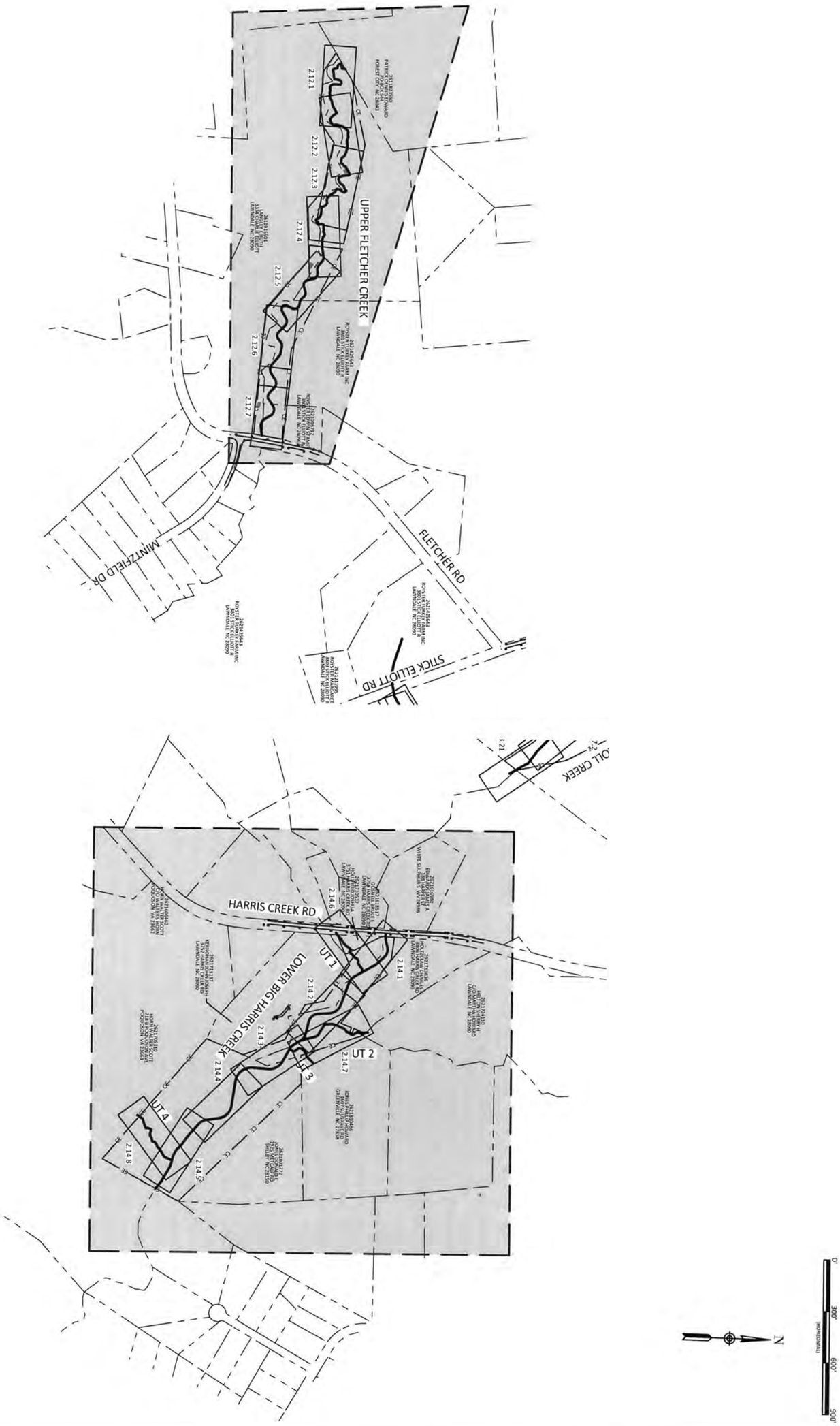

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Job Number:	005-02123
Designed By:	EGR, AA
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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Project Overview - Area C

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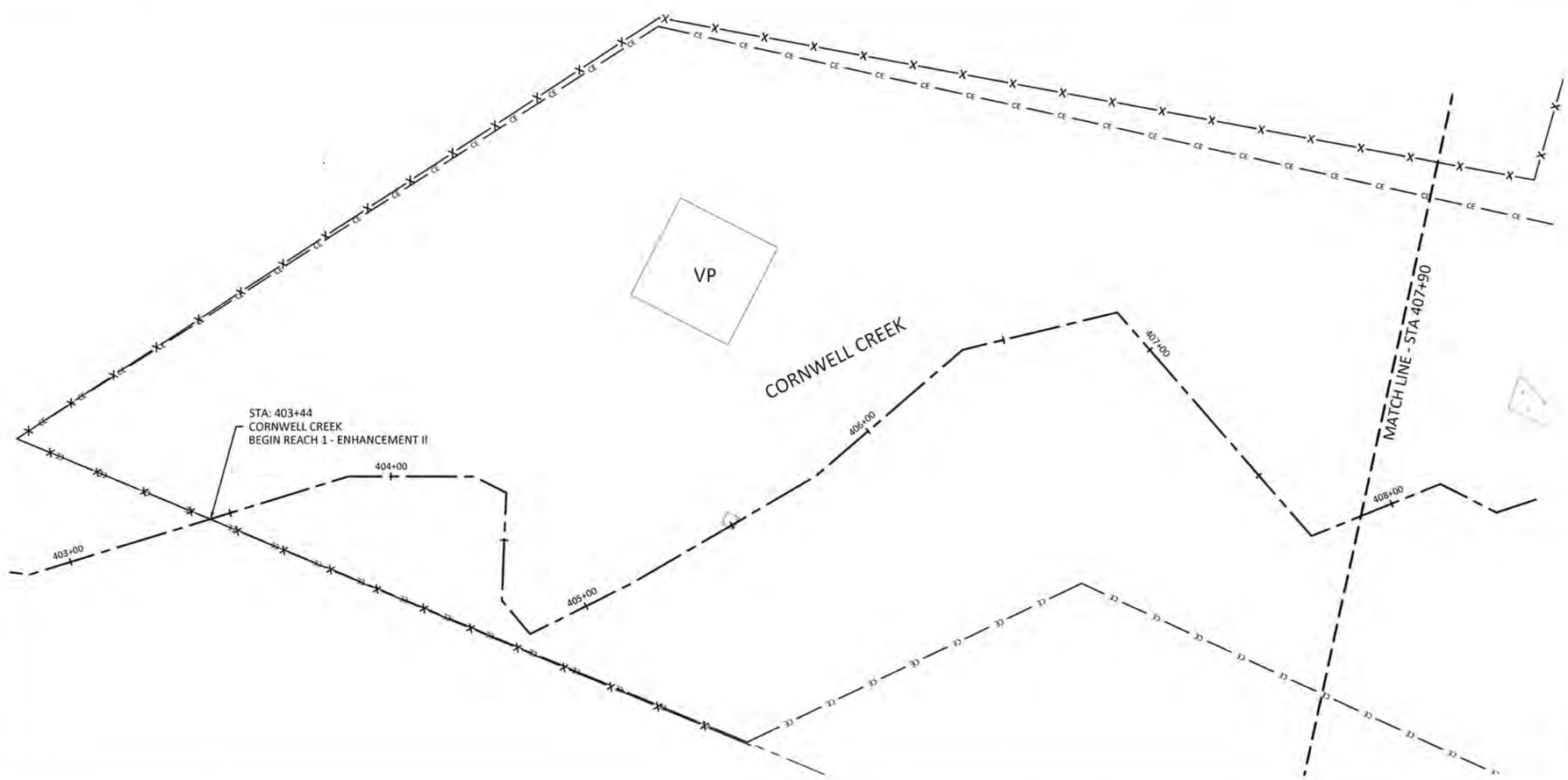

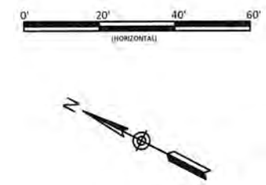

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1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

NOTE:
SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.

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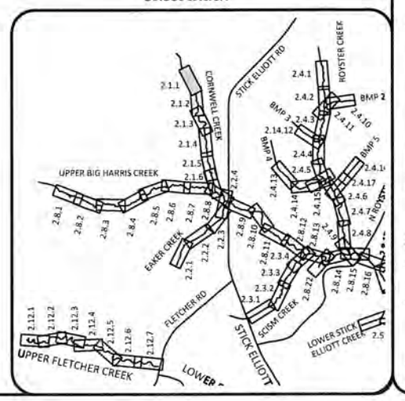

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NORTH CAROLINA PROFESSIONAL SEAL 12391 ENGINEER EMILY G. REINICKER 07/24/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

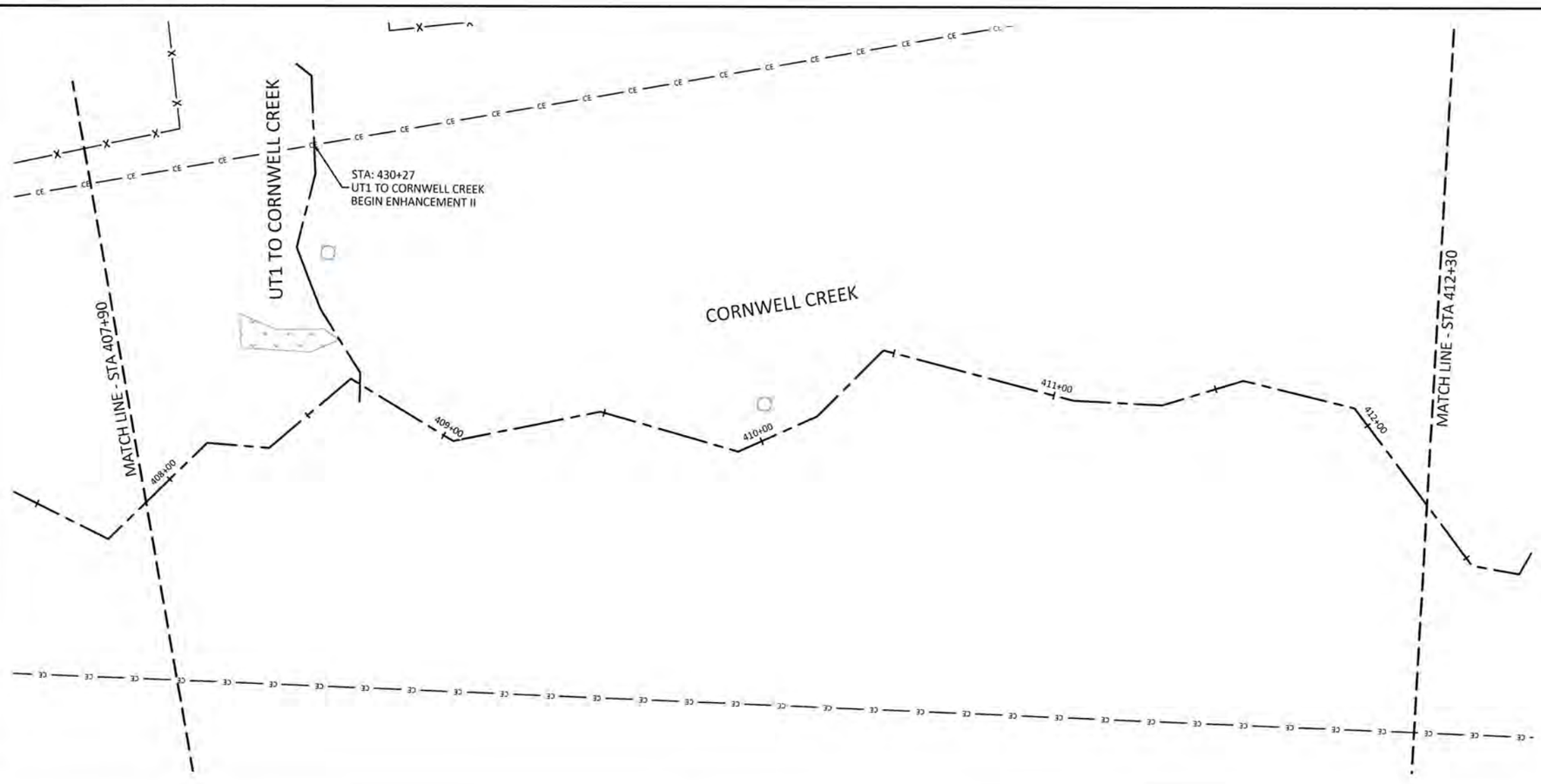
Cornwell Creek
Stream Plan and Profile Record Drawings

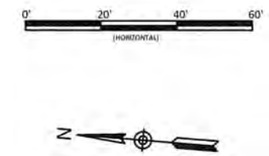
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

Sheet 2.1.1

August 20, 2018





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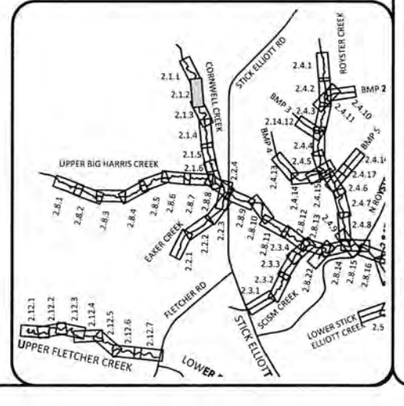

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 050123 G. REINIKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Stream Plan and Profile Record Drawings

Revisions:

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Job Number:	005-02123
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Sheet 2.1.2

August 20, 2018

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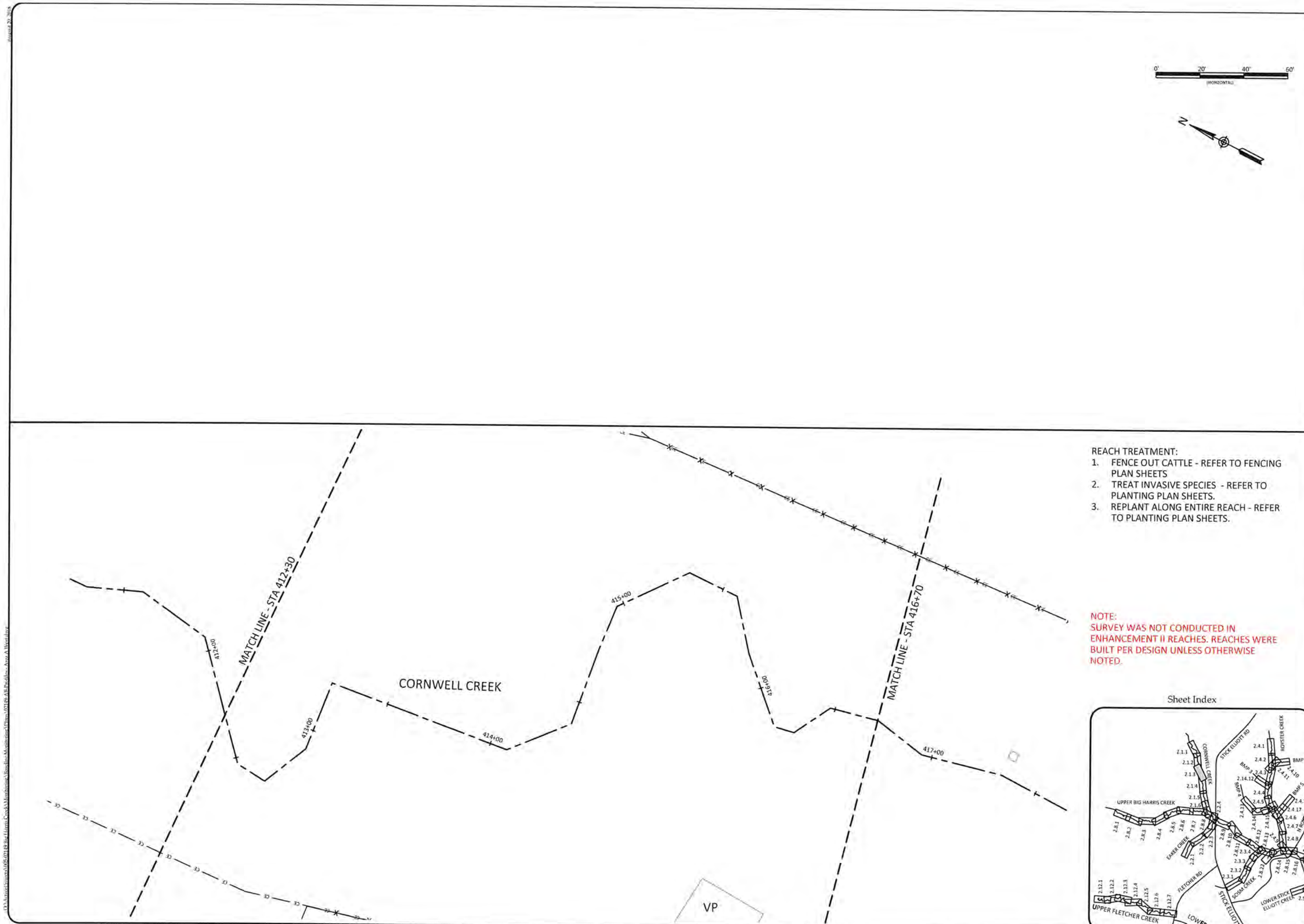

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINICKE

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Stream Plan and Profile Record Drawings

Revisions:

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Sheet 2.1.3

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER 8/29/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Stream Plan and Profile Record Drawings

Revisions:

Date: August 21, 2018
Job Number: 005-02123
Designed By: EGR, AA
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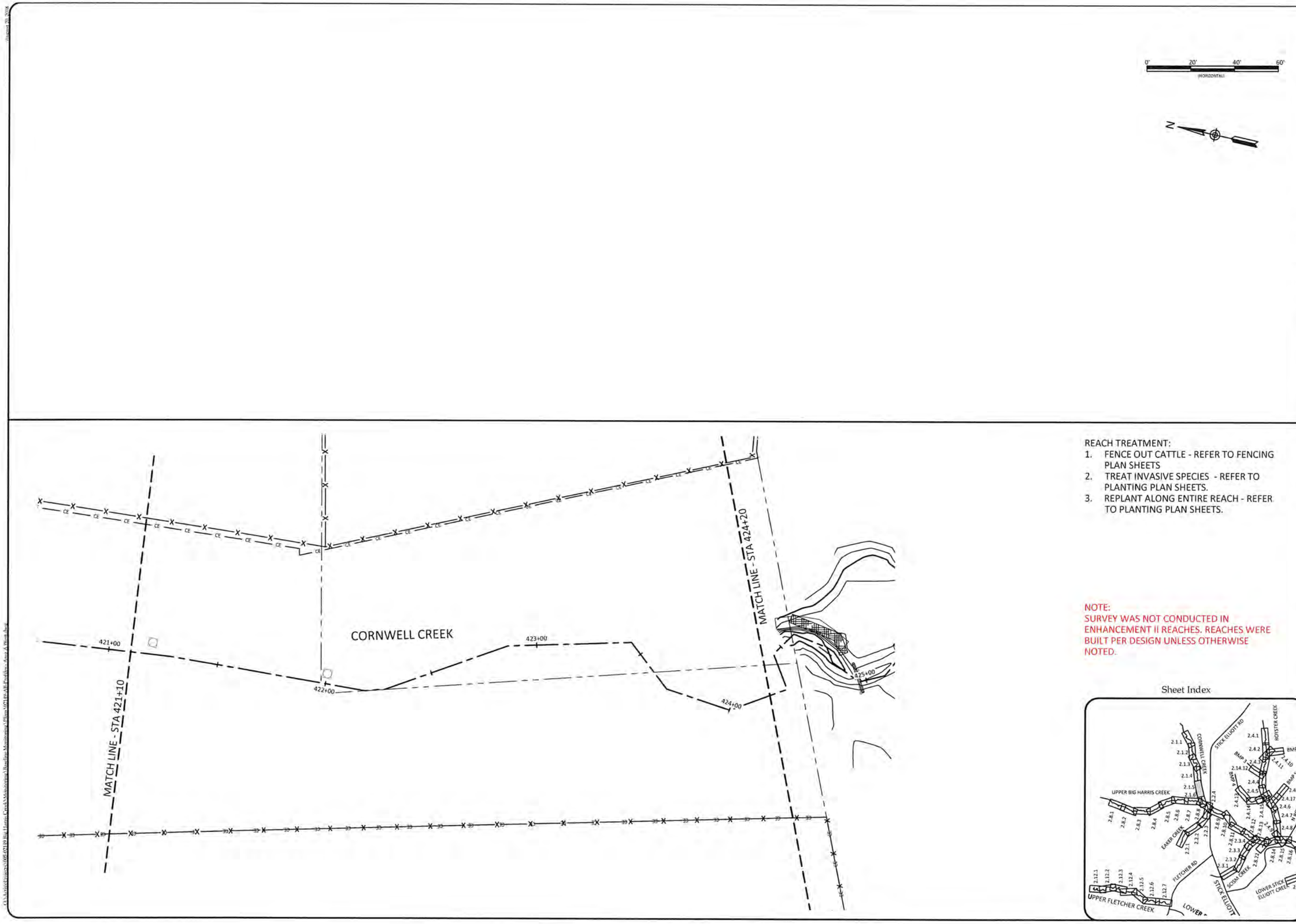
Sheet 2.1.4



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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Designed By:	EGR, AA
Drawn By:	JS
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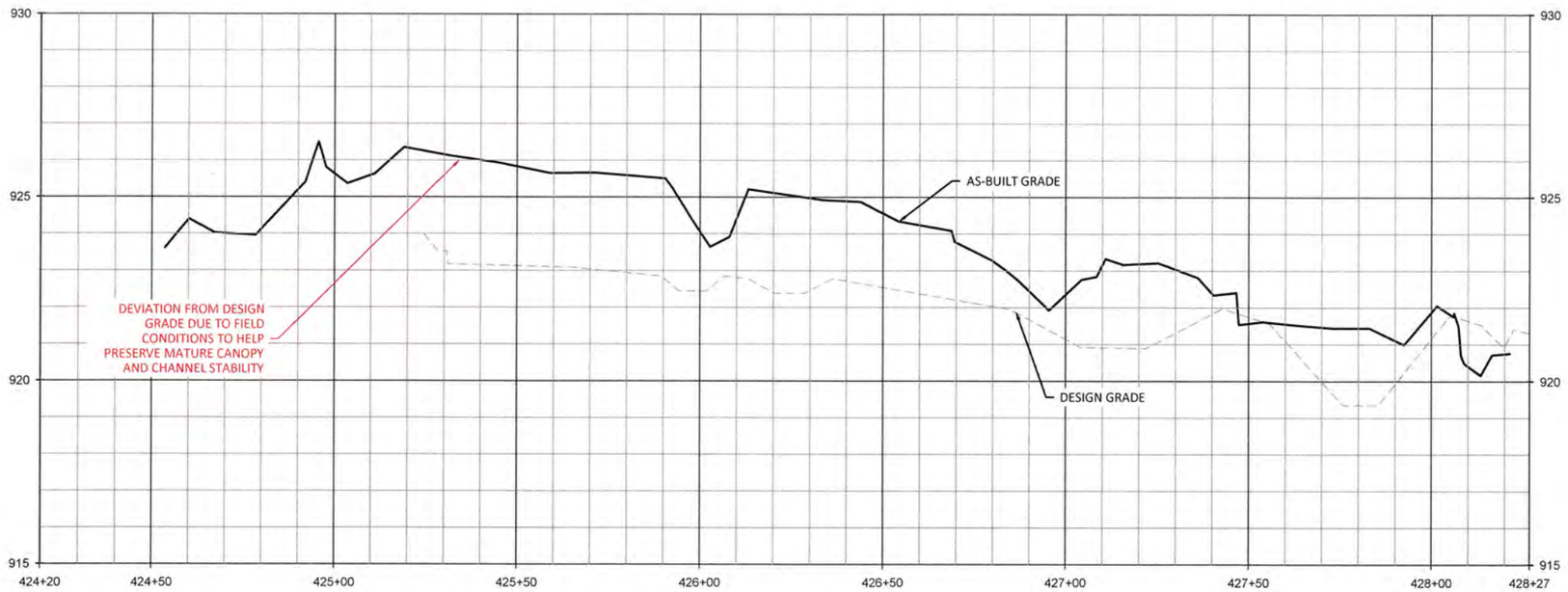
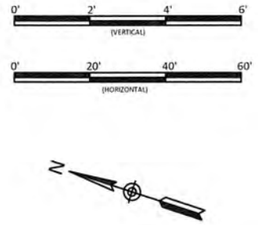
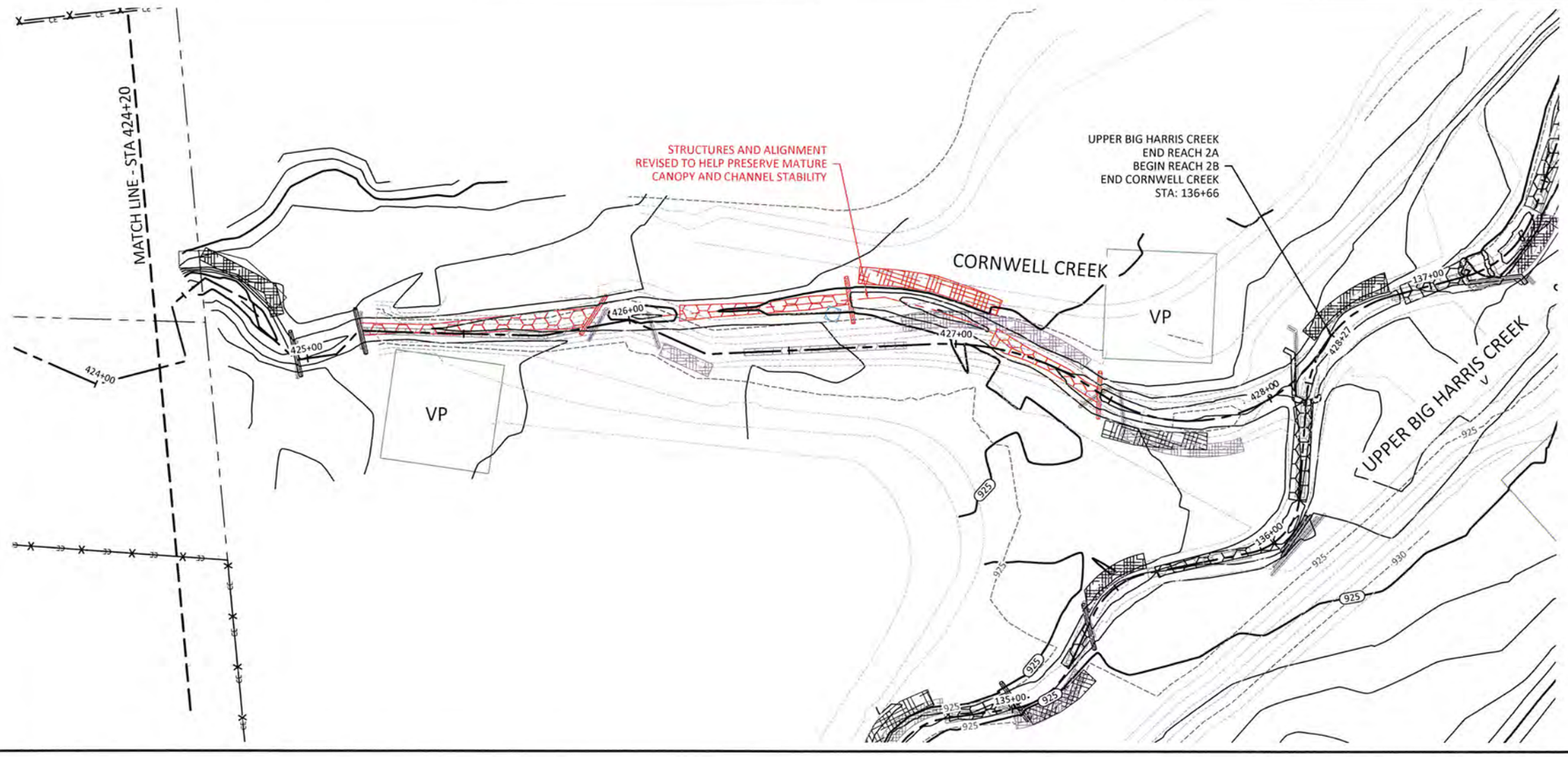
Sheet 2.1.5







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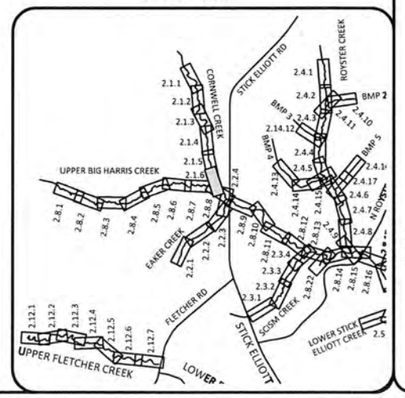

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29313 8/21/2018 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
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Sheet 2.1.6

August 20, 2018

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REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.
4. STABILIZE HEADCUTS WITH ROCK CASCADES.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29813 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Eaker Creek - BMP
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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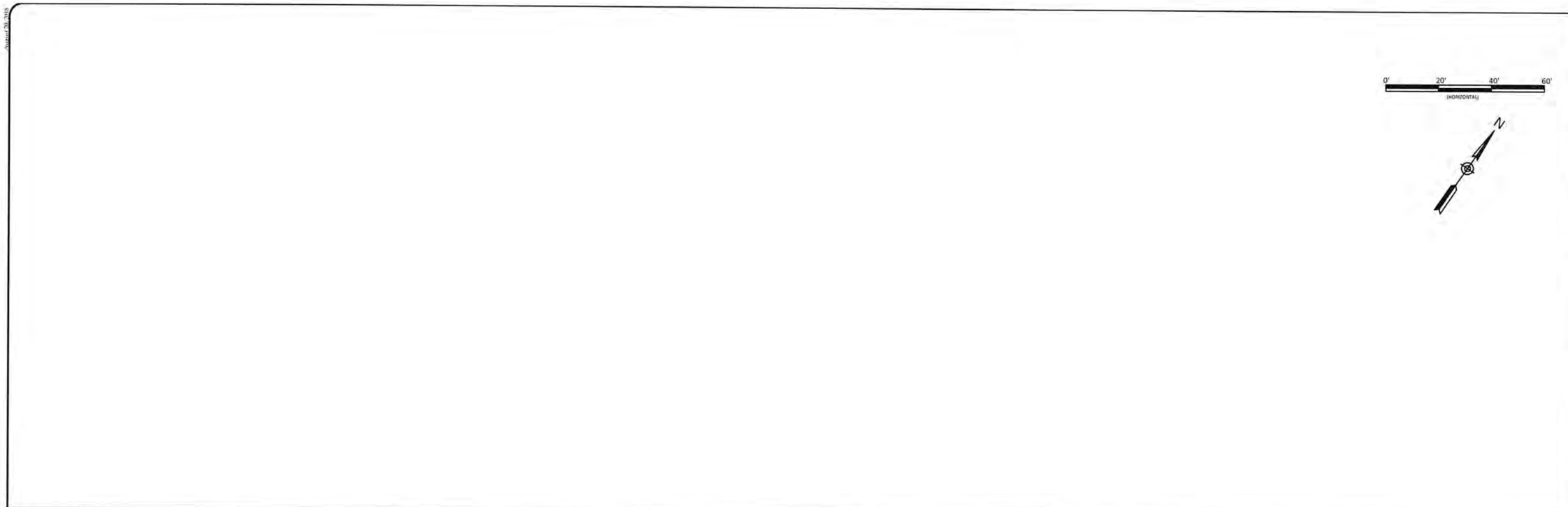
Sheet 2.2.1



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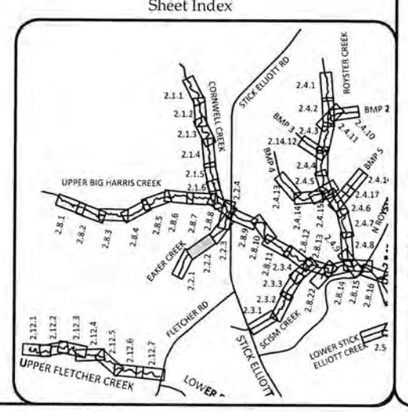

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 3/21/2018 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Eaker Creek - BMP
Stream Plan and Profile Record Drawings

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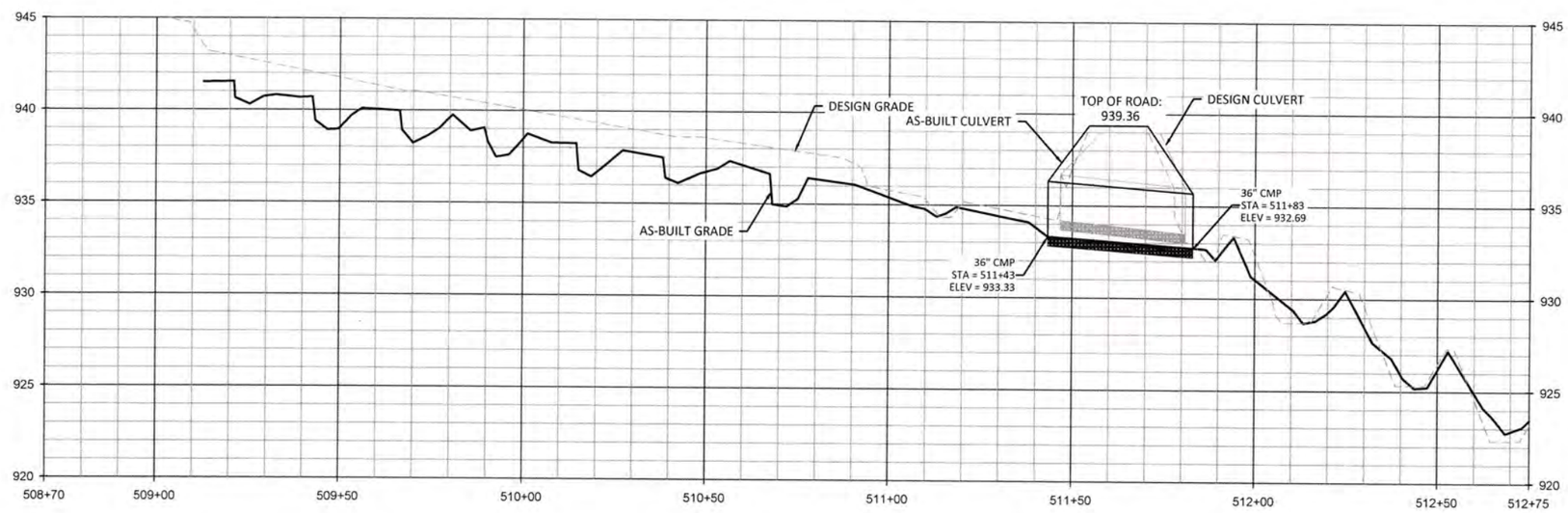
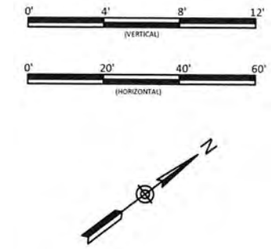
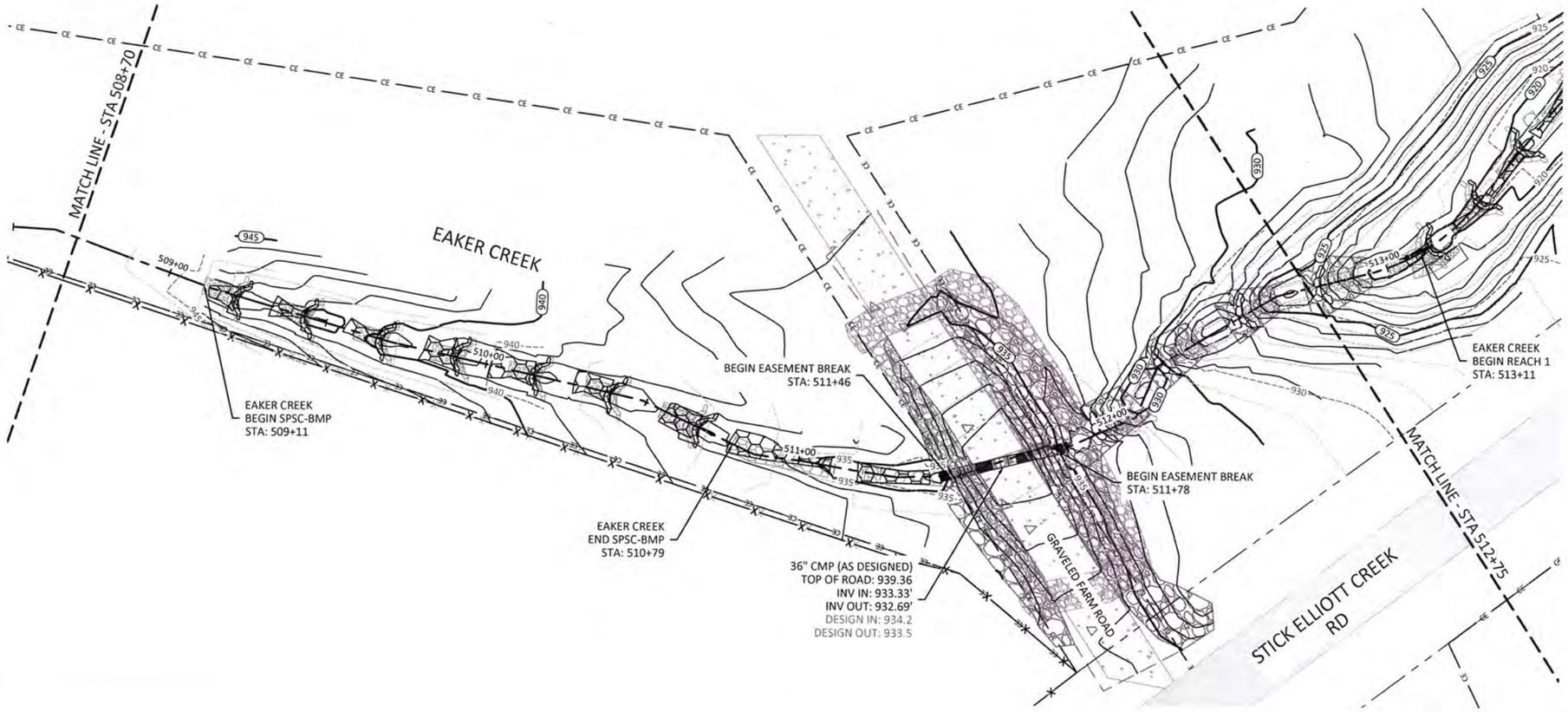
Sheet 2.2.2







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3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.
4. TREAT STORM WATER RUNOFF WITH STEP-POOL STORMWATER CONVEYANCE (SPSC).

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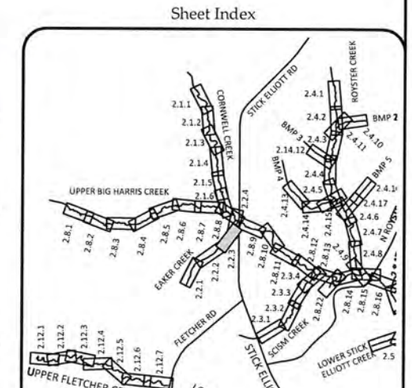

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NORTH CAROLINA PROFESSIONAL SEAL 29913 ENGINEER EMILY G. REINICKER 5/21/2019

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Eaker Creek - BMP
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.2.3

August 20, 2018
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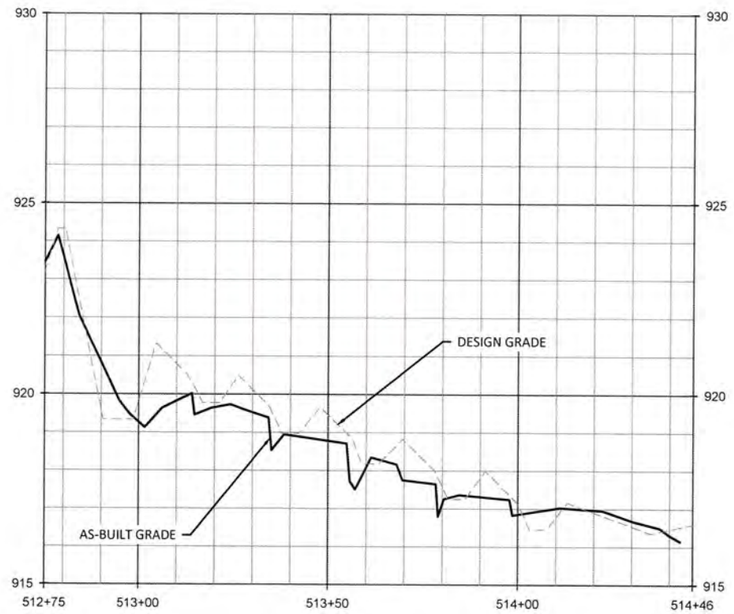

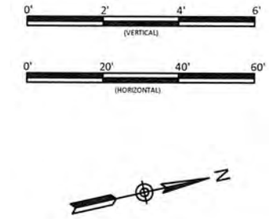

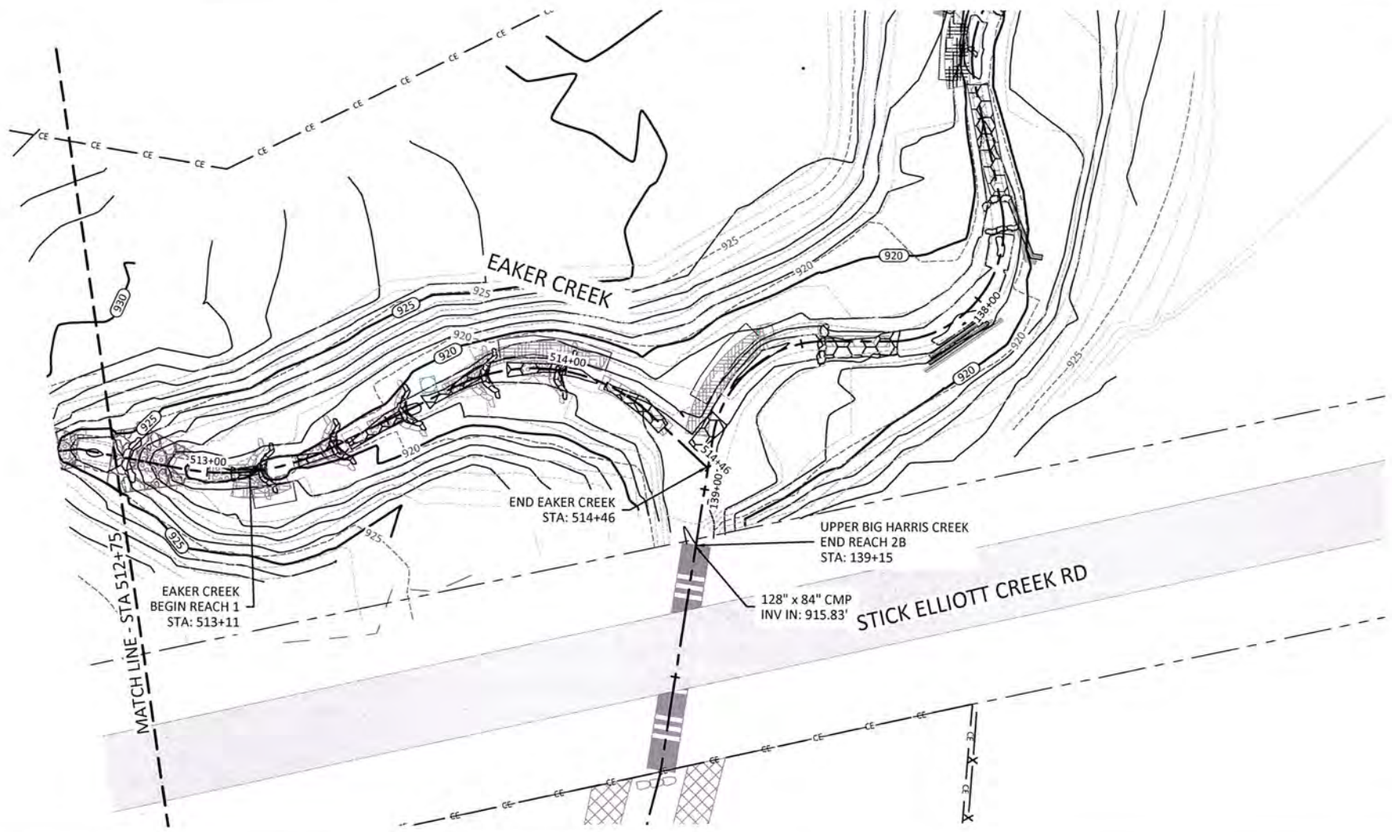

REACH TREATMENT:

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2. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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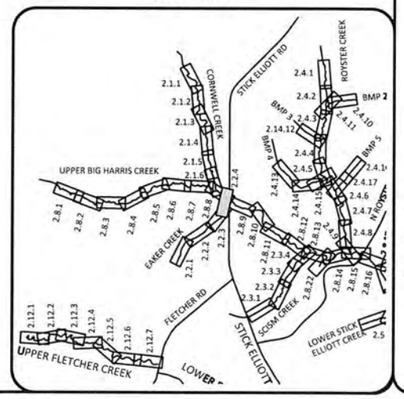

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049191 JENNY G. REINICKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Eaker Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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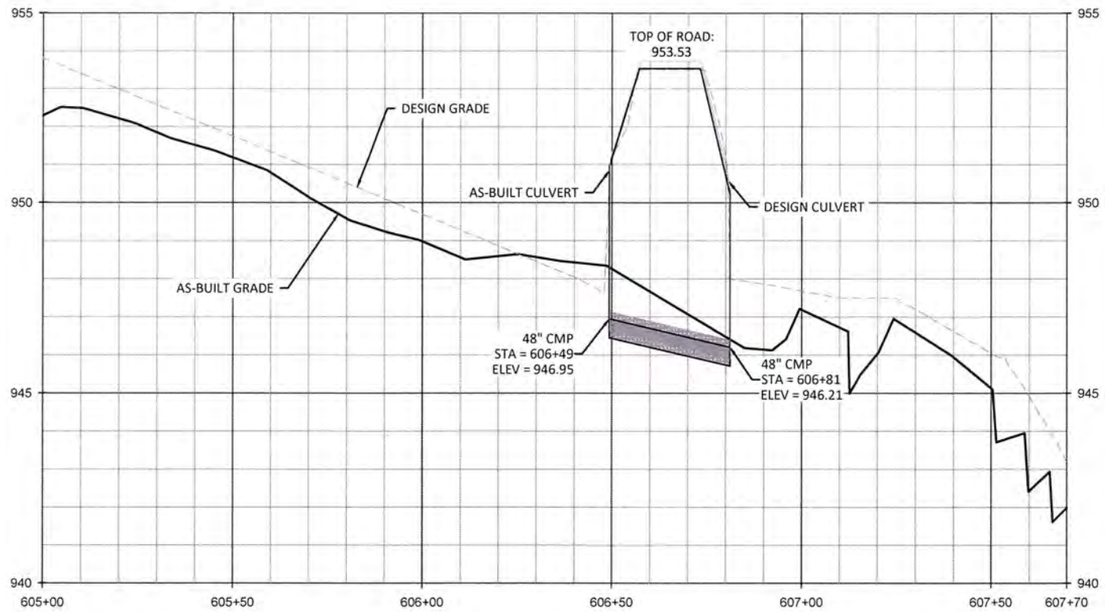

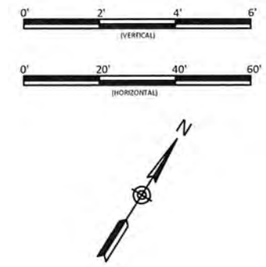

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2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
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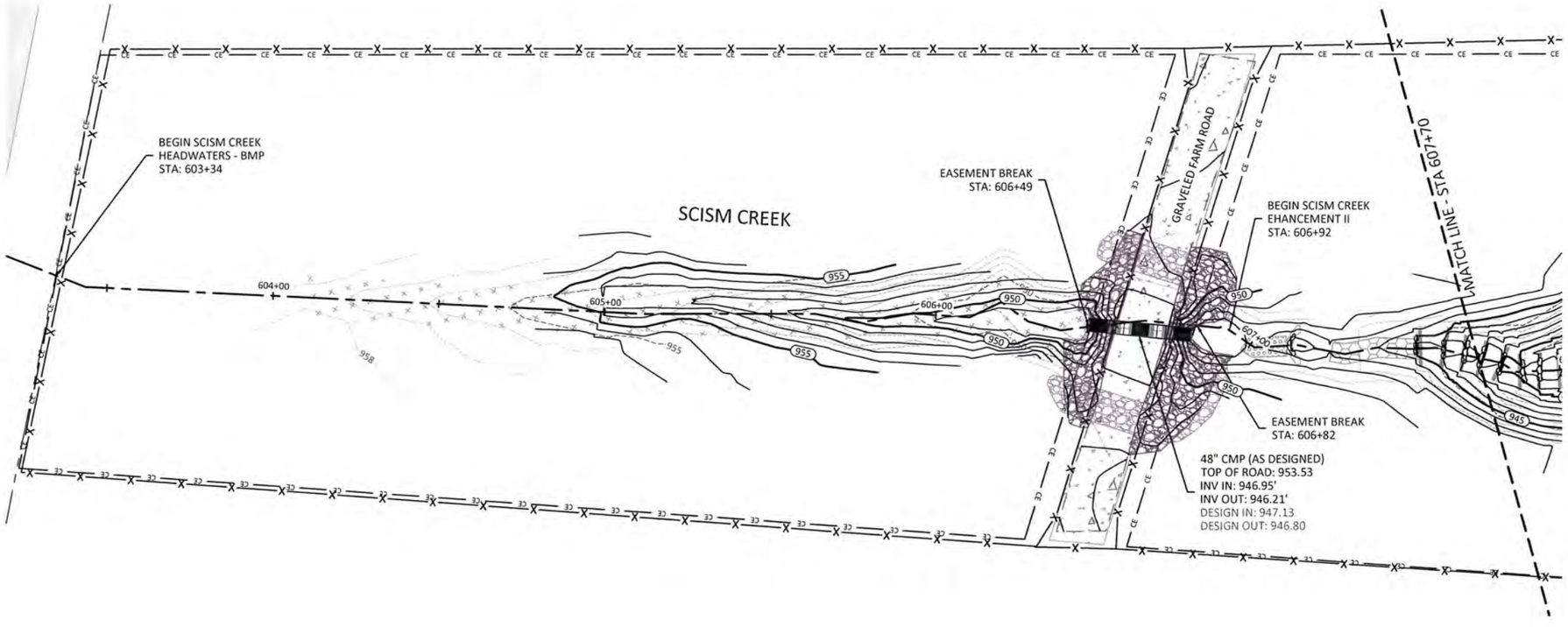
4. TREAT STORMWATER RUNOFF WITH BMP SYSTEM.



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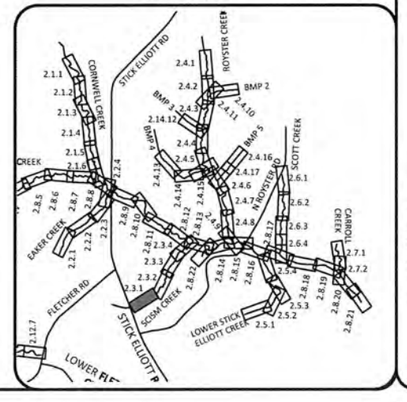

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024811 JAMES C. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scism Creek
Stream Plan and Profile Record Drawings

Revisions:

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Designed By:	EGR, AA
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Checked By:	JCK

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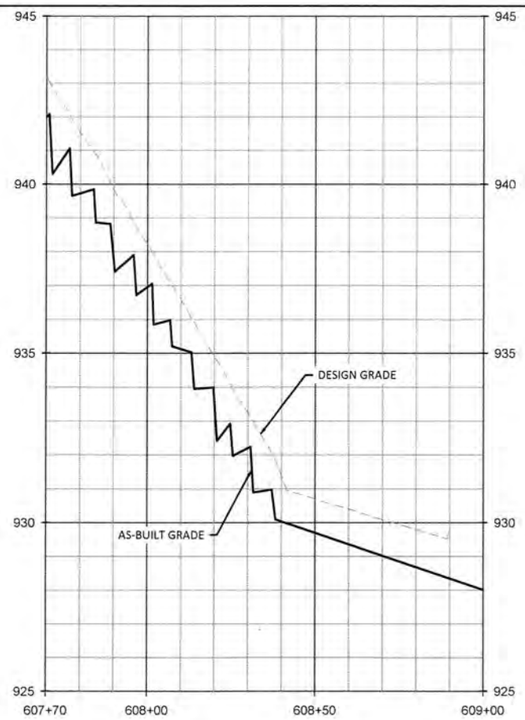

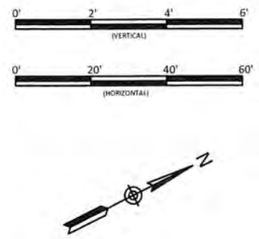

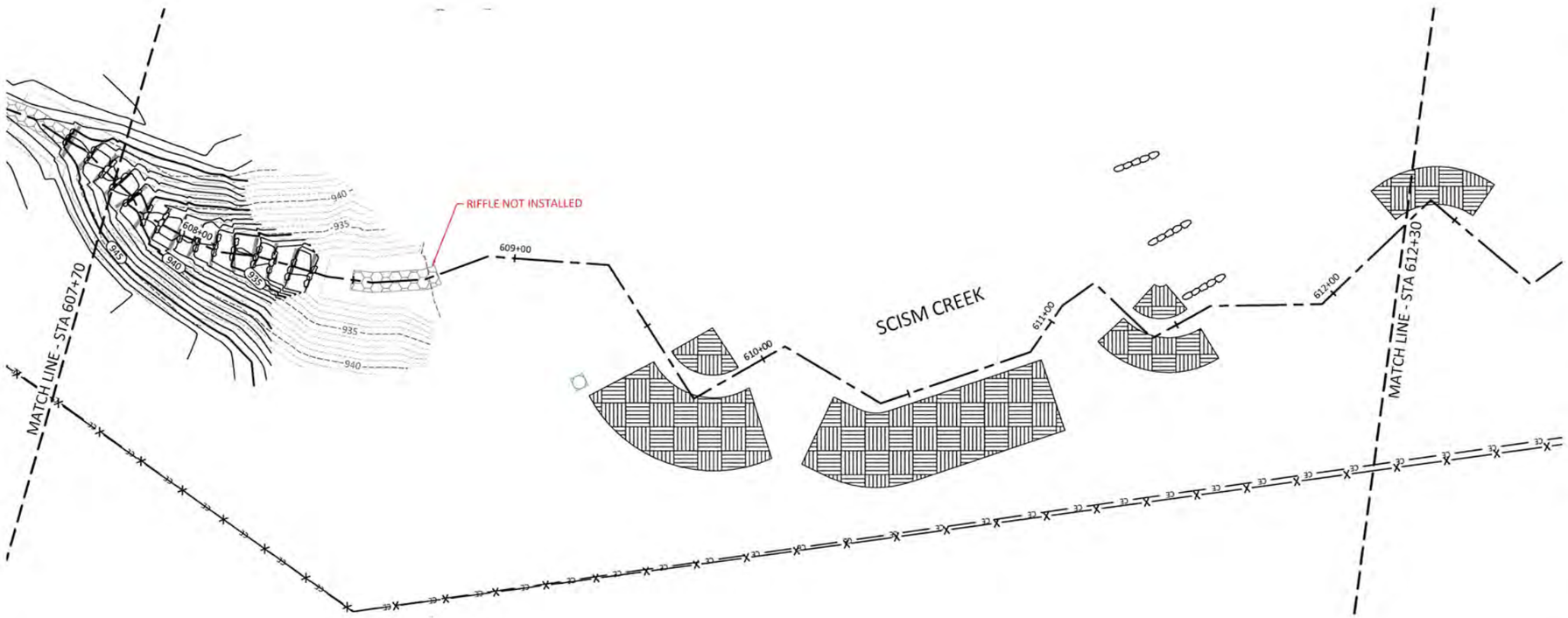

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4. TREAT STORMWATER RUNOFF WITH STEP POOL SEQUENCE.
5. STABILIZE HEADCUT WITH ROCK SILLS.

NOTE:
SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.
BANK GRADING WAS RE-EVALUATED DURING CONSTRUCTION AND REVISED ACCORDINGLY.

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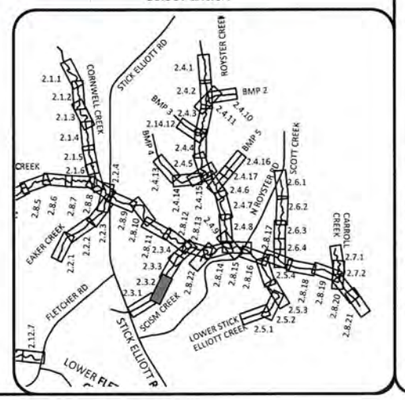

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 JEMMY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scism Creek
Stream Plan and Profile Record Drawings

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Drawn By:	JS
Checked By:	JCK

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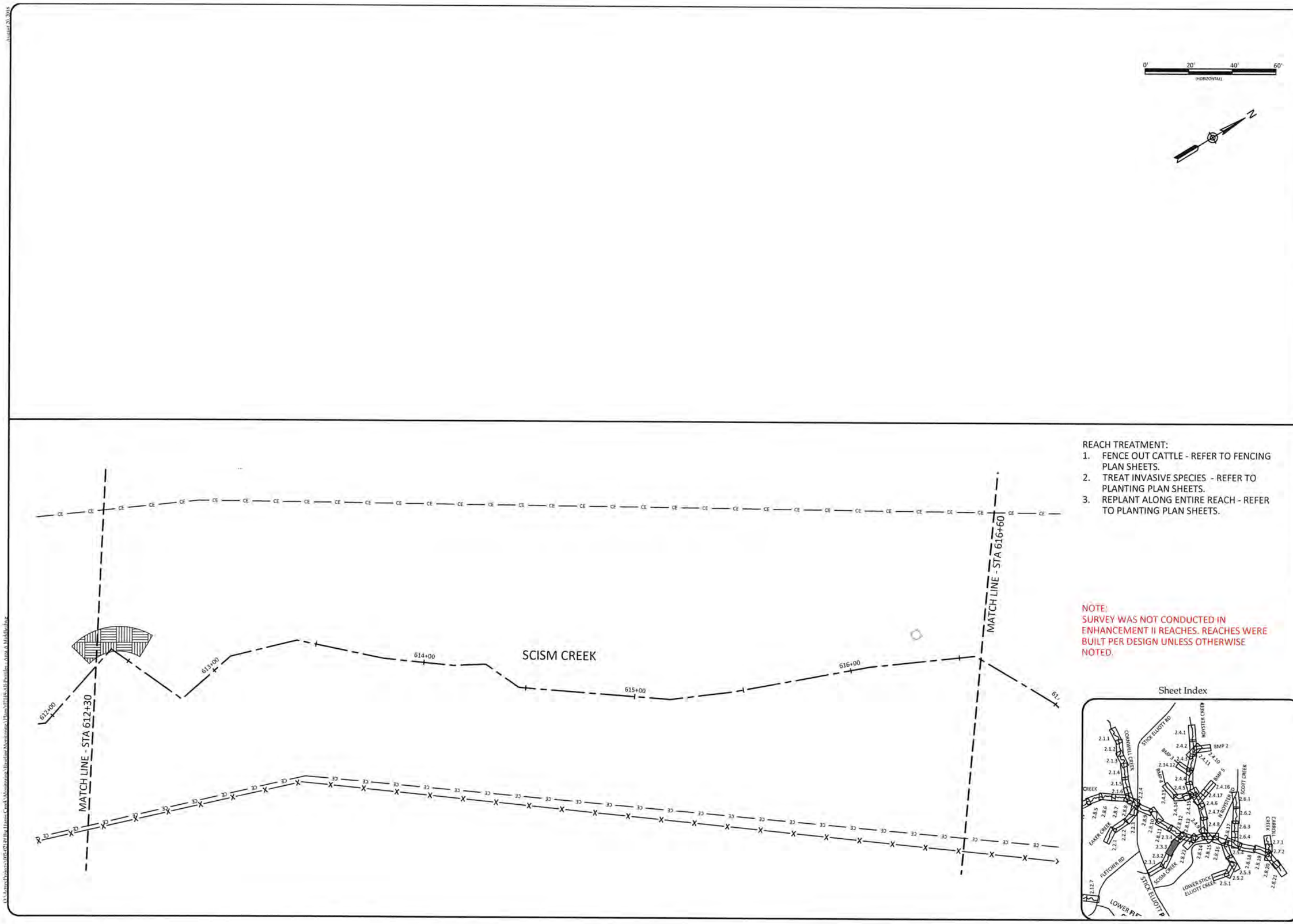

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Big Harris Creek Mitigation Site
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Scism Creek
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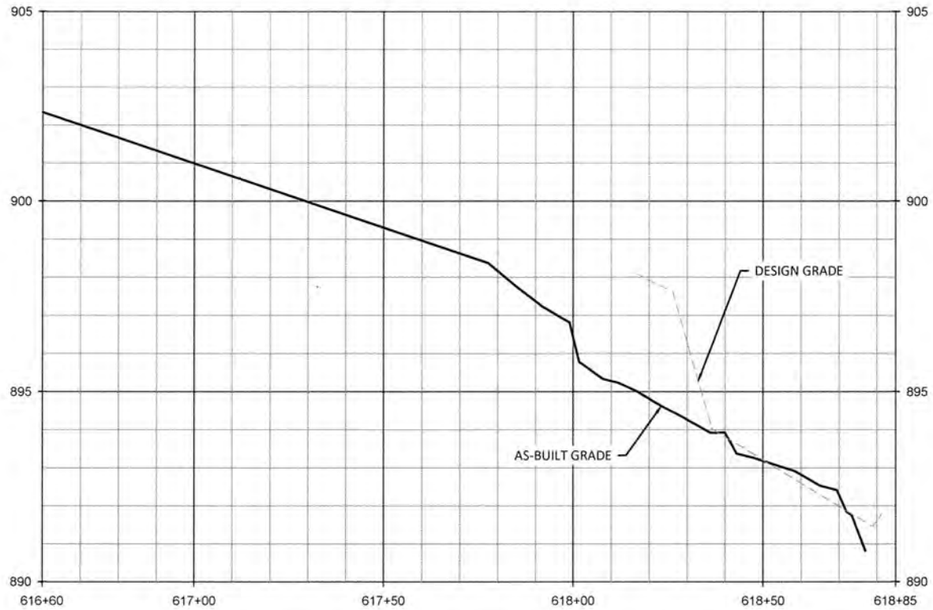

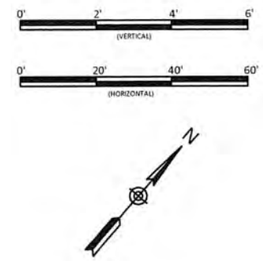

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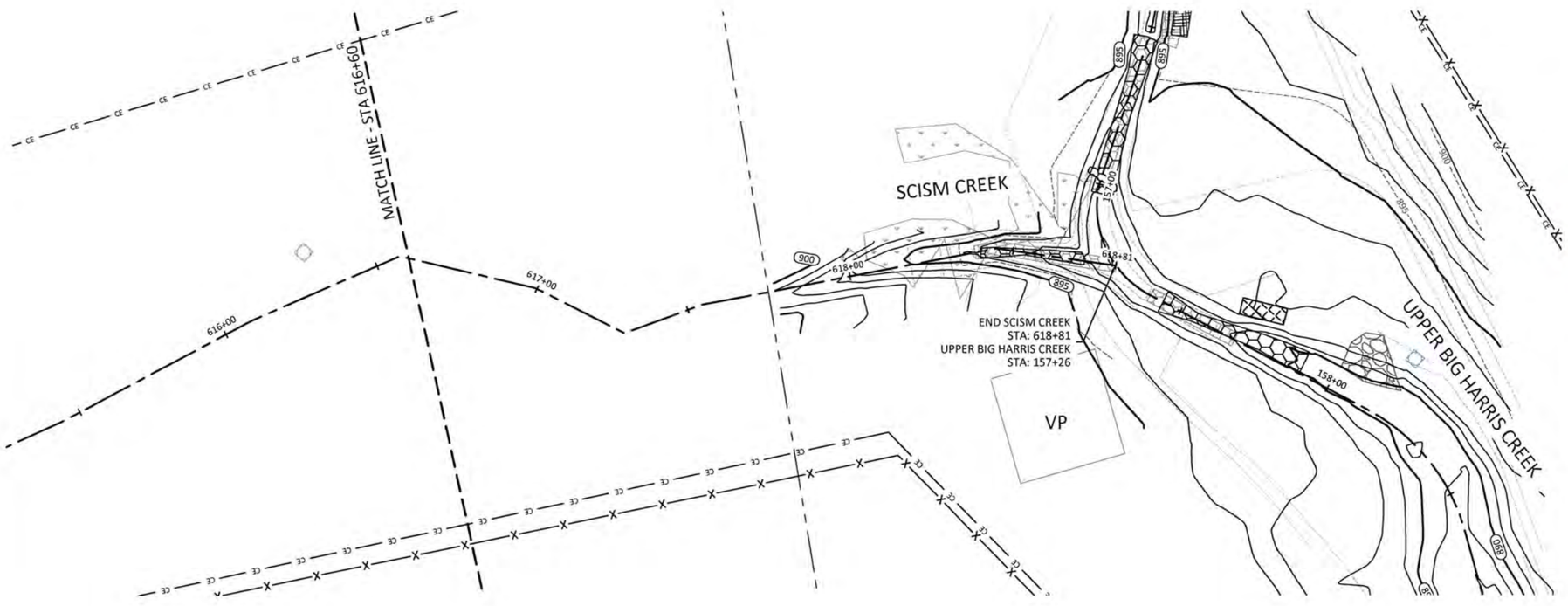

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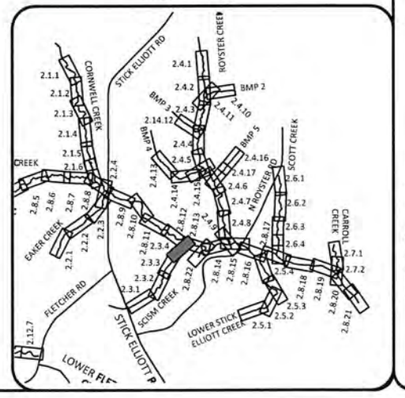

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029873 EMILY G. REINIKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scism Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Drawn By:	JS
Checked By:	JCK

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August 20, 2018

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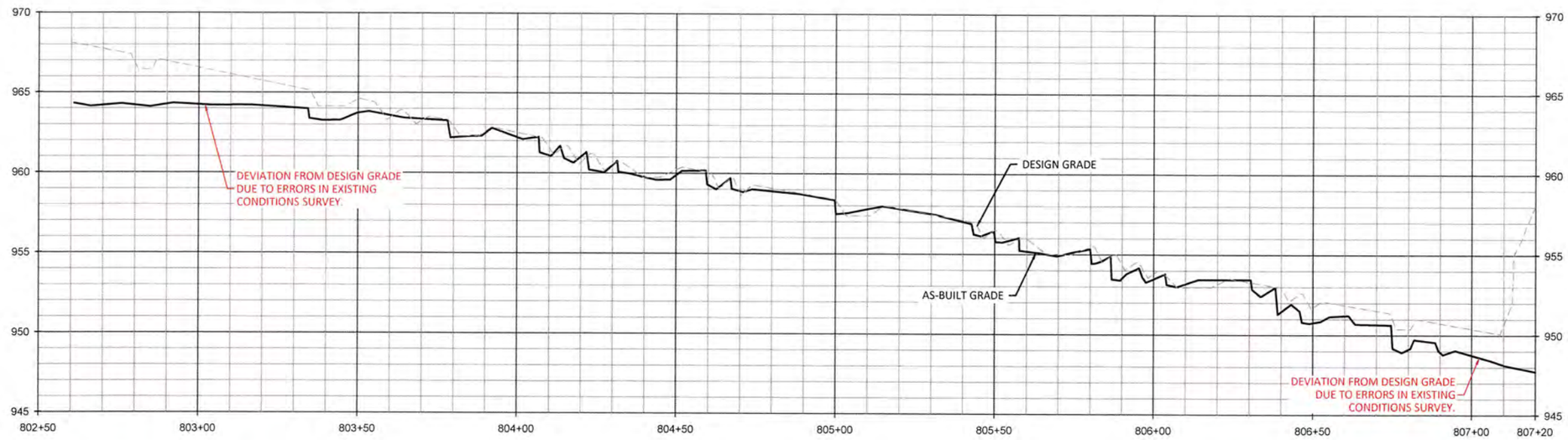

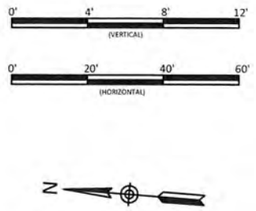

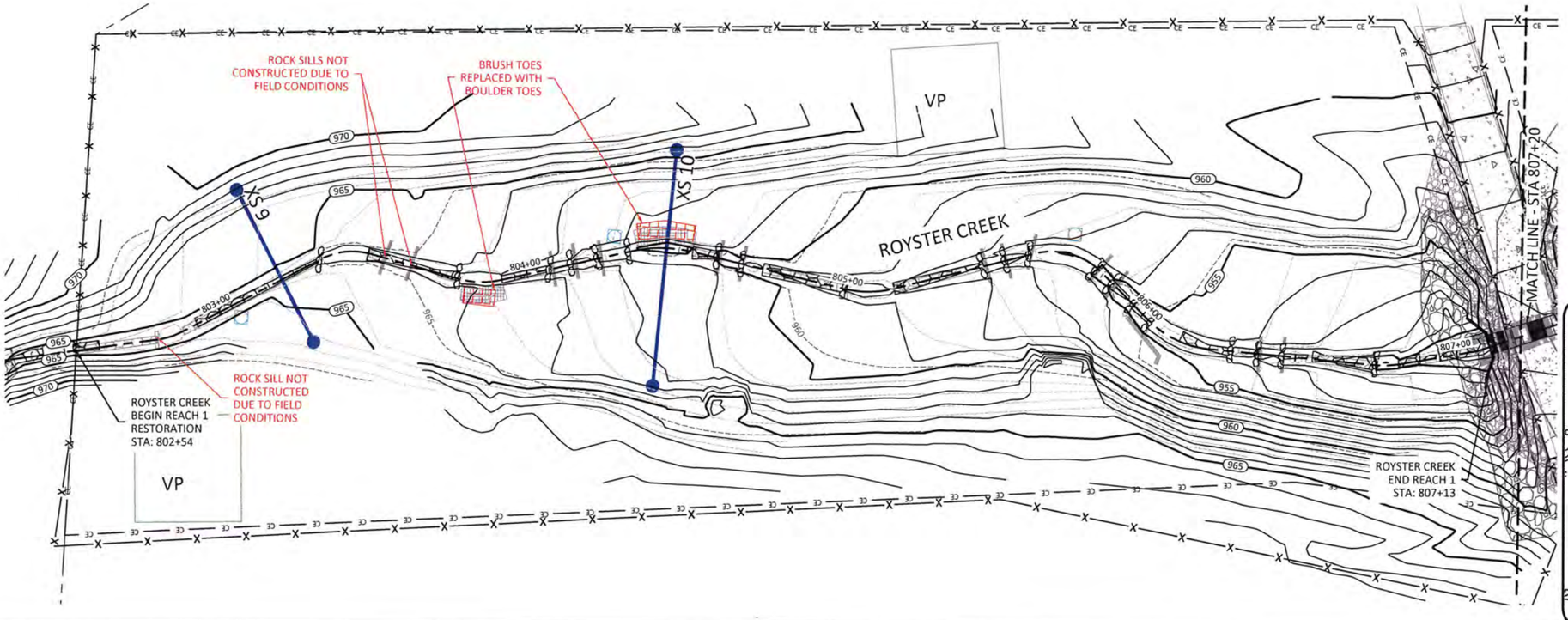

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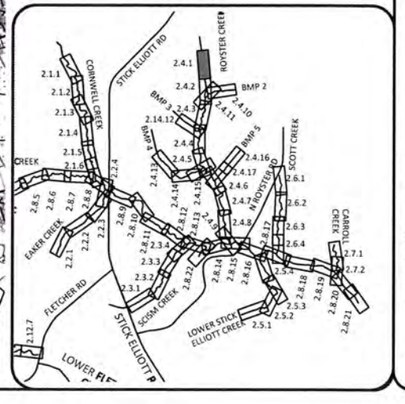

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29813 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

Revisions:

Date: August 21, 2018
Job Number: 005-02123
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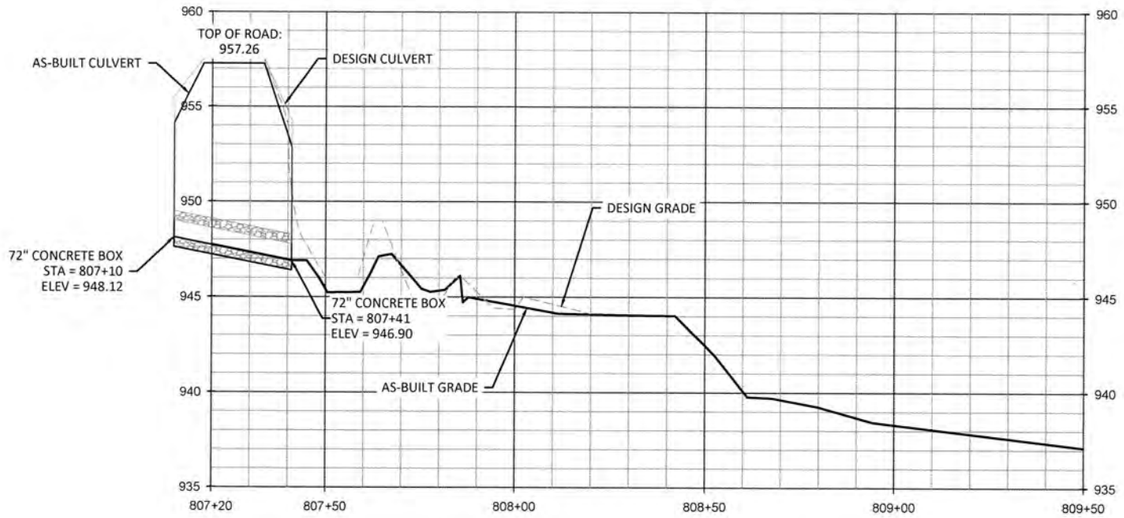

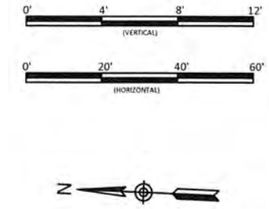

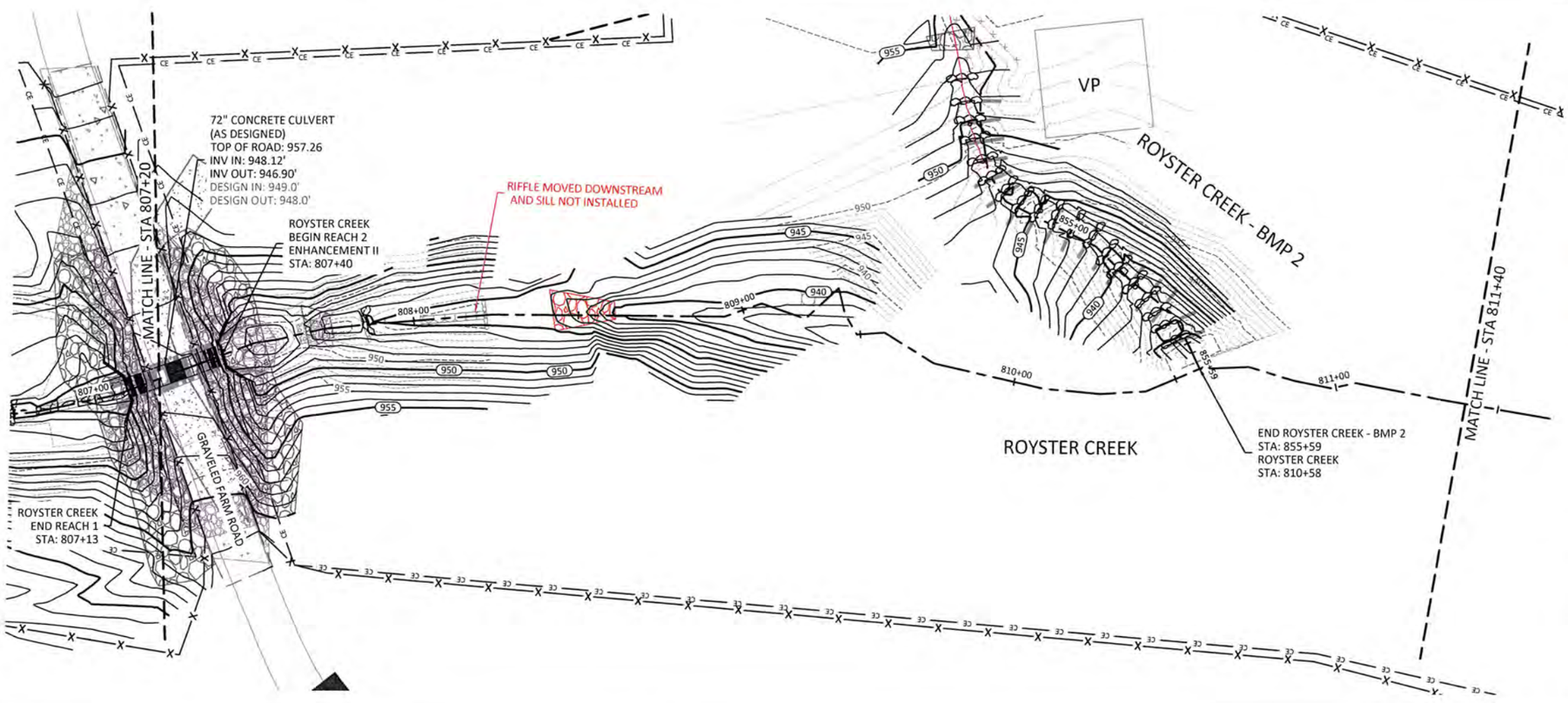

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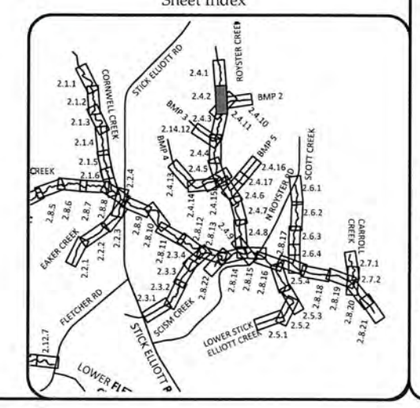

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

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Date: August 21, 2018
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Drawn By: JS
Checked By: ICK

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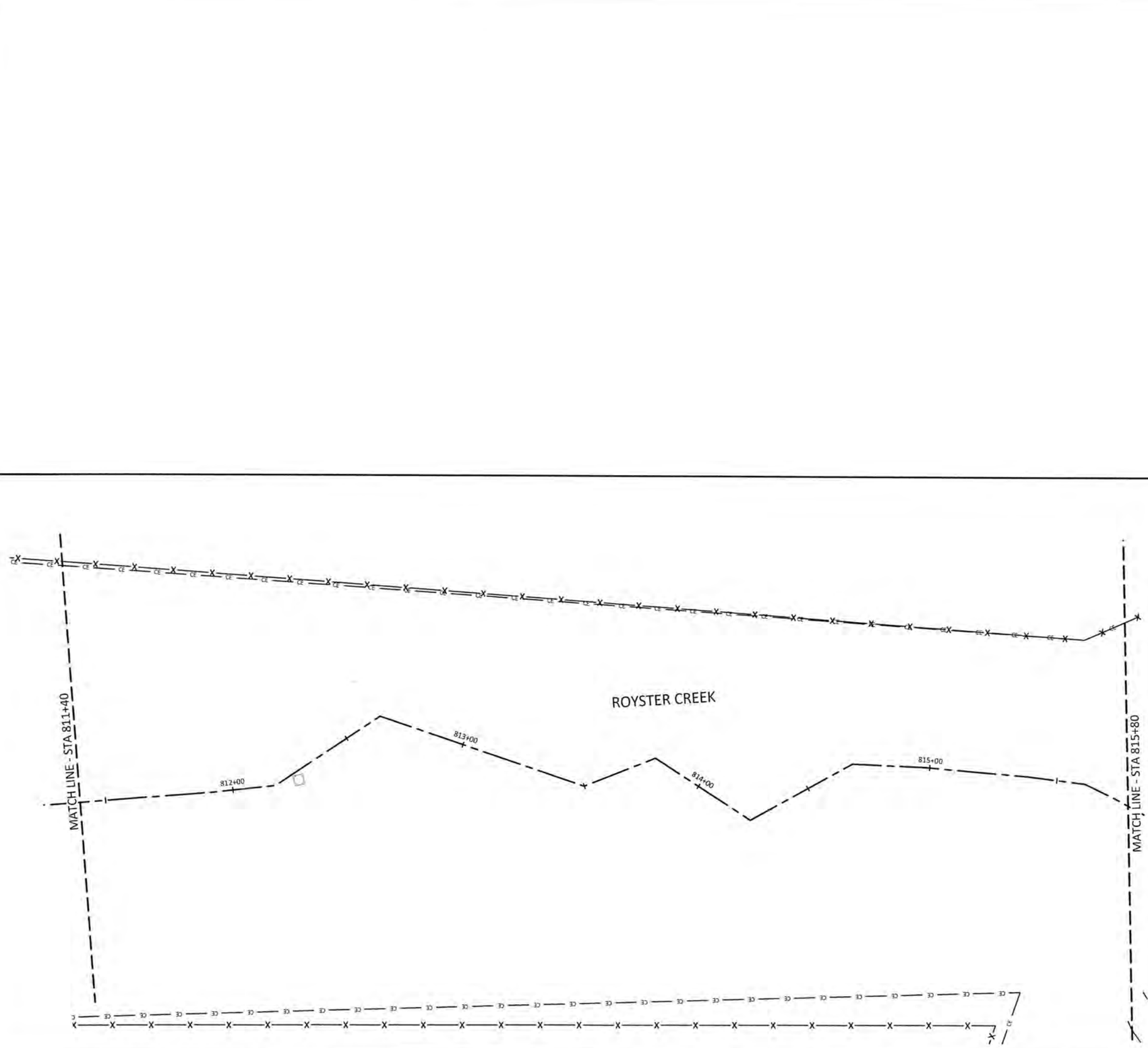
August 20, 2018



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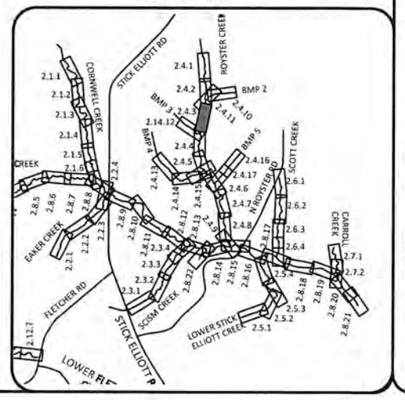

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038352 JOHN C. REVICKI, JR.

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

Revisions:

Date: August 21, 2018
Job Number: 005-02123
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Drawn By: JS
Checked By: JCR

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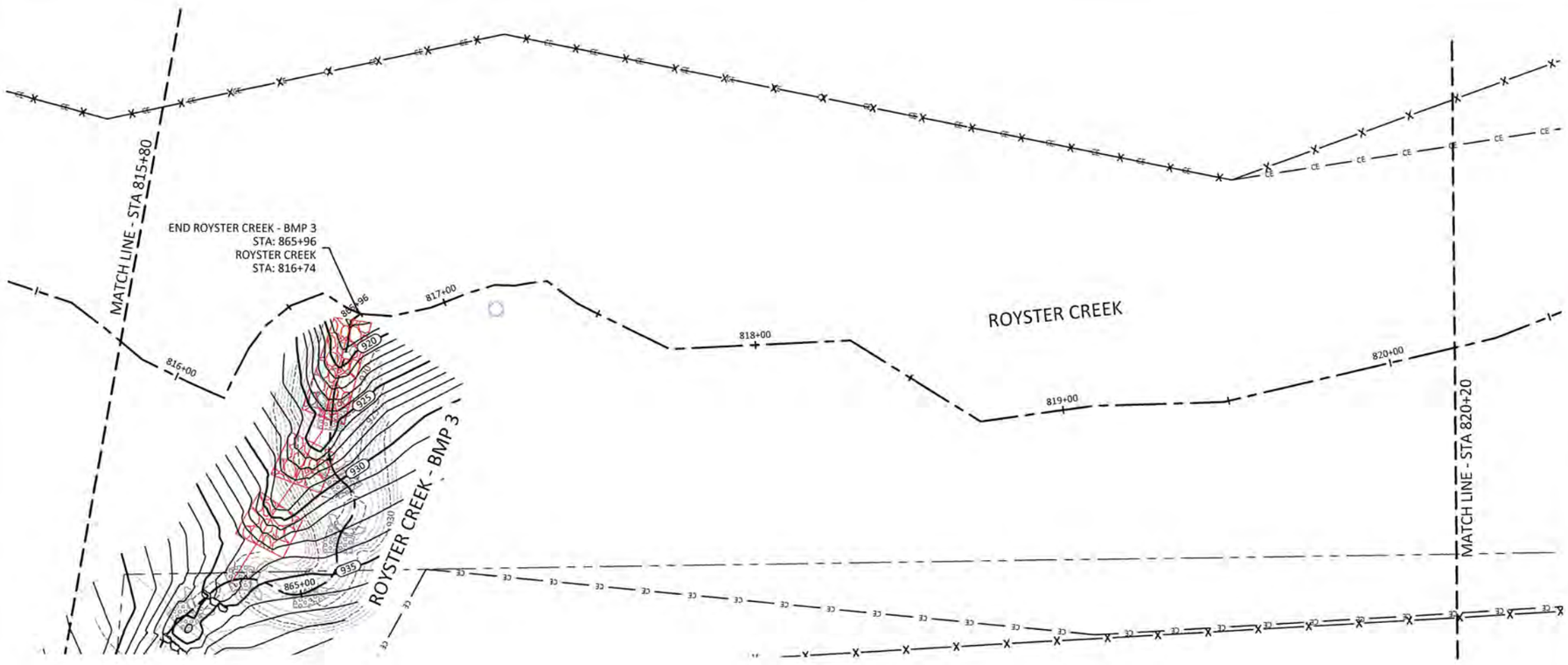

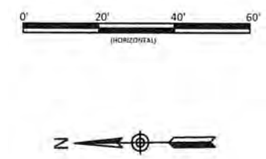

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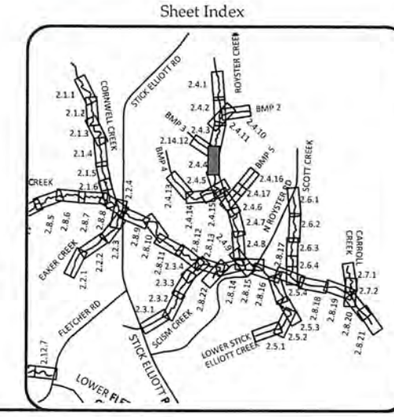

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

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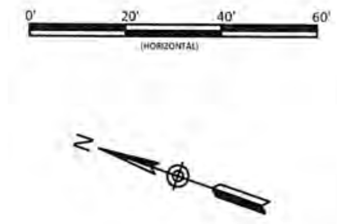

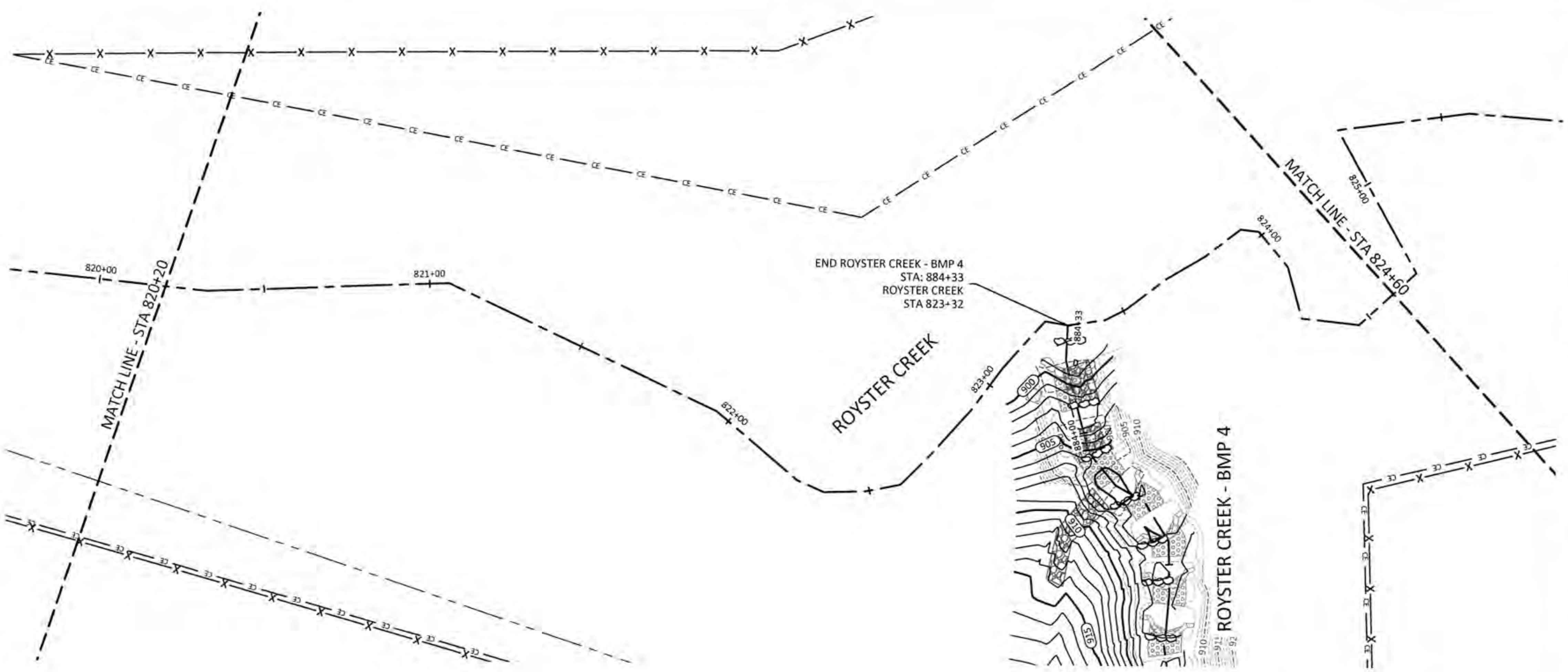

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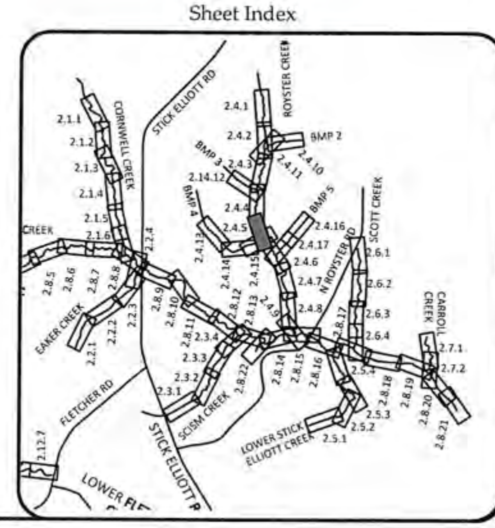

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
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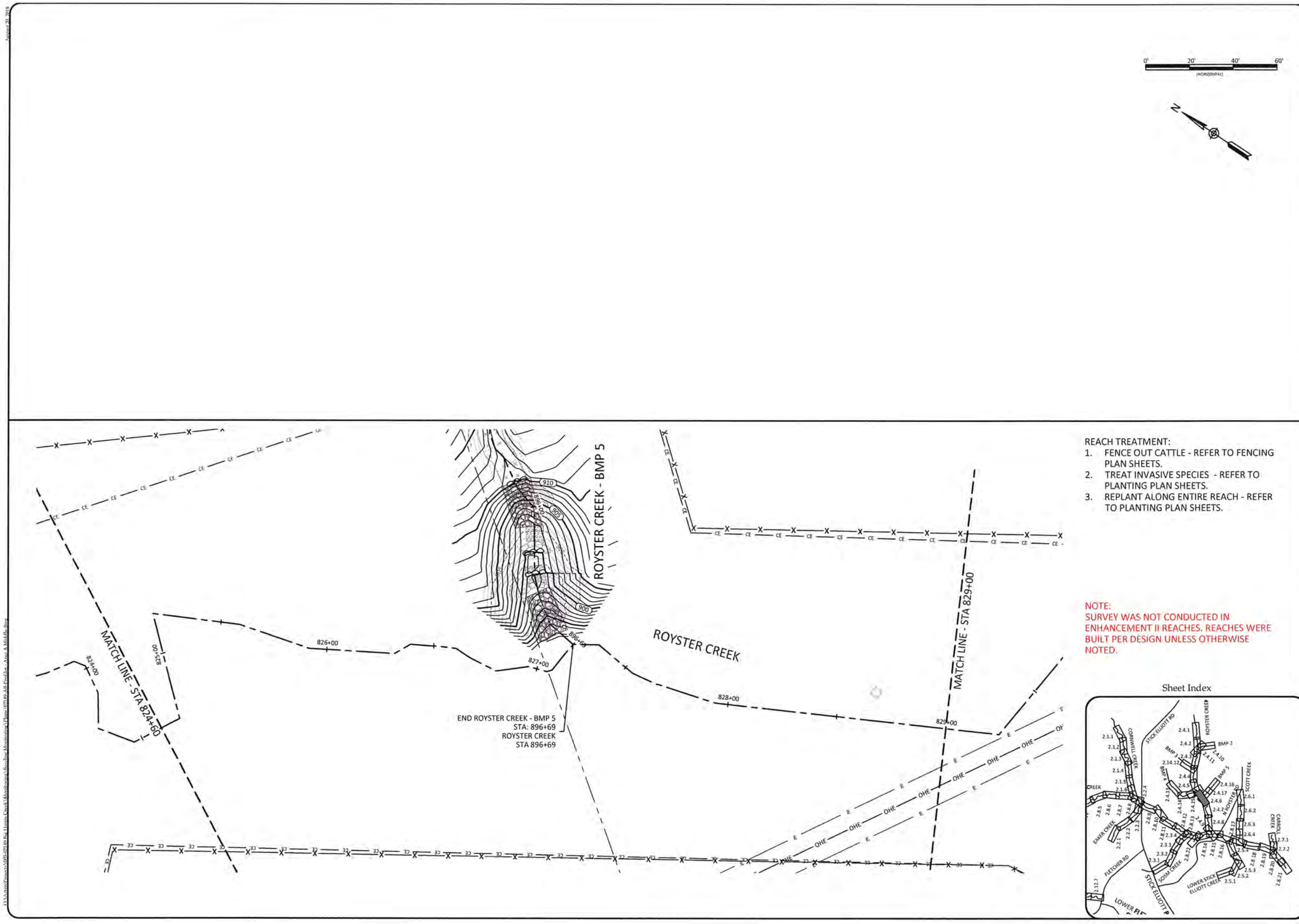

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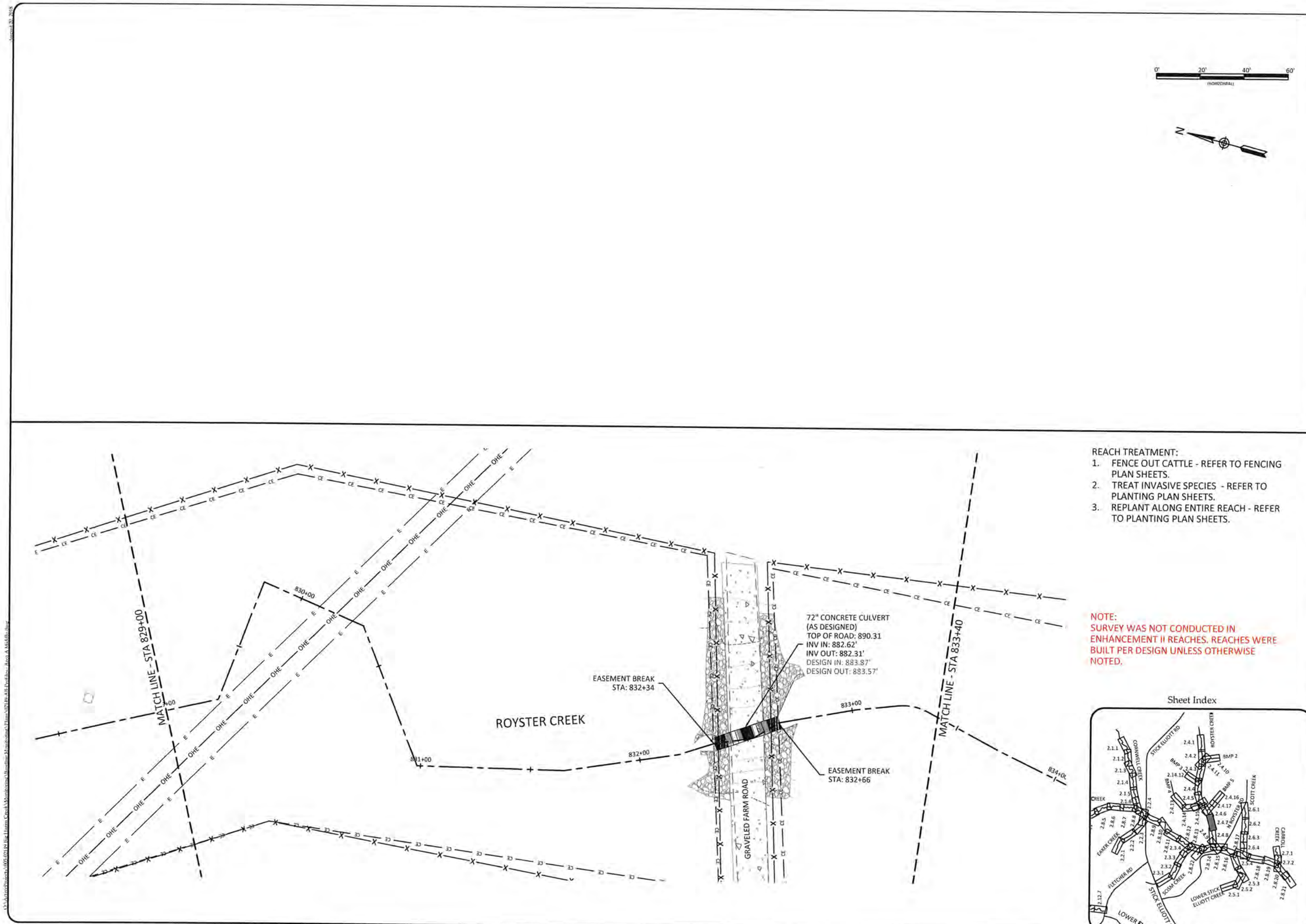
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.6



REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

NOTE:
SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EDWIN G. REINICKER

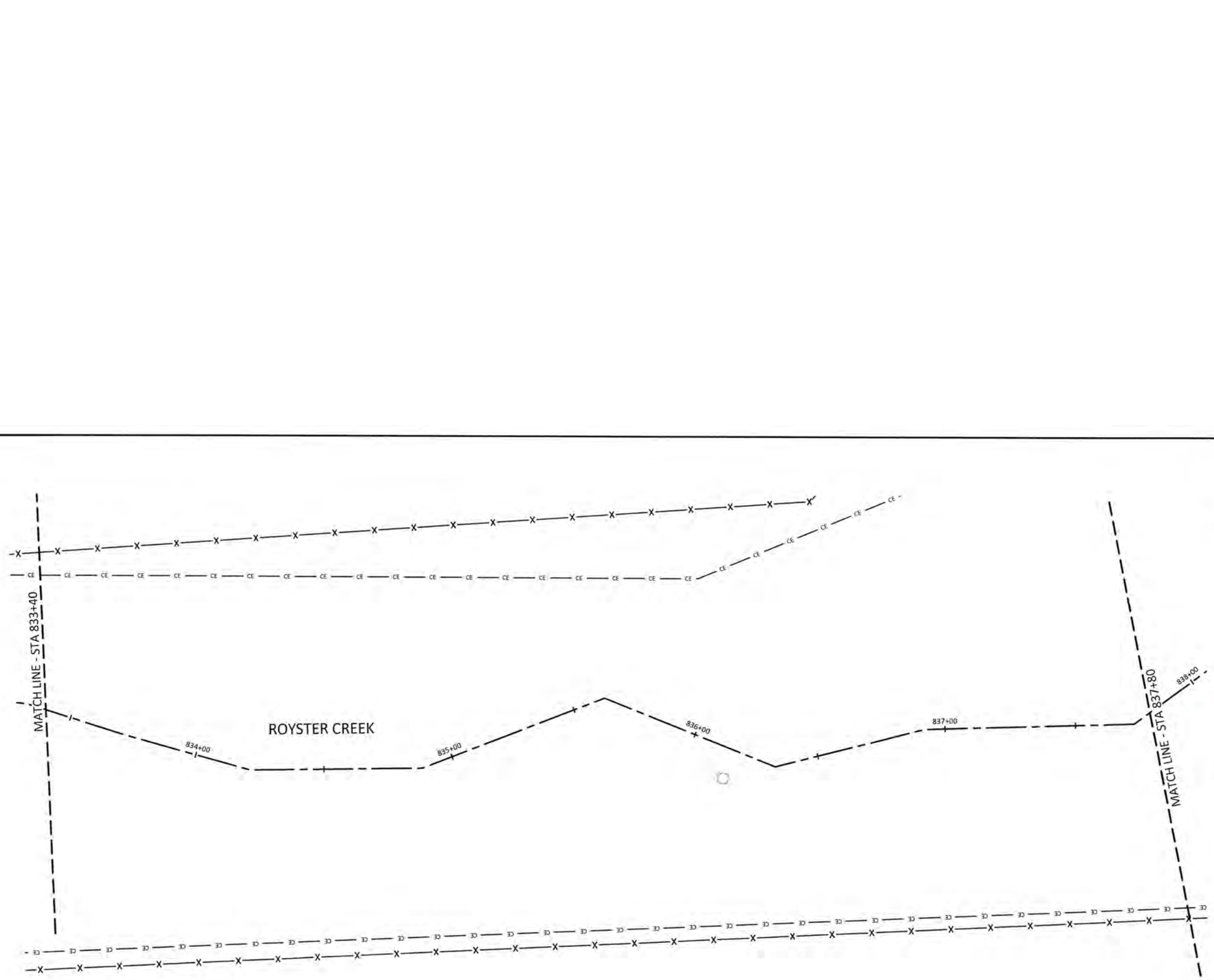
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.7



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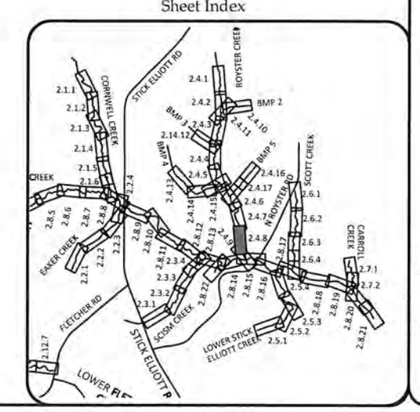

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NORTH CAROLINA PROFESSIONAL SEAL 9/21/18 ENGINEER ENRIC G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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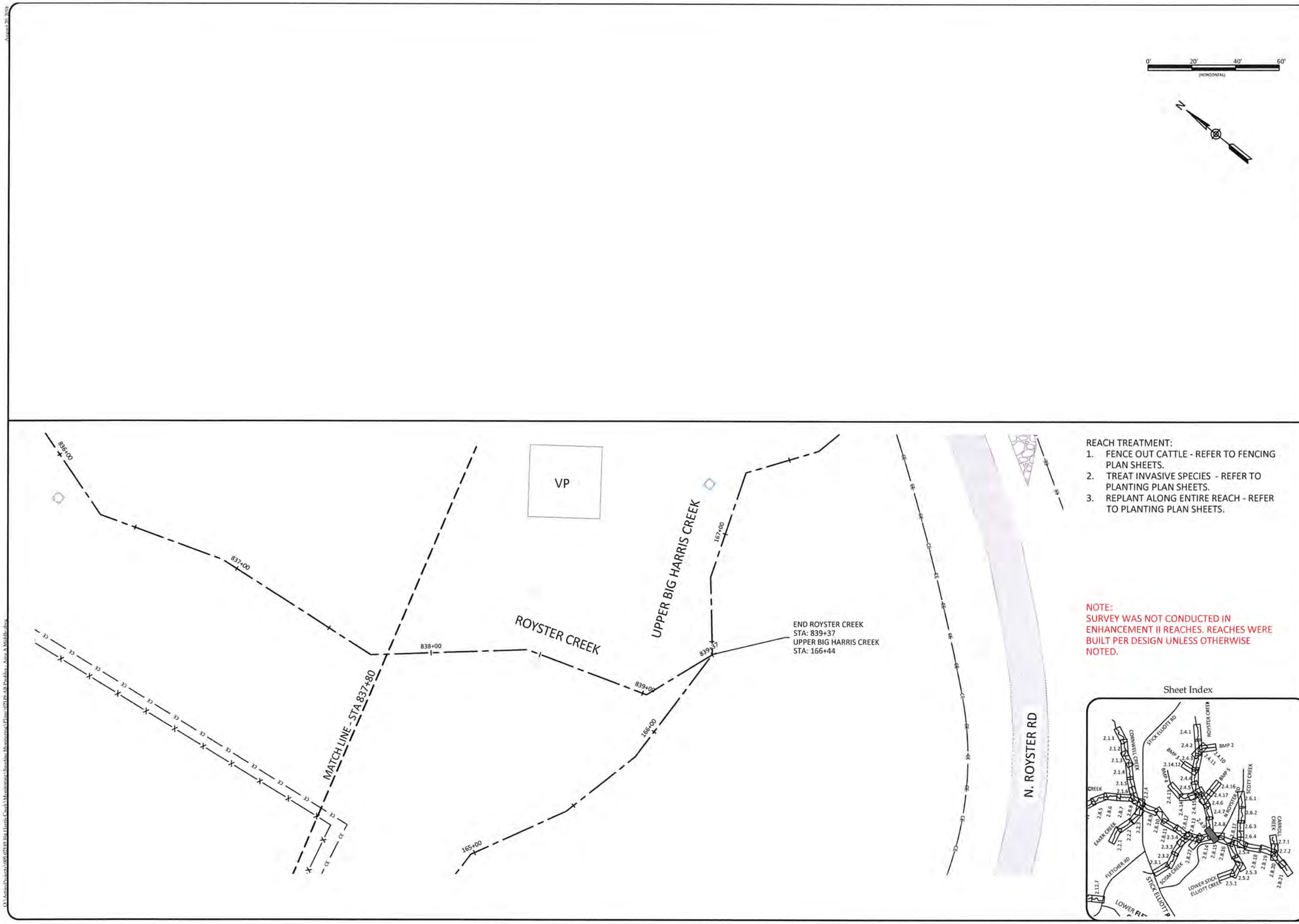

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29321 EMILY G. REINICKER

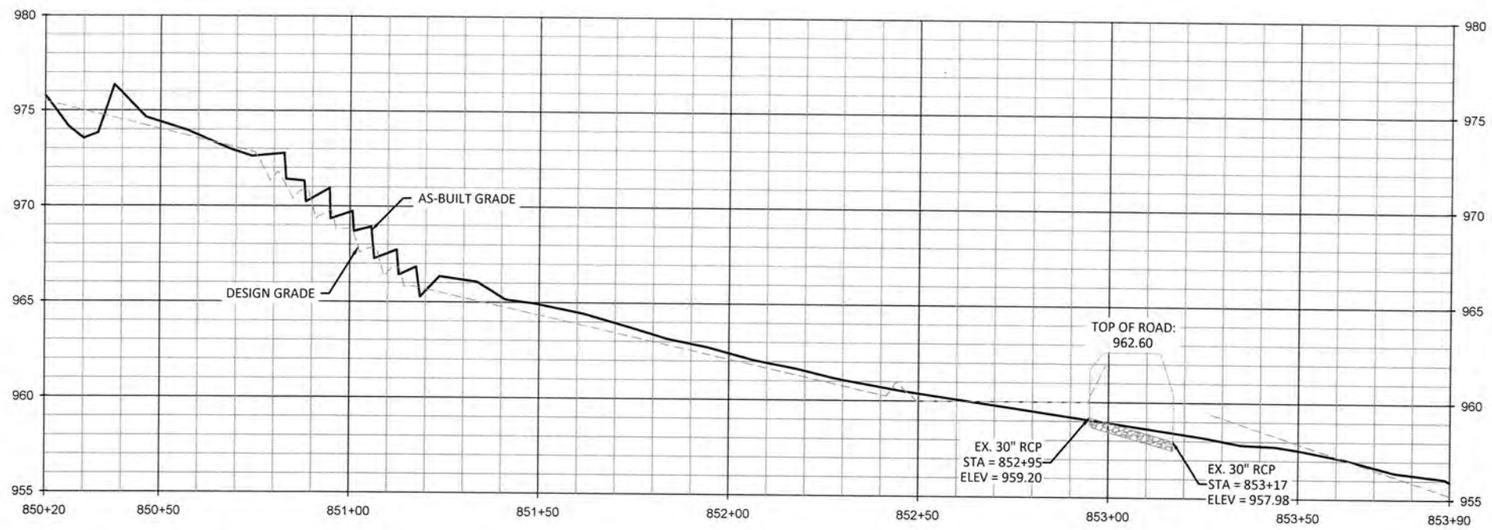
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

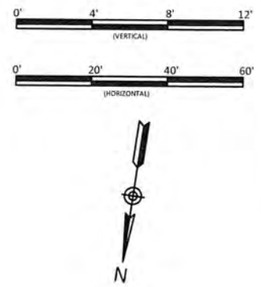
Royster Creek
Stream Plan and Profile Record Drawings

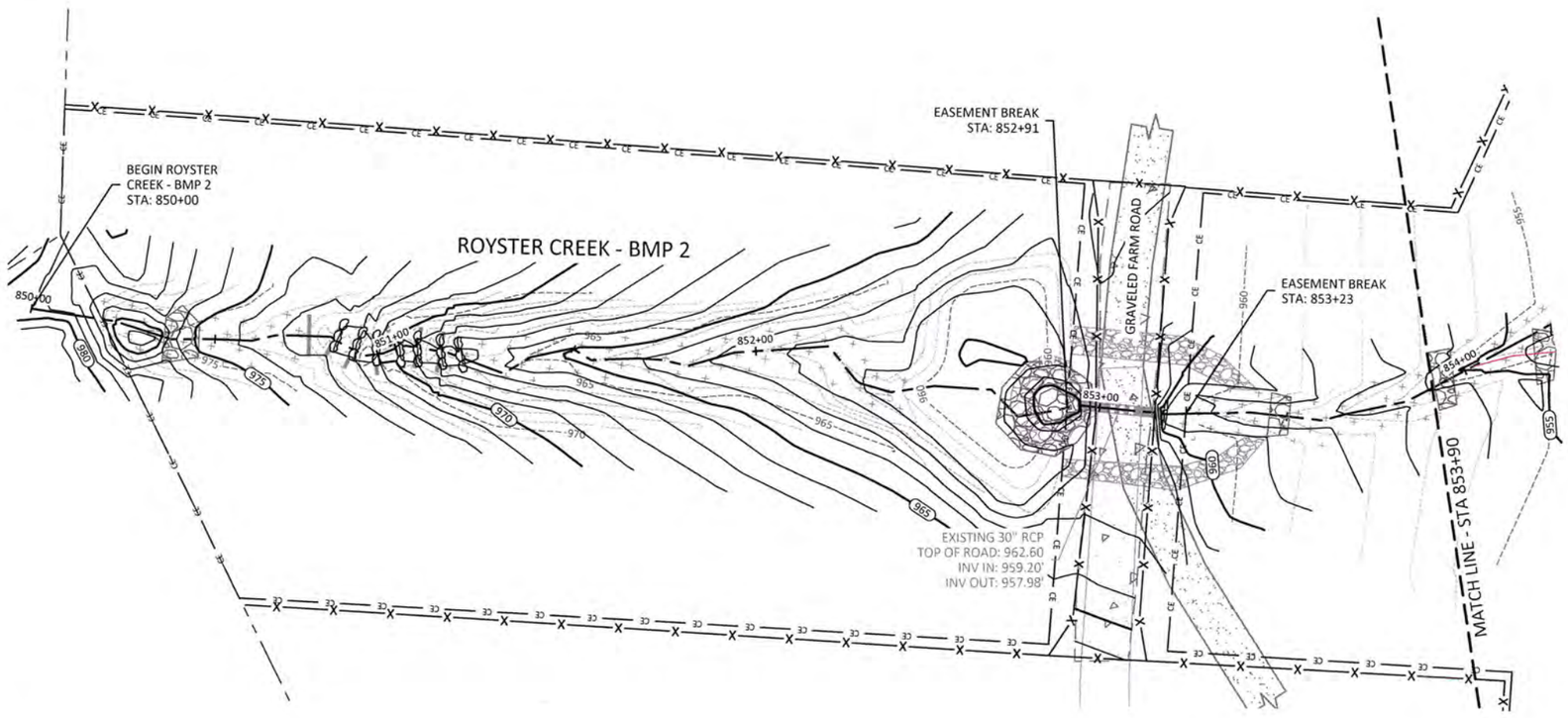
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.9







REACH TREATMENT:

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2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.
4. STABILIZE EPHEMERAL CHANNEL WITH STEP-POOLS AND ROCK CASCADES.
5. TREAT STORMWATER WITH HEADWATERS DETENTION.

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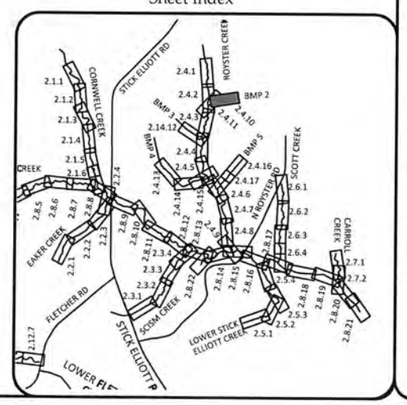

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28916 ENTY G. REINICKER

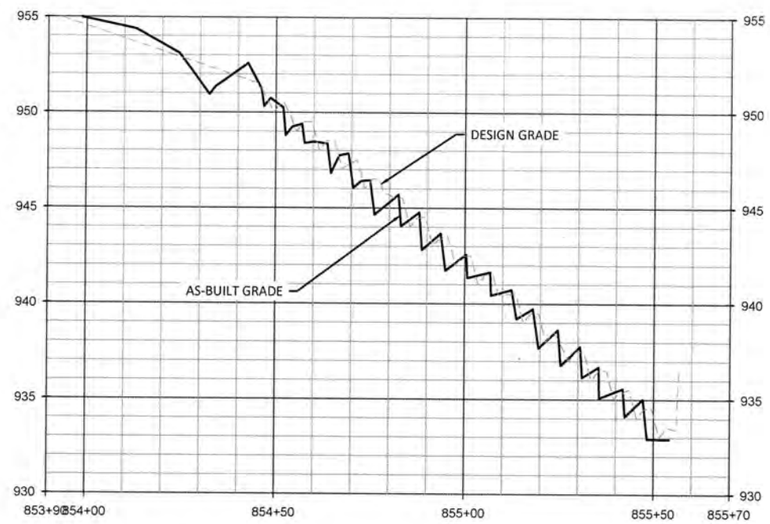
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

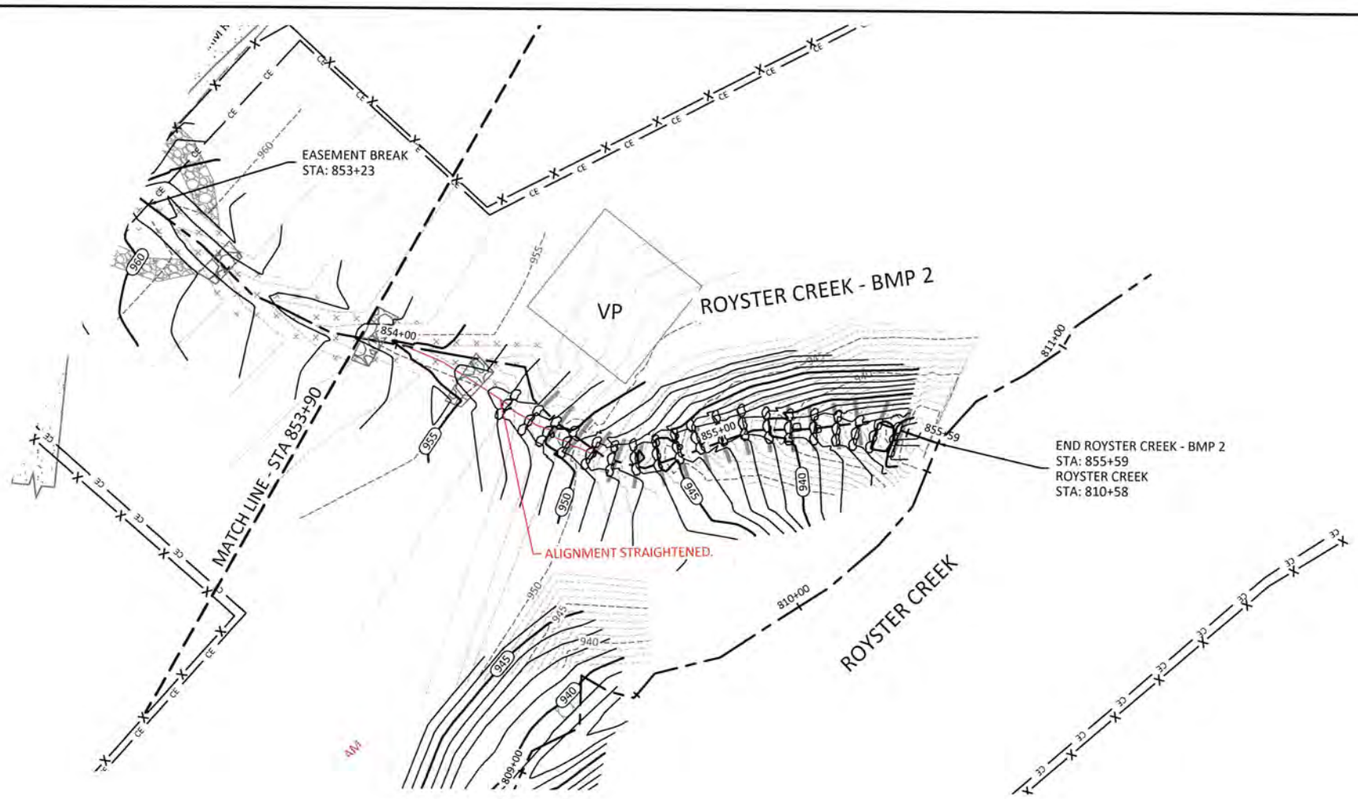
Royster Creek - BMP 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.10





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4. STABILIZE EPHEMERAL CHANNEL WITH STEP-POOLS AND ROCK CASCADES.

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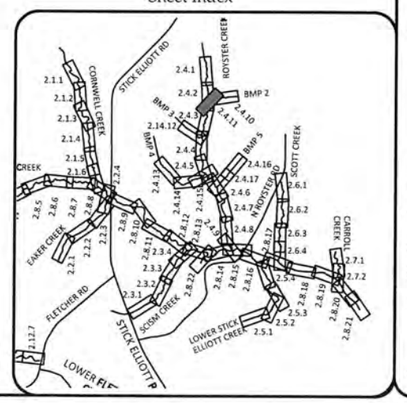

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 3/21/18 JAMES G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek - BMP 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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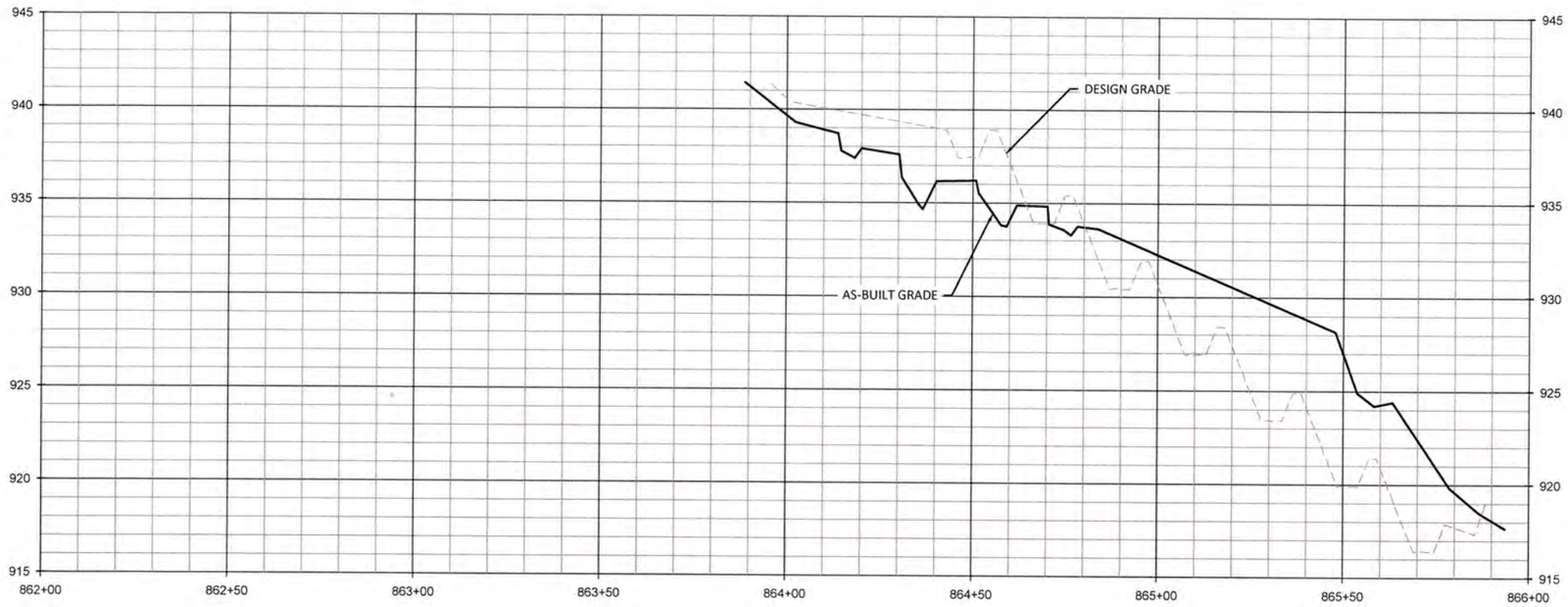

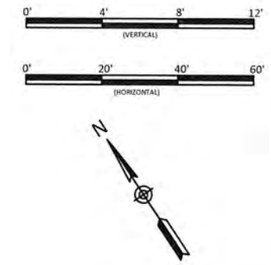

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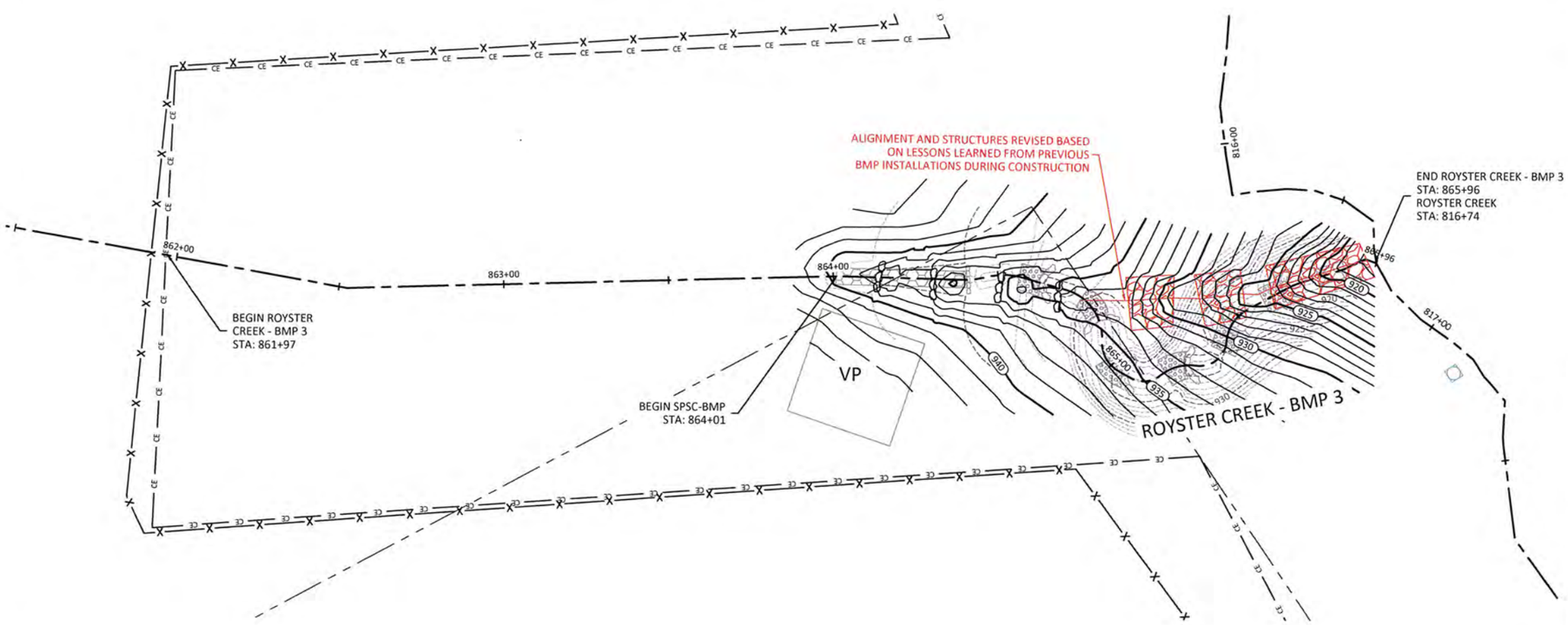

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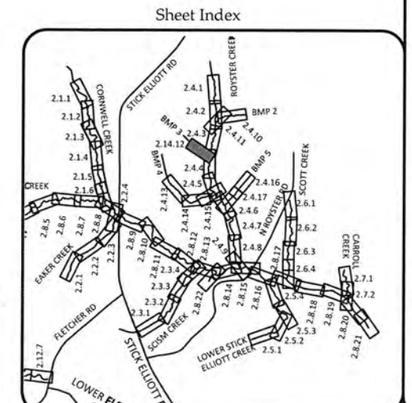

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NORTH CAROLINA PROFESSIONAL SEAL 29913 ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek - BMP 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.12

August 20, 2018
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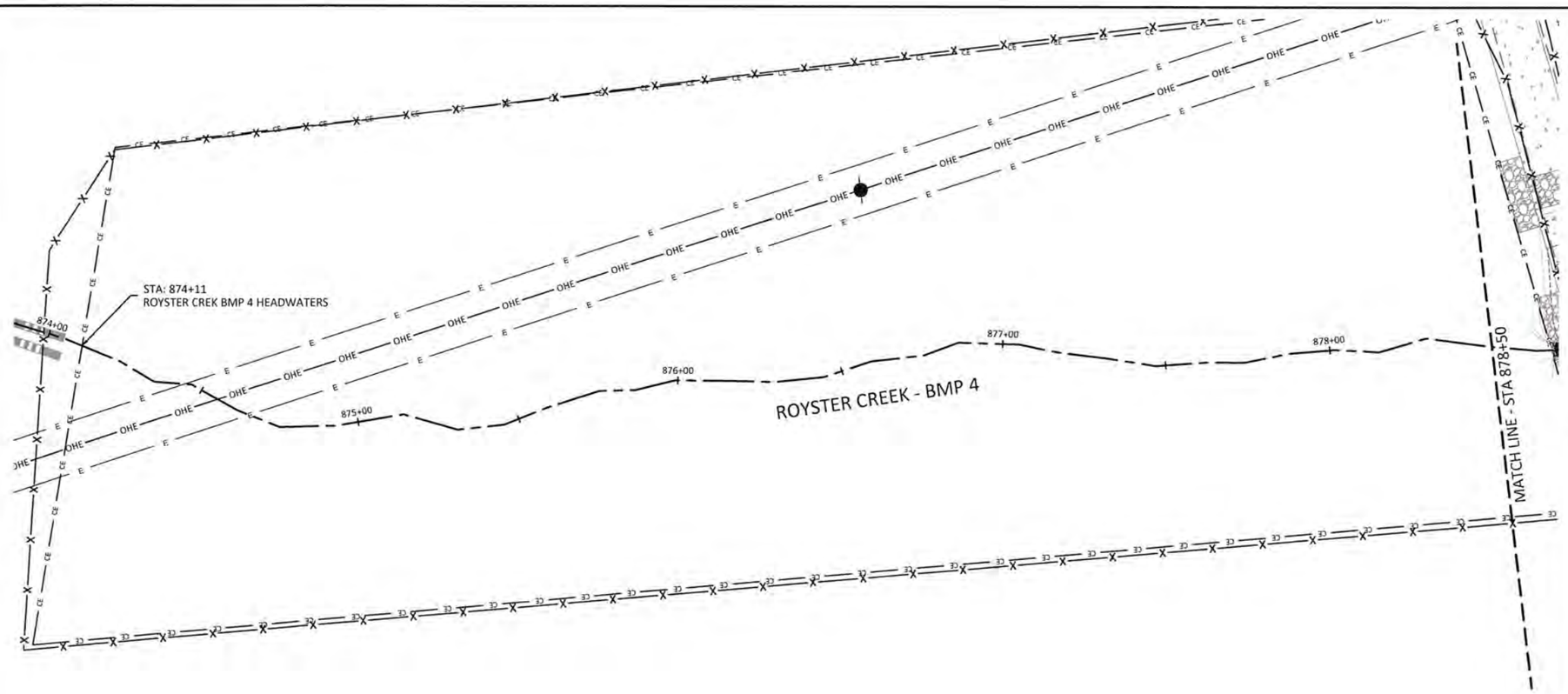

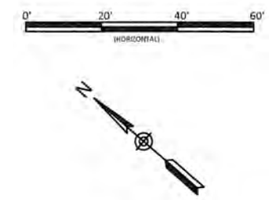

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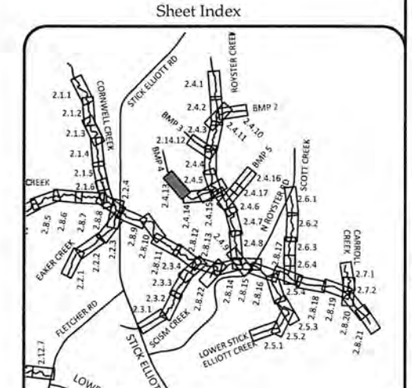

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28913 EMILY G. REINICKER

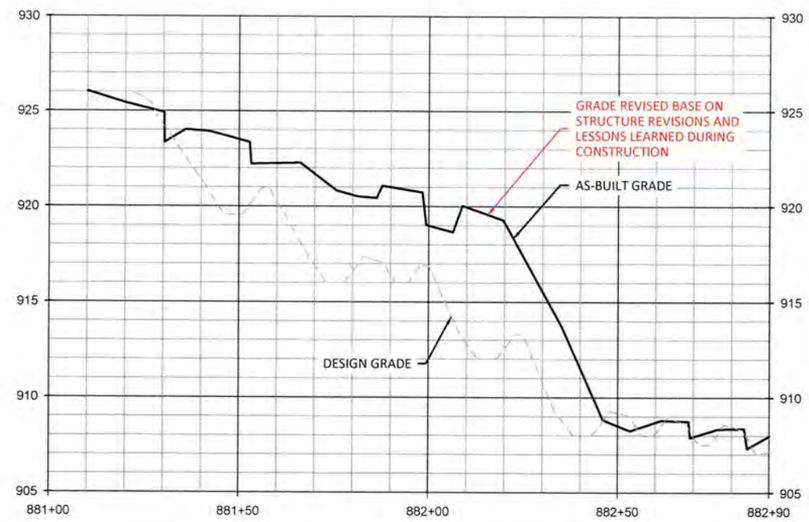
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

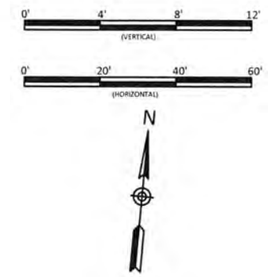
Royster Creek - BMP 4
Stream Plan and Profile Record Drawings

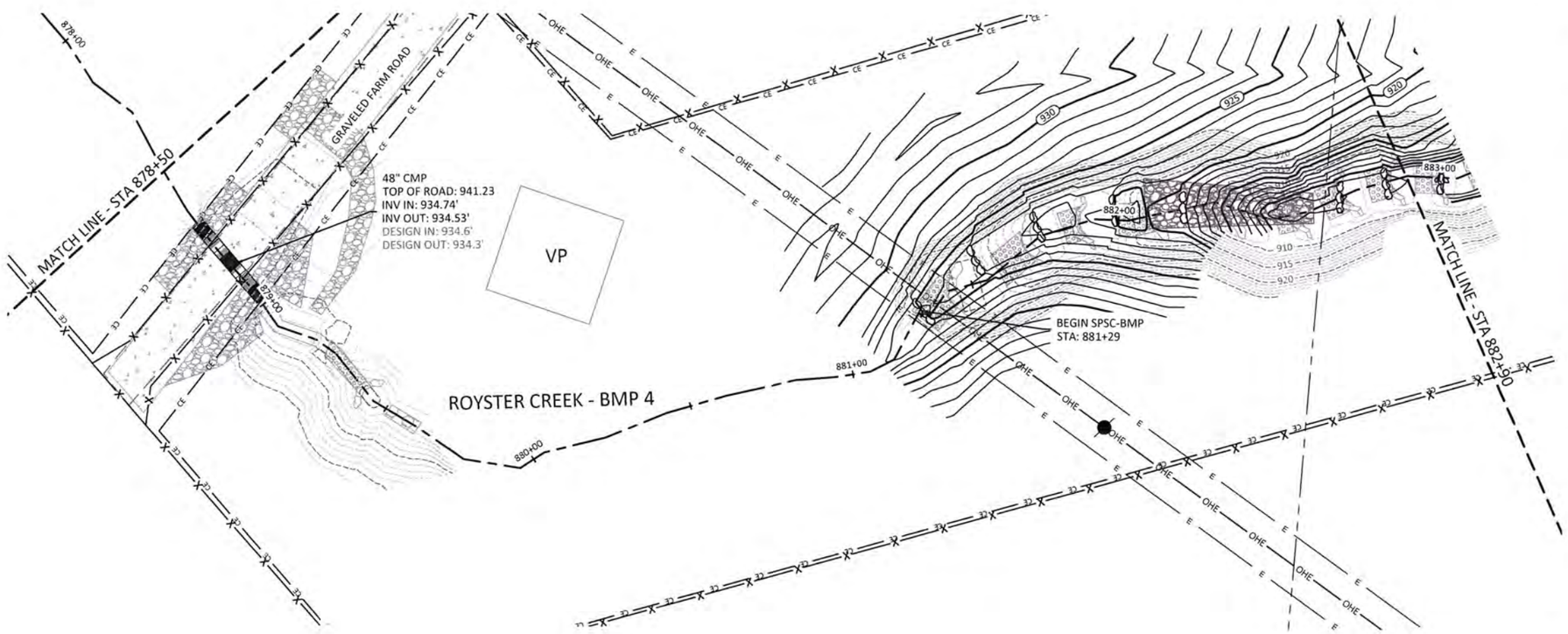
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.13







REACH TREATMENT:

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2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.
4. STABILIZE HEADCUT WITH ROCK CASCADE.
5. TREAT STORMWATER WITH SPSC.

NOTE:
STRUCTURES REVISED BASED ON LESSONS LEARNED FROM PREVIOUS BMP INSTALLATIONS DURING CONSTRUCTION

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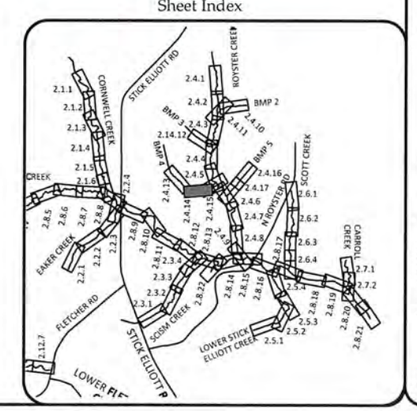

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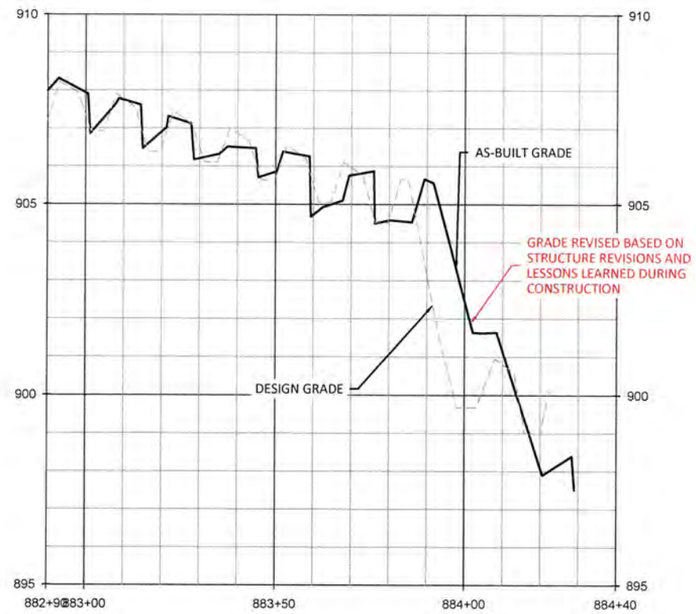
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

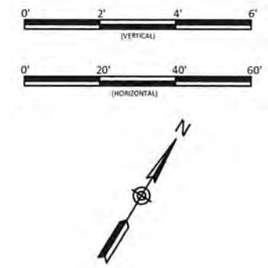
Royster Creek - BMP 4
Stream Plan and Profile Record Drawings

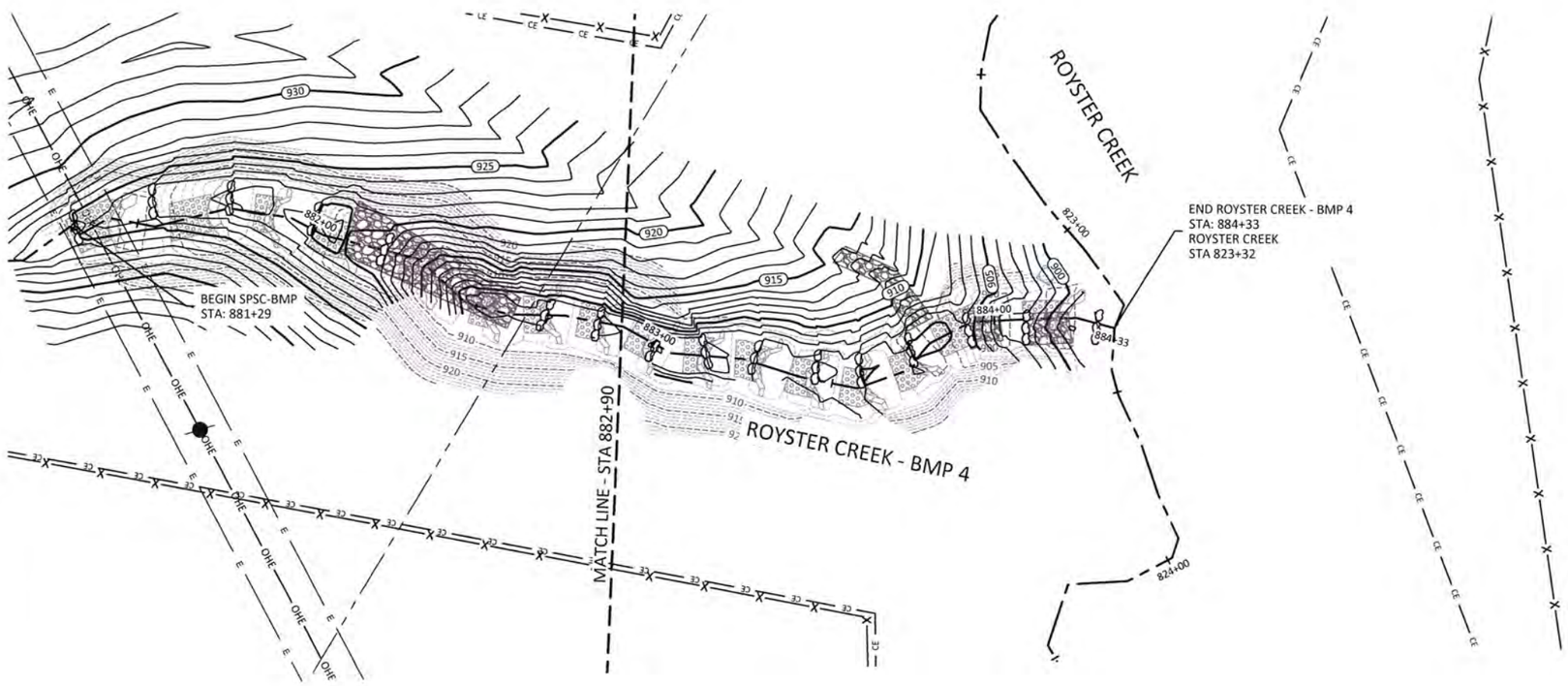
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.14







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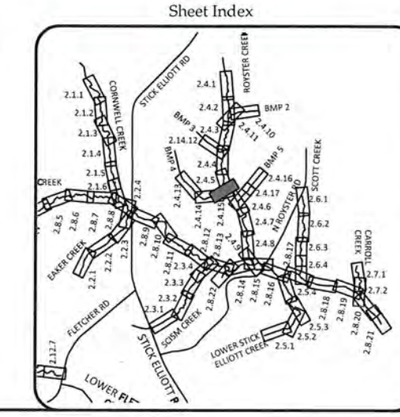
Sheet Index



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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 39913 EMILY G. REINICKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek - BMP 4
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.15

August 20, 2018
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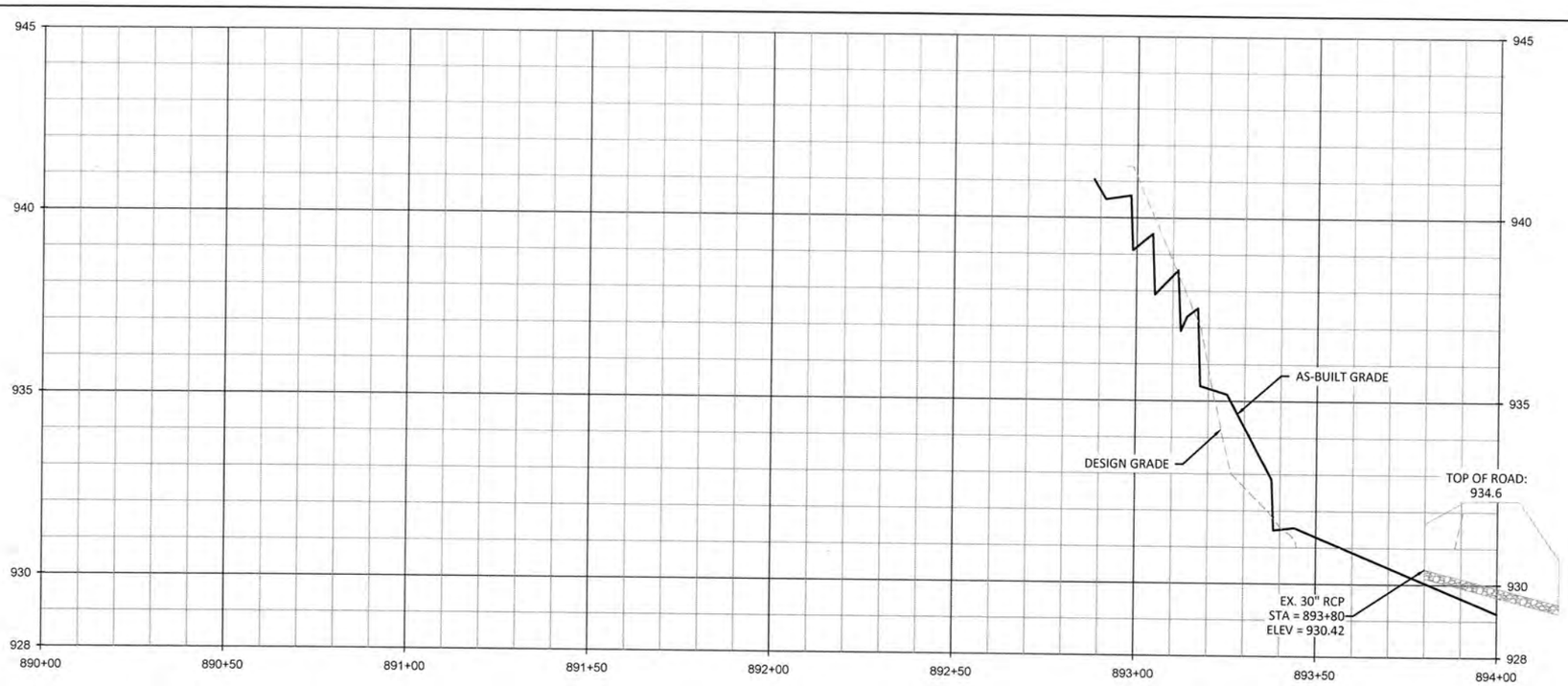

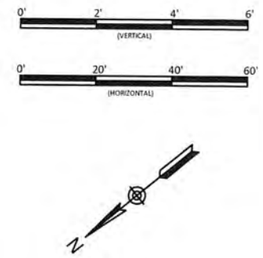

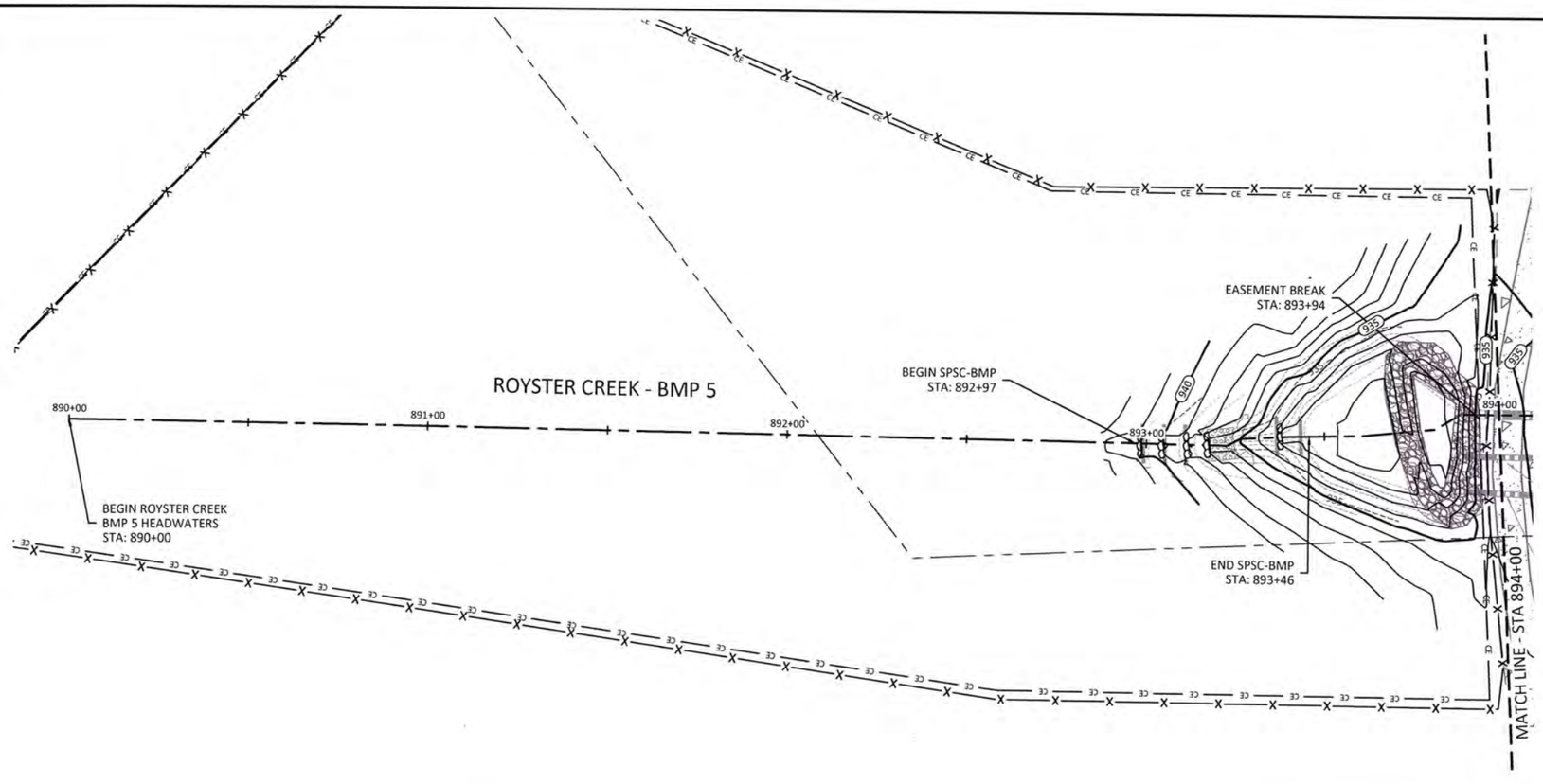

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5. TREAT STORMWATER WITH HEADWATER DETENTION.

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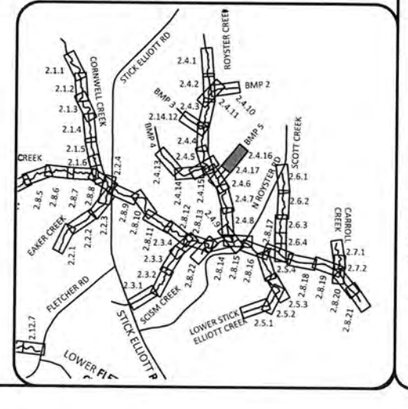

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

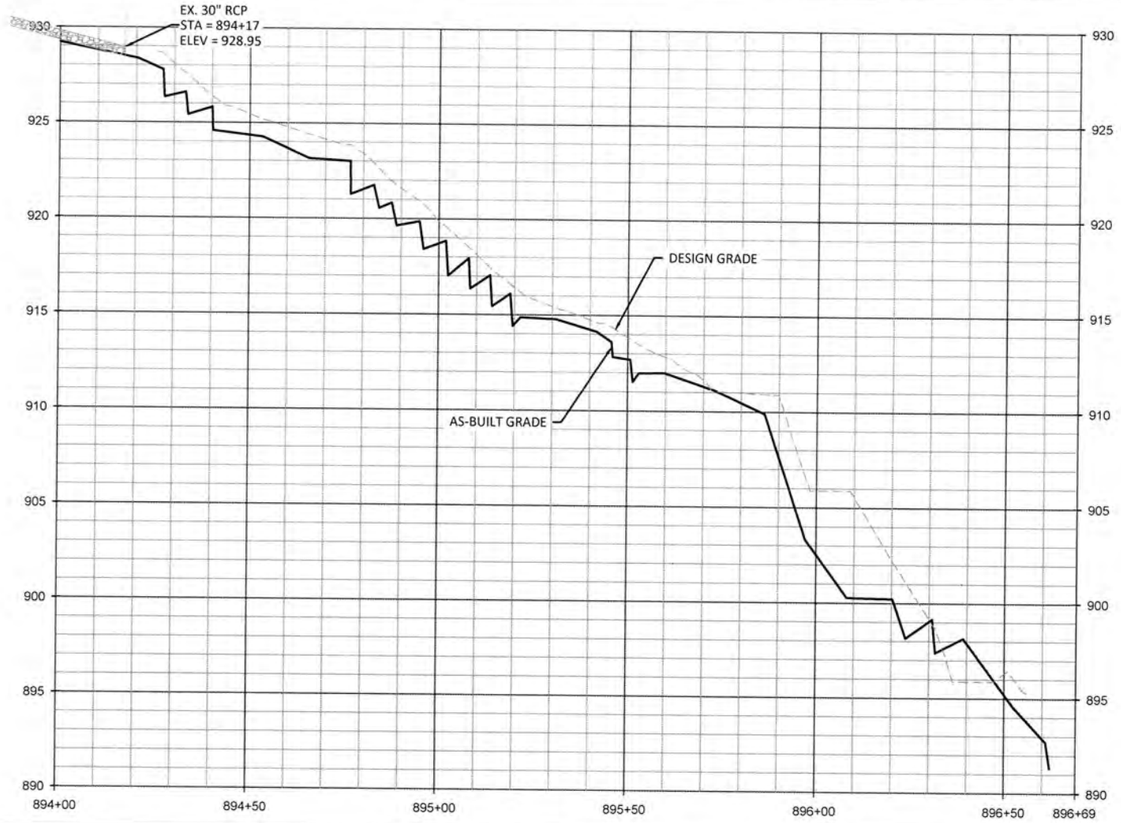
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

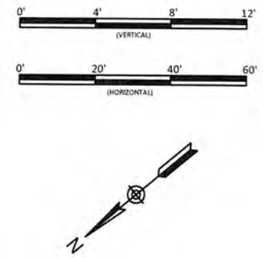
Royster Creek - BMP 5
Stream Plan and Profile Record Drawings

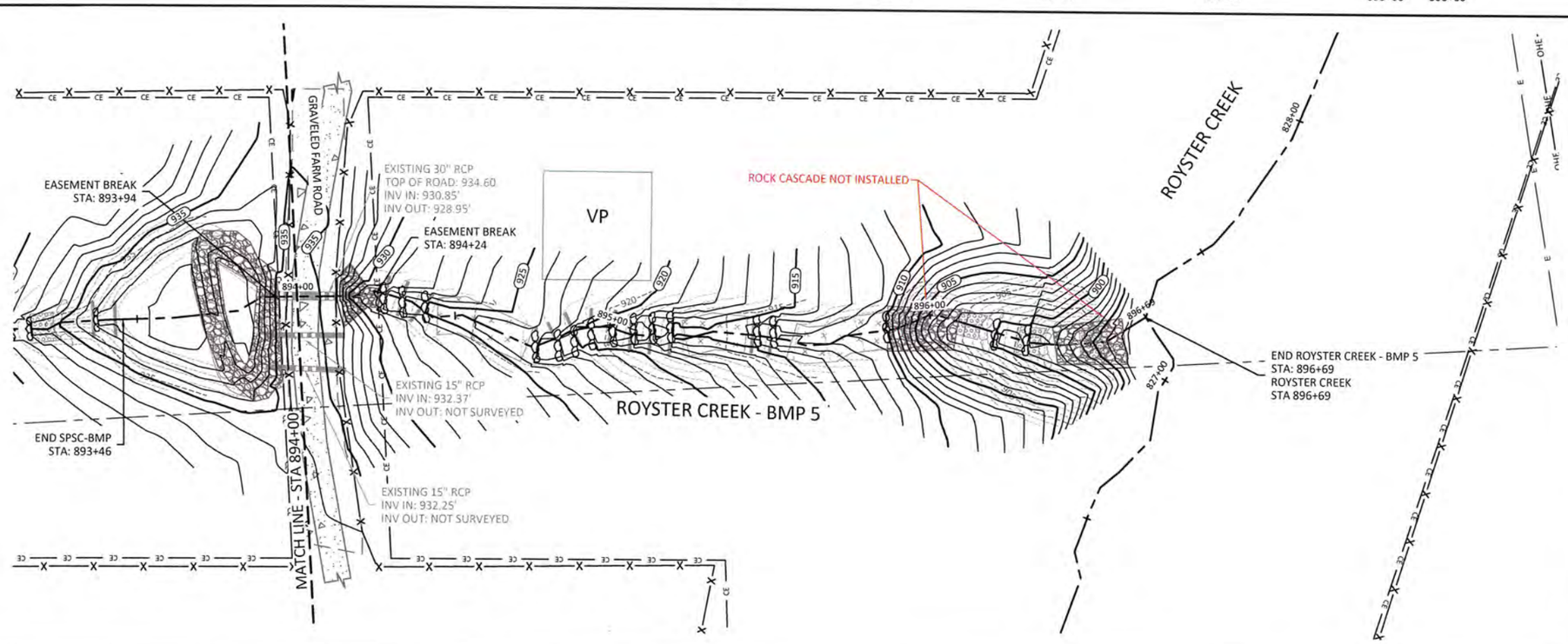
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.16







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4. STABILIZE EPHEMERAL CHANNEL WITH STEP-POOLS AND ROCK CASCADES.

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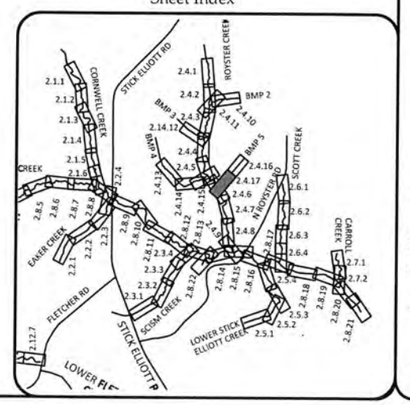

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030746 ENGINEER ERIK C. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek - BMP 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.4.17

August 20, 2018

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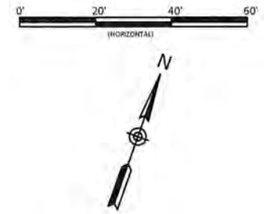

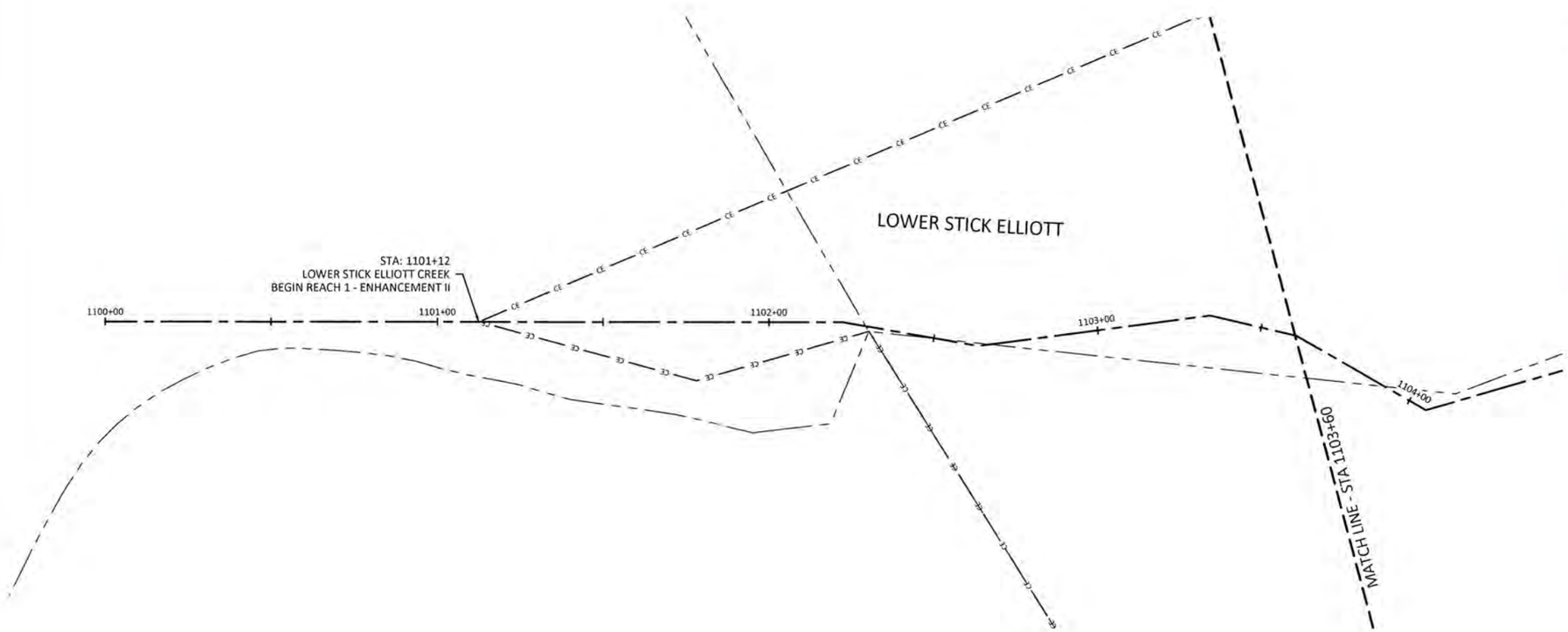

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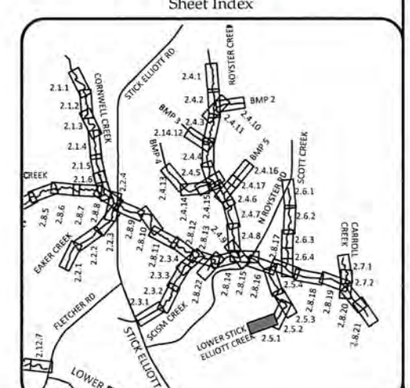

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
EMILY G. REINICKE
8/21/2018

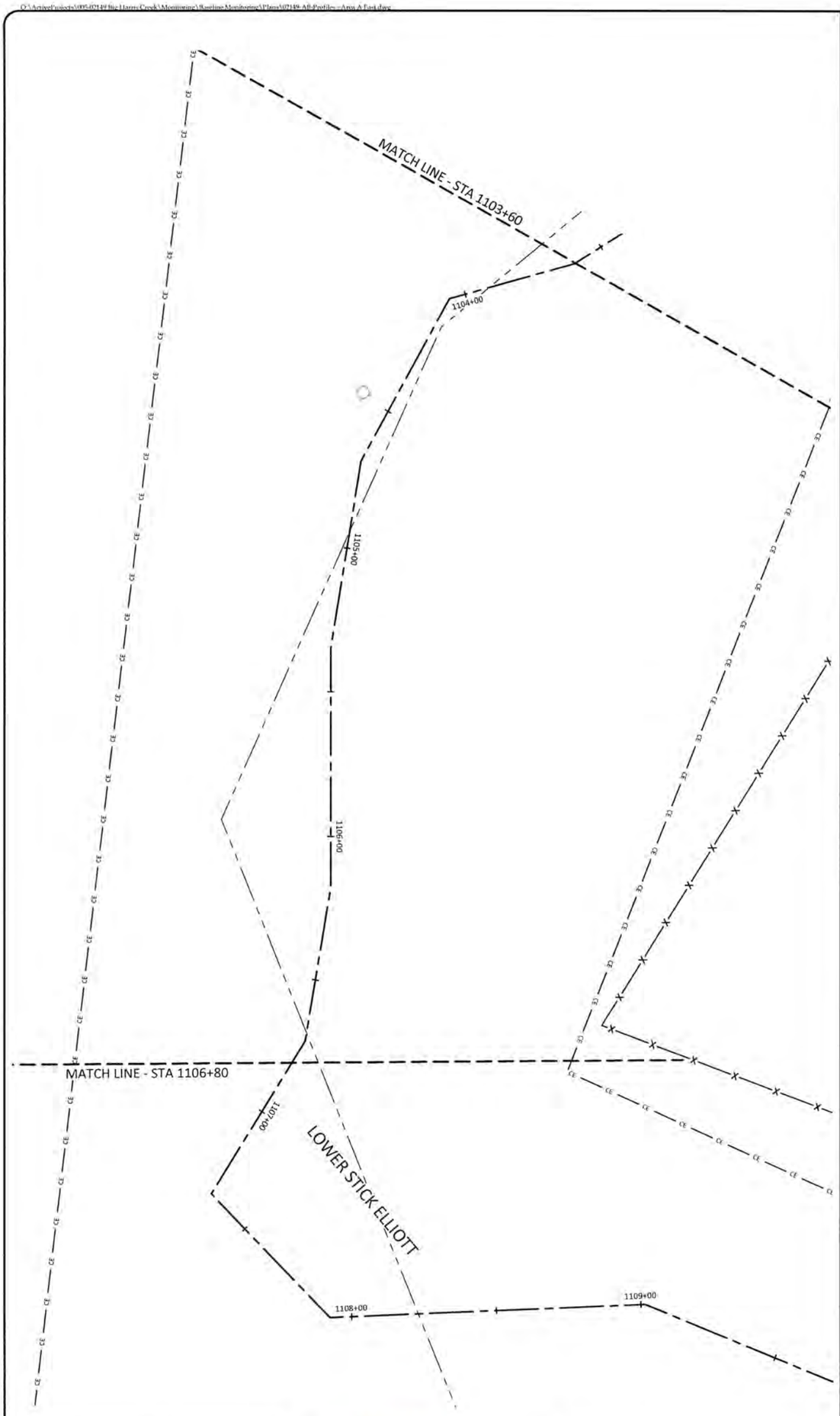
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

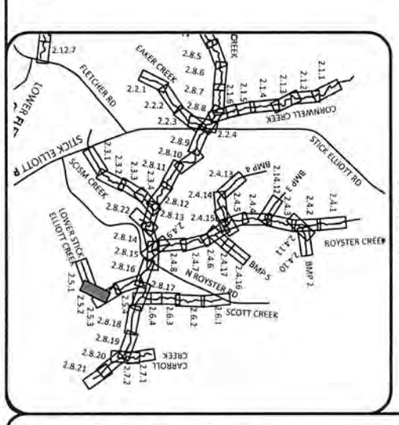
Lower Stick Elliott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet: 2.5.1





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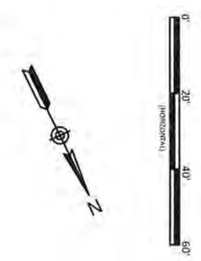

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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Revisions:

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Stick Elliott Creek
Stream Plan and Profile Record Drawings

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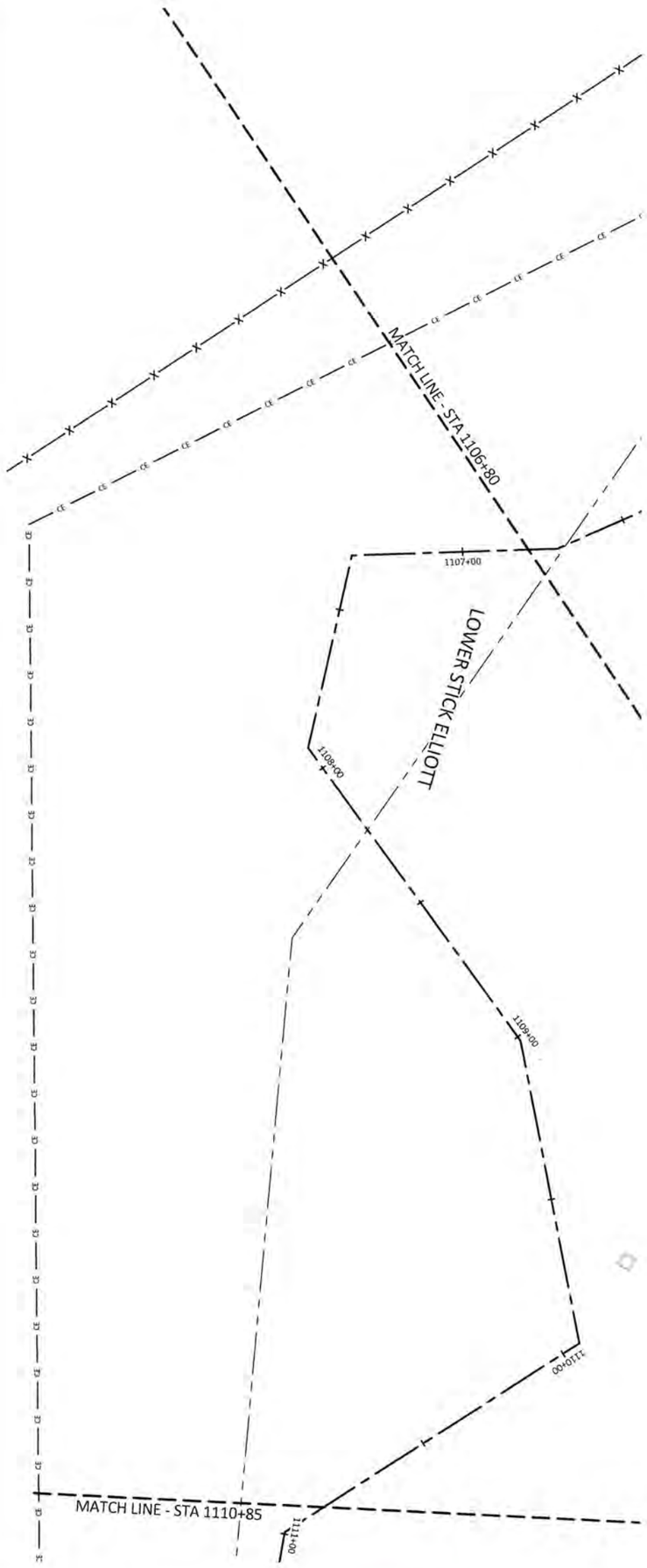

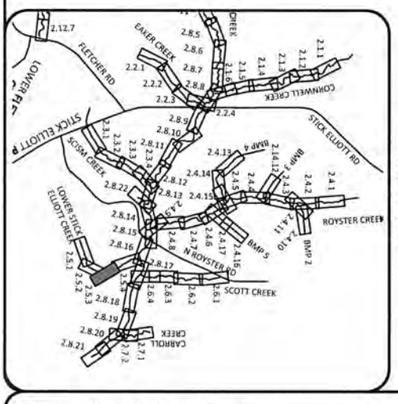

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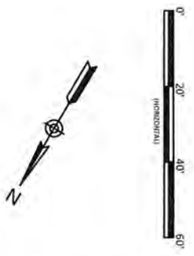

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Stick Elliott Creek
Stream Plan and Profile Record Drawings

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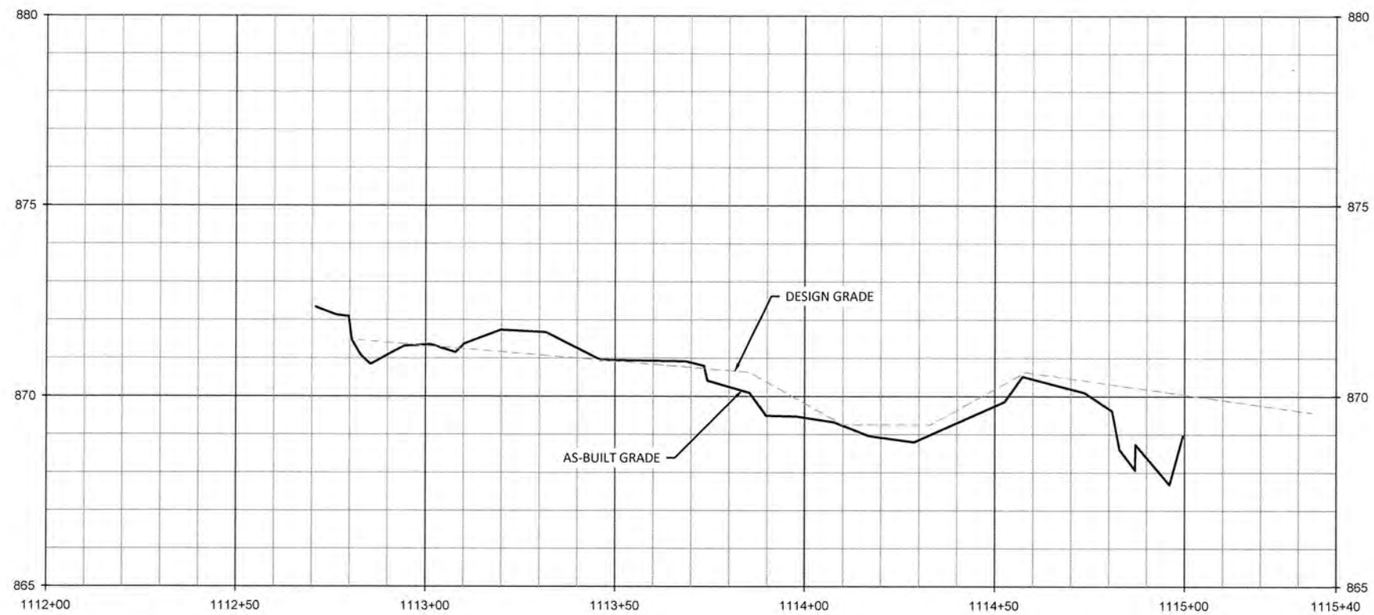

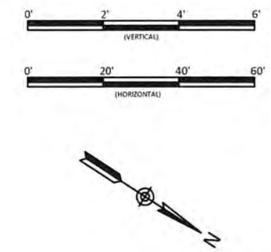

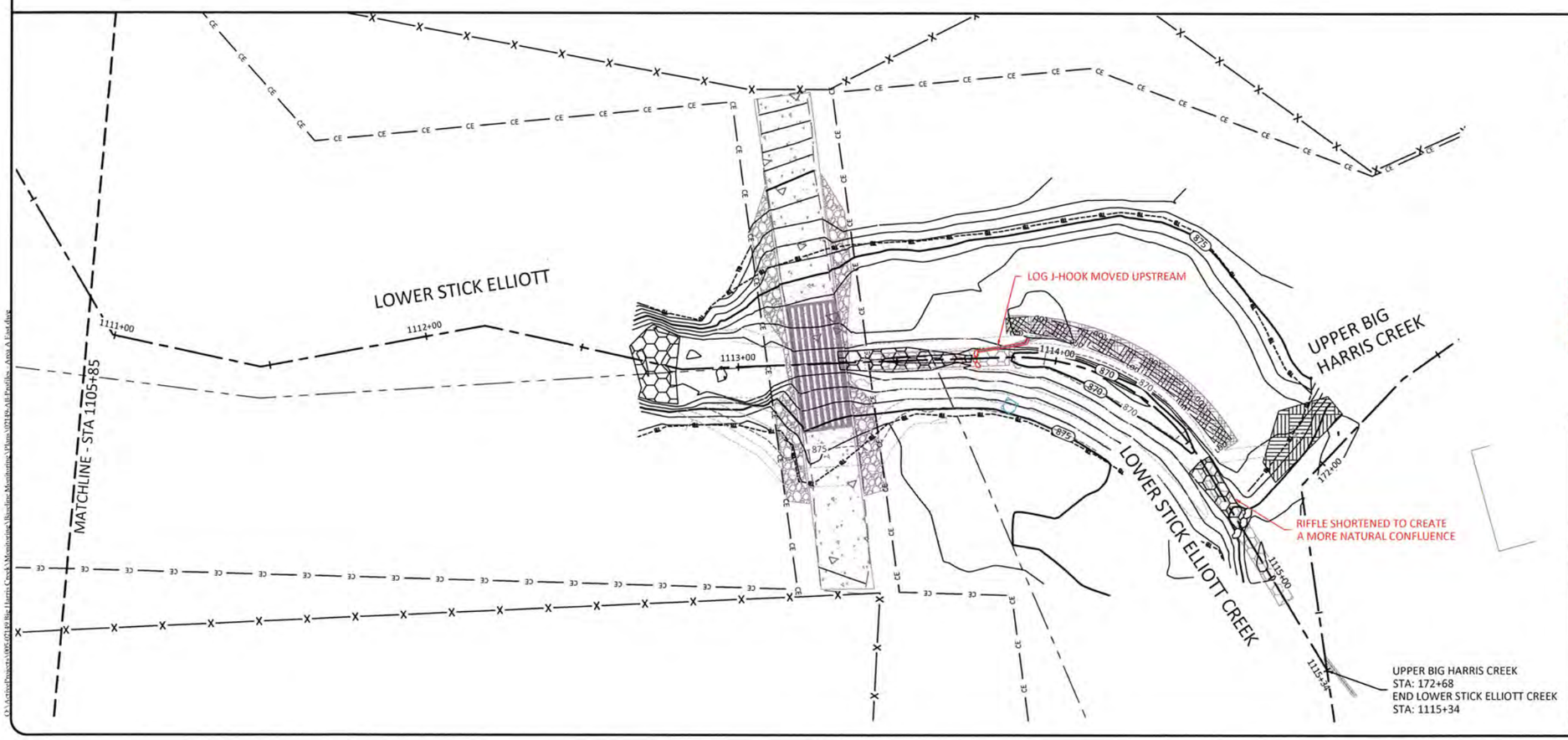

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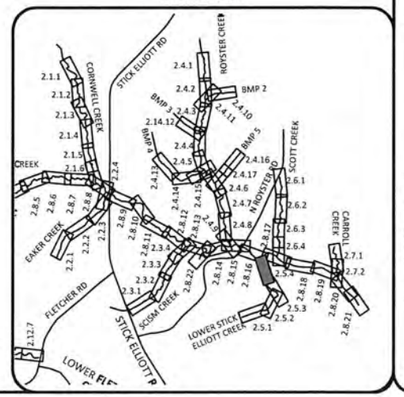

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038241 J. C. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Stick Elliott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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August 20, 2018
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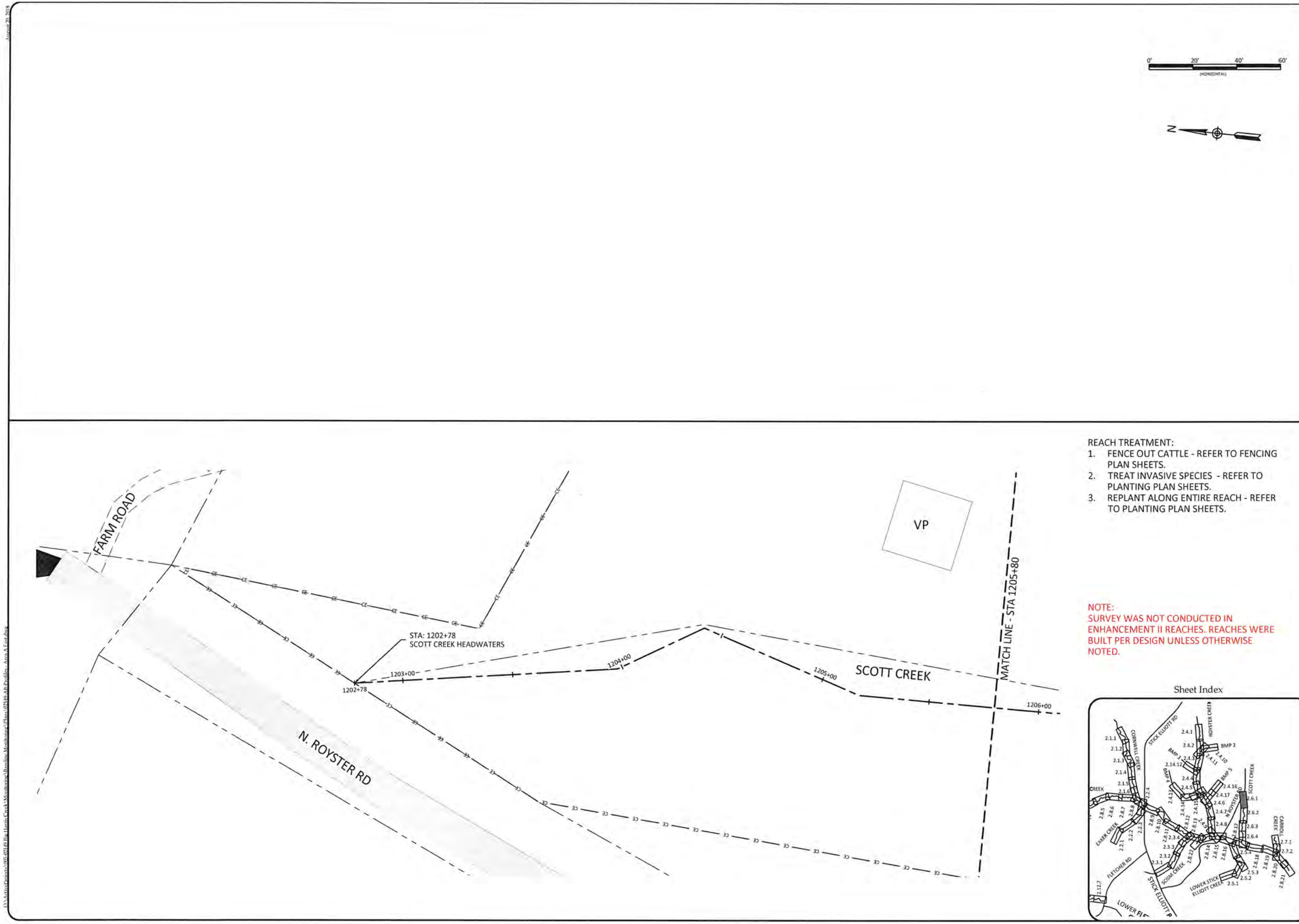

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scott Creek
Stream Plan and Profile Record Drawings

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Date:	August 21, 2018
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Checked By:	JCK

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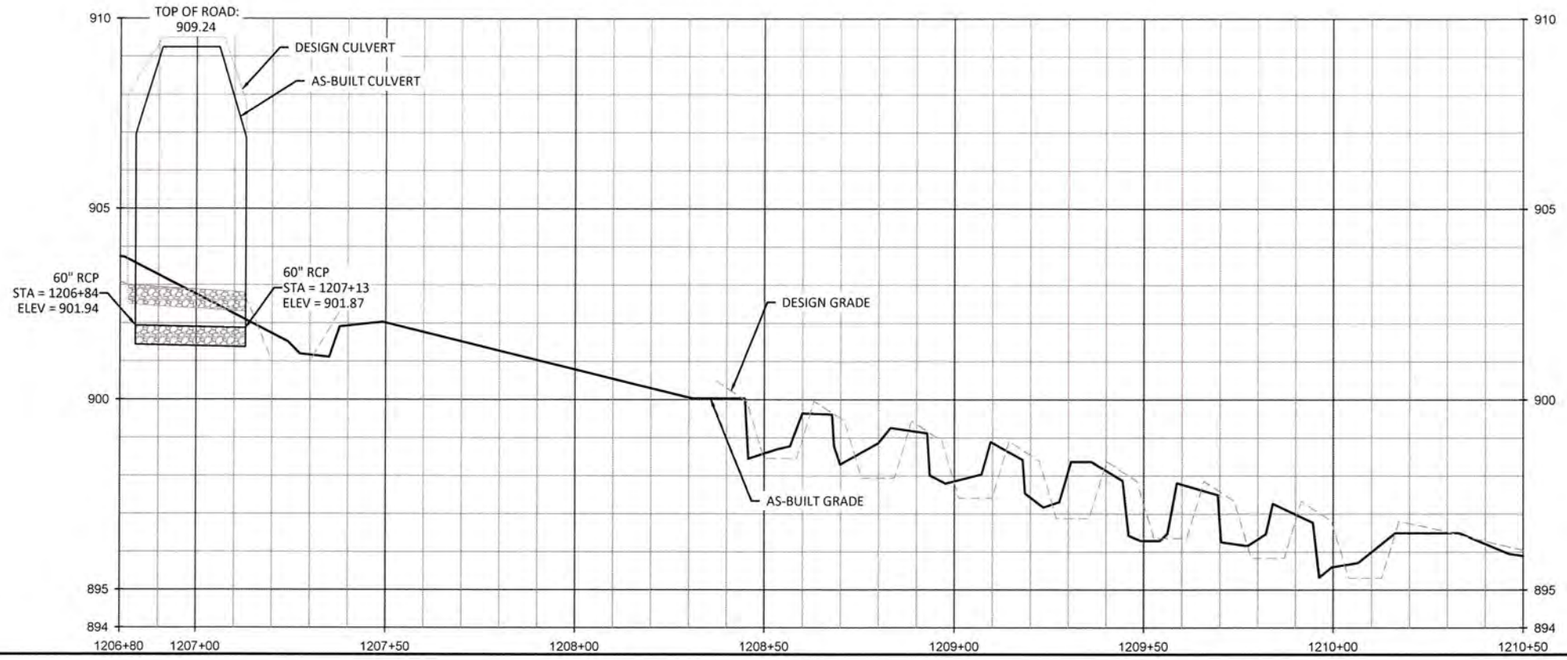

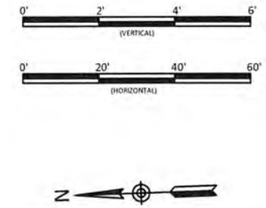

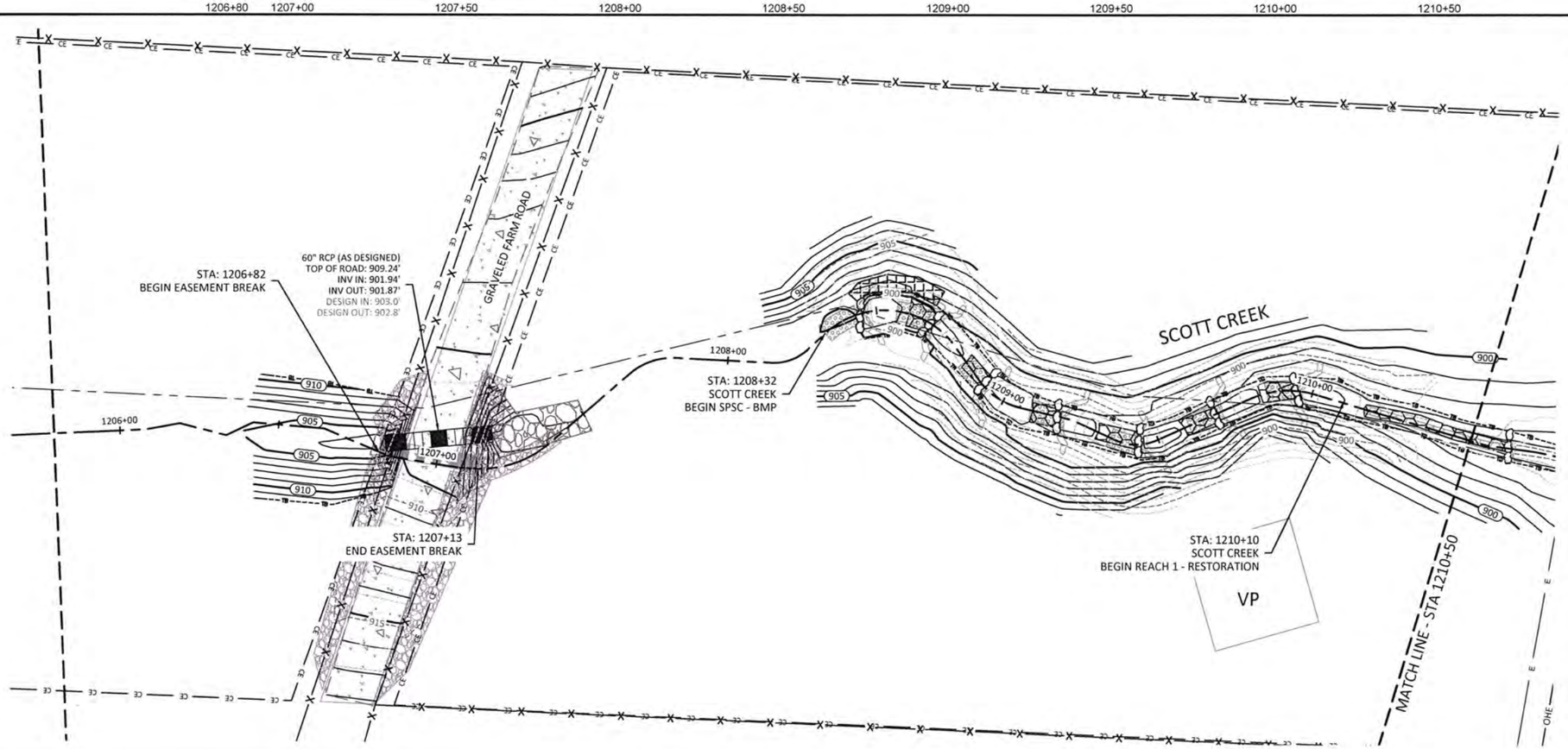

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4. TREAT STORMWATER RUNOFF WITH SPSC.

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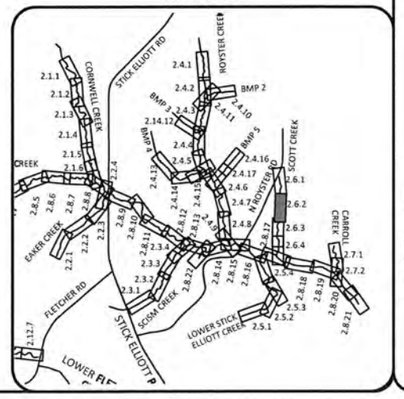

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Designed By:	EGR, AA
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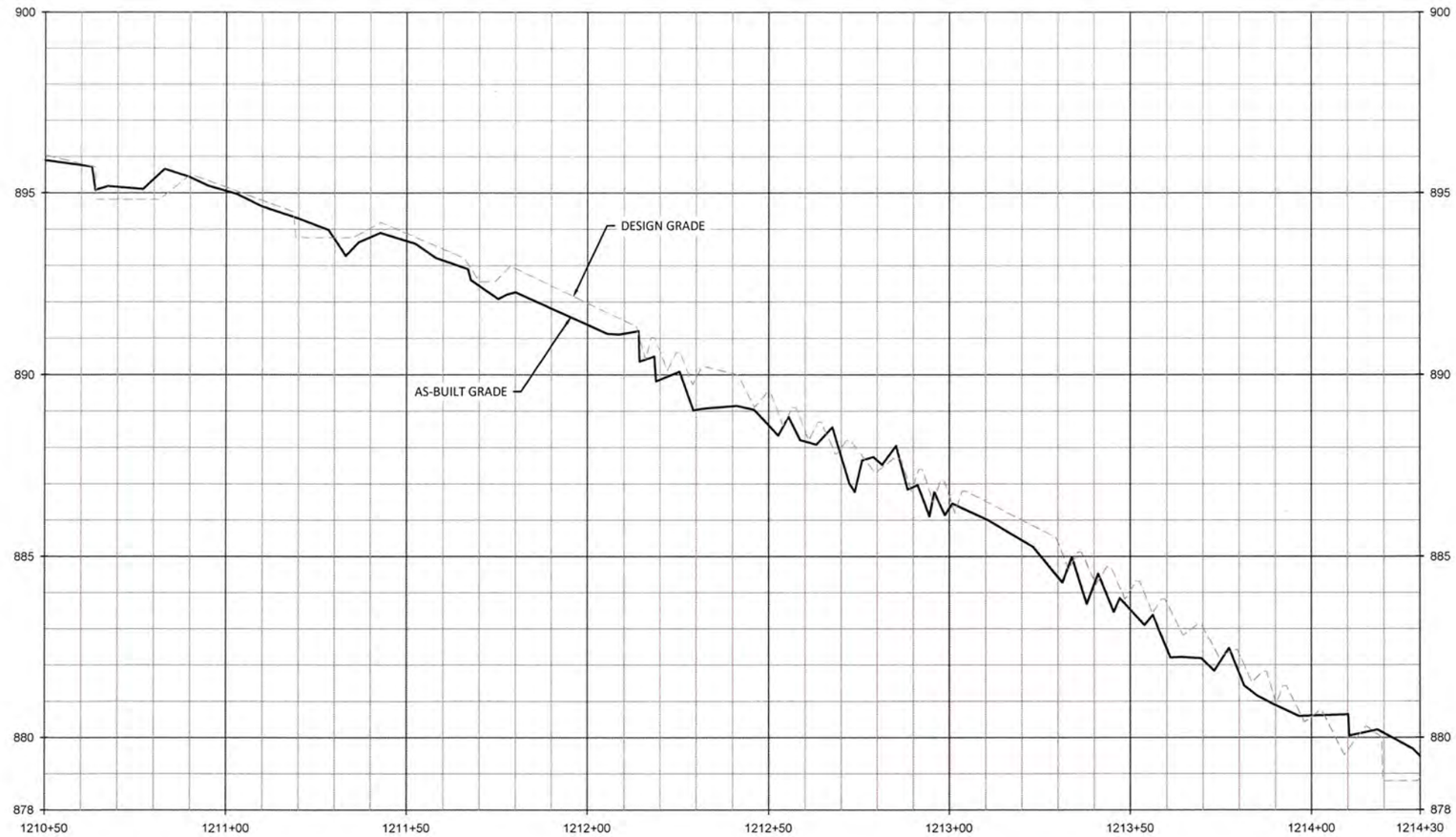

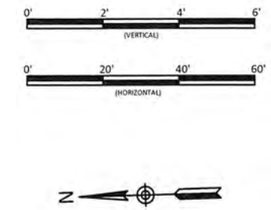

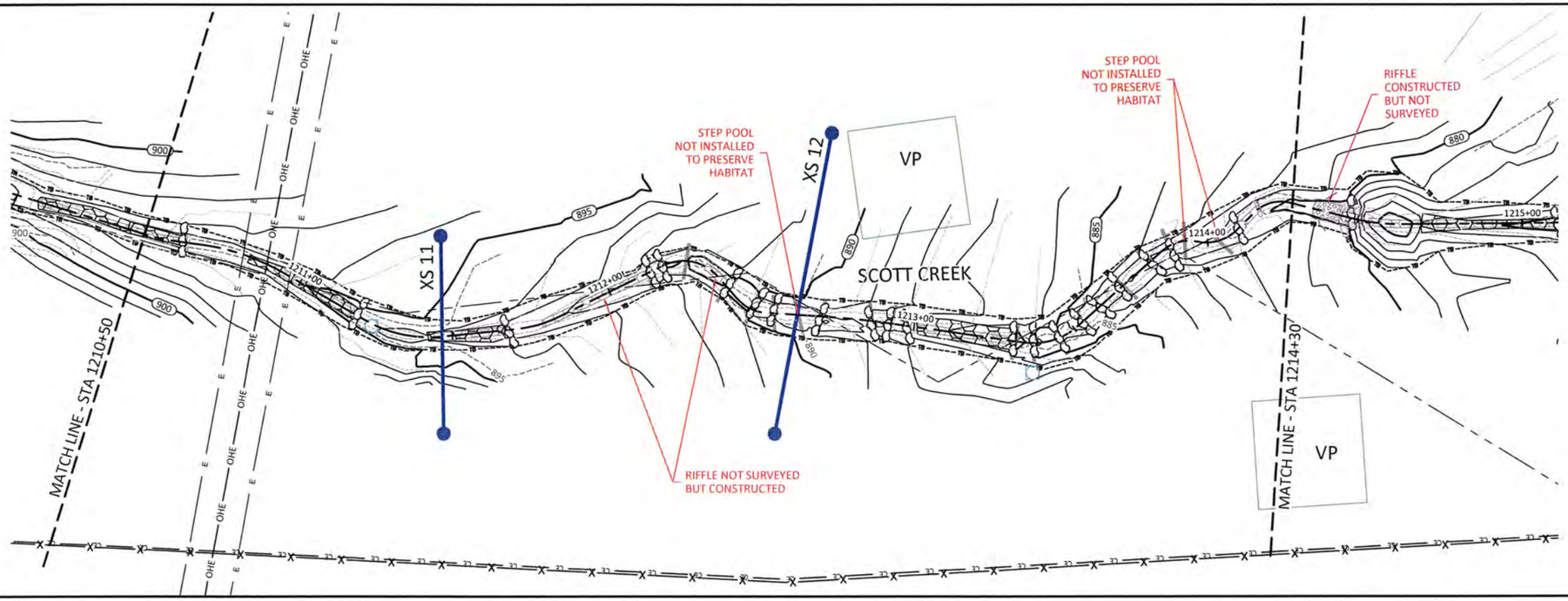

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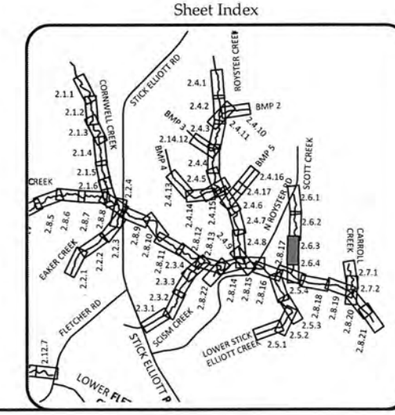

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER 8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Checked By:	JCK

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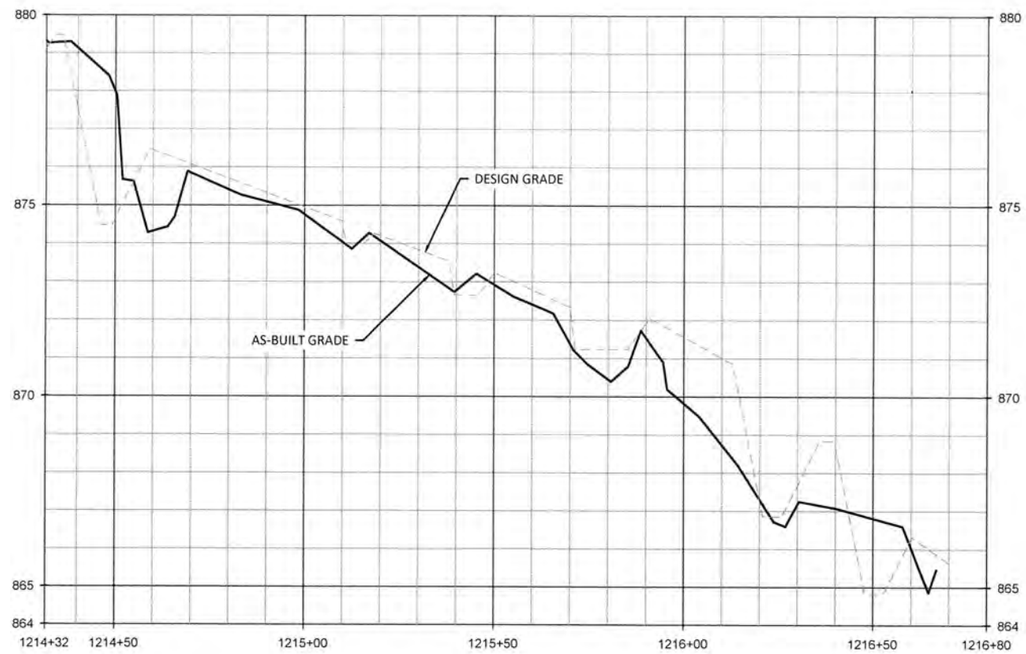

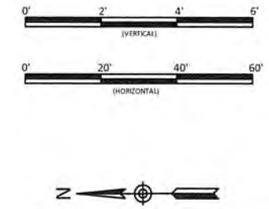

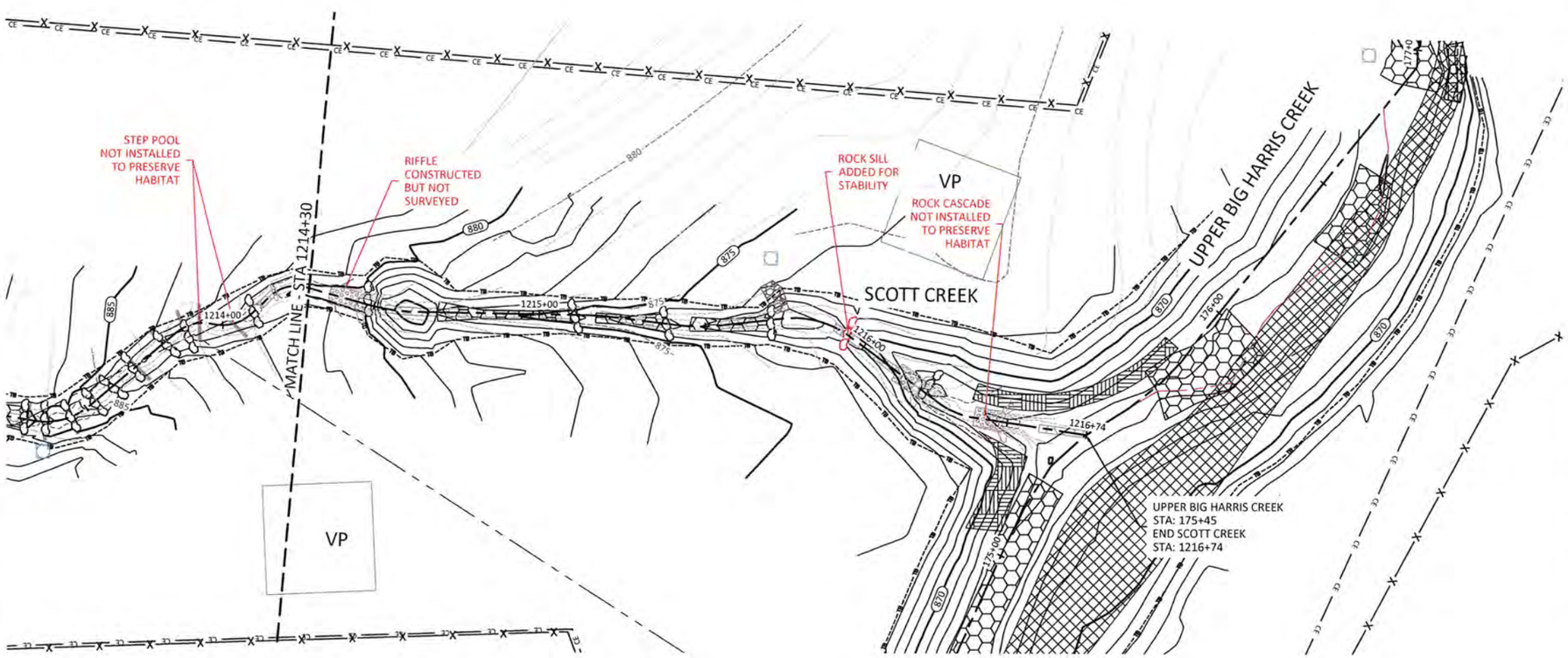

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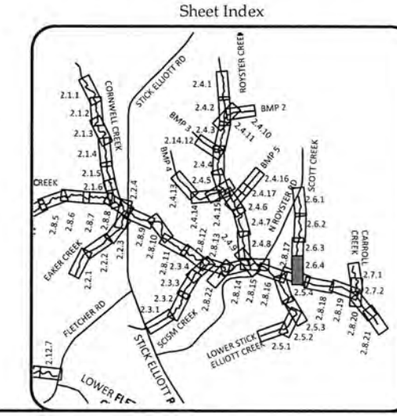

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scott Creek
Stream Plan and Profile Record Drawings

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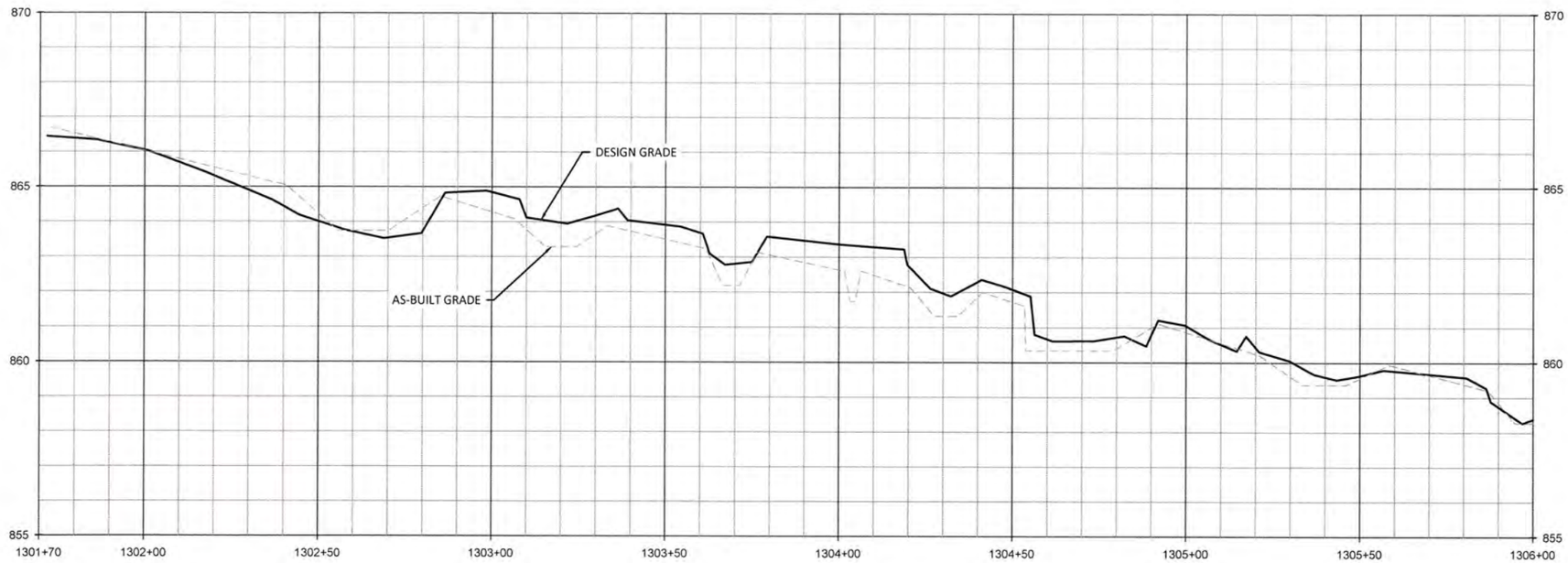

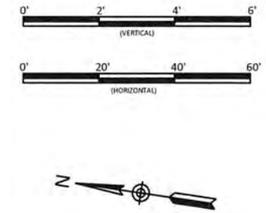

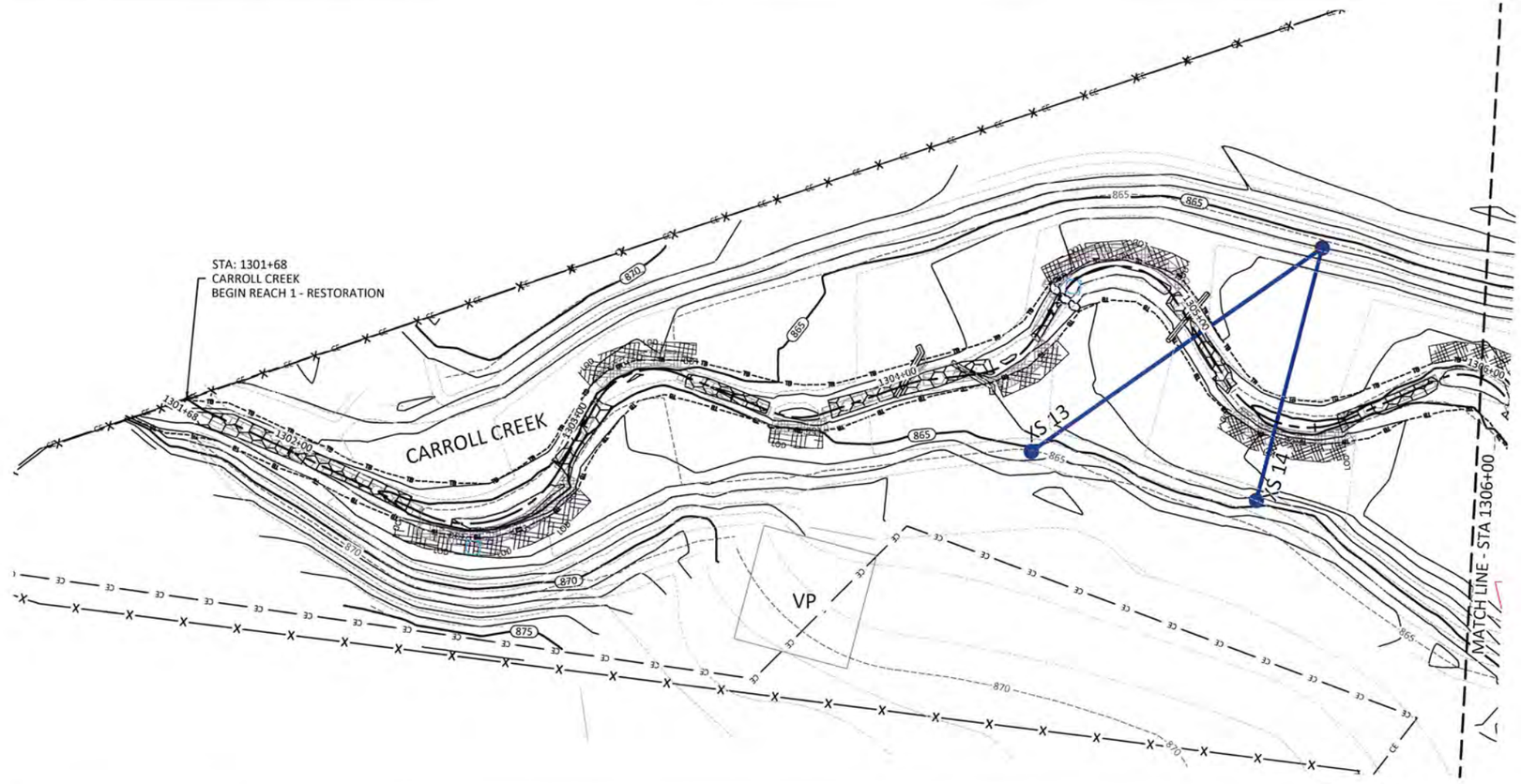

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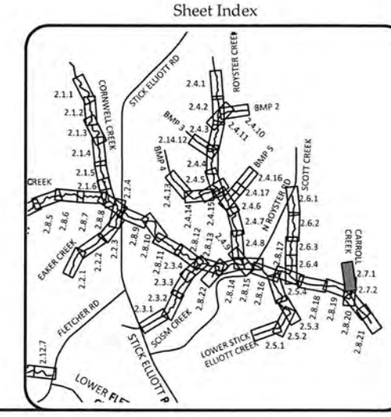

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Carroll Creek
Stream Plan and Profile Record Drawings

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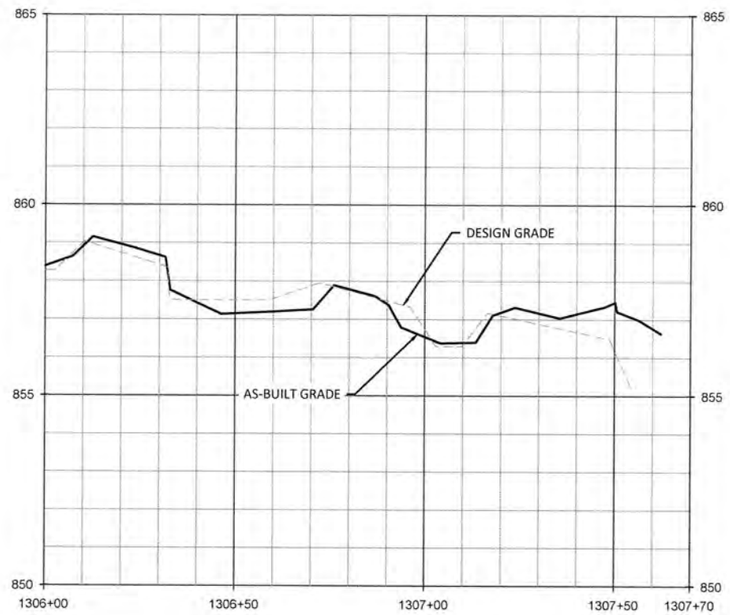
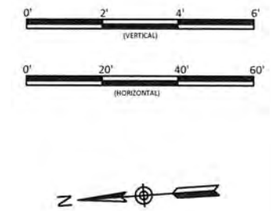
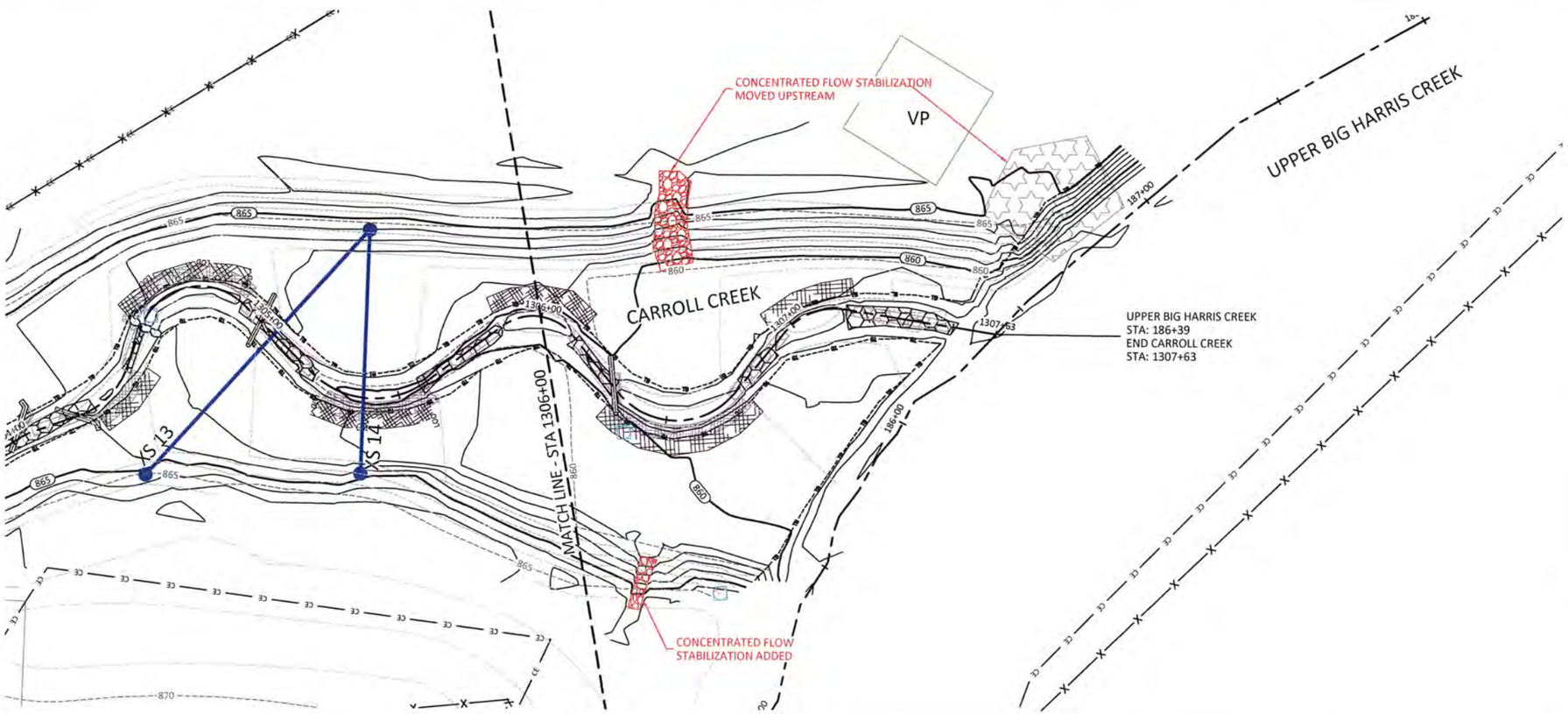
Sheet 2.7.1

August 20, 2018







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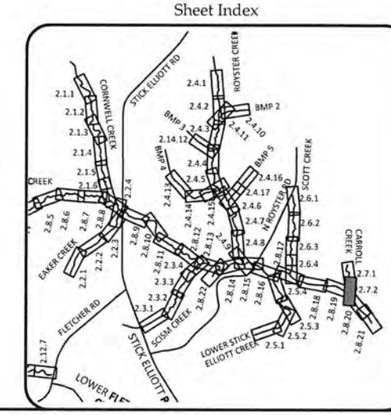

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Carroll Creek
Stream Plan and Profile Record Drawings

Revisions:

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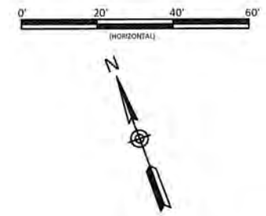
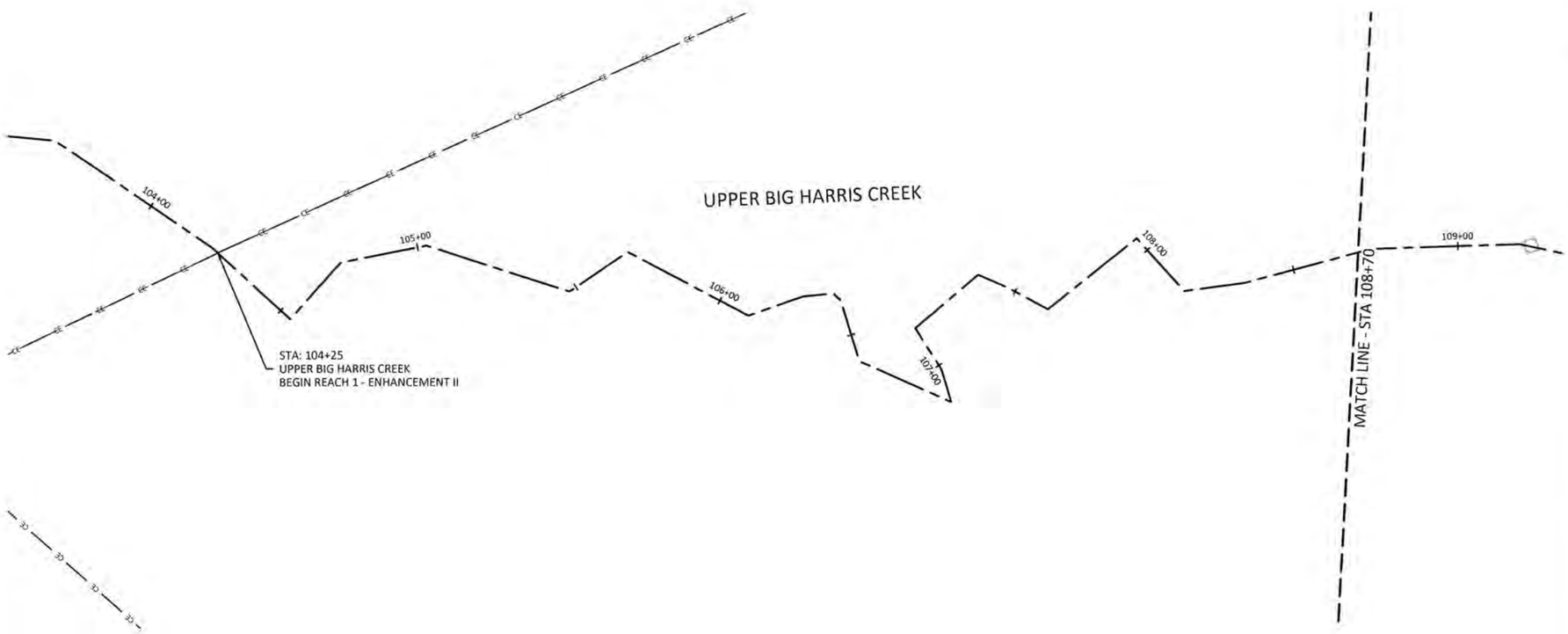
Drawn By:	JS
Checked By:	JCK

Sheet 2.7.2





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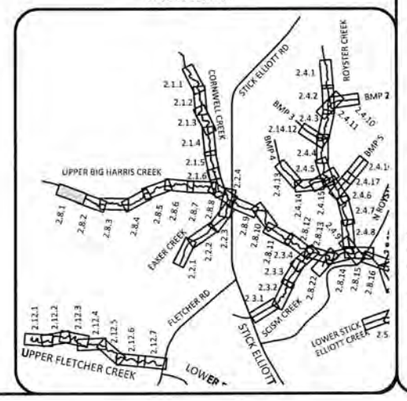

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
JOHN C. REINICKER, JR.
8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
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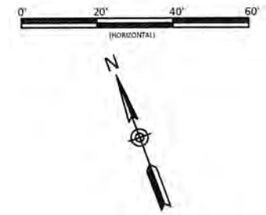
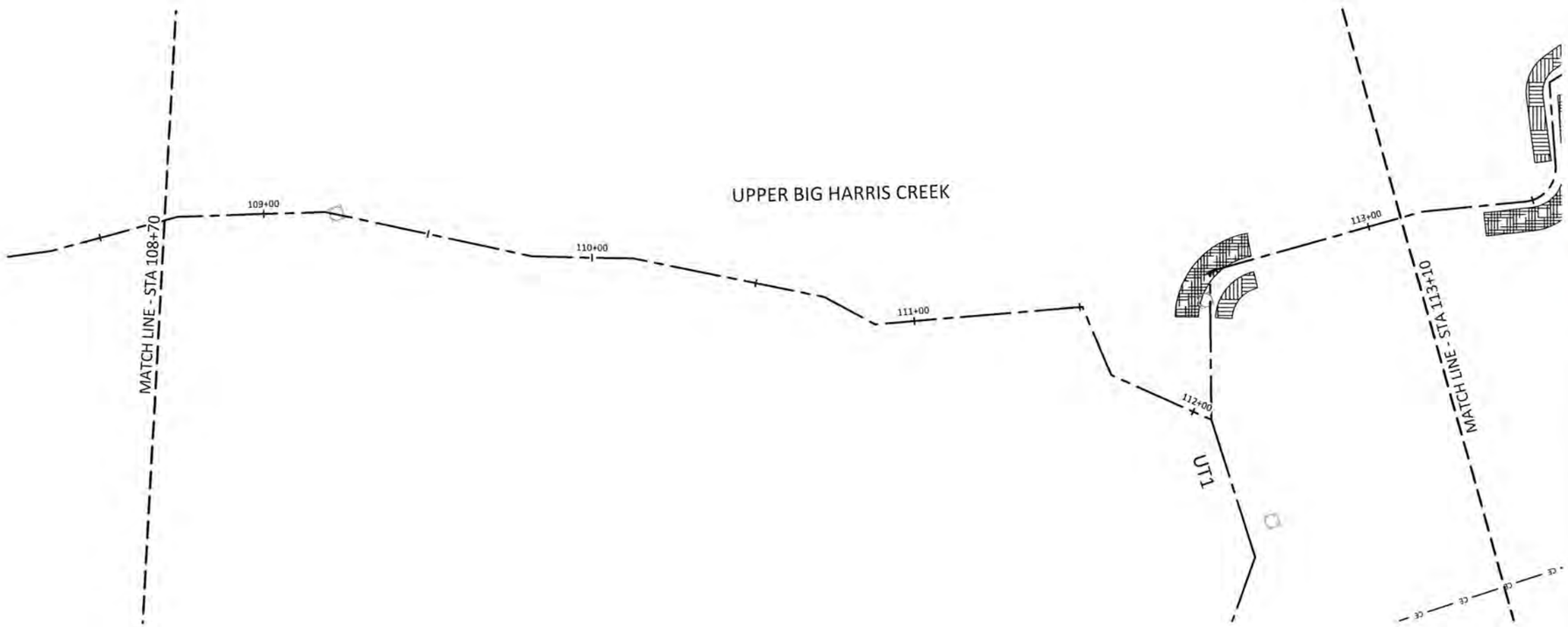
Checked By:	JCK

Sheet 2.8.1





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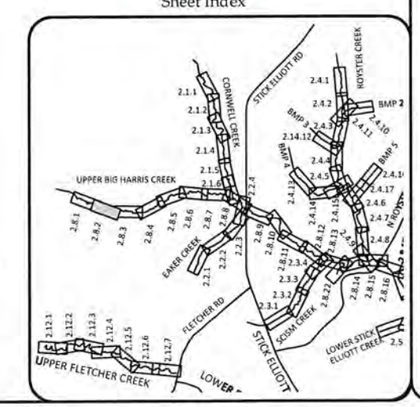

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NORTH CAROLINA PROFESSIONAL SEAL 045 ENGINEER JAMES C. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed by:	EGR, AA
Drawn by:	JS
Checked by:	JCK

Sheet 2.8.2

August 20, 2018
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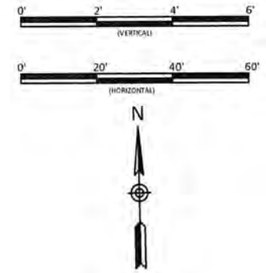
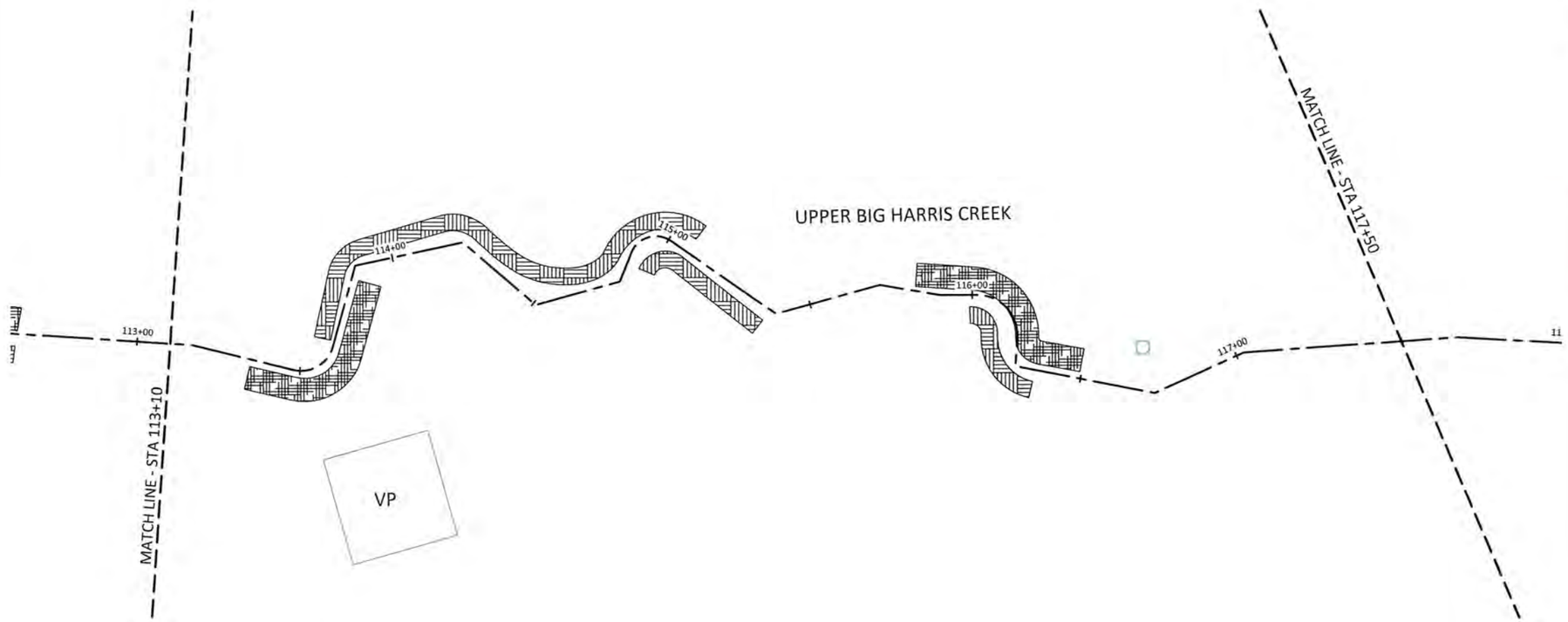


REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.



NOTE:
SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.
BANK GRADING WAS RE-EVALUATED DURING CONSTRUCTION AND REVISED ACCORDINGLY.

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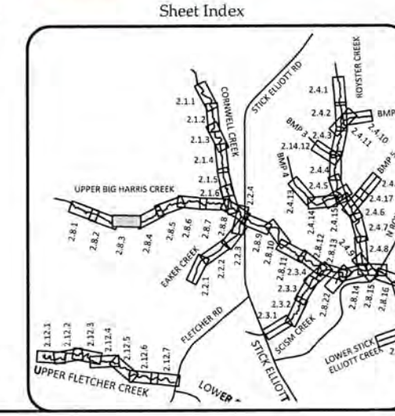

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

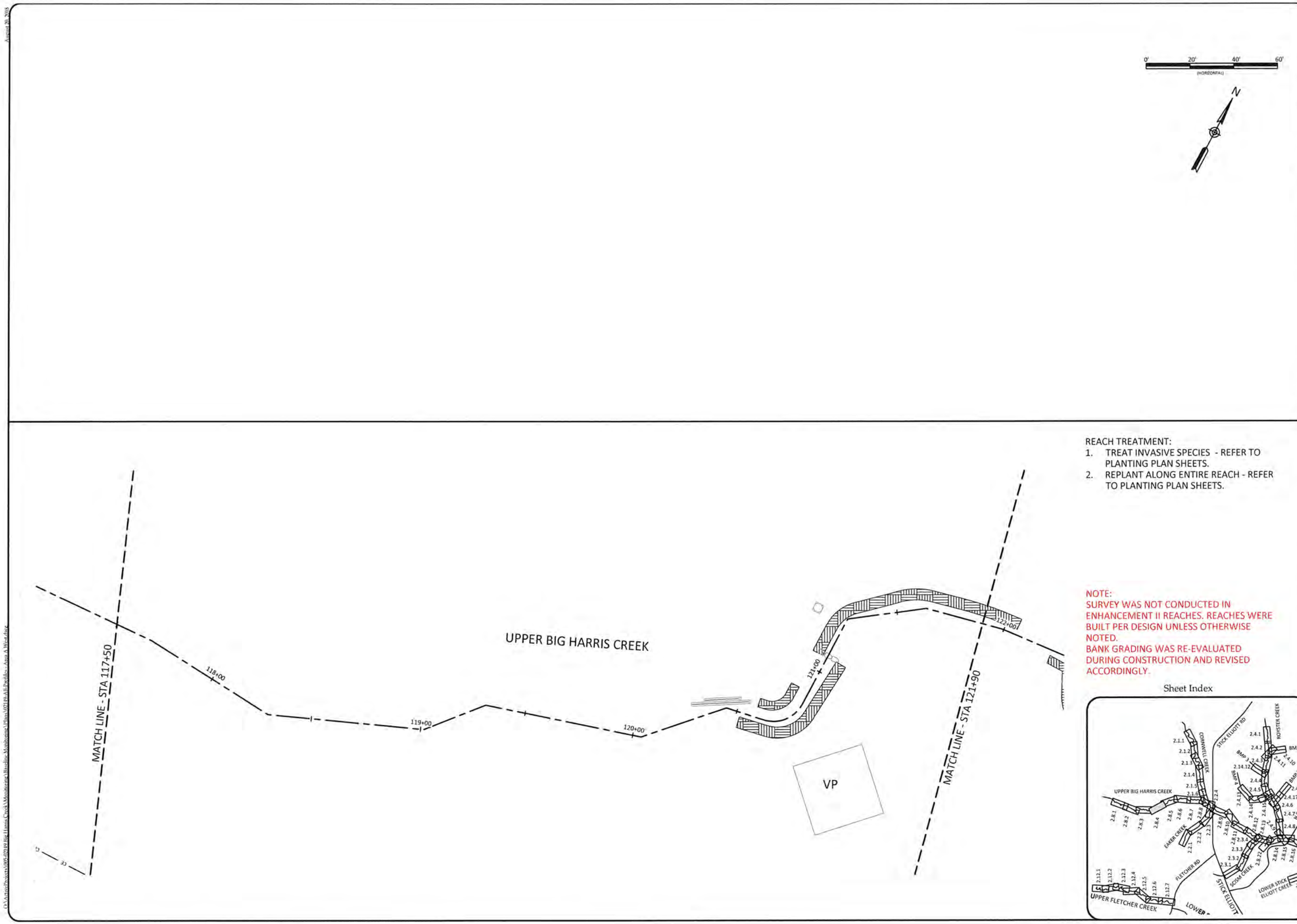
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.3



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Sheet Index

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINIKER 8/23/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.4

August 20, 2018
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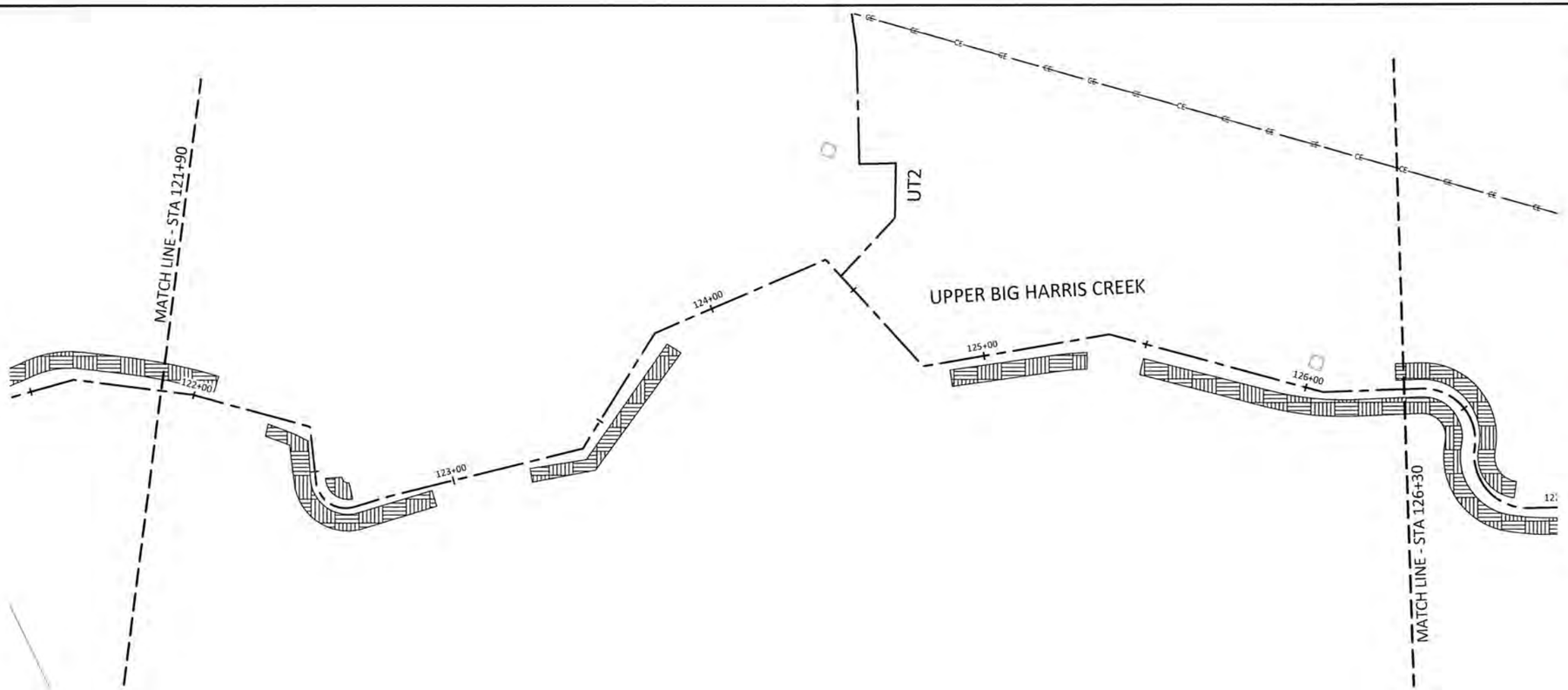

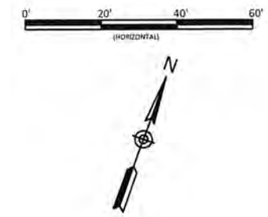

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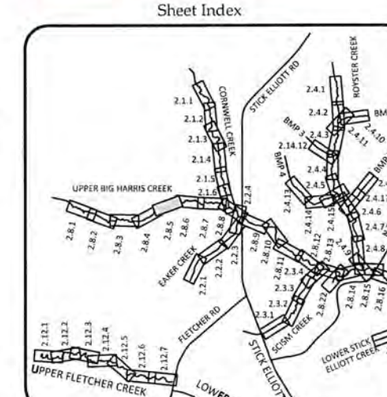

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER EMILY G. REINICKER

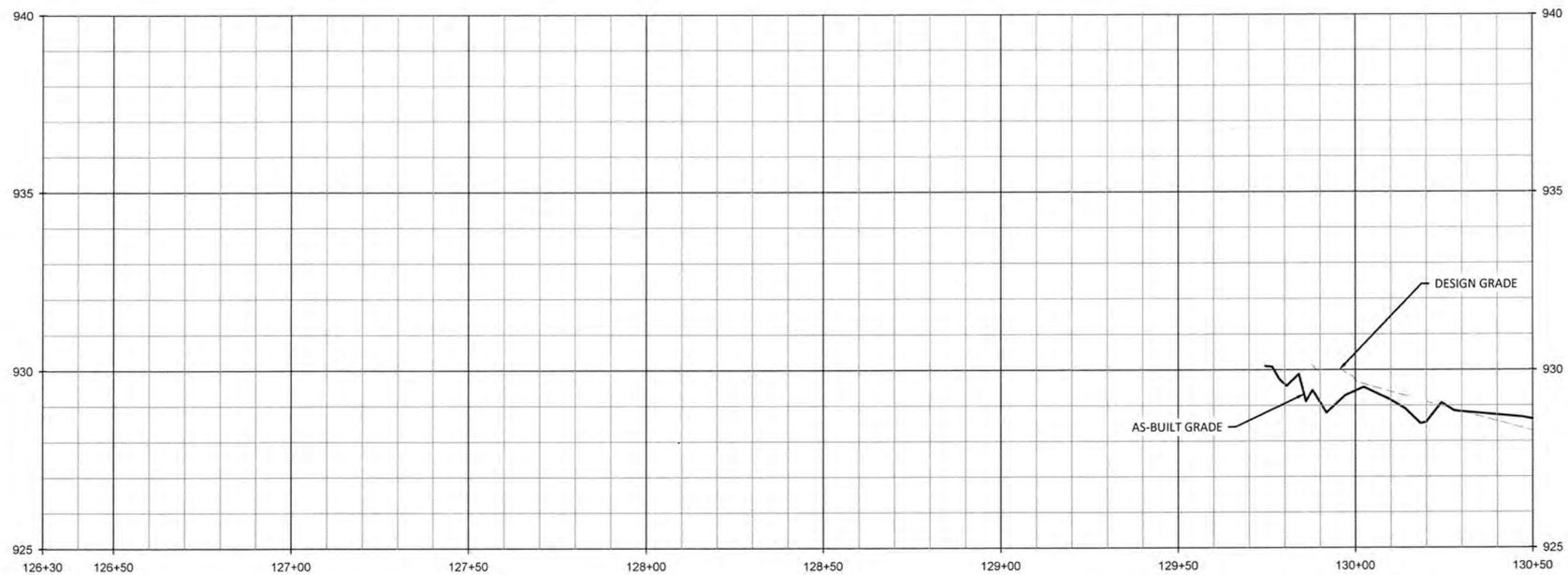
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

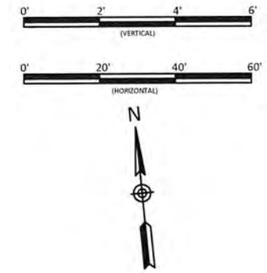
Upper Big Harris Creek Reach 1
Stream Plan and Profile Record Drawings

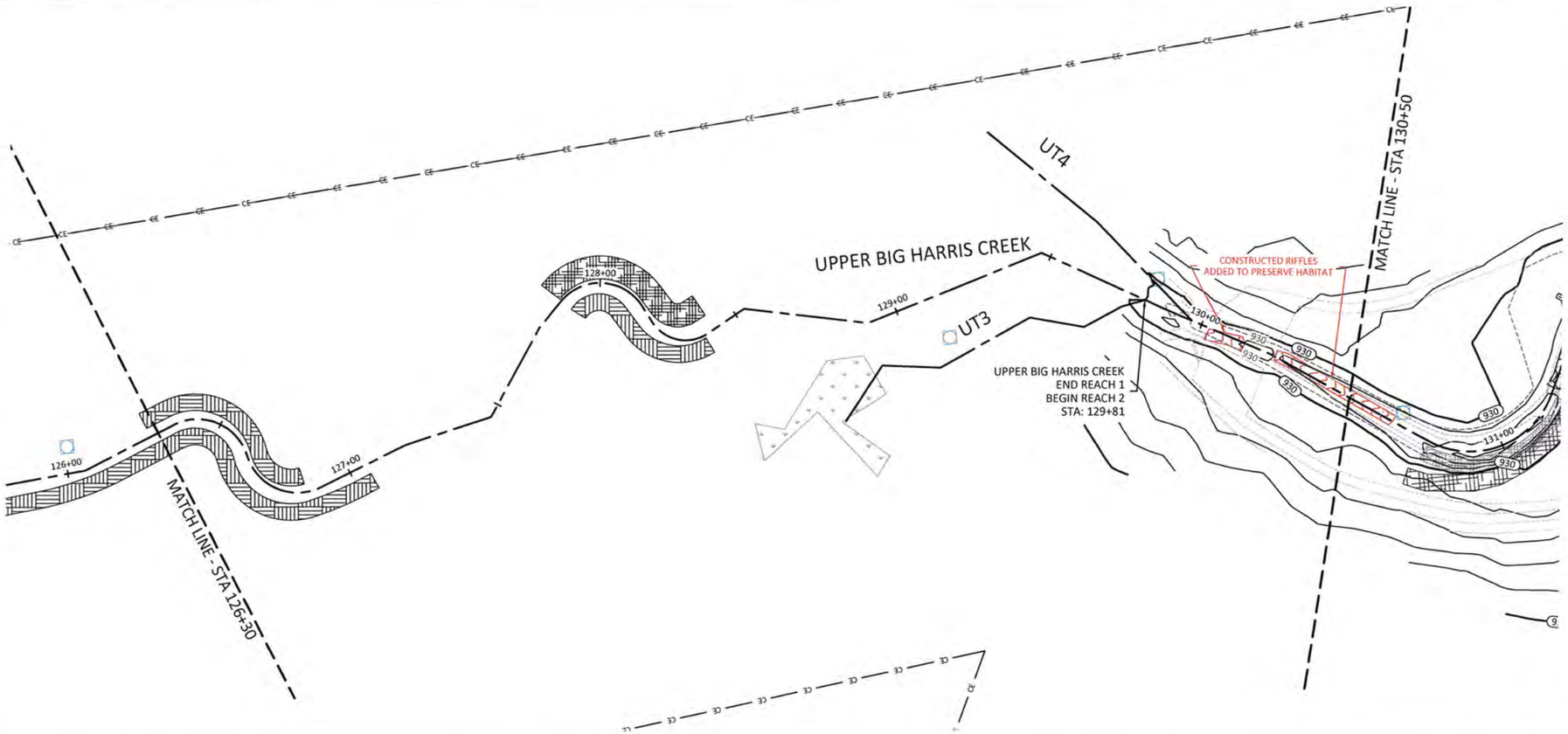
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.5







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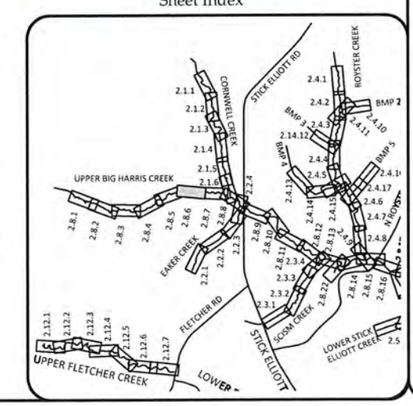

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 1 & 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.6

August 20, 2018
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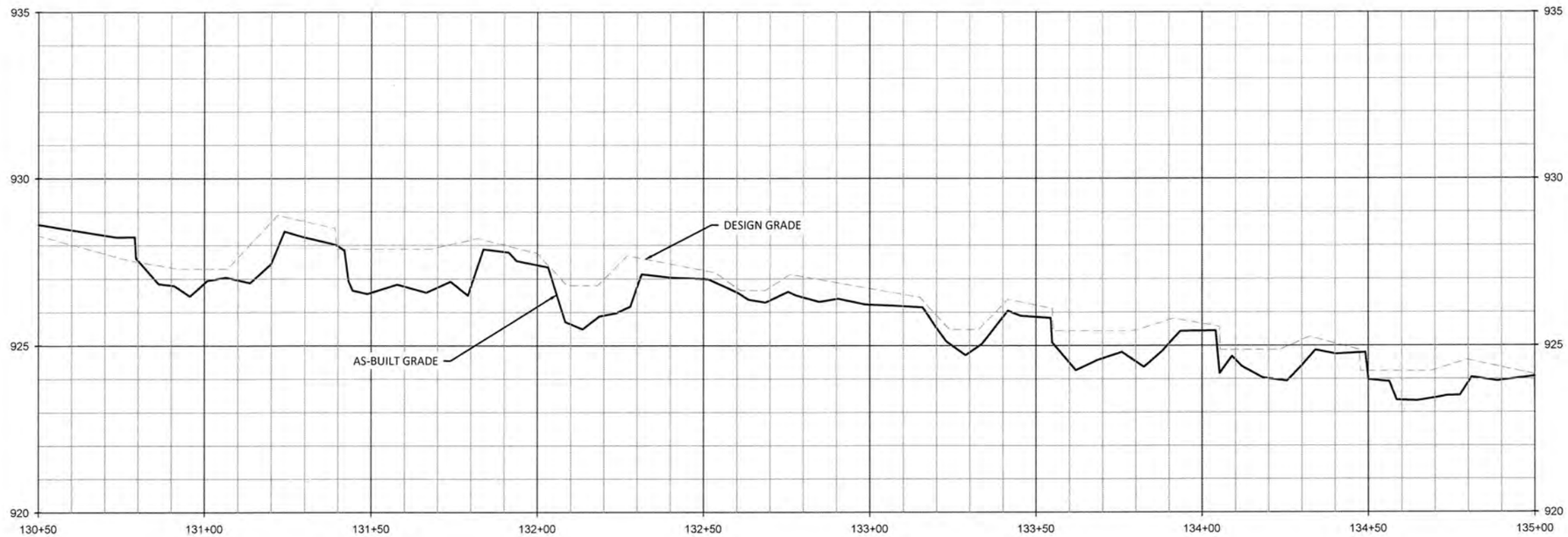

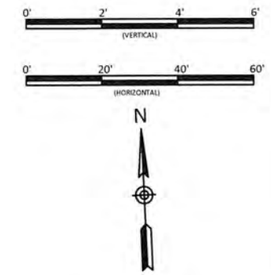

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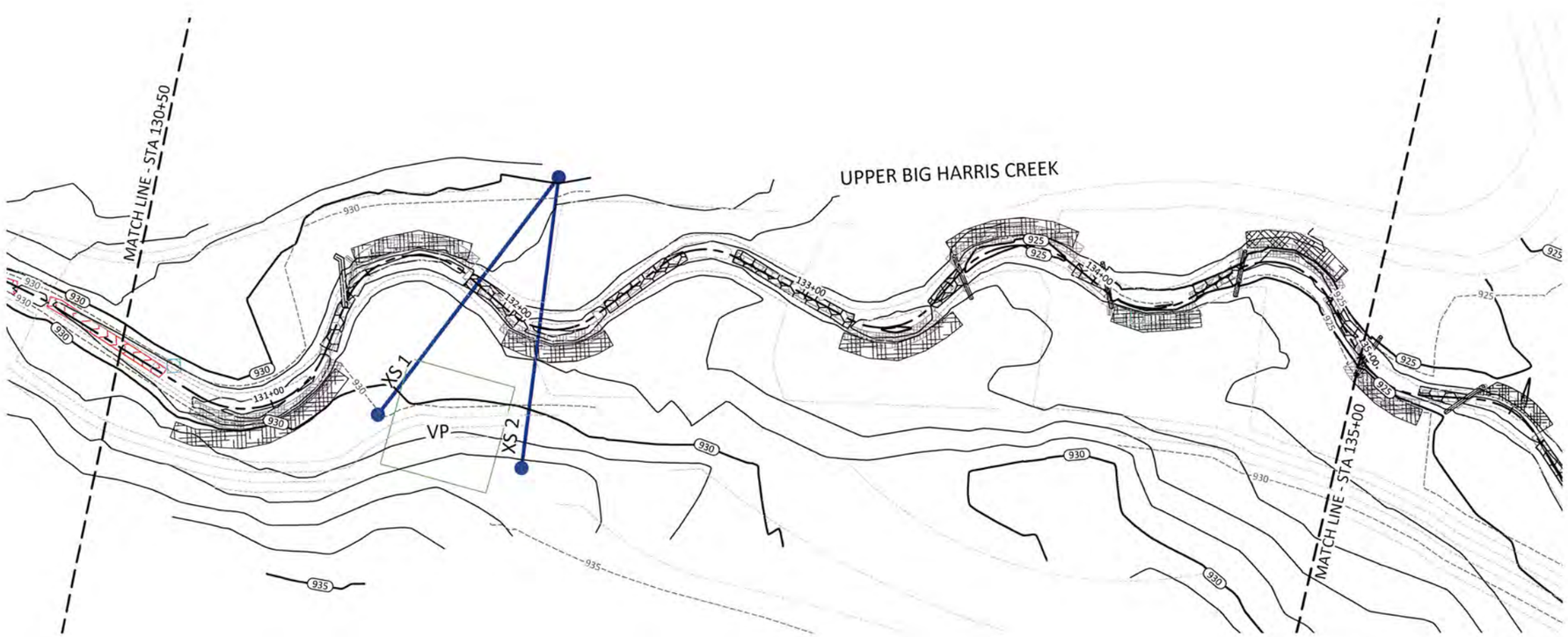

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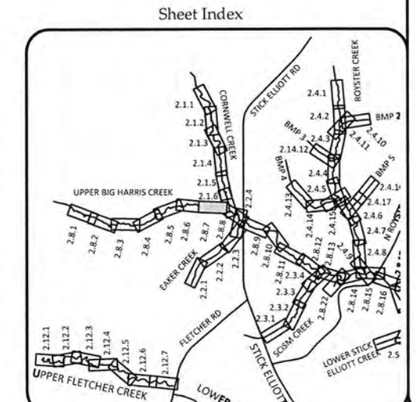

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29910 EMILY G. REINICKER

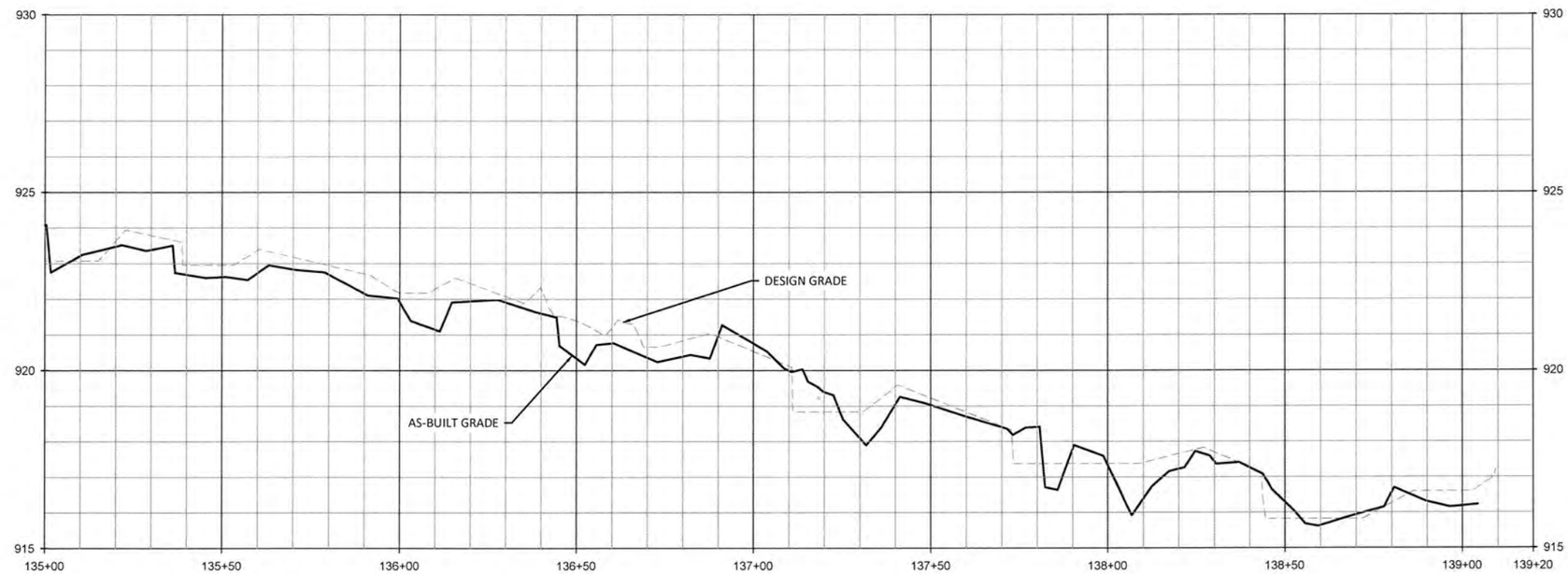
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

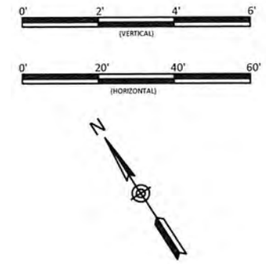
Upper Big Harris Creek Reach 2
Stream Plan and Profile Record Drawings

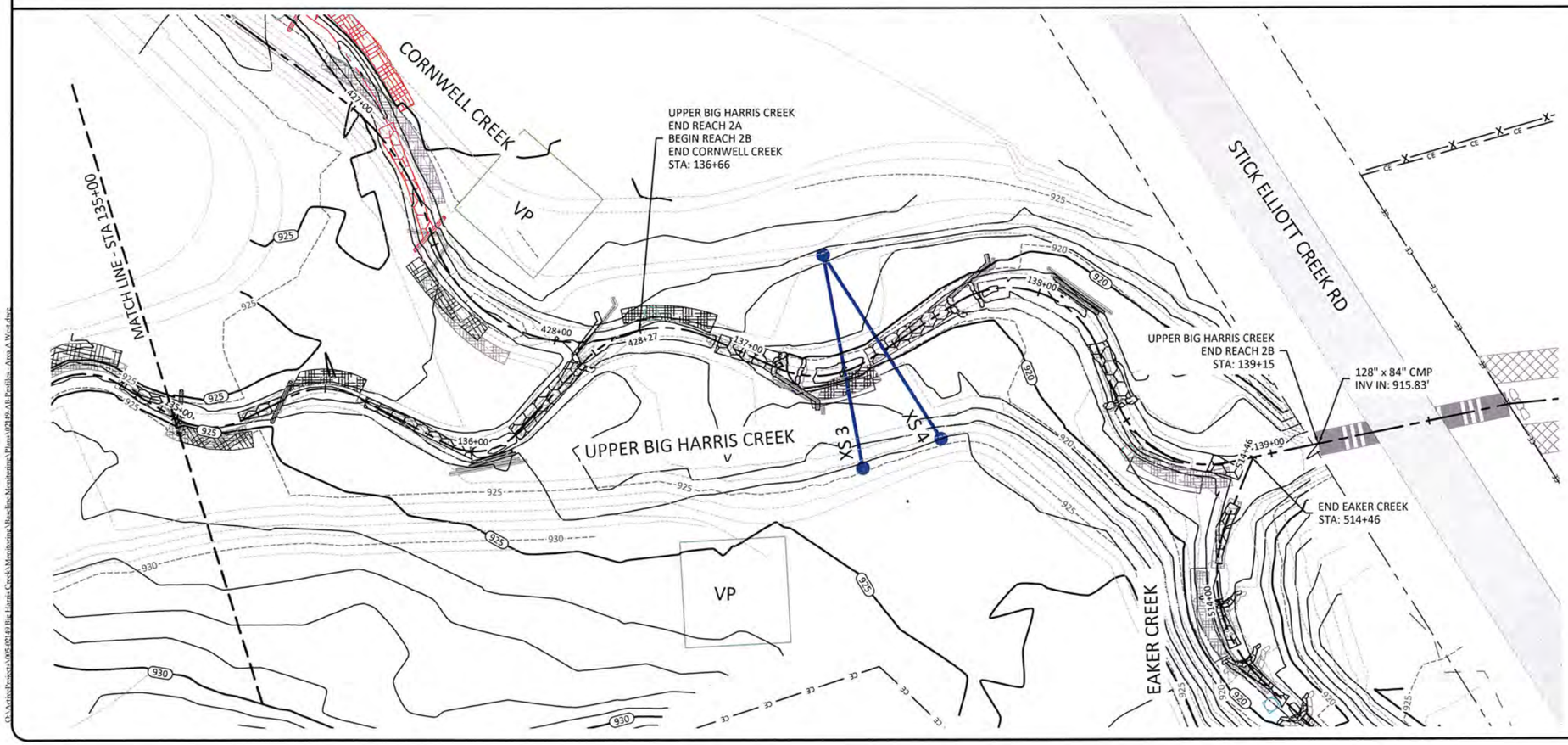
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.7







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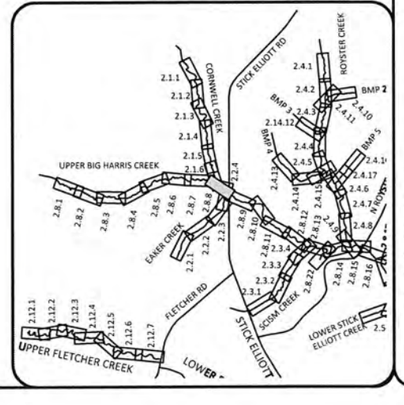

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19913 EMILY G. REINICKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.8

August 20, 2018

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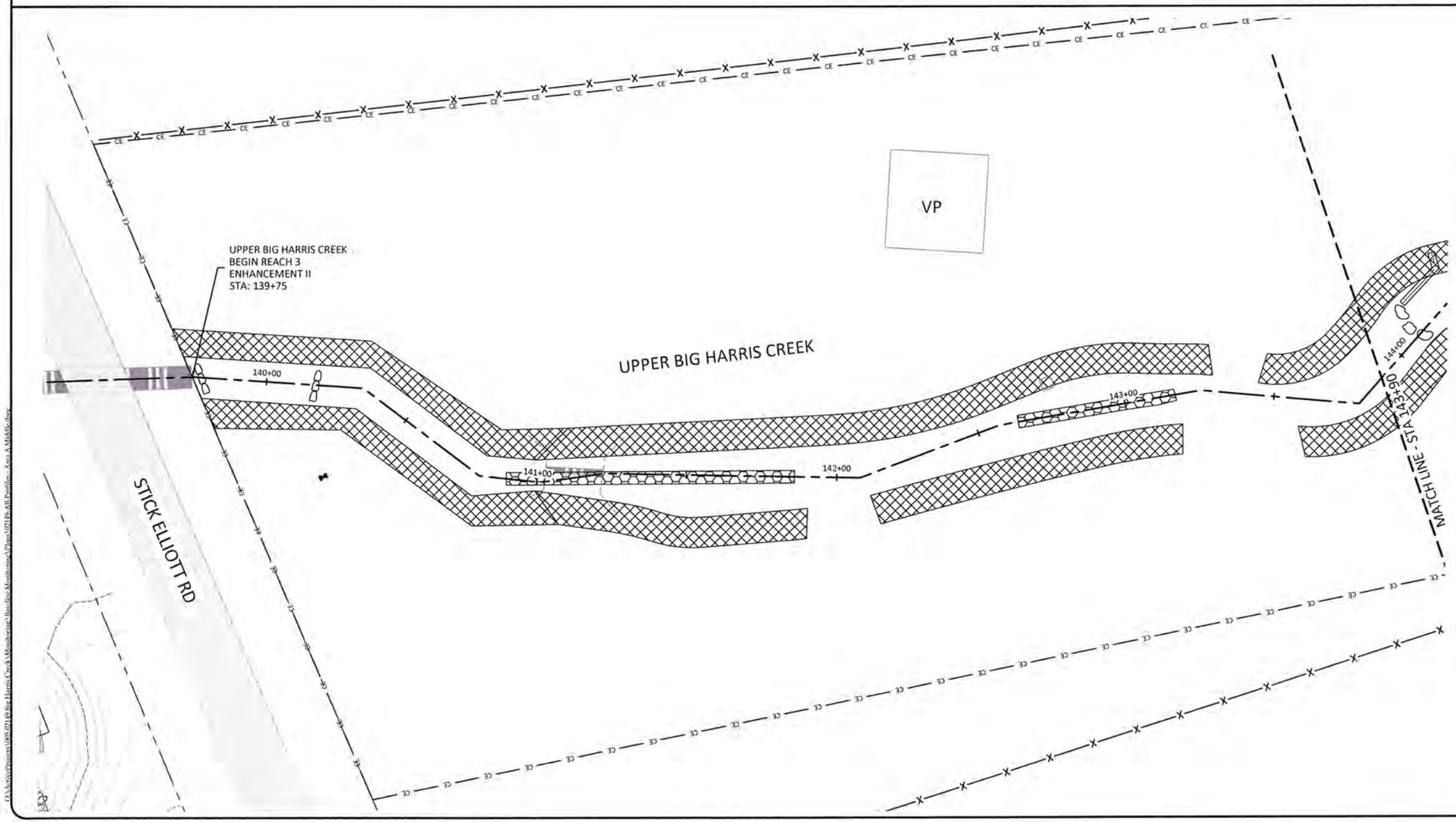

REACH TREATMENT:

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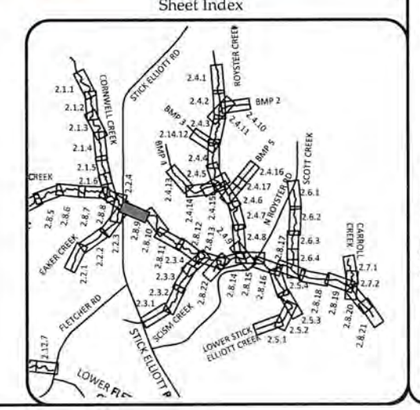
Sheet Index



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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINIKER 8/14/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

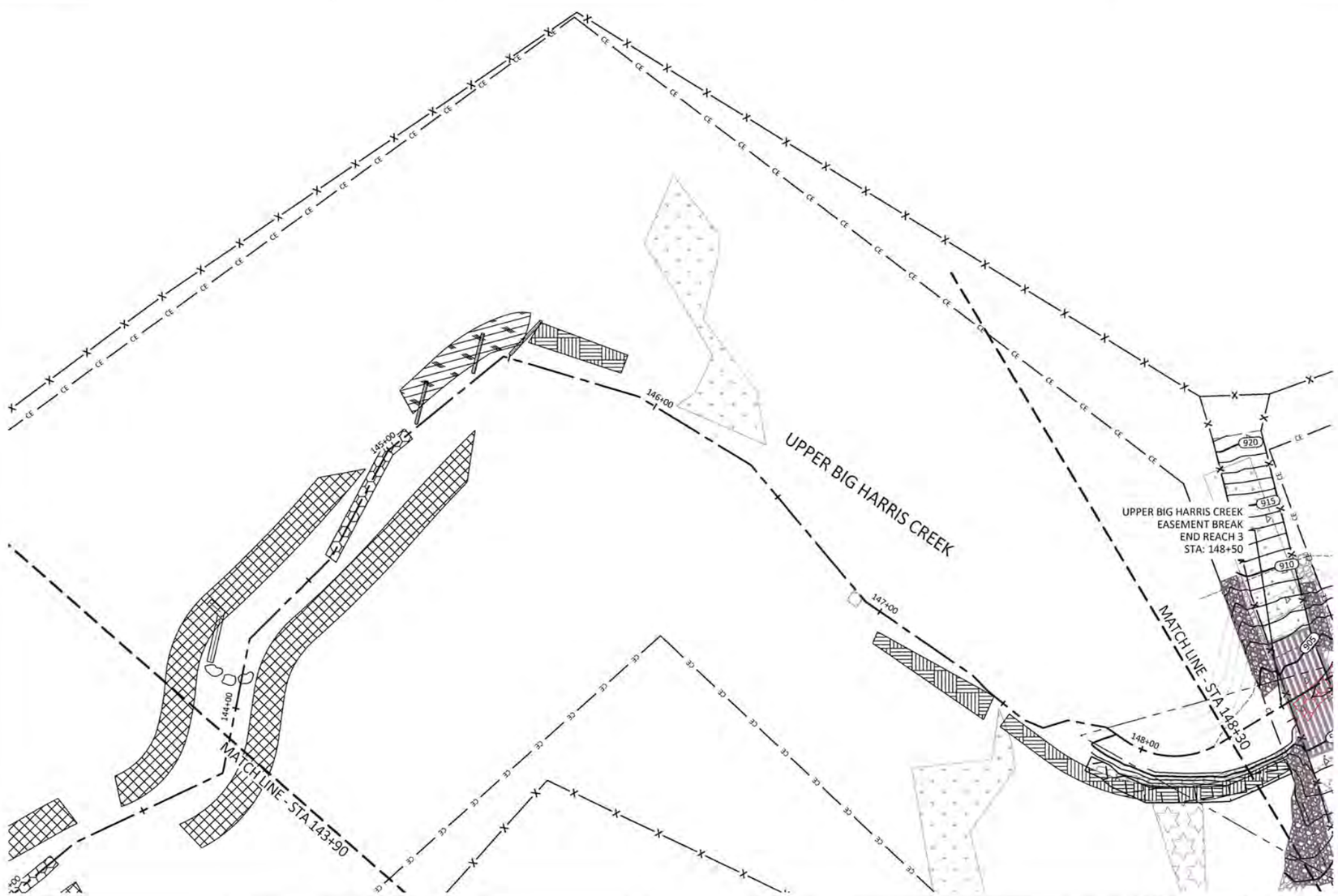
Upper Big Harris Creek Reach 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	ECR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.9

August 20, 2018



REACH TREATMENT:

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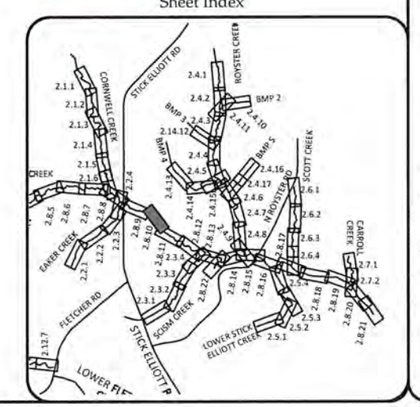

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036824 JOHN C. REINICKER, JR.

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 3
Stream Plan and Profile Record Drawings

Date:	August 21, 2018
Job Number:	005-02123
Designed by:	EGR, AA
Drawn by:	JS
Checked by:	JCR

Revisions:

Sheet 2.8.10

August 20, 2018

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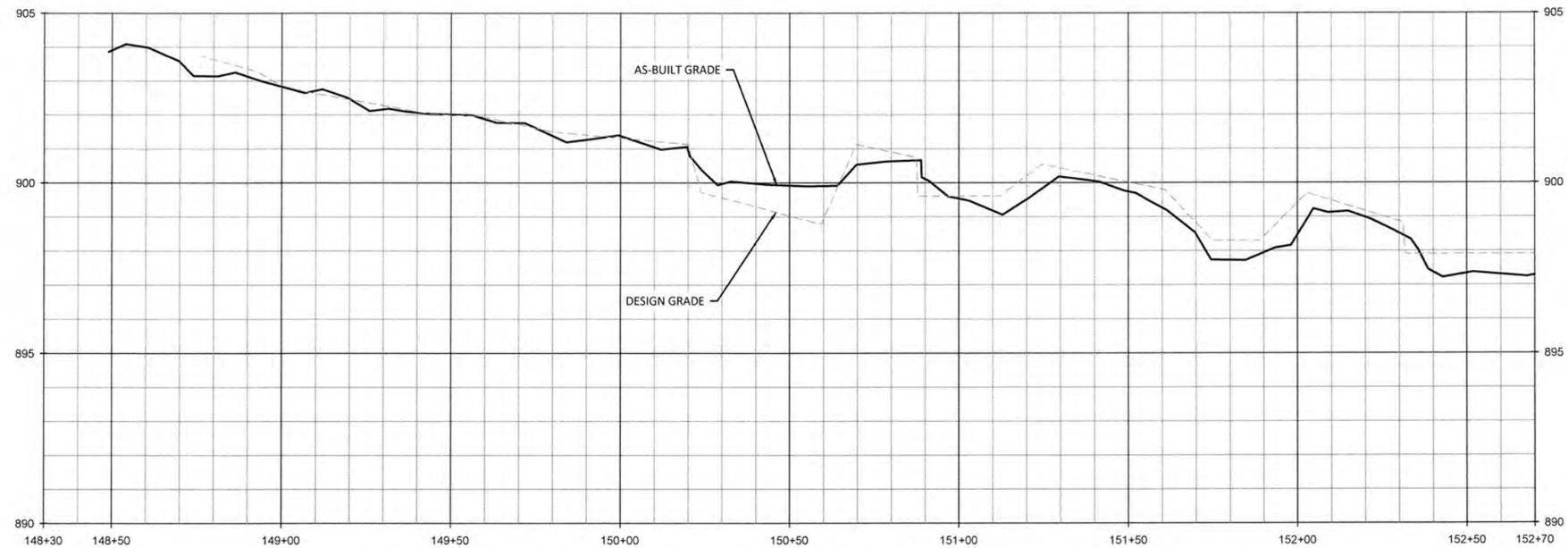

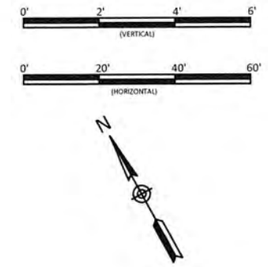

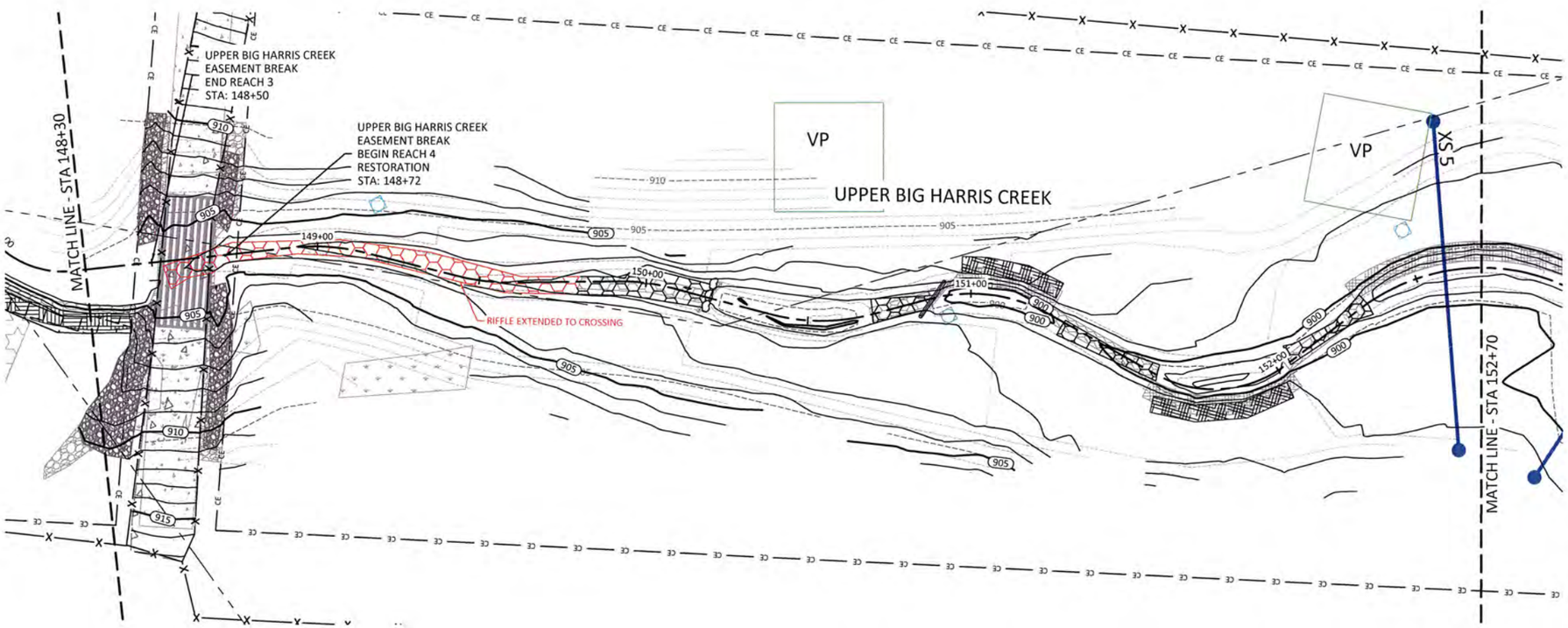

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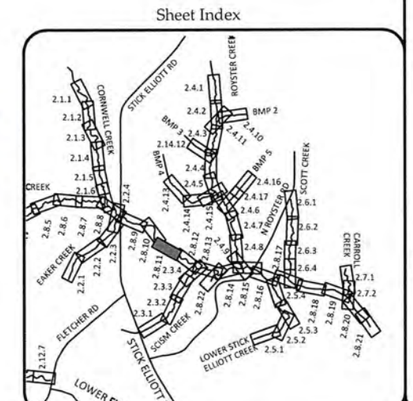

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NORTH CAROLINA PROFESSIONAL SEAL 29913 ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

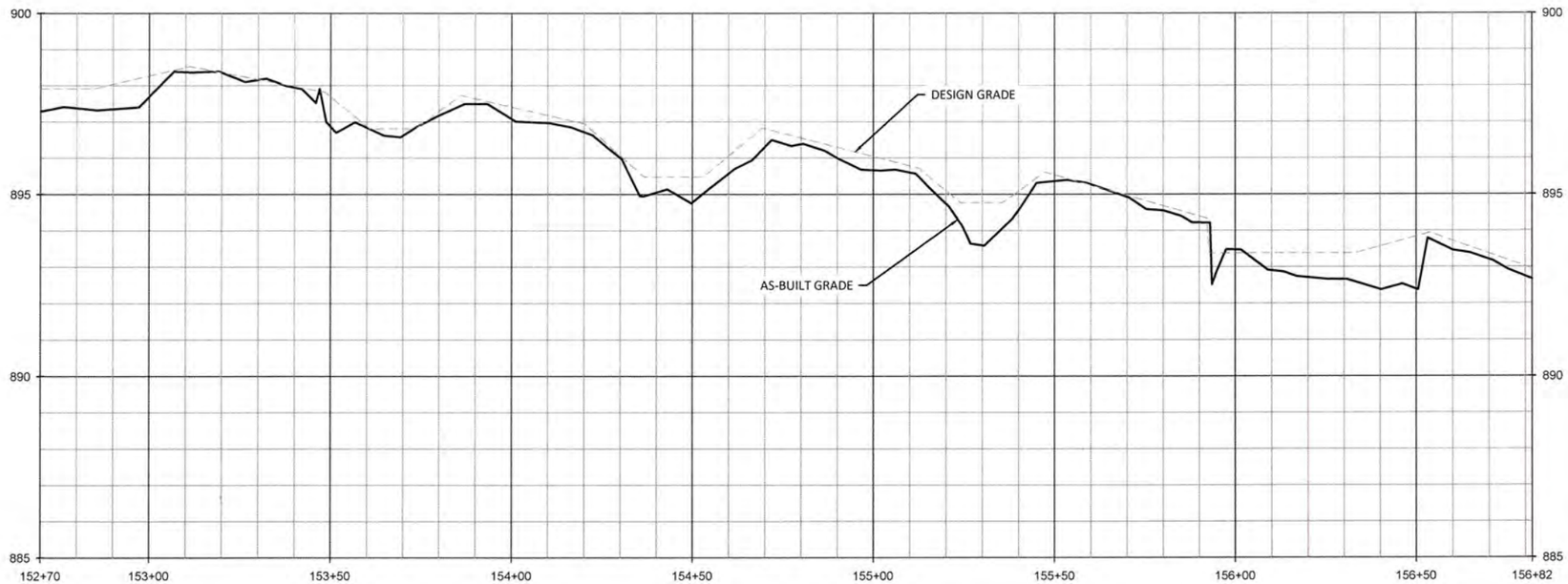
Upper Big Harris Creek Reach 4
Stream Plan and Profile Record Drawings

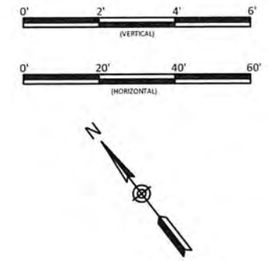
Revisions:

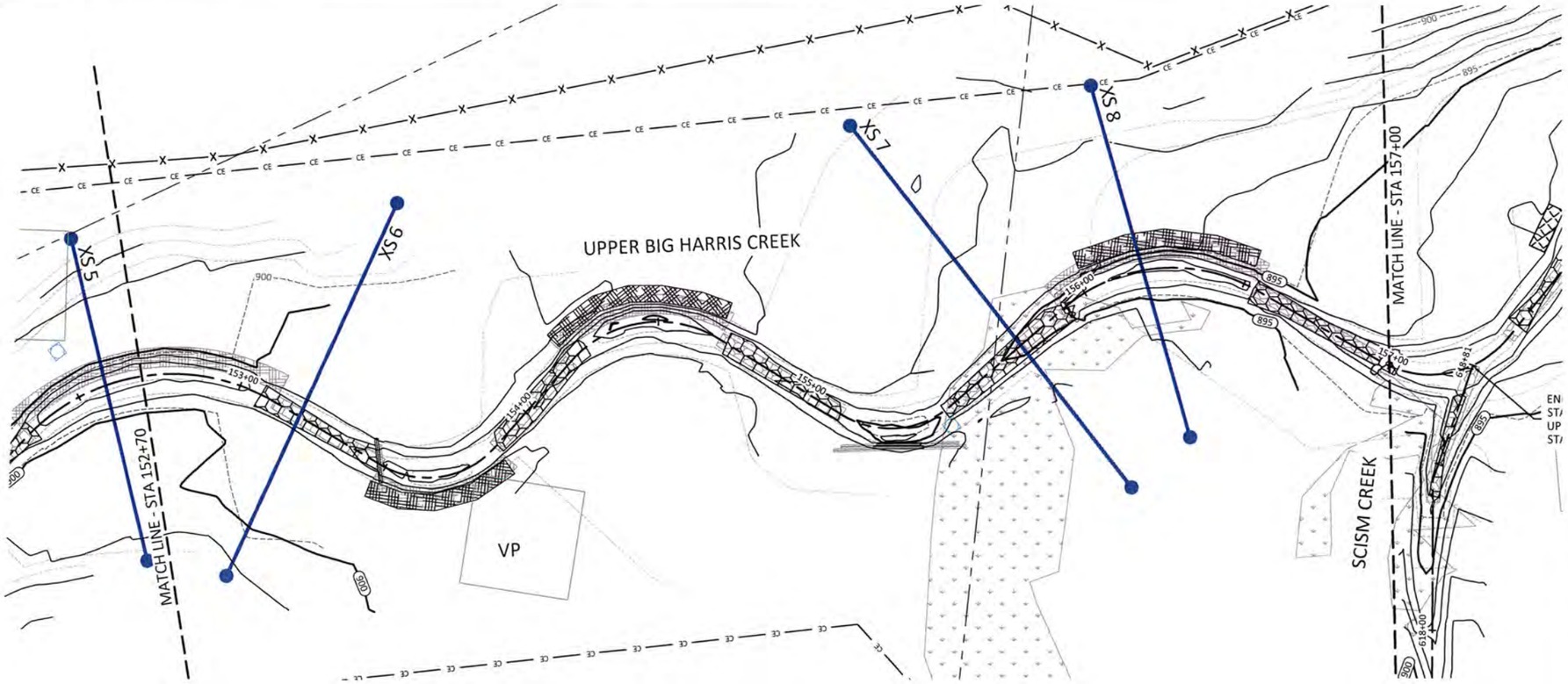
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.11

August 20, 2018







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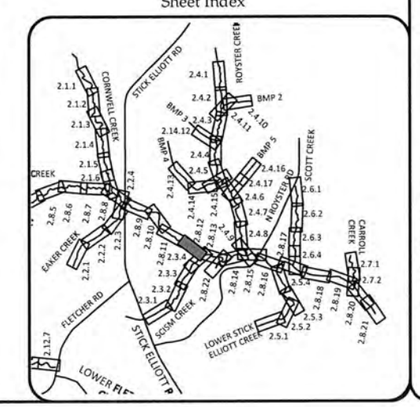

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 4
Stream Plan and Profile Record Drawings

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

Sheet 2.8.12

August 20, 2018
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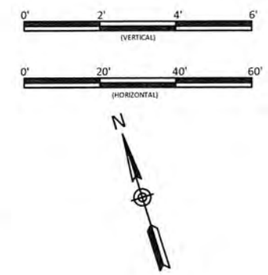

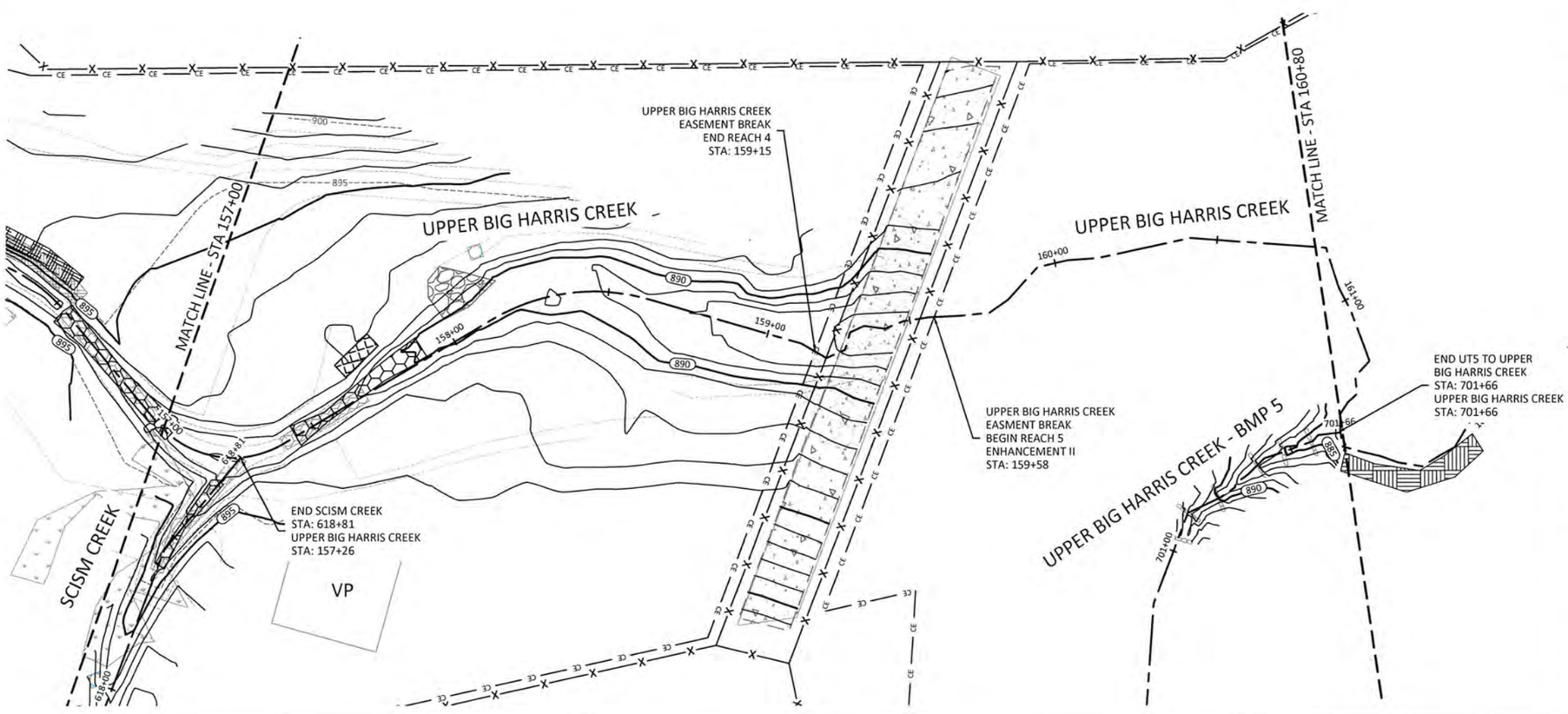

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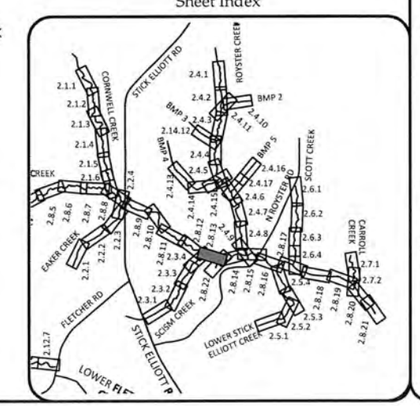

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049191 JAMES C. REINICKER III 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Reach Creek 4 & 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.13

Printed 20 2018
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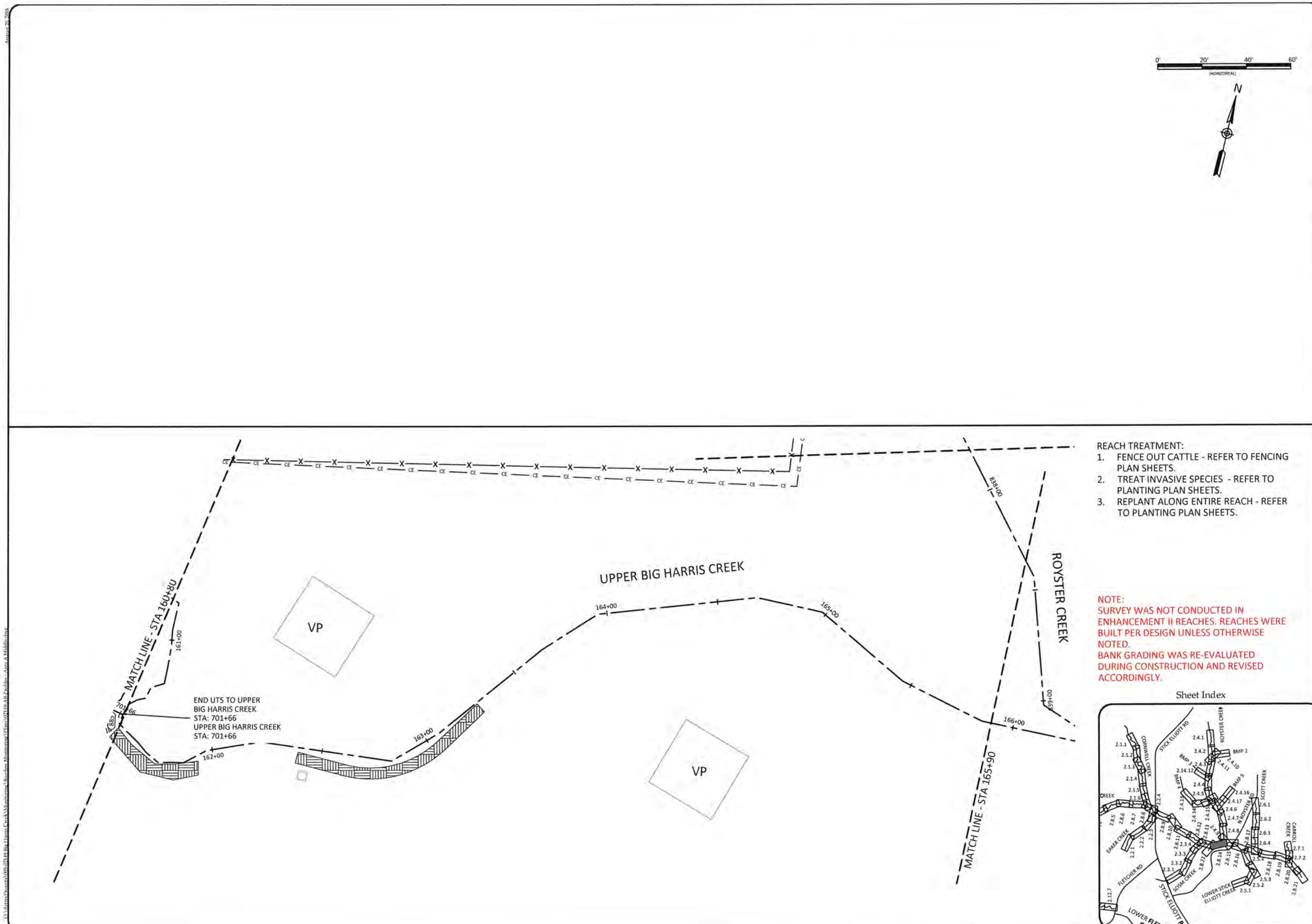

REACH TREATMENT:

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2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

NOTE:
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BANK GRADING WAS RE-EVALUATED DURING CONSTRUCTION AND REVISED ACCORDINGLY.

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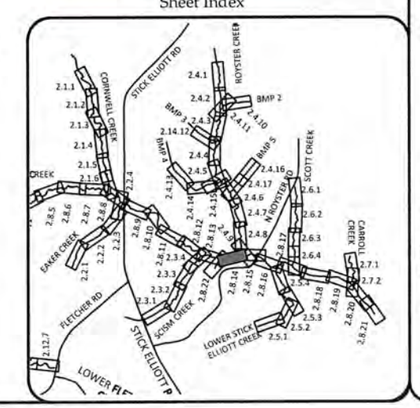

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

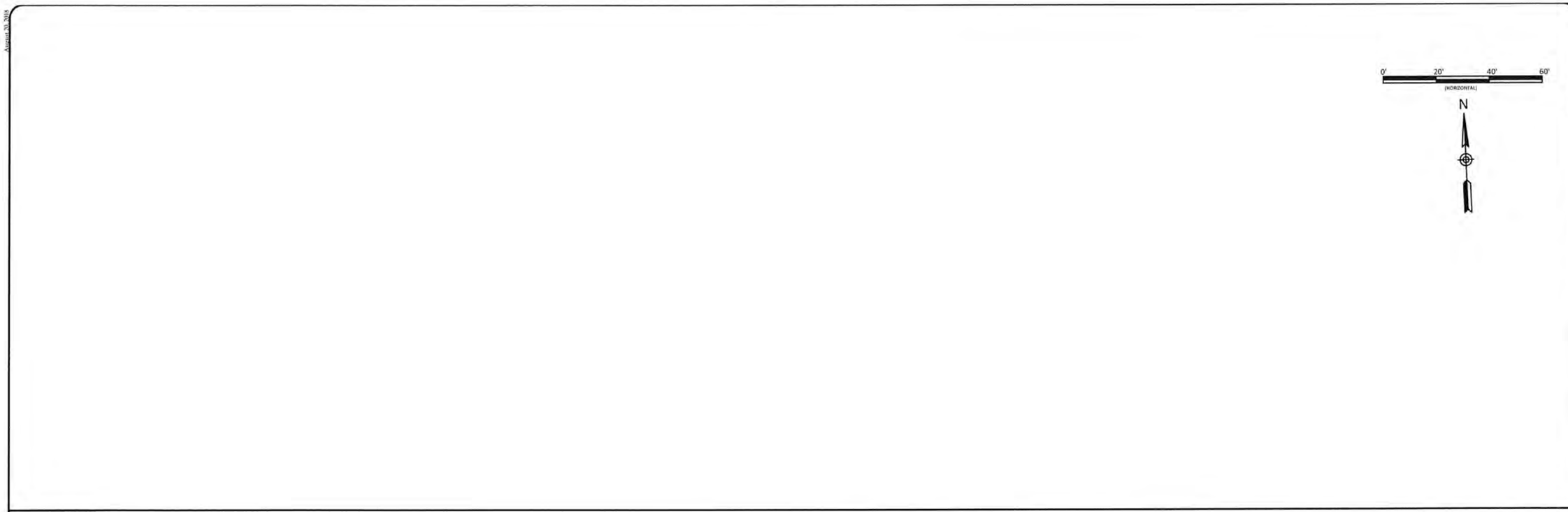
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.14



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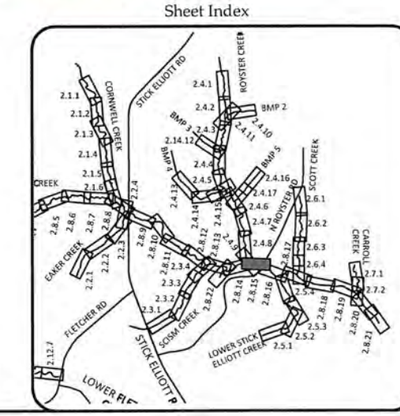

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29 EMILY G. REINICKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

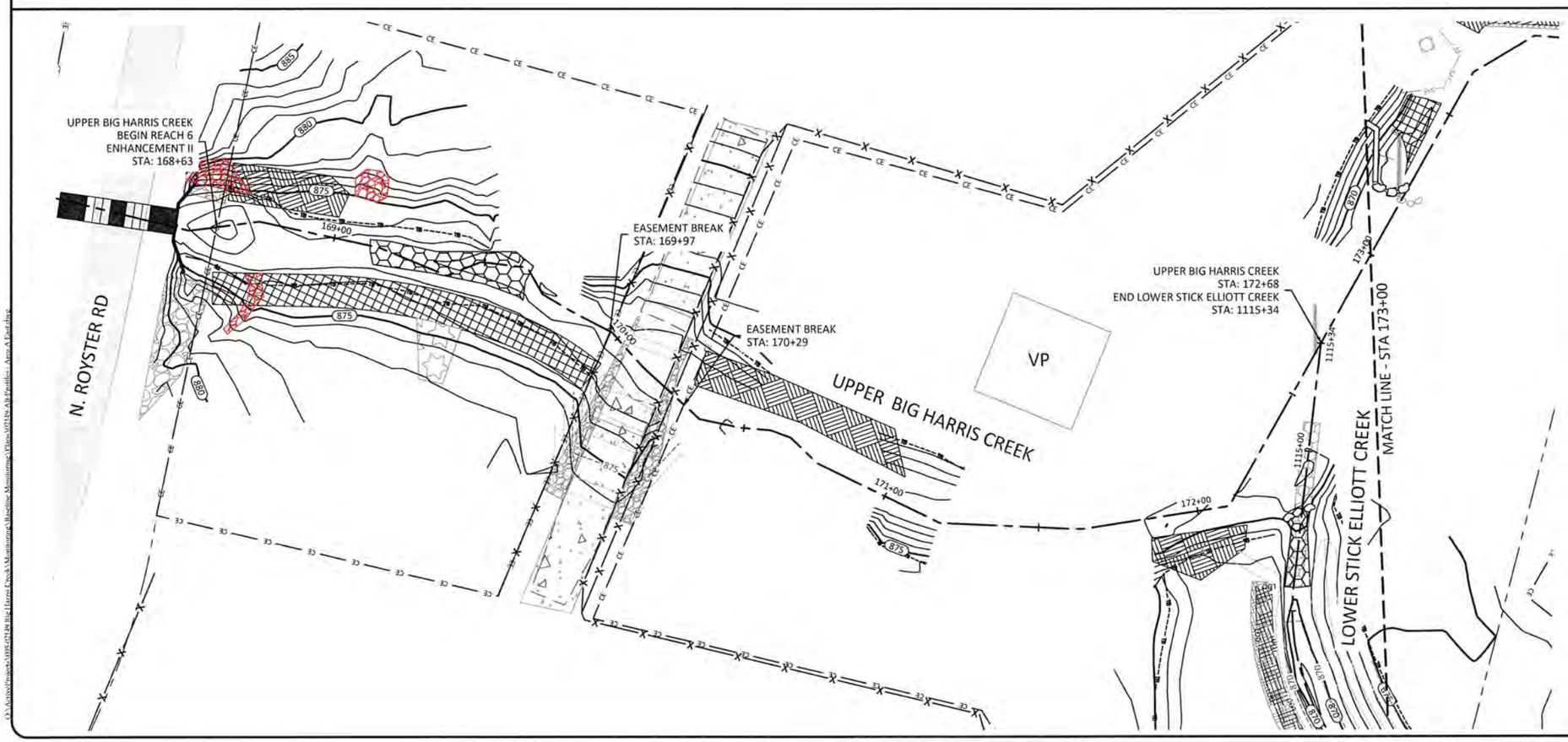
Upper Big Harris Creek Reach 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.15

August 30, 2018



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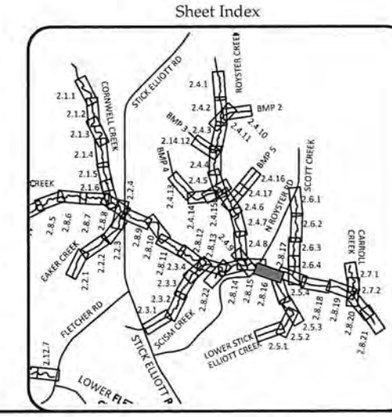

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

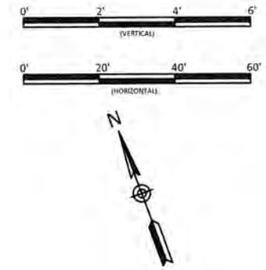
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

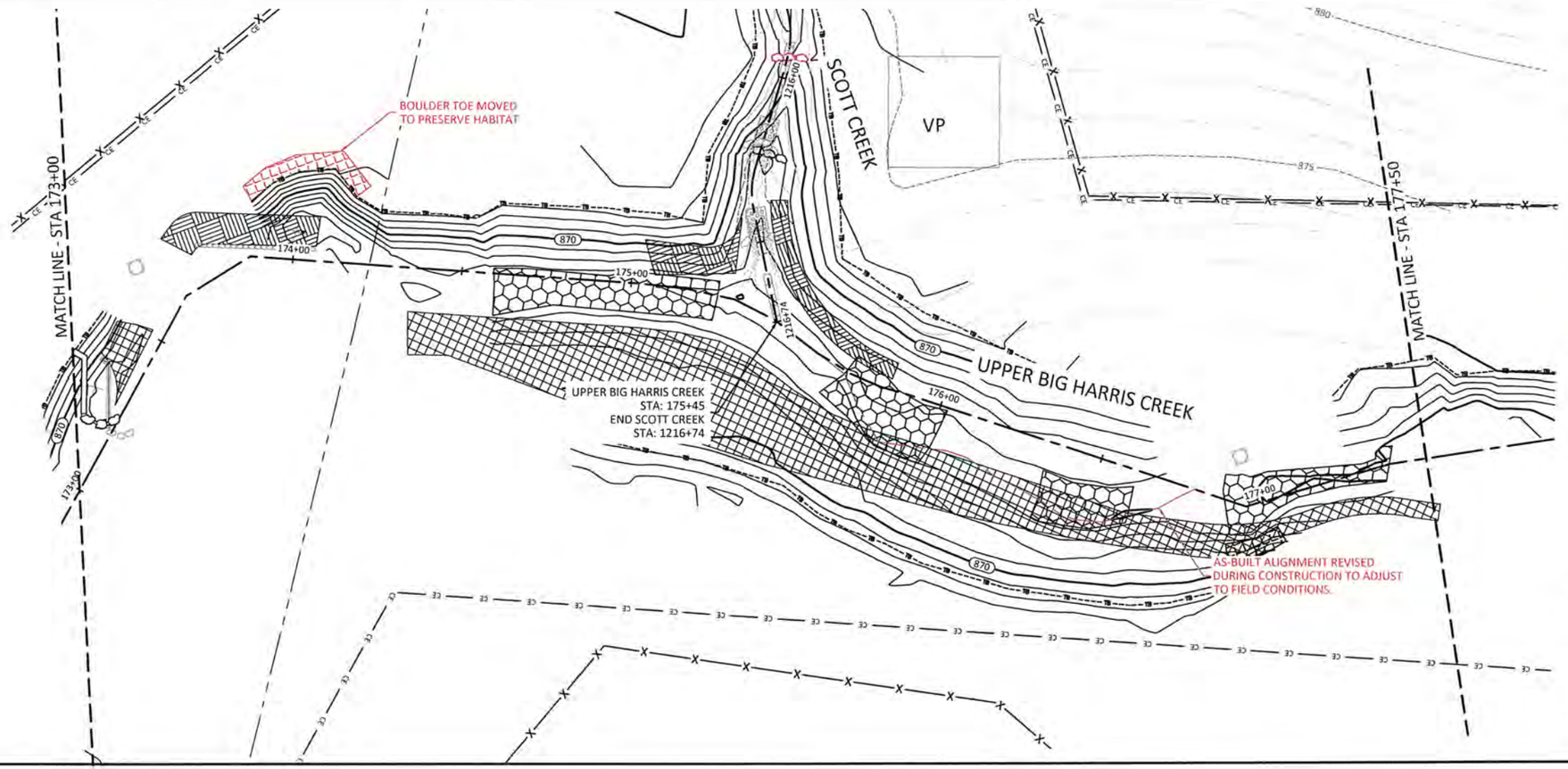
Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.16





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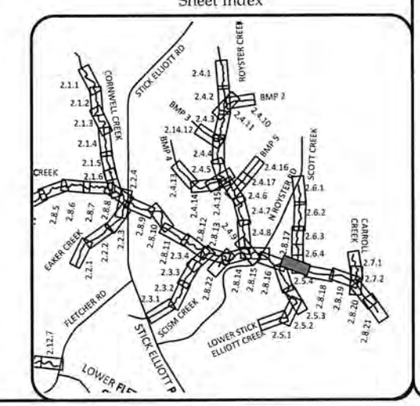

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
EMILY G. REINICKER
8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.17

August 20, 2018
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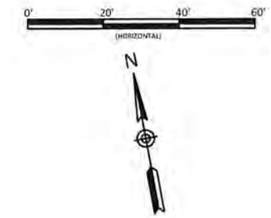

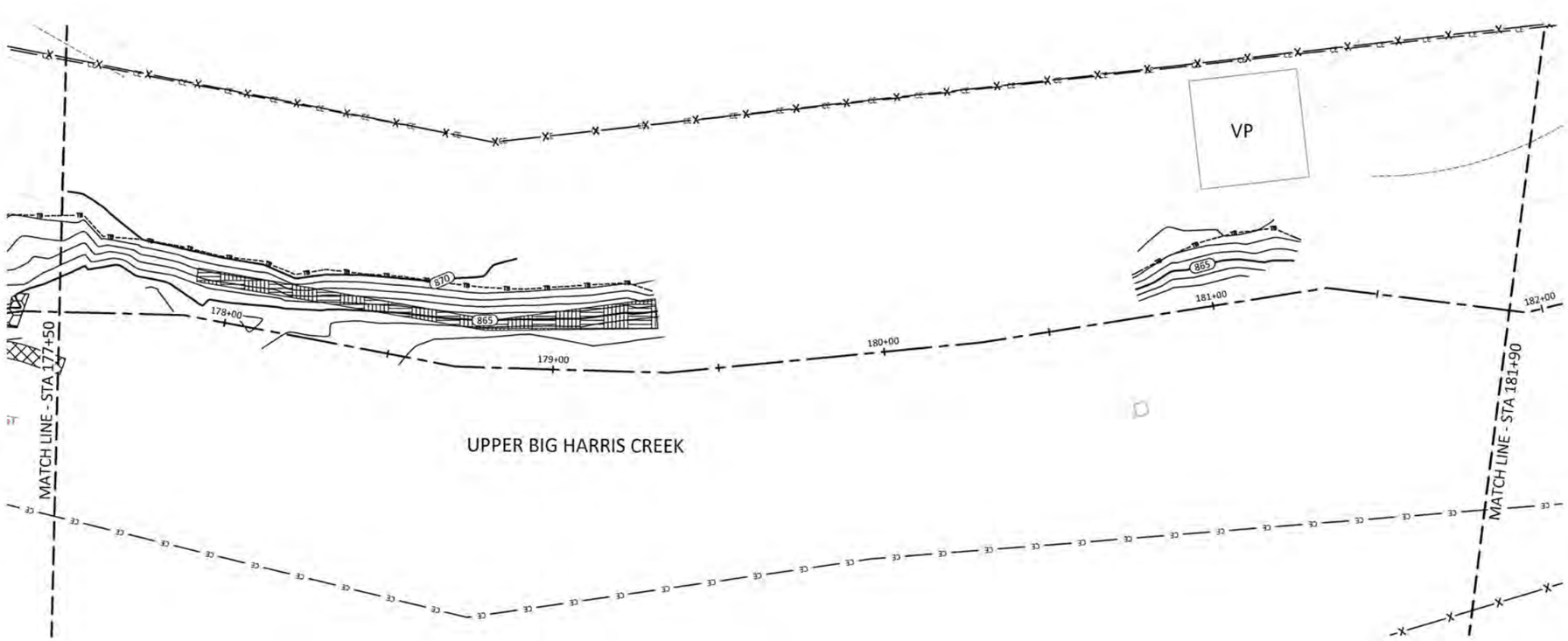

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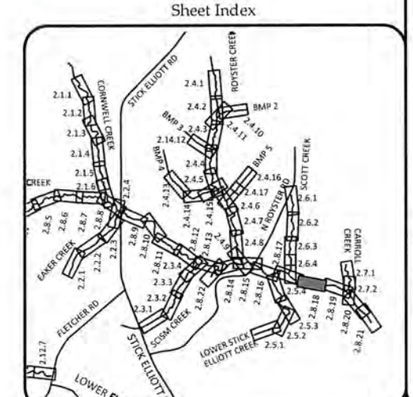

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9/24/2018 JEMMY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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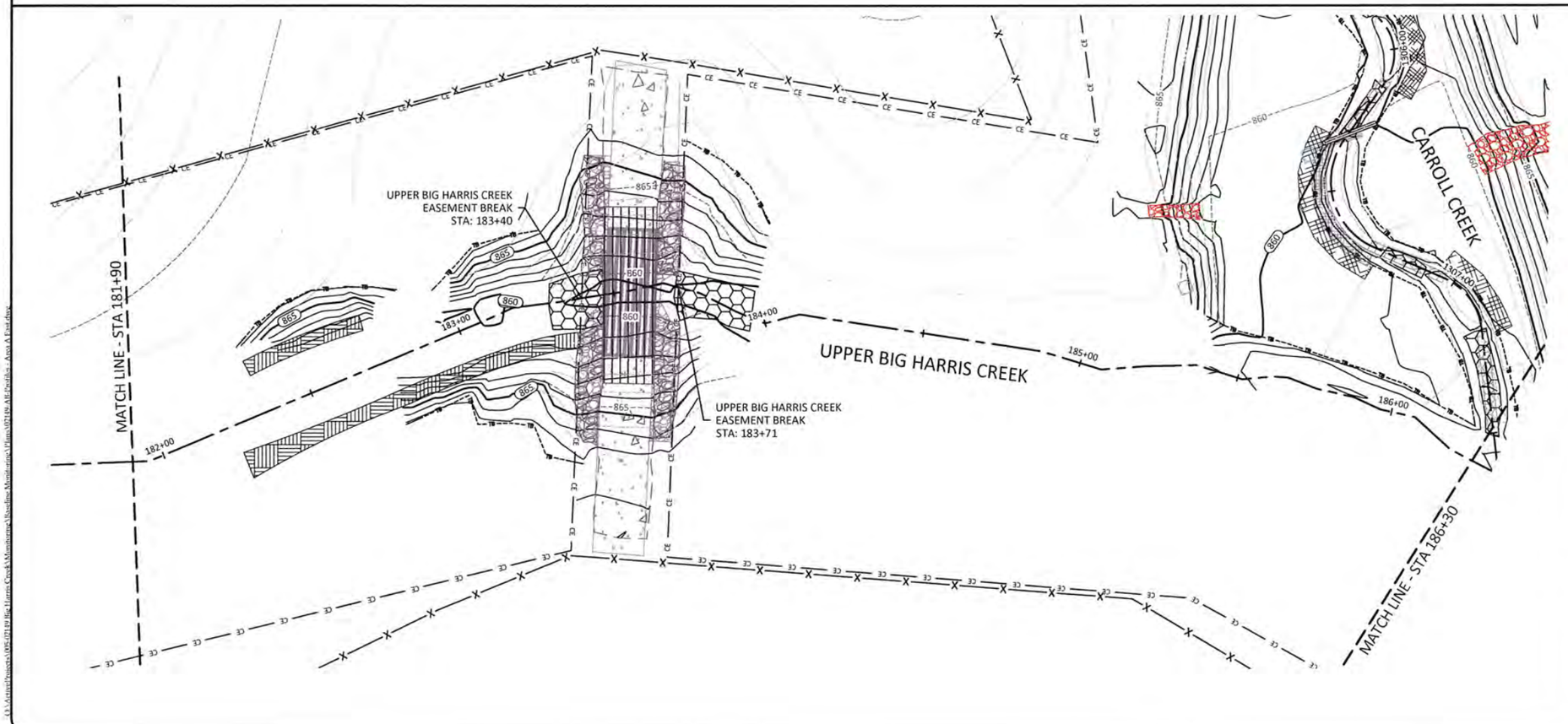

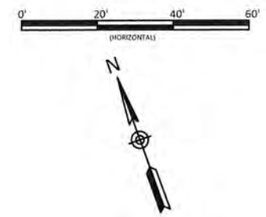

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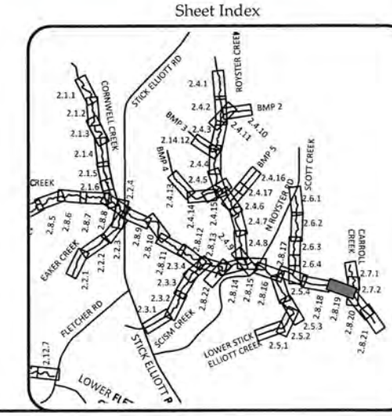

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28212 EMILY G. REINICKER

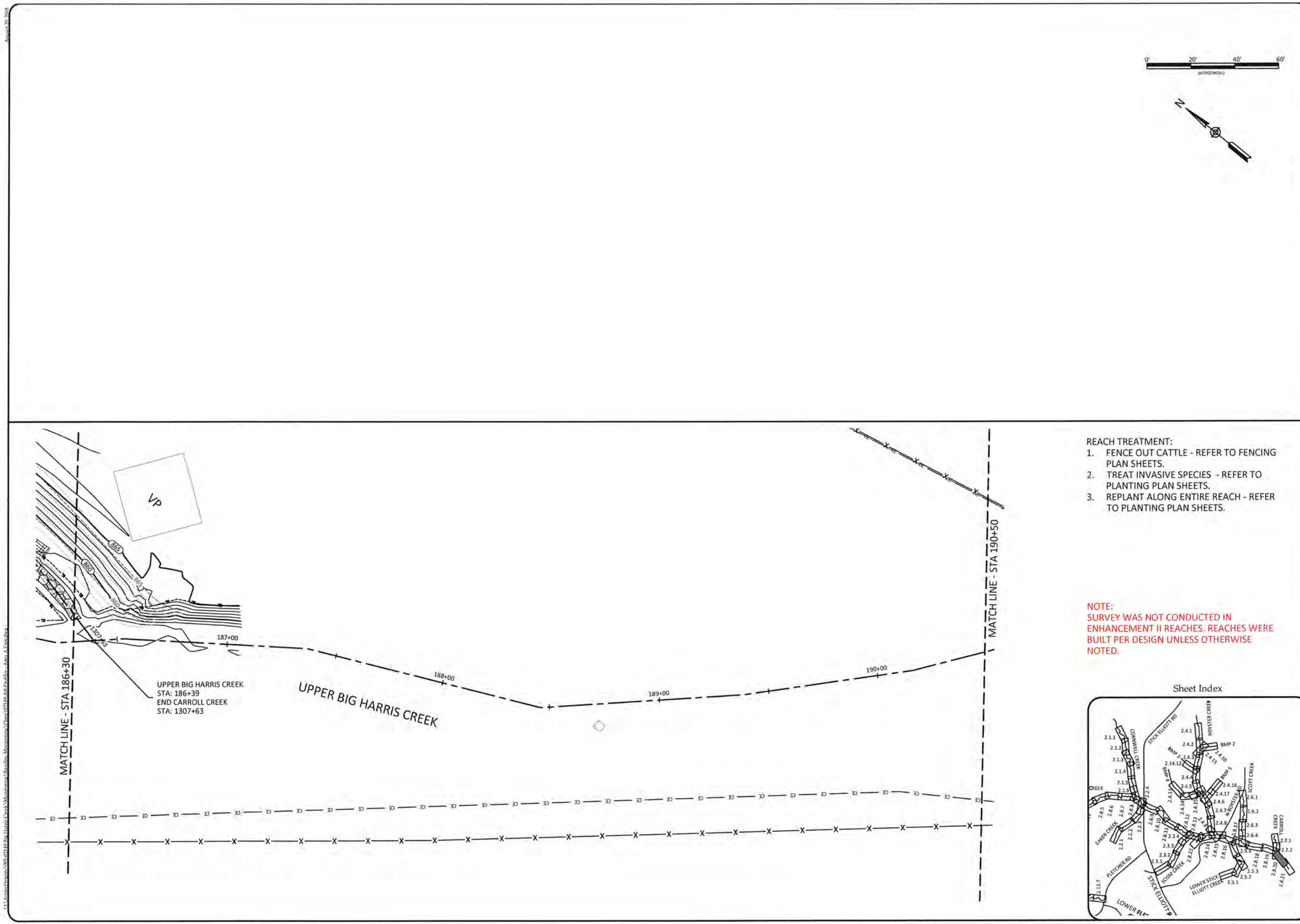
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.19



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NORTH CAROLINA PROFESSIONAL SEAL 29912 ENGINEER EMILY G. REINICKER

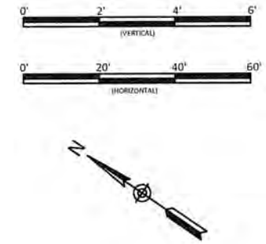
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

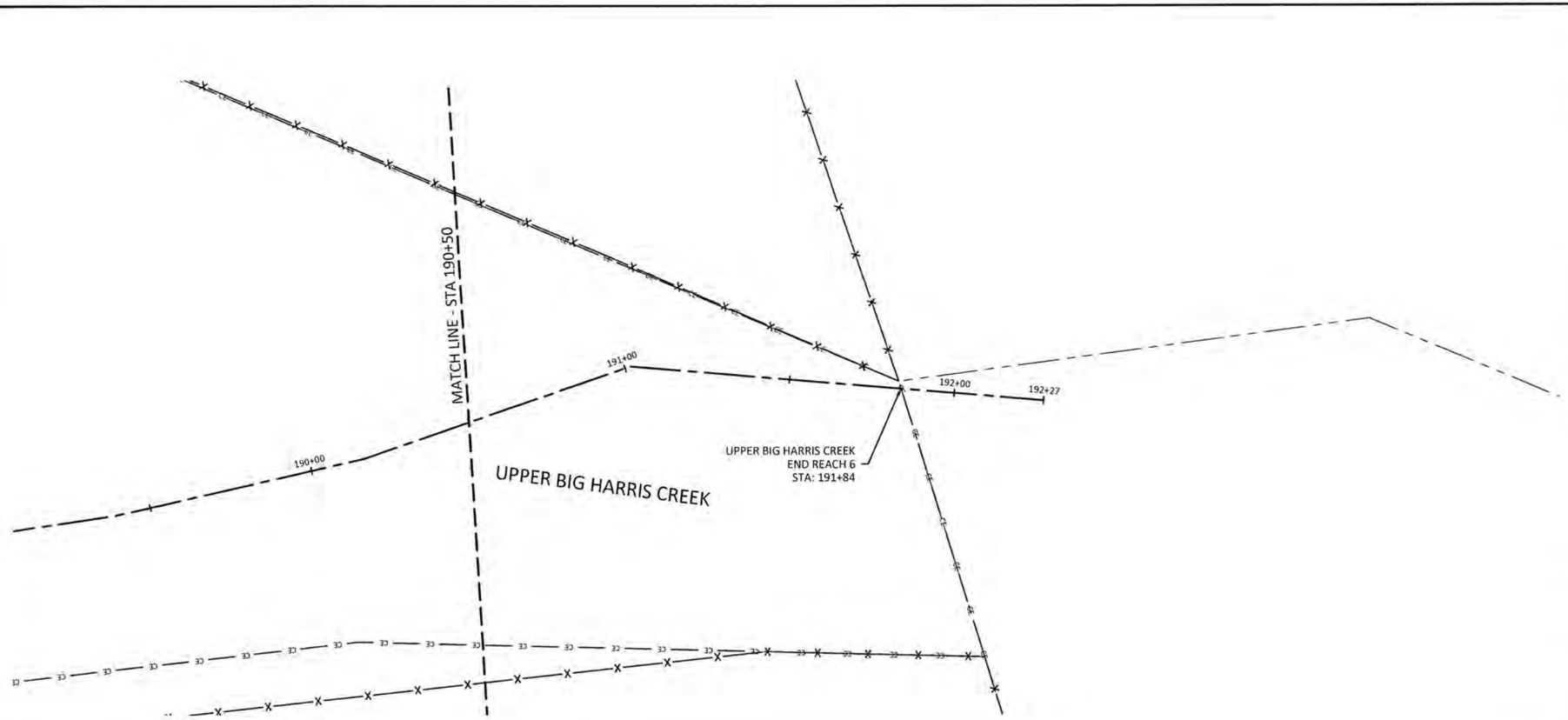
Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.20





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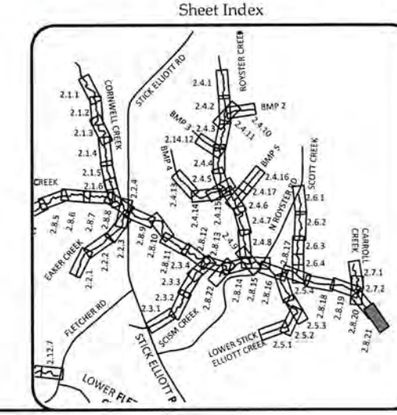

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8/29/2018 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.8.21

August 20, 2018

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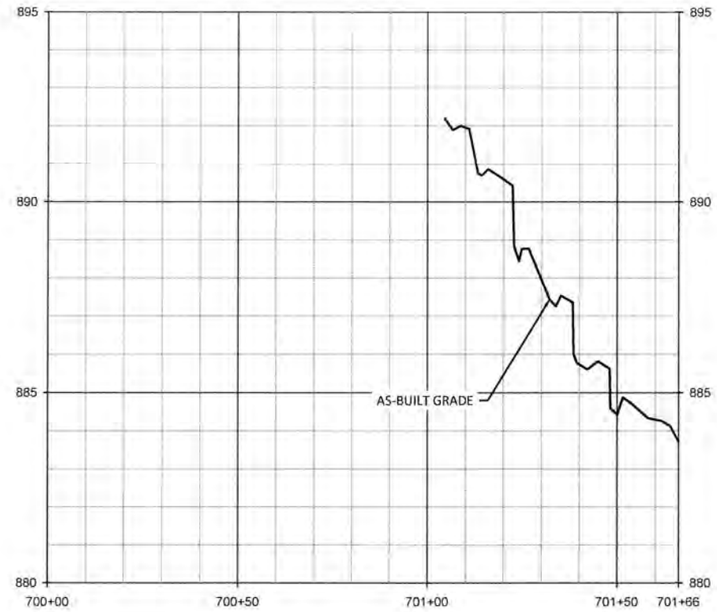

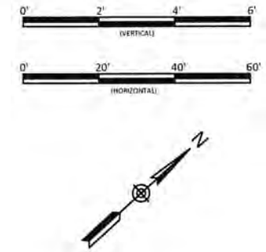

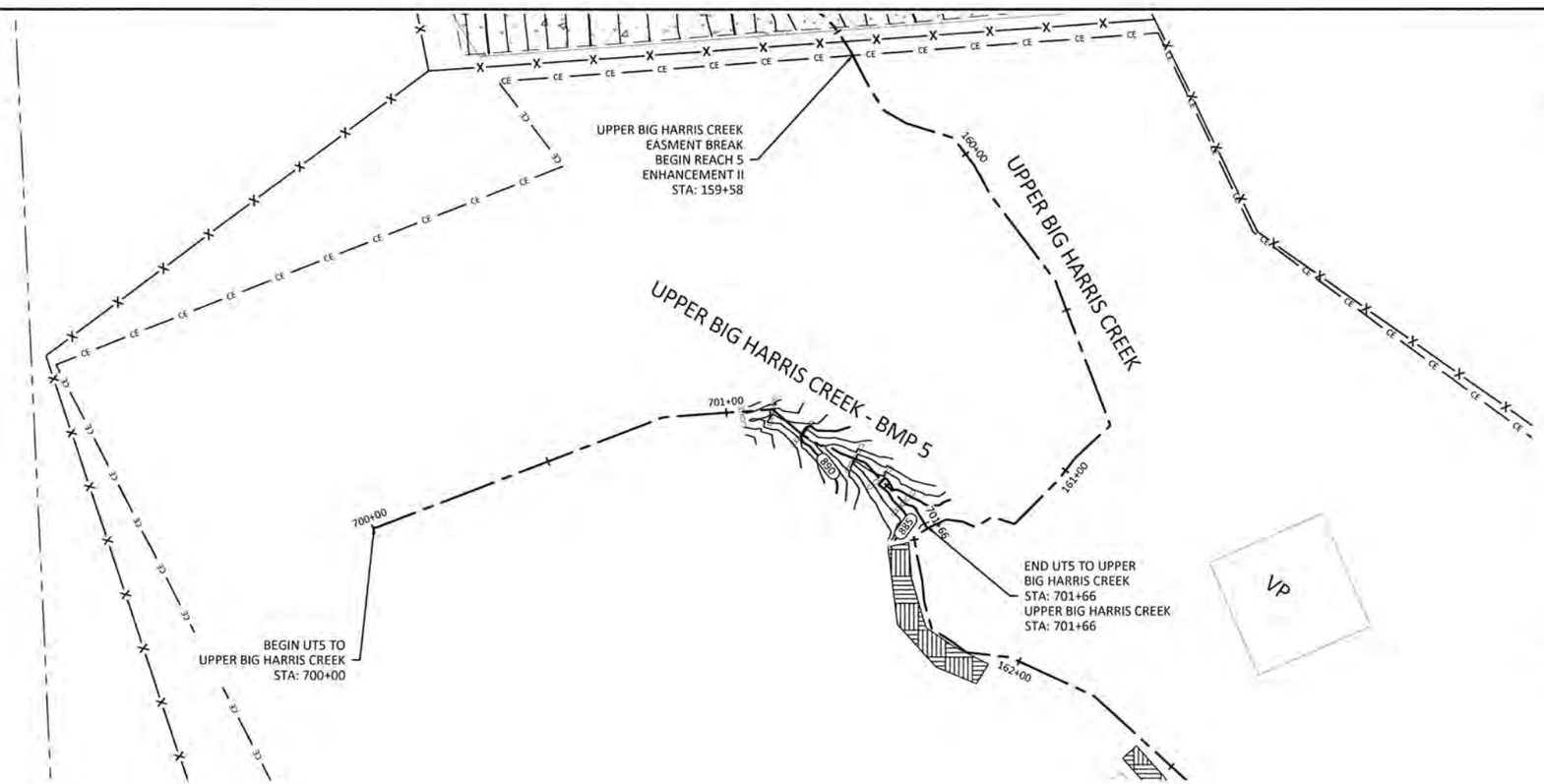

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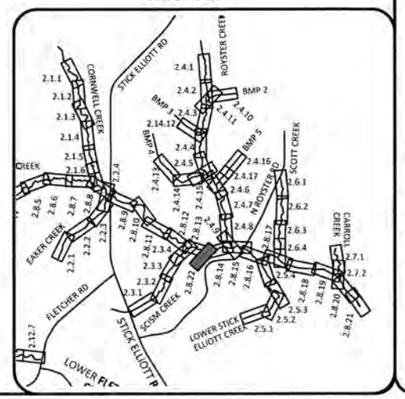

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9/8/2017 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek - UT5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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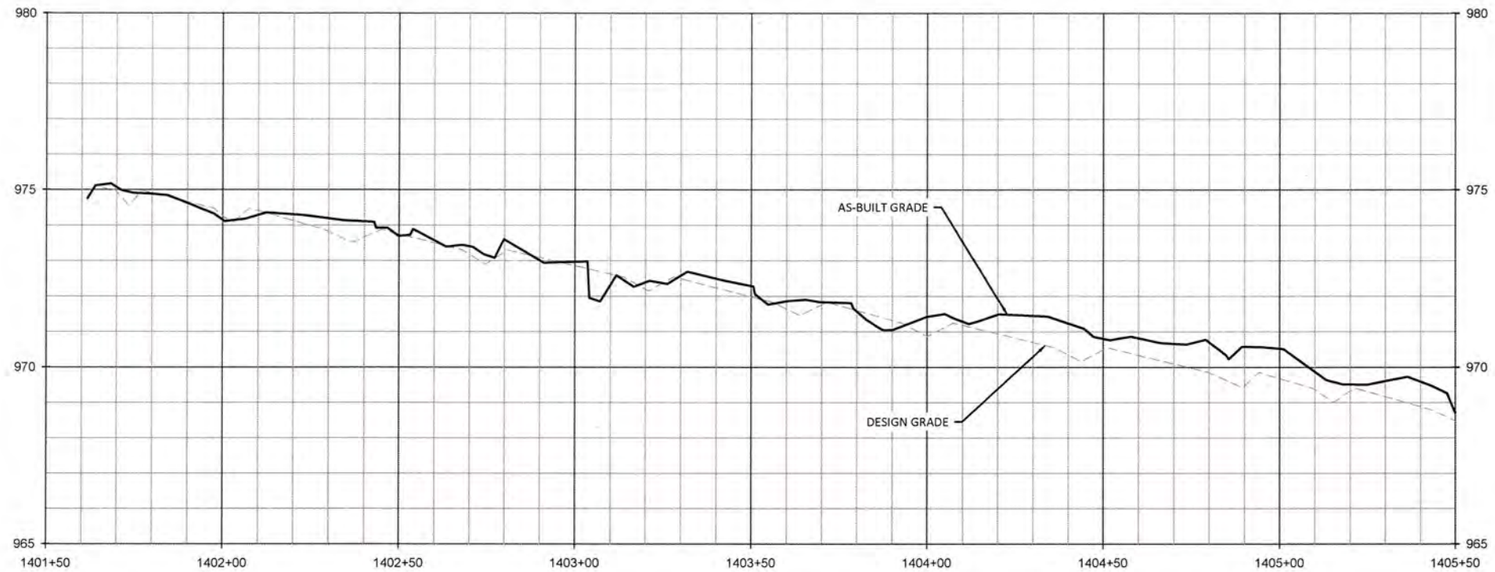

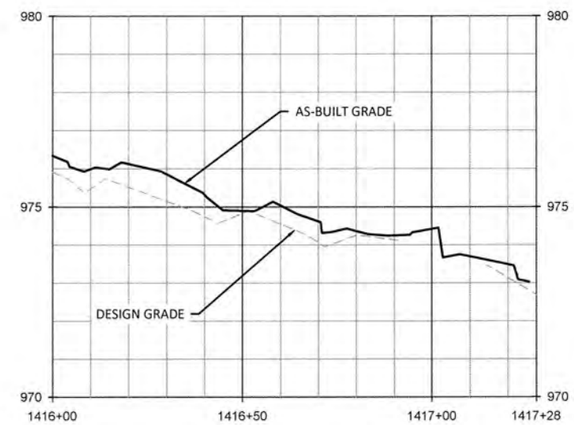

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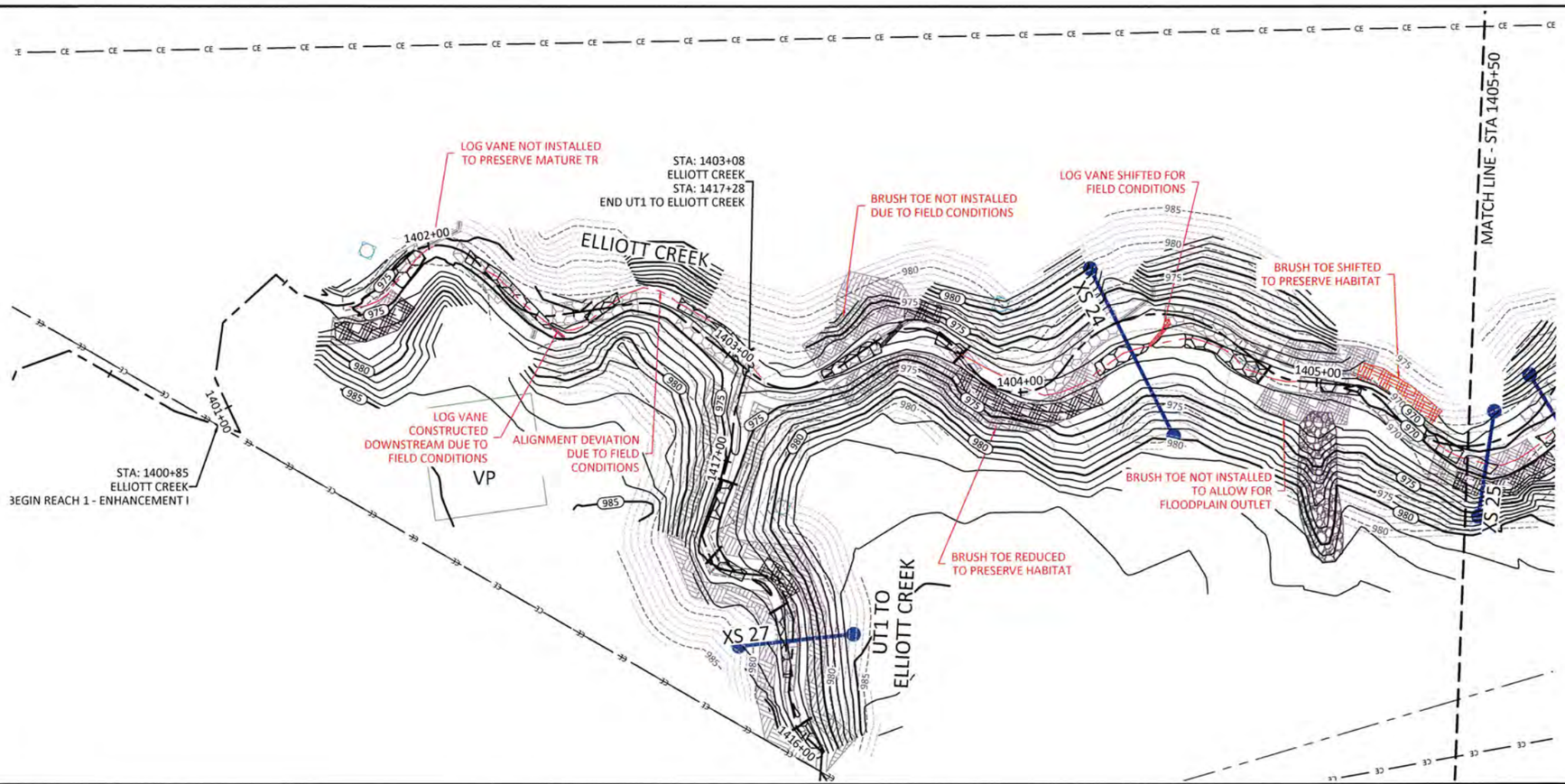

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4. CONSTRUCT BED FORMS IN EXISTING CHANNEL (ENHANCEMENT 1)

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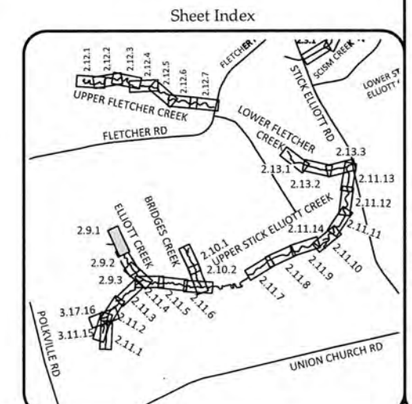

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NORTH CAROLINA PROFESSIONAL SEAL 29913 ENGINEER ELLIOTT G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

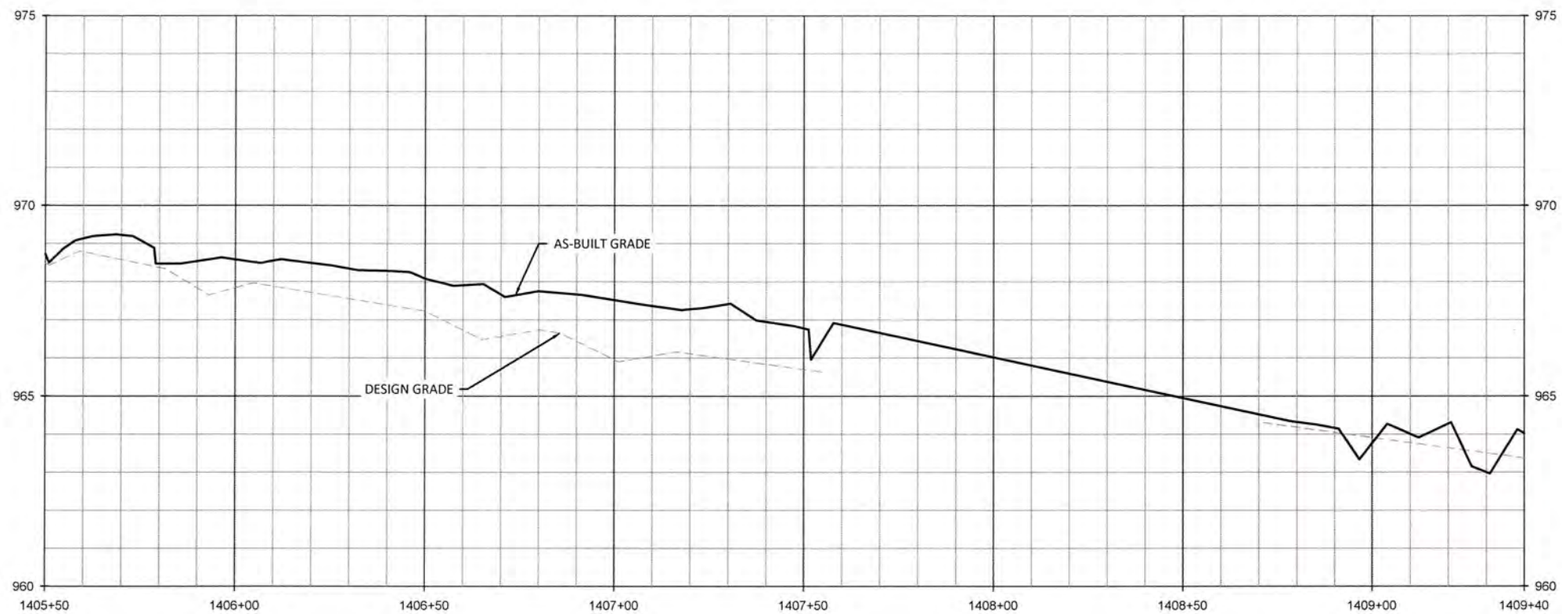
Elliott Creek
Stream Plan and Profile Record Drawings

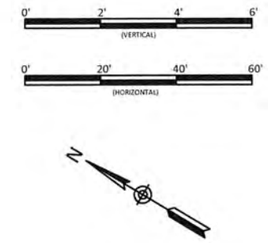
Revisions:

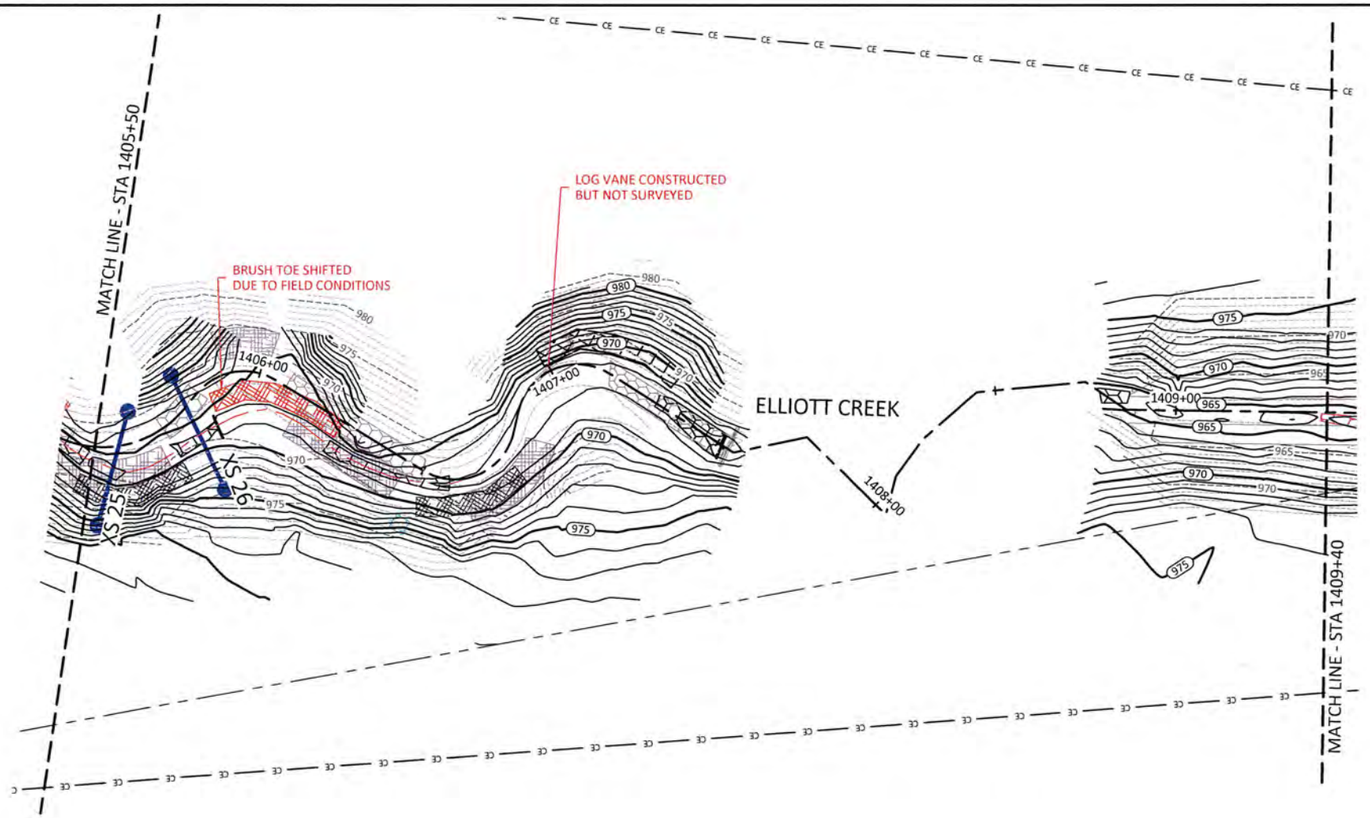
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.9.1

August 20, 2018







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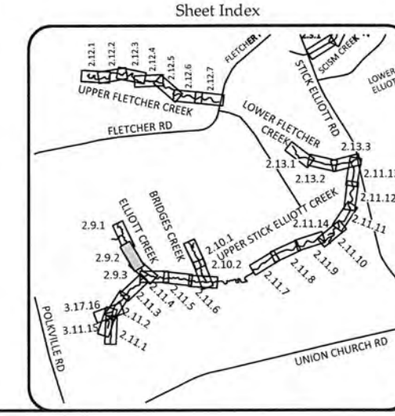

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29012 ERILY G. REINICKER 6/14/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Elliott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.9.2

August 20, 2018
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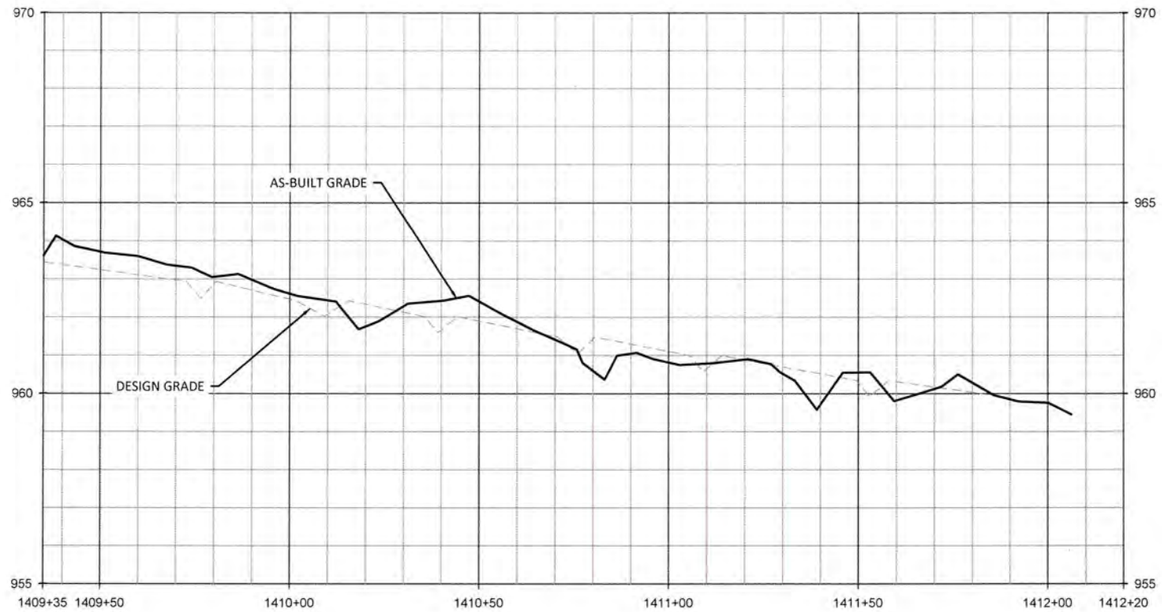

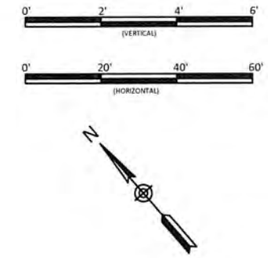

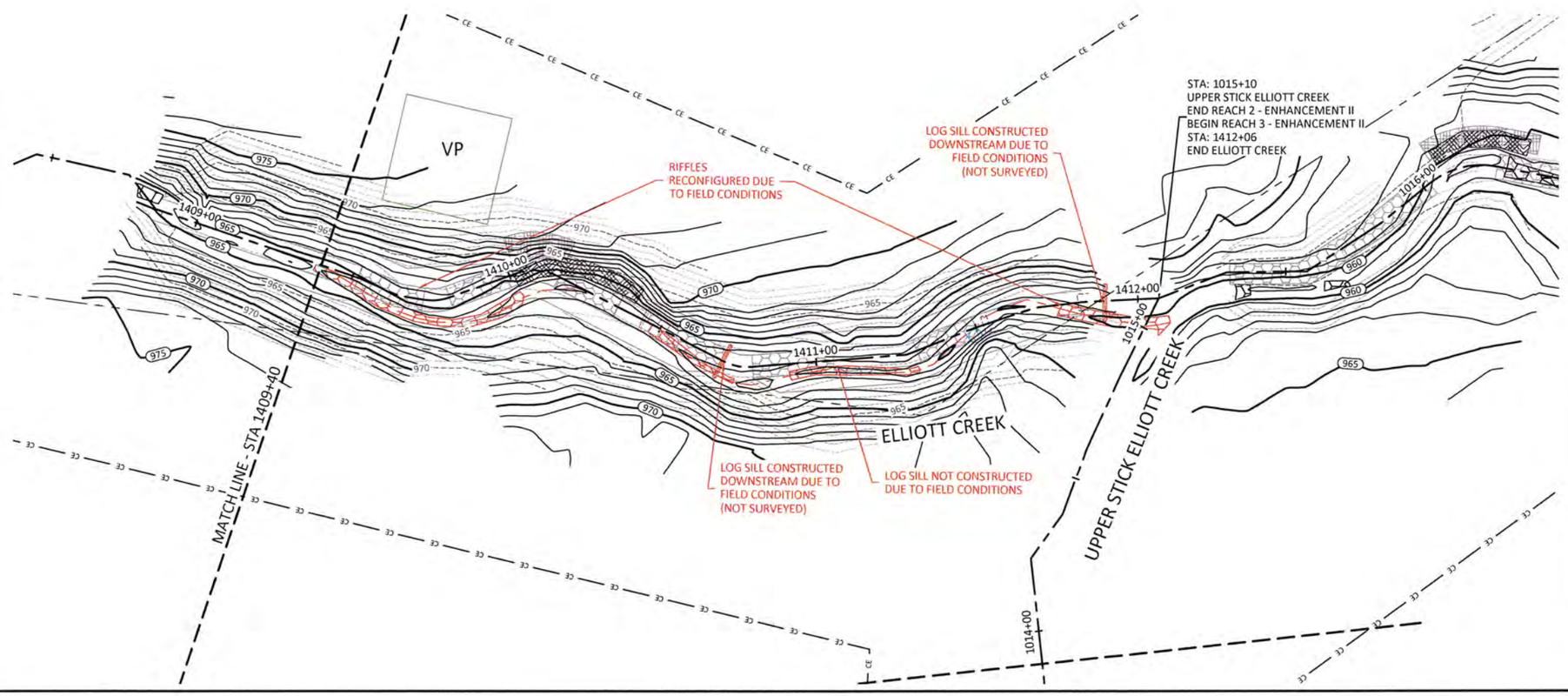

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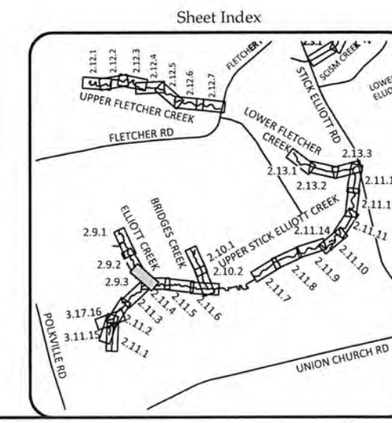

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 39117 MILY G. REINICKER

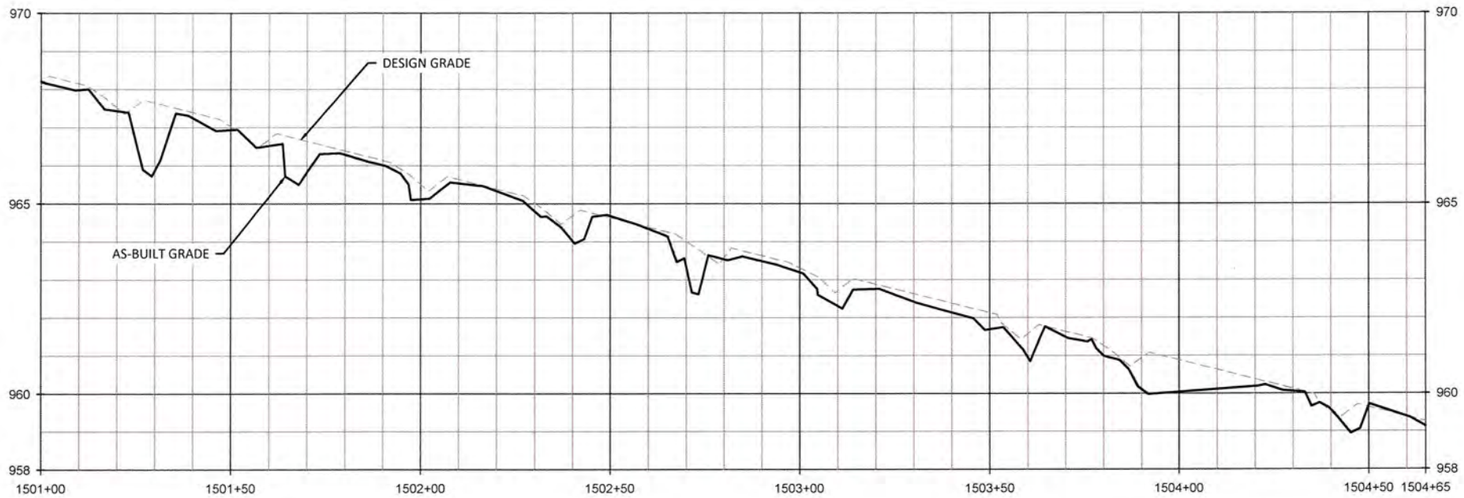
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

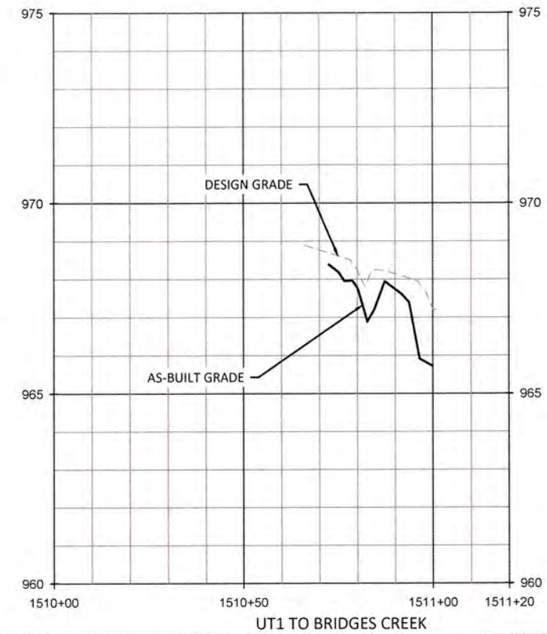
Elliott Creek
Stream Plan and Profile Record Drawings

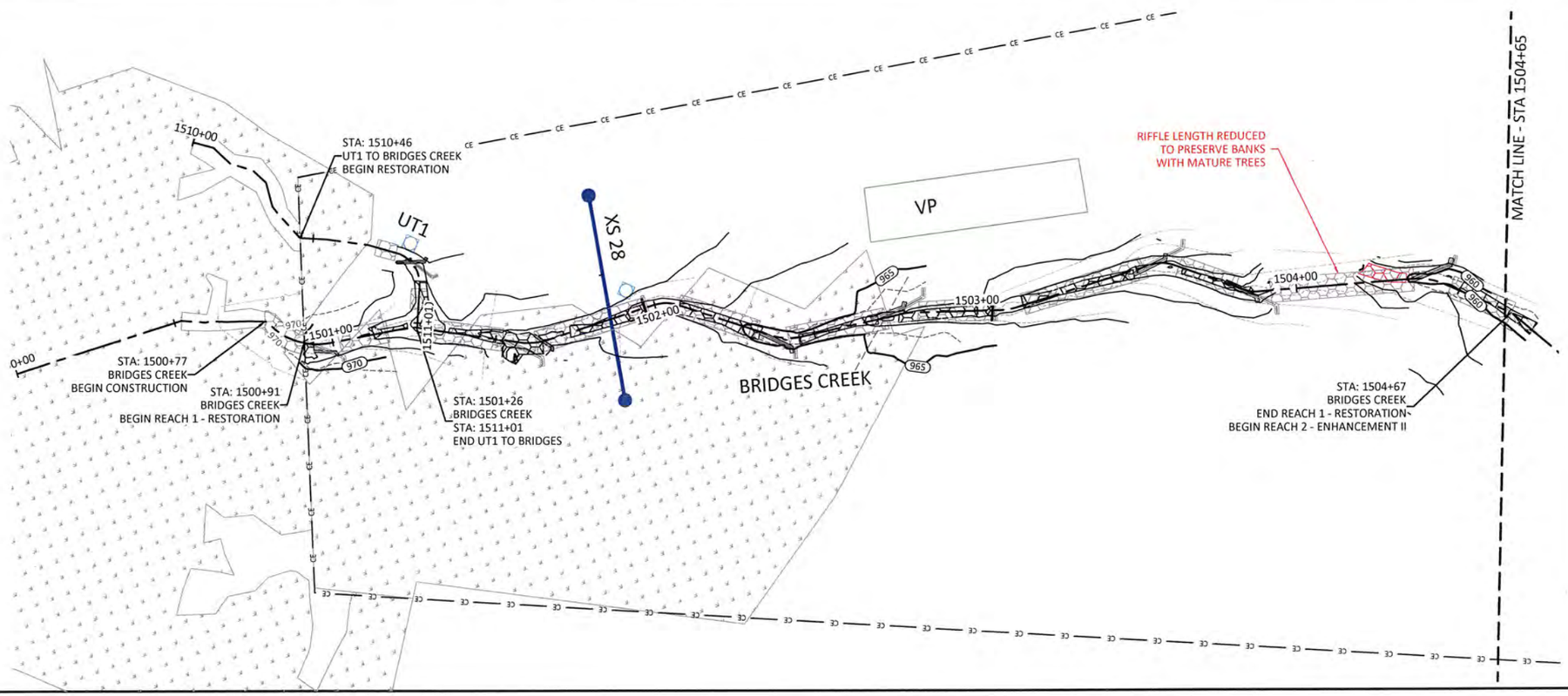
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.9.3







REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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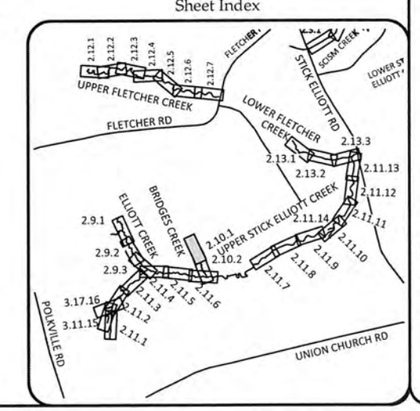

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Bridges Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.10.1

August 20, 2018

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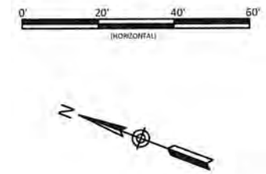

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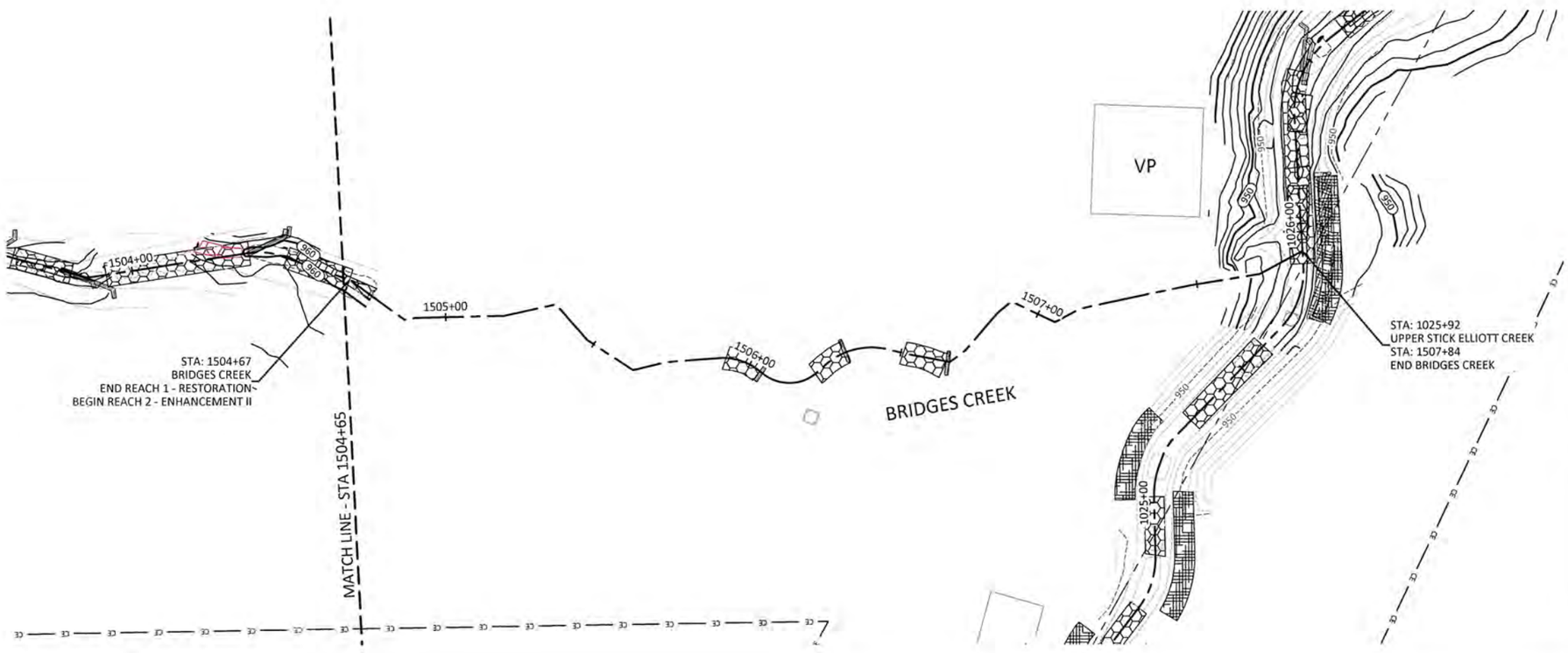

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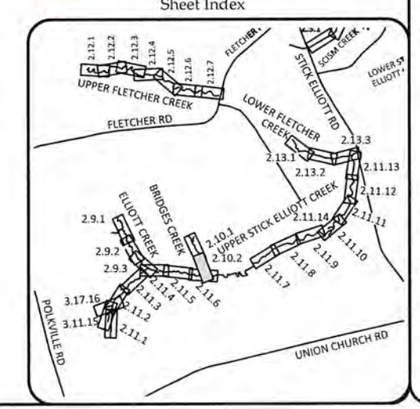

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EMILY G. REINICKER

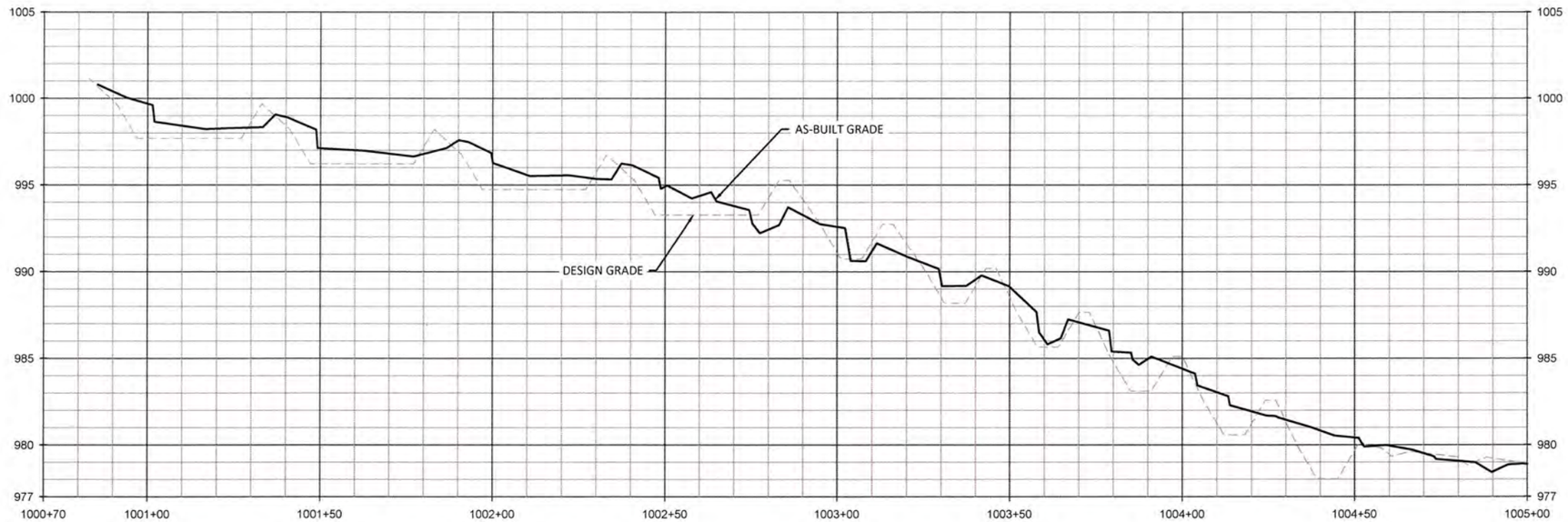
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

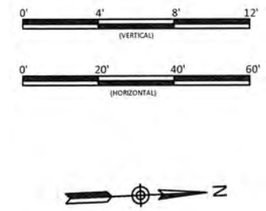
Bridges Creek Reach 2
Stream Plan and Profile Record Drawings

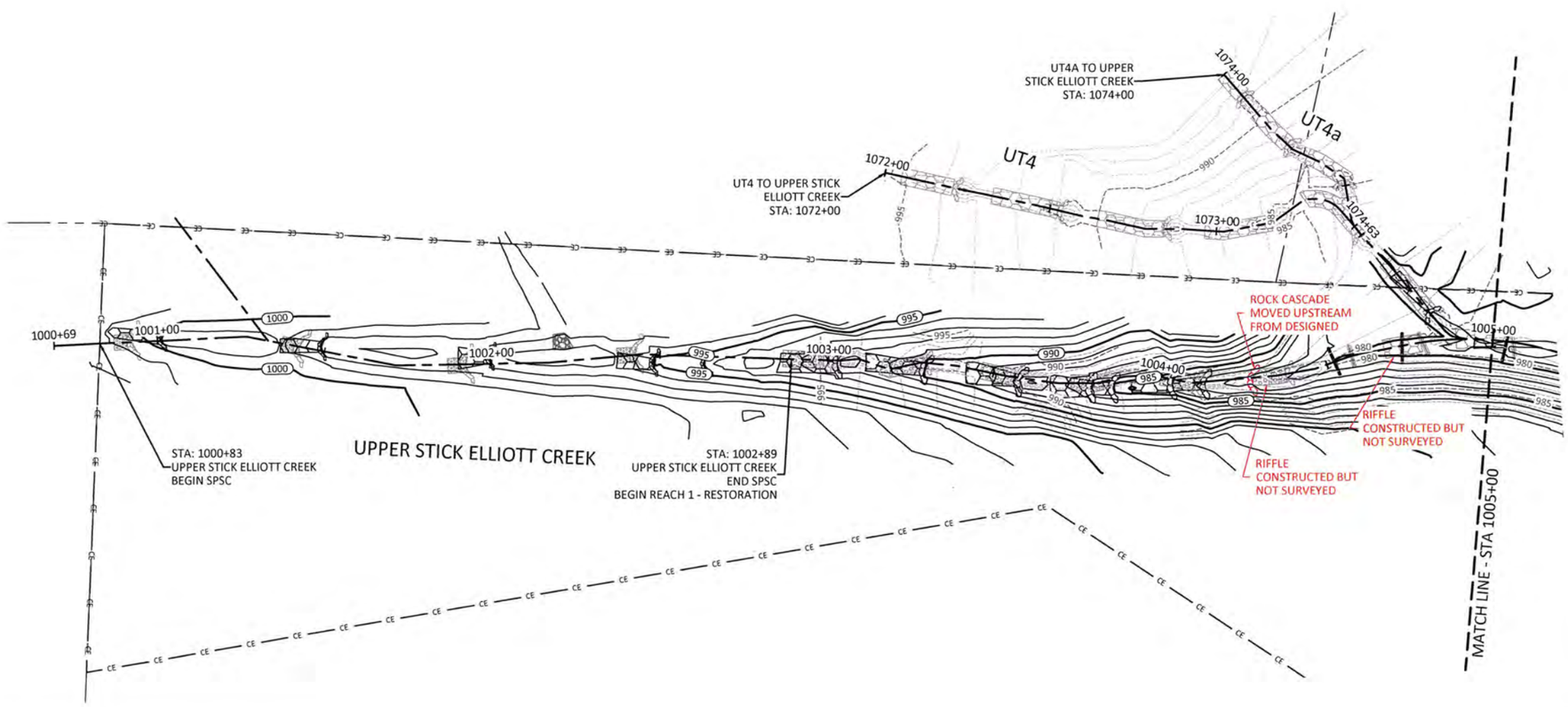
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.10.2







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3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.
4. TREAT STORMWATER RUNOFF WITH SPSC.
5. SEE SHEETS 3.11.16-3.11.17 FOR UT4, UT4A, AND UT5 PROFILES.

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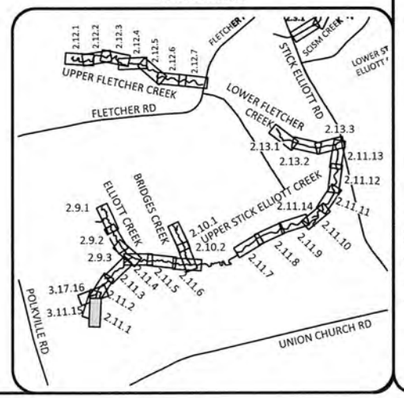

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Drawn By:	JS
Checked By:	JCK

Sheet 2.11.1

August 20, 2018
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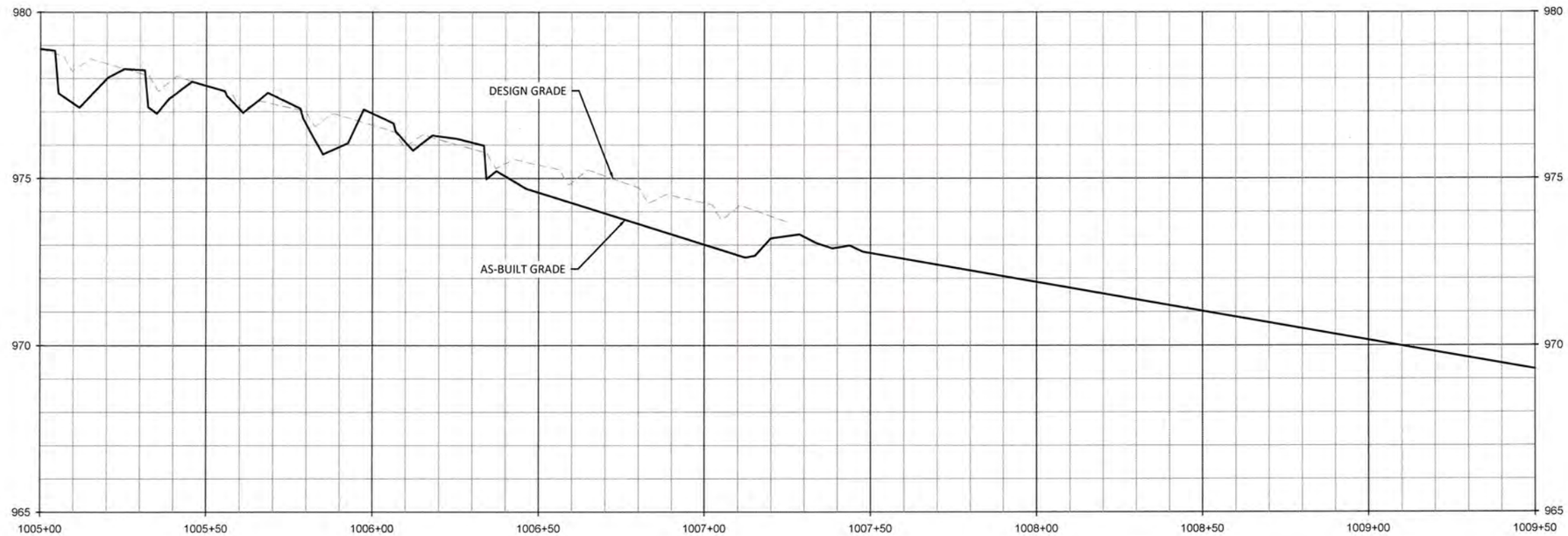

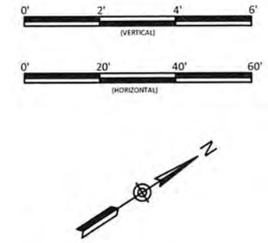

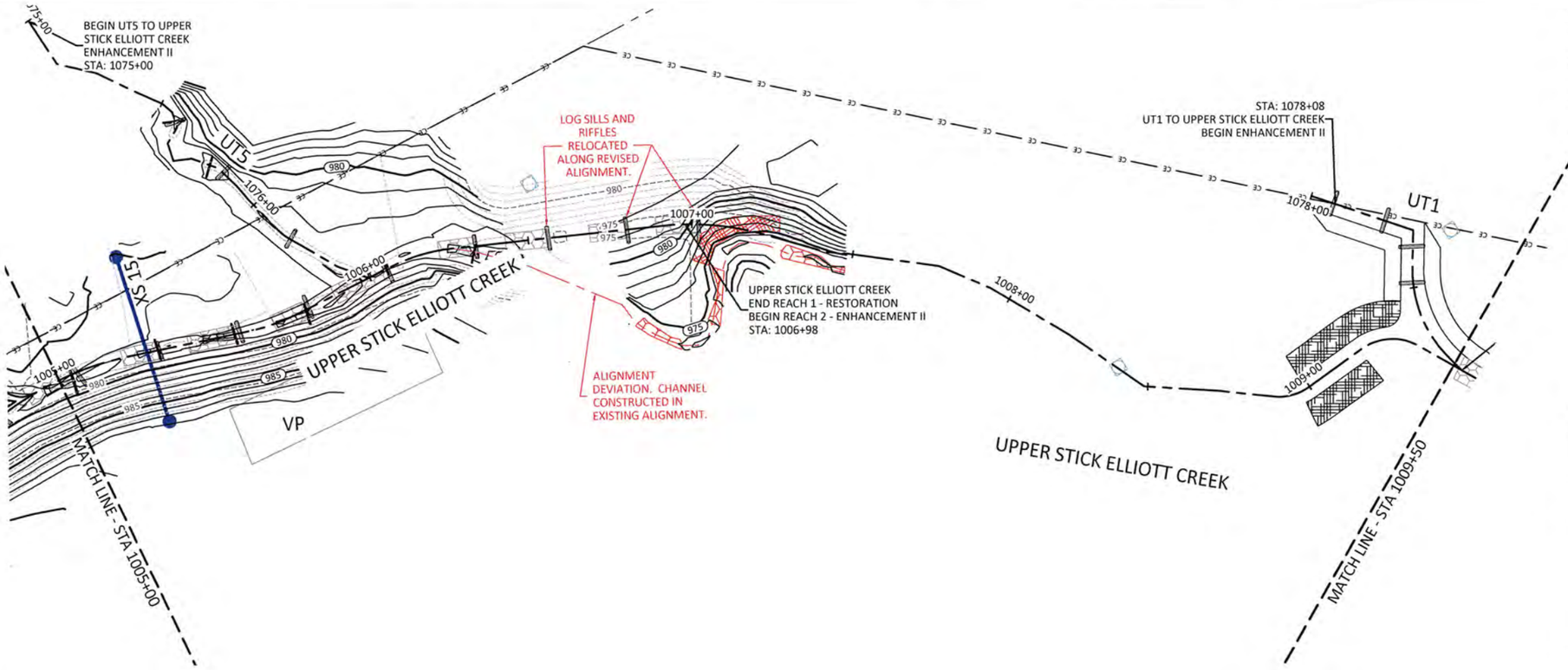

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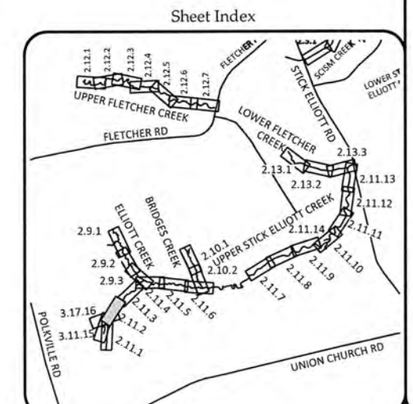

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 1 & 2
Stream Plan and Profile Record Drawings

Revisions:

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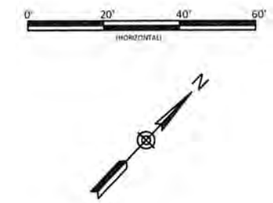
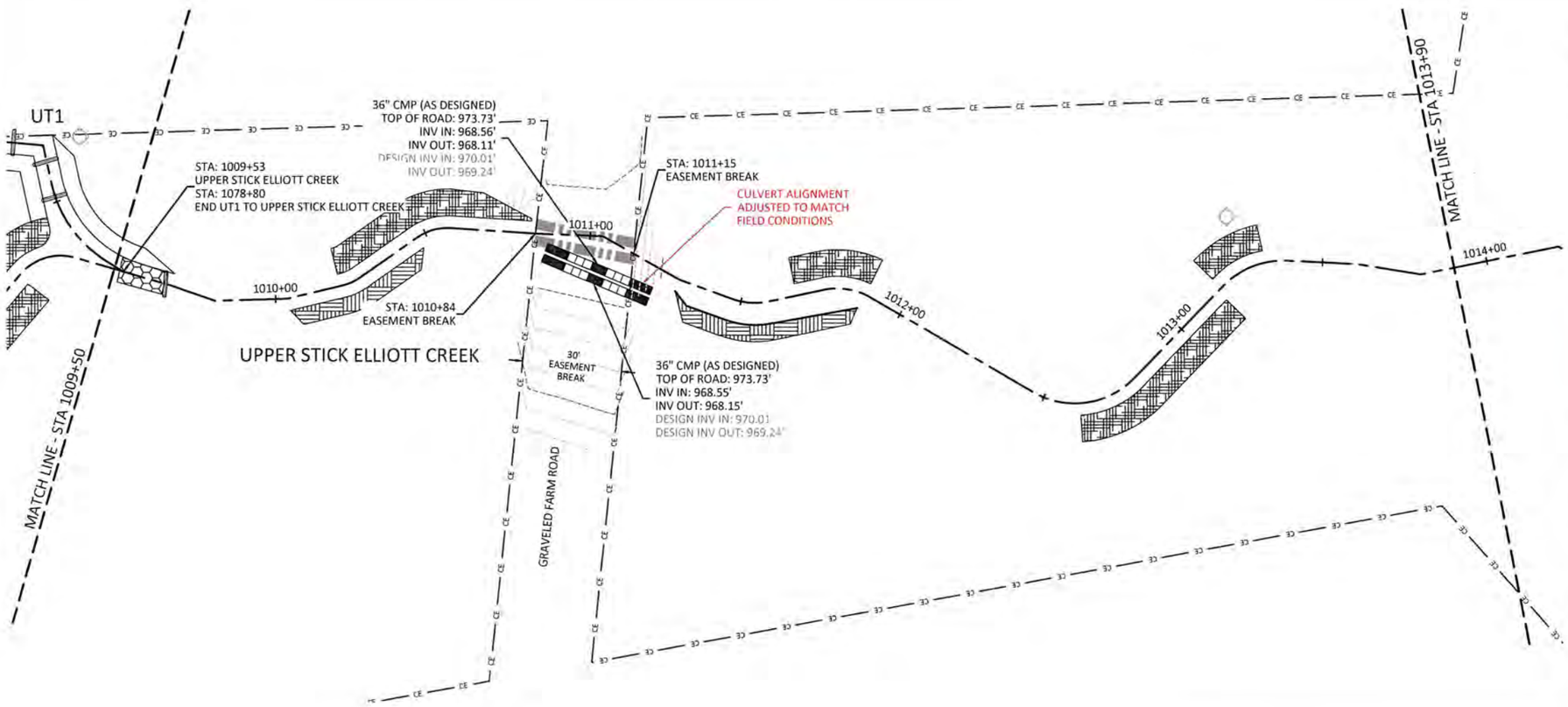
Checked By:	JCK

Sheet 2.11.2





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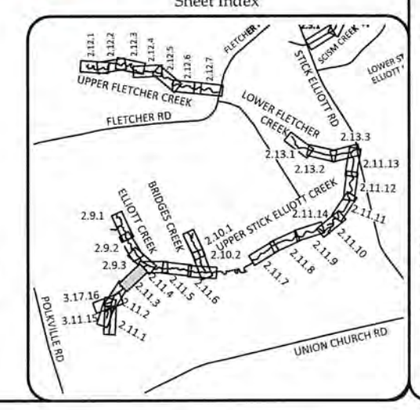

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.3

August 20, 2018
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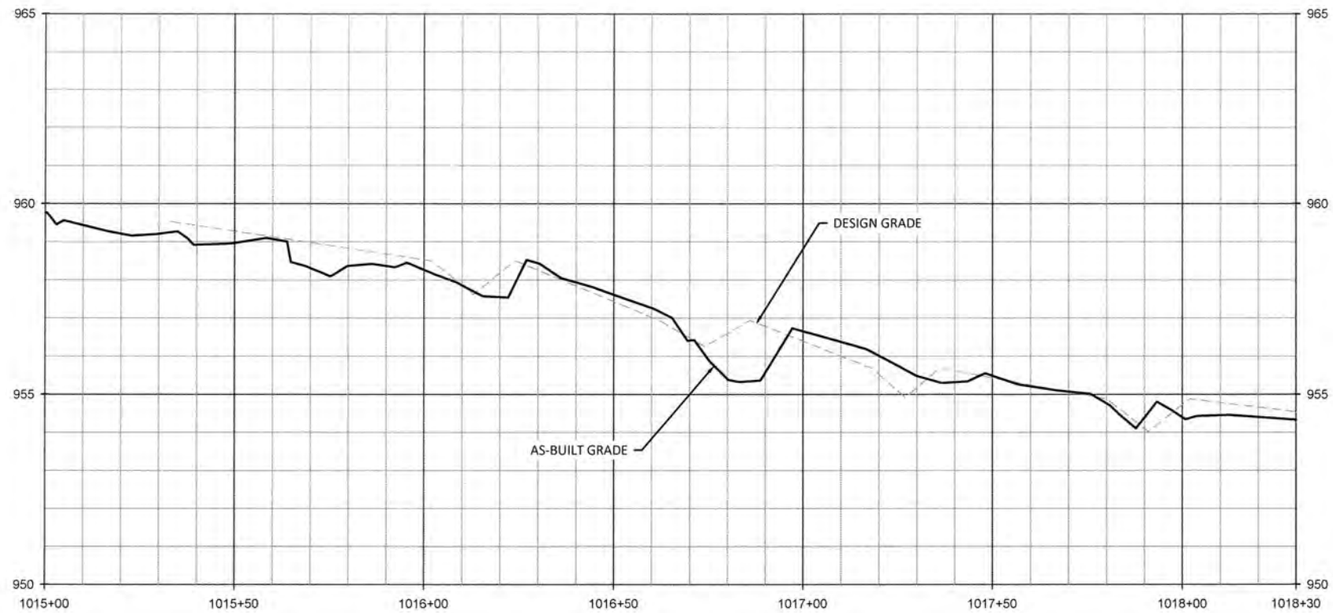

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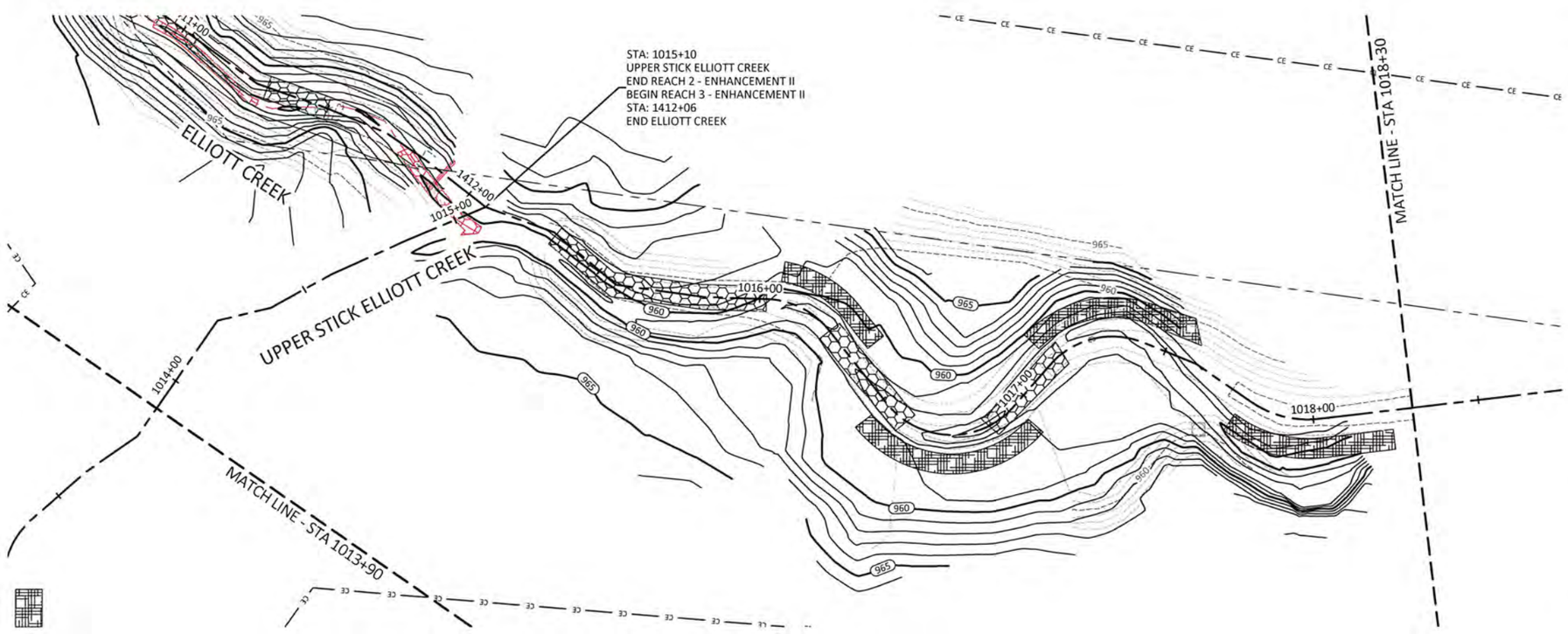

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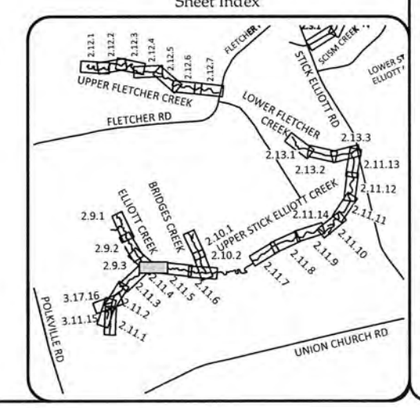

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.4

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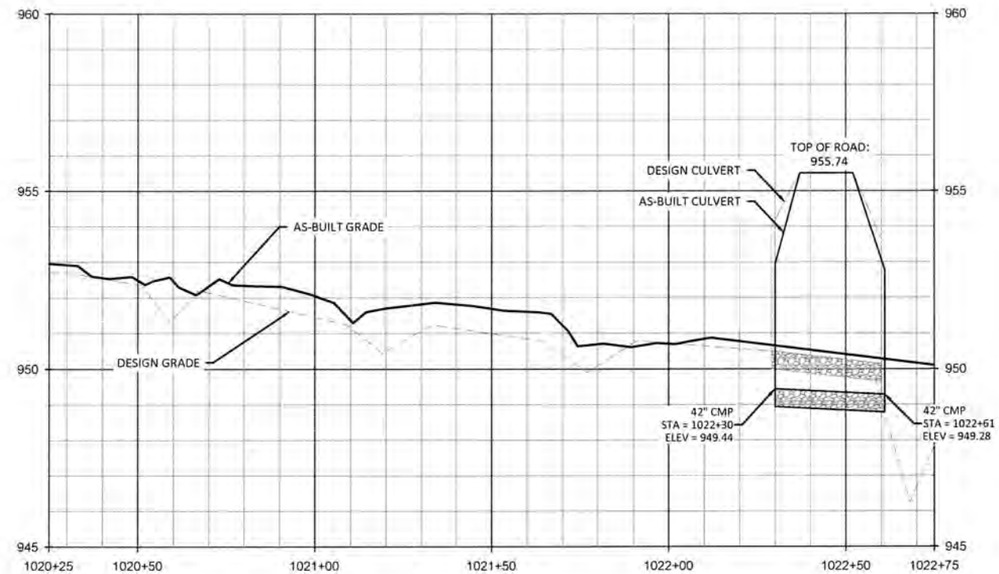

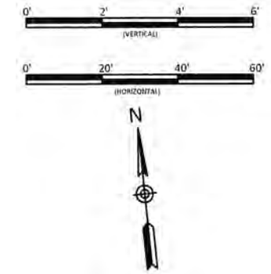

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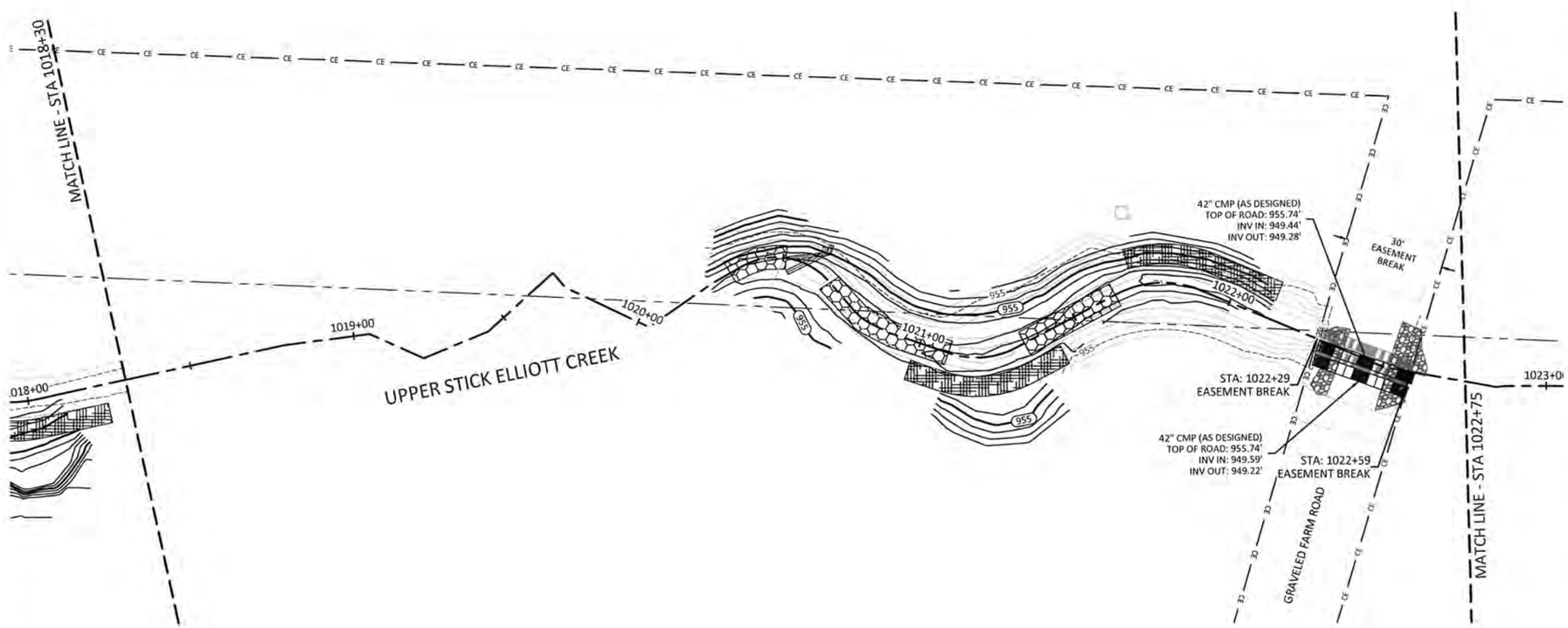

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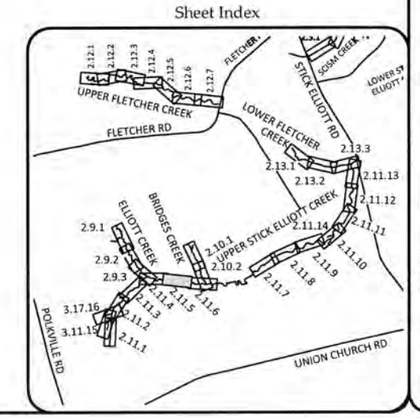

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040787 G. REINIKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 3
Stream Plan and Profile Record Drawings

Date:	August 21, 2018
Job Number:	005-02123
Designed by:	EGR, AA
Drawn by:	JS
Checked By:	JCK

Revisions:

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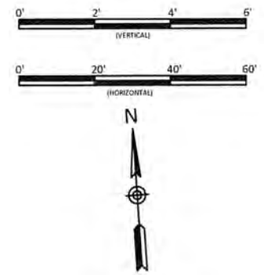

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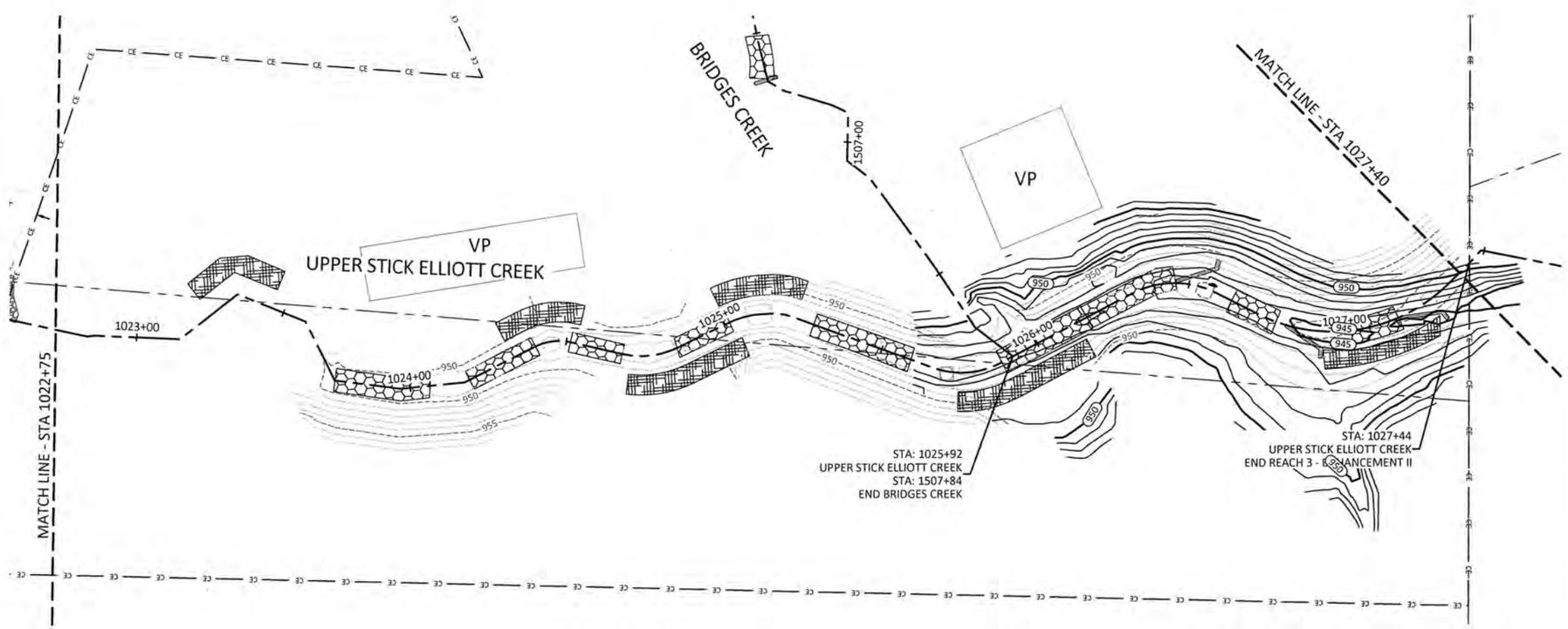

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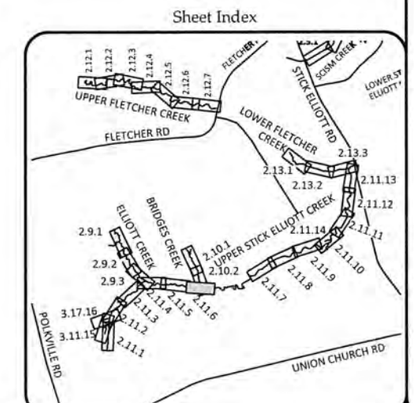

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 3 MILTON G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

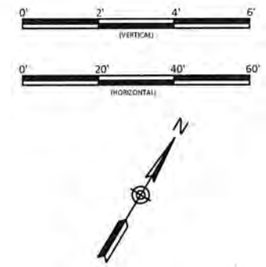
Upper Stick Elliott Creek Reach 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.6

August 21, 2018



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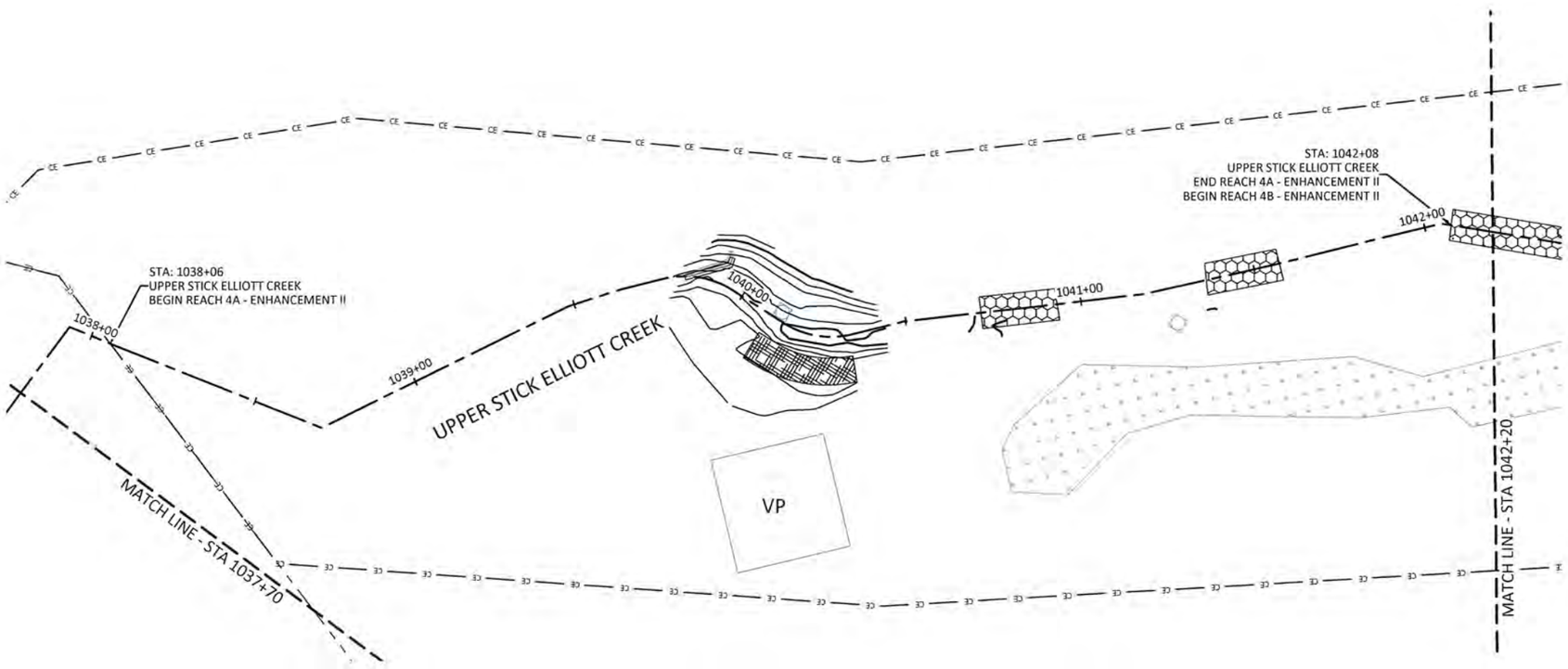

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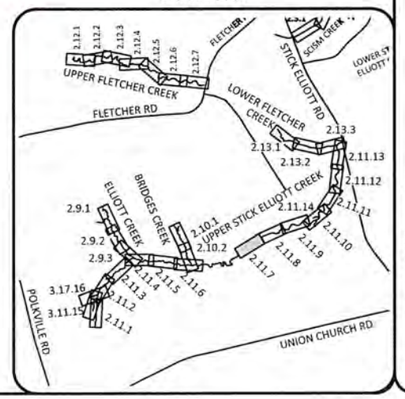

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

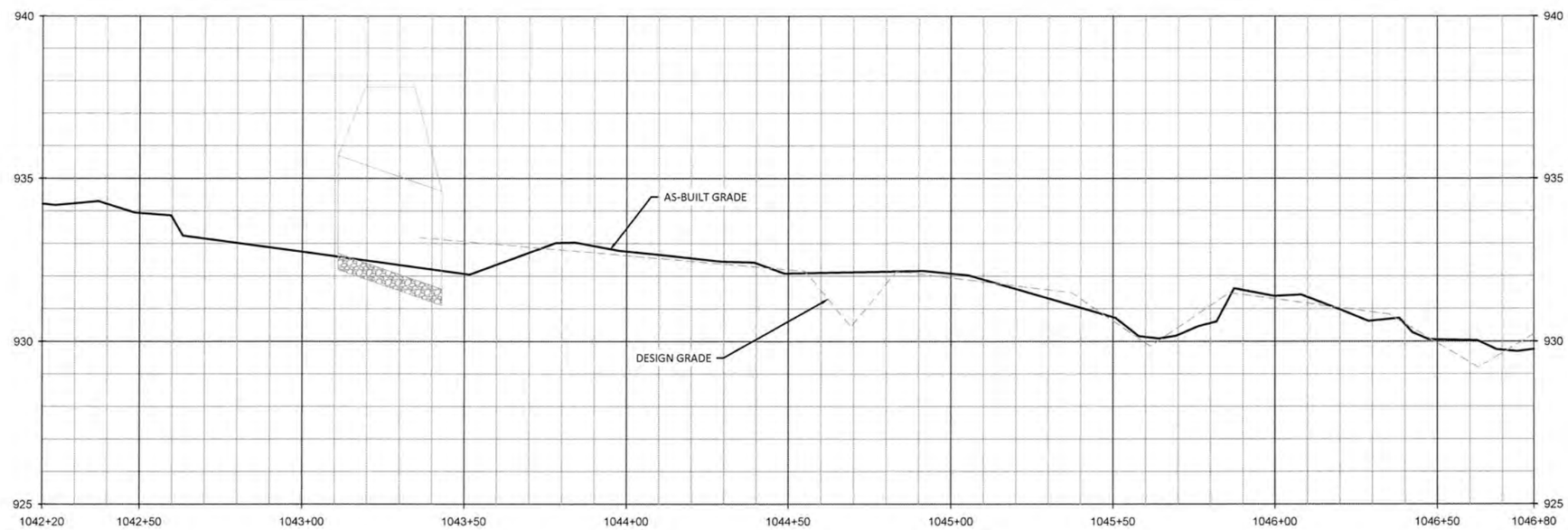
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

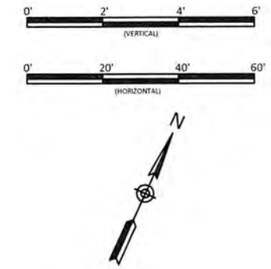
Upper Stick Ellott Creek Reach 4
Stream Plan and Profile Record Drawings

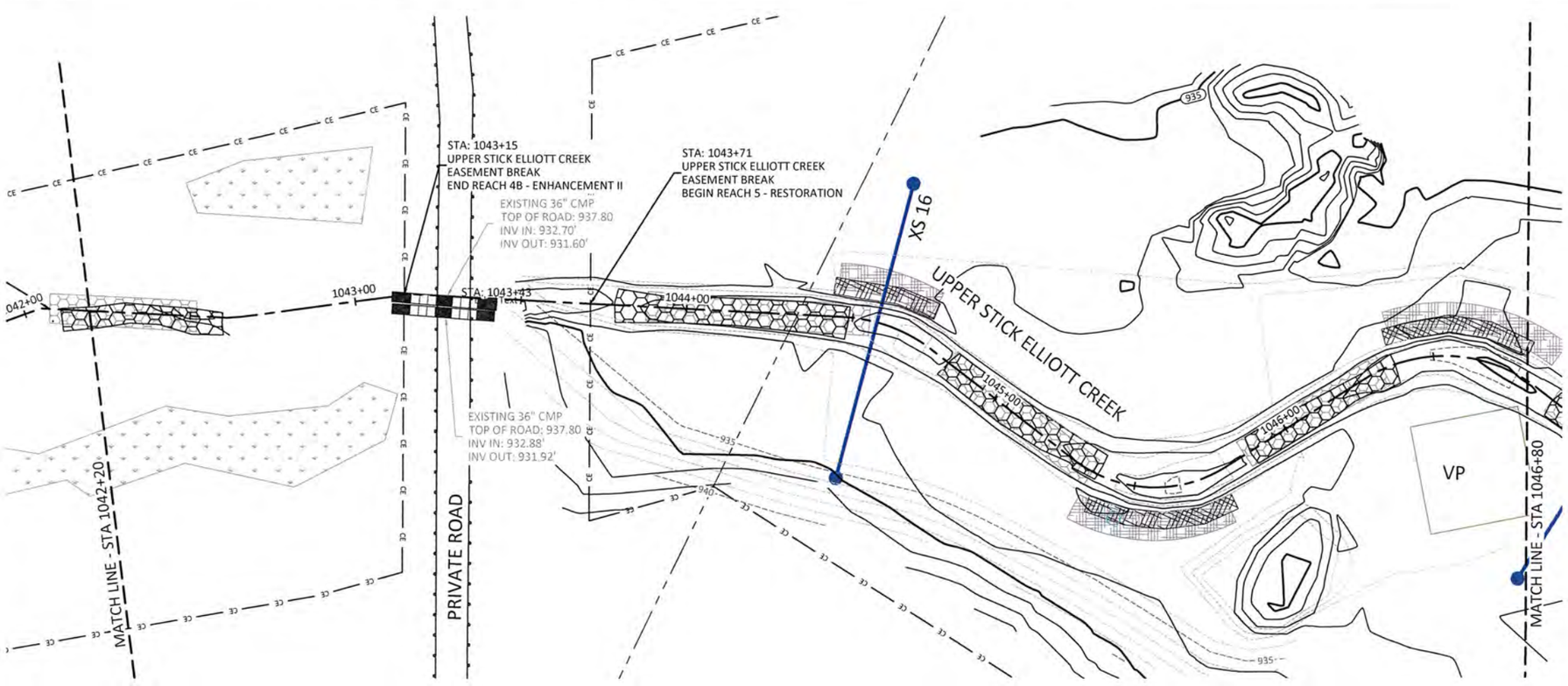
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.7







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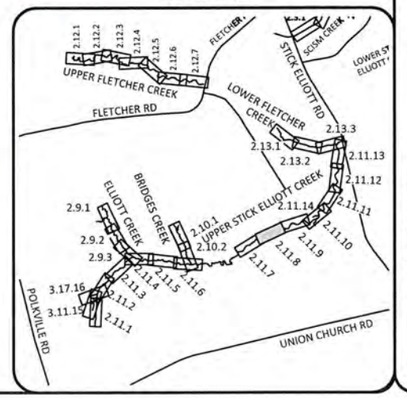

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 4 & 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
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Drawn By:	JS
Checked By:	JCK

Sheet 2.11.8

August 20, 2018

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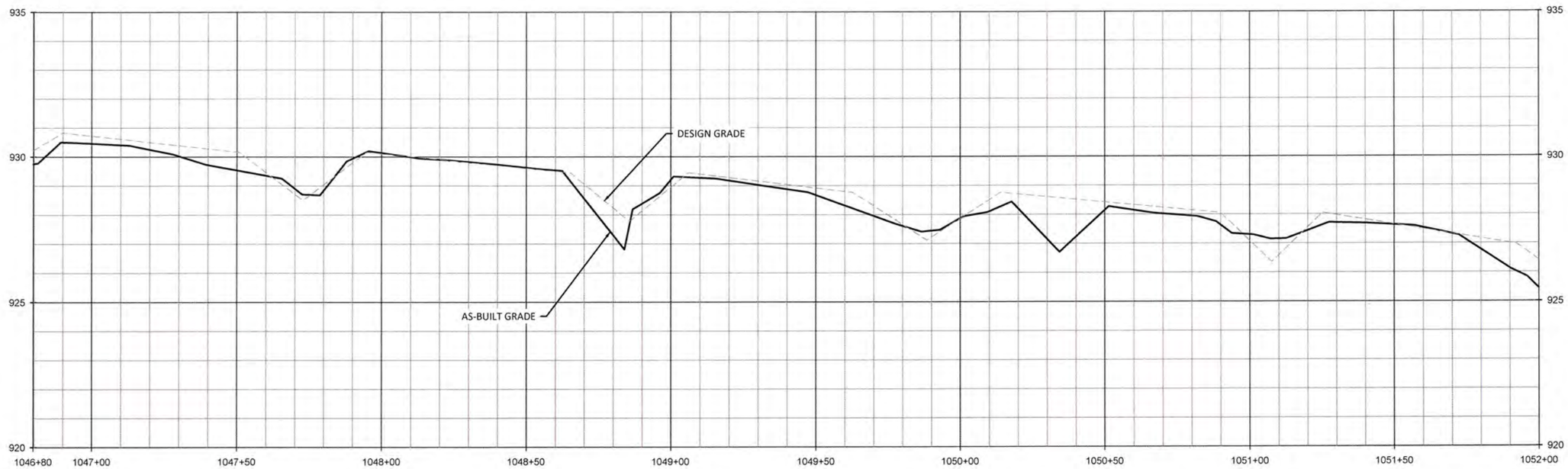

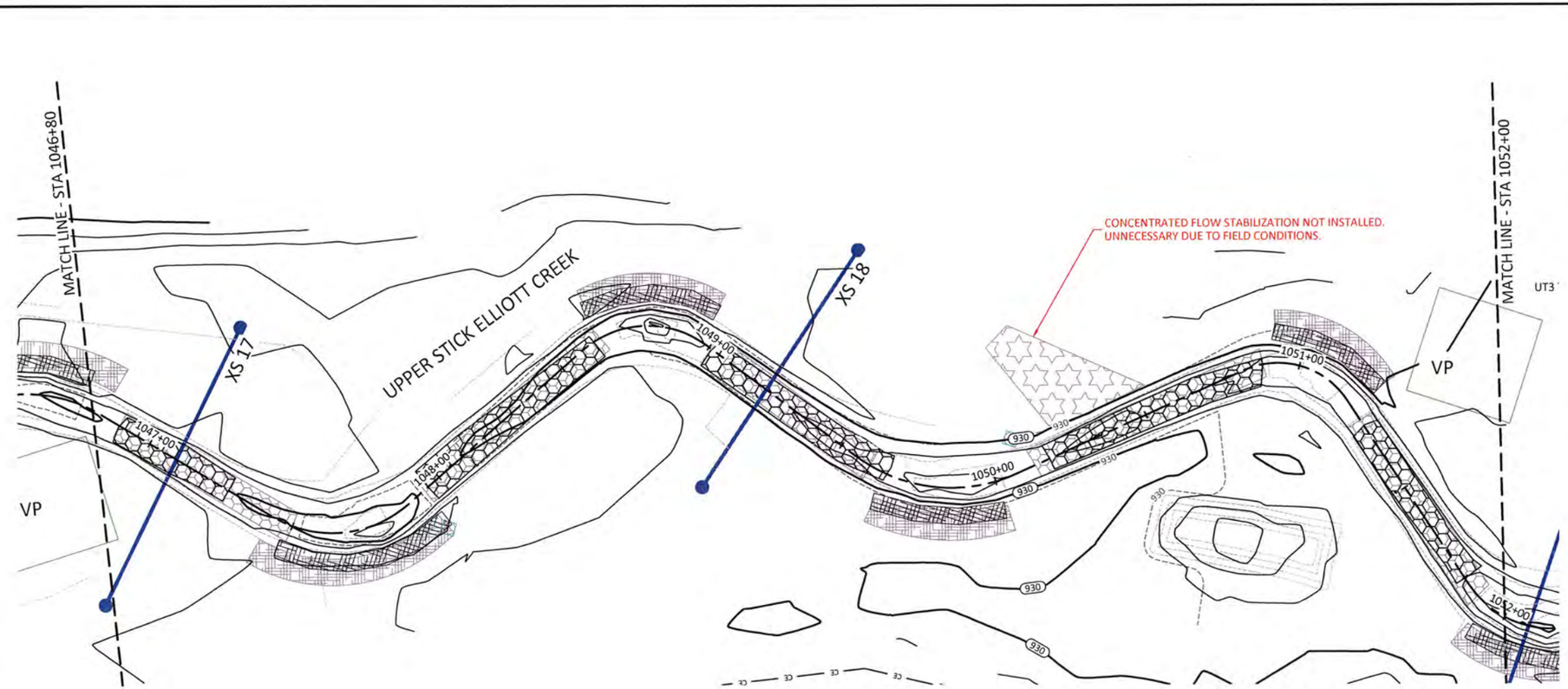

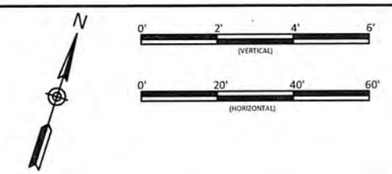

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3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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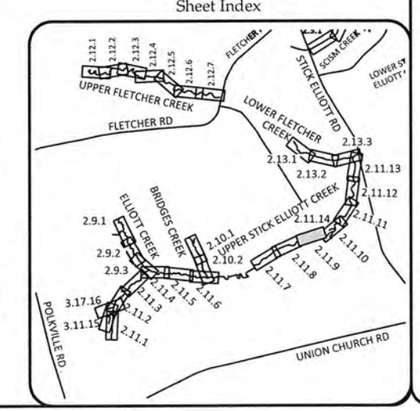

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.9

August 20, 2018

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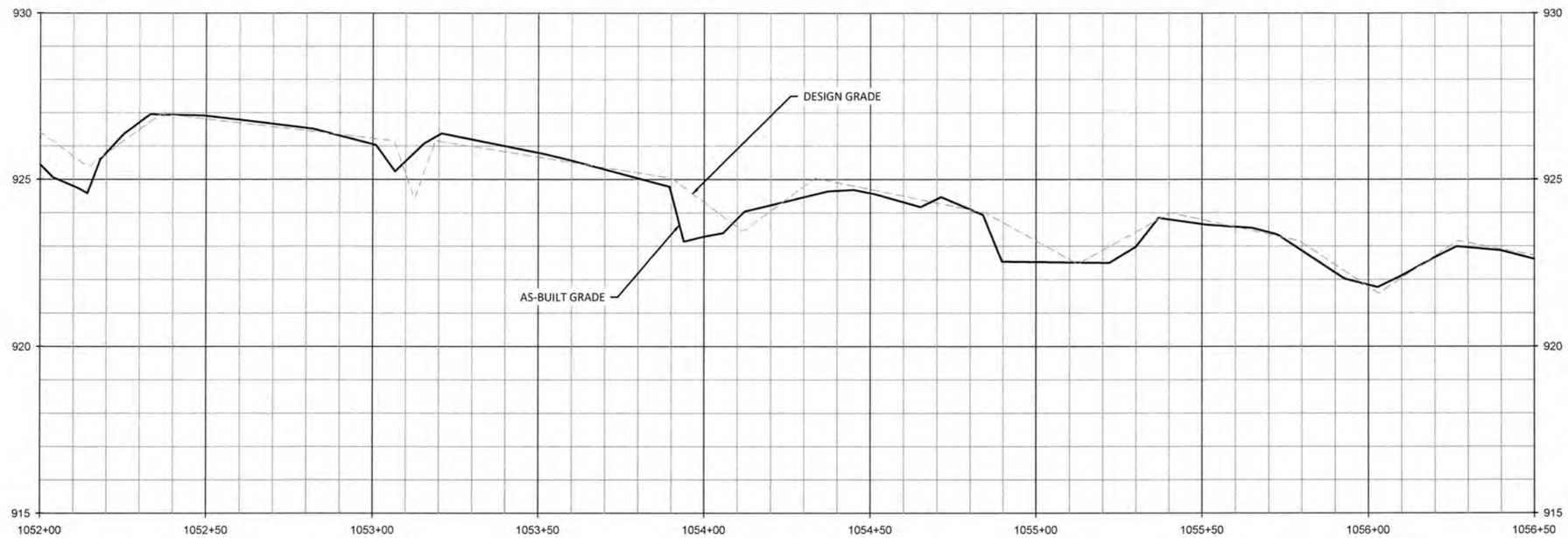

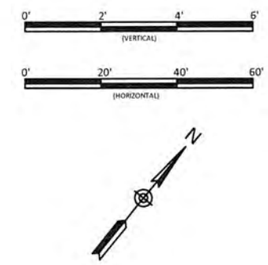

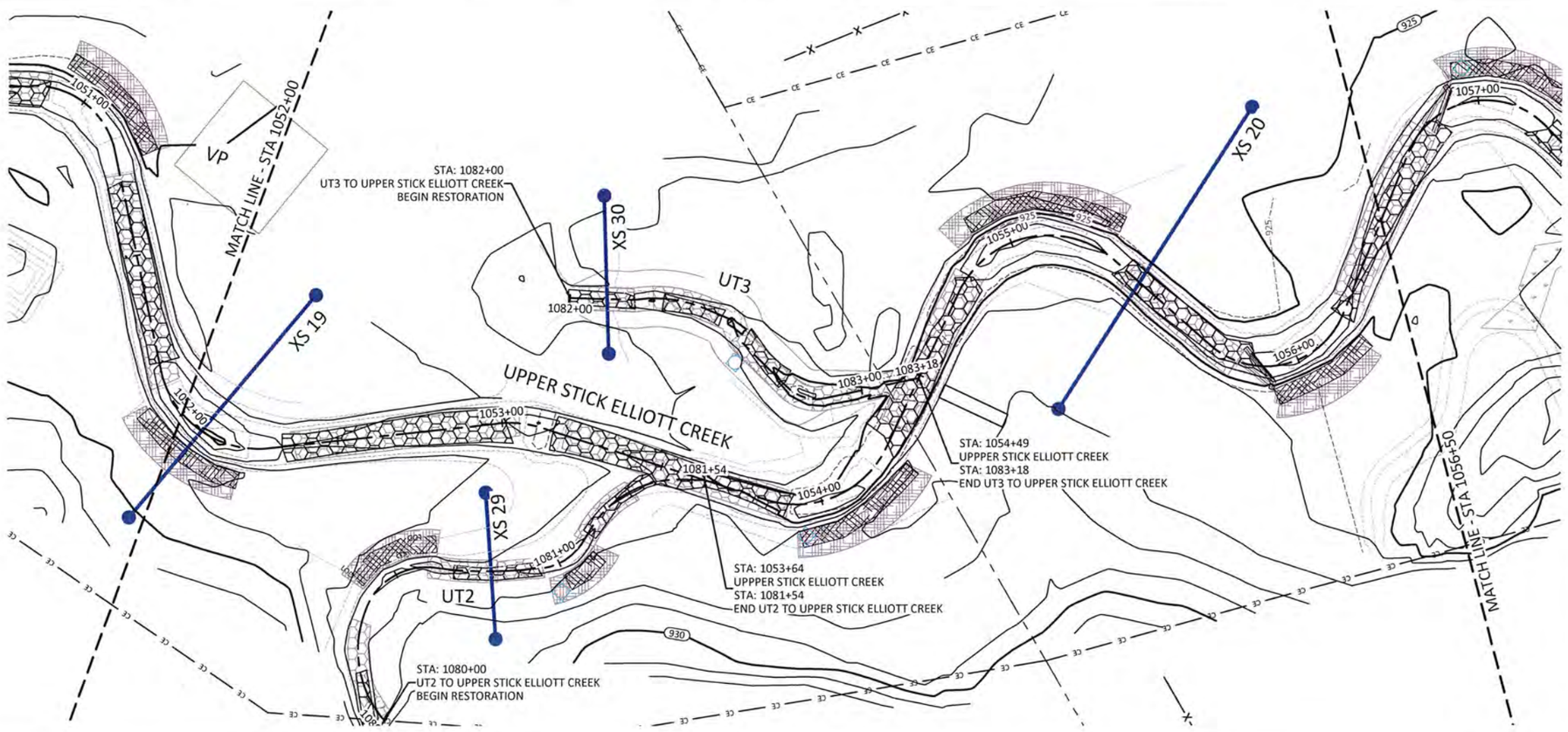

REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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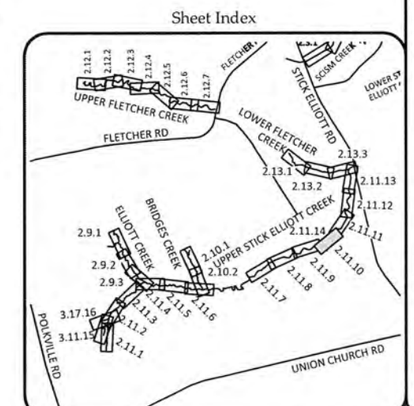

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8/21/2018 CLEMENT G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 5
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.10

August 20, 2018

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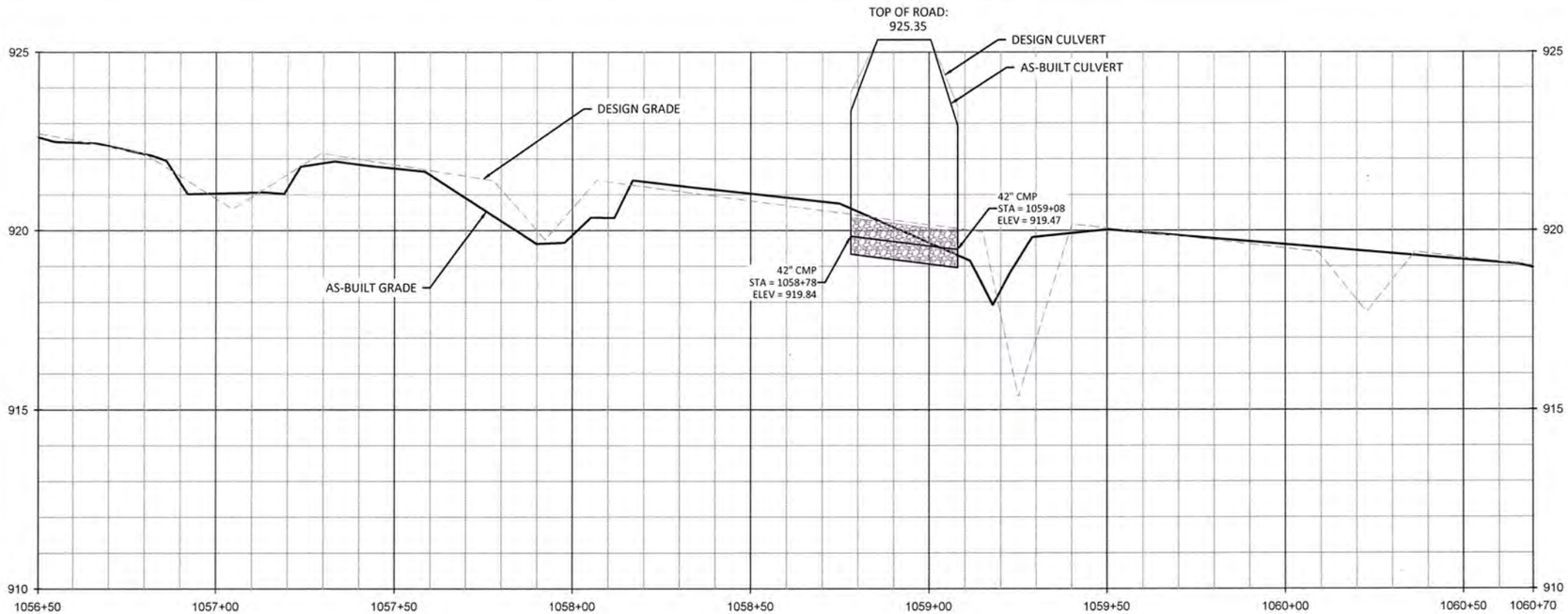

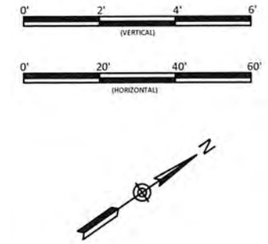

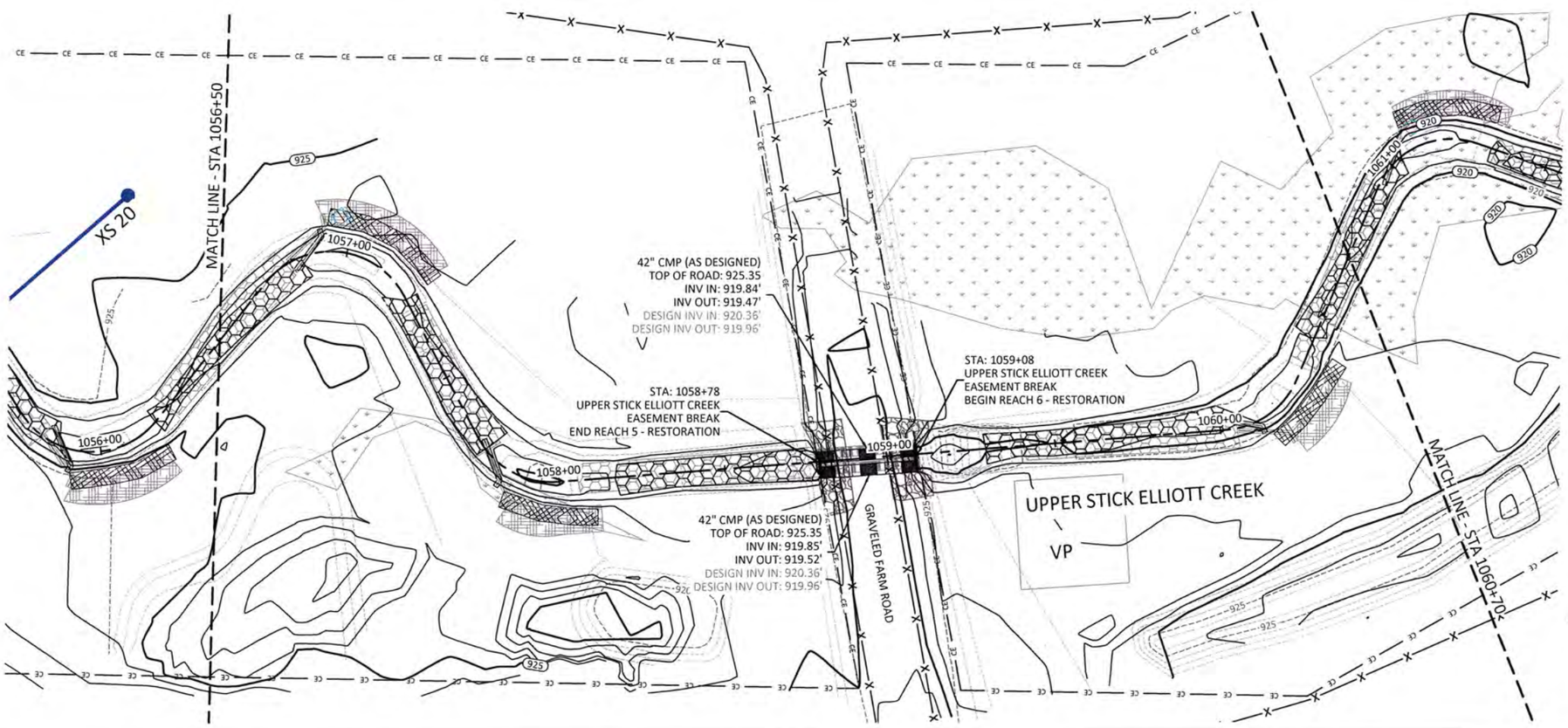

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3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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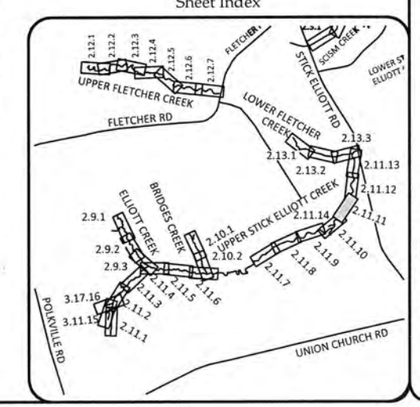

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NORTH CAROLINA PROFESSIONAL SEAL 29910 ENGINEER CHARLES G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott Creek Reach 5 & 6
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.11

August 20, 2018
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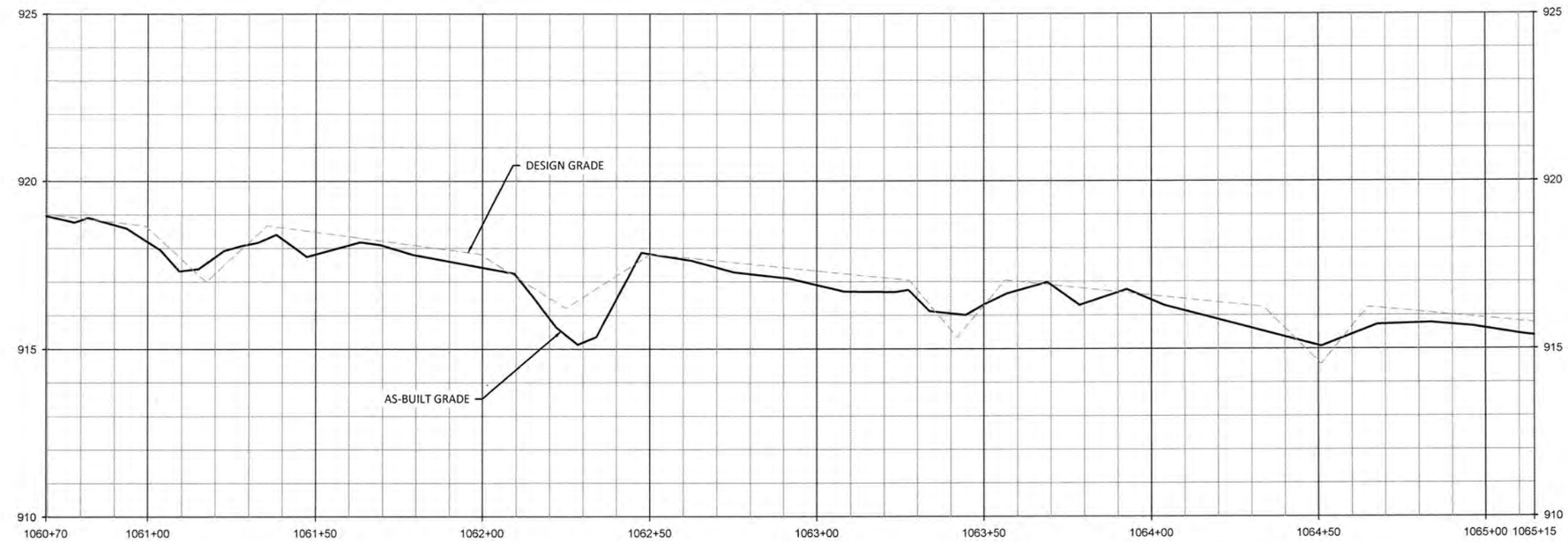

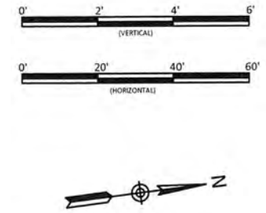

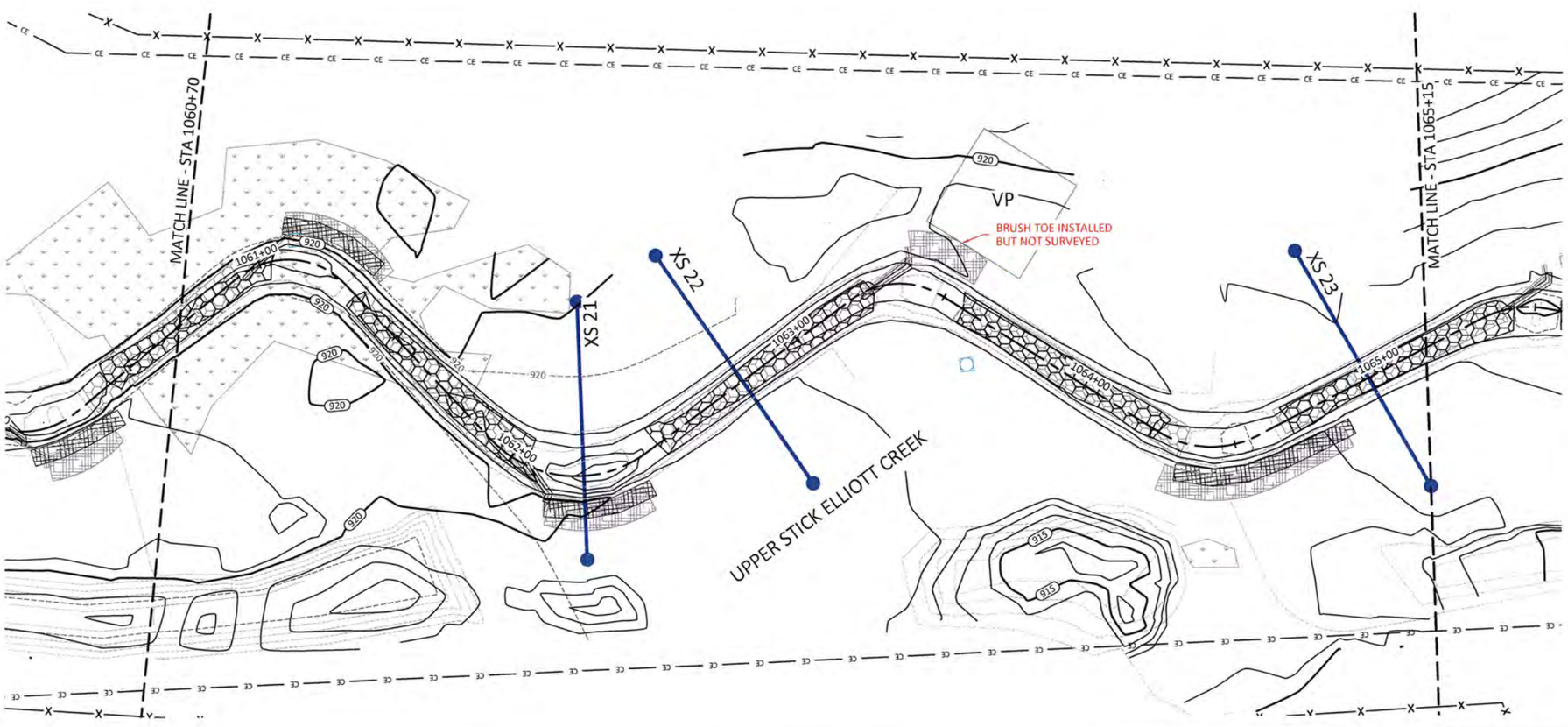

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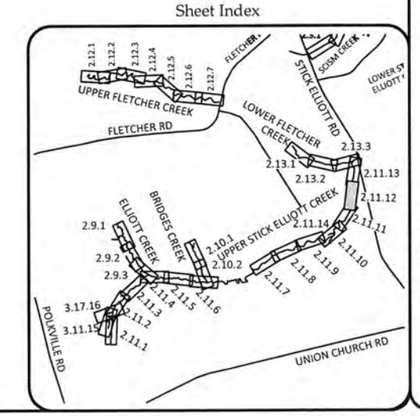

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28 ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

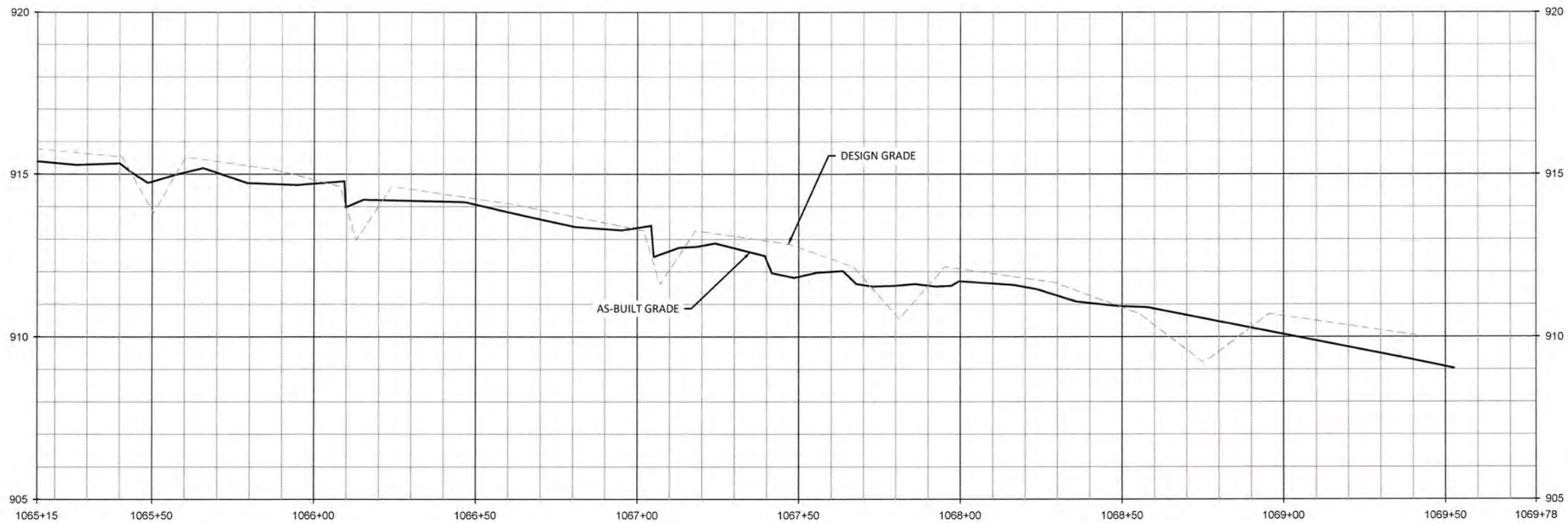
Upper Stick Elliott Creek Reach 6
Stream Plan and Profile Record Drawings

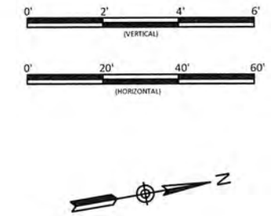
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.12

August 20, 2018





REACH TREATMENT:

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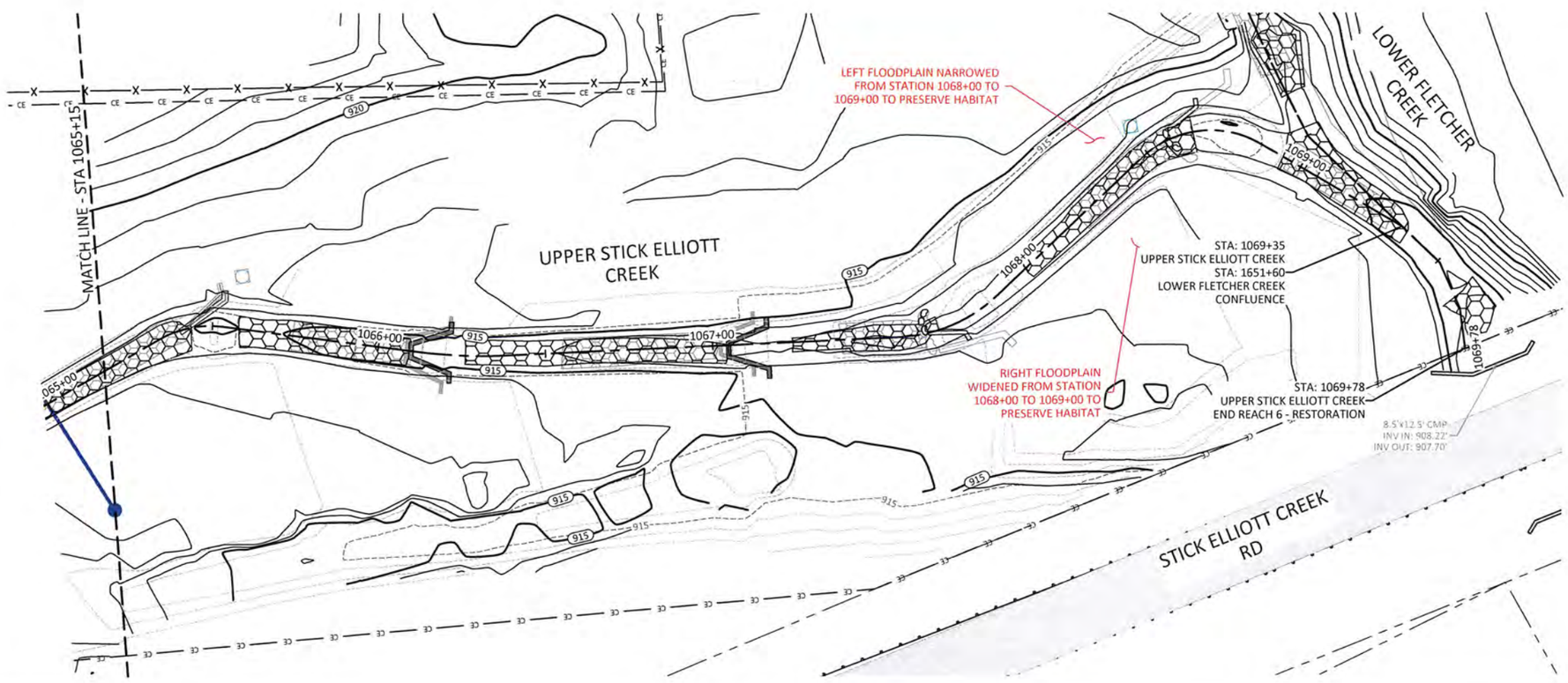
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.



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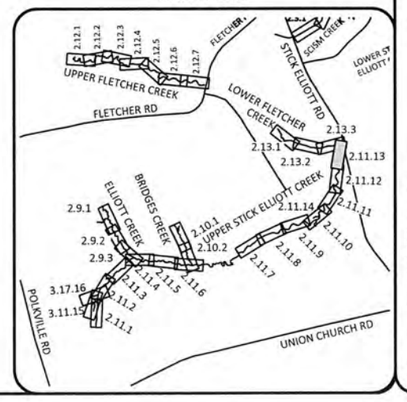

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8/28/2018 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

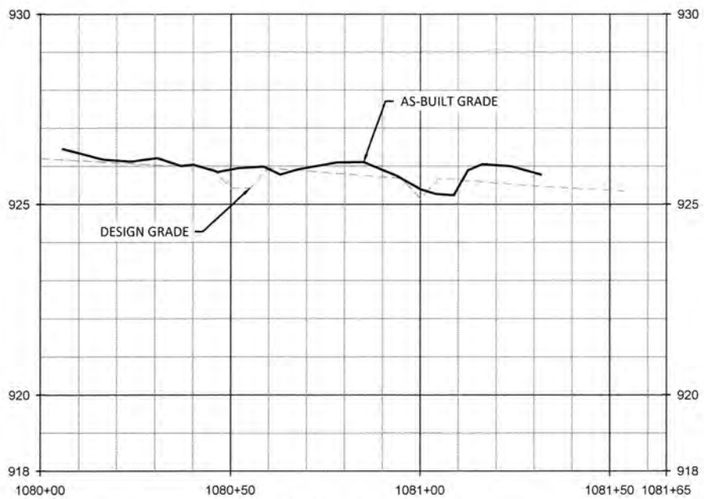
Upper Stick Elliott Creek Reach 6
Stream Plan and Profile Record Drawings

Revisions:

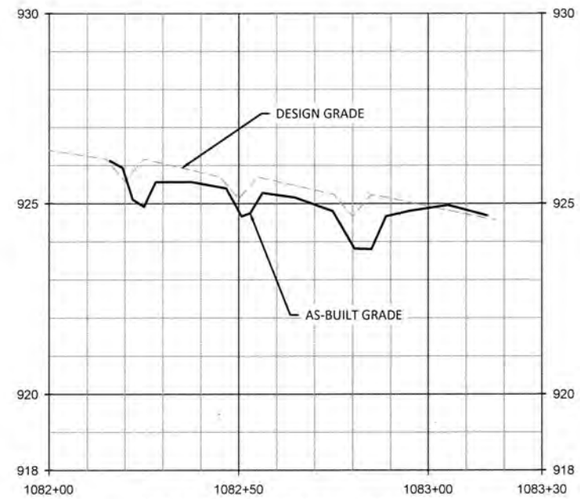
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.13

August 20, 2018



UT2 TO UPPER STICK ELLIOTT CREEK



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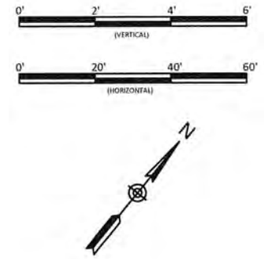

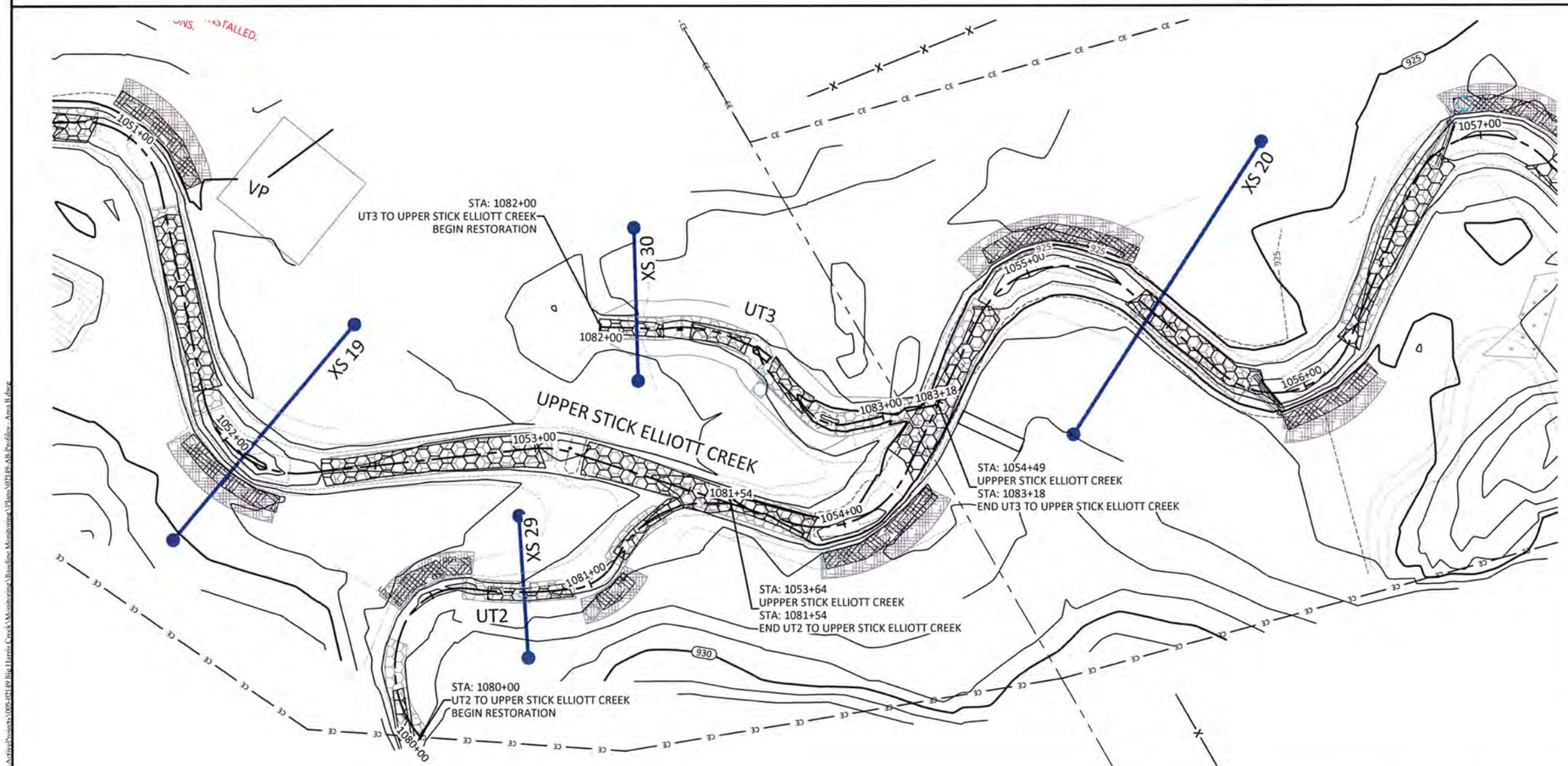

REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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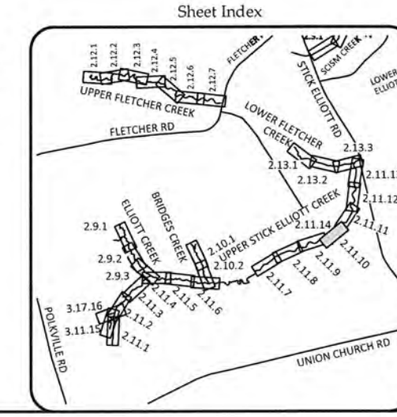

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

UT2 & UT3 to Upper Stick Elliott Creek
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	KT
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.14

August 20, 2018
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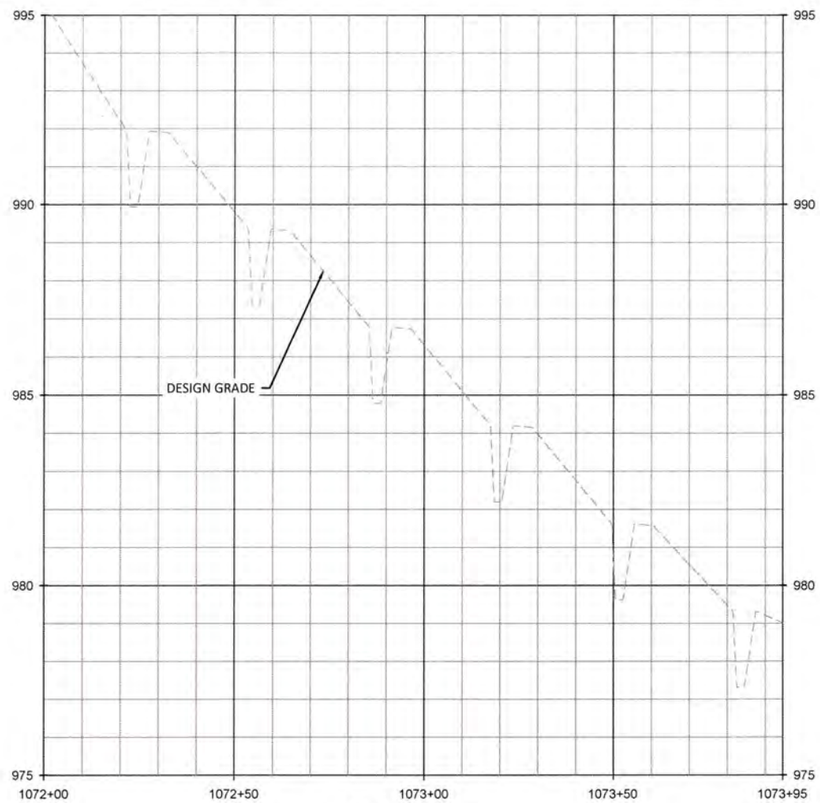

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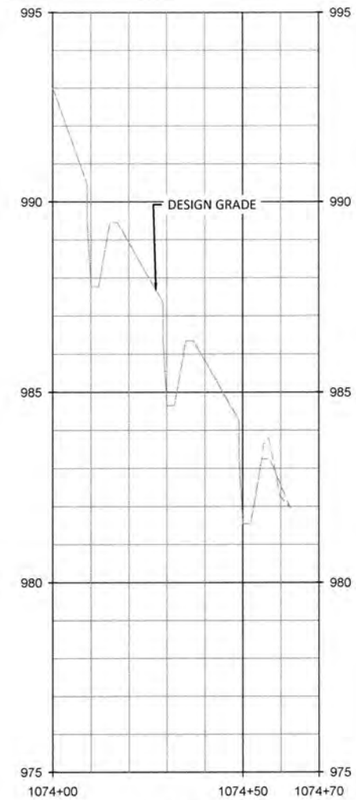

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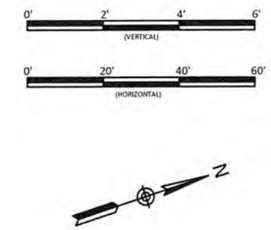

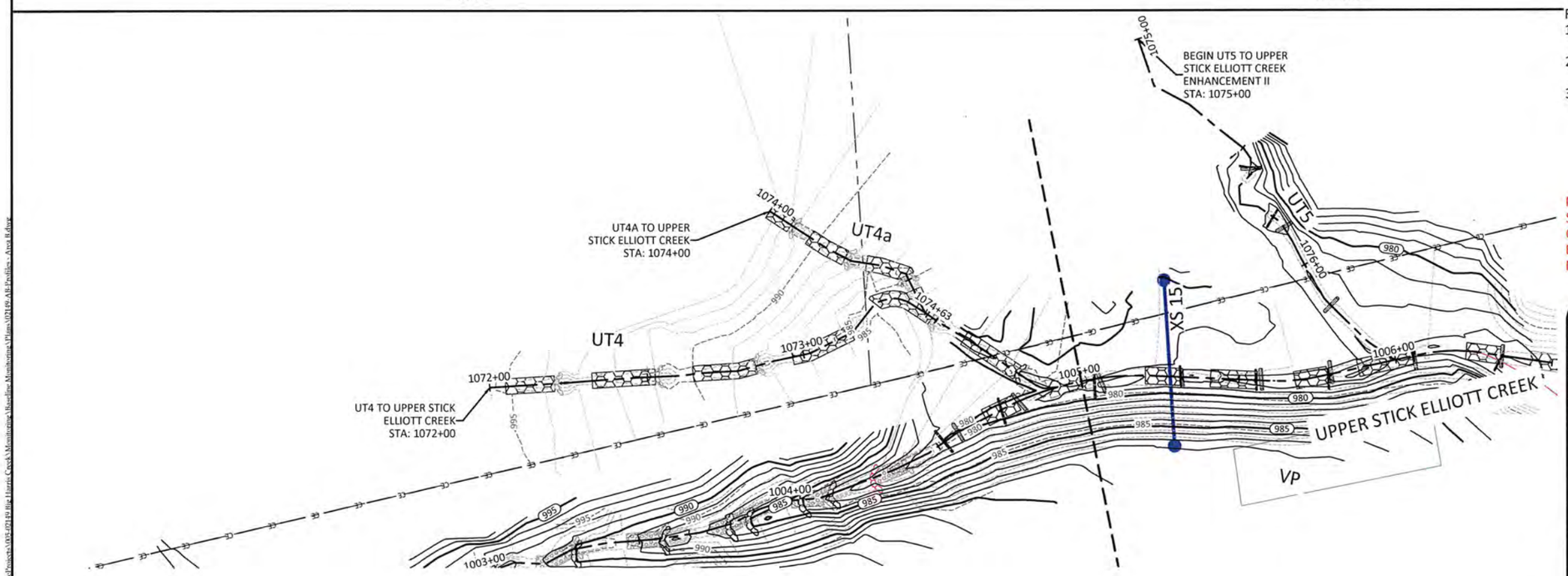

REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

NOTE:
SURVEY WAS NOT CONDUCTED OUTSIDE CONSERVATION EASEMENT. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.

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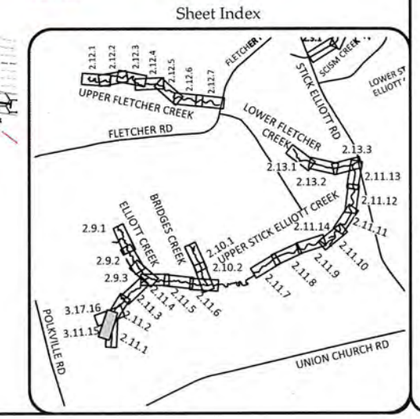

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — JAY G. REINICKER — 038021 — 08/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

UT4 & UT4a to Upper Stick Elliott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.15

August 20, 2018
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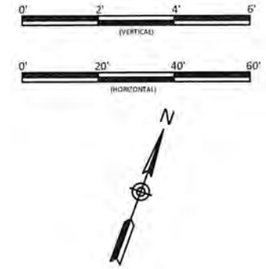

REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
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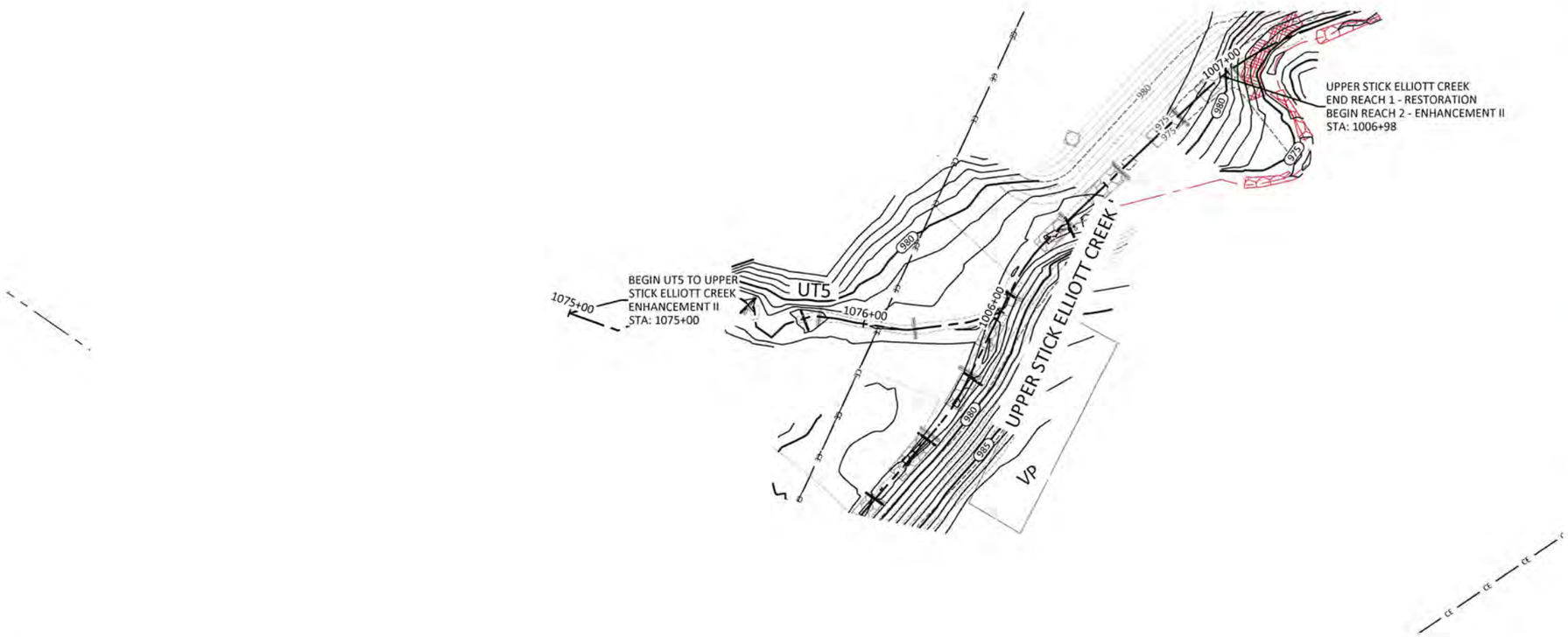

NOTE:
SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.

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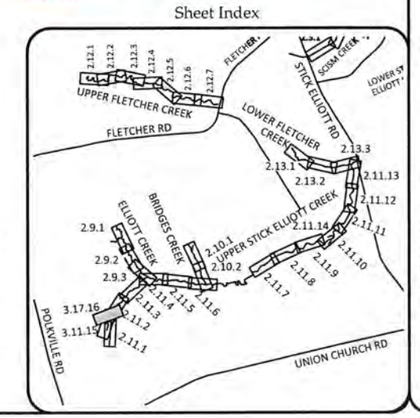

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

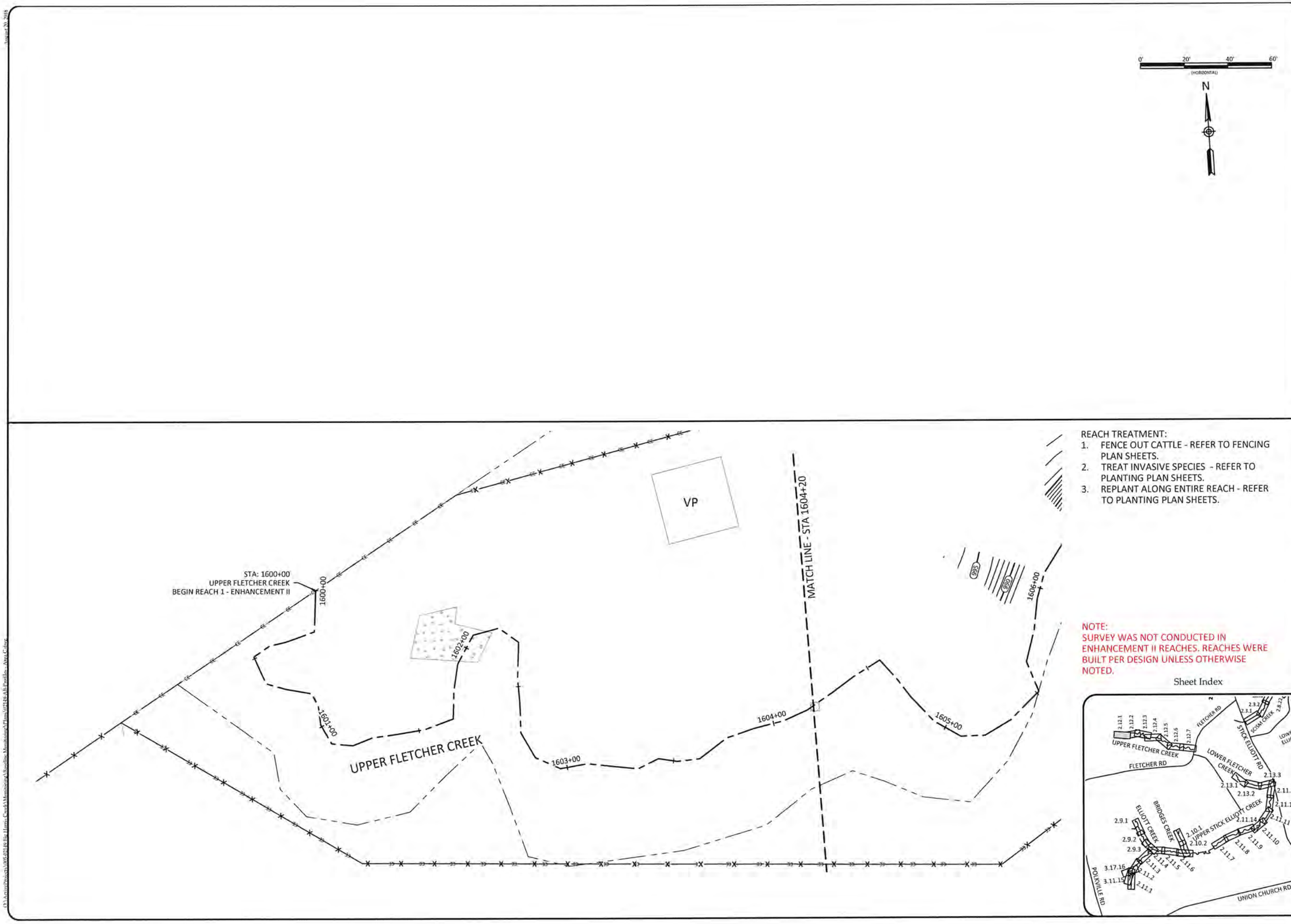
UT5 to Upper Stick Elliott Creek
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.11.16

August 20, 2018



REACH TREATMENT:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28943 EMILY G. REINICKER 8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.12.1

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NORTH CAROLINA PROFESSIONAL SEAL 019412 ENGINEER RICHARD G. REINIKER

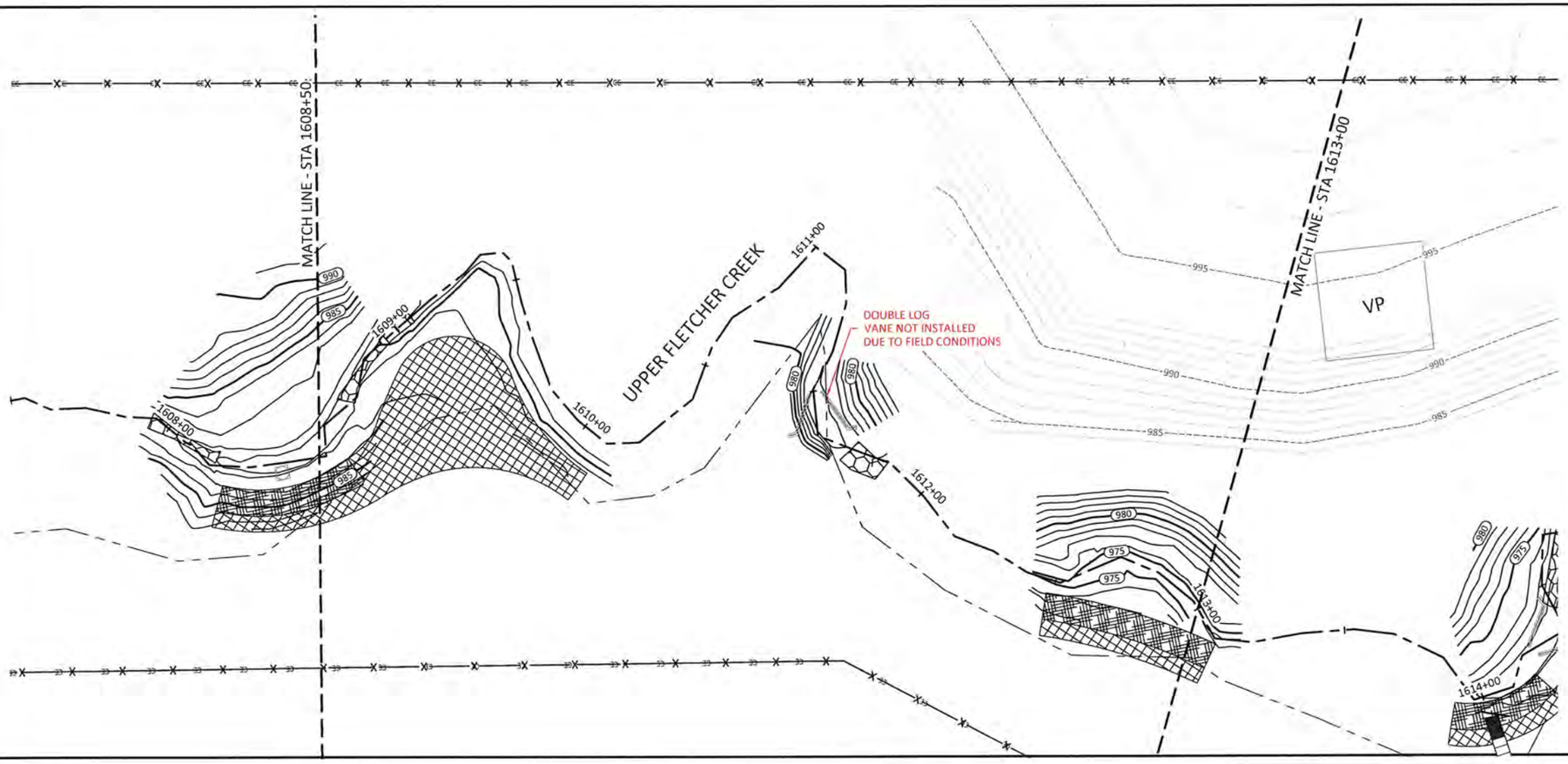
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

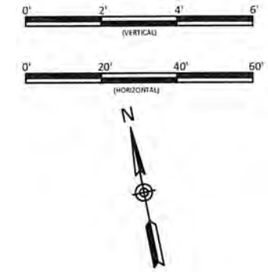
Upper Fletcher Creek Reach 1
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed by:	EGR, AA
Drawn by:	JS
Checked by:	JCK

Sheet 2.12.2





REACH TREATMENT:

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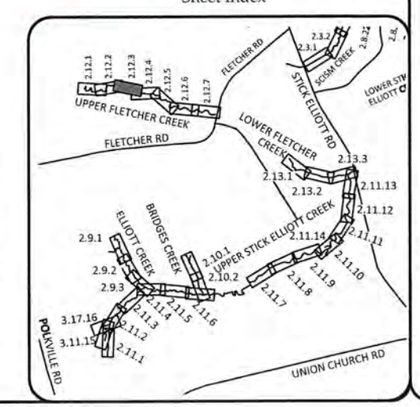

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NORTH CAROLINA PROFESSIONAL SEAL 029013 ENGINEER G. REINIKER
12/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek Reach 1
Stream Plan and Profile Record Drawings

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

Sheet 2.12.3

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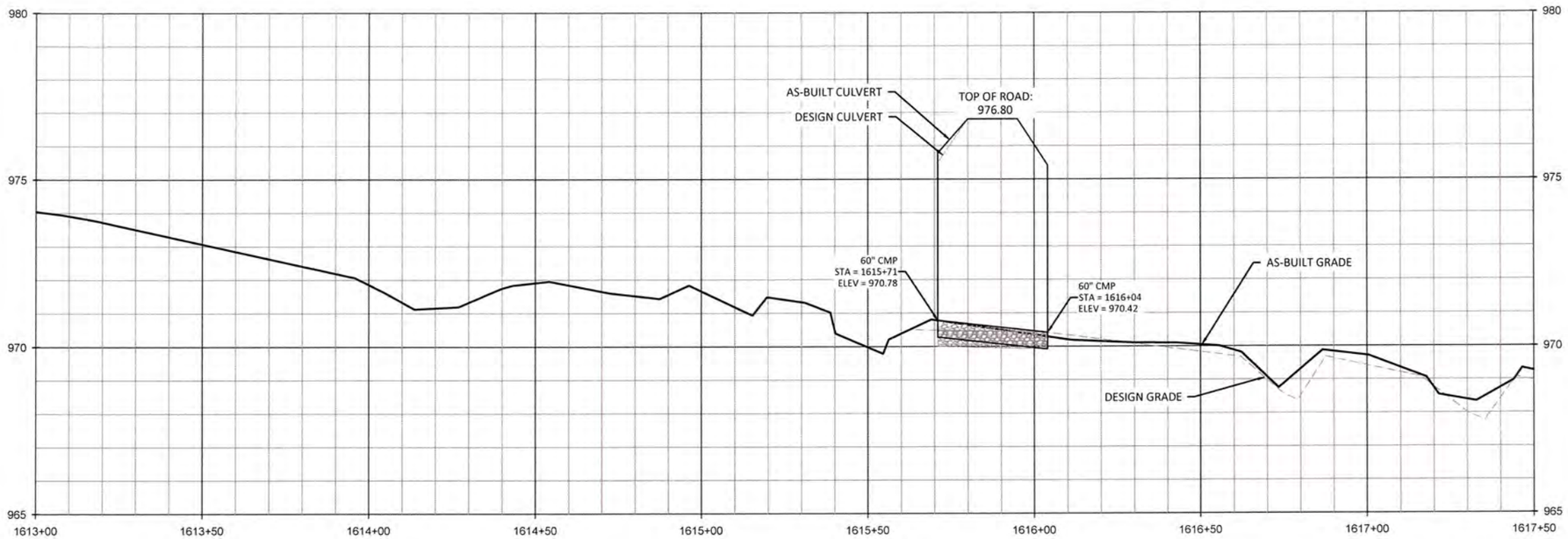
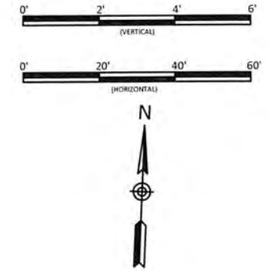
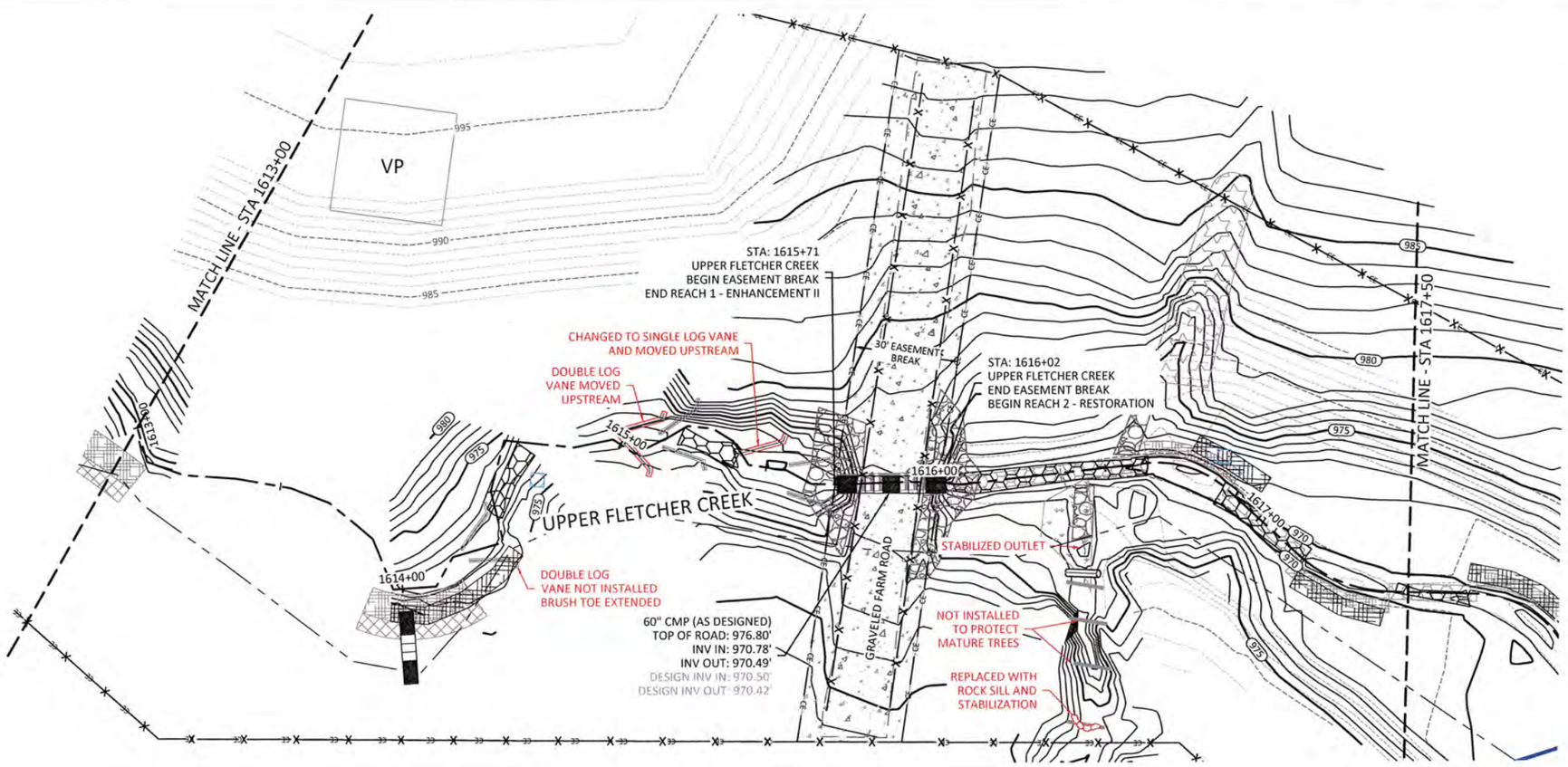
August 20, 2018







REACH TREATMENT:

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SURVEY WAS NOT CONDUCTED IN ENHANCEMENT II REACHES. REACHES WERE BUILT PER DESIGN UNLESS OTHERWISE NOTED.

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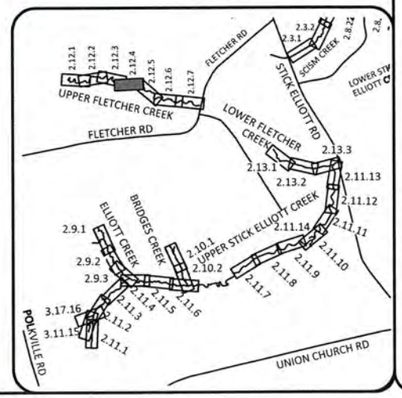

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

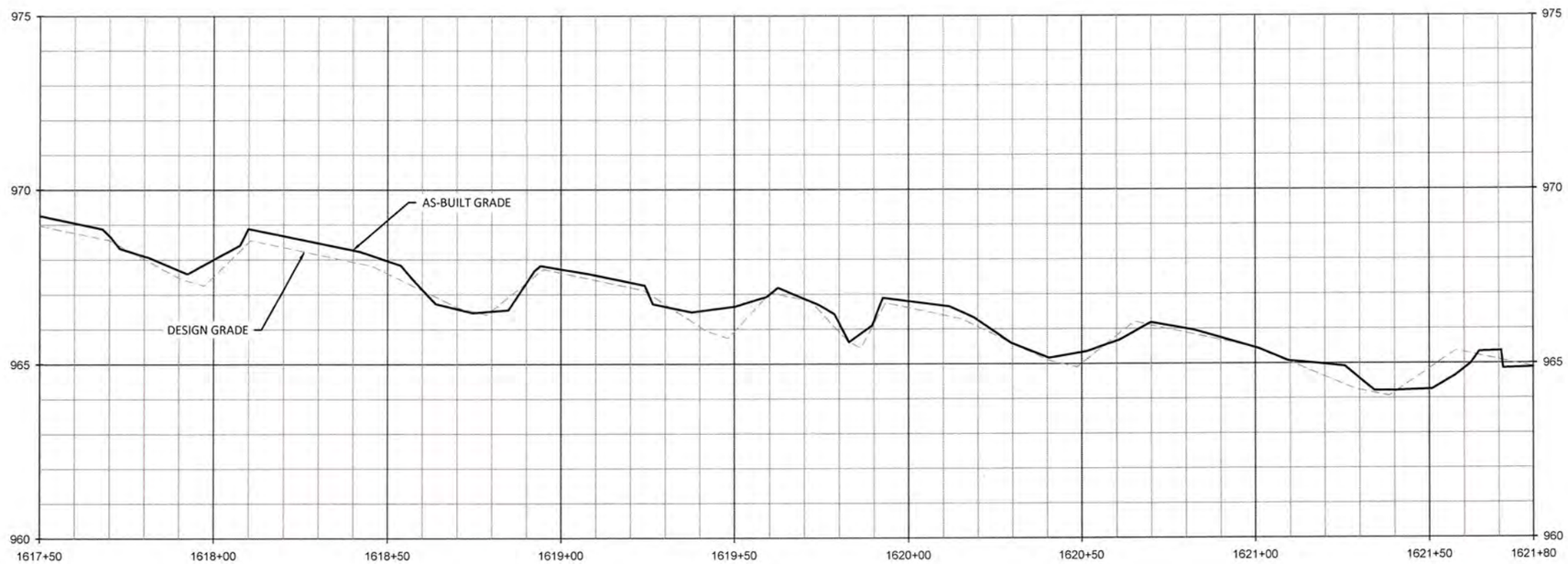
Upper Fletcher Creek Reach 1 & 2
Stream Plan and Profile Record Drawings

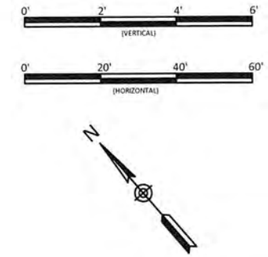
Revisions:

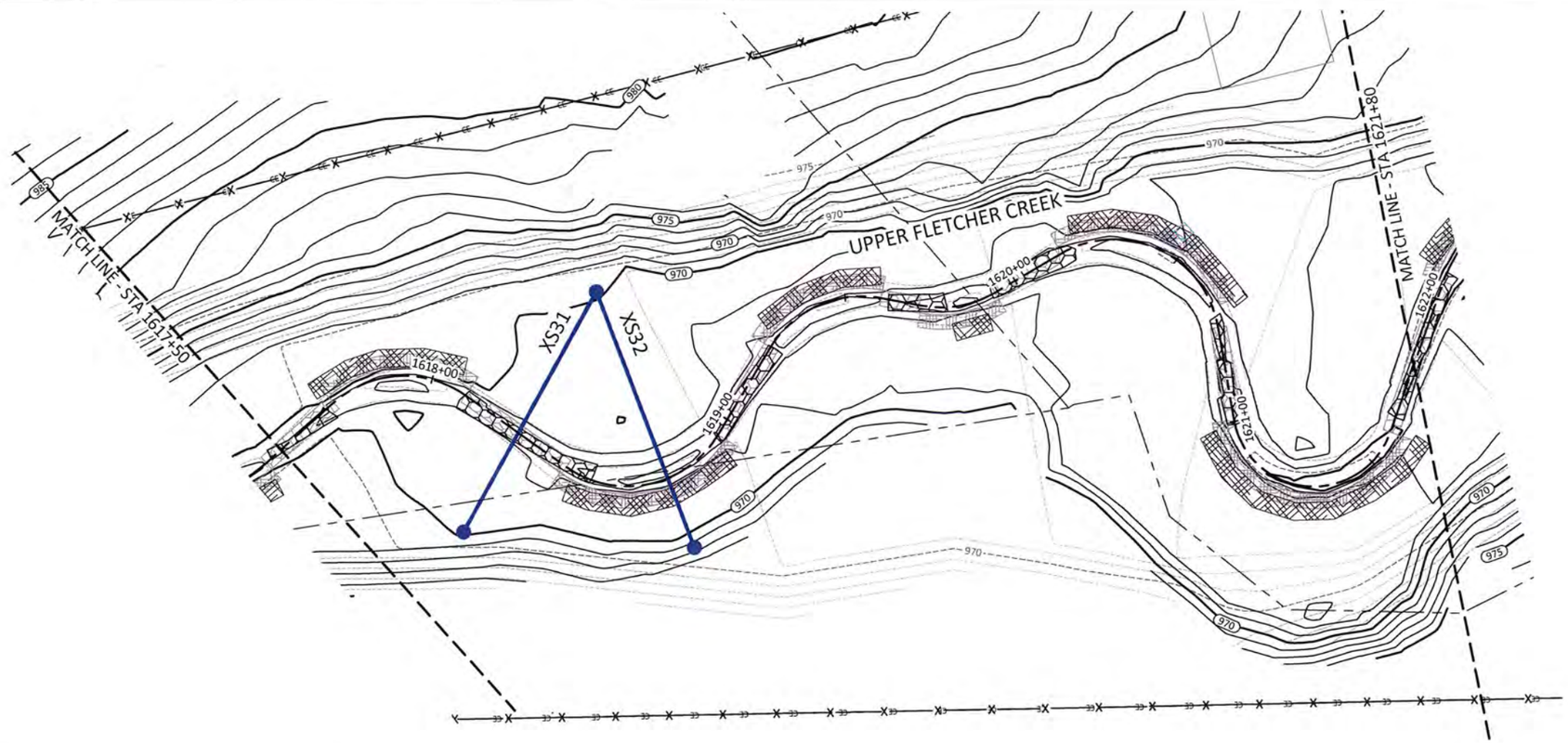
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.12.4

August 20, 2018







REACH TREATMENT:

1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.
3. REPLANT ALONG ENTIRE REACH - REFER TO PLANTING PLAN SHEETS.

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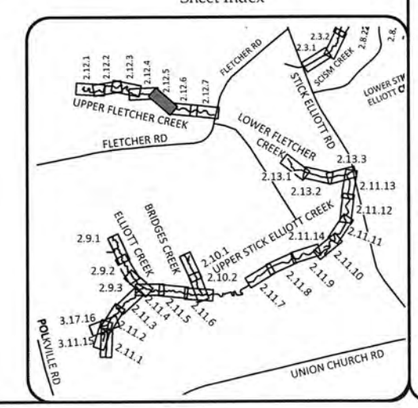

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045181 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek Reach 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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2.12.5

August 28, 2018
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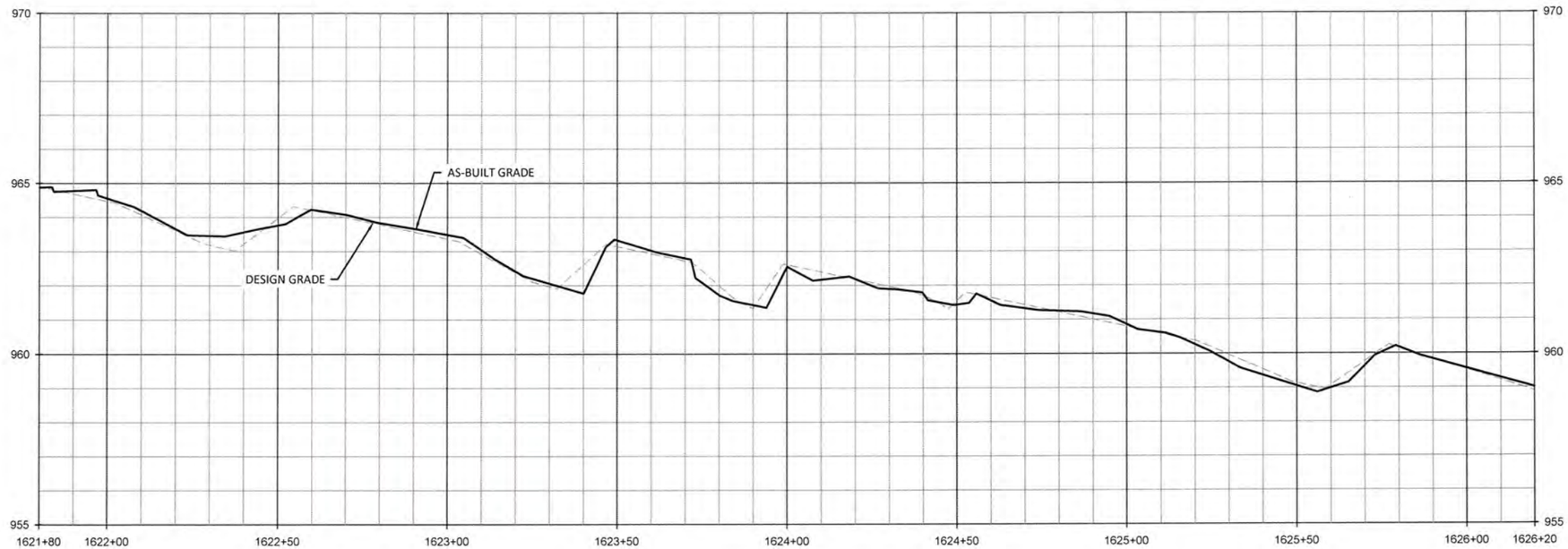

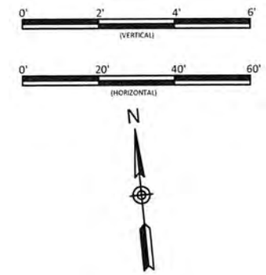

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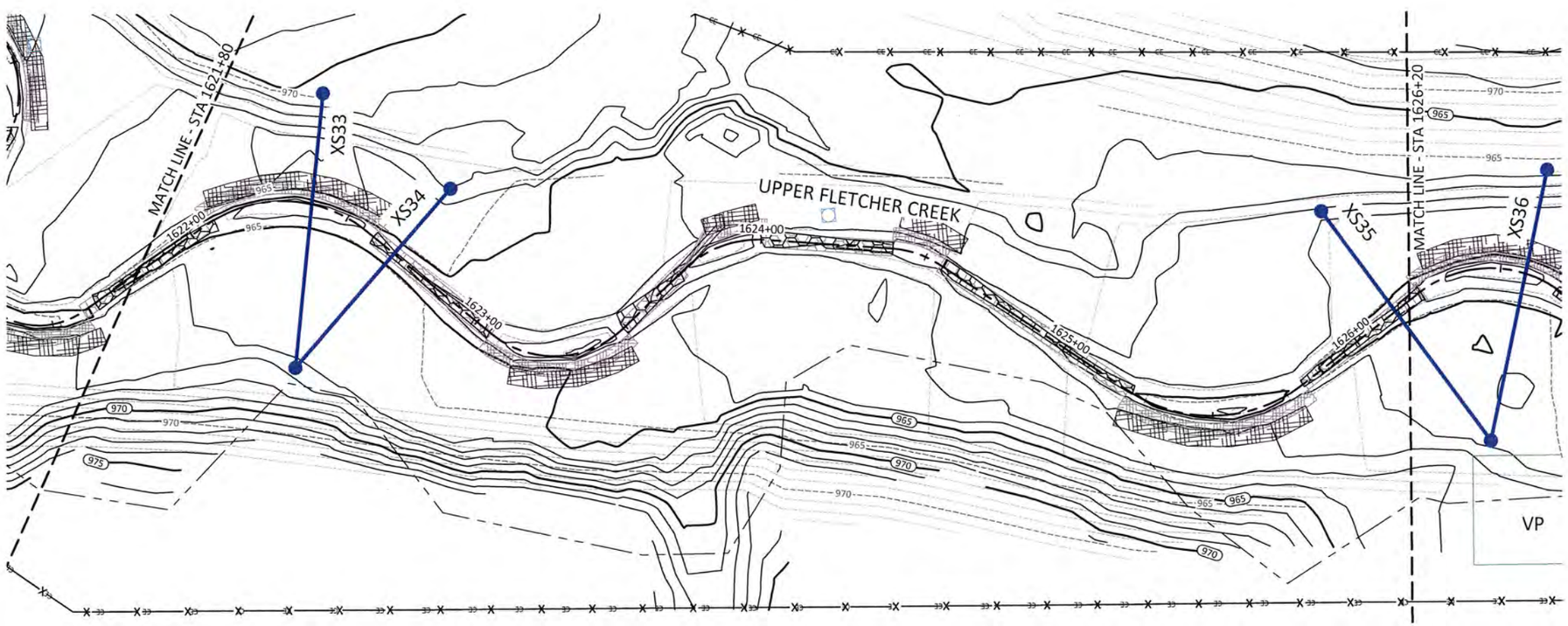

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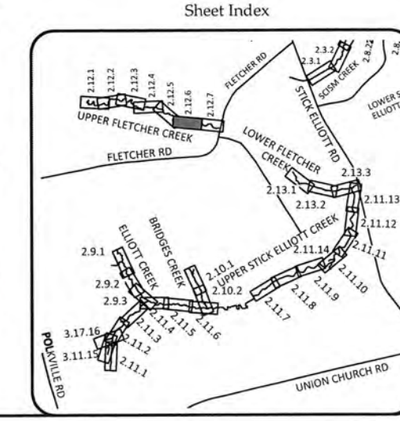

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek Reach 2
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

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August 20, 2018
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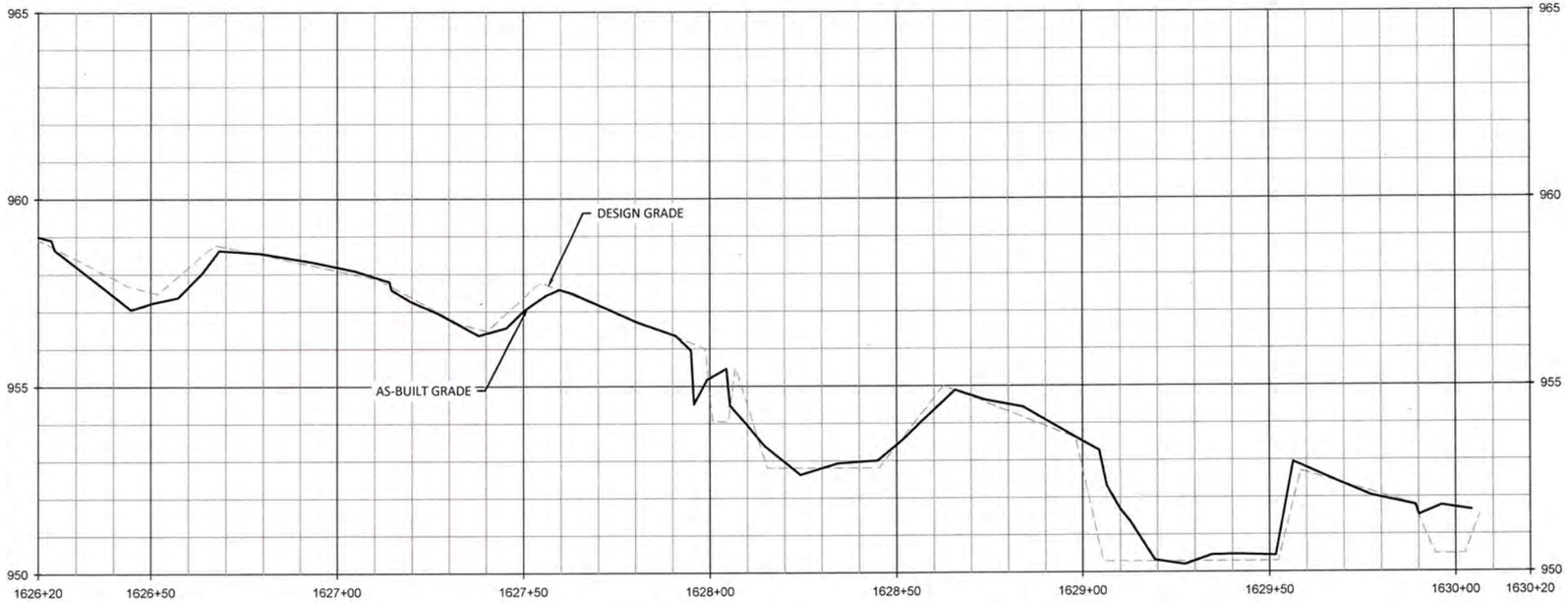

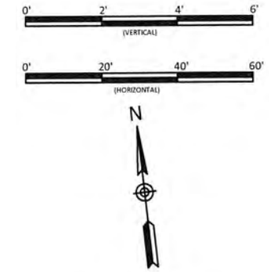

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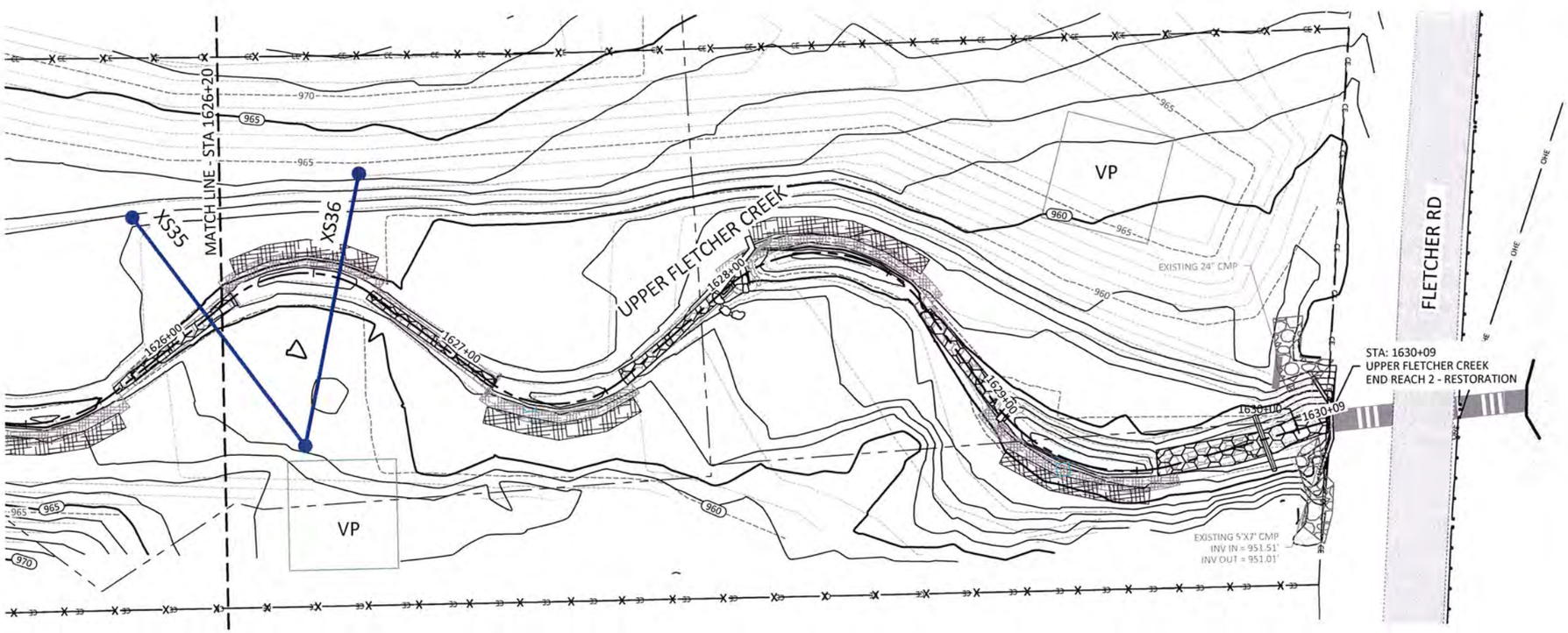

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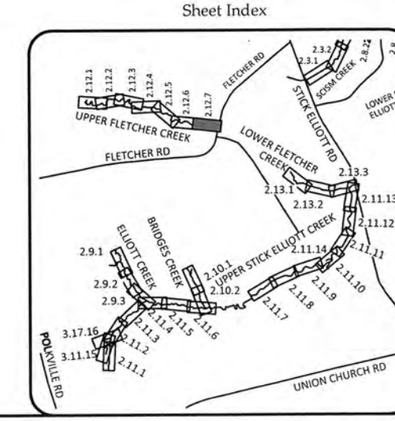

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek Reach 2
Stream Plan and Profile Record Drawings

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Drawn By:	JS
Checked By:	JCK

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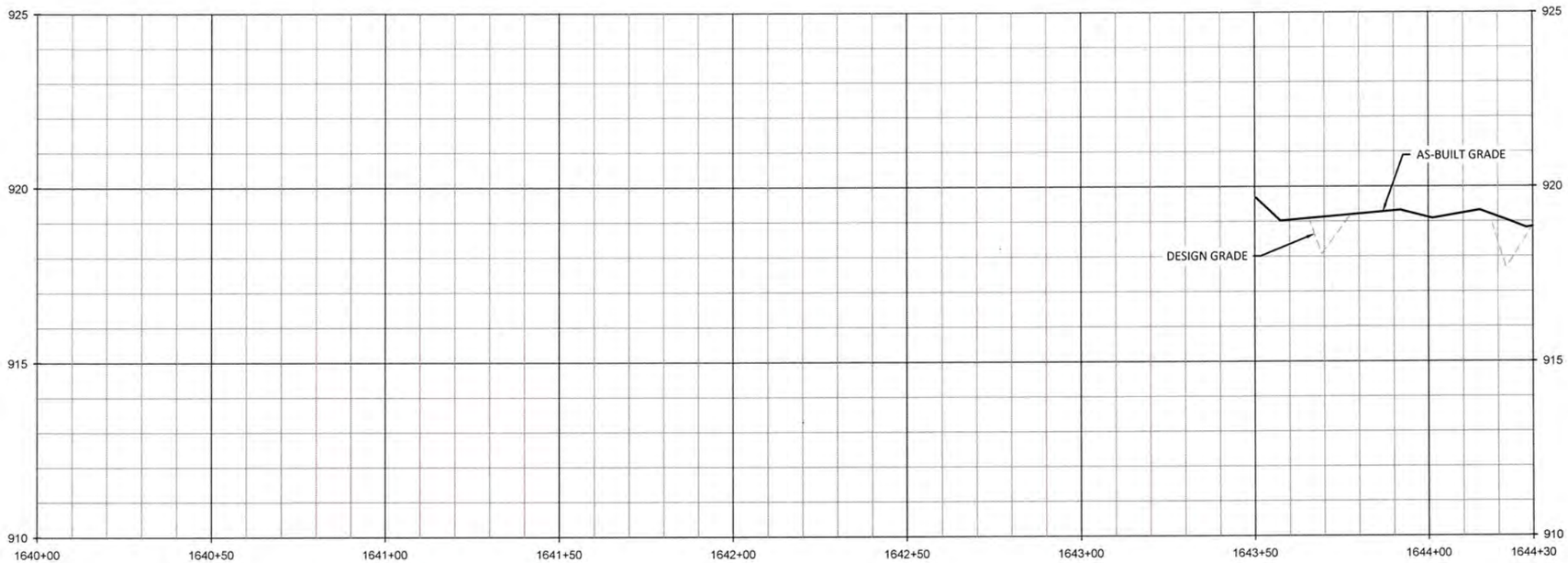
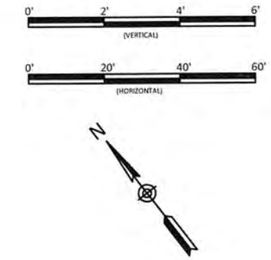
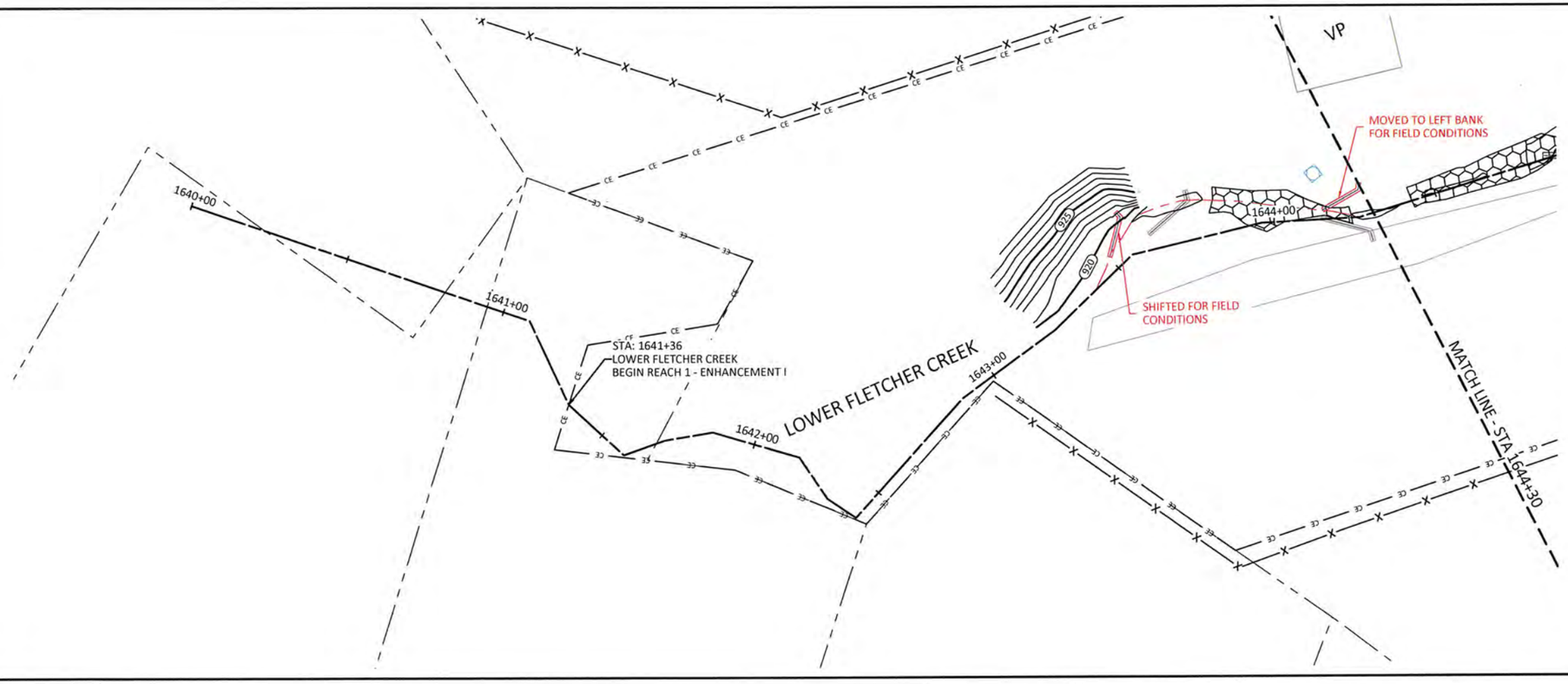
August 20, 2018







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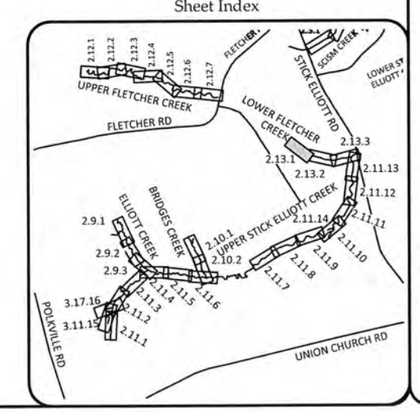

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Fletcher Creek Reach 1
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	KT
Drawn By:	JS
Checked By:	JCK

Sheet 2.13.1

August 20, 2018

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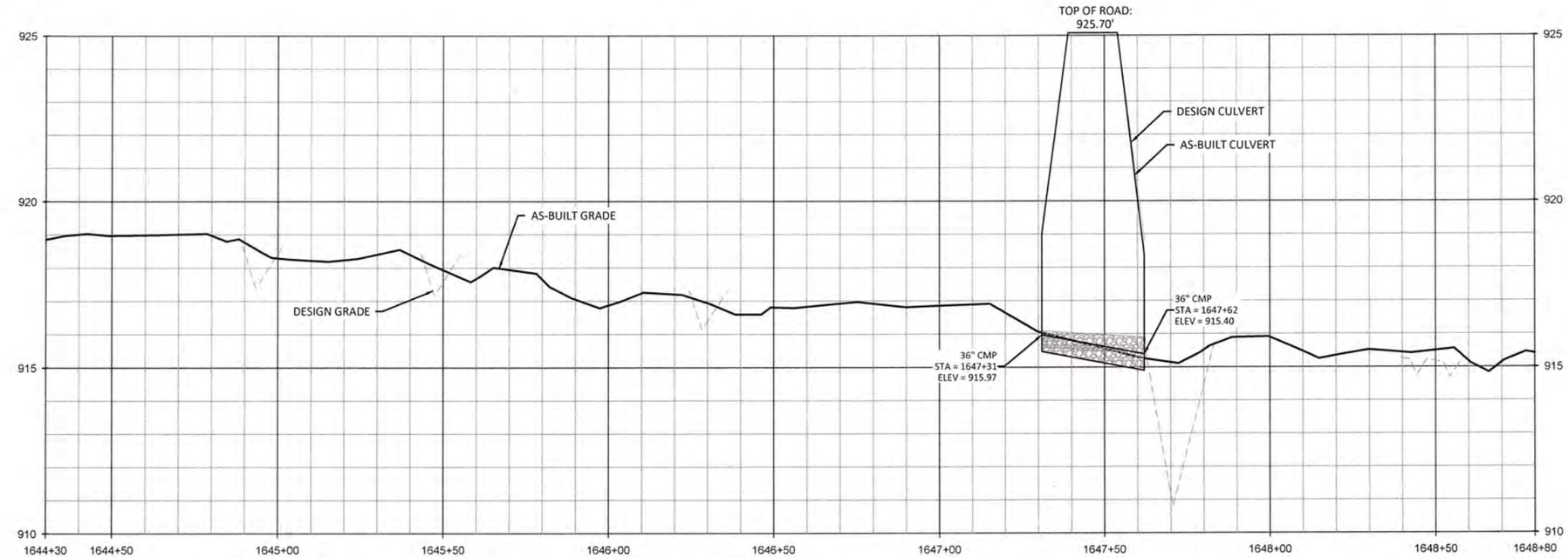

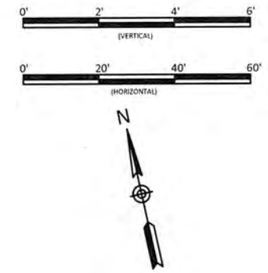

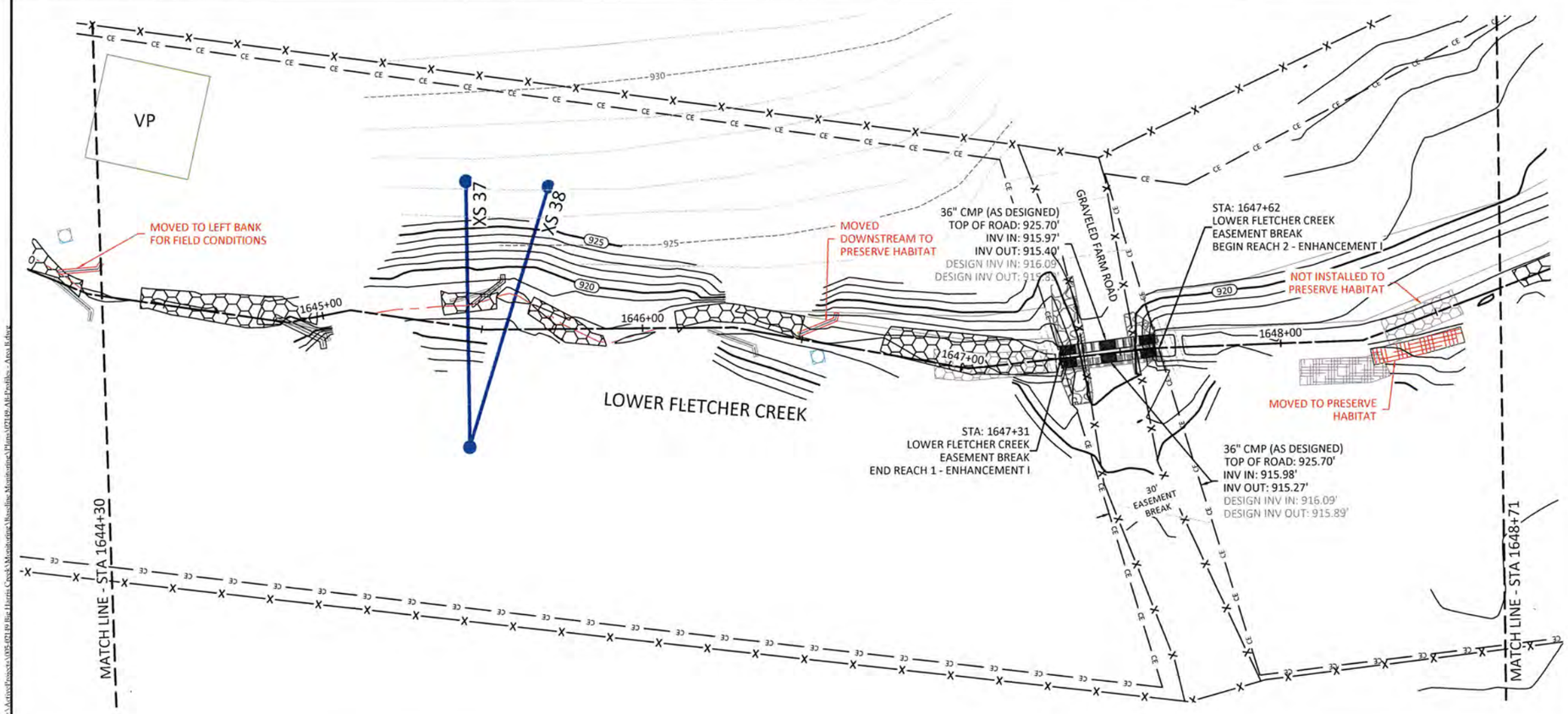

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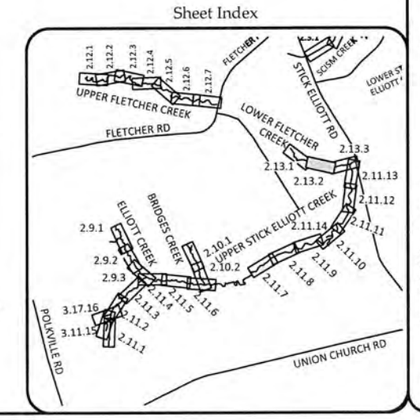

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Fletcher Creek Reach 1 & 2
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	KT
Drawn By:	JS
Checked By:	JCK

Sheet 2.13.2

August 20, 2018

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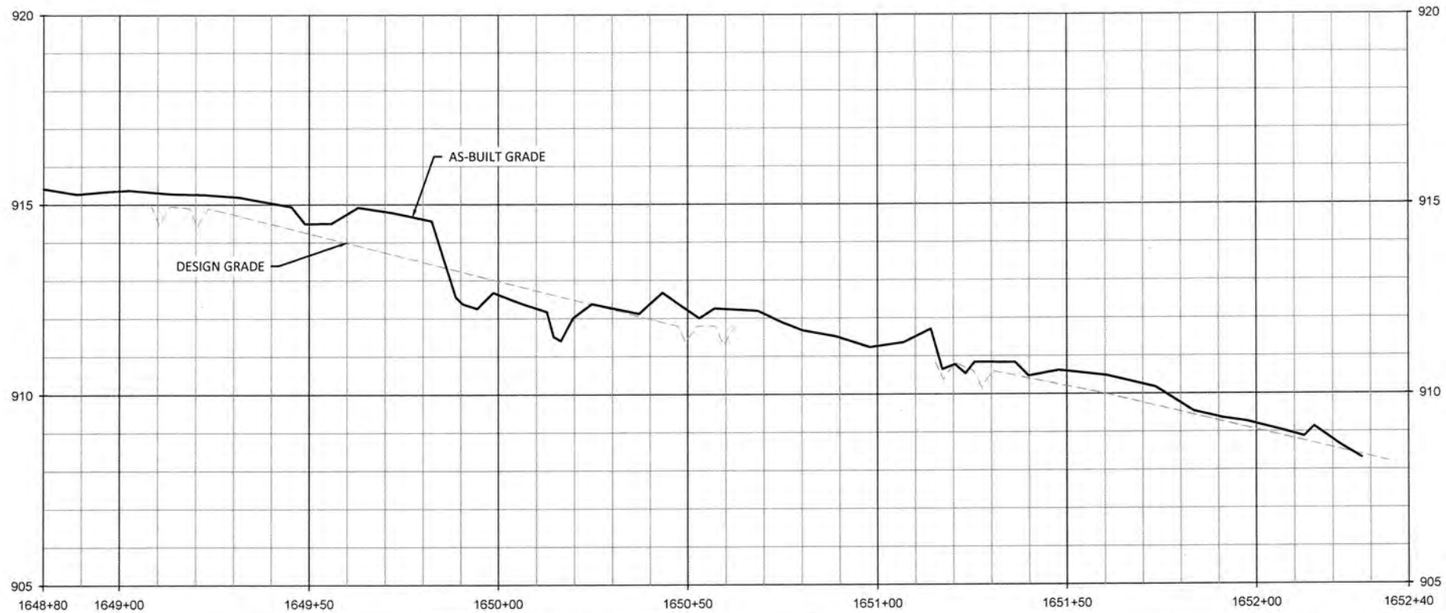

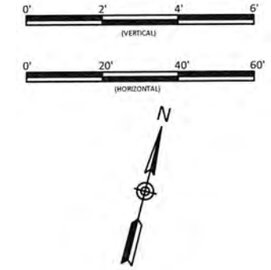

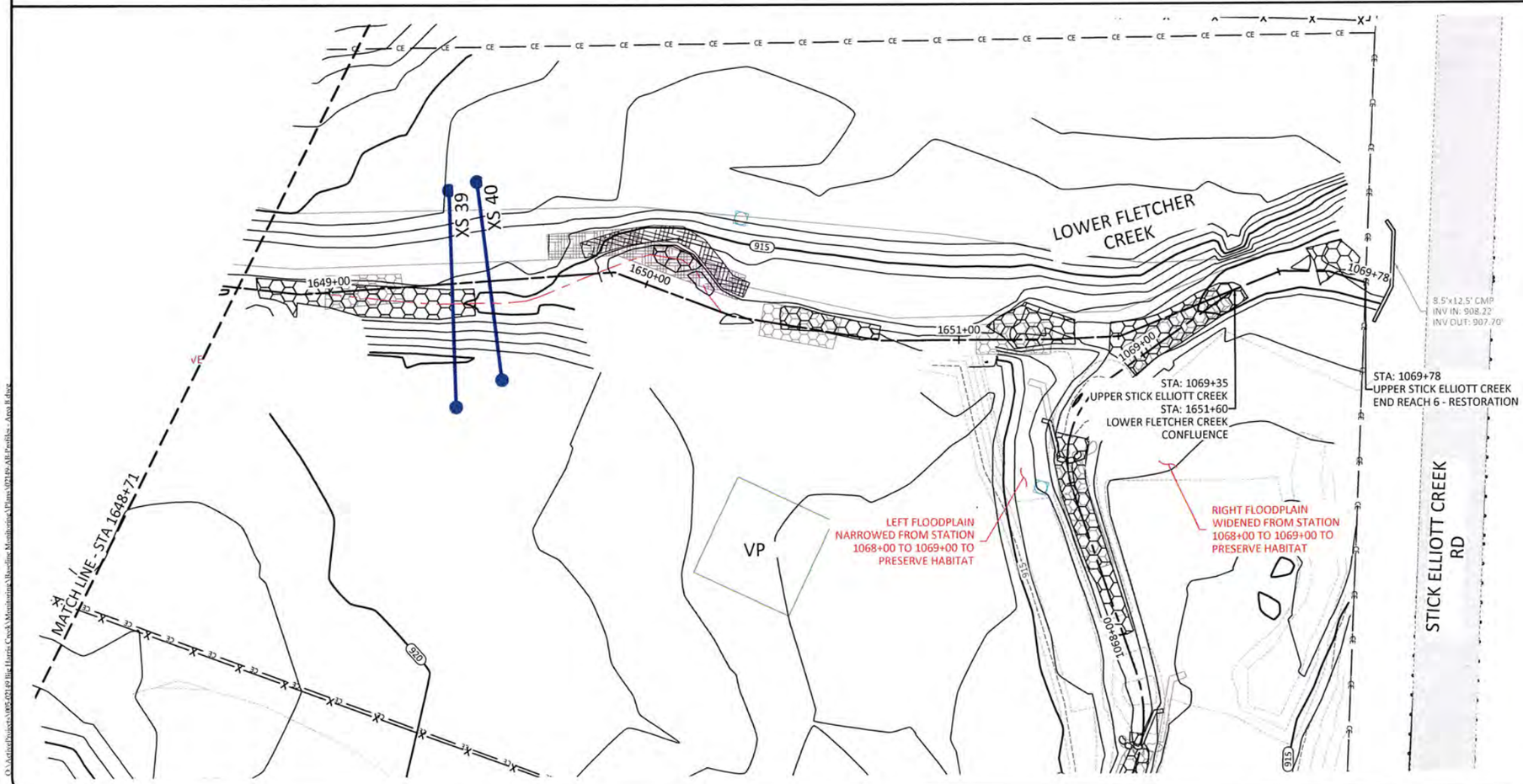

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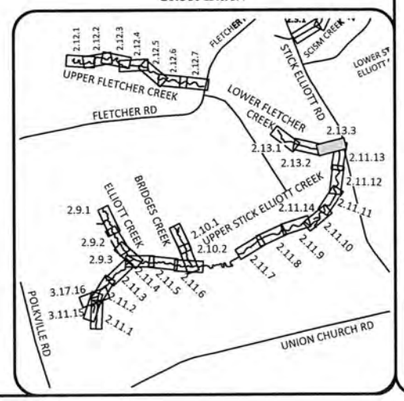

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045291 EMILY G. REINICKER 8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Fletcher Creek Reach 2
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	KT
Drawn By:	JS
Checked By:	JCK

Sheet 2.13.3

August 20, 2018

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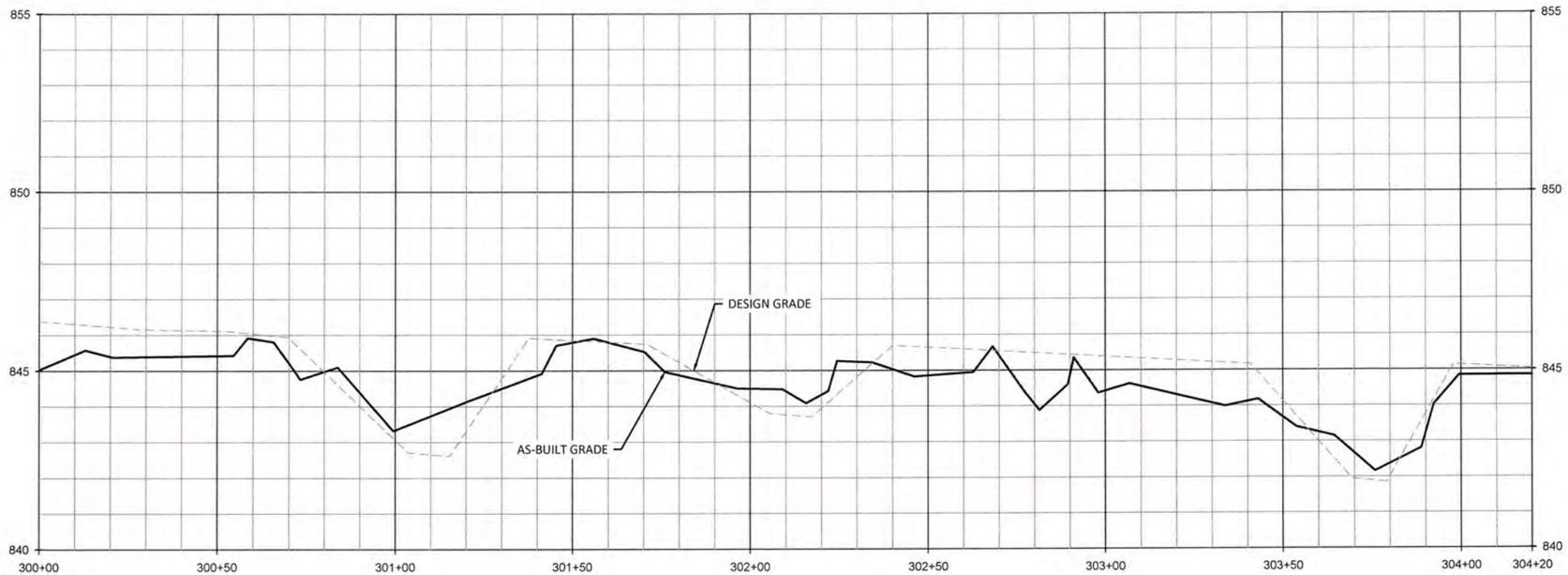

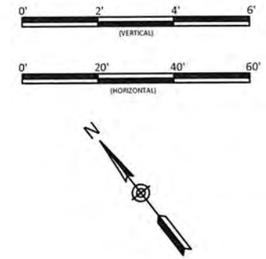

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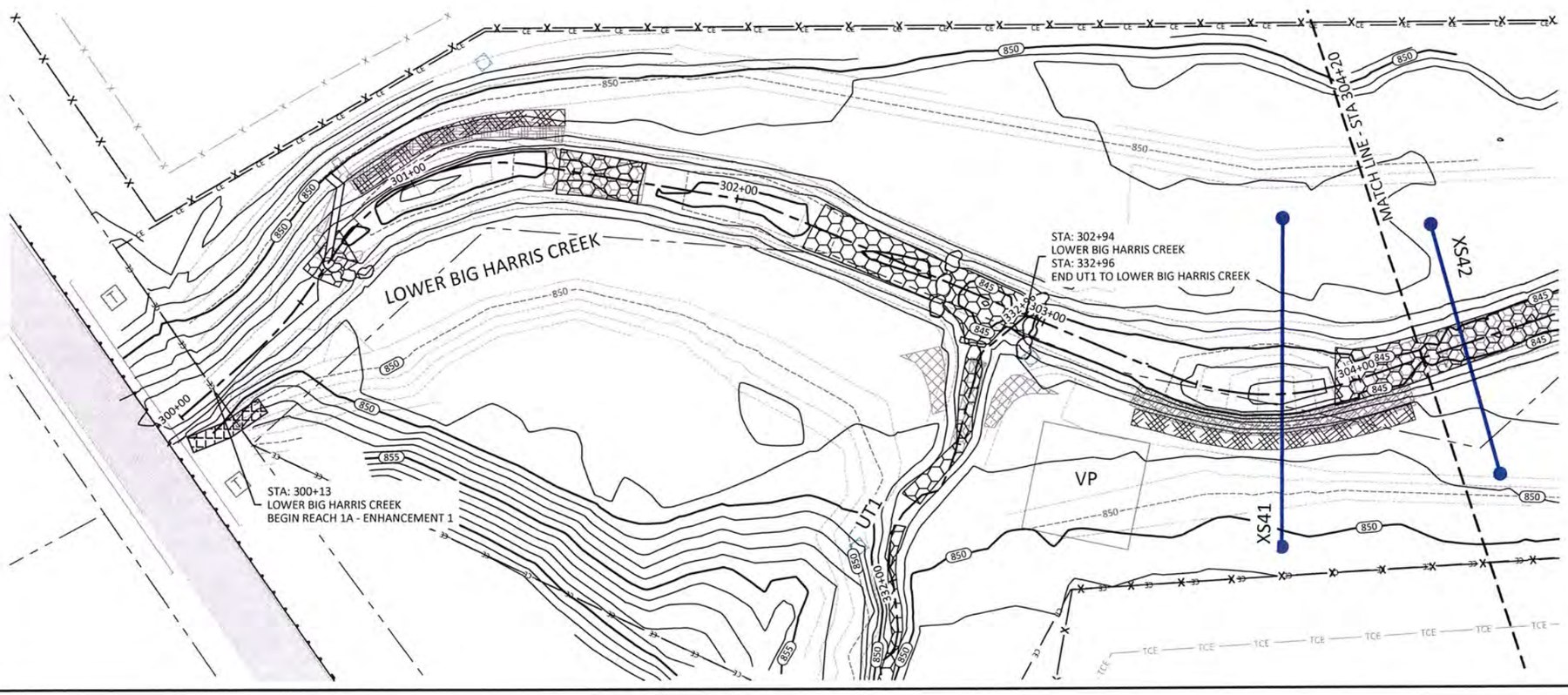

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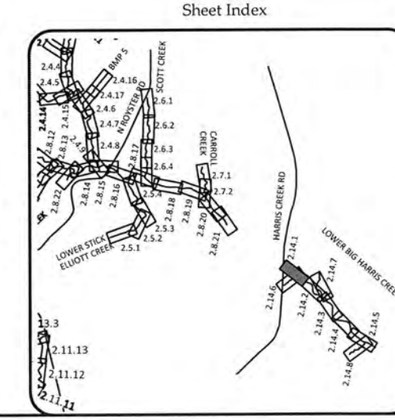

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29843 EMILY G. REINICKER 8/21/2018

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

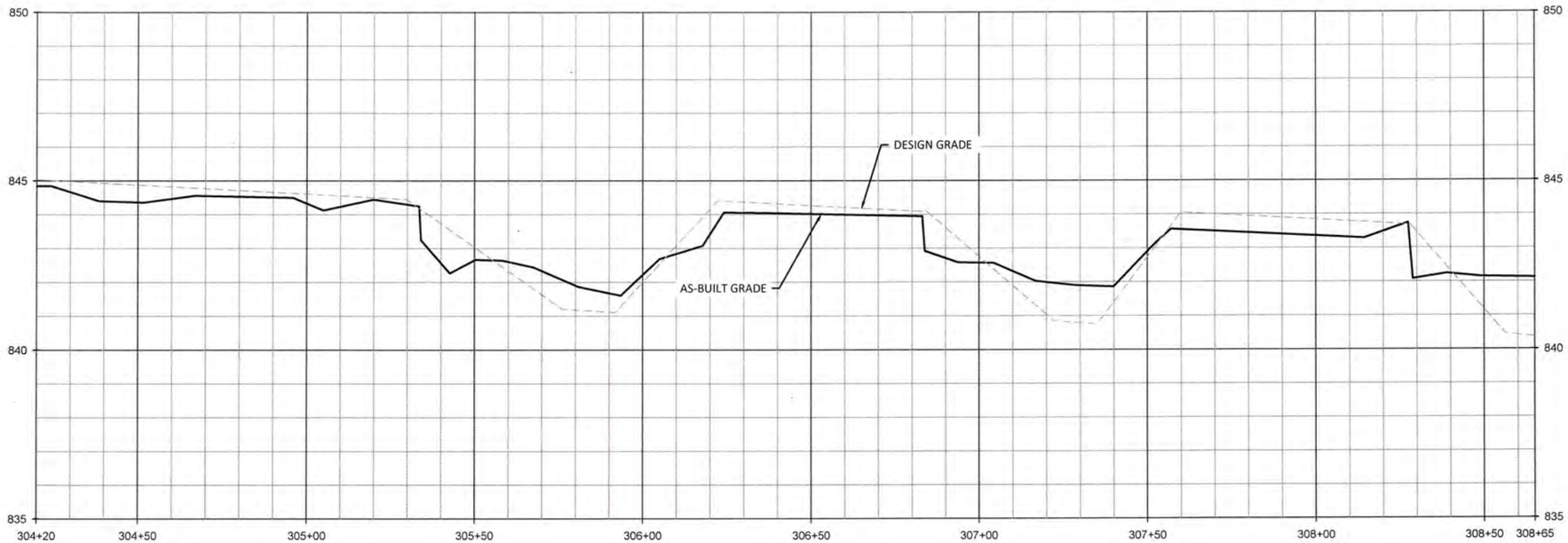
Lower Big Harris Creek Reach 1A
As-Built Plans

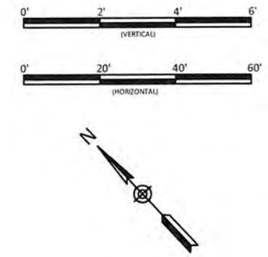
Revisions:

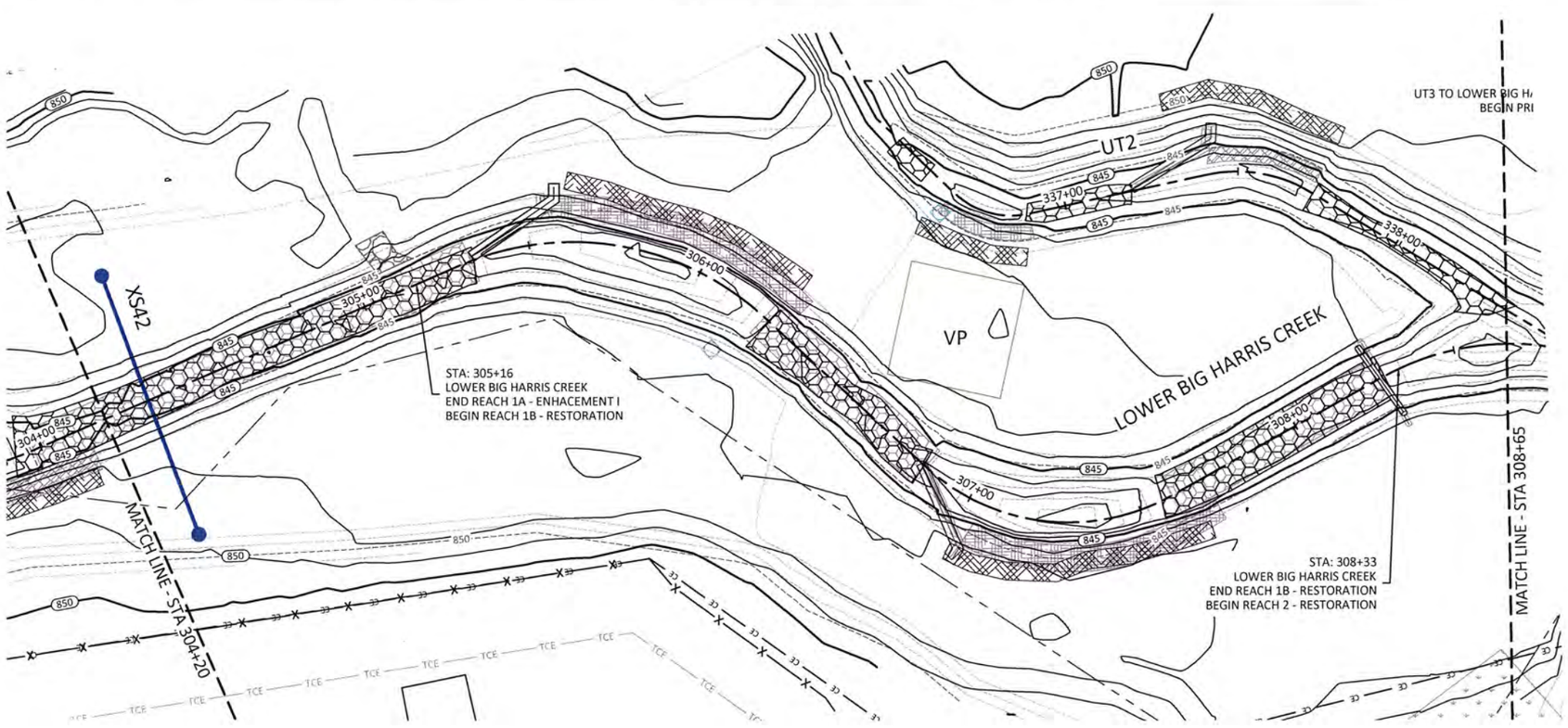
Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.14.1

August 20, 2018







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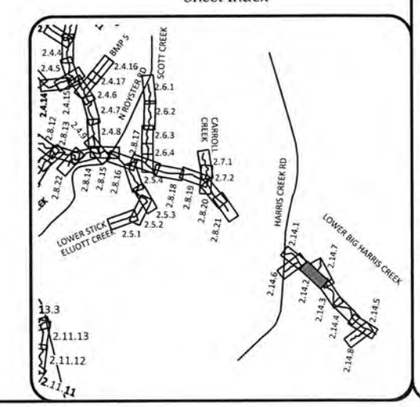

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek Reach 1A & 1B
Stream Plan and Profile Record Drawings

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Date:	August 21, 2018
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Checked By:	JCK

Sheet 2.14.2

August 20, 2018

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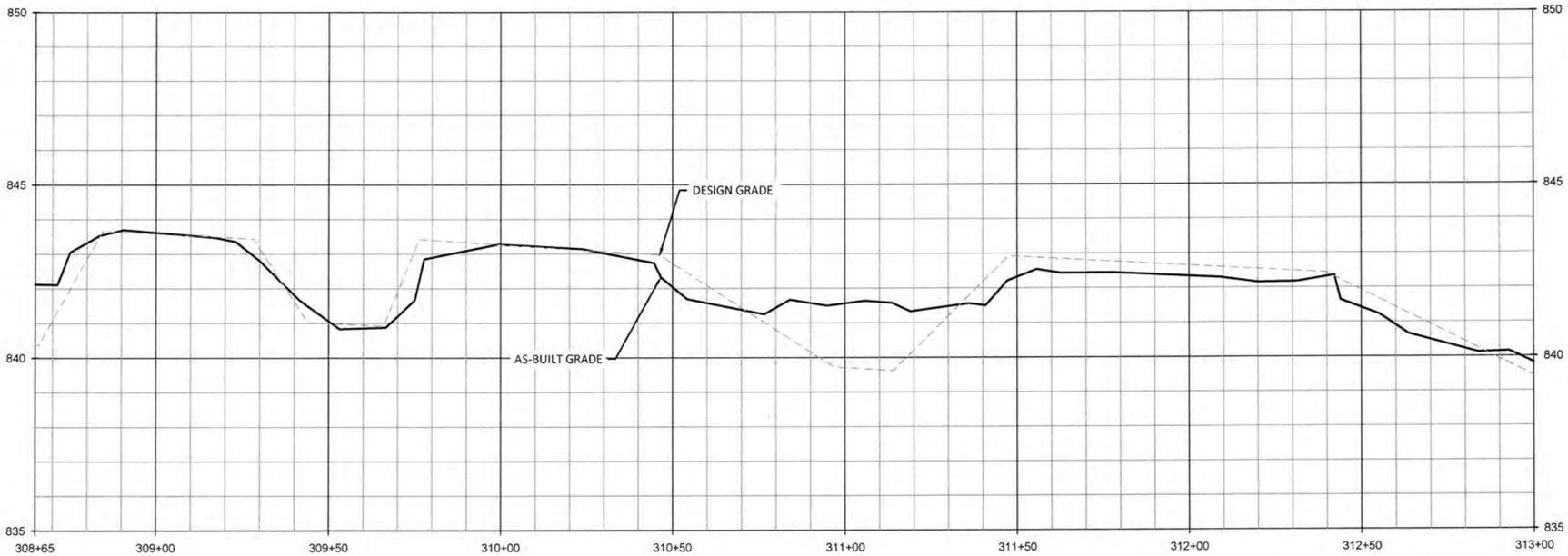

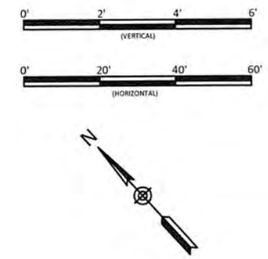

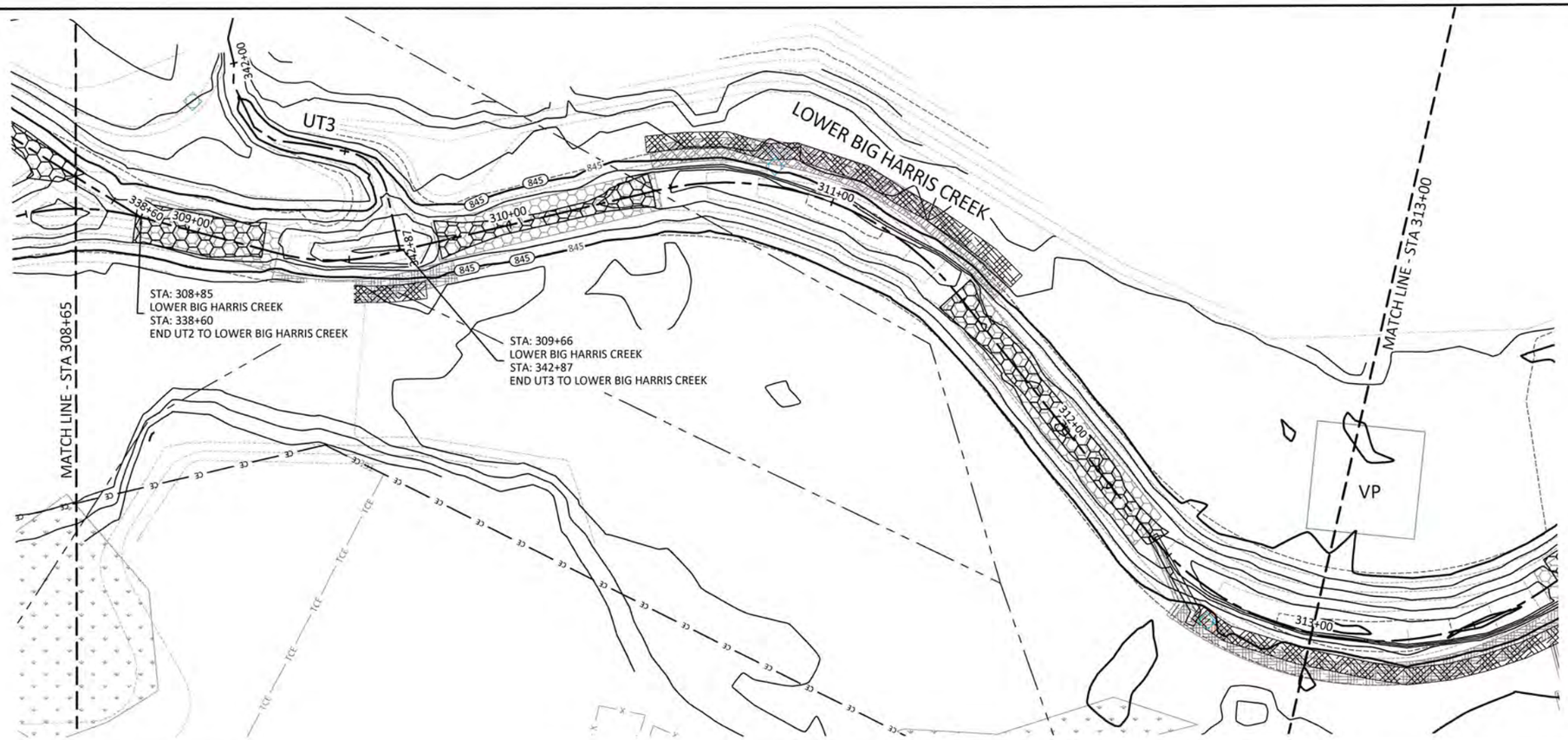

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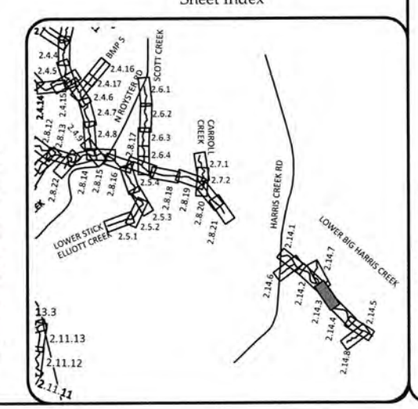

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek Reach 2
Stream Plan and Profile Record Drawings

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Checked By:	JCK

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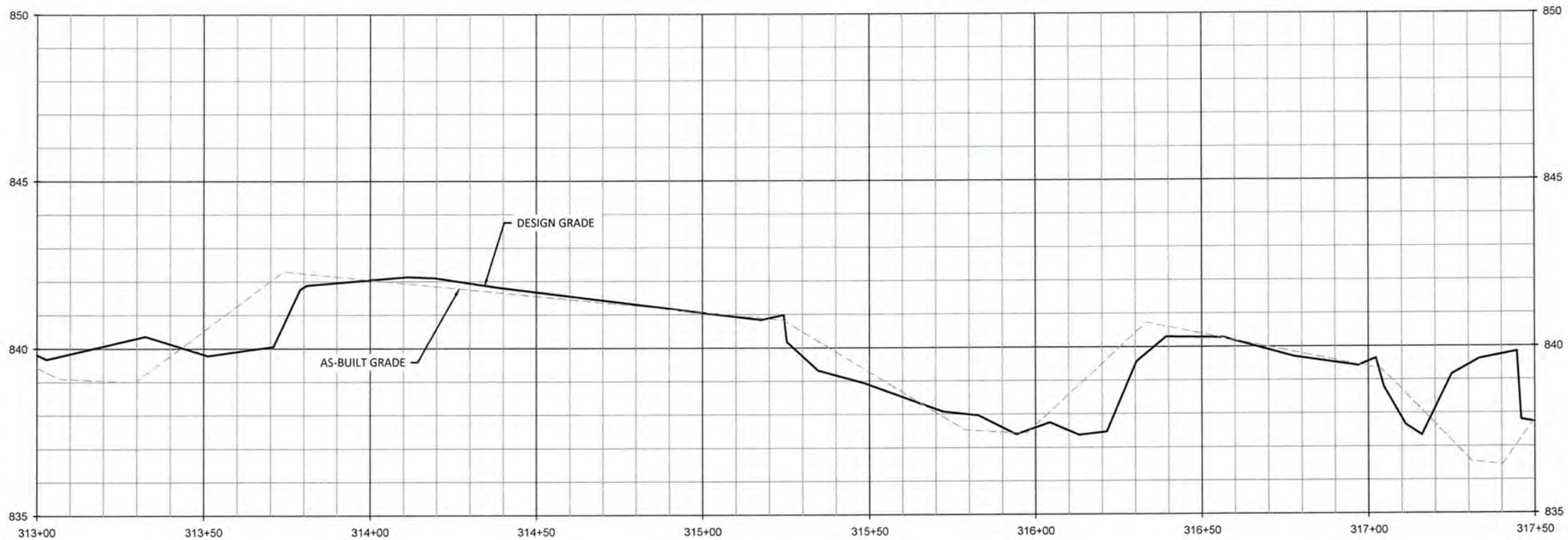

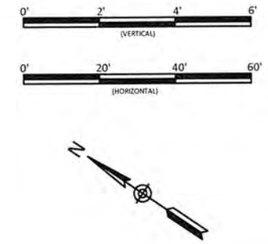

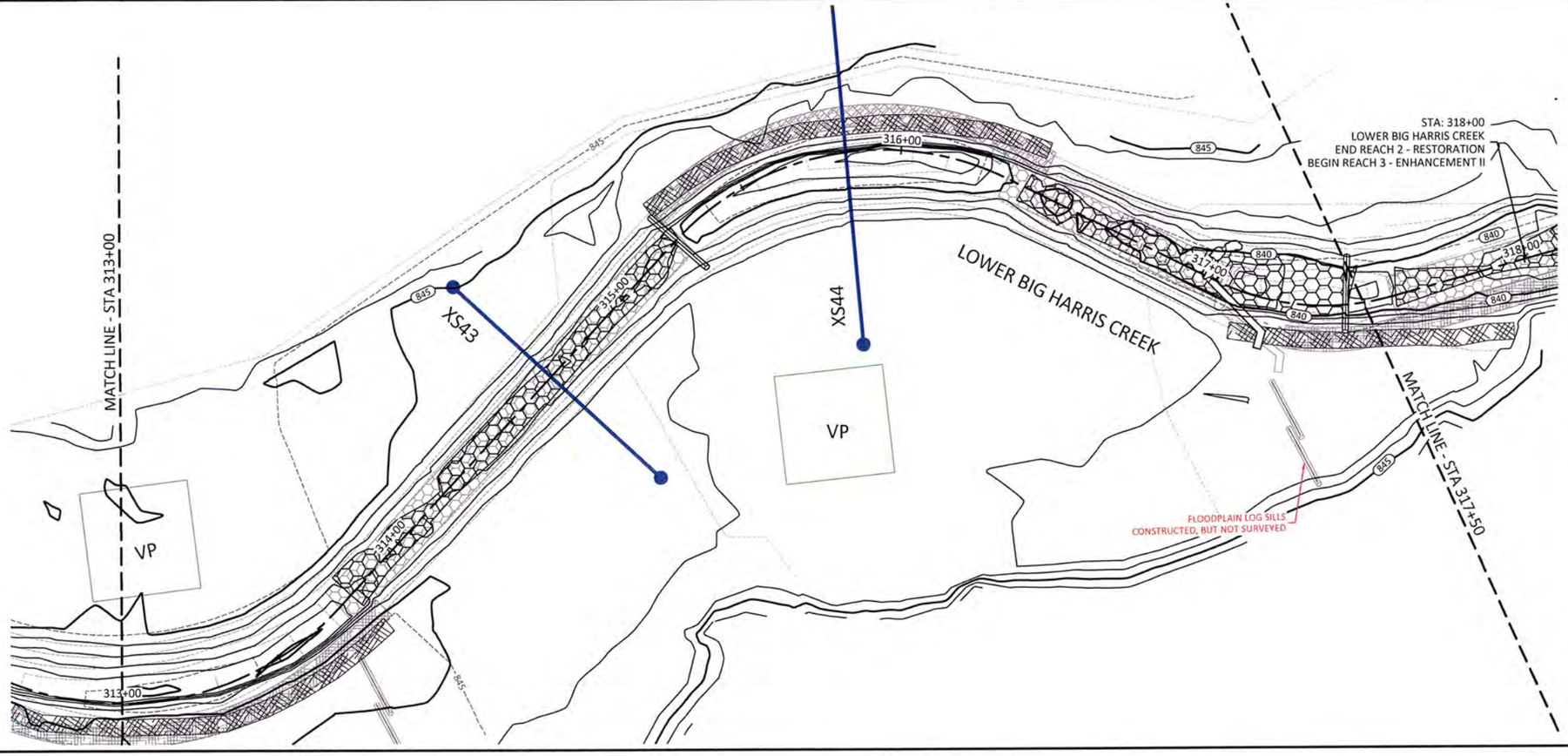

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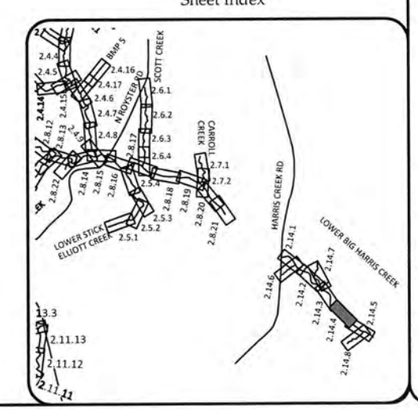

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042824 EMILY G. REINIKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek Reach 2 & 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.14.4

August 20, 2018

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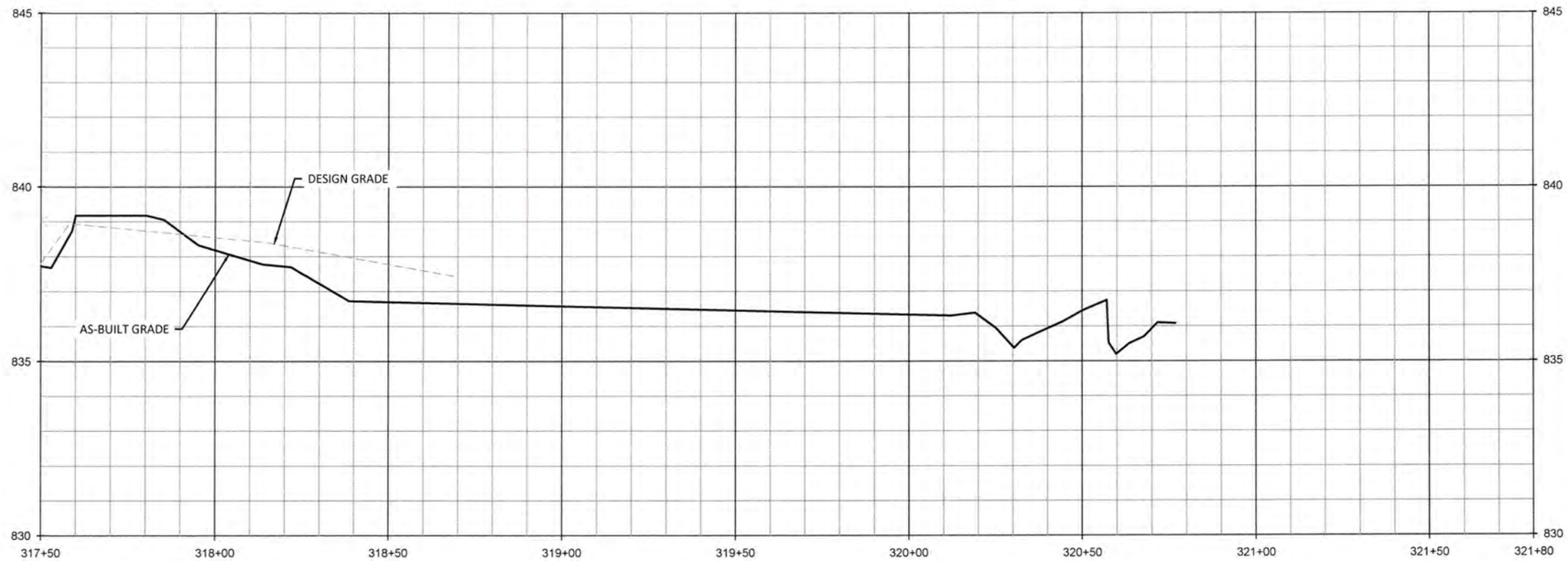

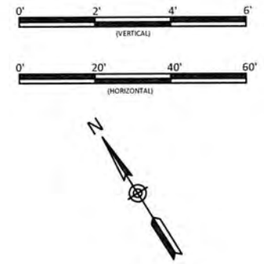

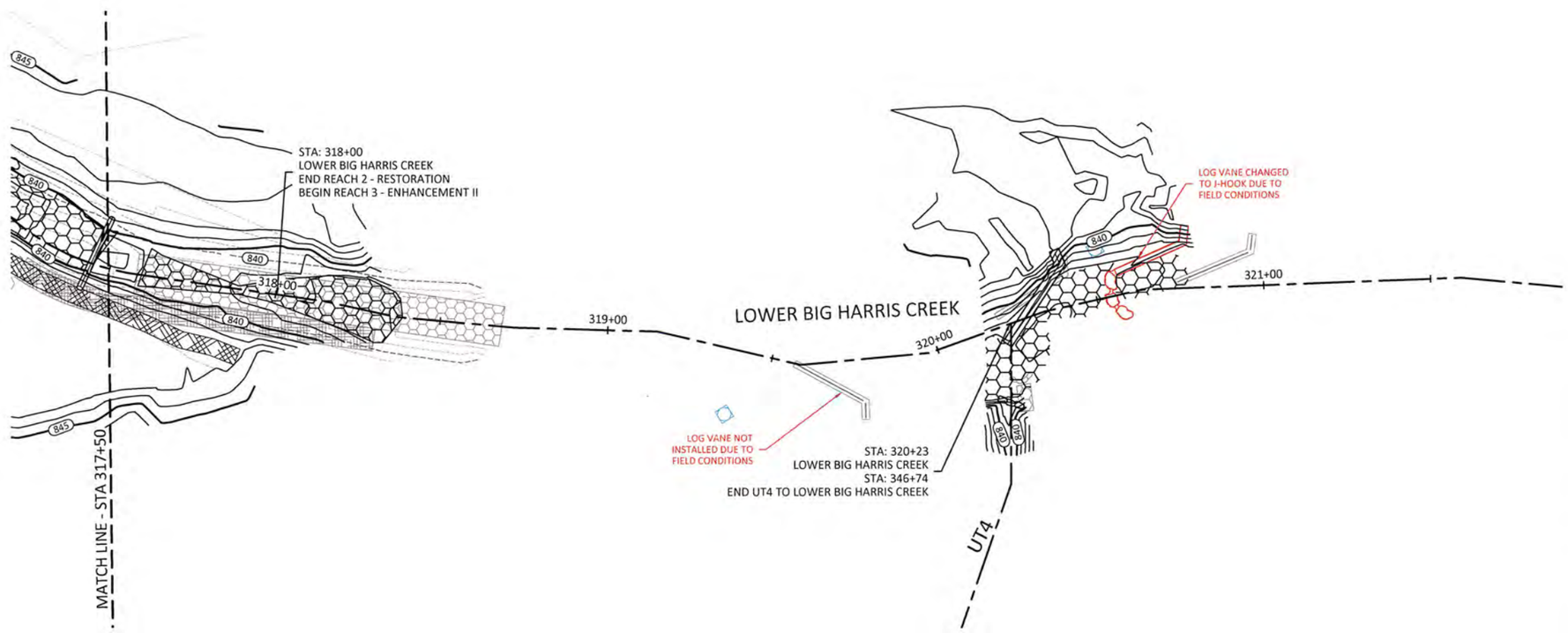

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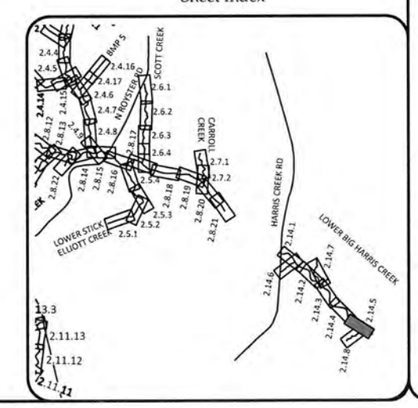

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038413 JOHN C. REINICKER, JR.

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek Reach 3
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.14.5

August 20, 2018

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REACH TREATMENT:
1. FENCE OUT CATTLE - REFER TO FENCING PLAN SHEETS.
2. TREAT INVASIVE SPECIES - REFER TO PLANTING PLAN SHEETS.

Sheet Index

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek - UT1
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.14.6

August 20, 2018

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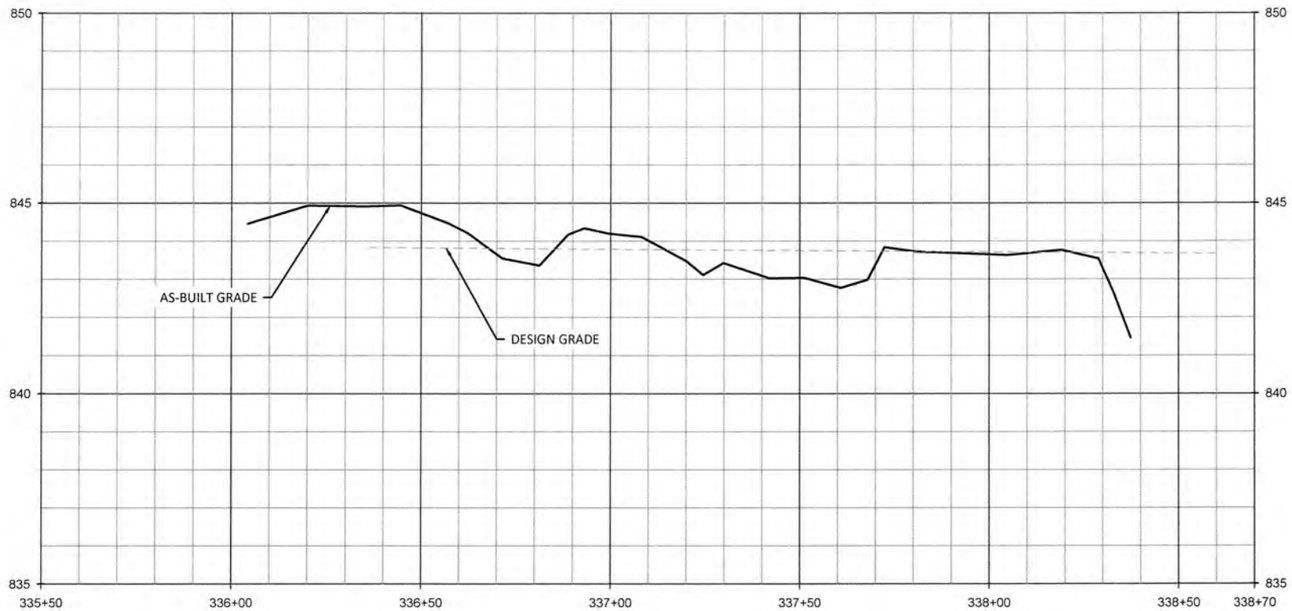

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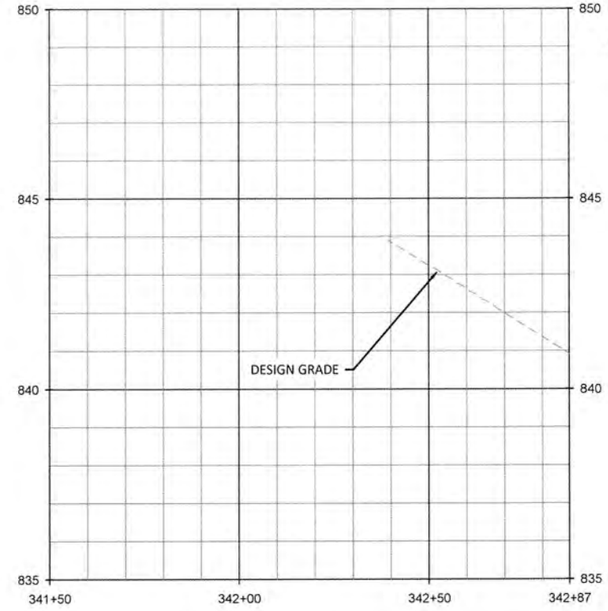

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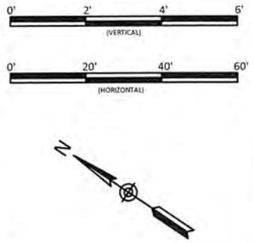

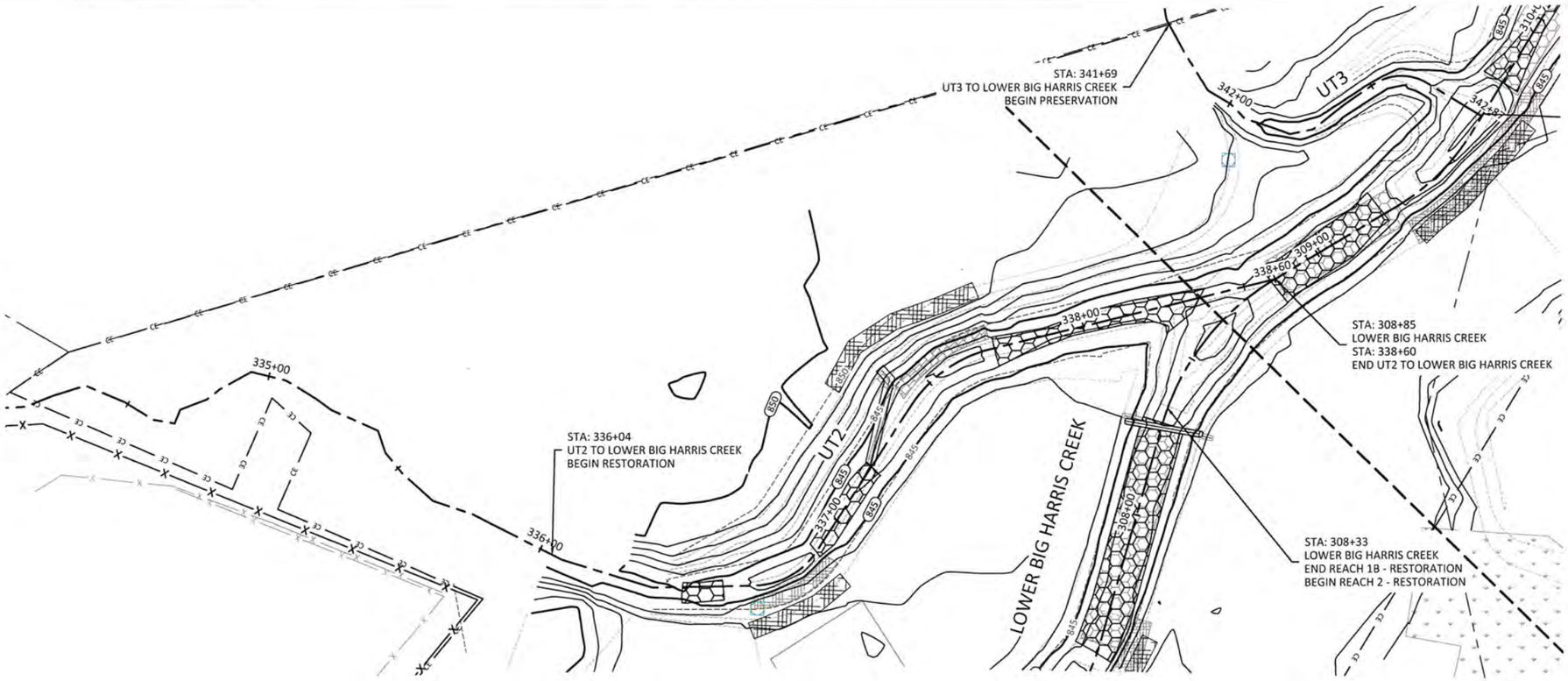

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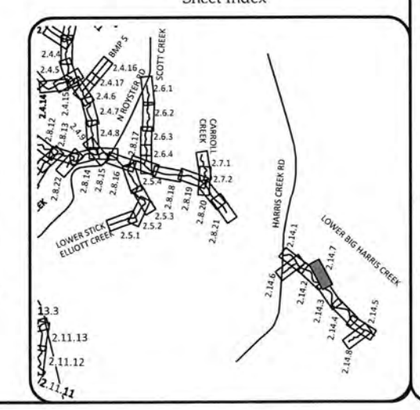
Sheet Index



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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038351 JESSE G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek - UT2 & UT3
As-Built Plans

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 2.14.7

August 29, 2018

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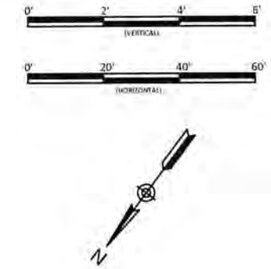

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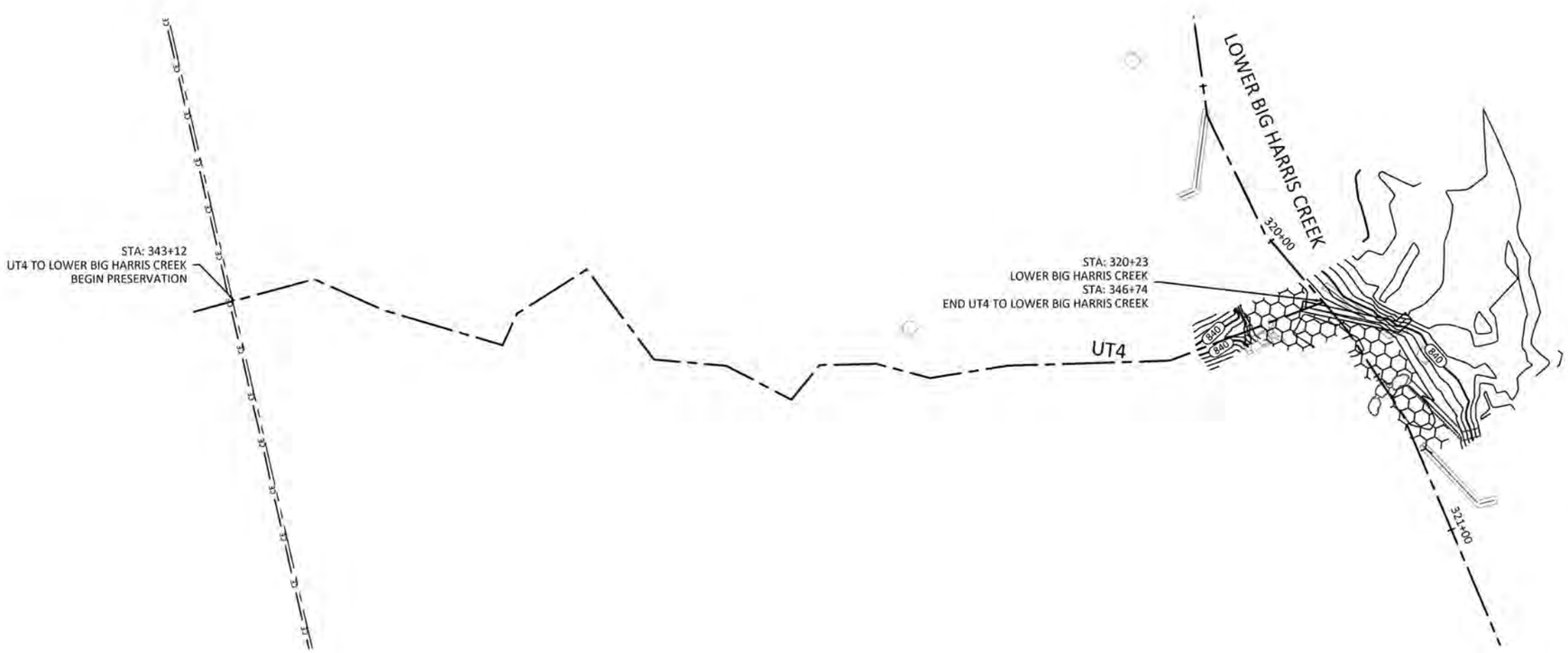

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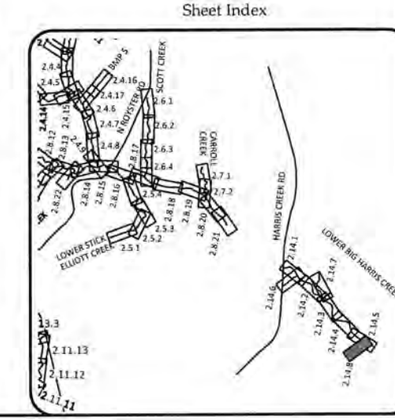

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek - UT4
Stream Plan and Profile Record Drawings

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
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Sheet 2.14.8

Proposed Invasive Species Control

Proposed Intensive Invasive Treatment

Proposed Fescue Treatment

Proposed Pine Removal

Proposed Kudzu Removal

Proposed Planting

Note:

1. See Detail 1, Sheet 6.6 for Live Staking
2. All bank grading shall have live staking
3. For Area A: Only plant Juncus effusus and Carex alata on Upper Big Harris Creek

Streambank Planting Zone						
Live Stakes and Herbaceous Plugs						
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Size**	**Stratum**	**# of Stems**
Physocarpus opulifolius	Ninebark	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
Cephalanthus occidentalis	Buttonbush	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
Cornus ammomum	Silky Dogwood	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Salix sericea	Silky Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Juncus effusus	Common Rush	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	N\A
Carex alata	Broadwing Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	N\A
						100%

Temporary Seeding				
Pure Live Seed				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density (lbs/acre)**
Aug 15 - May 1	*Secale cereale*	Rye Grain	Herb	140
May 1 - Aug 15	*Setaria italica*	German Millet	Herb	50

Pasture Seeding In Disturbed Areas Outside Easement				
Approved Date	**Species Name**	**Stratum**	**Common Name**	**Density (lbs/acre)**
All Year	*Festuca arundinacea*	Herb	Tall Fescue	80
All Year	*Trifolium repens*	Herb	White Clover	8

Power Easement Planting						
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Size**	**Stratum**	**# of Stems**
Cornus amomum	Silky Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Ilex verticillata	Winterberry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Itea virginica	Virginia Sweetspire	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Physocarpus opulifolius	Ninebark	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
Aronia melanocarpa	Black Chokeberry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
						100%

Proposed Planting

Open/Graded Areas Bare Roots				
Species	**Common name**	**Max spacing**	**Individ. Spacing**	**# of stems**
Platanus occidentalis	Sycamore	12 ft.	6-12 ft.	20%
Fraxinus pennsylvanicum	Green Ash	12 ft.	6-12 ft.	20%
Betula nigra	River Birch	12 ft.	6-12 ft.	15%
Acer rubrum	Red Maple	12 ft.	6-12 ft.	15%
Alnus serrulata	Tag Alder	12 ft.	6-12 ft.	10%
Nyssa sylvatica	Black Tupelo	12 ft.	6-12 ft.	5%
Quercus rubra	Red Oak	12 ft.	6-12 ft.	5%
Quercus phellos	Willow Oak	12 ft.	6-12 ft.	5%
Quercus pagoda	Cherrybark Oak	12 ft.	6-12 ft.	5%
				100%

Permanent Riparian Seeding Within Conservation Easement- Open Canopy				
Pure Live Seed (20 lbs/ acre)				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density**
All Year	*Panicum rigidulum*	Redtop Panicgrass	herb	1.5
All Year	*Agrostis hyemalis*	Winter Bentgrass	herb	4
All Year	*Chasmanthium latifolium*	River Oats	herb	2
All Year	*Rudbeckia hirta*	Blackeyed Susan	herb	1
All Year	*Coreopsis lanceolata*	Lanceleaf Coreopsis	herb	1
All Year	*Carex vulpinoidea*	Fox Sedge	herb	3
All Year	*Panicum clandestinum*	Deertongue	herb	3.5
All Year	*Elymus virginicus*	Virginia Wild Rye	herb	2
All Year	*Asclepias syrica*	Common Milkweed	herb	0.2
All Year	*Baptisia australis*	Blue False Indigo	herb	0.2
All Year	*Gaillardia pulchella*	Annual Gaillardia	herb	1
All Year	*Echinacea purpurea*	Pale Purple Coneflower	herb	0.6

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

Permanent Riparian Seeding for Cut/Low pH soils				
Pure Live Seed (20 lbs/ acre)				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density**
All Year	*Panicum virgatum*	Switchgrass	herb	5
All Year	*Panicum clandestium*	Deertongue	herb	4
All Year	*Sorgastrum nutans*	Indian Grass	herb	3
All Year	*Tridens flavus*	Purple top	herb	3
All Year	Elymus virginicus	Virginia Wild Rye	herb	3
All Year	*Rudbeckia hirta*	Blackeyed Susan	herb	2

Shaded Areas Bare Roots - Buffer Planting As Needed to Increase Density		
Species	**Common name**	**# of stems**
Platanus occidentalis	Sycamore	15%
Fraxinus pennsylvanicum	Green Ash	15%
Betula nigra	River Birch	10%
~~*Liriodendron tulipifera*~~	~~Tulip Poplar~~	~~10%~~
~~*Quercus michauxii*~~	~~Swamp Chestnut Oak~~	~~10%~~
~~*Carpinus caroliniana*~~	~~Ironwood~~	~~5%~~
~~*Diospyros virginiana*~~	~~Persimmon~~	~~5%~~
Quercus pagoda	Cherrybark Oak	~~5%~~ 10%
Acer saccharinum	Silver Maple	~~5%~~ 10%
Nyssa sylvatica	Black Gum	~~5%~~ 10%
~~*Gallicarpa americana*~~	~~Beautyberry~~	~~5%~~
~~*Cornus alternifolia*~~	~~Pagoda Dogwood~~	~~5%~~
~~*Euonymus americanus*~~	~~American Strawberry Bush~~	~~1%~~
~~*Calycanthus floridus*~~	~~Sweetshrub~~	~~1%~~
~~*Magnolia virginiana*~~	~~Sweetbay Magnolia~~	~~1%~~
~~*Hamamelis virginiana*~~	~~Witch-Hazel~~	~~1%~~
~~*Clethra alnifolia*~~	~~Sweet Pepperbush~~	~~1%~~
Acer rubrum	Red Maple	10%
Quercus rubra	Red Oak	10%
Quercus phellos	Willow Oak	10%
		100%

PLANTING LIST REVISED BASED ON LOCALLY AVAILABLE PLANT STOCK AT TIME OF PLANTING.

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NORTH CAROLINA PROFESSIONAL SEAL 29913 ENGINEER G. BEINIKER

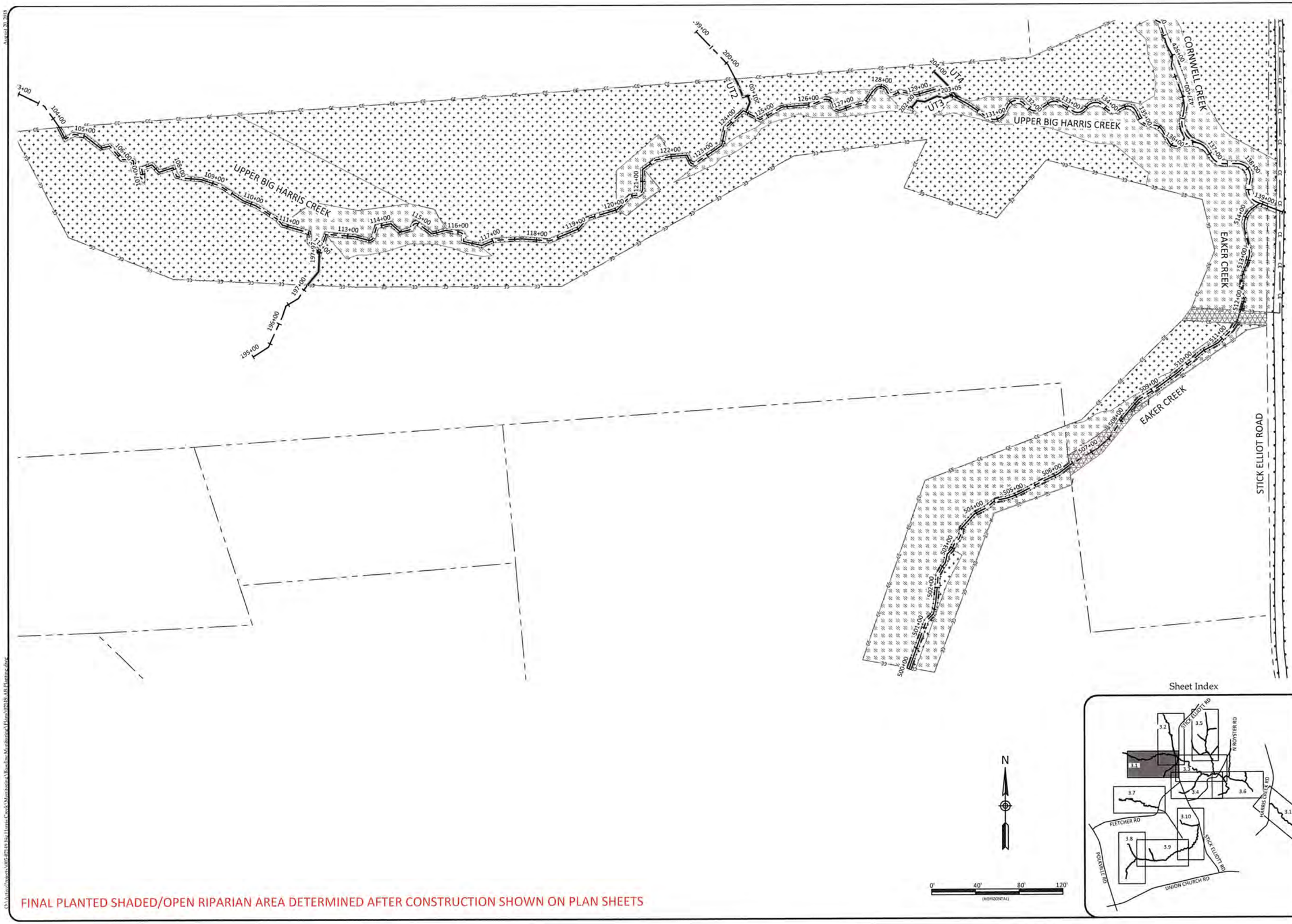
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Planting List
Planting Sheets

Revisions:

Date: August 21, 2018
Job Number: 005-02123
Designed By: EGR, AA
Drawn By: JS
Checked By: JCR

Sheet 3.0



FINAL PLANTED SHADED/OPEN RIPARIAN AREA DETERMINED AFTER CONSTRUCTION SHOWN ON PLAN SHEETS

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NORTH CAROLINA PROFESSIONAL ENGINEER EMILY G. REINICKER

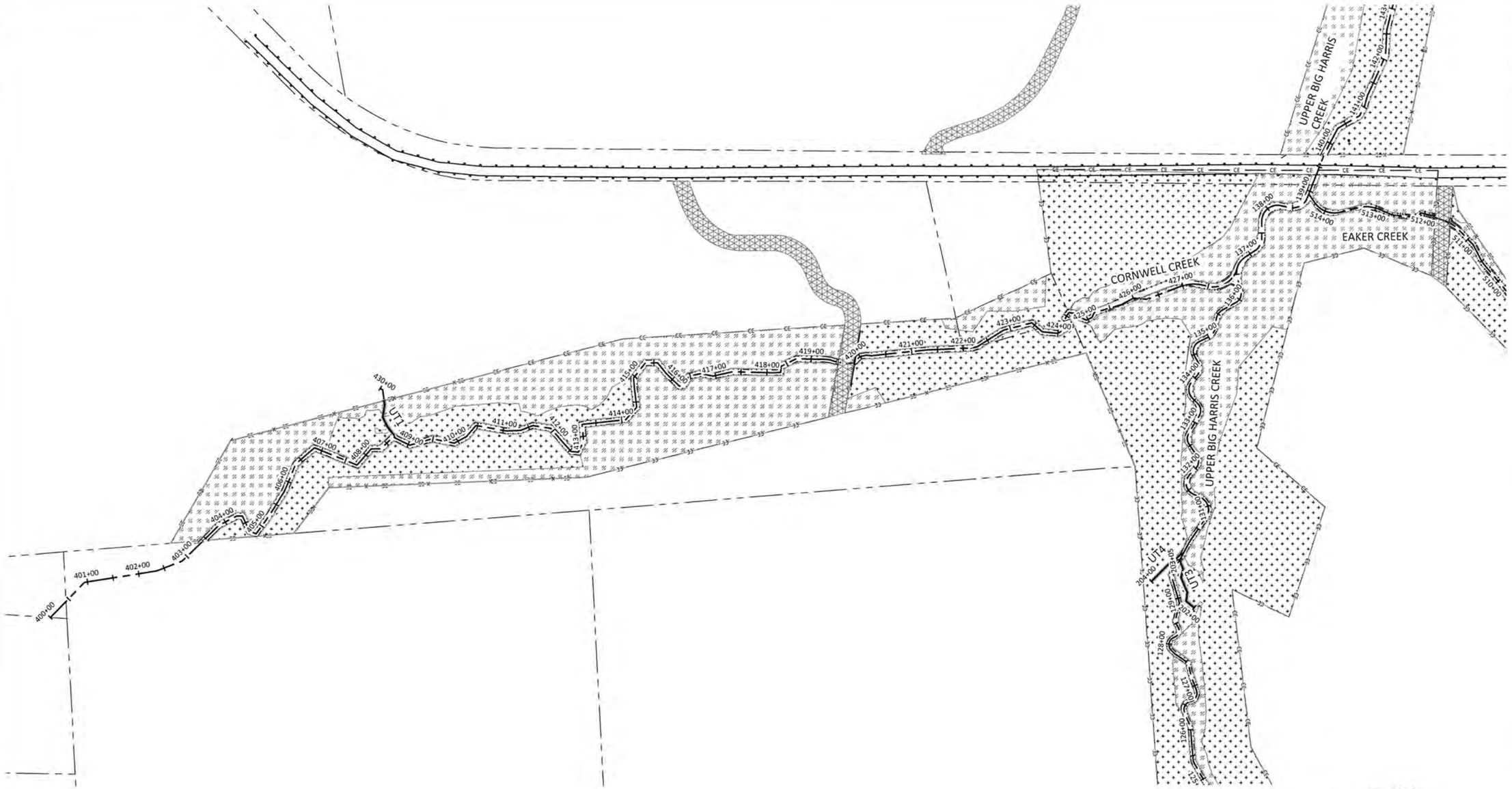
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Creek & Eaker Creek
Planting Sheets

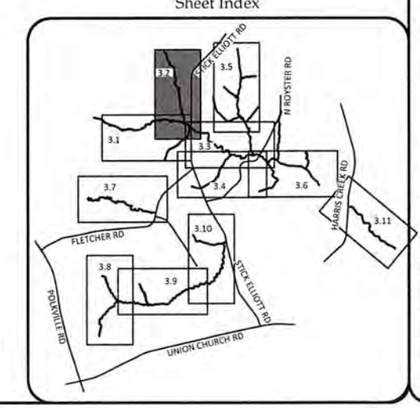
Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 3.1



Sheet Index



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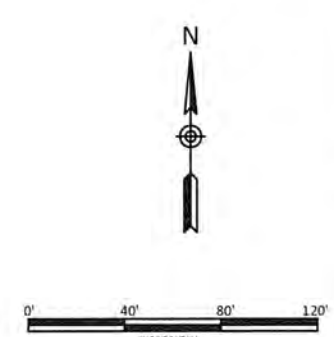
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Cornwell Creek
Planting Sheets

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Sheet 3.2



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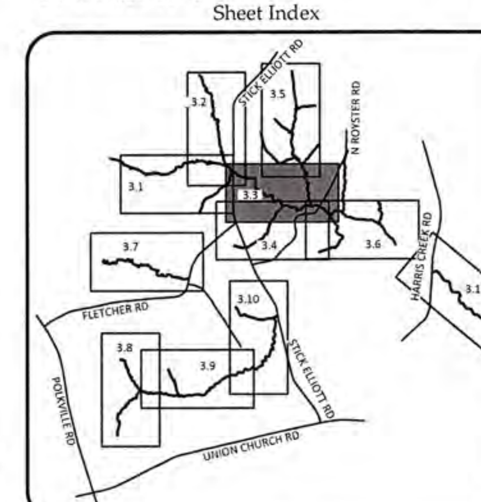

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER 8/21/18

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

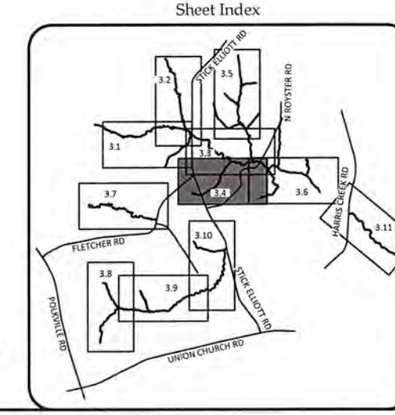
Upper Big Harris Creek Scism Creek & Royster Creek
Planting Sheets

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

Sheet 3.3

Sheet Index



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(HORIZONTAL)

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Scism Creek Upper Big Harris & Lower Stick Elliott
Planting Sheets

Revisions:

Date:	August 21, 2018
Job Number:	005-02723
Designed By:	EGR, AA
Drawn By:	JS
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Sheet 3.4

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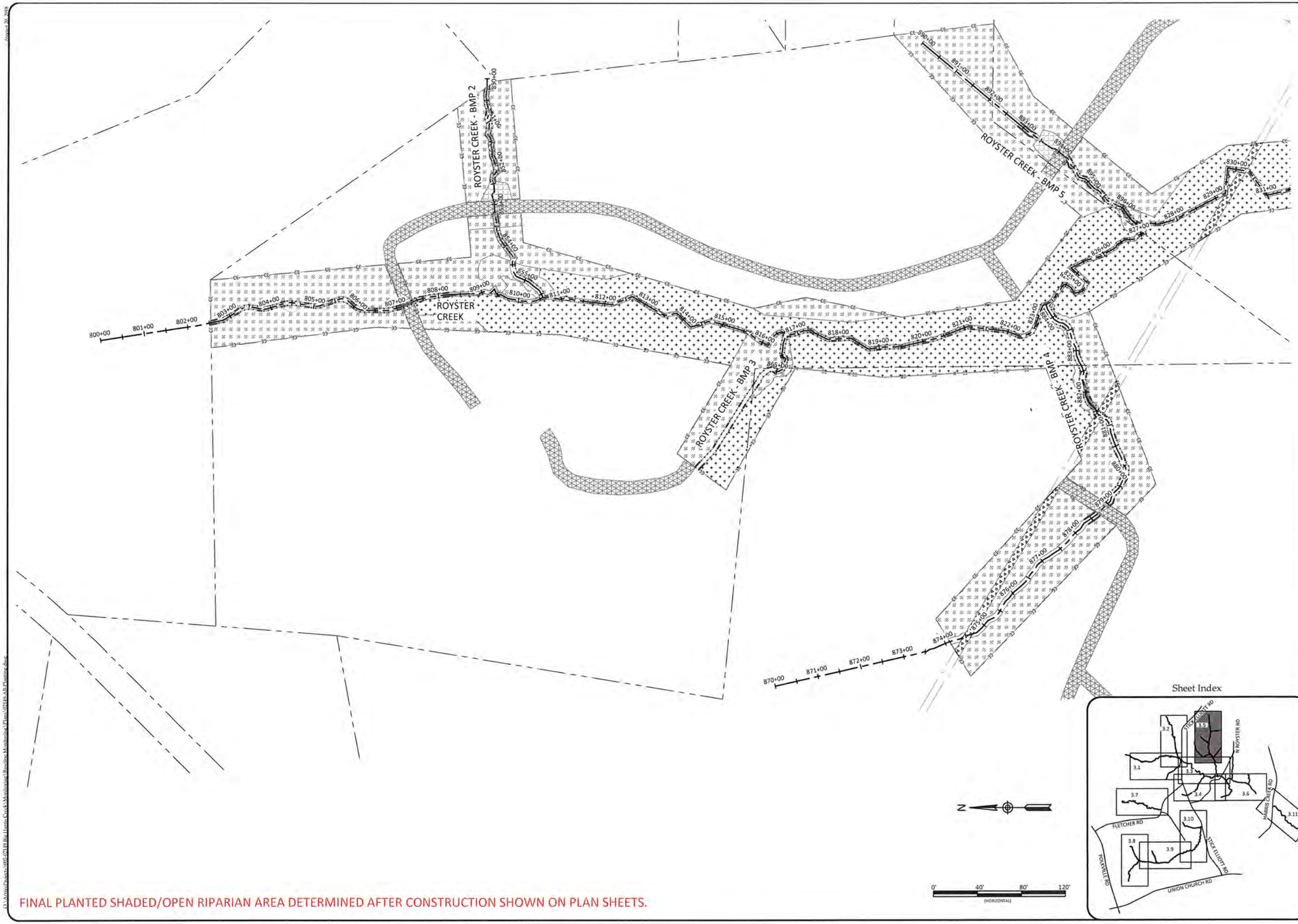

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Royster Creek
Planting Sheets

Revisions:

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
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Sheet 3.5

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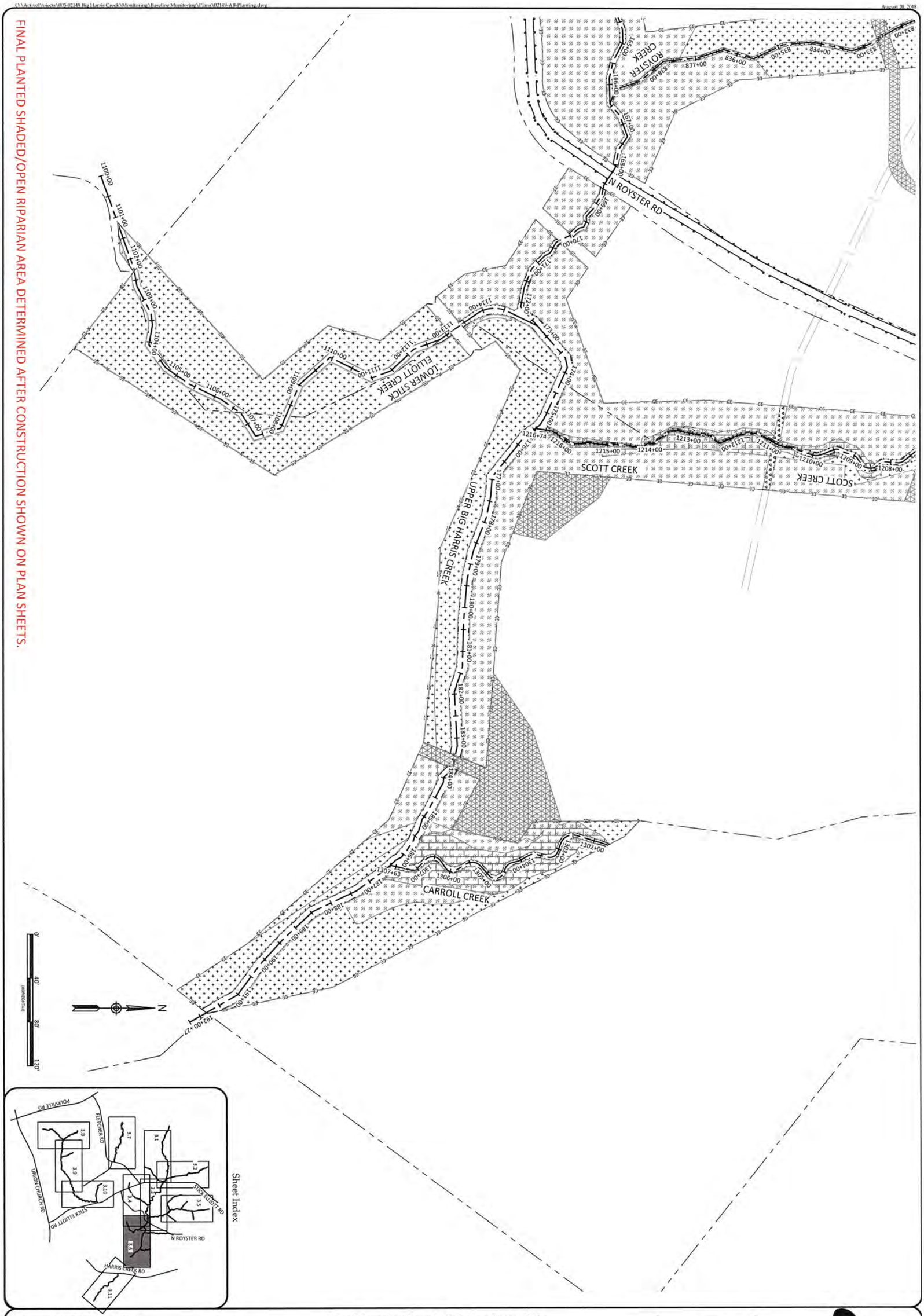

Date:	August 21, 2018
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3.6
Sheet

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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Big Harris Scott Carroll & Lower Stick Elliott
Planting Sheets

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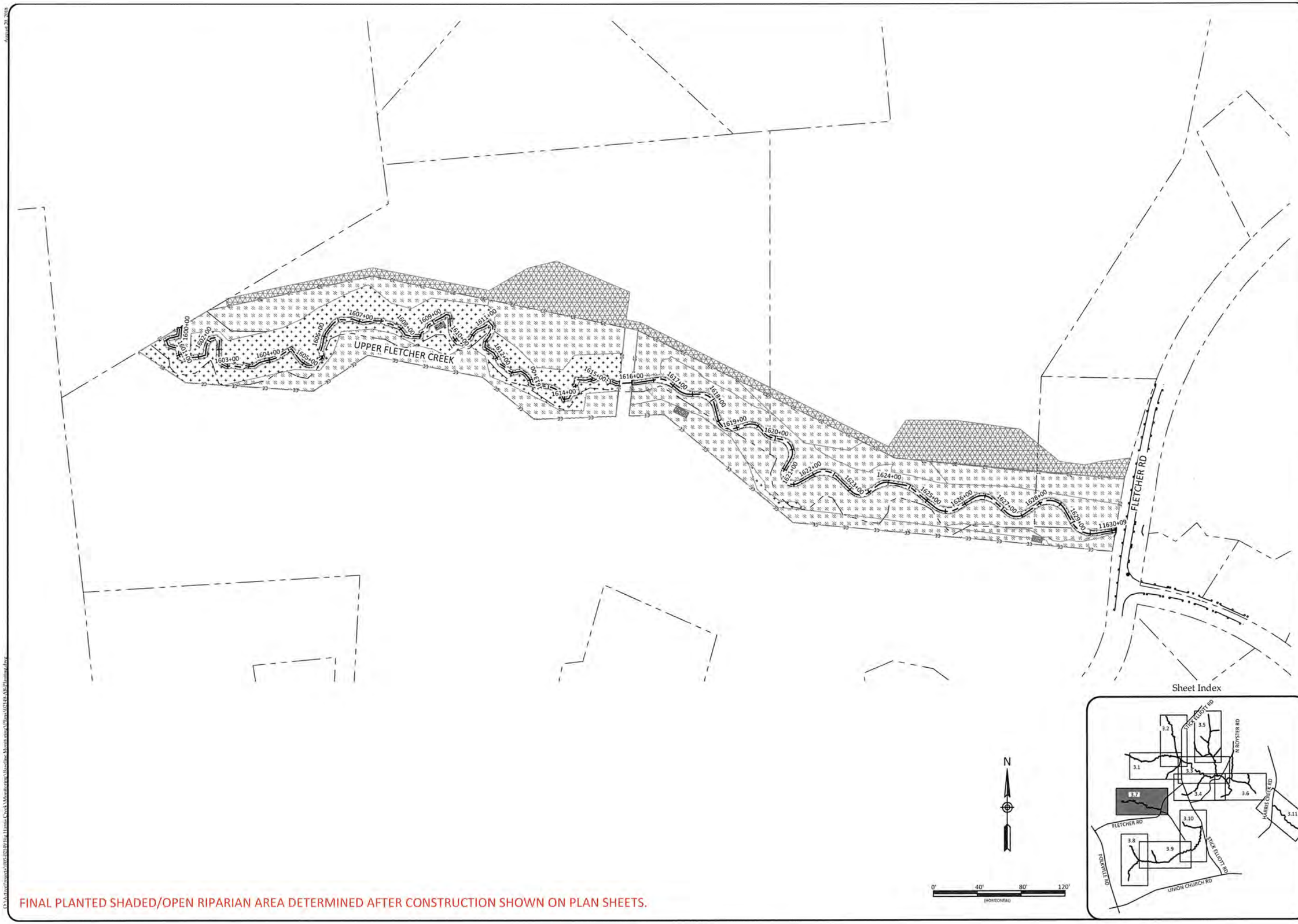

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29913 EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Fletcher Creek
Planting Sheets

Revisions:

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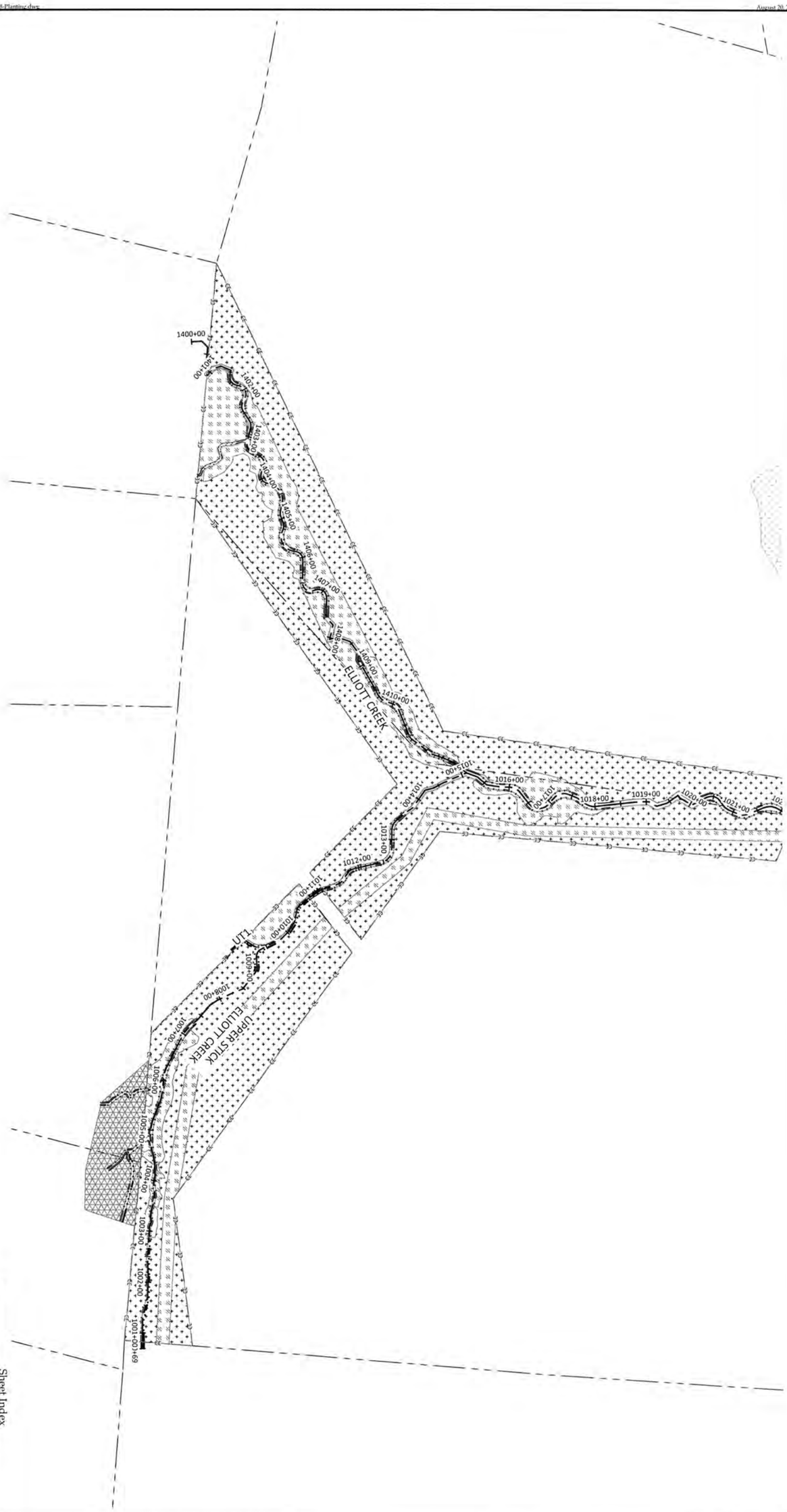
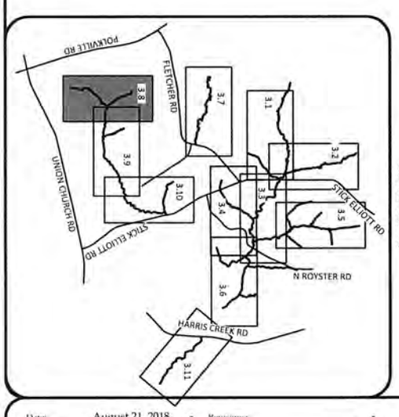
FINAL PLANTED SHADED/OPEN RIPARIAN AREA DETERMINED AFTER CONSTRUCTION SHOWN ON PLAN SHEETS.





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Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott and Elliott Creek
Planting Sheets

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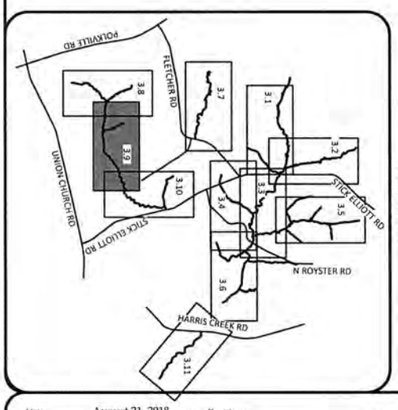
FINAL PLANTED SHADED/OPEN RIPARIAN AREA DETERMINED AFTER CONSTRUCTION SHOWN ON PLAN SHEETS.



Sheet Index

Date:	August 21, 2018
Job Number:	005-02123
Designed By:	EGR, AA
Drawn By:	JS
Checked By:	JCK

Revisions:

3.9

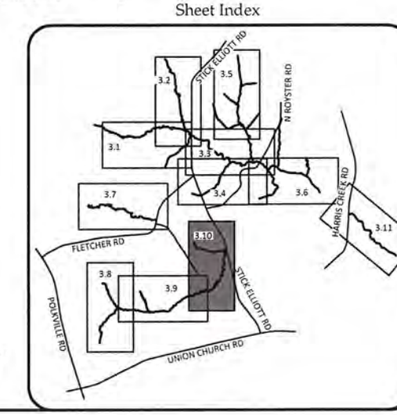
Sheet

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott and Bridges Creek
Planting Sheets

WILDLANDS ENGINEERING
1430 S. Mint Street, Ste 104
Charlotte, NC 28203
Tel: 704.332.7754
Fax: 704.332.3306
Firm License No. F-0831

Sheet Index



N

0' 40' 80' 120'
(HORIZONTAL)

FINAL PLANTED SHADED/OPEN RIPARIAN AREA DETERMINED AFTER CONSTRUCTION SHOWN ON PLAN SHEETS.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Upper Stick Elliott & Lower Fletcher Creek
Planting Sheets

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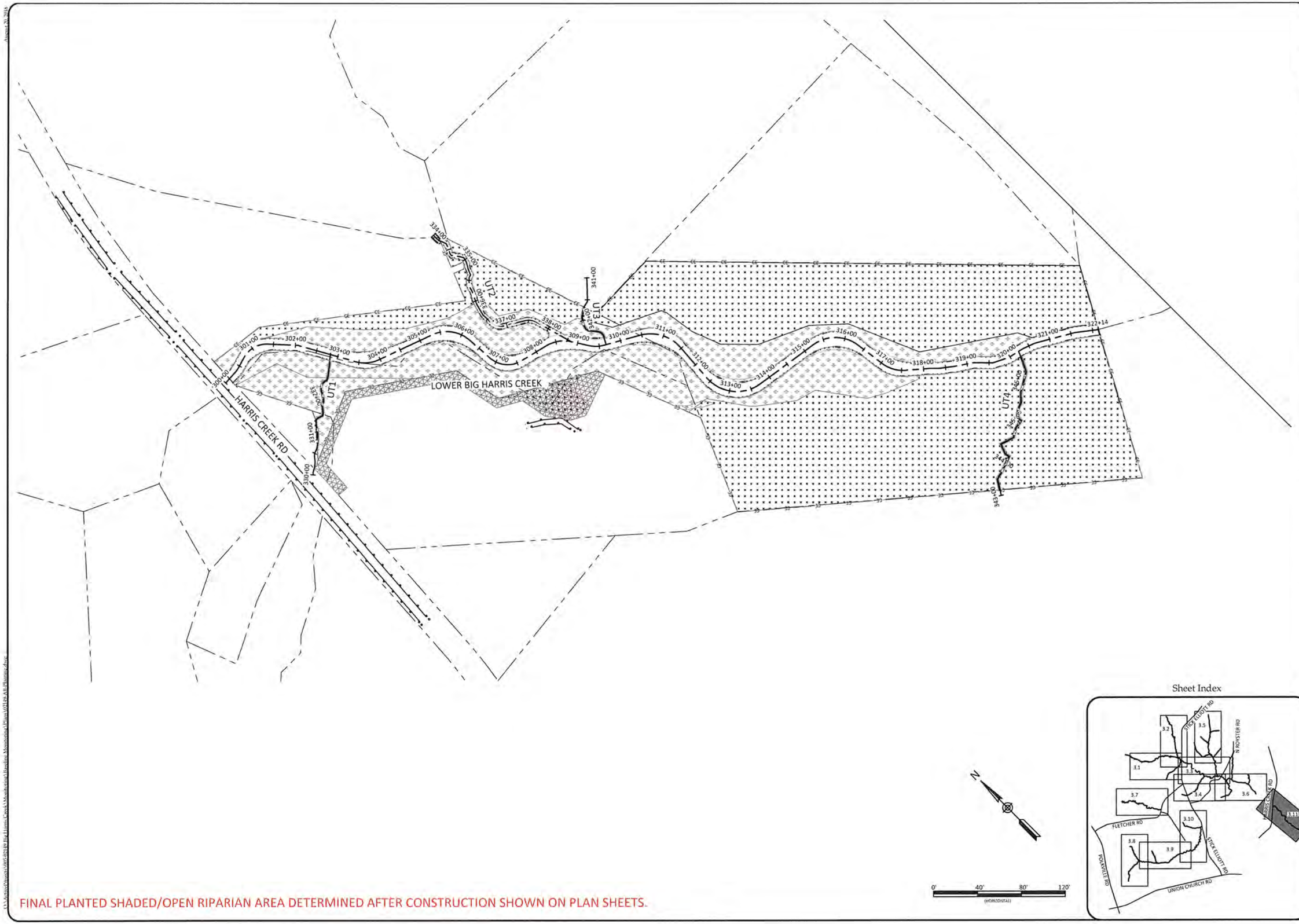
Checked By:	JCK

Sheet 3.10



FINAL PLANTED SHADED/OPEN RIPARIAN AREA DETERMINED AFTER CONSTRUCTION SHOWN ON PLAN SHEETS.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9/21/2018 EMILY G. REINICKER

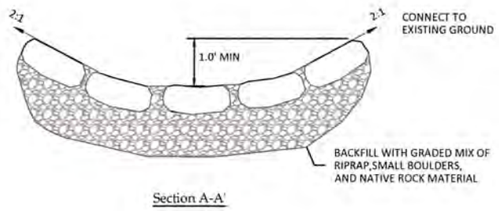
Big Harris Creek Mitigation Site
Cleveland County, North Carolina

Lower Big Harris Creek
Planting Sheets

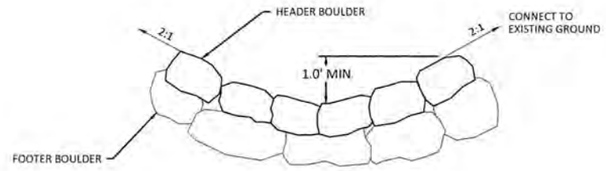
Revisions:

Date: August 21, 2018
Job Number: 005-02123
Designed By: EGR, AA
Drawn By: JS
Checked By: JCK

Sheet 3.11



Section A-A'



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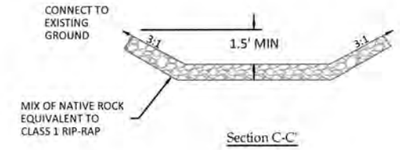

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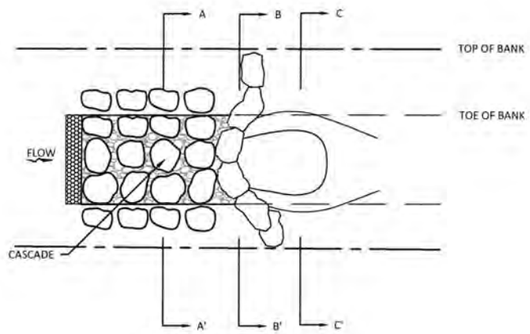
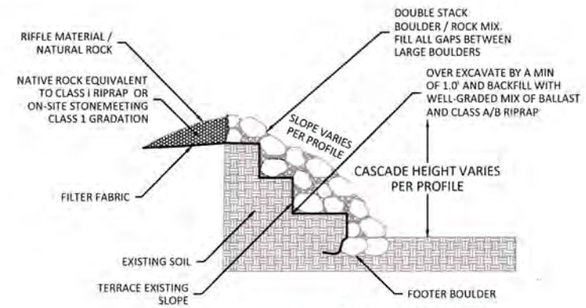


Riffle Sequence Plan View

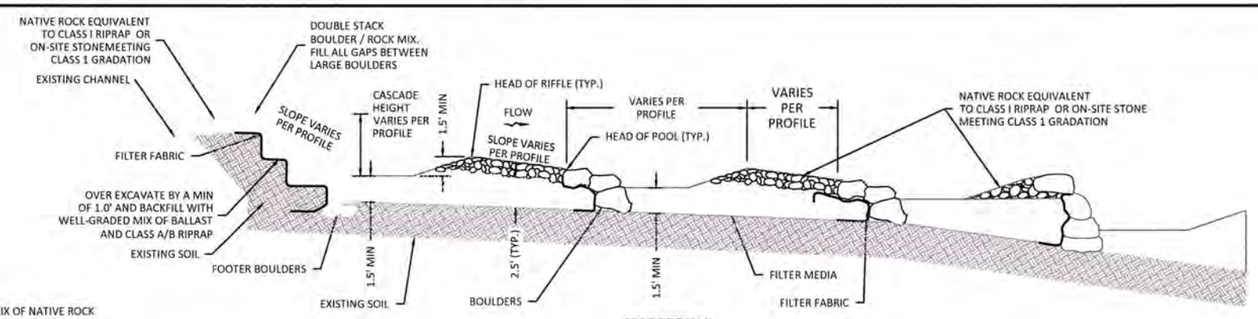


Profile

NOTES:

1. MINIMUM SIZE FOR BOULDERS SHALL BE 2' x 2' x 1'.
2. VOID SPACES BETWEEN BOULDERS ON CASCADE SHALL BE FILLED WITH SMALLER NATIVE ROCK.
3. IF NATIVE ROCK IS NOT AVAILABLE, QUARRIED ROCK MAY BE SUBSTITUTED IN THE SAME SIZES.
4. ALL SMALLER ROCK SHALL BE HETEROGENEOUS AND WELL MIXED.

1/4.1 Rock Cascade
Not to Scale



SPSC PROFILE

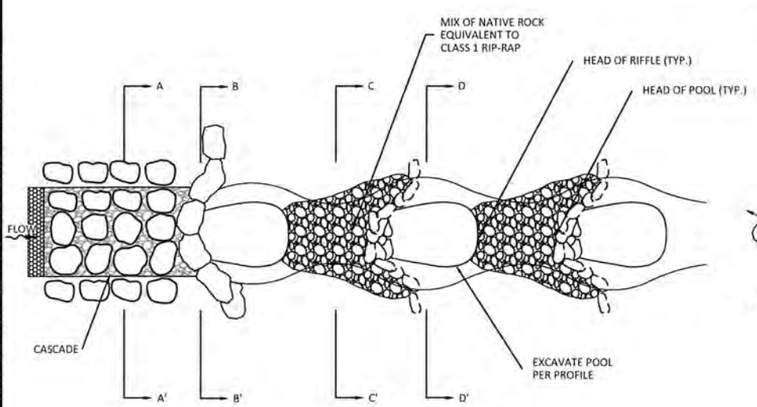
NOTES:
1. FILTER MEDIA SHALL BE WELL MIXED AND CONSIST OF 90% SAND AND 10% WOODCHIPS COMPACTED IN 6" LIFTS.

2. MINIMUM SIZE FOR BOULDERS SHALL BE 2' x 2' x 1'.

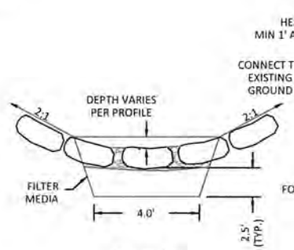
3. VOID SPACES BETWEEN BOULDERS ON CASCADE SHALL BE FILLED WITH SMALLER NATIVE ROCK.

4. IF NATIVE ROCK IS NOT AVAILABLE, QUARRIED ROCK MAY BE SUBSTITUTED IN THE SAME SIZES.

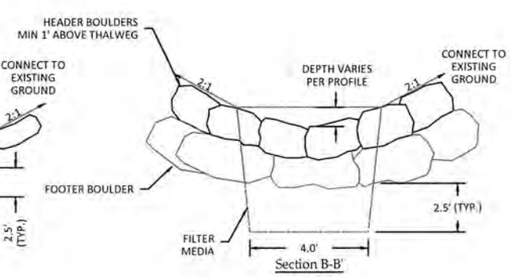
5. ALL SMALLER ROCK SHALL BE HETEROGENEOUS AND WELL MIXED.



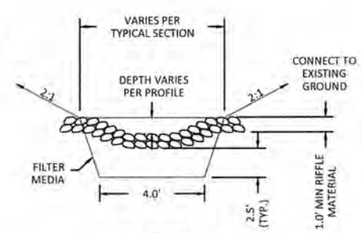
Riffle Sequence Plan View



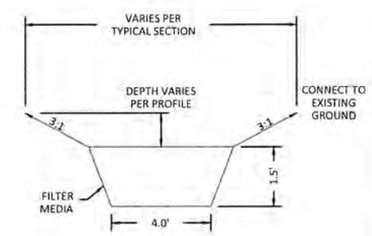
Section A-A'



Section B-B'



Section C-C'



Section D-D'

2/4.1 Step-Pool Stormwater Conveyance (SPSC)
Not to Scale

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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER EMILY G. REINICKER

Big Harris Creek Mitigation Site
Cleveland County, North Carolina
Details

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Sheet 4.1