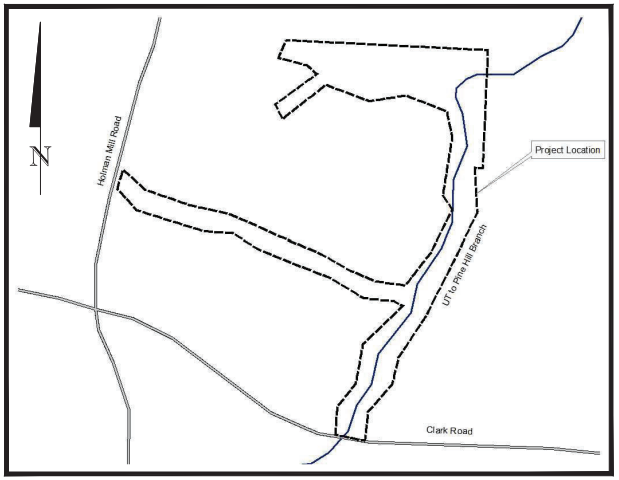
APPENDIX 4. As-Built Plan Sheets

Holman Mill Mitigation Project

Cape Fear River Basin 03030002
Alamance County, North Carolina
for
NCDEQ Division of Mitigation Services



Vicinity Map
Not to Scale

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 SUPERVISION AND THAT THE ORIGINAL DIGITAL FILES WERE PROVIDED BY KEE MAPPING AND SURVEYING, PA AS SHOWN ON AN AS-BUILT SURVEY FOR "THE STATE OF NC, DIVISION OF MITIGATION SERVICES", JOB #1510161-AS, DATED OCTOBER 25TH, 2016 AND WERE INCORPORATED HEREIN BY WILDLANDS ENGINEERING, INC TO PRODUCE THE RECORD DRAWINGS; THAT THIS SURVEY WAS 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; THAT THE ORIGINAL DATA WAS OBTAINED BETWEEN THE DATES OF 3/16-10/16; 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 BASED ON NAVD 88; THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 31ST DAY OF OCTOBER, 2016.

OFFICIAL SEAL

NORTH CAROLINA PROFESSIONAL SEAL L-5076 LAND SURVEYOR NOLAN R. CARMACK

NOLAN R. CARMACK, PLS L-5076

FINAL RECORD DRAWINGS
Issued October 2016

Stream Origins

Stream	Latitude	Longitude
UT1	N 35° 51' 09.14"	W 79° 23' 29.27"
UT2	N 35° 51' 18.47"	W 79° 23' 15.11"
UT2A	N 35° 51' 19.28"	W 79° 23' 06.82"

Sheet Index

Title Sheet	0.1
Stream Overlay Overview	0.2
Legend	0.3
Stream Overlay Plans	1.1-1.12
Cross Section and Typical Section Overlays	2.1-2.4
Planting Plan	3.1

Project Directory

Surveying:
Kee Mapping & Surveying, PA
88 Central Avenue
Asheville, NC 28801
Brad Kee, PLS
828-575-9021

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 West Millbrook Road, Suite 225
Raleigh, NC 27609
Angela N. Allen, PE
919-851-9986

Owner:
NCDEQ Division of
Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652
Kristie Corson
919-707-8935

DEQ Contract No. 005795

DMS ID No. 96316

Record Drawing

WILDLANDS
Wildlands Engineering, Inc.
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N ALLEN

Holman Mill Mitigation Project
Alamance County, North Carolina

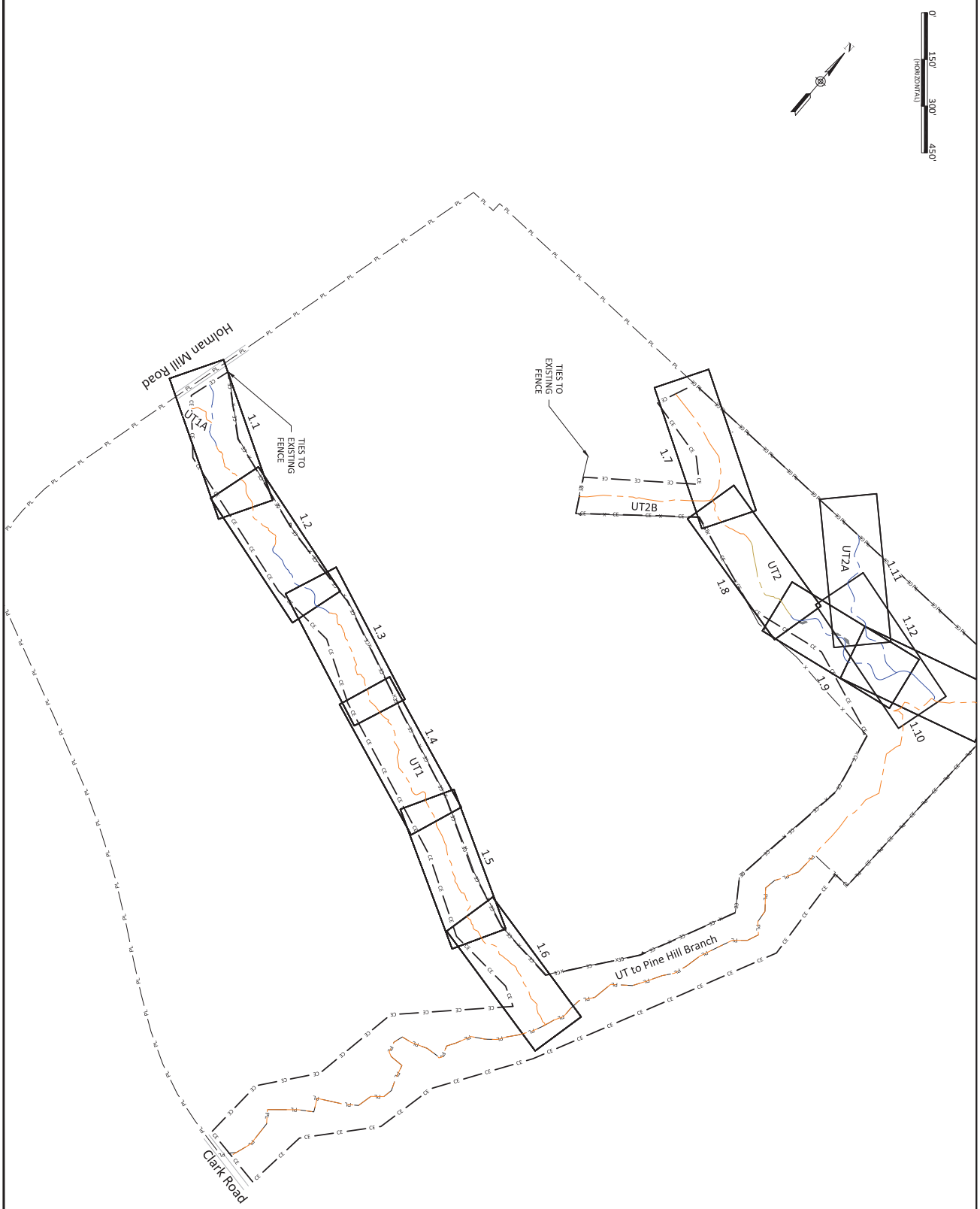
Title Sheet

Date: 10.31.2016
Job Number: 095-02116
Project Engineer: A.N.A.
Drawn By: E.M.S.
Checked By: D.M.

Revisions:

0.1

Sheet



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

0.2

Sheet

Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

Stream Overlay Overview

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

Legend

Existing Features

- Existing Thalweg Alignment

Proposed Features

- Proposed Thalweg Alignment
- Proposed Bankfull
- Proposed Major Contour (520)
- Proposed Minor Contour
- Proposed Constructed Riffle
- Proposed Log Vane
- Proposed Angled Log Drop
- Proposed Log J-Hook
- Proposed Brush Toe
- Proposed Cover Log
- Proposed Boulder Sill
- Proposed Boulder J-Hook with Sill
- Proposed Transplanted Sod Mats
- Proposed Rock Outlet
- PL PL PL Property Line

As-Built Features

- 10+00 As-Built Thalweg Alignment - Restoration
- 10+00 As-Built Thalweg Alignment - Enhancement I
- 10+00 As-Built Thalweg Alignment - Enhancement II
- As-Built Bankfull
- CE CE Conservation Easement
- 520 As-Built Major Contour
- As-Built Minor Contour
- As-Built Constructed Riffle
- As-Built Log Vane
- As-Built Angled Log Drop
- As-Built Brush Toe
- As-Built Cover Log
- As-Built Boulder Sill
- As-Built Transplanted Sod Mats
- As-Built Rock Outlet
- As-Built Boulder Toe
- X As-Built Fence

NOTE: FEATURES IN RED INDICATE DEVIATION FROM FINAL CONSTRUCTION PLANS.

Record Drawing

WILDLANDS
Wildlands Engineering, Inc.
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No: P-0831

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N ALLEN

Holman Mill Mitigation Project
Alamance County, North Carolina

Legend

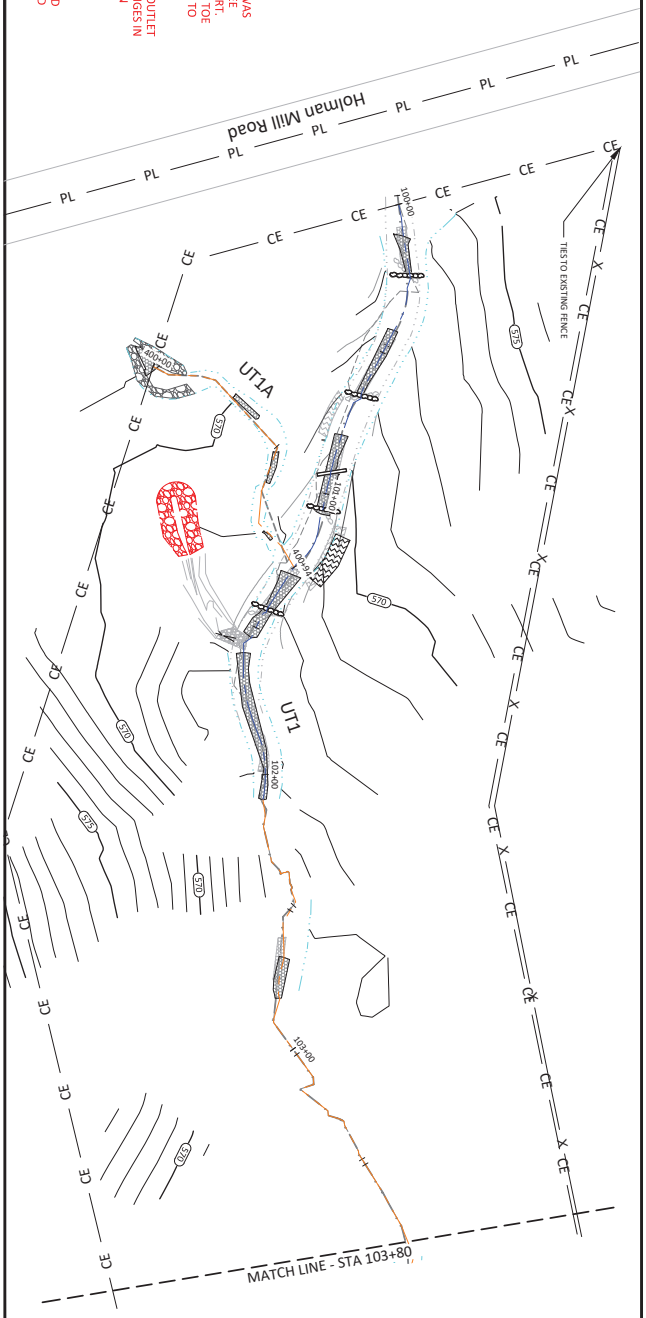
Date: 10.31.2016
Job Number: 095-02146
Project Engineer: ANA
Drawn By: CLM
Checked By: DNL

Revisions:

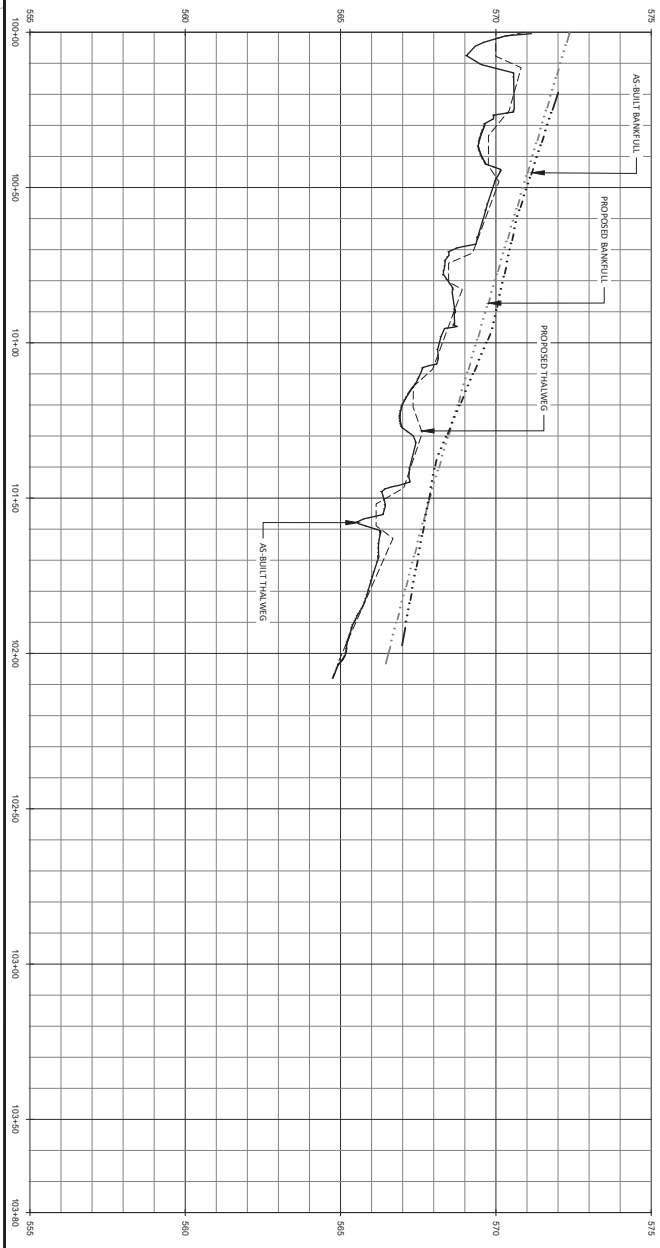
Sheet 0.3

October 31, 2016
E:\Projects\095-02146-1\Holman_MMP_v08\Plans\As-Built\Record Drawings\095-02146-1 Record.dwg

NOTE: 1. AT STATION 100+00 LT, ROCK WAS ADDED TO ROADSIDE DITCH, SEE SECTION 5.1 OF AS-BUILT REPORT.
2. AT STATION 100+75 RT, BRUSH TOE WAS NOT INSTALLED IN ORDER TO AVOID IMPACTS TO EXISTING, MATURE TREES.
3. AT STATION 101+35 RT, ROCK OUTLET WAS RELOCATED DUE TO CHANGES IN DRAINAGE PATTERNS BETWEEN PROJECT DESIGN AND CONSTRUCTION.
4. UT1A WAS STABILIZED DURING CONSTRUCTION DUE TO DEGRADATION THAT OCCURRED BETWEEN PROJECT DESIGN AND CONSTRUCTION.



NOTE:
AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT.



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.1
Sheet

Revisions:

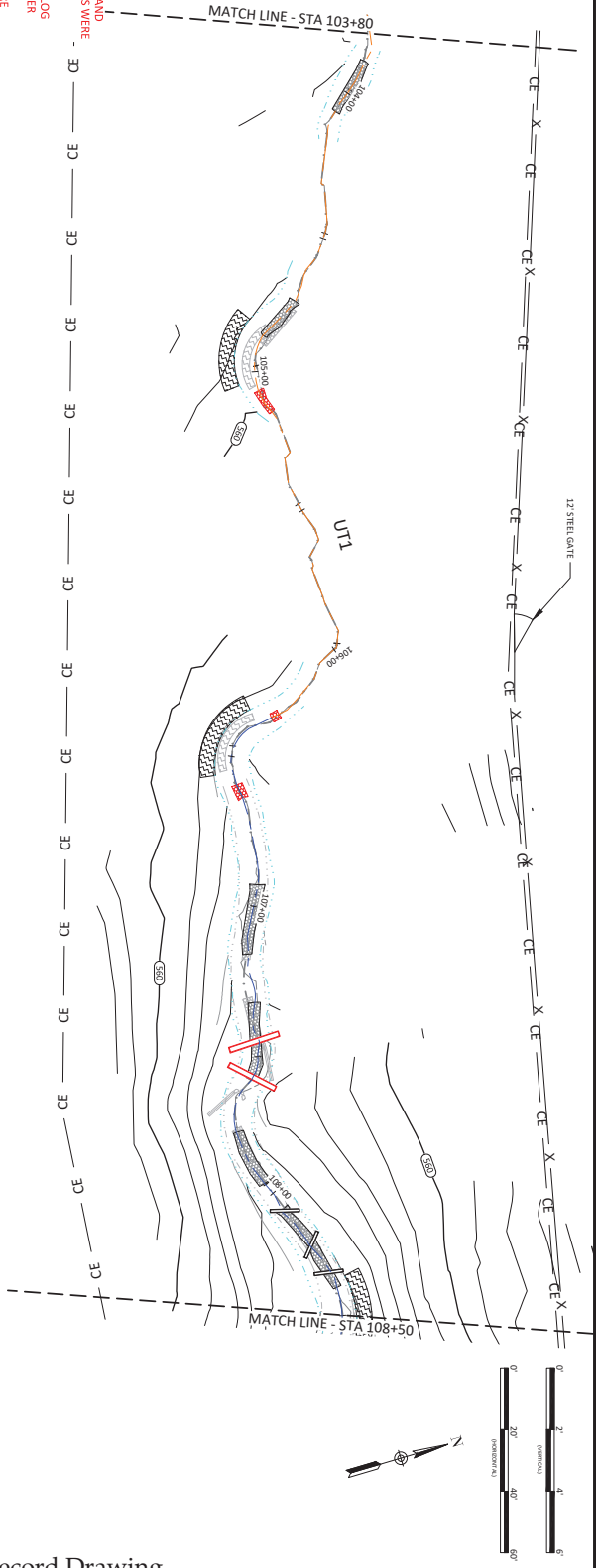
Holman Mill Mitigation Project
Alamance County, North Carolina

UT1 Reaches 1 & 2
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040280 JOHN NICHOLAS ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATIONS 105+10, 106+30 AND 106+60, CONSTRUCTED RIFFLES WERE INSTALLED WHERE CHANNEL STABILIZATION WAS NEEDED.
2. AT STATION 107+50, ANGLED LOG DROPS WERE INSTALLED RATHER THAN LOG J-HOOKS TO AVOID IMPACTS TO EXISTING, MATURE TREES ON LEFT BANK.



NOTE:
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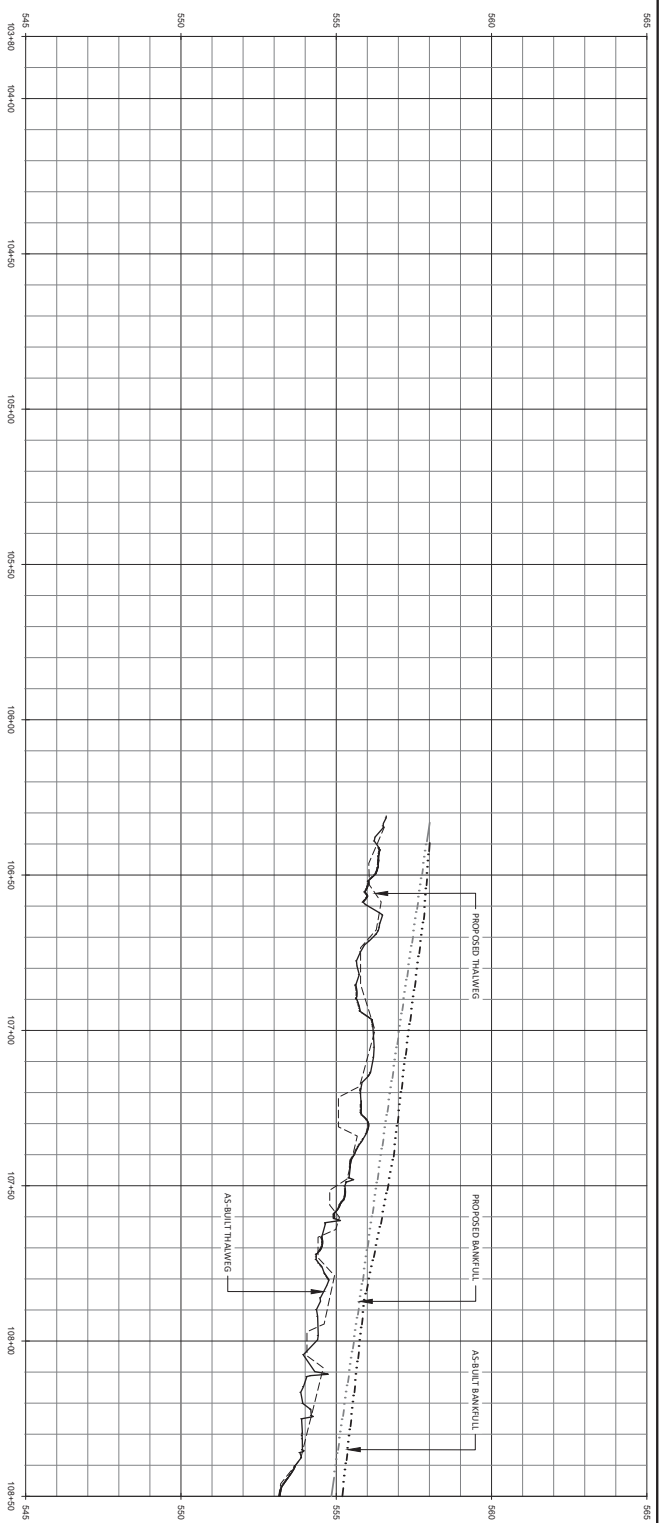


Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.2
Sheet

Revisions:

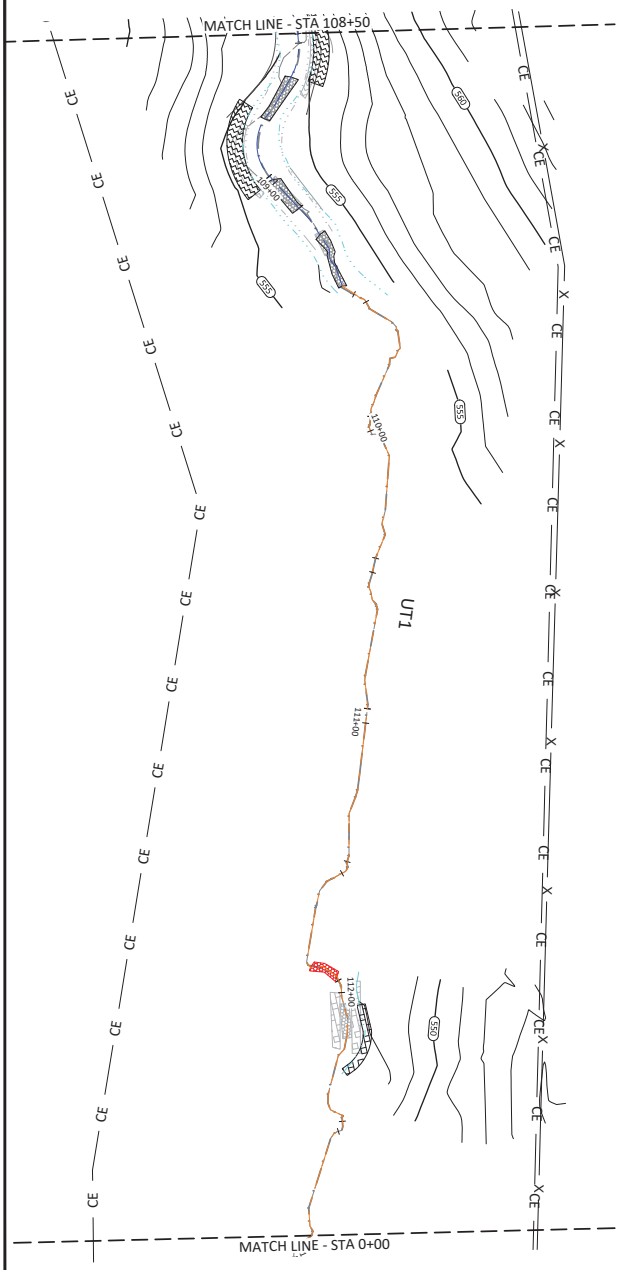
Holman Mill Mitigation Project
Alamance County, North Carolina

UT1 Reaches 2 & 3
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. ALLEN

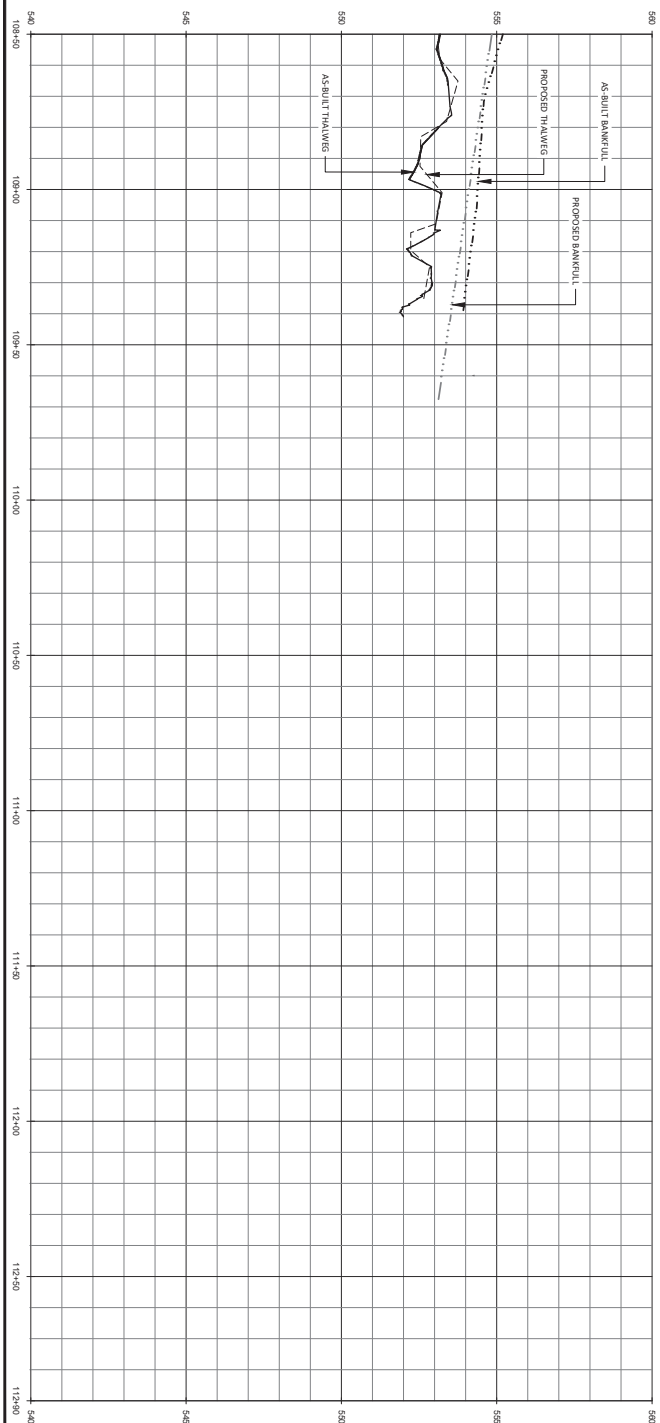
WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATION 111+90, CONSTRUCTED RIFFLE WAS SHIFTED UPSTREAM WHERE CHANNEL STABILIZATION WAS NEEDED.



NOTE:

AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT.



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.3
Sheet

Revisions:

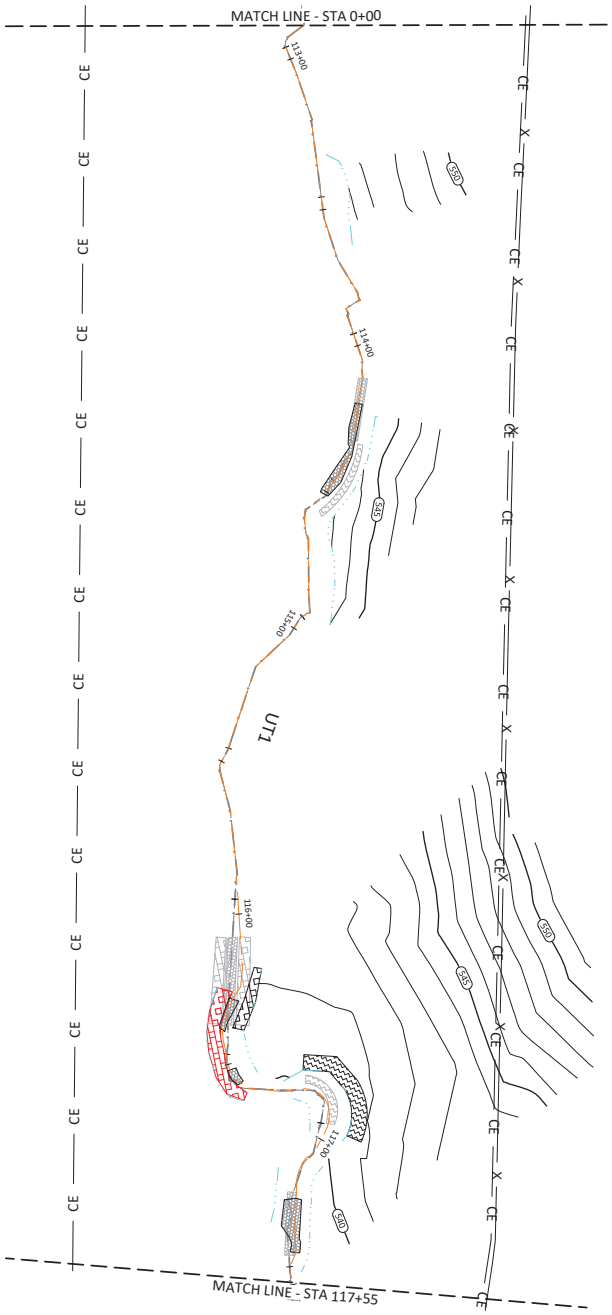
Holman Mill Mitigation Project
Alamance County, North Carolina

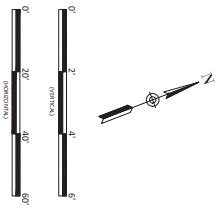
UT1 Reaches 3 & 4
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATION 114+45 LT, BRUSH TOE WAS NOT INSTALLED IN ORDER TO MINIMIZE DISTURBANCE TO HILLSLOPE.
2. AT STATION 116+45 RT, SOD MATS WERE EXTENDED FURTHER DOWNSTREAM TO STABILIZE BANK.





Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.4
Sheet

Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

UT1 Reach 4
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N. ALLEN

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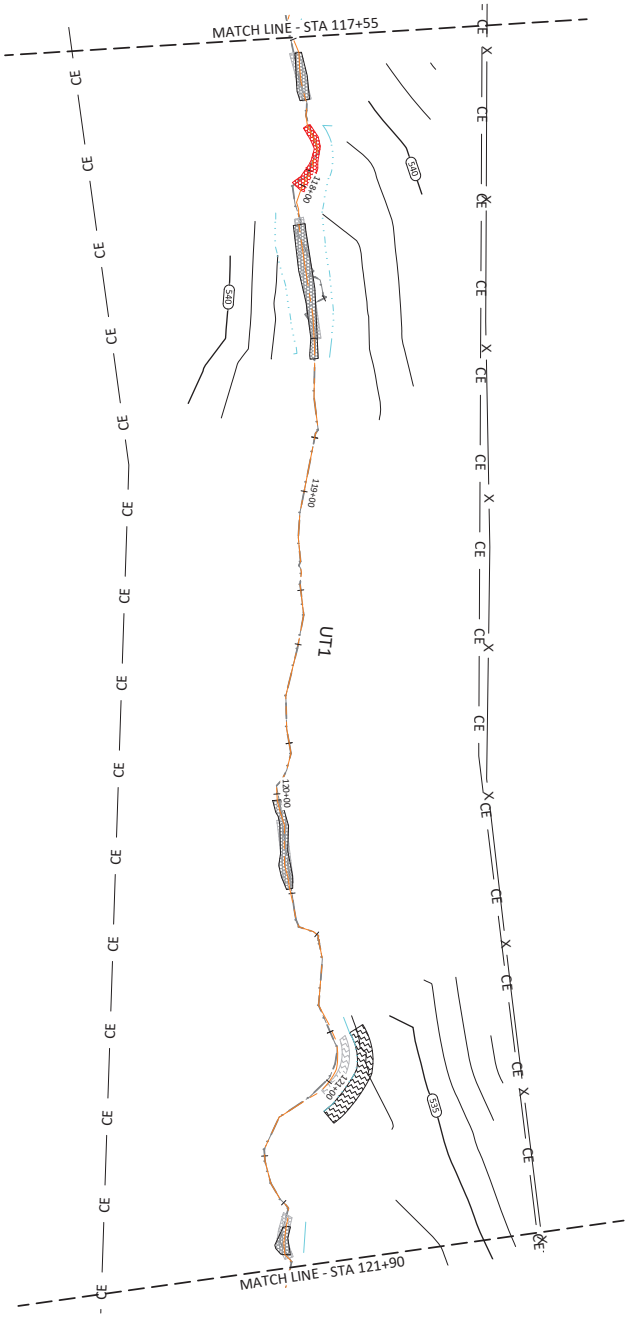
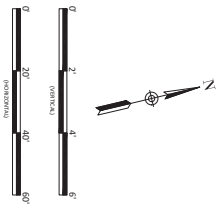
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATION 117+90, CONSTRUCTED RIFFLE WAS INSTALLED FOR GRADE STABILIZATION.


MATCH LINE - STA 117+55
MATCH LINE - STA 121+90
UT1
117+00
118+00
119+00
120+00
121+00
CE
X
CE
CE
CE



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.6
Sheet

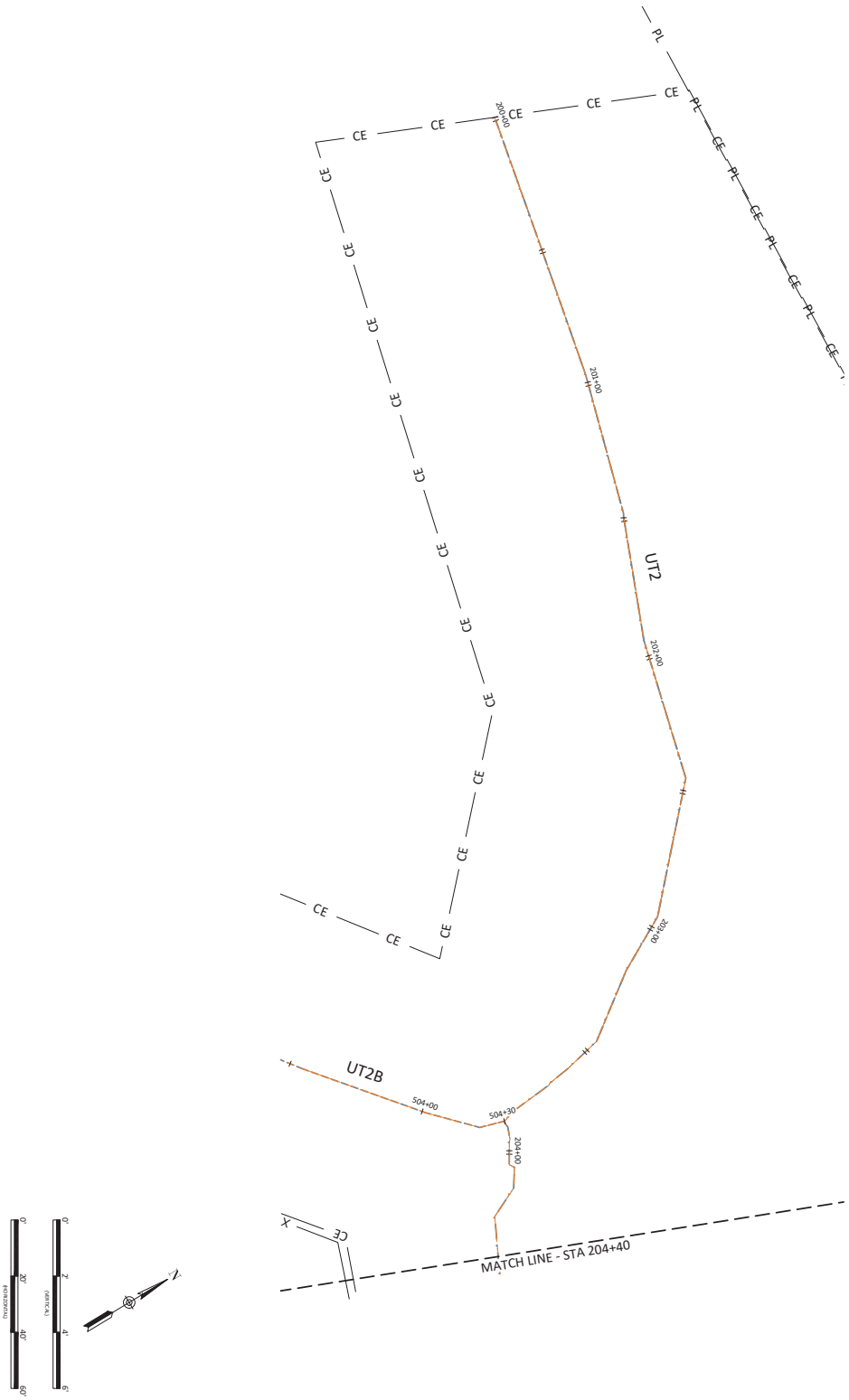
Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

UT1
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

Revisions:

1.7

Sheet

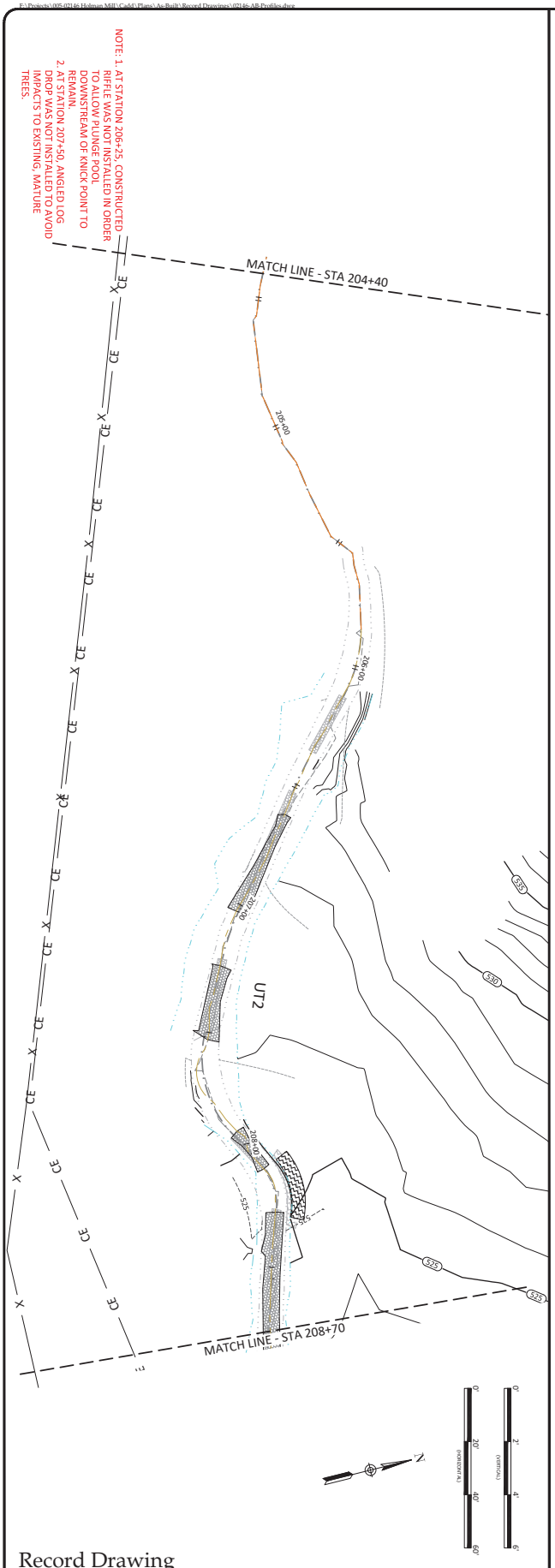
Holman Mill Mitigation Project
Alamance County, North Carolina

UT2 Reach 1
Stream Overlay Plans

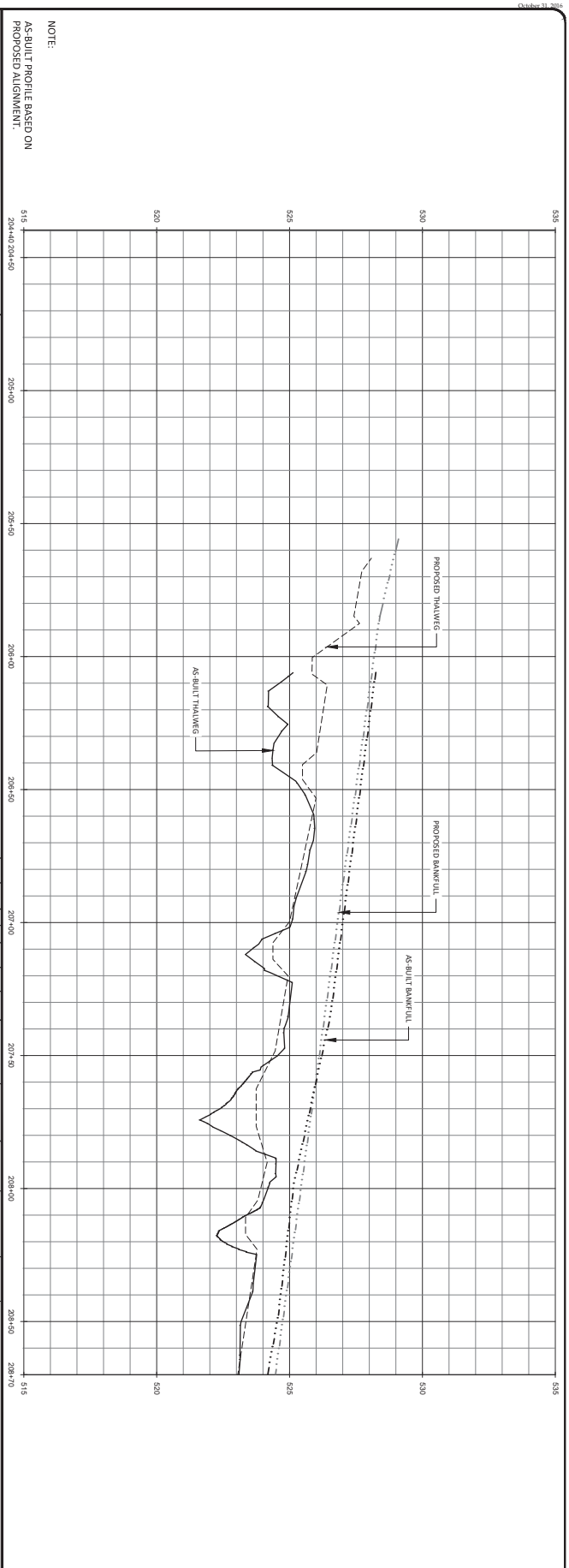
NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATION 206+25, CONSTRUCTED RIFFLE WAS NOT INSTALLED IN ORDER TO ALLOW PLUNGE POOL DOWNSTREAM OF KNICK POINT TO REMAIN.
2. AT STATION 207+50, ANGLED LOG DROP WAS NOT INSTALLED TO AVOID IMPACTS TO EXISTING, MATURE TREES.



NOTE:
AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT.



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.8
Sheet

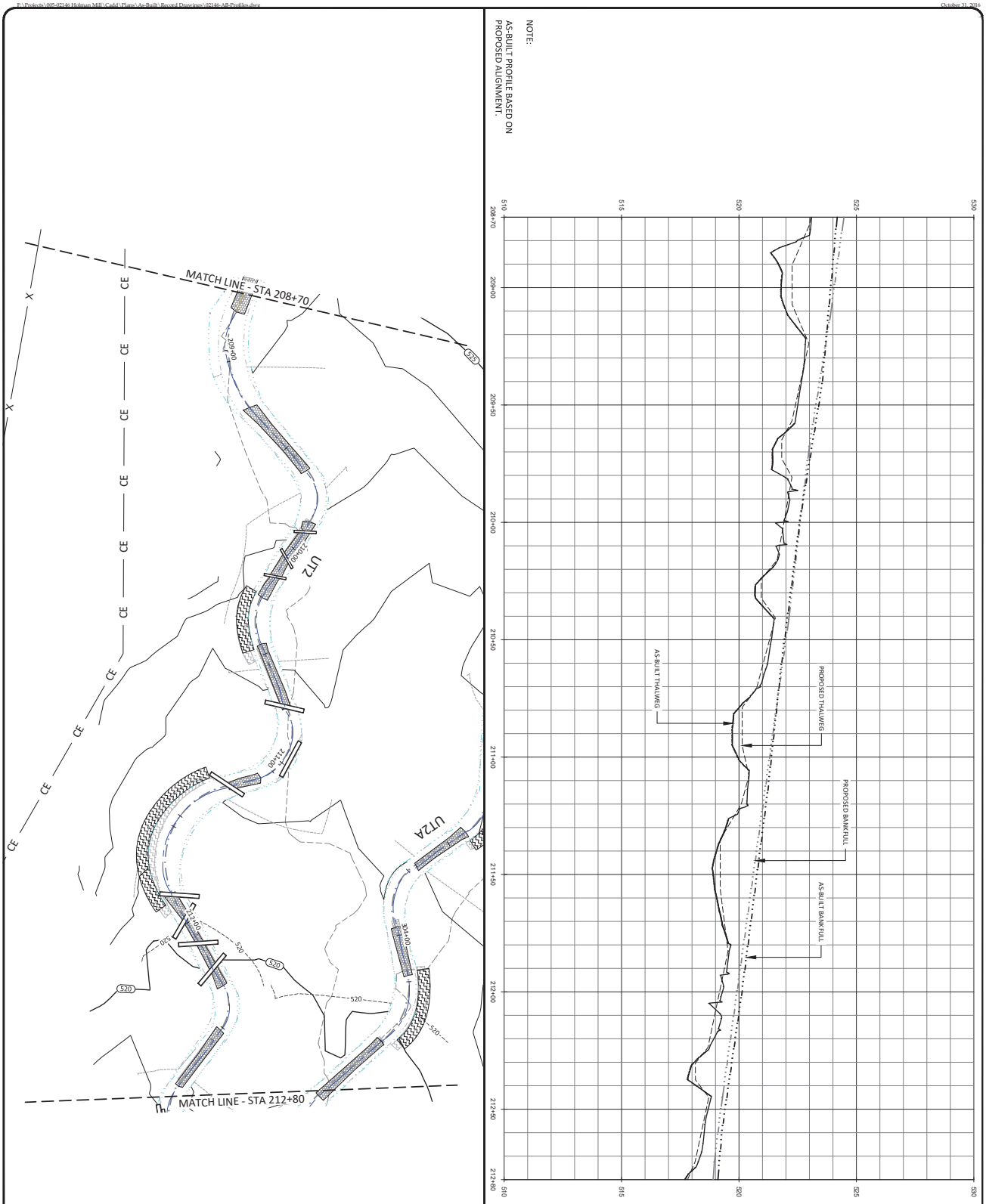
Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

UT2 Reaches 1 & 2
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831



Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.9
Sheet

Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

UT2 Reaches 2 & 3
Stream Overlay Plans

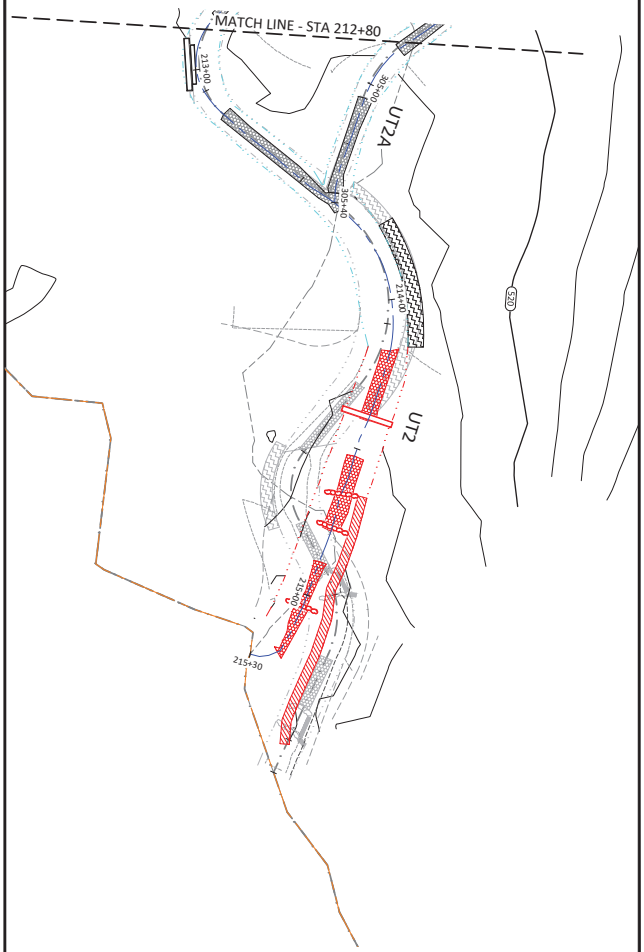
NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N. ALLEN

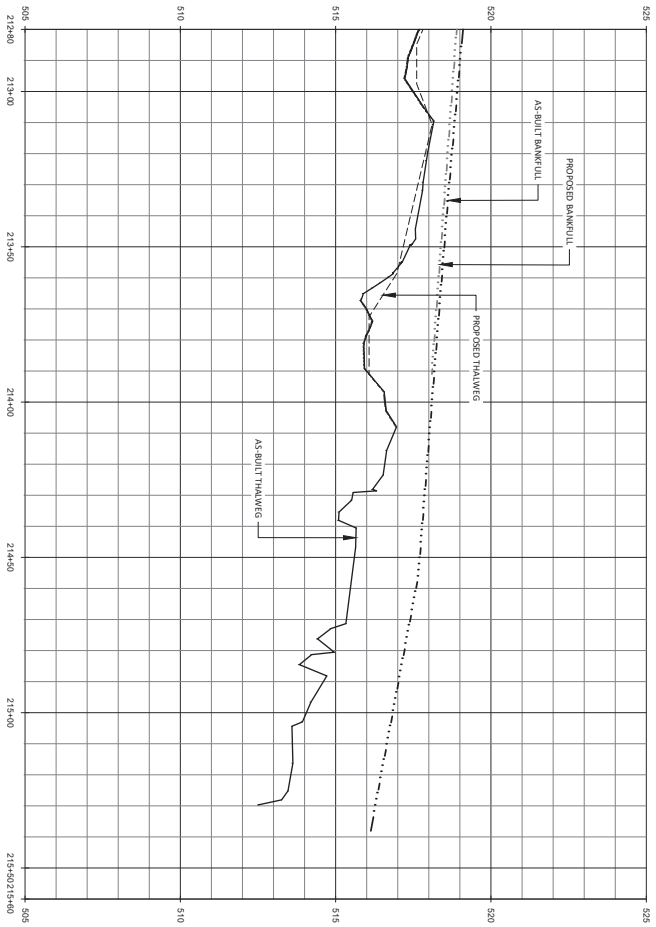
WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

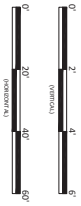
NOTE: 1. AT STATION 213+90, ALIGNMENT CHANGED TO AVOID IMPACTS TO EXISTING, MATURE TREES AND TO AVOID IMPACTING ERODED BANKS THAT HAD FORMED ON RIGHT BANK OF UT TO PINE HILL BRANCH.

NOTE:

AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT UP TO POINT WHERE AS-BUILT ALIGNMENT DEVIATES FROM PROPOSED ALIGNMENT. AT THIS POINT, ONLY THE AS-BUILT PROFILE BASED ON THE AS-BUILT ALIGNMENT IS SHOWN.







Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.10
Sheet

Revisions:

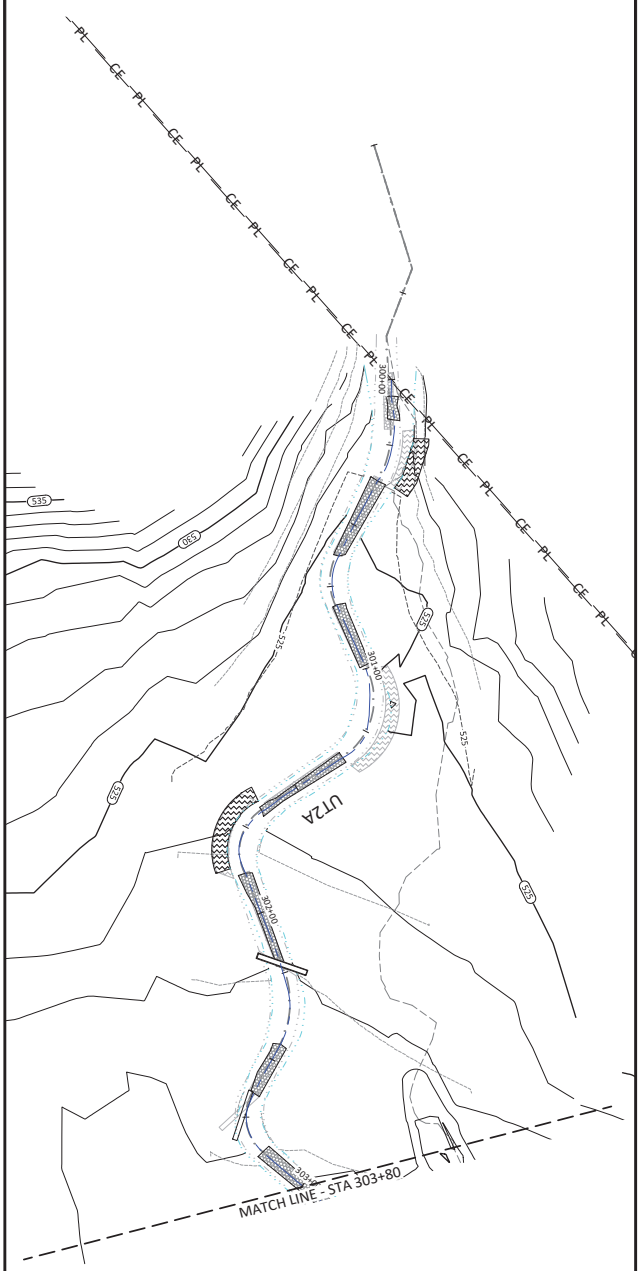
Holman Mill Mitigation Project
Alamance County, North Carolina

UT2 Reaches 3 & 4
Stream Overlay Plans

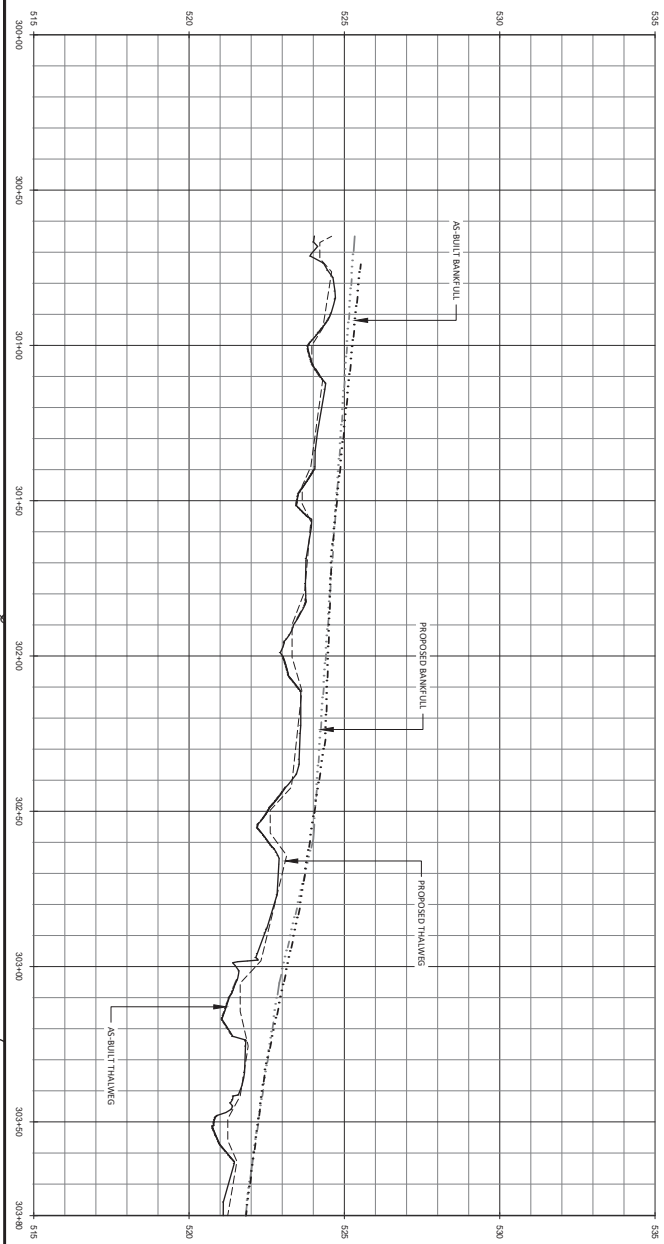
NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. KENNEDY ALLEN

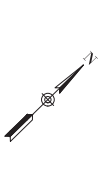
WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE: 1. AT STATION 301+15, BRUSH TOE WAS NOT INSTALLED IN ORDER TO AVOID IMPACTS TO EXISTING, MATURE TREES.



NOTE:
AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT.





Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.11
Sheet

Revisions:
08-04-2015 Extension of pump around on UT2A

Holman Mill Mitigation Project
Alamance County, North Carolina

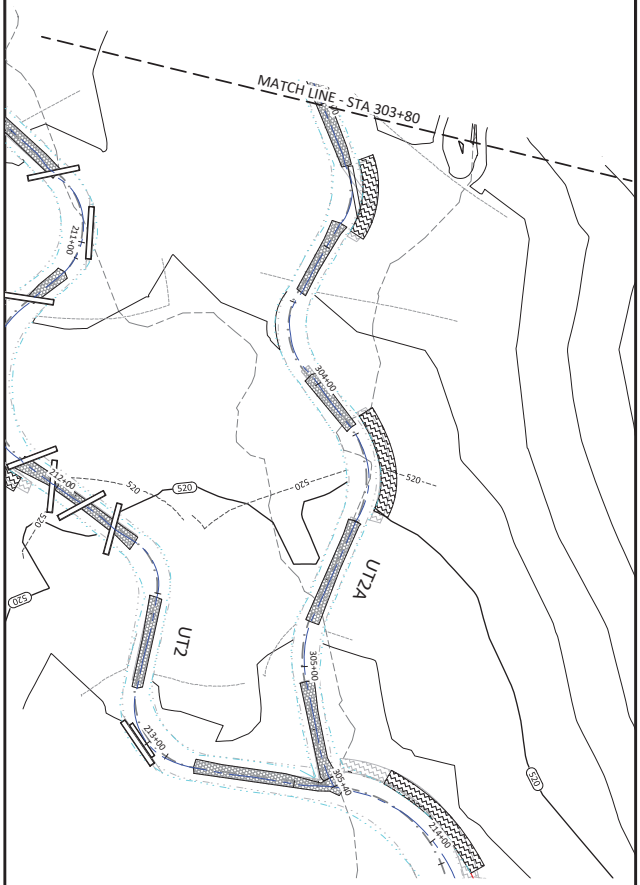
UT2A
Stream Overlay Plans

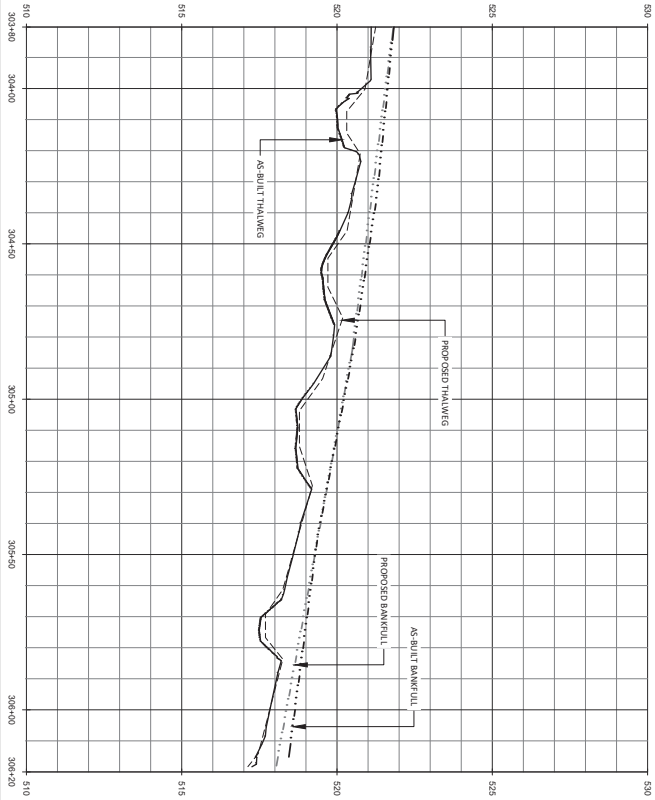
NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

NOTE:

AS-BUILT PROFILE BASED ON PROPOSED ALIGNMENT.





Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

1.12
Sheet

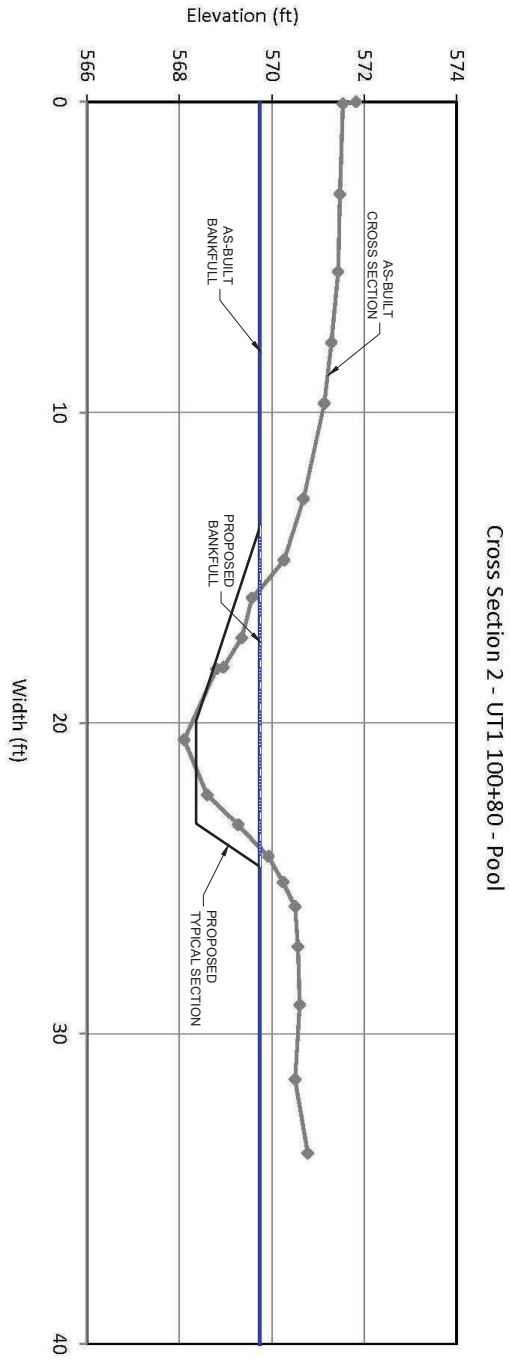
Revisions:
08-04-2015 extension of pump around on UT2A

Holman Mill Mitigation Project
Alamance County, North Carolina

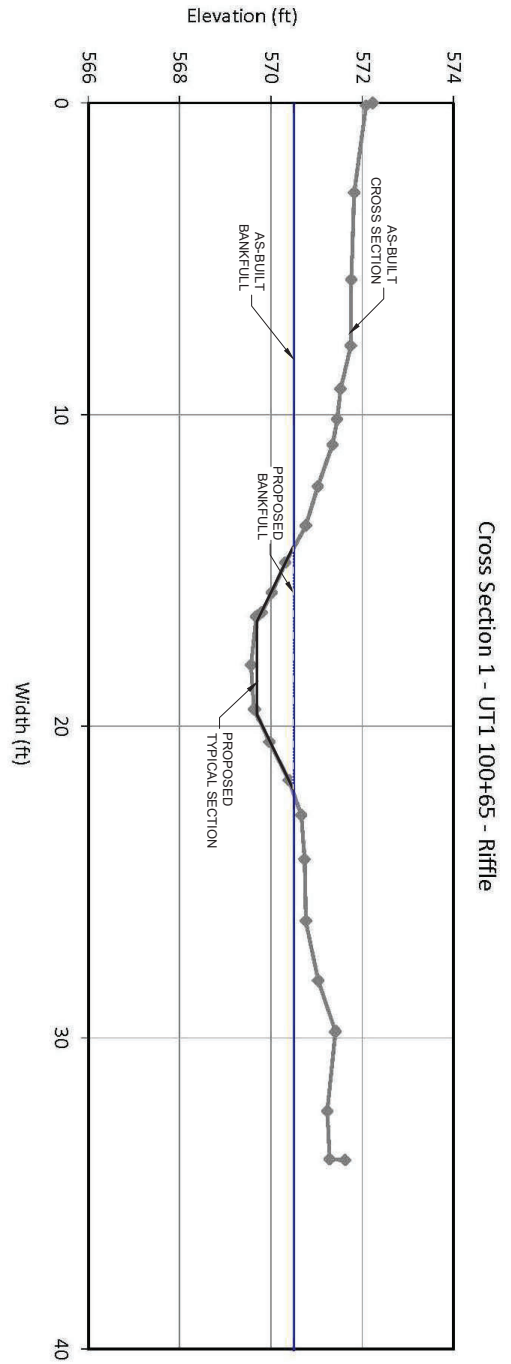
UT2A
Stream Overlay Plans

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. ALLEN

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831



Cross Section 2 - UT1 100+80 - Pool



Cross Section 1 - UT1 100+65 - Riffle

Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

Sheet 2.1

Revisions:

Holman Mill Mitigation Project
Alamance County, North Carolina

Cross Section and Typical Section Overlays

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. KELLY

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
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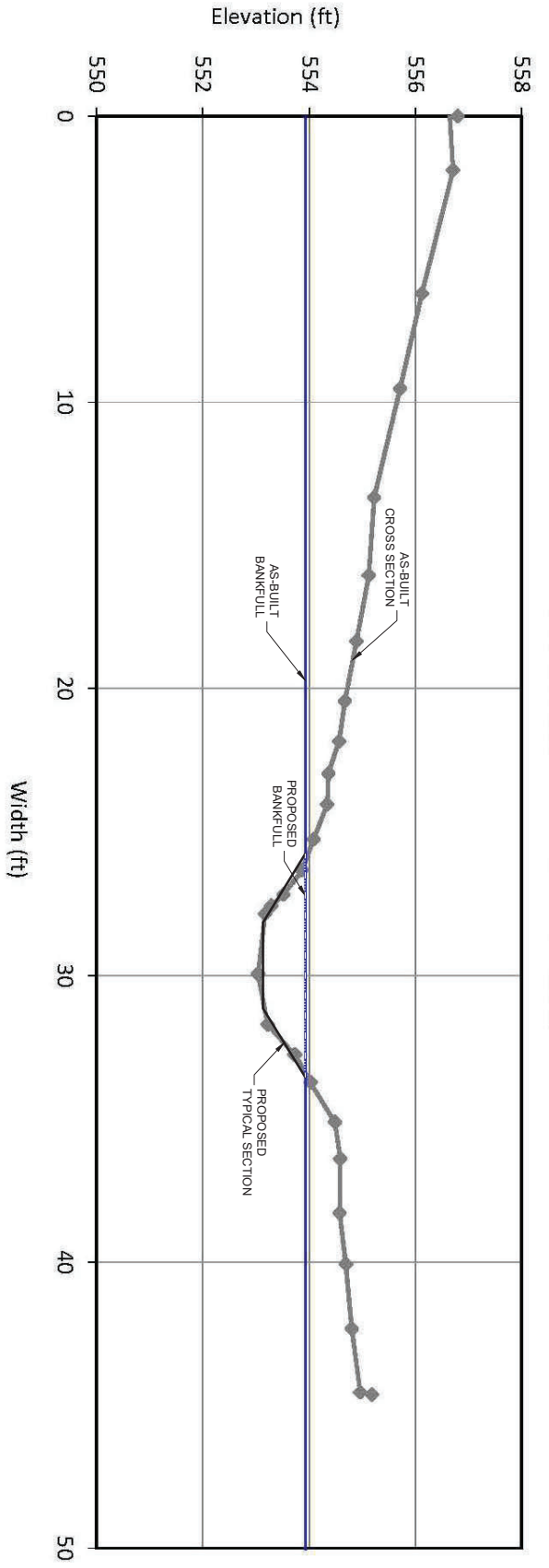

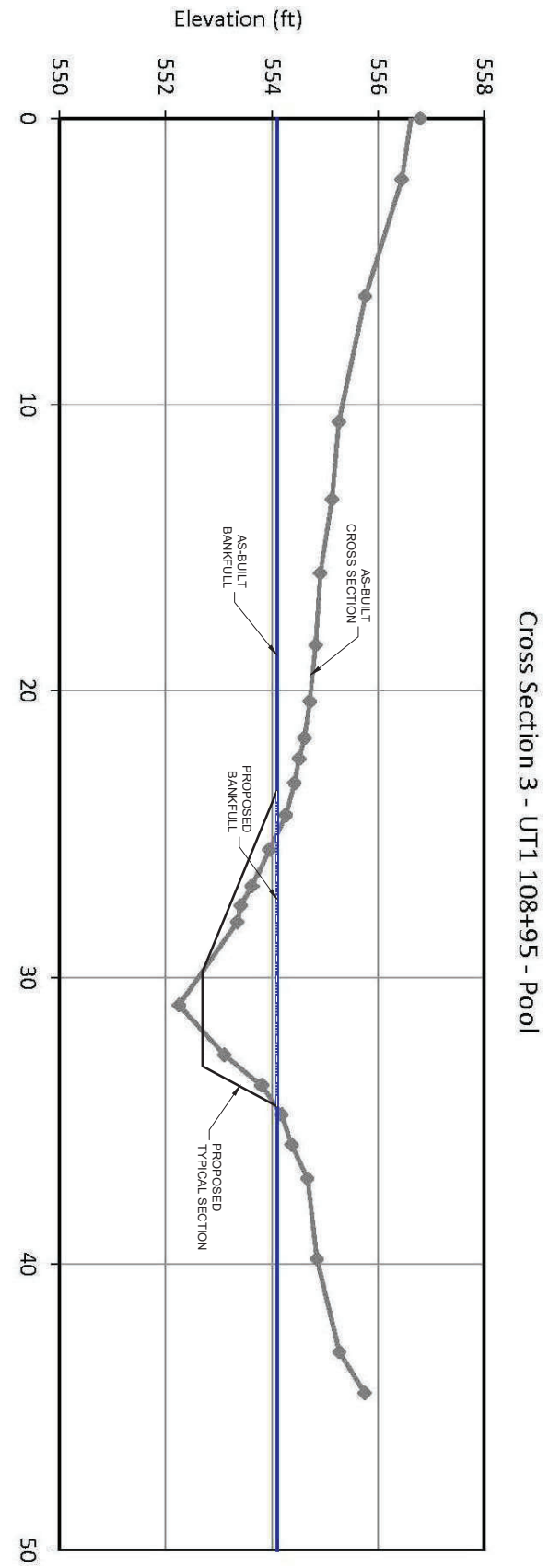

Record Drawing

Date: 10.31.2016
Job Number: 005-02146
Project Engineer: ANA
Drawn By: CLM
Checked By: JNK

Revisions:

Sheet 2.2

Holman Mill Mitigation Project
Alamance County, North Carolina

Cross Section and Typical Section Overlays

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. ALLEN

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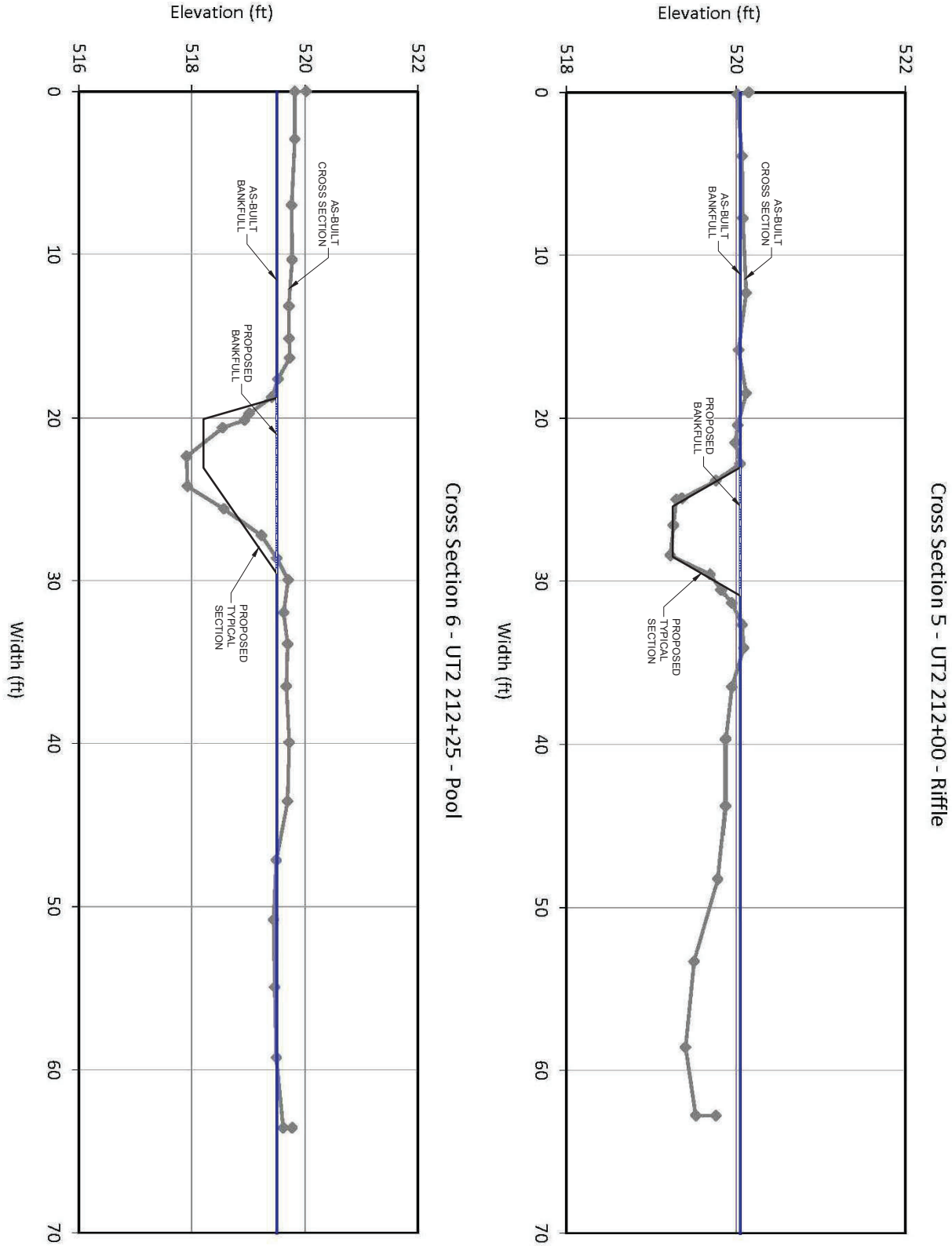

Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

Revisions:

2.3
Sheet

Holman Mill Mitigation Project
Alamance County, North Carolina

Cross Section and Typical Section Overlays

NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER JOHN N. KNOTT ALLEN

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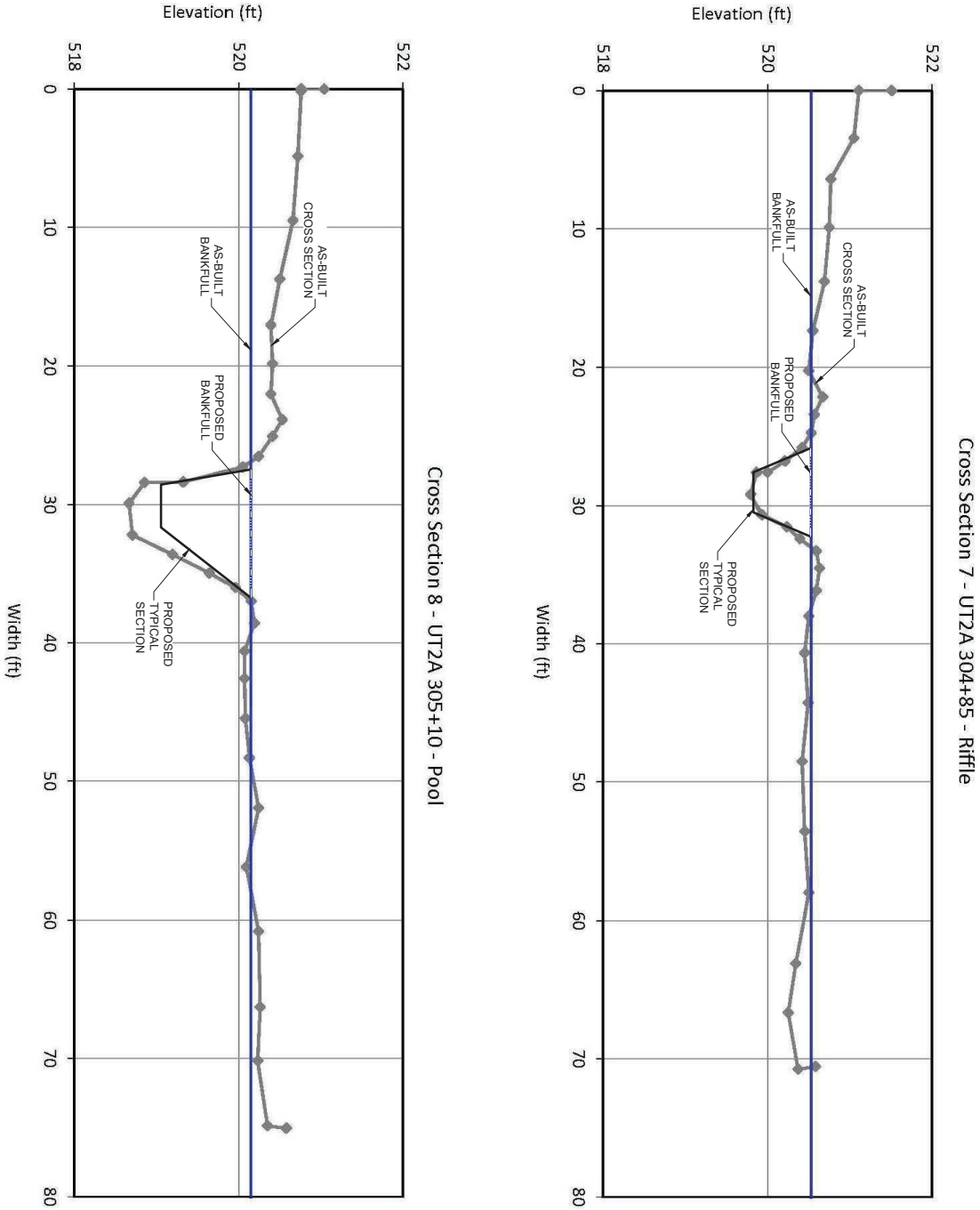

Cross Section 7 - UT2A 304+85 - Riffle

Cross Section 8 - UT2A 305+10 - Pool

Record Drawing

Date:	10.31.2016
Job Number:	005-02146
Project Engineer:	ANA
Drawn By:	CLM
Checked By:	JNK

Revisions:

2.4
Sheet

Holman Mill Mitigation Project
Alamance County, North Carolina

Cross Section and Typical Section Overlays

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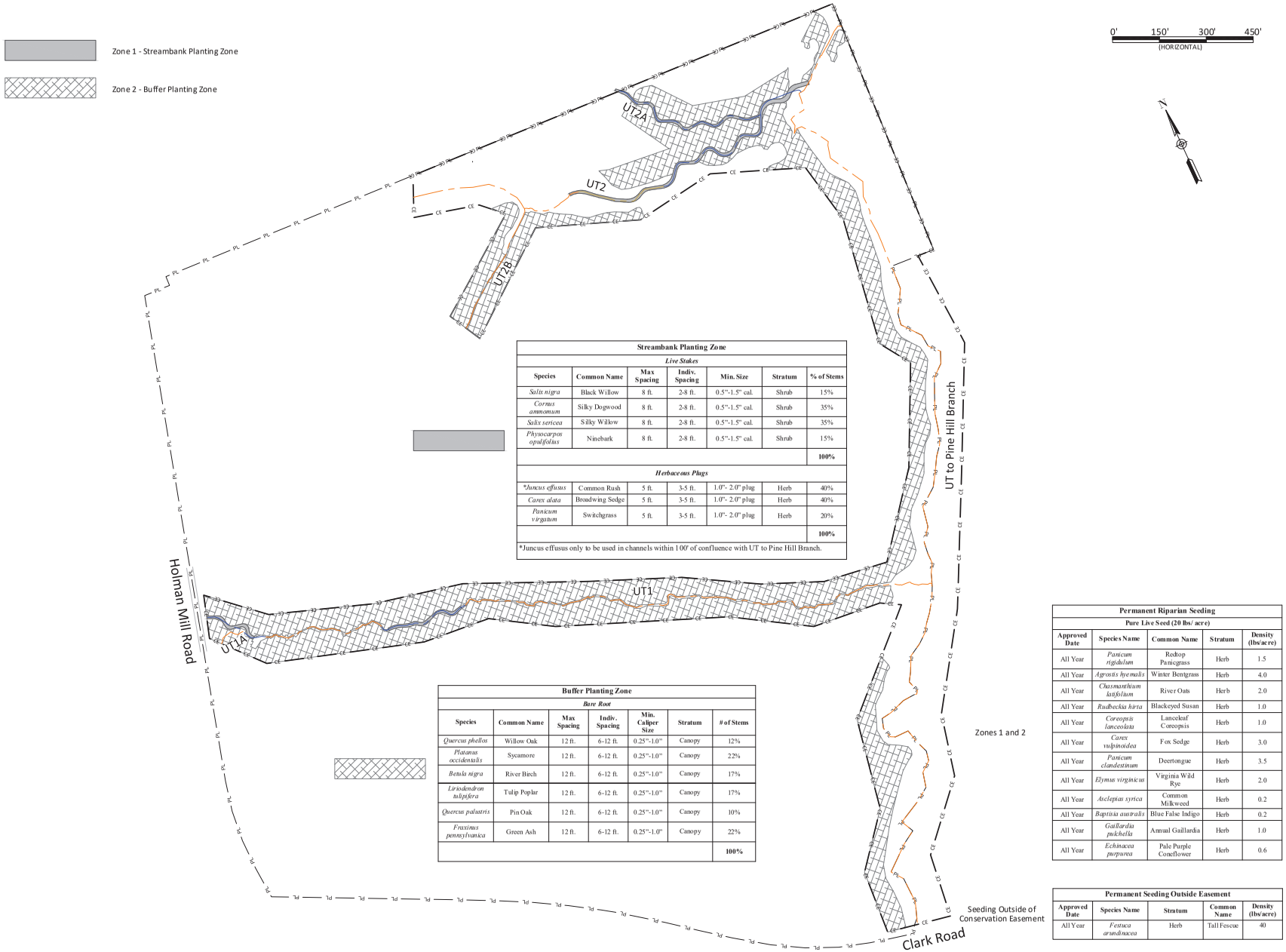

Streambank Planting Zone						
Live Stakes						
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Size**	**Stratum**	**% of Stems**
Salix nigra	Black Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
Cornus ammomum	Silky Dogwood	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Salix sericea	Silky Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Physocarpos opulifolius	Ninebark	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
						100%
Herbaceous Plugs						
**Juncus effusus*	Common Rush	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
Carex alata	Broadwing Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
Panicum virgatum	Switchgrass	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	20%
						100%
*Juncus effusus only to be used in channels within 100' of confluence with UT to Pine Hill Branch.						

Buffer Planting Zone						
Bare Root						
Species	**Common Name**	**Max Spacing**	**Indiv. Spacing**	**Min. Caliper Size**	**Stratum**	**# of Stems**
Quercus phellos	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	12%
Platanus occidentalis	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	22%
Betula nigra	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	17%
Liriodendron tulipifera	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	17%
Quercus palustris	Pin Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
Fraxinus pennsylvanica	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	22%
						100%

Permanent Riparian Seeding				
Pure Live Seed (20 lbs/ acre)				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density (lbs/acre)**
All Year	*Panicum rigidulium*	Redtop Panicgrass	Herb	1.5
All Year	*Agrostis hyemalis*	Winter Bentgrass	Herb	4.0
All Year	*Chasmanthium latifolium*	River Oats	Herb	2.0
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	1.0
All Year	*Coreopsis lanceolata*	Lanceleaf Coreopsis	Herb	1.0
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	3.0
All Year	*Panicum clandestinum*	Deertongue	Herb	3.5
All Year	*Elymus virginicus*	Virginia Wild Rye	Herb	2.0
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	1.0
All Year	*Echinacea purpurea*	Pale Purple Coneflower	Herb	0.6

Permanent Seeding Outside Easement				
Approved Date	**Species Name**	**Stratum**	**Common Name**	**Density (lbs/acre)**
All Year	*Festuca arundinacea*	Herb	Tall Fescue	40

Record Drawing

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NORTH CAROLINA PROFESSIONAL SEAL 040280 ENGINEER ANGELA N ALLEN

Holman Mill Mitigation Project
Alamance County, North Carolina

Planting Plan

Revisions:

Date: 10.31.2016
Job Number: 005-02146
Project Engineer: ANA
Drawn By: CLM
Checked By: DNK

Sheet 3.1

October 31, 2016
E:\Projects\005-02146 Holman Mill Creek\Plans\As-Built Record Drawings\005-02146 As-Built Record Plan.dwg