Crooked Creek #2 Restoration Project

Union County, North Carolina

for

NCDENR Division of Mitigation Services

Vicinity Map
Not to Scale

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CALL 1-800-632-4949
N.C. ONE-CALL CENTER
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Project Summary

SCO#09-0751301
Latitude: N35°08'19.04"
Longitude: W80°31'27.14"

Disturbed Area: 10.6 Acres

Crooked Creek Reach A Enhancement	1,555 LF
Crooked Creek Reach B Enhancement	2,404 LF
UT1 to Crooked Creek Restoration	1,718 LF
UT2 to Crooked Creek Enhancement	470 LF
Wetland Zone A (FACW)	7.8 AC
Wetland Zone B (FAC)	3.9 AC

RECORD DRAWINGS
ISSUED JULY 15, 2015

Sheet Index

Project Directory

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

Owner:
NCDENR Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

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NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY 7-15-15

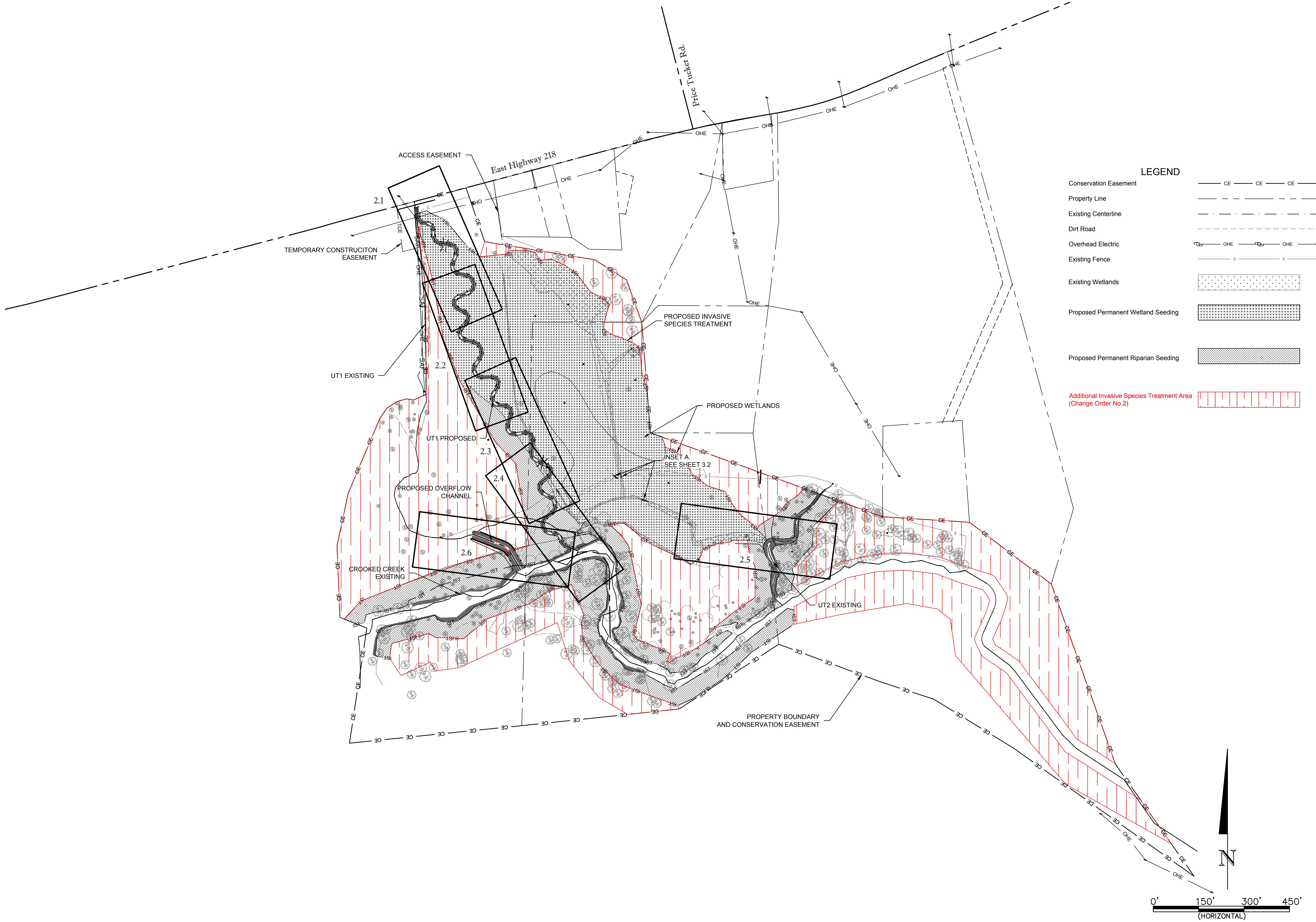
RECORD DRAWINGS - SCO PROJECT # 09-0751301

Crooked Creek #2 Restoration Project
Union County, North Carolina
Cover Sheet

Revisions:

Date:	July 15, 2015
Job Number:	005-02127
Project Engineer:	ASE
Drawn By:	JCK
Checked By:	AA

Sheet 0.1



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NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY 7-15-15

Crooked Creek #2 Restoration Project
Union County, North Carolina

Project Overview

Date: July 15, 2015
Job Number: 005-02127
Project Engineer: ASE
Drawn By: JCK
Checked By: AA

Revisions:

Sheet 0.2

General Construction Notes for all Reaches

All erosion and sediment control practices shall comply with the North Carolina Erosion and Sediment Control Planning and Design Manual

1) Contractor will install pump-around systems to divert flow while working in live, flowing channels. The Contractor shall operate and maintain the pump-around system 24 hours a day unless all disturbed areas within the pump-around work area can be stabilized by the end of the work day. Contractor shall not remove pump-around systems and advance to the next work area until the current work area is completed and stabilized.

2) No material from the off-line proposed stream channel excavation many be backfilled into the adjacent existing stream channel until the newly-constructed proposed stream section is completed, stabilized, and the stream flow has been diverted into it, not even if that section of old/ existing stream is being pumped.

3) In areas without a pump-around system, Contractor shall disturb only as much channel bank as can be stabilized with temporary seeding, mulch and erosion control matting by the end of each work day.

4) When crossing an active section of new or old stream channel, a Timber Mat shall be installed according to the details and specifications.

5) All graded areas with slopes steeper than 3:1 will be stabilized within seven working days. All other areas will be stabilized within 14 days.

6) Locations for staging and stockpile areas and stream crossings have been provided on the Plans. Additional or alternative staging and/or stockpile areas and stream crossings may be used by the Contractor provided that all practices comply with the North Carolina Erosion and Sediment Control Planning and Design manual and are approved by the Engineer prior to implementation.

7) Various types of constructed riffles are specified on the plans. Contractor shall build the specific types of constructed riffles at locations shown on the plans. Changes in constructed riffle type must be approved by the Engineer.

8) Contractor is to make every effort to avoid damaging or removing existing trees.

9) Under no circumstances will the Contractor exceed the limits of disturbance shown on the plans.

The Crooked Creek #2 Restoration Project construction will follow the construction sequence protocol as described below, unless otherwise noted.

Initial Site Preparation

10) Contact North Carolina "ONE CALL" Center (1.800.632.4949) before any excavation.

11) Contact Land Quality (704-663-1699) before any work begins on the project and notify them of the start date.

12) Mobilize equipment and materials to the Site.

13) Identify and establish construction entrance, staging and stockpile areas, haul roads, silt fencing, tree protection fencing and temporary stream crossings as indicated on the Plans for work areas. Note: all construction traffic will enter the site from the construction entrance show on the Plans at NC Highway 218.

14) All haul roads shall be monitored for sediment loss on a daily basis. In the event of sediment loss, silt fence or other acceptable sediment and erosion control practices shall be installed. Silt fence outlets shall be located at points of low elevation or a minimum spacing of 150 ft.

15) Set up temporary facilities, locate equipment within the staging area, and stockpile materials needed for the initial stages of construction within the stockpile area(s).

16) Install and maintain an onsite rain gauge and log book to record the rainfall amounts and dates. Complete the self-inspection as required by DENR permit.

UT1 Channel Construction Notes

1) Construction of UT 1 is to be done in the dry, constructing the proposed channel from upstream to downstream starting off-line at approximately STA100+60 at the northern portion of the Site along NC Highway 218.

2) As work progresses, remove and stockpile the top 3 inches of soil from the active grading area. Stockpiled topsoil shall be kept separate for onsite replacement prior to floodplain seeding.

3) Remove all non-native and invasive vegetation prior to beginning the channel construction.

4) Where feasible, more than one offline section may be constructed concurrently. Offline sections shall be tied online sequentially from downstream to upstream.

5) Construct the proposed stream channel to the grade specified in the cross sections and profile. Transfer coarse material from abandoned channel riffles to new channel riffles utilizing a pump around on the existing UT1 when doing so.

6) Grade the adjacent floodplain and wetland area according to grades shown on the plan.

7) Install structures (log vane, j hook rock vane, riffles, log sills, brush sills, etc.) and in-bank bioengineering such brush toe after channel grading is completed.

8) Seed (with appropriate seed mix) and straw mulch areas where the coir fiber matting is to be installed.

9) Install coir fiber matting according to specifications, using coir fiber matting ECC-2B or equivalent from STA 100+00 to STA 114+20.71 and coir fiber matting C-600 or equivalent from STA 114+20.71 to the confluence with Crooked Creek at STA 117+17.53.

10) Install coir fiber matting ECC-2B or equivalent on the 2(H):1(V) slope transition from floodplain to upland on the right side of UT1 approximate corresponding stations 115+45.00 - 117+17.53.

11) Install a pump around at the upstream end of site between the culvert and existing UT1, installing channel dikes as necessary, in order to complete tie-in grading of the proposed UT1 from the offline section to the culvert.

12) Upon completion of UT1 and stabilization, turn water into newly constructed UT1 and remove pump around.

13) Backfill abandoned channel sections with stockpiled soil according to the grades shown on the Plans. Non-native and invasive vegetation (e.g. privet, multiflora rose, and Japanese honeysuckle) shall be removed from the existing channel prior to backfilling.

14) Prepare floodplain for seeding by applying stockpiled topsoil to the floodplain between bankfull elevation and the grading limits, ripping, and raking/ smoothing. Seed and mulch. Any areas within the conservation easement that have not been graded shall be treated according to the planting plan.

15) Plant live stakes and herbaceous plugs on stream banks according to planting details and specifications.

Overflow Channel Construction Notes

16) Install a pump around system between the existing UT1 and Crooked Creek (UT1 existing STA 113+40) and install Channel Plug as shown on the Plans.

17) Construct the proposed Overflow Channel to the grades and profile shown on the Plans.

18) Install structures (e.g. constructed riffle and rock sills) after channel grading is completed.

19) Seed (with appropriate seed mix) and straw mulch areas where the coir fiber matting is to be installed.

20) Install coir fiber matting C-600 or equivalent

21) Upon completion of the Overflow Channel, turn water into the newly constructed Overflow Channel and remove the pump around.

22) Backfill the abandoned channel between the Overflow Channel and newly constructed UT1 east of the Overflow Channel with stockpiled soils according to the grades shown on the Plans. Non-native invasive vegetation (i.e. privet, multiflora rose, and Japanese honeysuckle) shall be removed from the existing channel prior to backfilling.

23) Plant live stakes on stream banks according to the planting details and specifications.

Wetland Construction Notes

1) Finalize floodplain and wetland grading, removing haul roads as necessary.

2) Prepare floodplain for seeding by applying stockpiled topsoil to the floodplain between bankfull elevation and the grading limits, ripping, and raking/ smoothing. Seed and mulch.

3) Install Channel Plug in the ditch in the southeast section of the site at the confluence with UT2 according to sheet 2.6 of the Plans.

4) Backfill channel with stockpiled soils according to the grades shown on the Plans. Non-native invasive vegetation (i.e. privet, multiflora rose, and Japanese honeysuckle) shall be removed from the existing channel prior to backfilling.

5) Seed and straw mulch disturbed areas of the backfilled channel and seed according to plans and specifications.

Construction Demobilization

6) Remove temporary stream crossings.

7) The Contractor shall ensure that the site is free of trash and leftover materials prior to demobilization of equipment from the site.

8) Complete the removal of any additional stockpiled material from the site.

9) Demobilize grading equipment from the site.

10) All rock and other stockpiled materials must be removed from the limits of disturbance and conservation easement. All areas outside the conservation easement shall be returned to pre-project conditions or better.

11) Seed, mulch, and stabilize staging areas, stockpile areas, haul roads, and construction entrances. Pasture seed mix is to be applied to areas of disturbance outside of the conservation easement and disturbed areas that do not fall within the riparian or wetland planting zones shown in the planting plan. Remove all temporary fencing.

Existing Property Line
Existing Thalweg
Existing Ditch
Existing Major Contour (100)
Existing Minor Contour
Existing Tree Line
Existing Tree
Existing Paved Road
Existing Overhead Electric with Easement (OHE)
Existing Power Pole
Existing Easement (E)
Existing Fence (X)
Existing Sanitary Sewer
Existing Culvert Pipe
Existing Wetland
Existing Ground Water Gauge

Proposed Channel Centerline (10+00)
Proposed Bankfull
Proposed Major Contour (100)
Proposed Minor Contour
Proposed Conservation Easement (CE)
Proposed Silt Fence ([x])
Proposed Safety Fence (SAF)
Proposed Limits of Disturbance (LOD)
Proposed Invasive Species Treatment (IST)
Proposed Temporary Construction Easement (TCE)

Proposed Log Vane
See Detail 2, Sheet 5.3

Proposed Construction Entrance
See Detail 3, Sheet 5.7

Proposed Brush Toe
See Detail 2, Sheet 5.4

Proposed Log Sill
See Detail 1, Sheet 5.3

Proposed Brush Sill
See Detail 4, Sheet 5.3

Proposed Angled Log Step Pool
See Detail 1, Sheet 5.2

Proposed Rock J-Hook
See Detail 2, Sheet 5.2

Proposed Boulder Sill
See Detail 3, Sheet 5.2

Proposed Silt Fence Outlet
See Detail 1, Sheet 5.5

Proposed Construction Route (Haul Road)

Proposed Temporary Stream Crossing
See Detail 4, Sheet 5.6

Proposed Constructed Riffle
See Details 1-4, Sheet 5.1

Proposed Channel Plug
See Detail 4, Sheet 5.7

Proposed Livestaking
See Detail 2, Sheet 5.5

Proposed Permanent Riparian Seeding

Proposed Permanent Wetland Seeding

Proposed Stockpile Area

Proposed Pump Around System
See Detail 1, Sheet 5.4

RECORD DRAWINGS - SCO PROJECT # 09-0751301

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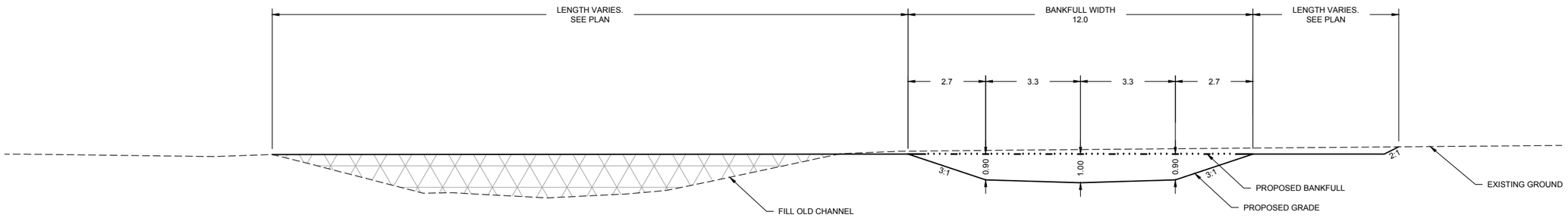
NORTH CAROLINA PROFESSIONAL SEAL 020340 ENGINEER AARON S. EARLEY 7-15-15

Crooked Creek #2 Restoration Project
Union County, North Carolina
General Notes and Symbols

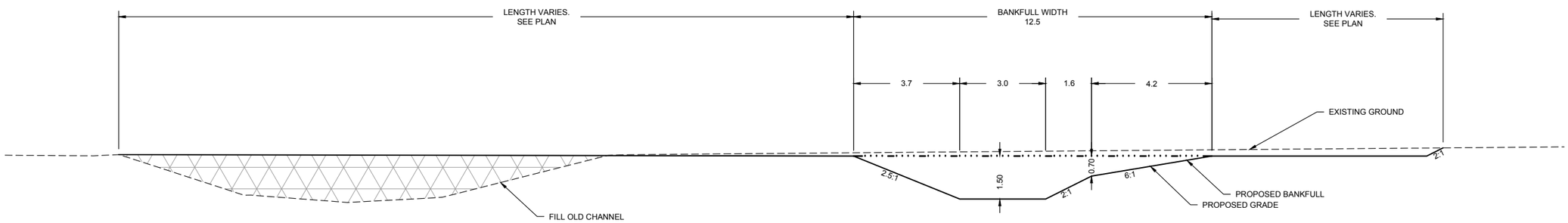
Revisions:

Date: July 15, 2015
Job Number: 005-02127
Project Engineer: ASE
Drawn By: JCK
Checked By: AA

Sheet 0.3



UT1- Typical Section: Riffle
Sta: 100+00 to 117+18
Not To Scale



UT1 - Typical Section: Pool
Sta: 100+00 to 117+18
Not To Scale

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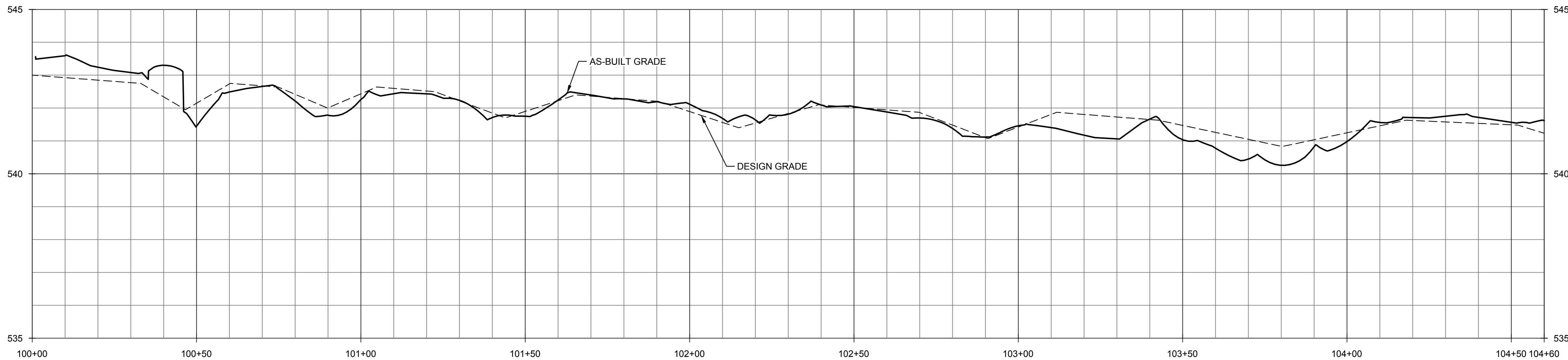
Crooked Creek #2 Restoration Project
Union County, North Carolina
Typical Sections

Date: July 15, 2015
Job Number: 095-0217
Project Engineer: ASE
Drawn By: JCK
Checked By: AA

Revisions:

Sheet 1.1



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Crooked Creek #2 Restoration Project
Union County, North Carolina

UT 1 Restoration
As-Built Stream Plan & Profile

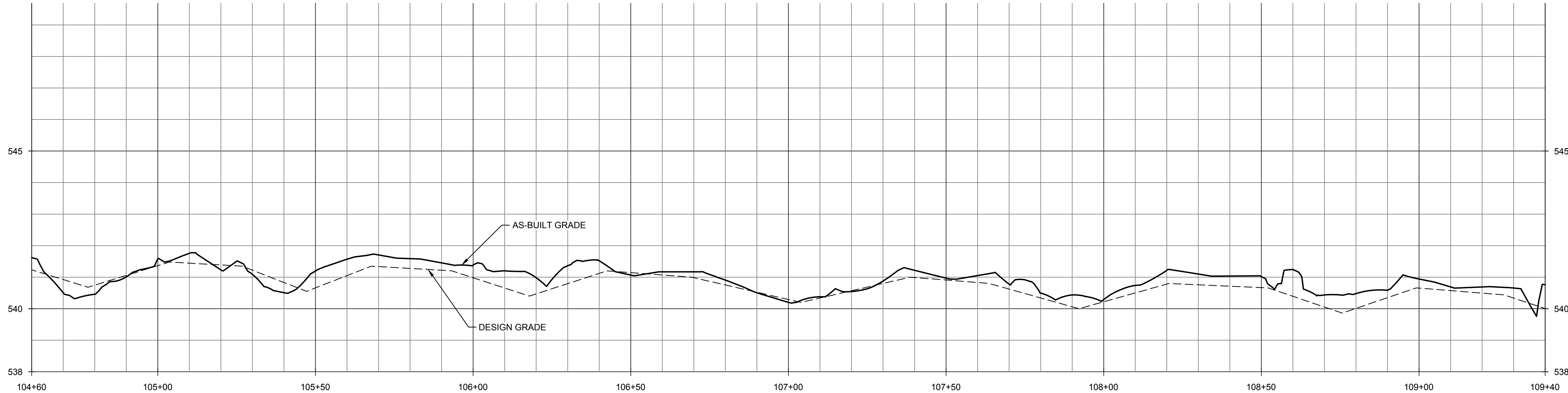
RECORD DRAWINGS - SCO PROJECT # 09-0751301

Revisions:

Date:	July 15, 2015
Job Number:	005-02127
Project Engineer:	ASE
Drawn By:	JCK
Checked By:	AA

2.1

Sheet



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Crooked Creek #2 Restoration Project
Union County, North Carolina

UT 1 Restoration
As-Built Stream Plan & Profile

RECORD DRAWINGS - SCO PROJECT # 09-0751301

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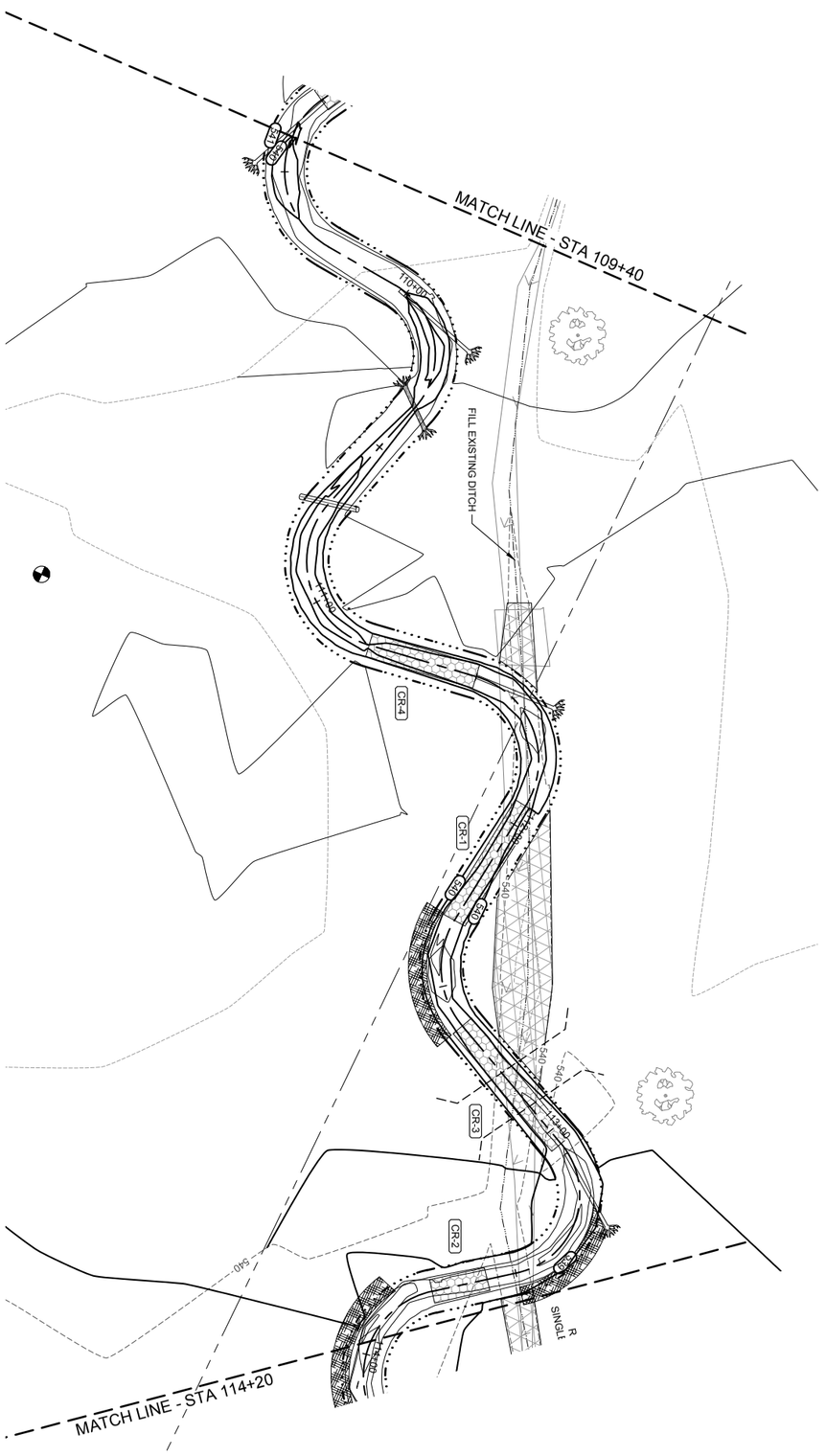
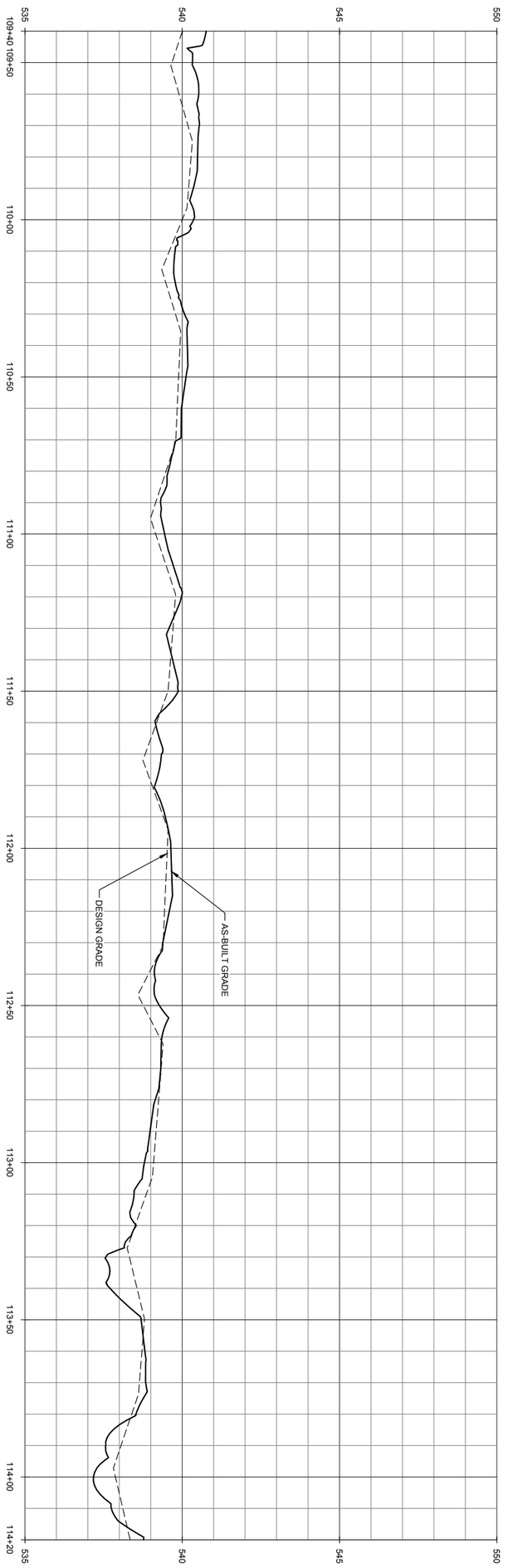
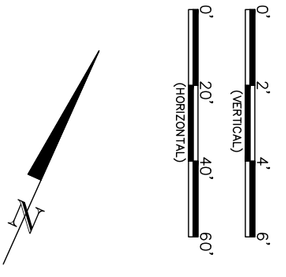
Drawn By:	JCK
Checked By:	AA

Sheet 2.2







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Date:	July 15, 2015
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Project Engineer:	ASE
Drawn By:	JCK
Checked By:	AA

2.3
Sheet

Revisions:

Crooked Creek #2 Restoration Project
Union County, North Carolina

UT 1 Restoration
As-Built Stream Plan & Profile

NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER JOHN S. ENGLISH

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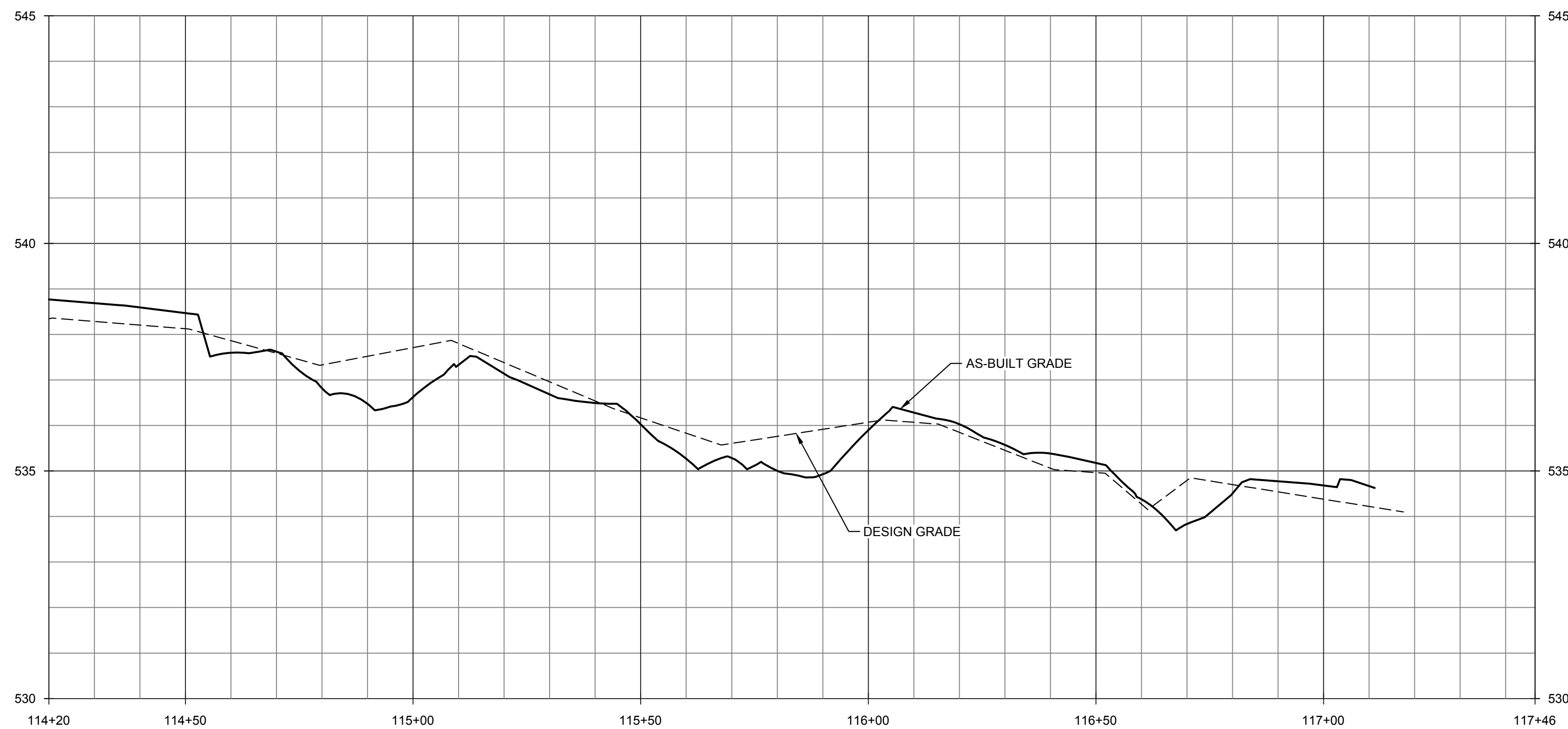

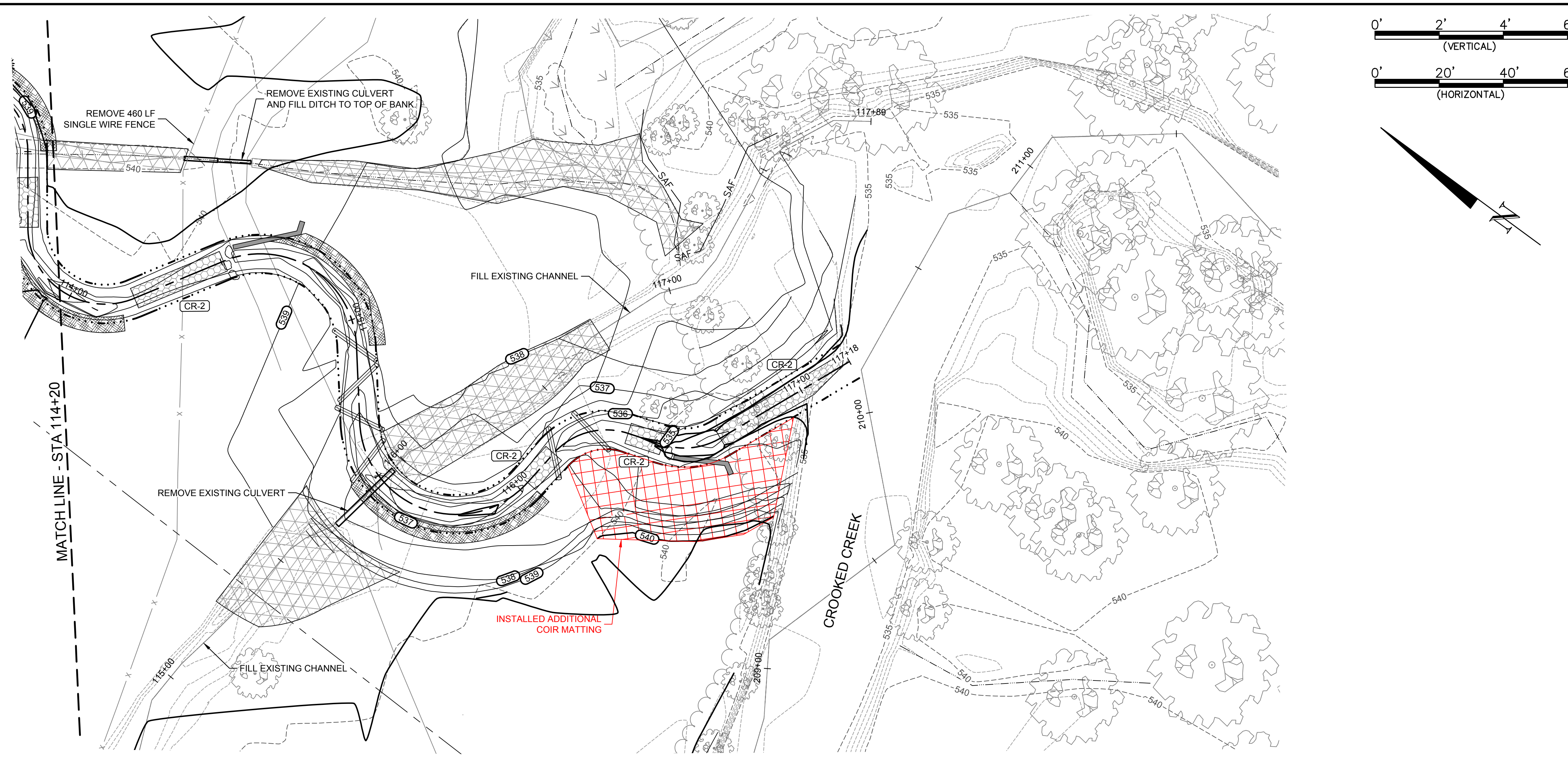

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NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY
7-15-15

Crooked Creek #2 Restoration Project
Union County, North Carolina

UT 1 Restoration
As-Built Stream Plan & Profile

RECORD DRAWINGS - SCO PROJECT # 09-0751301

Revisions:

Date:	July 15, 2015
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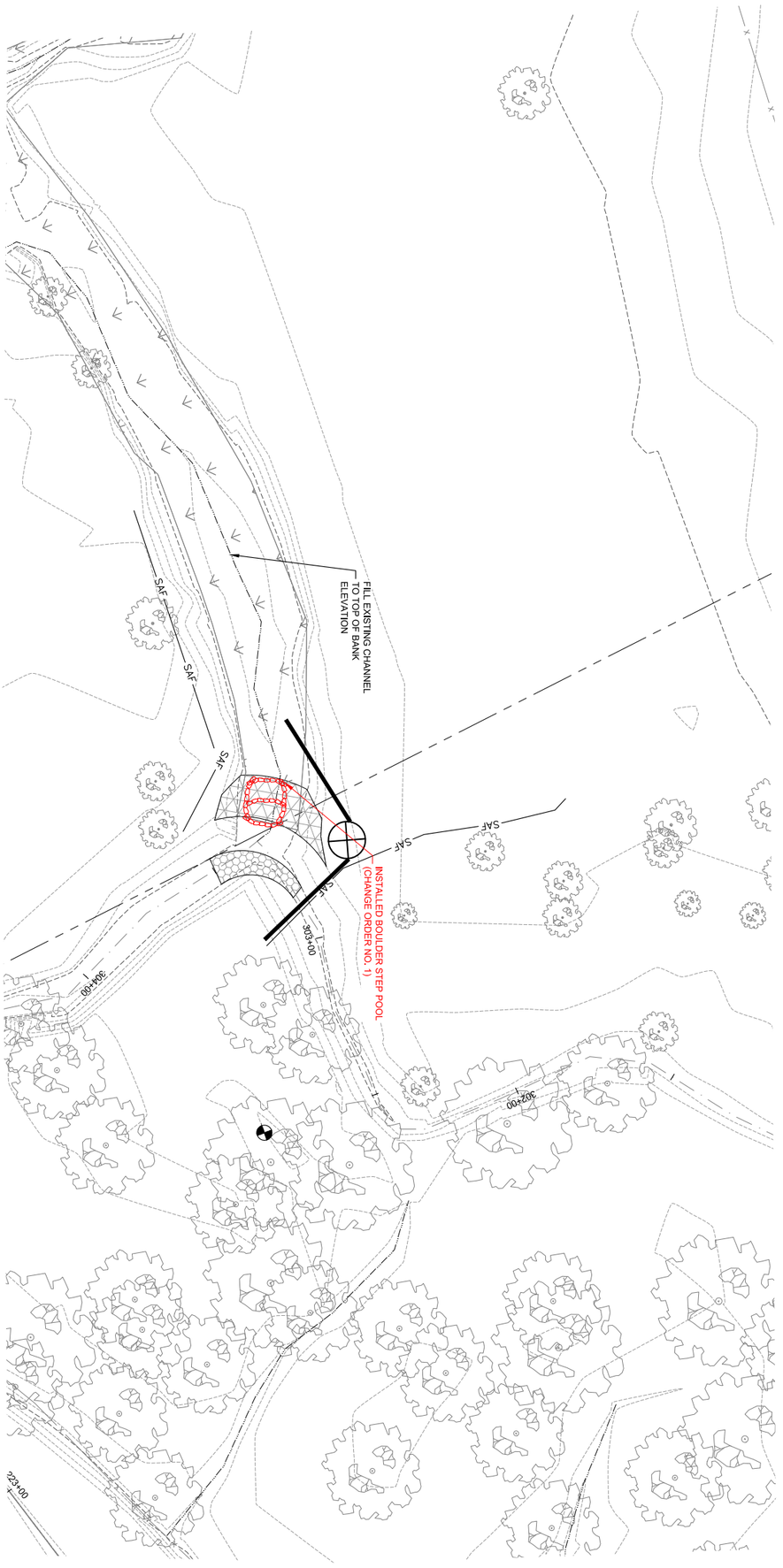
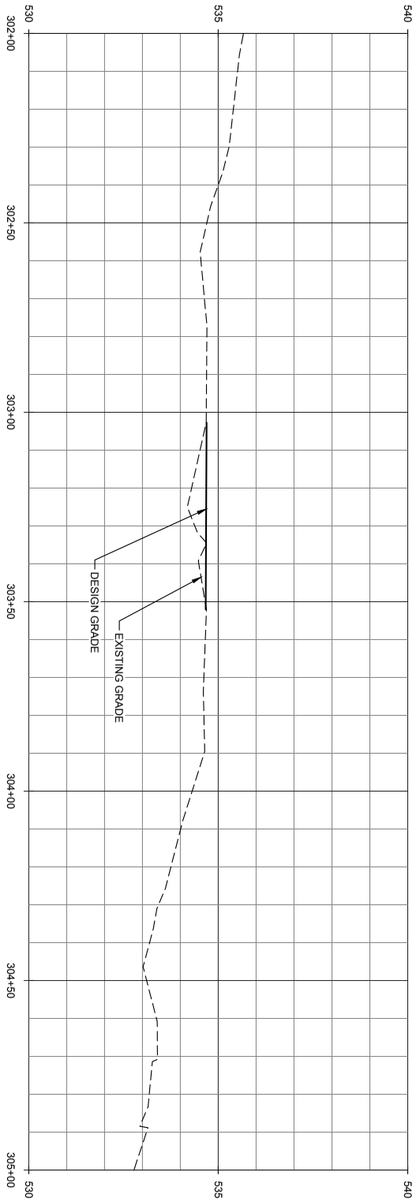
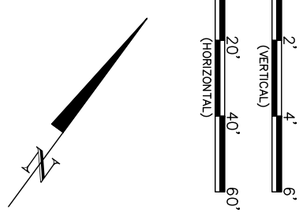
Sheet 2.4







RECORD DRAWINGS - SCO PROJECT # 09-0751301

Date:	July 15, 2015
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Project Engineer:	ASE
Drawn By:	JCK
Checked By:	AA

2.5
Sheet

Revisions:

Crooked Creek #2 Restoration Project
Union County, North Carolina

UT2
As-Built Stream Plan & Profile

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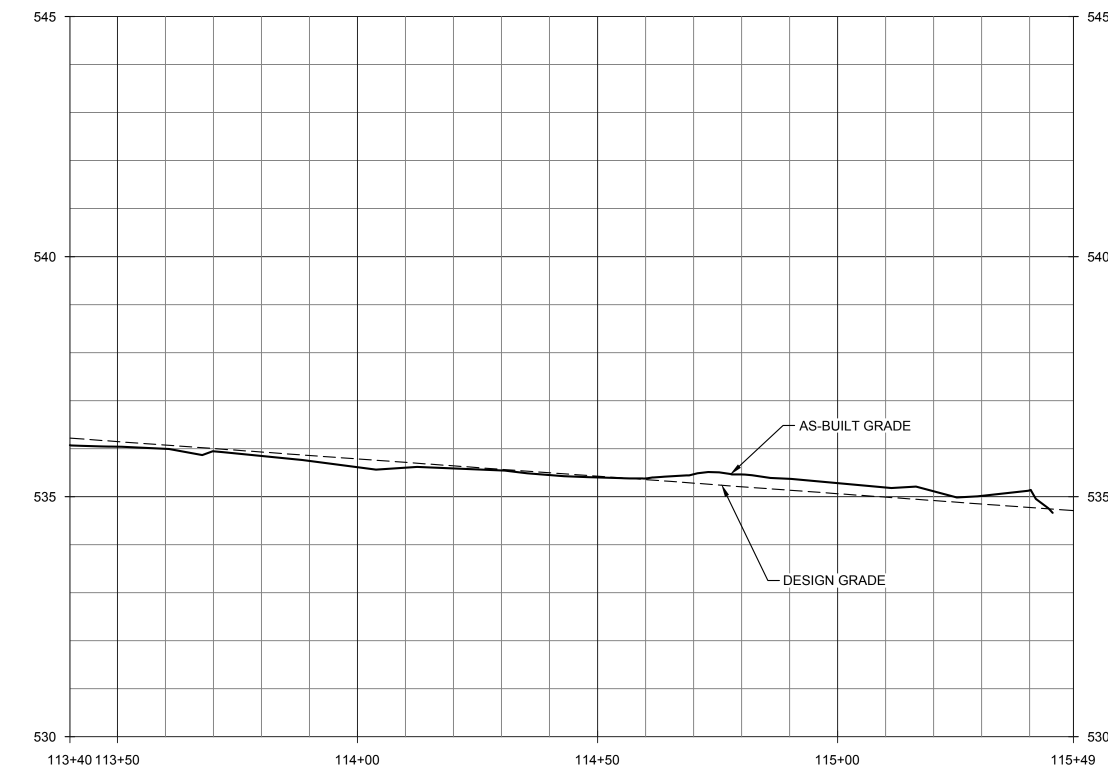

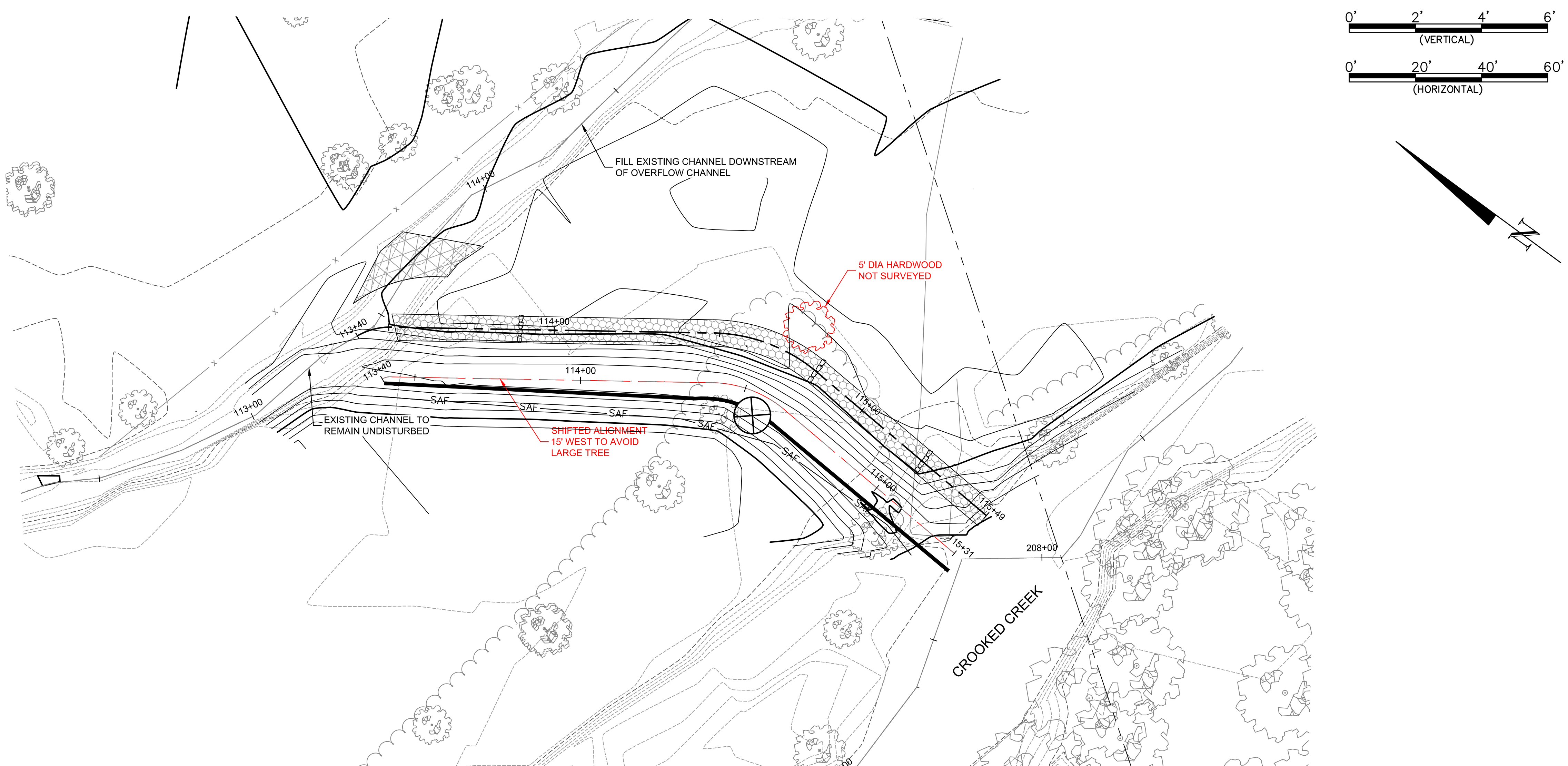

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NORTH CAROLINA PROFESSIONAL SEAL 029340 ENGINEER AARON S. EARLEY 7-15-15

Crooked Creek #2 Restoration Project
Union County, North Carolina

Overflow Channel
As-Built Stream Plan & Profile

RECORD DRAWINGS - SCO PROJECT # 09-0751301

Revisions:

Date:	July 15, 2015
Job Number:	005-02127
Project Engineer:	ASE
Drawn By:	JCK
Checked By:	AA

Sheet 2.6