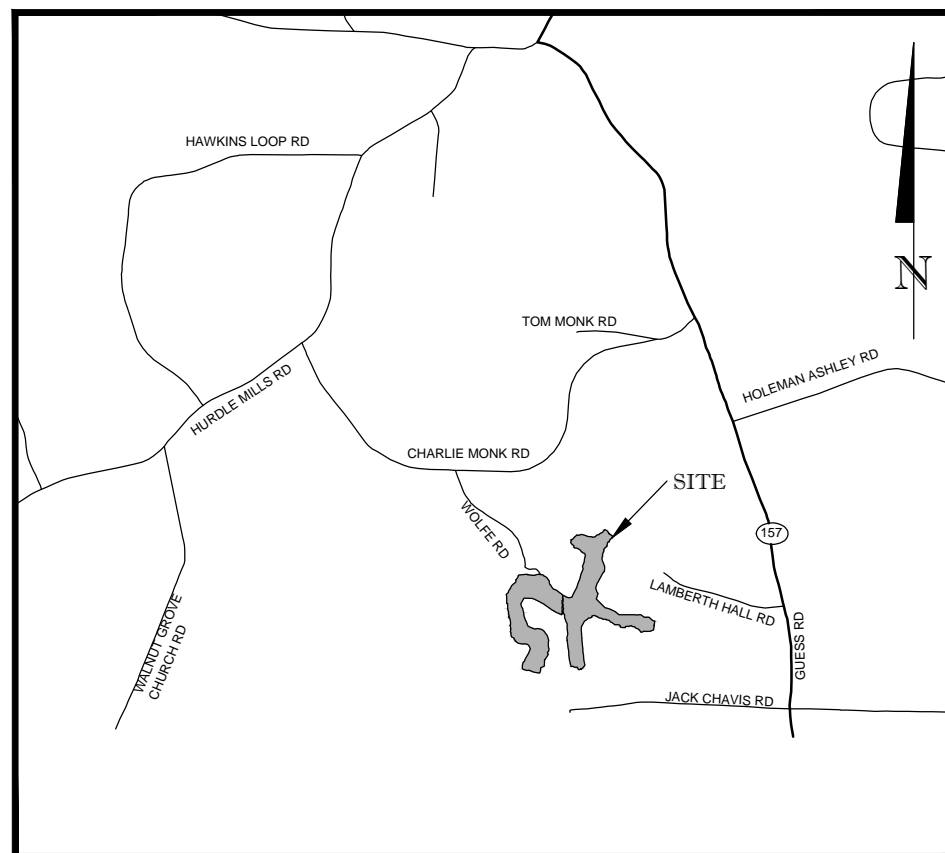


Byrds Creek Stream Restoration Project

Person County, NC

for

North Carolina Ecosystem Enhancement Program



Vicinity Map
Not to Scale



**BEFORE YOU DIG!
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N.C. ONE-CALL CENTER
IT'S THE LAW!**

Directions to Project Site

The Site is located in southwestern Person County, southwest of Roxboro. From Roxboro take Route 157 south 9.8 miles. Turn right on Charlie Monk Road. Travel 1.0 miles and turn left on Wolfe Road. Travel 0.4 miles to the end of Wolfe Road. The project site is located south and east of the end of Wolfe Road and is bound by Route 157 to the west and Walnut Grove Church Road to the east.

Record Drawing Issued
January 27, 2014

Stream Origins

Stream	Latitude	Longitude
Byrds Creek	N 36° 14' 40.01"	W 79° 02' 50.77"
South Branch	N 36° 14' 40.09"	W 79° 02' 40.89"
Southeast Branch	N 36° 14' 46.45"	W 79° 02' 28.46"
West Branch	N 36° 15' 00.74"	W 79° 02' 42.13"

Sheet Index

Title Sheet	0.1
Legend	0.2
Stream Overlay Overview	1.0
Stream Overlay Plans	2.1-2.13
Planting Plans	3.1-3.4

Project Directory

Engineering:

Wildlands Engineering, Inc
License No. F-0831
5605 Chapel Hill Road
Suite 122
Raleigh, NC 27607
Jeff Keaton, PE
919-851-9986

Surveying:

North State Environmental
2889 Lowery Street
Winston Salem, NC 27101
David K. Alley, PLS
336-245-1248

Owner:

NC Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652
Perry Sugg
919.715.1359

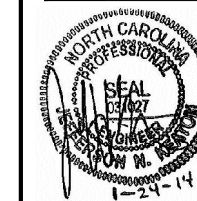
Contractor:

North State Environmental
2889 Lowery Street
Winston Salem, NC 27101
336-725-2010

EEP Project No. 95020

DENR Contract No. 003987

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ENGINEERING, INC.
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Fax: 919.851.9987
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Byrds Creek Stream Restoration Project
Person County, NC

Title Sheet

Record Drawing

Revisions












Date: 01.27.2014
Job Number: 005-02128
Project Engineer: JNK
Drawn By: CLM
Checked By: JWH

0.1

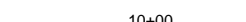
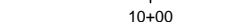













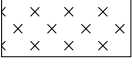

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LEGEND

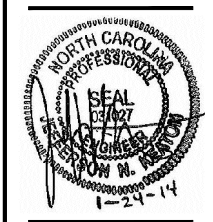
Proposed Structures

-  Proposed Stream Alignment
-  Proposed Bankfull
-  Proposed Major Contour
-  Proposed Minor Contour
-  Proposed Constructed Riffle
-  Proposed Log Sill
-  Proposed Angled Log Step Pool
-  Proposed Log J-Hook
-  Proposed Log Vane
-  Proposed Rock Cross Vane
-  Proposed Brush Toe

As-Built Structures

-  As-Built Channel Centerline - Restoration
-  As-Built Channel Centerline - Enhancement I
-  As-Built Channel Centerline - Enhancement II
-  As-Built Channel Centerline - Not for Credit
-  As-Built Bankfull
-  Conservation Easement
-  As-Built Major Contour
-  As-Built Minor Contour
-  As-Built Constructed Riffle
-  As-Built Log Sill
-  As-Built Angled Log Step Pool
-  As-Built J-Hook
-  As-Built Log Vane
-  As-Built Rock Cross Vane
-  As-Built Brush Toe
-  As-Built Boulder Toe
-  As-Built Fenceline

NOTE: FEATURES IN RED INDICATE DEVIATION FROM DESIGN PLANS.



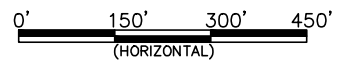
Byrds Creek Stream Restoration Project
 Person County, NC

Legend

Record Drawing

Date:	01.27.2014
Job Number:	005-02128
Project Engineer:	JNK
Drawn By:	CLM
Checked By:	JWH

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Record Drawing

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Job Number:	005-50228
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Drawn By:	CLM
Checked By:	JWH

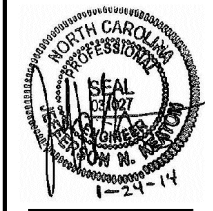
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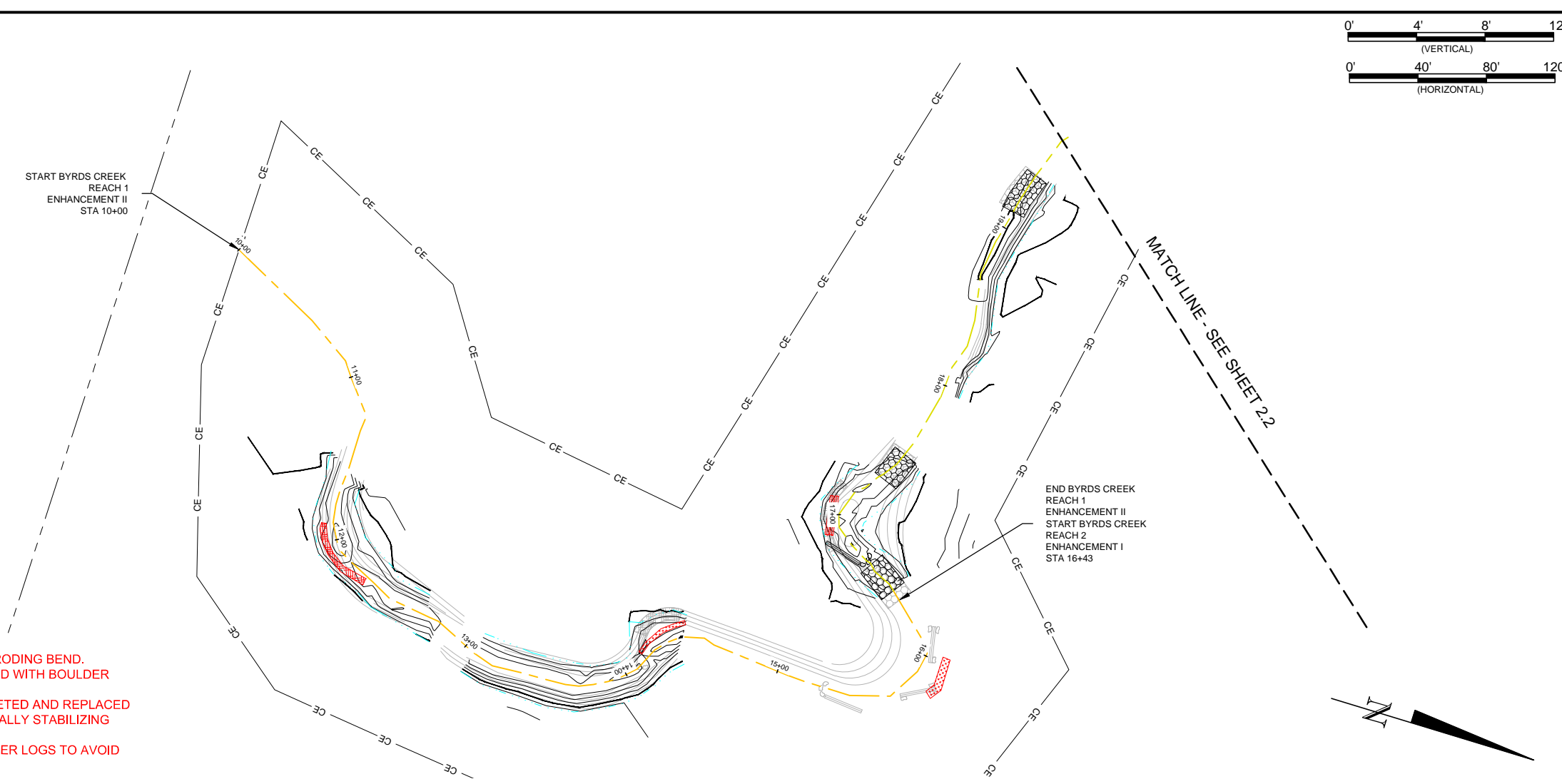
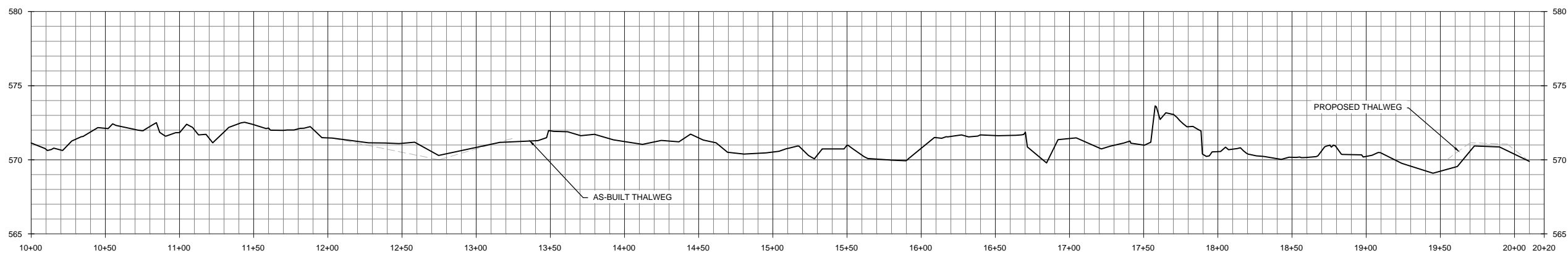
**Byrds Creek Stream Restoration Project
Person County, NC**

Stream Overlay Overview



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Raleigh, NC 27607
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Firm License No. F-0831

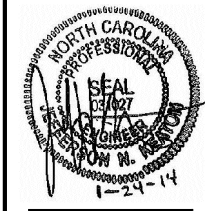
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- NOTE:**
1. AT STATION 12+00, BRUSH TOE ADDED TO STABILIZE ERODING BEND.
 2. AT STATION 14+50, BRUSH TOE DELETED AND REPLACED WITH BOULDER TOE TO AVOID IMPACTS TO SEVERAL LARGE TREES.
 3. AT STATION 15+75, LOG J-HOOK AND 2 LOG VANES DELETED AND REPLACED WITH BOULDER TOE DUE TO BEDROCK ALREADY PARTIALLY STABILIZING THIS BEND.
 4. AT STATION 17+00, BRUSH TOE REPLACED WITH 2 ROLLER LOGS TO AVOID IMPACTS TO SEVERAL LARGE TREES.

Byrds Creek Stream Restoration Project
Person County, NC
 Byrds Creek
 Stream Overlay Plans

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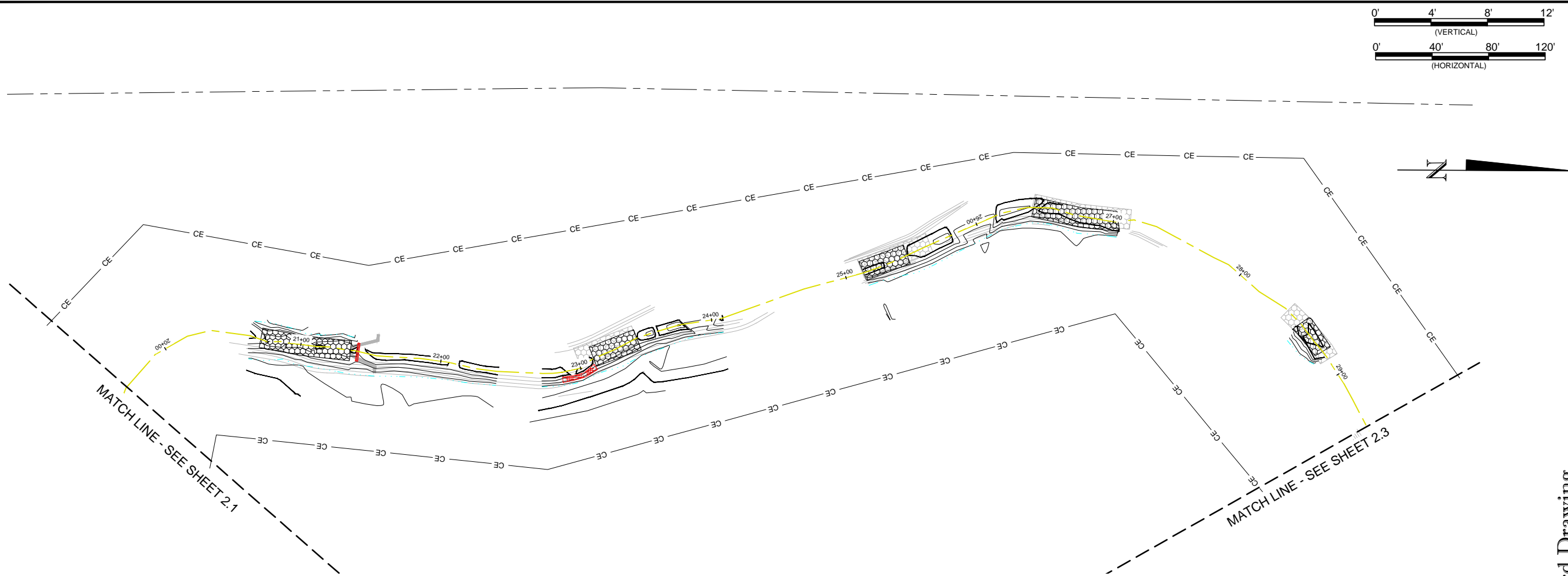
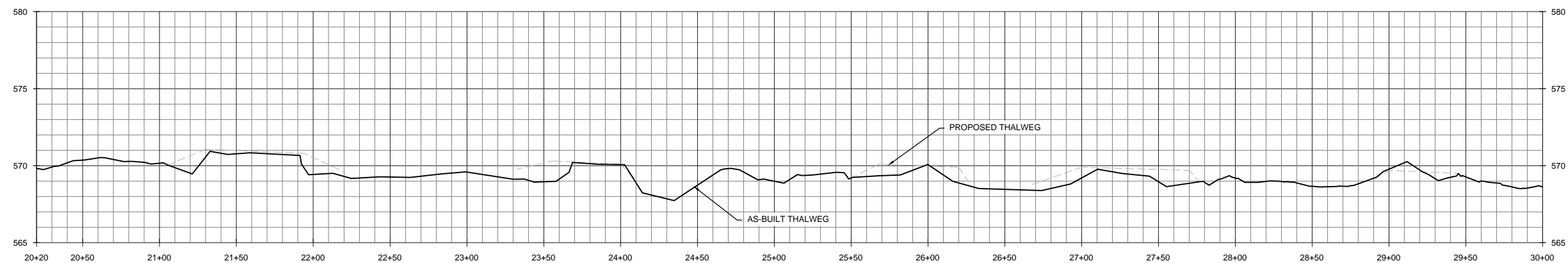
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Drawn By:	CLM
Checked By:	JWH
Revisions:	

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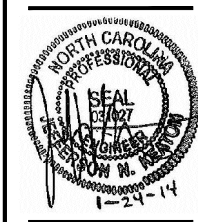
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NOTE: 1. AT STATION 21+00, COMBINED STRUCTURE CONSISTING OF JAZZ RIFFLE AND CROSS VANE DELETED AND REPLACED WITH BOULDER TAIL RIFFLE TO AVOID TREE IMPACTS.
2. AT STATION 23+00, BRUSH TOE ADDED TO STABILIZE ERODING BEND.

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Byrds Creek Stream Restoration Project
Person County, NC
 Byrds Creek
 Stream Overlay Plans

Revision	Description

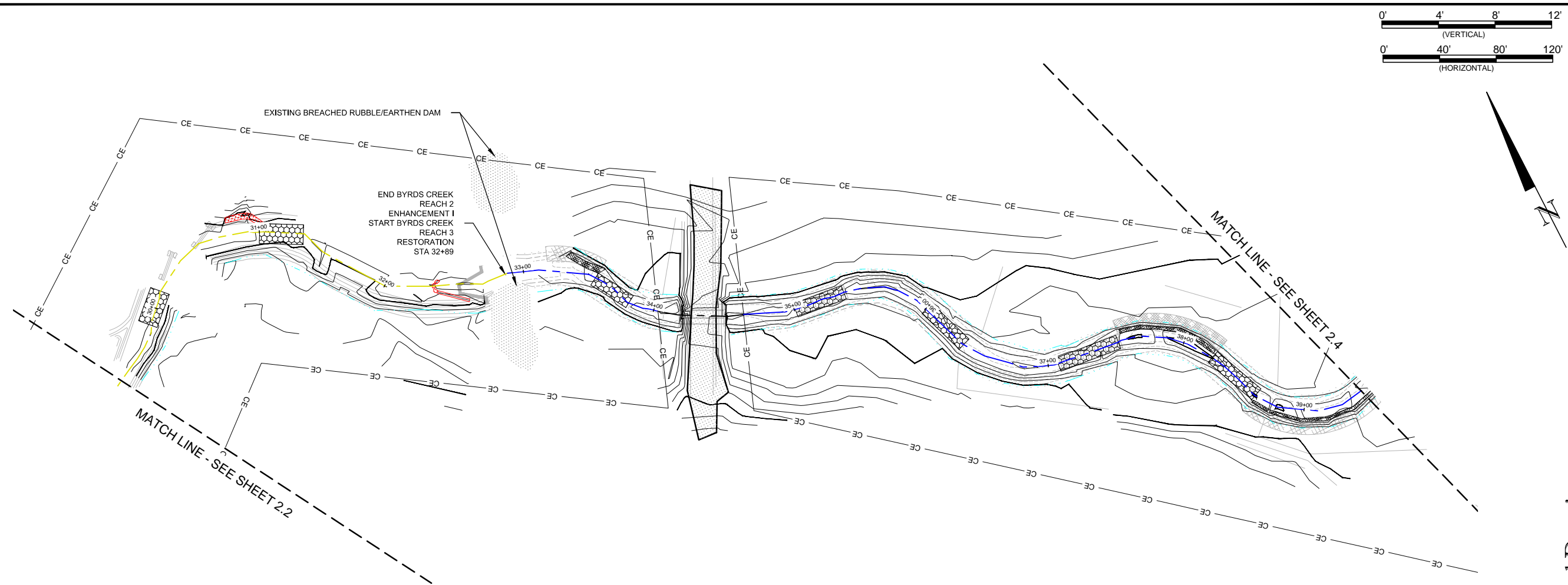
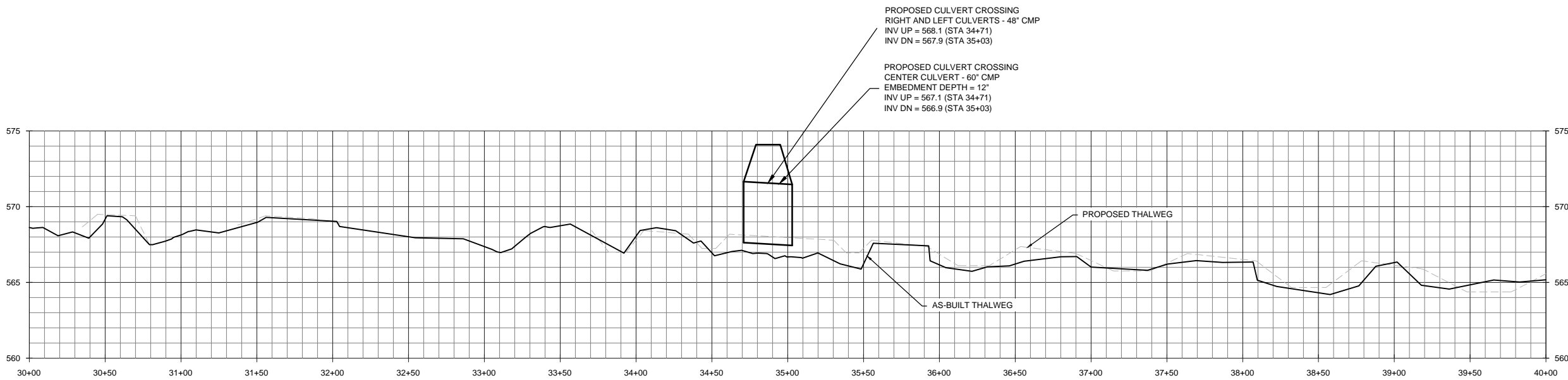
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 JNK
 CLM
 JWH



NOTE: 1. AT STATION 30+50, 2 LOG VANES DELETED AND REPLACED WITH BOULDER TOE TO AVOID IMPACTS TO SEVERAL LARGE TREES.
2. AT STATION 32+50, ROCK CROSS VANE DELETED AND REPLACED WITH BOULDER J-HOOK TO AVOID GRADING STABLE BANK.

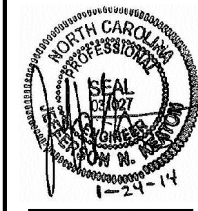
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Drawn By:	CLM
Checked By:	JWH

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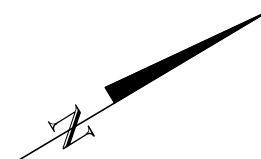
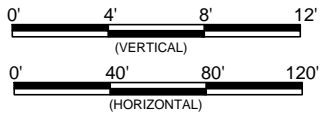
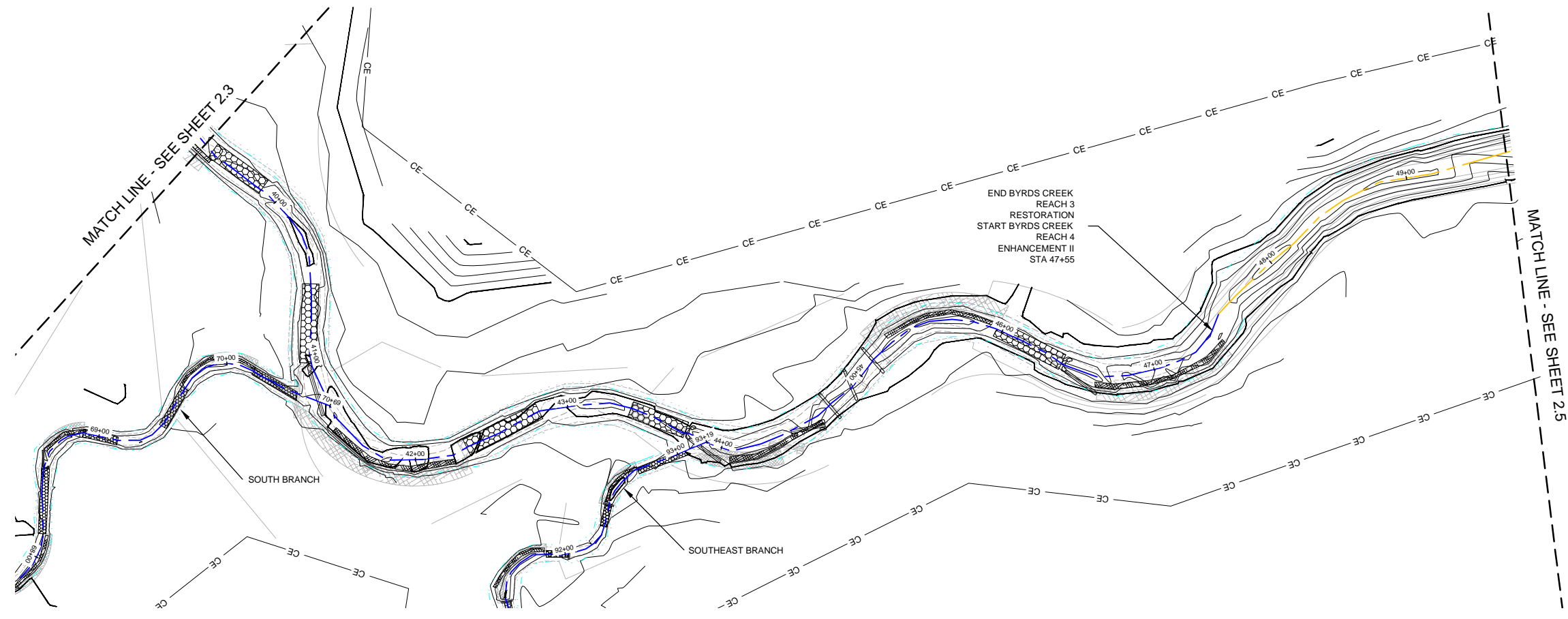
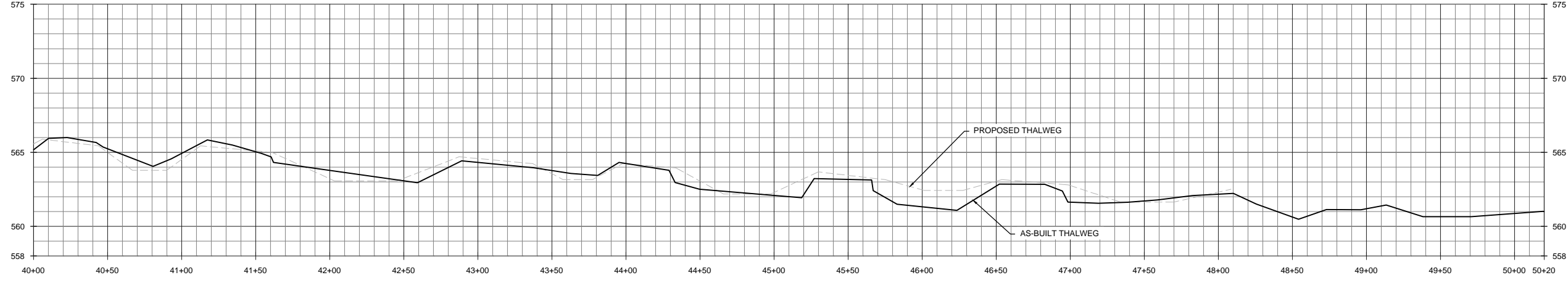
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Byrds Creek Stream Restoration Project
Person County, NC
 Byrds Creek
 Stream Overlay Plans



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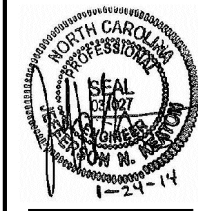
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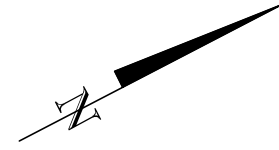
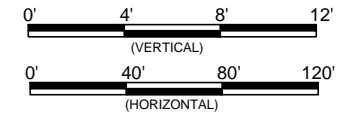
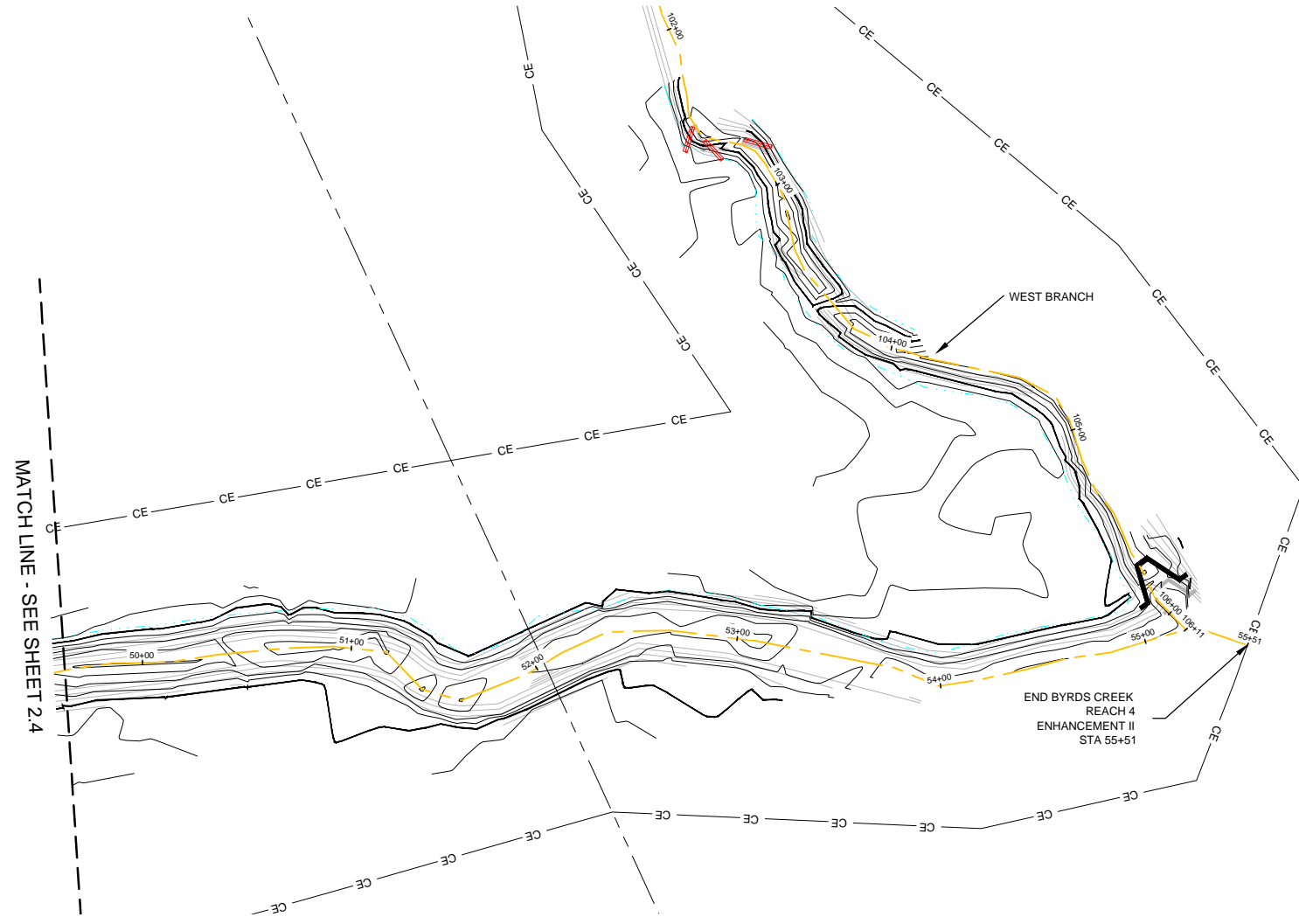
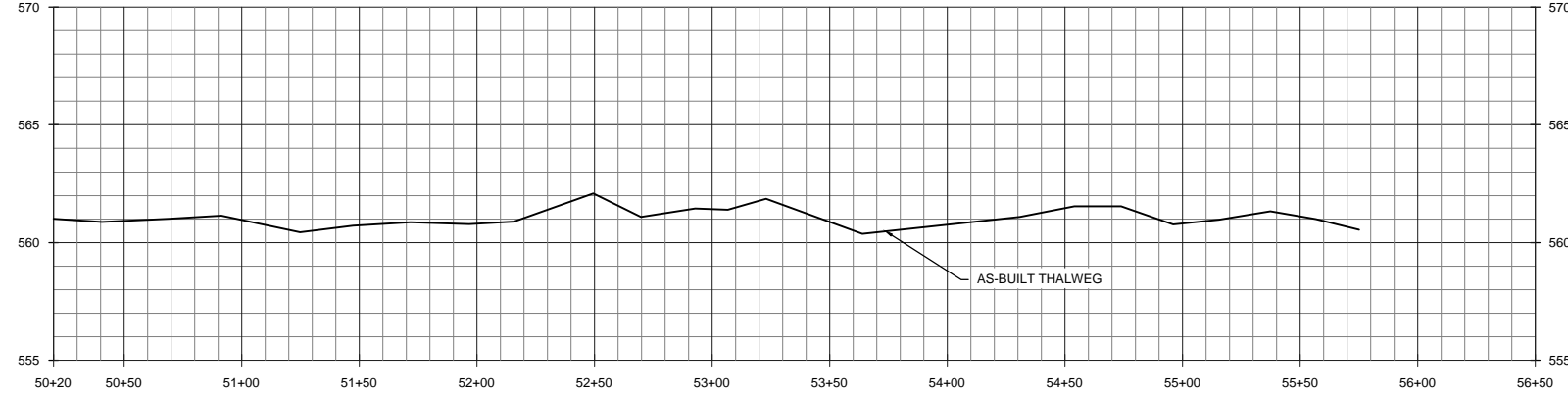
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Byrds Creek Stream Restoration Project
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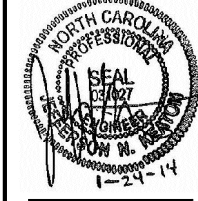
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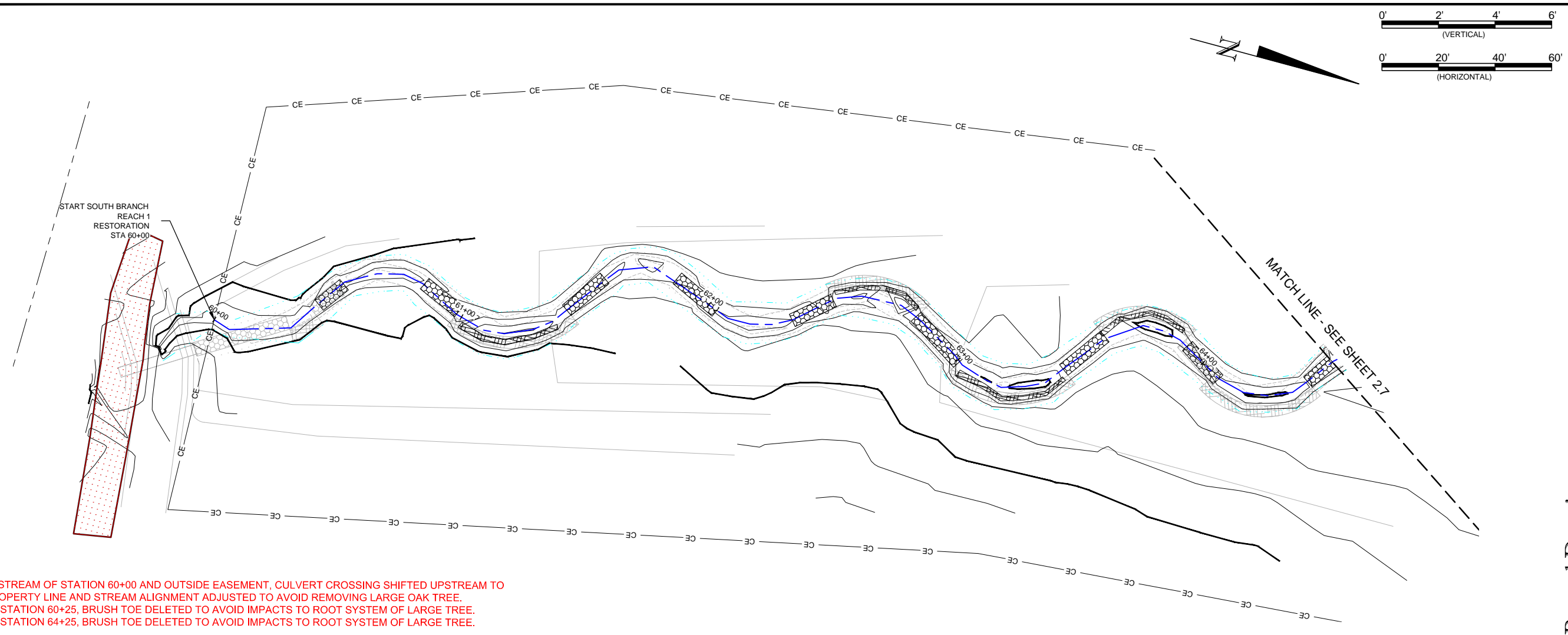
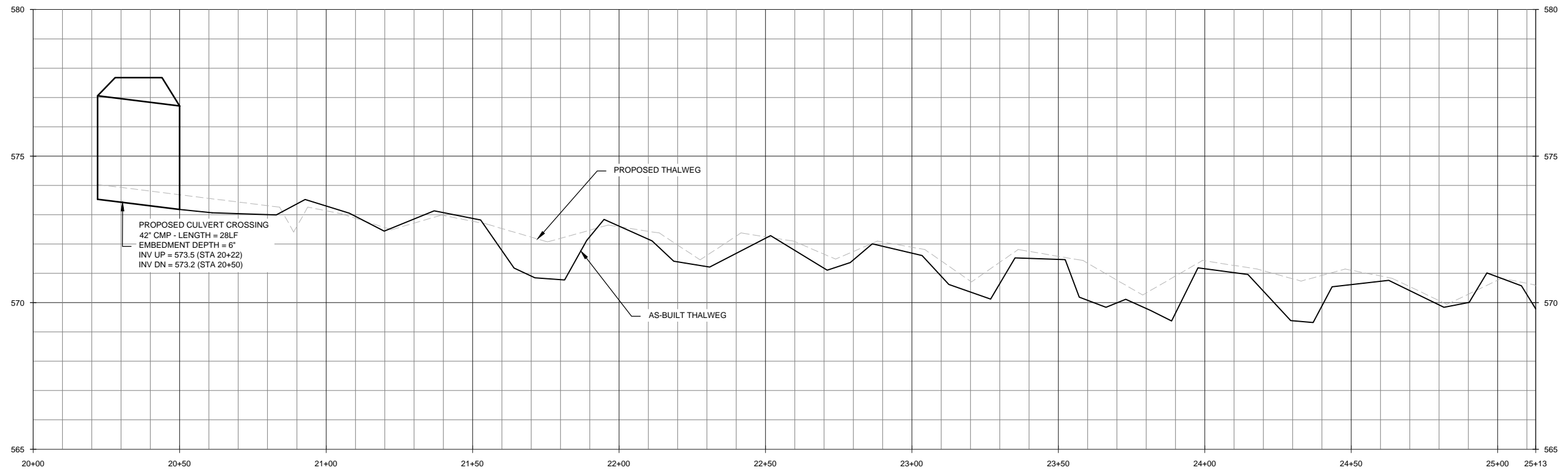
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Byrds Creek Stream Restoration Project
Person County, NC
Byrds Creek
Stream Overlay Plans



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- NOTE:**
1. UPSTREAM OF STATION 60+00 AND OUTSIDE EASEMENT, CULVERT CROSSING SHIFTED UPSTREAM TO PROPERTY LINE AND STREAM ALIGNMENT ADJUSTED TO AVOID REMOVING LARGE OAK TREE.
 2. AT STATION 60+25, BRUSH TOE DELETED TO AVOID IMPACTS TO ROOT SYSTEM OF LARGE TREE.
 3. AT STATION 64+25, BRUSH TOE DELETED TO AVOID IMPACTS TO ROOT SYSTEM OF LARGE TREE.

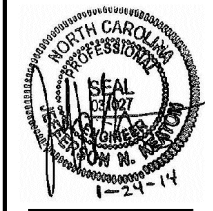
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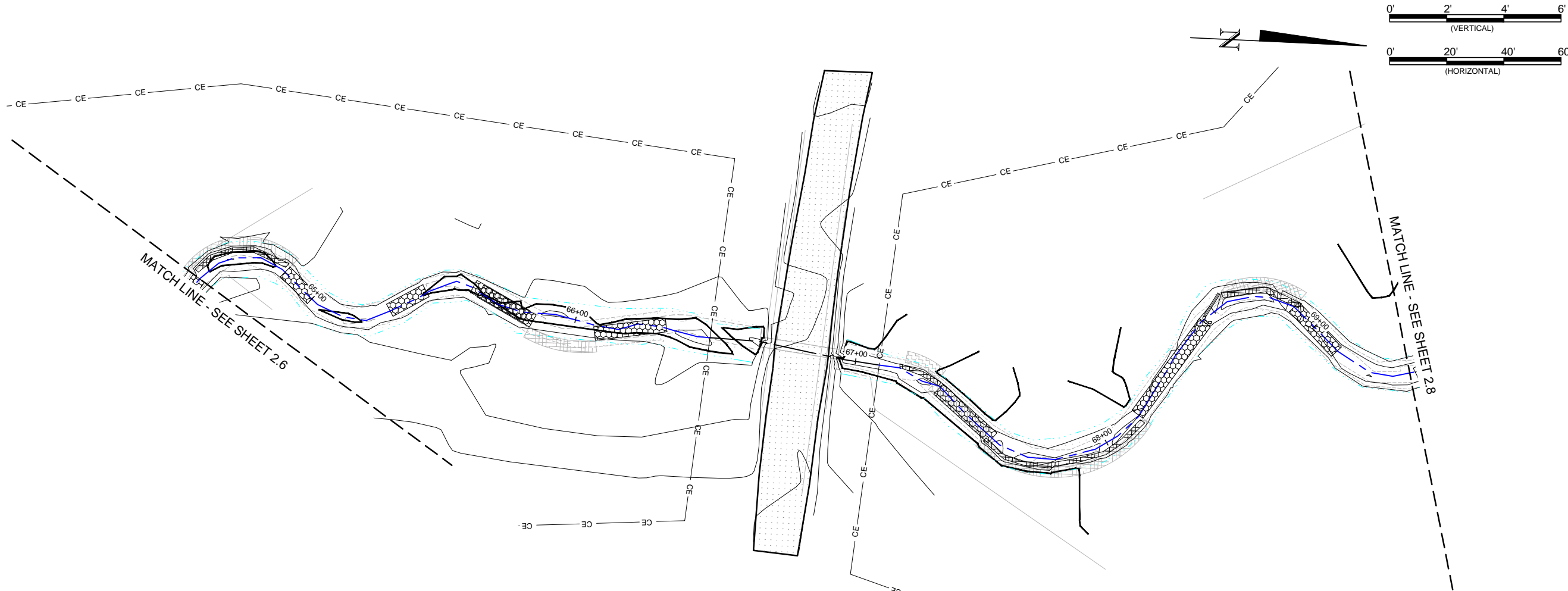
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Byrds Creek Stream Restoration Project
Person County, NC
 South Branch
 Stream Overlay Plans



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- NOTE:**
1. AT STATION 66+00, BRUSH TOE DELETED TO AVOID IMPACTS TO ROOT SYSTEM OF LARGE TREE.
 2. AT STATION 68+60, J-HOOK ADDED TO CREATE STABLE DRAINAGE POINT FOR ADJACENT WETLAND.
 3. AT STATION 80+00, CHANNEL ALIGNMENT REVISED TO CORRECT TIE IN LOCATION AT REVISED EDGE OF EASEMENT.

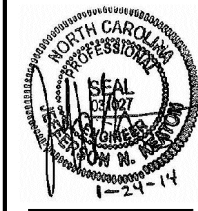
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Job Number:	005-02128
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Drawn By:	CLM
Checked By:	JWH

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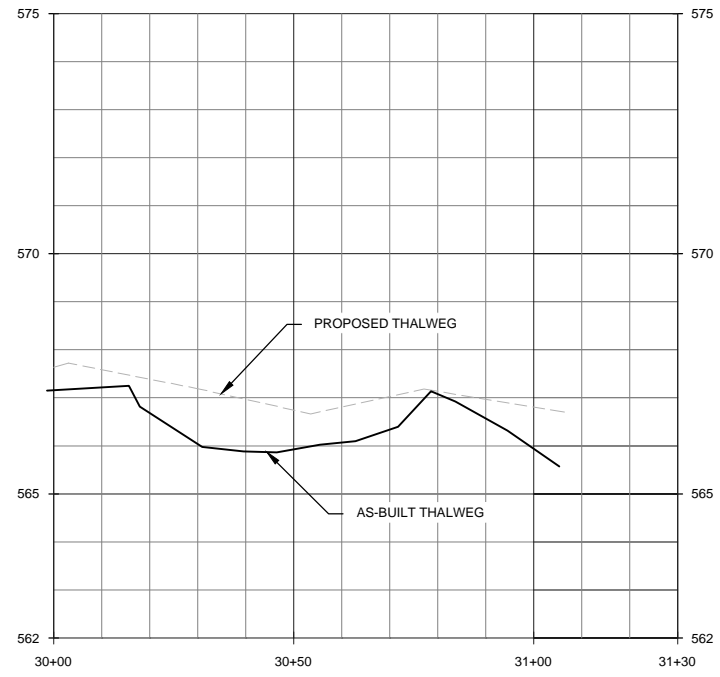
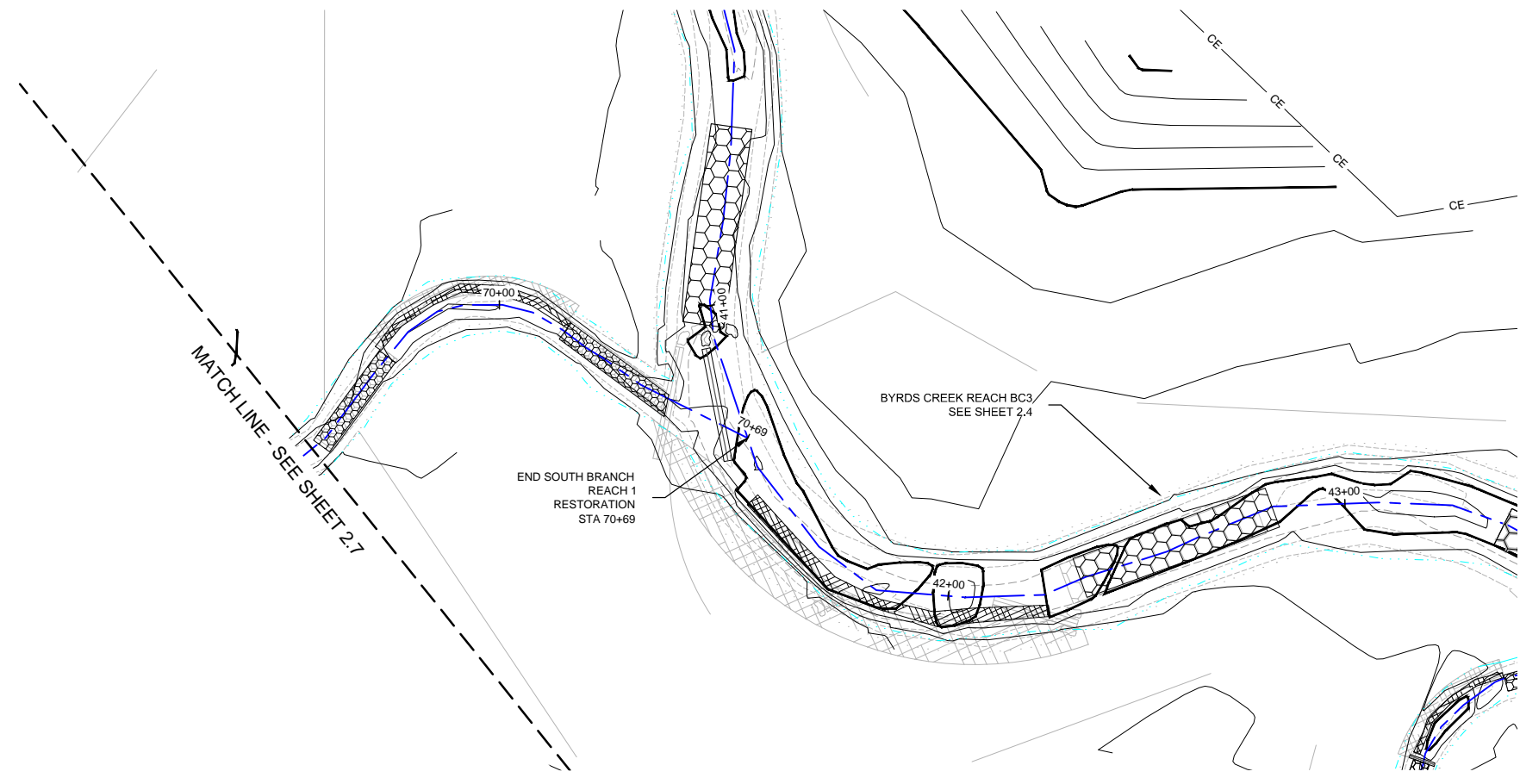
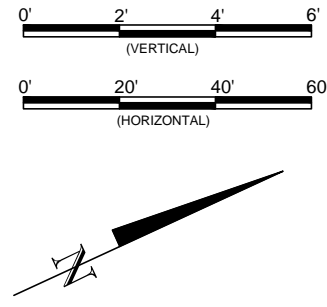
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Byrds Creek Stream Restoration Project
 Person County, NC
 South Branch
 Stream Overlay Plans



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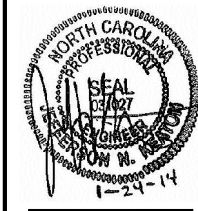
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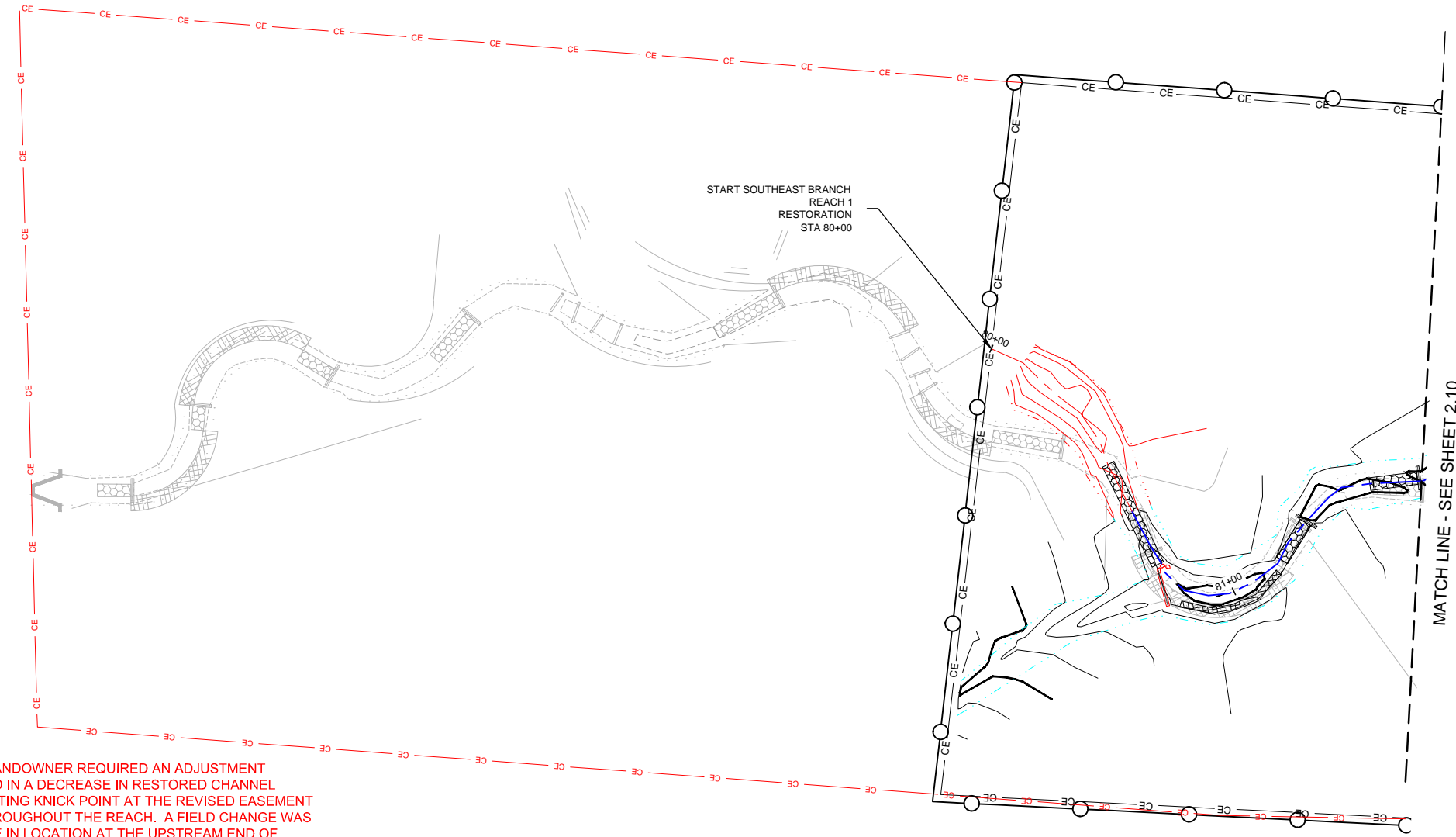
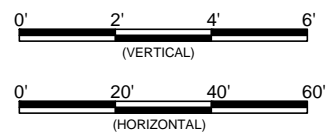
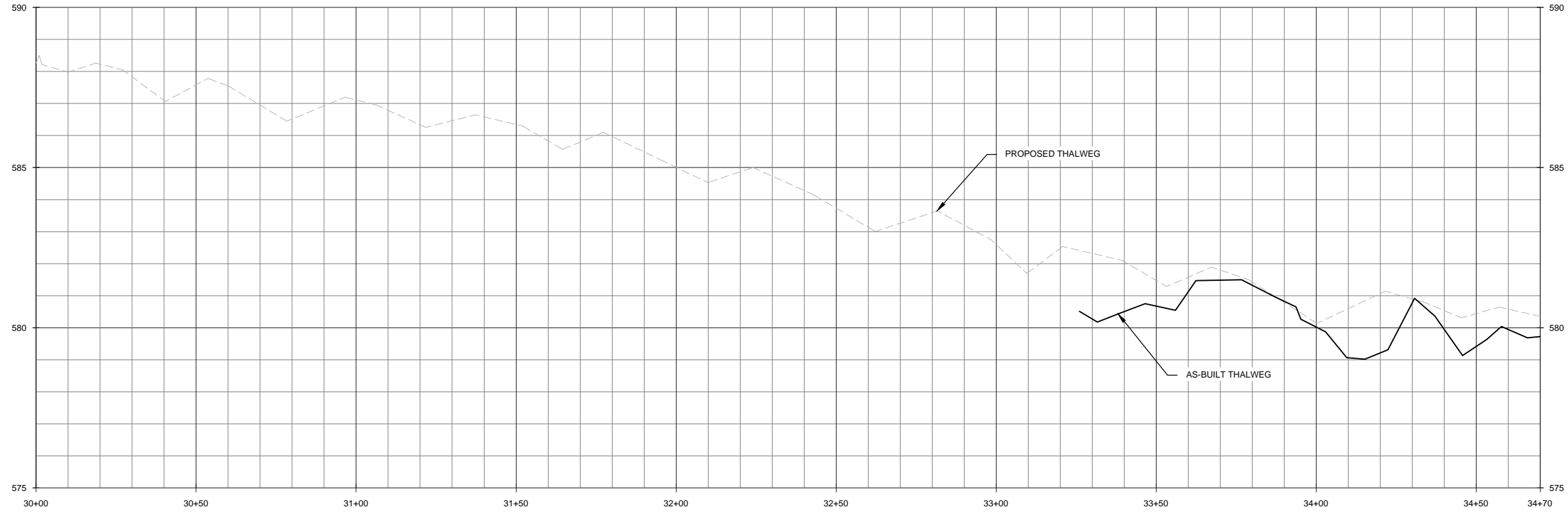
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Byrds Creek Stream Restoration Project
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NOTE: 1. DURING CONSTRUCTION, A DISAGREEMENT WITH THE LANDOWNER REQUIRED AN ADJUSTMENT TO THE EASEMENT BOUNDARY. THIS CHANGE RESULTED IN A DECREASE IN RESTORED CHANNEL LENGTH ON SOUTHEAST BRANCH OF 328 FT. A PRE-EXISTING KNICK POINT AT THE REVISED EASEMENT BOUNDARY ALLOWED FOR PRIORITY I RESTORATION THROUGHOUT THE REACH. A FIELD CHANGE WAS MADE IN THE CHANNEL ALIGNMENT TO CORRECT THE TIE IN LOCATION AT THE UPSTREAM END OF THE REACH.
 2. AT STATION 80+75, LOG VANE ADDED TO CREATE STABLE TIE IN WITH SPRING FED DRAINAGE FEATURE.

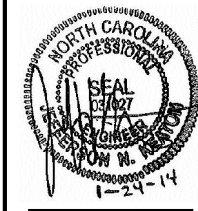
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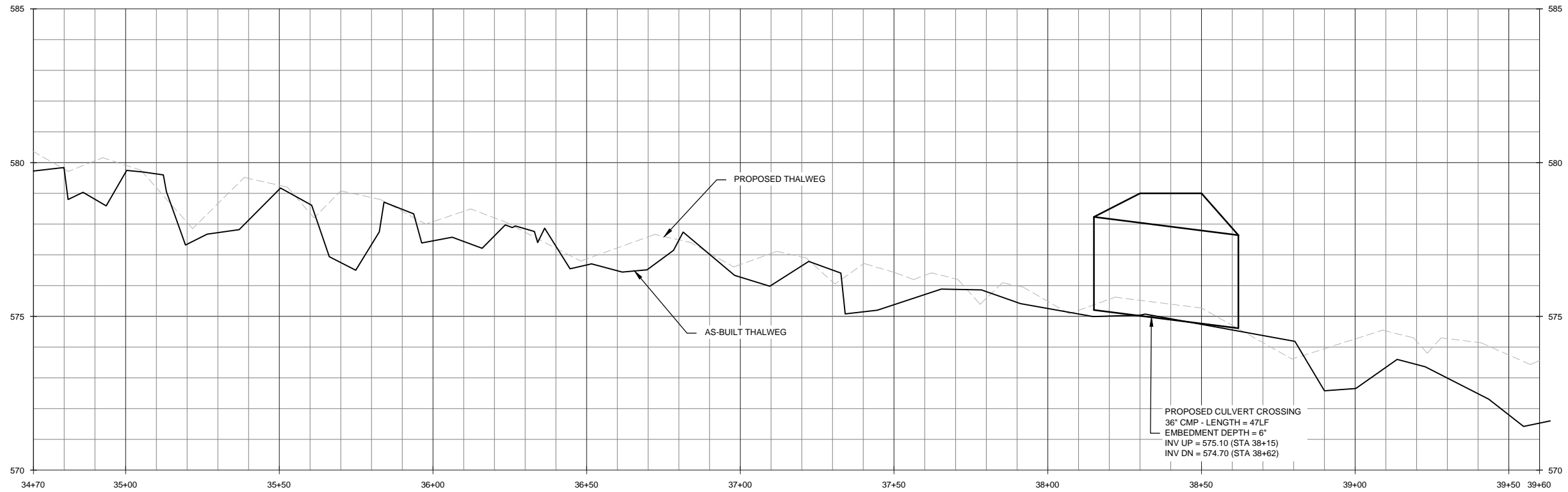
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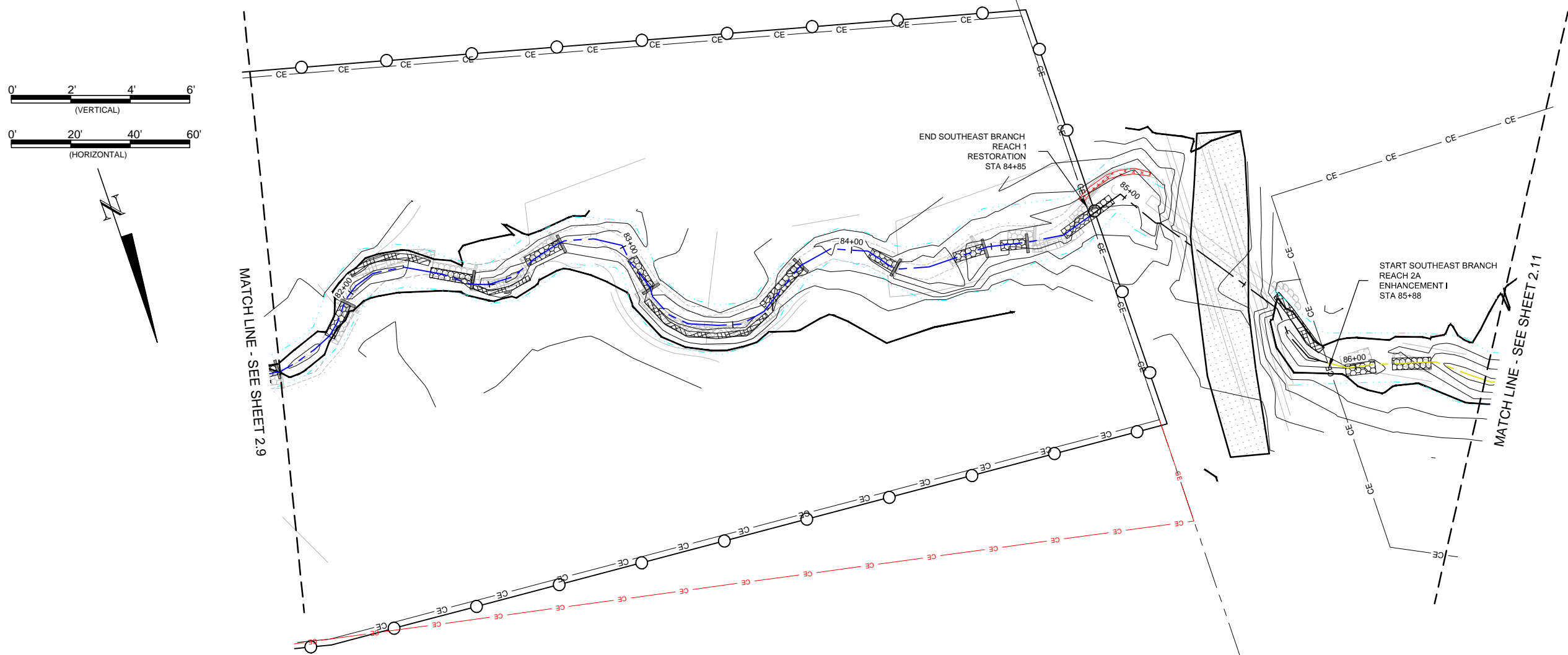
Byrds Creek Stream Restoration Project
 Person County, NC
 Southeast Branch
 Stream Overlay Plans



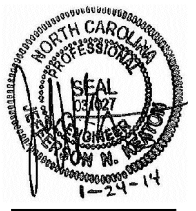
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 Fax: 919.851.9987
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NOTE: 1. POOLS WERE NOT FILLED TO DESIGN GRADE IN ENHANCEMENT I AREAS DURING CONSTRUCTION BASED ON RECENT FIELD REVIEWS OF CONSTRUCTED ENHANCEMENT REACHES.



NOTE: 1. AT STATION 84+75, BRUSH TOE DELETED TO AVOID IMPACTS TO ROOT SYSTEM OF LARGE TREE.
 2. AT STATION 85+00, J-HOOK DELETED AND REPLACED WITH BOULDER TOE TO AVOID REMOVING SEVERAL TREES.



Byrds Creek Stream Restoration Project
 Person County, NC
 Southeast Branch
 Stream Overlay Plans

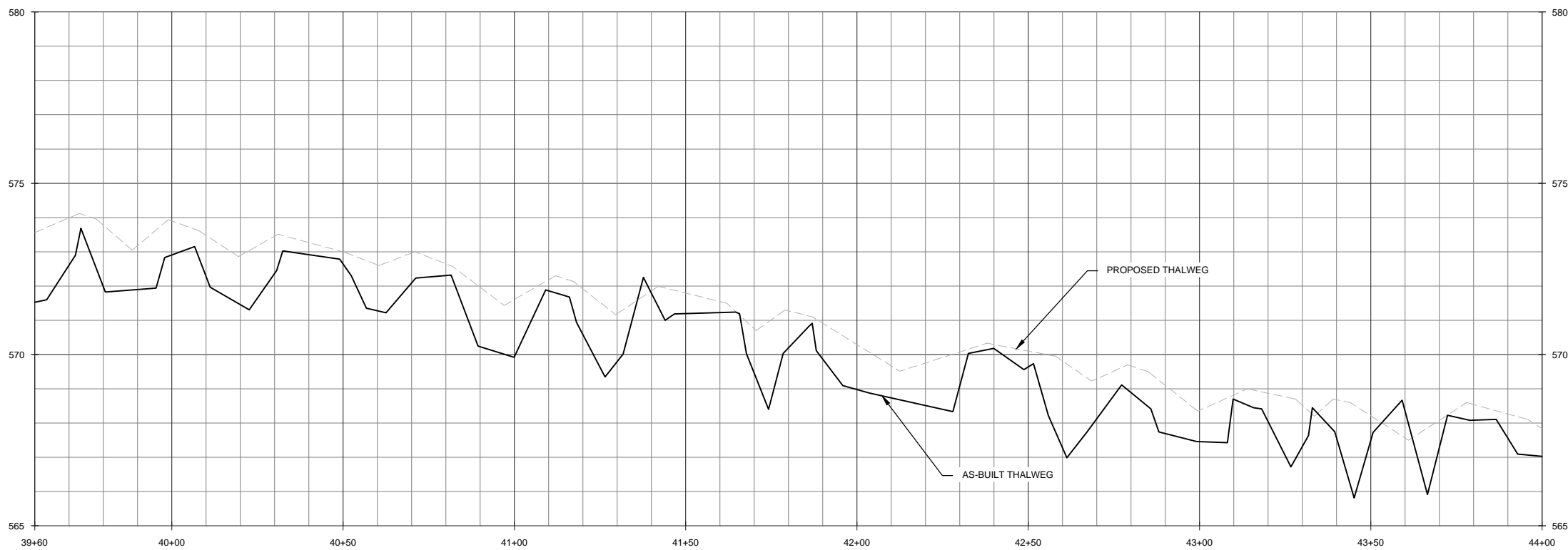
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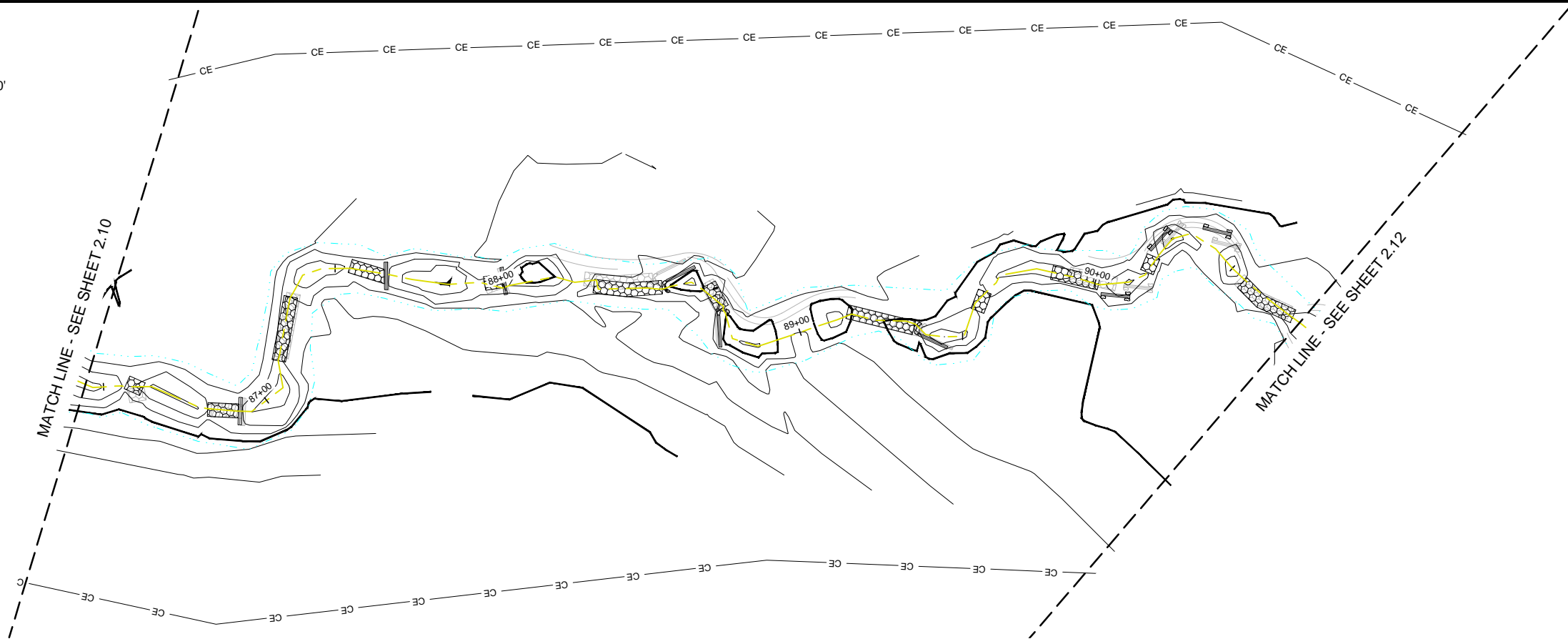
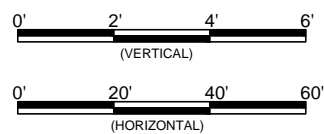
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Checked By:	JWH

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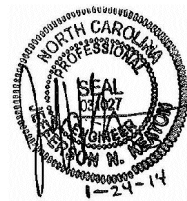
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NOTE: 1. POOLS WERE NOT FILLED TO DESIGN GRADE IN ENHANCEMENT I AREAS DURING CONSTRUCTION BASED ON RECENT FIELD REVIEWS OF CONSTRUCTED ENHANCEMENT REACHES.



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 CONSULTANTS
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 Fax: 919.851.9987
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Byrds Creek Stream Restoration Project
 Person County, NC
 Southeast Branch
 Stream Overlay Plans

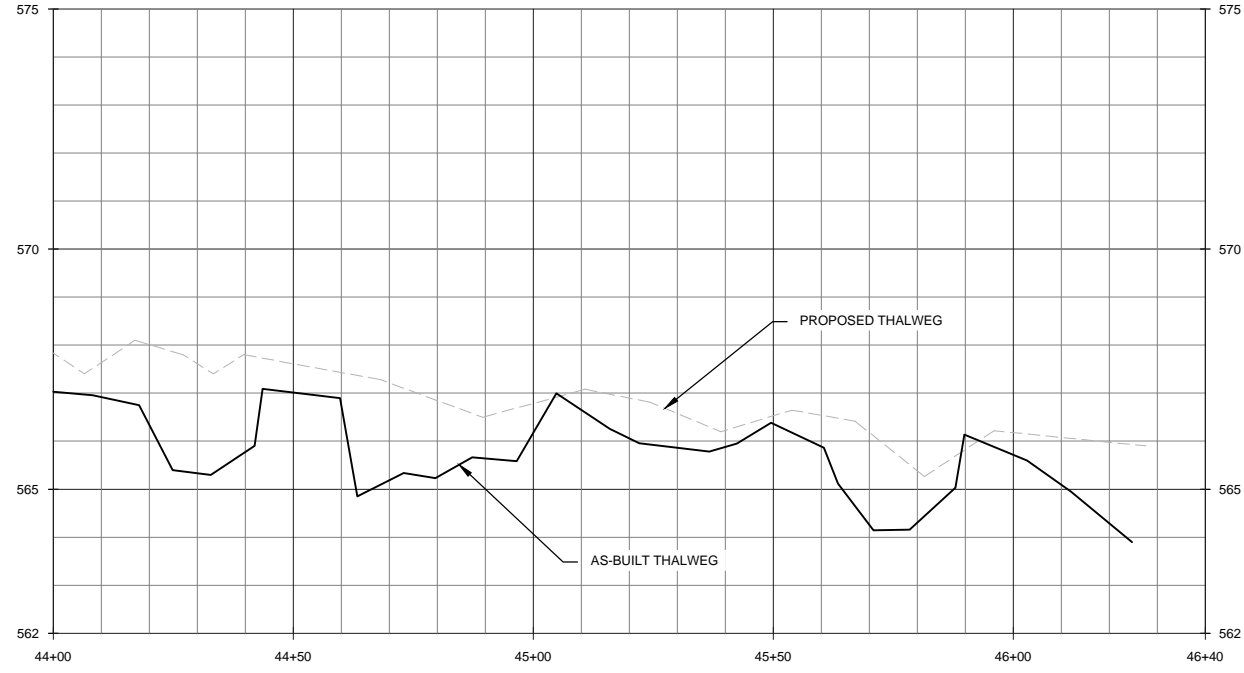
Revision	Date	By

Date: 01.27.2014
 Job Number: 005-02128
 Project Engineer: JNK
 Drawn By: CLM
 Checked By: JWH

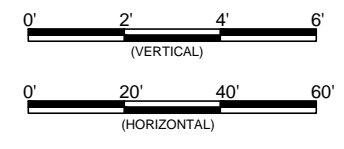
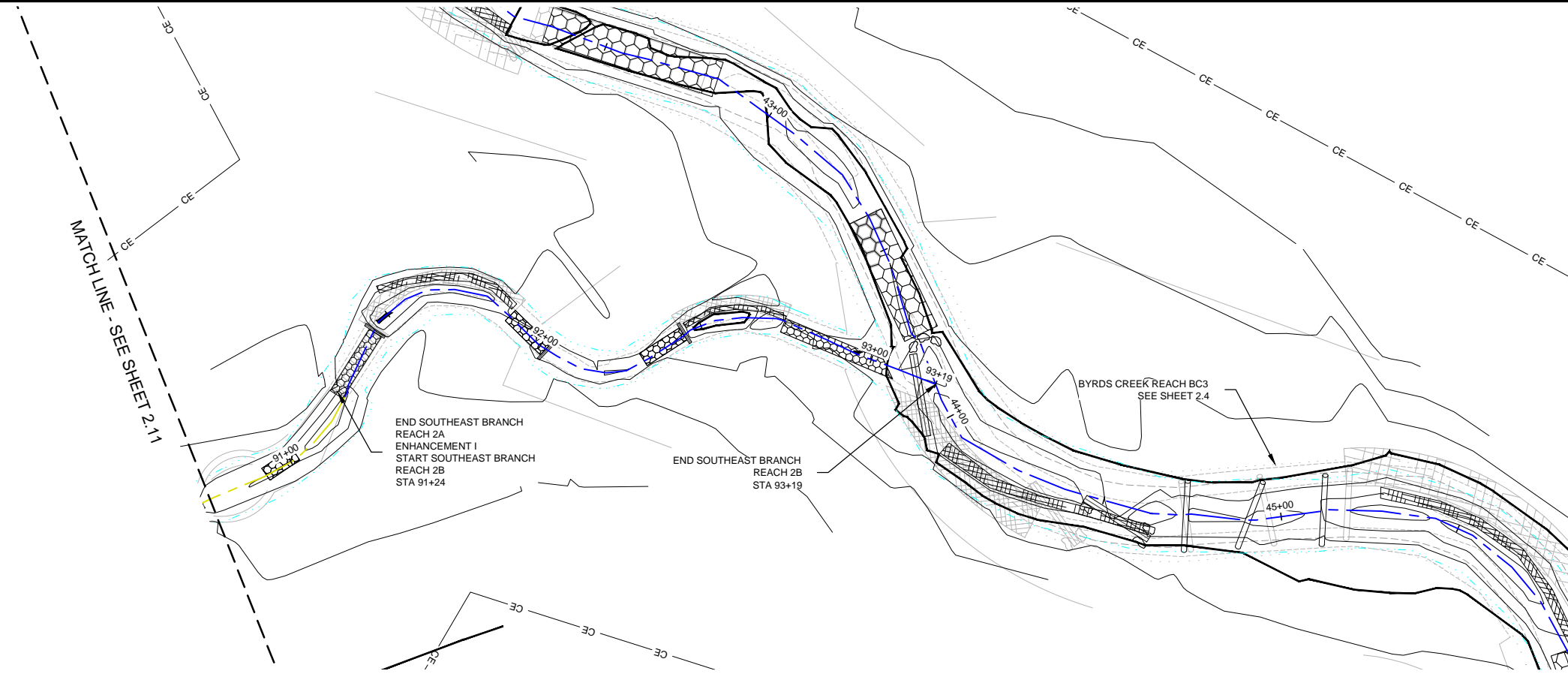
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Record Drawing

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NOTE: 1. POOLS WERE NOT FILLED TO DESIGN GRADE IN ENHANCEMENT I AREAS DURING CONSTRUCTION BASED ON RECENT FIELD REVIEWS OF CONSTRUCTED ENHANCEMENT REACHES.



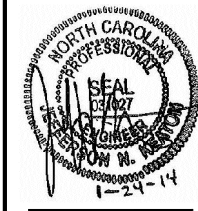
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Date:	01/27/2014
Job Number:	005-02128
Project Engineer:	JNSK
Drawn By:	CLM
Checked By:	JWH

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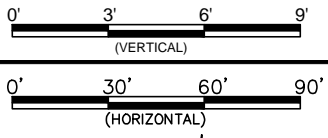
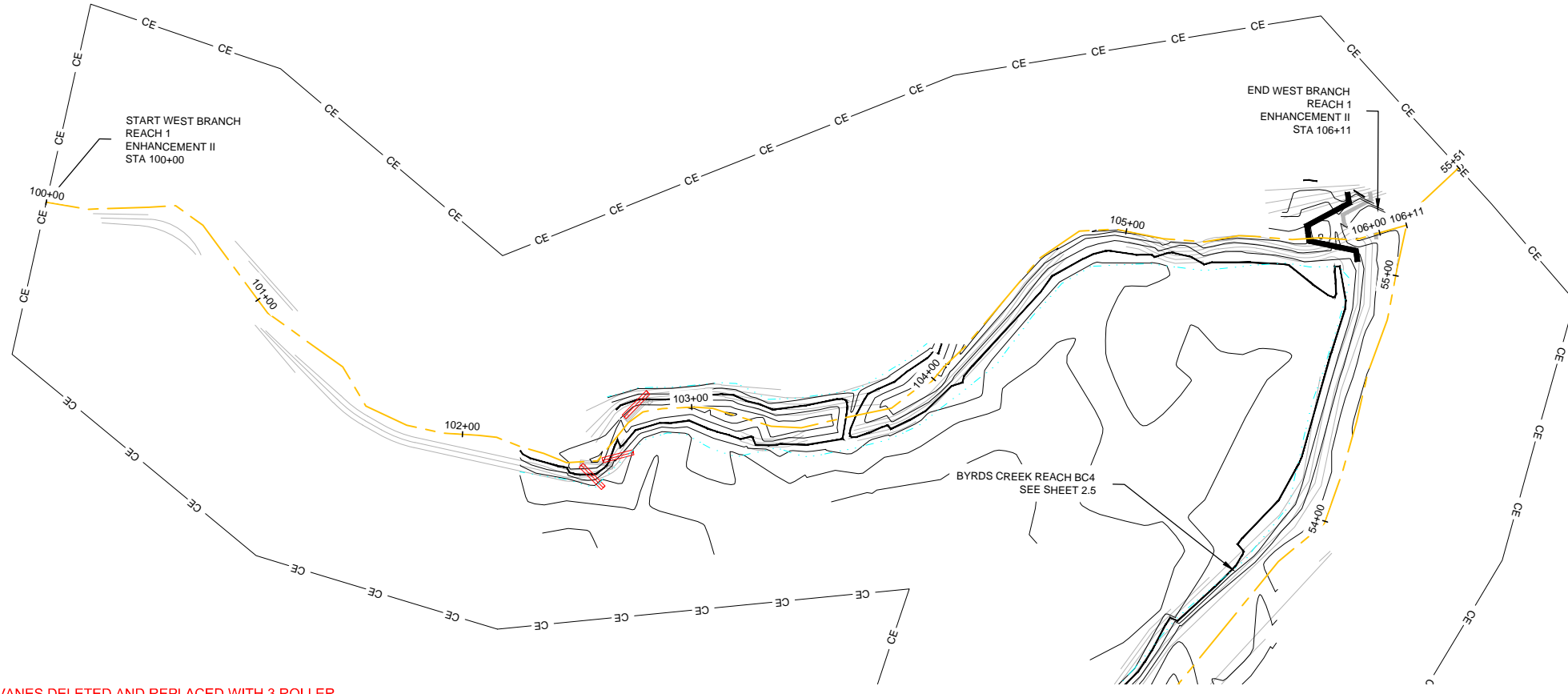
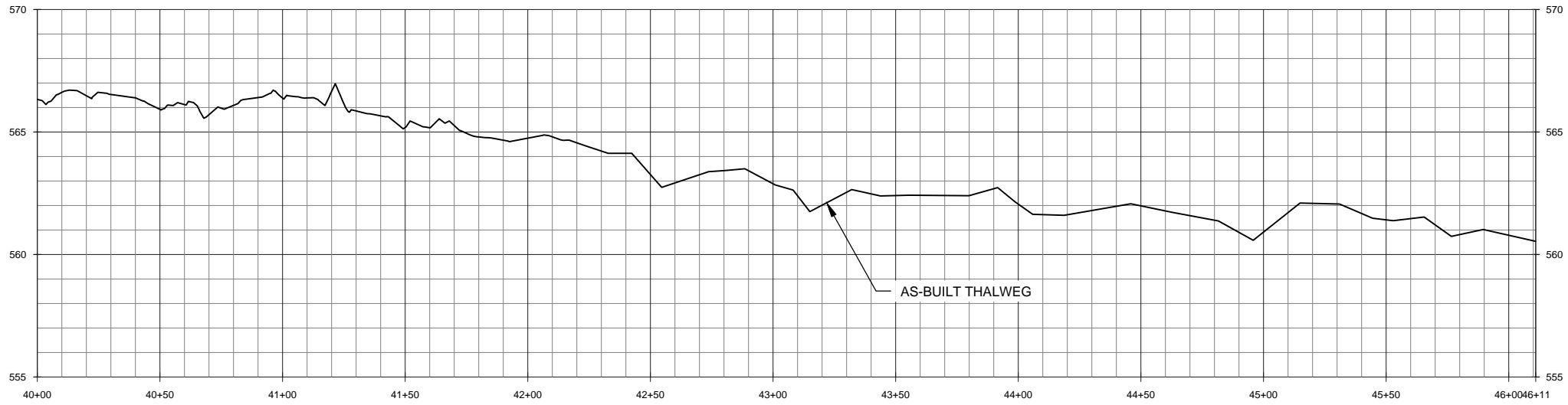
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Byrds Creek Stream Restoration Project
 Person County, NC
 Southeast Branch
 Stream Overlay Plans



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NOTE: 1. BETWEEN STATION 102+50 AND 102+75, 2 LOG VANES DELETED AND REPLACED WITH 3 ROLLER LOGS AND ADDITIONAL TRANSPLANTS TO WORK WITHIN EXISTING CHANNEL GEOMETRY.

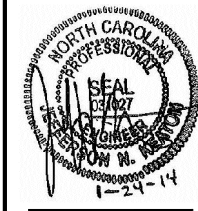
Record Drawing

Date:	01/27/2014
Job Number:	005-02128
Project Engineer:	JNSK
Drawn By:	CLM
Checked By:	JWH

2.13

Sheet

Byrds Creek Stream Restoration Project
Person County, NC
West Branch
Stream Overlay Plans



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STREAMBANK PLANTING ZONE					
Live Stakes and Herbaceous Plugs (~5,000--4,500 linear foot planting area)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Size	# Plants
<i>Cornus amomum</i>	Silky Dogwood	3 ft	3 ft	0.5"-1.0" cal.	600 500
<i>Cornus sericea</i>	Redoiser Dogwood	3 ft	3 ft	0.5"-1.0" cal.	600 500
<i>Salix sericea</i>	Silky Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	1100 900
<i>Salix nigra</i>	Black Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	200 200
<i>Juncus effusus</i>	Common Rush	5 ft	5 ft	1"-2" plug	1100 800

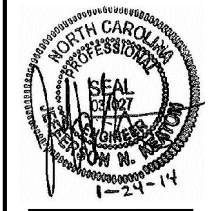
Bare Root (Planting Area = 15.6--14.3 acres planted at 605 stems / acre)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper	#
<i>Cercis canadensis</i>	American Redbud	12 ft	6-12 ft	0.25"-1.0"	500
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"	1500
<i>Quercus phellos</i>	Willow Oak	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Plantus occidentalis</i>	Sycamore	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Betula nigra</i>	River Birch	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Quercus michauxii</i>	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"	500
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Quercus rubra</i>	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"	500

PERMANENT RIPARIAN SEED PLANTING ZONE		
Pure Live Seed (Planting area = 15.1--14.3 acres)		
Species Name	Common Name	lbs/acre
<i>Agrostis stolonifera</i>	Creeping bentgrass	2.0
<i>Andropogon ternarius</i>	Split beardgrass	0.4
<i>Bouteloua curtipendula</i>	Side oats grama	2.8
<i>Bouteloua gracilis</i>	Blue grama	3.6
<i>Panicum clandestinum</i>	Deer tongue	3.6
<i>Schizachyrium scoparium</i>	Little bluestem	2.8
<i>Sporobolus clandestinus</i>	Rough dropseed	1.6
<i>Vicia villosa</i>	Hairy vetch	0.8
<i>Chasmanthium latifolium</i>	River Oats	1.6
<i>Carex vulpinoidea</i>	Fox sedge	0.8

NOTE: Herbaceous Plugs to be planted along tangent (riffle) sections and inner meander bends without structures along restoration reaches only.



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Byrds Creek Stream Restoration Project
 Person County, NC
 Byrds Creek
 Planting

Revisions	

Date: 01.27.2014
 Job Number: 005-02128
 Project Engineer: JNSK
 Drawn By: CLM
 Checked By: JWH

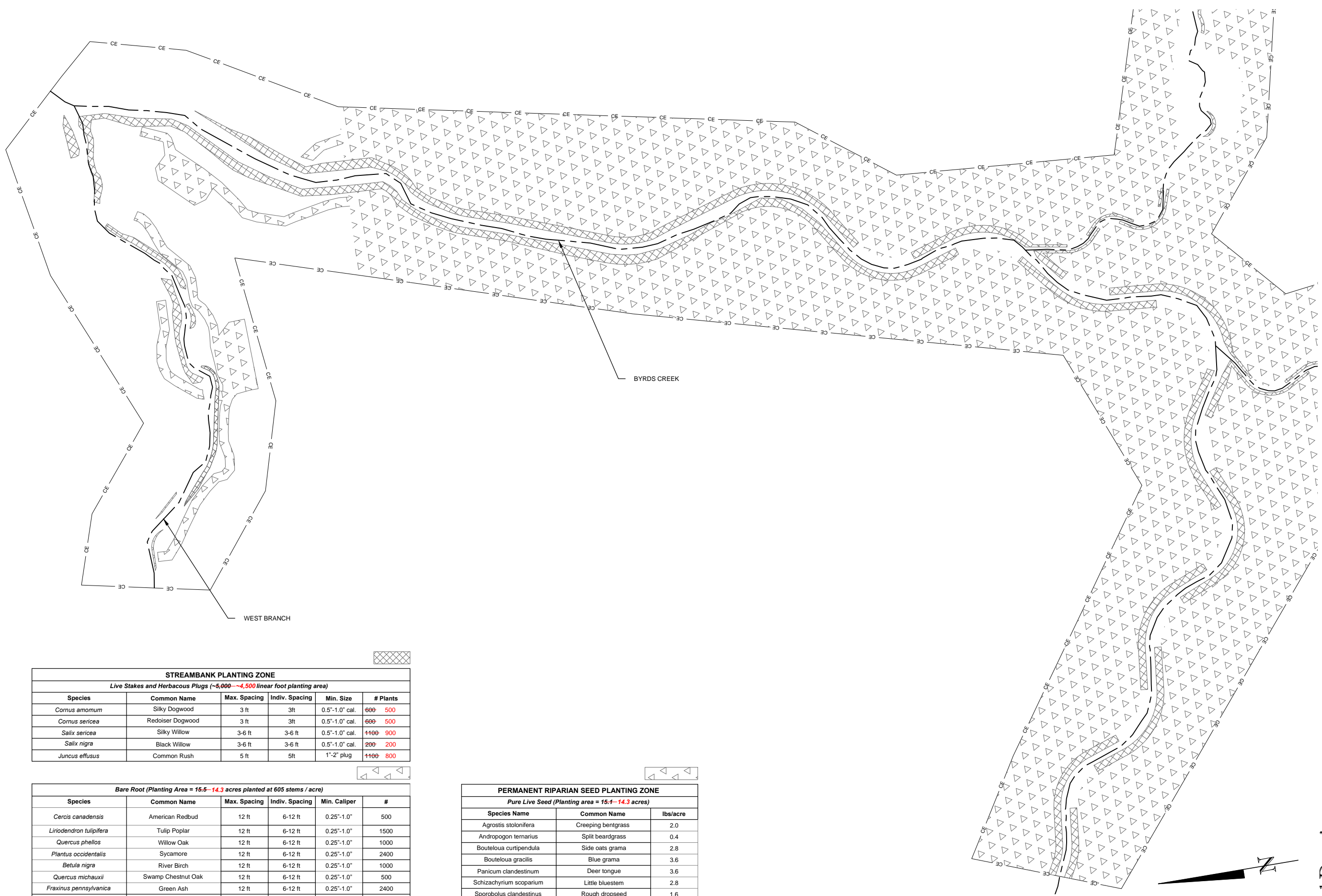
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Record Drawing

January 24, 2014



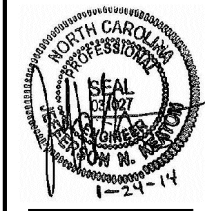
STREAMBANK PLANTING ZONE					
Live Stakes and Herbaceous Plugs (~5,000-4,500 linear foot planting area)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Size	# Plants
<i>Cornus amomum</i>	Silky Dogwood	3 ft	3ft	0.5"-1.0" cal.	600 500
<i>Cornus sericea</i>	Redoiser Dogwood	3 ft	3ft	0.5"-1.0" cal.	600 500
<i>Salix sericea</i>	Silky Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	4100 900
<i>Salix nigra</i>	Black Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	200 200
<i>Juncus effusus</i>	Common Rush	5 ft	5ft	1"-2" plug	4100 800

Bare Root (Planting Area = 15.5-14.3 acres planted at 605 stems / acre)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper	#
<i>Cercis canadensis</i>	American Redbud	12 ft	6-12 ft	0.25"-1.0"	500
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"	1500
<i>Quercus phellos</i>	Willow Oak	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Plantus occidentalis</i>	Sycamore	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Betula nigra</i>	River Birch	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Quercus michauxii</i>	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"	500
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Quercus rubra</i>	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"	500

PERMANENT RIPARIAN SEED PLANTING ZONE		
Pure Live Seed (Planting area = 15.4-14.3 acres)		
Species Name	Common Name	lbs/acre
<i>Agrostis stolonifera</i>	Creeping bentgrass	2.0
<i>Andropogon ternarius</i>	Split beardgrass	0.4
<i>Bouteloua curtipendula</i>	Side oats grama	2.8
<i>Bouteloua gracilis</i>	Blue grama	3.6
<i>Panicum clandestinum</i>	Deer tongue	3.6
<i>Schizachyrium scoparium</i>	Little bluestem	2.8
<i>Sporobolus clandestinus</i>	Rough dropseed	1.6
<i>Vicia villosa</i>	Hairy vetch	0.8
<i>Chasmanthium latifolium</i>	River Oats	1.6
<i>Carex vulpinoidea</i>	Fox sedge	0.8

NOTE: Herbaceous Plugs to be planted along tangent (riffle) sections and inner meander bends without structures along restoration reaches only.

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Byrds Creek Stream Restoration Project
 Person County, NC
 Byrds Creek & West Branch
 Planting

Revisions	
No.	Description

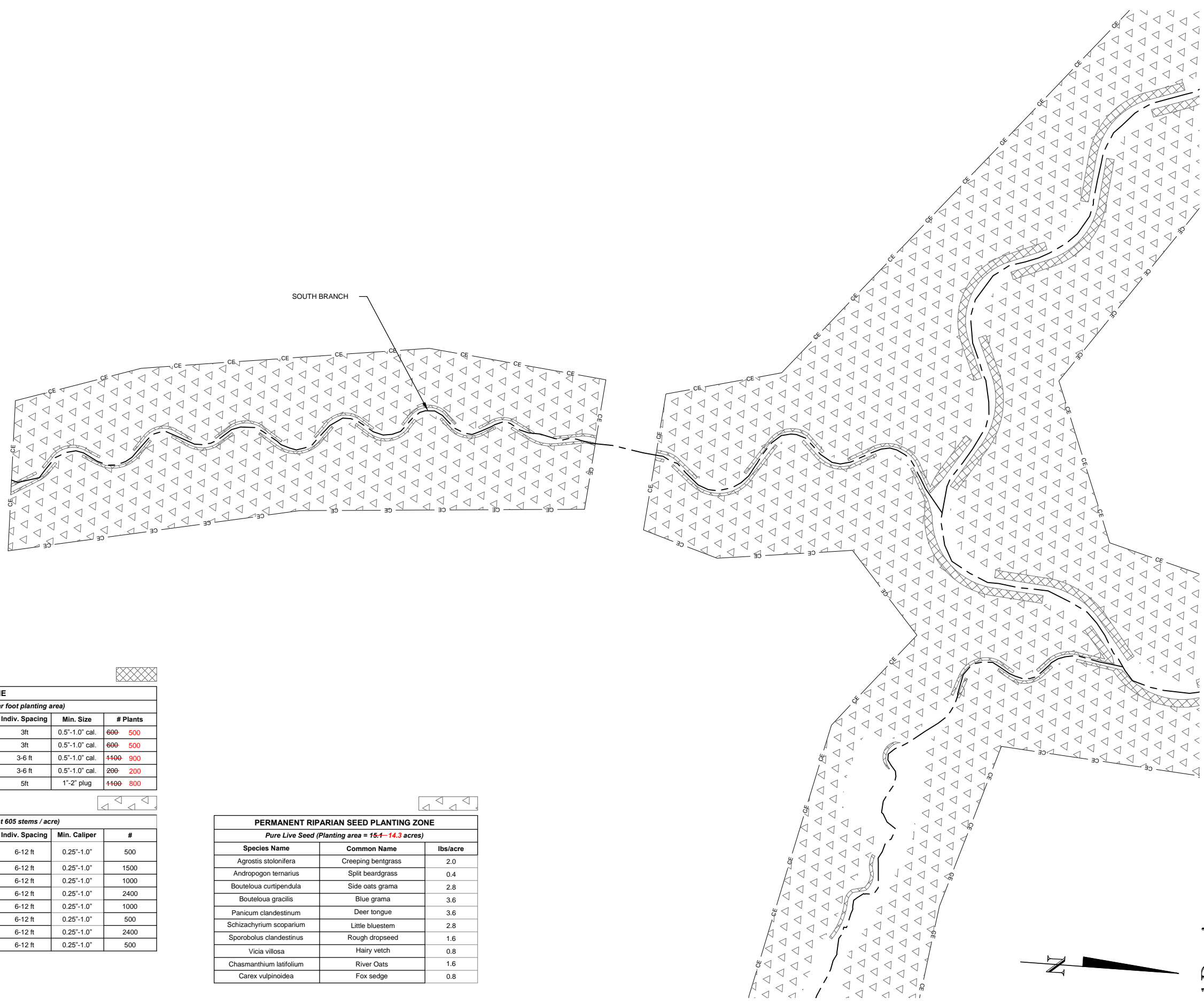
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 Job Number: 005-02128
 Project Engineer: JNK
 Drawn By: CLM
 Checked By: JWH

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Record Drawing

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STREAMBANK PLANTING ZONE					
Live Stakes and Herbaceous Plugs (~5,000-4,500 linear foot planting area)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Size	# Plants
<i>Cornus amomum</i>	Silky Dogwood	3 ft	3ft	0.5"-1.0" cal.	600 500
<i>Cornus sericea</i>	Redoiser Dogwood	3 ft	3ft	0.5"-1.0" cal.	600 500
<i>Salix sericea</i>	Silky Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	4400 900
<i>Salix nigra</i>	Black Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	200 200
<i>Juncus effusus</i>	Common Rush	5 ft	5ft	1"-2" plug	4400 800

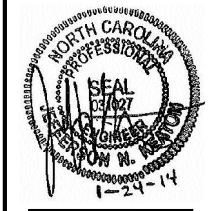
Bare Root (Planting Area = 15.5-14.3 acres planted at 605 stems / acre)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper	#
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<i>Quercus michauxii</i>	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"	500
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Quercus rubra</i>	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"	500

PERMANENT RIPARIAN SEED PLANTING ZONE		
Pure Live Seed (Planting area = 15.4-14.3 acres)		
Species Name	Common Name	lbs/acre
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<i>Panicum clandestinum</i>	Deer tongue	3.6
<i>Schizachyrium scoparium</i>	Little bluestem	2.8
<i>Sporobolus clandestinus</i>	Rough dropseed	1.6
<i>Vicia villosa</i>	Hairy vetch	0.8
<i>Chasmanthium latifolium</i>	River Oats	1.6
<i>Carex vulpinoidea</i>	Fox sedge	0.8

NOTE: Herbaceous Plugs to be planted along tangent (riffle) sections and inner meander bends without structures along restoration reaches only.

Byrds Creek Stream Restoration Project
Person County, NC
South Branch
Planting

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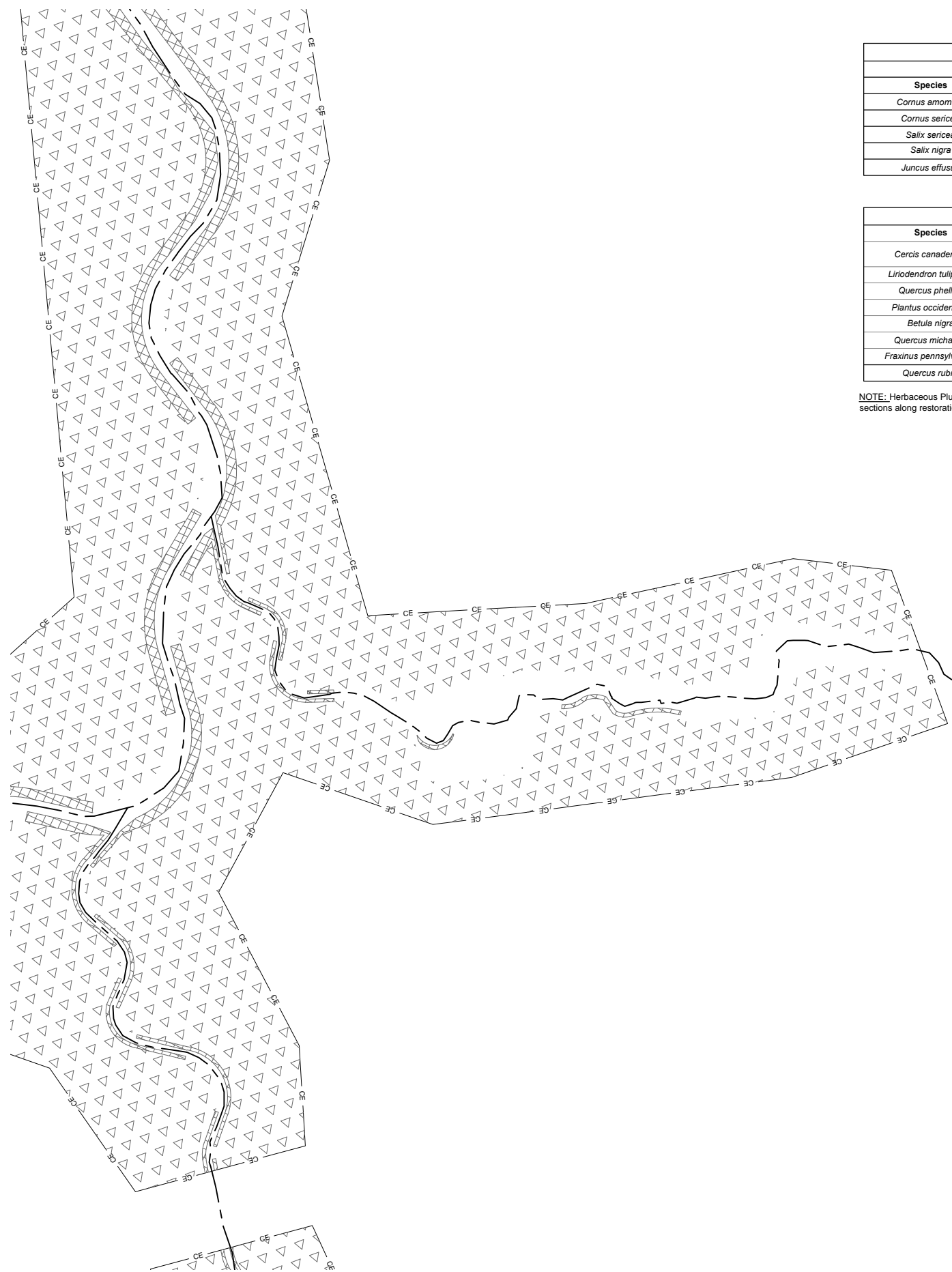
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Date: 01/27/2014
 Job Number: 005-02128
 Project Engineer: JNK
 Drawn By: CLM
 Checked By: JWH

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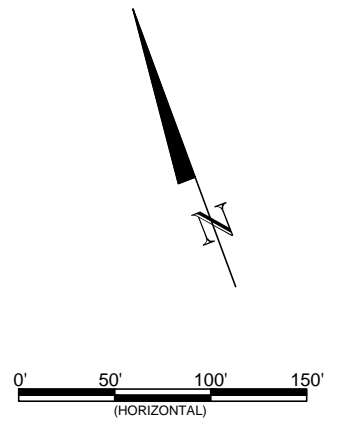
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Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Size	# Plants
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<i>Cornus sericea</i>	Redoiser Dogwood	3 ft	3ft	0.5"-1.0" cal.	600- 500
<i>Salix sericea</i>	Silky Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	1100- 900
<i>Salix nigra</i>	Black Willow	3-6 ft	3-6 ft	0.5"-1.0" cal.	200- 200
<i>Juncus effusus</i>	Common Rush	5 ft	5ft	1"-2" plug	1100- 800

Bare Root (Planting Area = 16.5--14.3 acres planted at 605 stems / acre)					
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper	#
<i>Cercis canadensis</i>	American Redbud	12 ft	6-12 ft	0.25"-1.0"	500
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"	1500
<i>Quercus phellos</i>	Willow Oak	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Plantus occidentalis</i>	Sycamore	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Betula nigra</i>	River Birch	12 ft	6-12 ft	0.25"-1.0"	1000
<i>Quercus michauxii</i>	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"	500
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft	6-12 ft	0.25"-1.0"	2400
<i>Quercus rubra</i>	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"	500

NOTE: Herbaceous Plugs to be planted along tangent (riffle) sections along restoration reaches only.

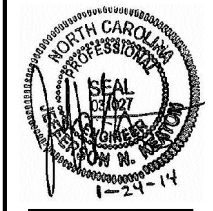
PERMANENT RIPARIAN SEED PLANTING ZONE		
Pure Live Seed (Planting area = 16.4--14.3 acres)		
Species Name	Common Name	lbs/acre
<i>Agrostis stolonifera</i>	Creeping bentgrass	2.0
<i>Andropogon ternarius</i>	Split beardgrass	0.4
<i>Bouteloua curtipendula</i>	Side oats grama	2.8
<i>Bouteloua gracilis</i>	Blue grama	3.6
<i>Panicum clandestinum</i>	Deer tongue	3.6
<i>Schizachyrium scoparium</i>	Little bluestem	2.8
<i>Sporobolus clandestinus</i>	Rough dropseed	1.6
<i>Vicia villosa</i>	Hairy vetch	0.8
<i>Chasmanthium latifolium</i>	River Oats	1.6
<i>Carex vulpinoidea</i>	Fox sedge	0.8

NOTE: 1. DURING CONSTRUCTION, A DISAGREEMENT WITH THE LANDOWNER REQUIRED AN ADJUSTMENT TO THE EASEMENT BOUNDARY. THIS CHANGE RESULTED IN A DECREASE OF APPROXIMATELY 1.2 ACRES OF BARE ROOT PLANTING AND APPROXIMATELY 500 LINEAR FEET OF LIVE STAKE PLANTING.



Byrds Creek Stream Restoration Project
Person County, NC
 Southeast Branch
 Planting

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Record Drawing

Date:	01/27/2014
Job Number:	005-02128
Project Engineer:	JNSK
Drawn By:	CLM
Checked By:	JWH

3.4

Sheet