

Newfound Creek Stream Restoration Mitigation Report

**Ecosystem Enhancement Program Project Number 92497
SCO Project Number 0606750-01
CU 06010105
Buncombe County**



Submitted to/Prepared for: Harry Tsomides – Project Manager
NCDENR-Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652
(828) 545-7057

Project Designed by: URS Corporation – North Carolina
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560
(919) 461-1597

Submitted: July 25, 2012



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Prepared by:

URS Corporation – North Carolina
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560

Project Manager:

Kathleen McKeithan
kathleen.mckeithan@urs.com
(919) 461-1597

Contractor:

Eagle Wood, Inc.
PO Box 1046
Denver, NC 28037

Contractor's Project Manager:

Bill Anderson
(704) 483-5853
BillPickle@aol.com

July 25, 2012

EXECUTIVE SUMMARY

The Newfound Creek Stream Restoration Project consists of a portion of Newfound Creek and six unnamed tributaries to Newfound Creek off of Browntown Road in Leicester, Buncombe County, North Carolina. The 11,020 linear foot project consists of 9,734 linear feet of stream restoration and enhancement and 0.70 acres of riverine wetland enhancement. 5,719 linear feet of stream was restored, 2,525 linear feet was Enhancement Level I, and 1,490 linear feet was Enhancement Level II. The pre-restoration length was 10,524 linear feet. The site contained 0.70 acres of riverine wetland prior to construction.

The stream restoration project is broken into 29 reaches. The mainstem of the project consists of a combination of Restoration and Enhancement Level I to a C4/1 channel. Tributary 3 also consists of a combination of Restoration and Enhancement Level I. Tributary 3 was restored to a B5 channel. Tributary 4 consists of Wetland Enhancement, Restoration, Enhancement Level I, and Enhancement Level II to a E5 channel. Tributary 5 consists of Restoration, Enhancement Level I, and Enhancement Level II to a E4b channel. Tributary 6 contains Restoration and Enhancement Level II to a E4b channel. Tributary 7 contains Wetland Enhancement, Enhancement Level I, and Enhancement Level II. Tributary 8 consists of Restoration and Enhancement Level II to a E5 channel.

A riparian buffer was planted along the entirety of the project. The planted buffer is a minimum of 30-feet. Some areas were planted outwards of 30-feet with native woody species.

Table 1: Project Restoration Type, Lengths, Mitigation Units, and Objectives

Reach	As-Built Station Range	Restoration Type	Pre-Existing Linear Feet/Ac	Designed Linear Feet/Ac	As-Built Linear Feet/Ac	Proposed Credit Ratio	Stream/Wetland Mitigation Units	Comment	
MAINSTEM	A	0 to 2+95	Enhancement I	450	300	295	0.67	198	Grade right bank, add a few structures to develop pools and direct flow around sharp bend.
	B/C	2+95 to 20+10	Restoration	1050	1675	1715	1.00	1715	Increase sinuosity and floodprone width by pulling meander bends out into left floodplain and away from steep bank on right.
	D	20+10 to 20+90	Enhancement I	500	90	80	0.67	54	Cut bankfull bench and remove berms on left floodplain. Add cross vane to direct flow correctly under bridge.
	Brown-town Road	20+90 to 21+80	N/A		95	90	0	0	Browntown Road ROW – no credit.
	D (cont.)/ E	21+80 to 29+15	Enhancement I	1300	690	735	0.67	492	Adjust to proper dimension, some small alignment corrections, and some structures to direct flow and develop pool habitat. Enhance meanders in select locations.
	F	29+15 to 45+00	Restoration	1100	1525	1585	1.00	1585	Adjust dimension pattern and profile, primarily in place with the addition of small meander bends.

Reach	As-Built Station Range	Restoration Type	Pre-Existing Linear Feet/Ac	Designed Linear Feet/Ac	As-Built Linear Feet/Ac	Proposed Credit Ratio	Stream/Wetland Mitigation Units	Comment	
TRIB 3	3A	0 to 2+95	Enhancement I	300	297	295	0.67	198	Adjust dimension and profile in confined valley.
	Brown-town Road	2+95 to 3+73	N/A		78	78	0	0	Browntown Road ROW – no credit.
	3B	3+73 to 11+25	Restoration	760	822	752	1.00	752	Adjust dimension, profile and pattern.
TRIB 4	4A	0	Enhancement Wetland A	0.26 ac	0.26 ac	0.26 ac	0.33	0.1	Buffer reforestation and wetland enhancement
	4B	0 to 2+25	Restoration	225	230	225	1.00	225	Build step-pool system to stabilize series of severe headcuts
	4C	2+25 to 5+25	Enhancement I	350	300	300	0.67	201	Adjust dimension and profile.
	4D	5+25 to 9+70	Enhancement II	425	450	445	0.5	223	Adjust dimension and add structure to stabilize headcuts below.
	4E	9+70 to 12+35	Enhancement I	250	255	265	0.67	178	Step-pool system, stabilize headcuts.
	Brown-town Road	12+35 to 13+10	N/A		75	75	0	0	Correct dimension and profile, stabilize culvert outlet.
	4G	13+10 to 18+32	Restoration	340	526	522	1.00	522	Restore dimension pattern and profile and improve sediment transport.
TRIB 5	5A	0 to 2+25	Enhancement II	225	225	225	0.5	113	Buffer reforestation
	5B	2+25 to 4+25	Restoration	200	200	200	1.00	200	Mimic step-pool in 5A and stabilize large headcut.
	5C	4+25 to 5+00	Enhancement II	75	75	75	0.5	38	Buffer reforestation, extensive debris removal.
	5D	5+00 to 6+75	Enhancement I	175	170	175	0.67	117	Slope back banks, add grade control.
TRIB 6	6A	0 to 3+15	Enhancement II	300	290	315	0.5	158	Bank grading in select areas during buffer reforestation.
	Culvert	3+15 to 3+55	N/A		50	40	0	0	Culvert – no credit.
	6B	3+55 to 7+18	Restoration	300	359	363	1.00	363	Restore to stable dimension, pattern, and profile.
TRIB 7	7A	0	Enhancement II		100	100	0.5	50	Buffer reforestation, cattle exclusion
	7B/C	0	Enhancement Wetland B/C	0.46 ac	0.44 ac	0.44 ac	0.33	.1	Dam stabilization, Buffer reforestation, cattle exclusion
	7A	0	N/A		70	100	0	0	Dam – no credit.
	7B	0 to 3+80	Enhancement I	400	345	380	0.67	225	Adjust dimension and profile.

Reach	As-Built Station Range	Restoration Type	Pre-Existing Linear Feet/Ac	Designed Linear Feet/Ac	As-Built Linear Feet/Ac	Proposed Credit Ratio	Stream/Wetland Mitigation Units	Comment	
TRIB 8	8A	-2+15 to -0+15	Enhancement II	100	200	200	0.5	100	Buffer reforestation, cattle exclusion
	8B	-0+15 to 3+42	Restoration	460	373	357	1.00	357	Dam removal and new channel construction
	Barn/Brown-town Road	3+42 to 13+45	N/A		306	1003	0	0	Barn/Browntown Road ROW – no credit.
	8C	13+45 to 14+75	Enhancement II	120	131	130	0.5	65	Buffer reforestation
Total Stream Mitigation Units							8156		
Total Wetland Mitigation Units							0.2		

Newfound Creek and its tributaries have a long-term history of agricultural use, including cattle and row crops. The primary project objective was to restore, enhance, and/or preserve stream functions; reforest a natural riparian buffer; exclude cattle from the streams; provide alternative water sources; and protect the area in perpetuity in a conservation easement. The property is currently used for raising beef cattle, hay, and row crops (primarily tomatoes). Prior to restoration, farming activities typically occurred right up to the streambanks, with little to no riparian buffer. Drainage ditches around the row crops discharged directly into Newfound Creek, and carried a large sediment load. In addition, cattle had direct access to Newfound Creek and some of the tributaries.

Newfound Creek and its unnamed tributaries are located in the French Broad River Basin, US Geological Survey (USGS) cataloging unit 06010105, hydrologic unit 06010105090020, and NC Division of Water Quality (NCDWQ) subbasin 04-03-02. The total watershed area is 10.3 mi² and is characterized by steep slopes leading to a broad bottomland valley. The dominant land use in the watershed is forest, primarily on the surrounding ridges and steep slopes. As the slopes decrease, agricultural land uses increase. The majority of the valley floor has been cleared and is being used for agricultural and residential practices.

The overall restoration strategy/approach is to restore and enhance the site through the use of pattern changes and instream structures that will provide grade control, enhance stability, promote efficient sediment transport, and produce/enhance in-stream habitat. A buffer was planted along the streambanks to help stabilize the banks, enhance water quality through root filtration and shading, and provide habitat for amphibians, reptiles, small mammals, and birds.

Performance criteria for stream and vegetation monitoring will follow that detailed in the USACE Stream Mitigation Guidelines (USACE *et al.* 2003). Monitoring shall consist of the collection and analysis of stream stability and riparian vegetation survivability data to support the evaluation of the project in meeting established restoration objectives. Data collection will include measurements of stream dimension, profile, pattern, and bed materials; photo documentation; vegetation survivability sampling; and stream bankfull return interval.

Twenty-eight permanent cross sections, 14 permanent vegetation plots, and 75 photo stations were established across the site. Vegetation monitoring will follow the methodologies outlined in *CVS-EEP Protocol for Recording Vegetation* (Lee *et al.* 2006). Level I inventories will be conducted. The dimension, pattern, and profile of the stream should show no radical change during the 5-year monitoring

period. Cross sections will be surveyed each year and overlaid to verify no significant change in the dimension from year to year. Monitoring will be performed each year for a five-year period, with no less than two bankfull flow events documented through the monitoring period. If less than two events occur during the first five years, monitoring will continue until the second bankfull event is documented. Monitoring should occur in late winter/early spring each year for five years.

Success criteria for vegetation plots will be measured based upon the survival of 320 stems per acre at the end of three years of monitoring. A tolerance of ten percent mortality rate will be acceptable for years four and five. The final vegetated success criteria will be survival of 260 stems per acre through year five.

North Carolina Ecosystem Enhancement Program (NCEEP) will determine whether repairs, replacements, re-planting, and/or invasive/exotic species management will occur based on findings of the yearly monitoring reports.

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1.0 INTRODUCTION

The Newfound Creek Stream Restoration site is located off of Browntown Road in western Buncombe County, North Carolina, in the Newfound Community near the town of Leicester (Figure 1). Newfound Creek and its unnamed tributaries are located in the French Broad River Basin, US Geological Survey (USGS) cataloging unit 06010105, hydrologic unit 06010105090020, and NC Division of Water Quality (NCDWQ) subbasin 04-03-02. The total watershed area is 10.3 square miles and is characterized by steep slopes leading to a broad bottomland valley. Much of the watershed can be easily viewed by traveling Newfound Road, which follows Newfound Creek along the bottom of the valley.

The dominant land use in the watershed is forest, primarily on the surrounding ridges and steep slopes. As the slopes decrease, agricultural land uses increase. The majority of the valley floor has been cleared and is being used for agricultural and residential practices.

The land uses directly adjacent to the project site are agricultural and residential. The conservation easement is bordered by agricultural fields that support beef cattle and row crops (mainly tomatoes). Prior to restoration, farming activities occurred right up to the streambank (including cattle access to the channel). Drainage ditches around the row crops discharged directly into Newfound Creek, and appeared to carry a large sediment load.

The project consists of a portion of Newfound Creek and six unnamed tributaries totaling 11,020 linear feet with 9,734 linear feet of stream restoration and enhancement and 0.70 acres of riverine wetland enhancement (Figure 2). 5,719 linear feet of stream was restored, 2,525 linear feet was Enhancement Level I, and 1,490 linear feet was Enhancement Level II (Table 1).

The stream restoration project is broken into 29 reaches (Figure 3). Newfound Creek is a perennial, third-order stream with a drainage area of approximately 10.3 square miles at the downstream limits of the project. According to the Rosgen classification scheme (Rosgen 1994), Newfound Creek pre-construction condition alternated between a C4/1 and B4 stream types, with high width/depth ratio, low slope, and gravel substrate with bedrock. There are several large bedrock outcrops providing grade control throughout the Project Reach. The stream appeared to no longer be down cutting, but was in the process of widening through bank erosion and mass wasting. The proposed design included Enhancement Level I and Restoration as a C4/1 stream.

Tributary 3 is a perennial, first-order stream with a drainage area of approximately 70 acres and pre-construction classification of G5/F5. The portion of Tributary 3 upstream of Browntown Road was designated for Enhancement I and the reach below Browntown Road was designated for Restoration as a B5 stream.

Tributary 4 is a first-order stream with a drainage area of approximately 70 acres. The first 250 feet consist of a small wetland. The perennial origin of the stream begins just below the wetland. The pre-construction condition included sections that resembled an A type channel, entrenched G channel, entrenched B channel, flat un-entrenched E channel, and entrenched F. Tributary 4 consists of Wetland Enhancement, Restoration, Enhancement Level I, and Enhancement Level II as an E5 channel.

Tributary 5 is a perennial, first-order stream with a drainage area of approximately 45 acres. The tributary classified as an E4b, G4, B4 and E4 prior to construction as it transitioned between a stable reach, steep headcuts, and then flattened out upstream of the confluence with Newfound Creek. Tributary 5 consisted of Restoration, Enhancement Level I, and Enhancement Level II as an E4b channel.

Tributary 6 is a perennial, first-order stream with a drainage area of approximately 51 acres. Tributary 6 transitions from an intermittent channel to a perennial channel within the project limits. The upstream portion classified as a stable B4 stream type pre-construction. Below the farm road culvert the stream channel braided and contained headcuts. The overarching classification was an entrenched E5 channel. Tributary 6 contains Restoration and Enhancement Level II as an E4b channel.

Tributary 7 is located on the north end of the property and flows north into Round Hill Branch upstream of its confluence with Newfound Creek. The drainage area at the bottom of the Project Reach is approximately 32 acres. Tributary 7 begins as an intermittent channel from a spring at the beginning of the Project Reach and flows through a wetland complex before becoming a perennial channel. An earthen dam impounds a small farm pond within this reach. The pre-construction and design classify Tributary 7 as an E5 channel. Tributary 7 contains Wetland Enhancement, Enhancement Level I, and Enhancement Level II.

Tributary 8 is a perennial, first-order stream with a drainage area of approximately 26 acres. The headwaters have been impounded for many years in a farm pond with an earthen dam. The pre-construction condition was the breached pond. The reach of Tributary 8 between Browntown Road and Newfound Creek was a stable E5. Tributary 8 consists of Enhancement Level II and Restoration as an E5 channel.

A riparian buffer was planted along the entirety of the project. The planted buffer is a minimum of 30-feet. Some areas were planted outwards of 30-feet with native woody species.

See Table 1 in the Executive Summary for the project's restoration type, lengths, mitigation units, and objectives.

1.1 RESTORATION SUMMARY

Newfound Creek and its tributaries are all influenced by human activities. Activities include historical channelization; streambank vegetation removal; and input of sediment, nutrients, fecal matter, fertilizers, and pesticides from adjacent agricultural activities. These man-made stressors have impacted the stream by changing the stream's ability to transport sediment, maintain stable streambanks, provide habitat, and uphold water quality.

The overall restoration strategy/approach was to restore and enhance the site through the use of pattern changes and instream structures that will provide grade control, enhance stability, promote efficient sediment transport, and produce/enhance in-stream habitat. A buffer was planted along the streambanks to help stabilize the banks, enhance water quality through root filtration and shading, and provide habitat for amphibians, reptiles, small mammals, and birds.

The goals of the proposed project include:

- Reducing erosion from within the project study area
- Restoring a channel that is able to properly transport watershed flows and sediment loads efficiently
- Improving aquatic habitat
- Enhancing wildlife habitat
- Improving overall water quality

The objectives of the proposed project include:

- Stabilizing eroding streambanks and headcuts
- Restoring the stream channels to a proper dimension, pattern, and profile

- Providing the stream channels with adequate flood prone area
- Establishing a more diverse bed morphology with riffle-pool sequences supported by in-stream structures, and by providing a source for woody debris and leaf litter by planting a native riparian buffer
- Creating riparian corridors
- Reducing direct inputs of nutrients and fecal coliform by excluding livestock from the stream channels and providing livestock with alternative sources of drinking water
- Reducing nutrient and sediment inputs to the stream from the agricultural fields by providing a native riparian buffer

The restoration approach for each reach is outlined in Table 1.

2.0 AS-BUILTS

As-Built plans are located in Appendix A. The As-Built plans detail the design versus post construction attributes of the site. They also outline the location of the permanent cross-sections, vegetation plots, and photo stations that were established for yearly monitoring purposes.

3.0 MONITORING PLAN

Performance criteria for stream and vegetation monitoring will follow that detailed in the USACE Stream Mitigation Guidelines (USACE *et al.* 2003). Monitoring shall consist of the collection and analysis of stream stability and riparian vegetation survivability data to support the evaluation of the project in meeting established restoration objectives. Baseline (Year 0) monitoring shall occur now that the project has been officially accepted following the final walkthrough. This is estimated to occur in early Summer 2012. Baseline monitoring does not replace a monitoring year. Monitoring beyond the baseline event shall occur every year for a total of five years (Table 2). Data collection will include measurements of stream dimension, profile, pattern, and bed materials; photo documentation; vegetation survivability sampling; and stream bankfull return interval.

Baseline and yearly monitoring reports shall follow the templates and guidelines provided on NCEEP's website at <http://portal.ncdenr.org/web/eep/fd-forms-templates>.

Table 2: Proposed Monitoring Schedule

Monitoring Year	Monitoring Date	Monitoring Firm
Year 0	Summer 2012	TBD
Year 1	Winter/Spring 2013	TBD
Year 2	Winter/Spring 2014	TBD
Year 3	Winter/Spring 2015	TBD
Year 4	Winter/Spring 2016	TBD
Year 5	Winter/Spring 2017	TBD

3.1 HYDROLOGY

Monitoring will be performed each year for a five-year period, with no less than two bankfull flow events documented through the monitoring period.

3.1.1 SUCCESS CRITERIA

If less than two events occur during the first five years, monitoring will continue until the second bankfull event is documented.

3.2 PROFILE AND CROSS SECTIONS

URS established 28 permanent cross sections across the site. Nine cross sections were established along the mainstem of Newfound Creek (8 riffles, 1 pool), four cross sections were established along Tributaries 3 and 4 (1 pool on Tributary 3), three cross sections were established along Tributaries 5, 7, and 8 (1 pool on Tributary 7), and two cross sections were established along Tributary 6 (1 riffle and 1 pool). Each cross section is marked with a 2-foot length of ½-inch diameter steel conduit, with six to 12 inches remaining above ground. A 2-foot length of ½-inch diameter PVC pipe was placed next to the conduit at each cross section location. The steel conduit is to act as the permanent monitoring point on each side of the channel; the PVC pipe is to act as an aid in locating the plots. The PVC piping is not intended to be a permanent marker. Pink flagging was used on the steel conduit and the PVC pipe to mark the location on both sides of each cross section.

Permanent cross sections included in the As-Builts were surveyed in February, 2012 using Topcon GTS 225 Total Station by Kee Mapping and Surveying. Cross-sectional features measured during the surveying efforts included top of steel conduit, ground beside steel conduit, topographic breaks in slope, bankfull indicators, edge of water at time of survey, and other channel features that could influence the direction and/or speed of flow in the channel. Permanent cross section locations are shown on the As-Built survey in Appendix A. Two photographs were taken of each cross section; one was taken from the left bank, facing the right bank and one was taken from the right bank, facing the left bank. These photos will be duplicated each year during monitoring to visually assess changes at each cross section location. Cross sections are included within the As-Builts and photos are located in Appendix B. The entirety of the thalweg of the site was surveyed during the As-Built survey. Yearly monitoring requires survey of 3,000 linear feet of the restored portion of the mainstem and all restored portions of the tributaries.

3.2.1 SUCCESS CRITERIA

The dimension, pattern, and profile of the stream should show no radical change during the 5-year monitoring period. Cross sectional data should be overlaid each monitoring year to verify no significant change in the dimension from year to year. The overall channel pattern and sinuosity should remain the same during the monitoring period.

Channel aggradation and/or degradation and/or areas that present problem spots to the restored stream will be noted and recorded during each monitoring year to determine whether these areas are temporary, static, or worsening. Yearly longitudinal profiles should show that the bedform features are remaining stable.

3.3 VEGETATION

URS established 14 permanent vegetation plots (100m²) across the site. The corners of each vegetation plot are marked with a 2-foot length of ½-inch diameter steel conduit, with six to 12 inches remaining above ground. A 2-foot length of ½-inch diameter PVC pipe was placed next to the conduit at the southwest corner (origin) of each vegetation plot. The southwest corner (origin) of each plot was flagged with orange. The remaining three corners were flagged with blue. Planted stems within each plot were flagged with white and counted. A photograph of each vegetation plot was taken from the southwest corner (origin) facing the northeast corner. These photographs and the number of stems found in each plot are located in Appendix C. Species identification and stem measurements will occur during Year 0 monitoring.

The vegetation plots were established according to the guidelines and methodologies outlined in *CVS-EEP Protocol for Recording Vegetation* (Lee *et al.* 2006). Future vegetation monitoring shall also follow the *CVS-EEP Protocol for Recording Vegetation* guidelines for Level I vegetation inventories.

3.3.1 SUCCESS CRITERIA

Success criteria for vegetation plots will be measured based upon the survival of 320 stems per acre at the end of three years of monitoring. Three hundred and twenty stems per acre is equivalent to the presence of eight or more stems in each 100m² vegetation plot. A tolerance of ten percent mortality rate will be acceptable for years 4 and 5. The final vegetation success criteria will be survival of 260 stems per acre, or seven or more stems in each 100m² vegetation plot, through year 5.

3.4 PHOTOGRAPHS

Seventy-five permanent photo stations were established to document the overall channel stability and reforestation of the riparian zone over time. The photo stations were not monumented with steel conduit, but were surveyed and shown on the As-Built survey and flagged with blue and white stripes. As a general rule, one photo was taken facing upstream and one facing downstream at each photo station location. This was done at all locations where an upstream and downstream vantage was possible. Photo stations were established in locations with vantages providing clear views of the channel banks, structures, and vegetation. Photo station photographs are provided in Appendix D.

3.4.1 SUCCESS CRITERIA

Repeat photography at the established photo station locations should show no major changes in channel pattern and no progressive bank erosion. It should also show no areas void of vegetation, or with large populations of exotic/invasive species. The photographs should indicate the net survival and relative growth rate of planted vegetation.

4.0 MAINTENANCE AND CONTINGENCY PLANS

Future maintenance issues arising from the failure of the above-outlined success criteria for stream and vegetation parameters should be reported to the NCEEP Project Manager. NCEEP will determine whether repairs, replacements, re-planting, and/or invasive/exotic management will occur.

5.0 REFERENCES

Lee, Michael T., Peek, Robert K., Roberts, Steven D., Wentworth, Thomas R. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. (<http://cvs.bio.unc.edu/methods.htm>).

Rosgen, D.L. 1994. A Classification of Natural Rivers. *Catena* 22:169-199.

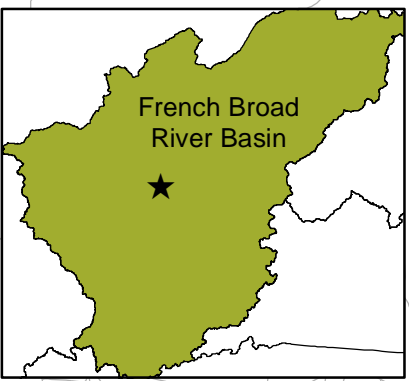
USACE, Wilmington District, US Environmental Protection Agency, NC Wildlife Resources Commission, and NC Division of Water Quality. 2003. Stream Mitigation Guidelines. April 2003. 26 pp.

APPENDICES

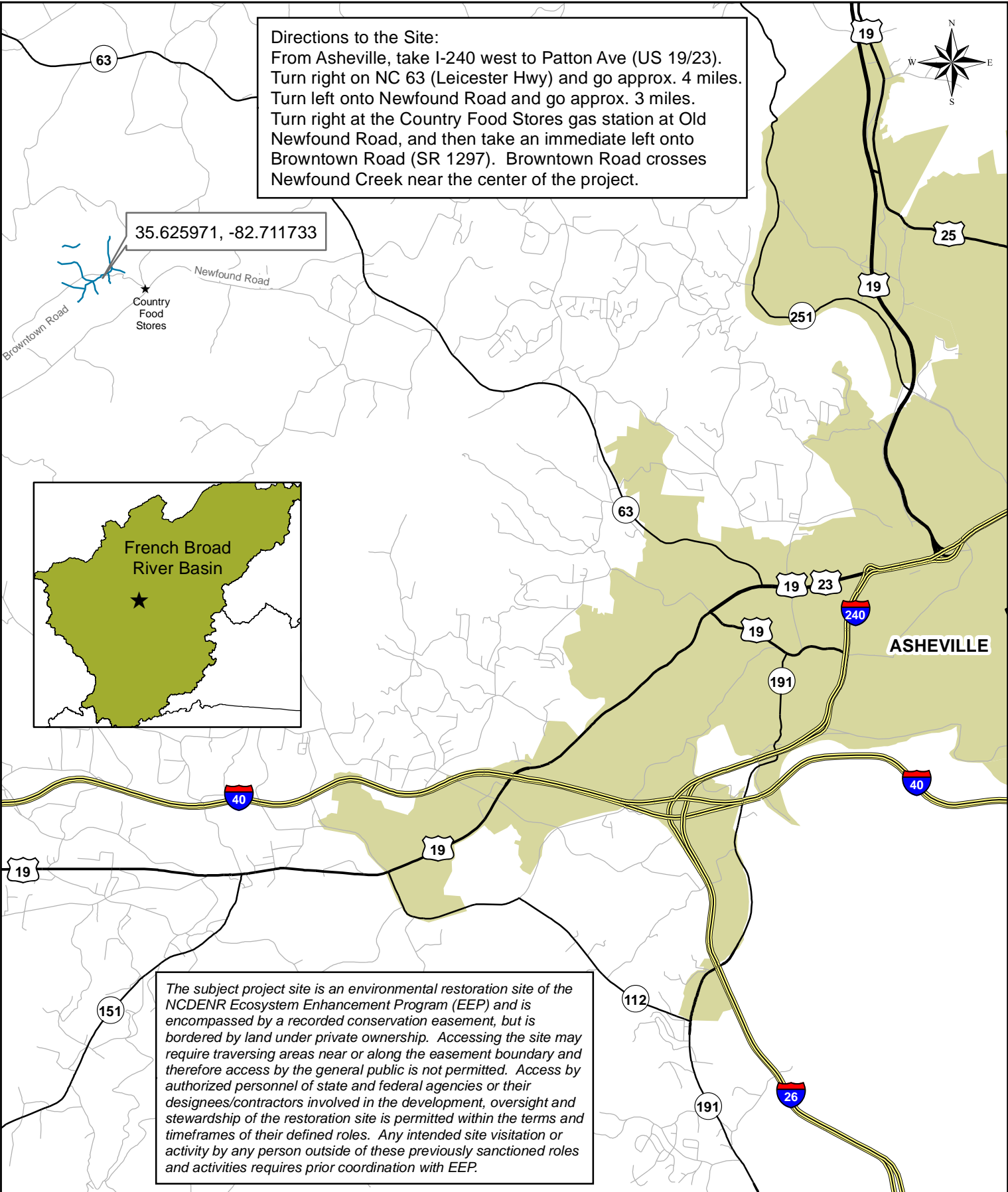
Appendix A: Figures, As-Built Plans & Red Lines

Directions to the Site:
 From Asheville, take I-240 west to Patton Ave (US 19/23). Turn right on NC 63 (Leicester Hwy) and go approx. 4 miles. Turn left onto Newfound Road and go approx. 3 miles. Turn right at the Country Food Stores gas station at Old Newfound Road, and then take an immediate left onto Browntown Road (SR 1297). Browntown Road crosses Newfound Creek near the center of the project.

35.625971, -82.711733



The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.



Prepared By:
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Suite 400
 Morrisville, NC 27560
 Phone: 919-461-1100
 Fax: 919-461-1415

Prepared For:
 NC Ecosystem Enhancement Program

Project: Newfound Creek Stream Restoration
 Buncombe County, NC
 CU 06010105

Project Number: 92497

Date: July 2012

Legend


- Project Reach
- Interstate
- US Hwy
- NC Hwy
- Local Road
- Municipal Boundary

Figure 1
 Project Vicinity

0 1 2 Miles



Prepared By:
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Suite 400
 Morrisville, NC 27560
 Phone: 919-461-1100
 Fax: 919-461-1415



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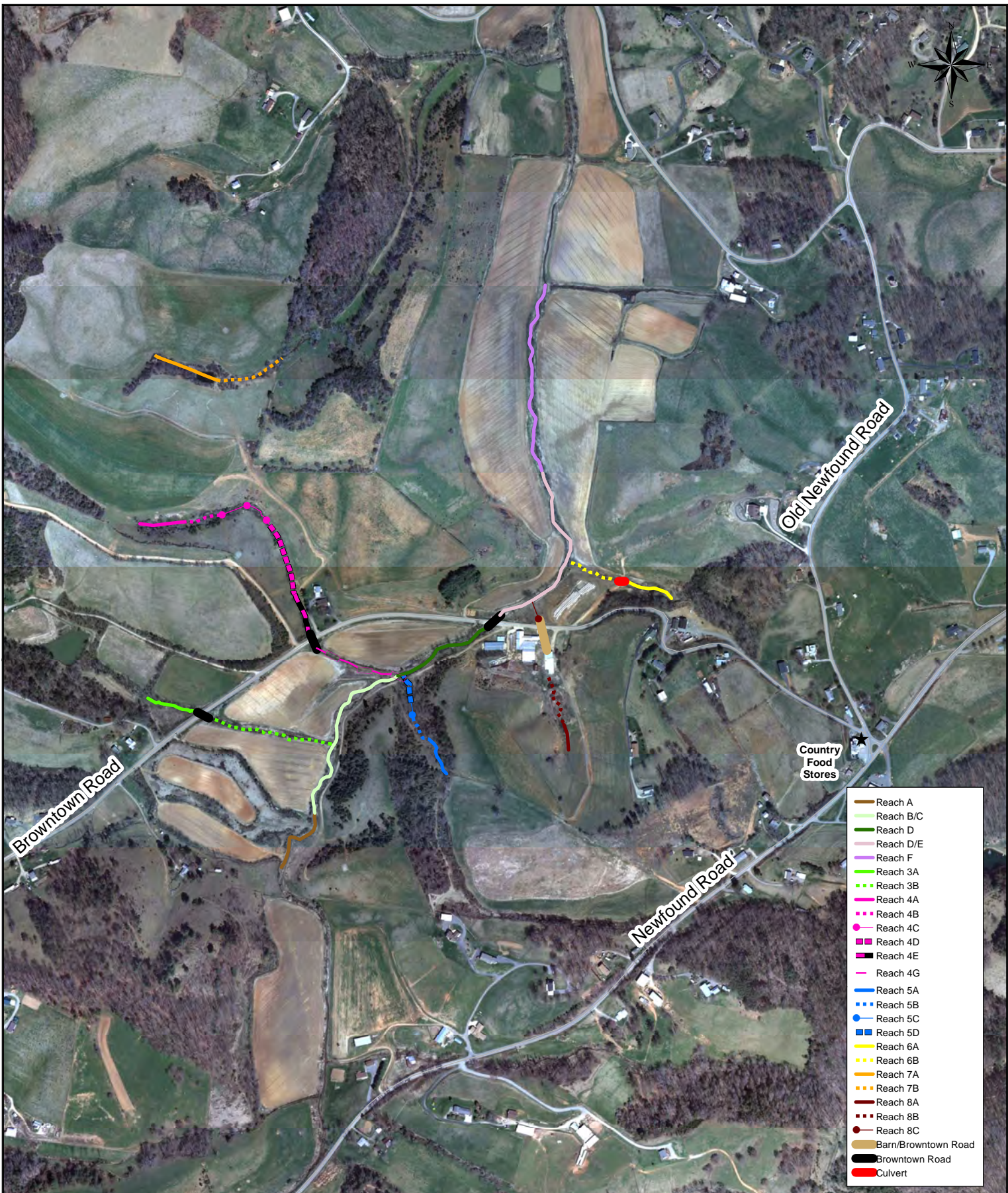
Legend

- Project Reach
- Conservation Easement
- Interstate
- US Hwy
- NC Hwy
- Local Road
- Municipal Boundary

Figure 2
Project Site


0 250 500 1,000
 Feet

North Carolina 2010 Ortho Imagery



- Reach A
- Reach B/C
- Reach D
- Reach D/E
- Reach F
- Reach 3A
- Reach 3B
- Reach 4A
- Reach 4B
- Reach 4C
- Reach 4D
- Reach 4E
- Reach 4G
- Reach 5A
- Reach 5B
- Reach 5C
- Reach 5D
- Reach 6A
- Reach 6B
- Reach 7A
- Reach 7B
- Reach 8A
- Reach 8B
- Reach 8C
- Barn/Browntown Road
- Browntown Road
- Culvert

Prepared By:
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Suite 400
 Morrisville, NC 27560
 Phone: 919-461-1100
 Fax: 919-461-1415



Prepared For:
 NC Ecosystem
 Enhancement Program



Project: Newfound Creek
 Stream Restoration
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Project Number: 92497	Date: July 2012
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Legend

- Interstate
- US Hwy
- NC Hwy
- Local Road

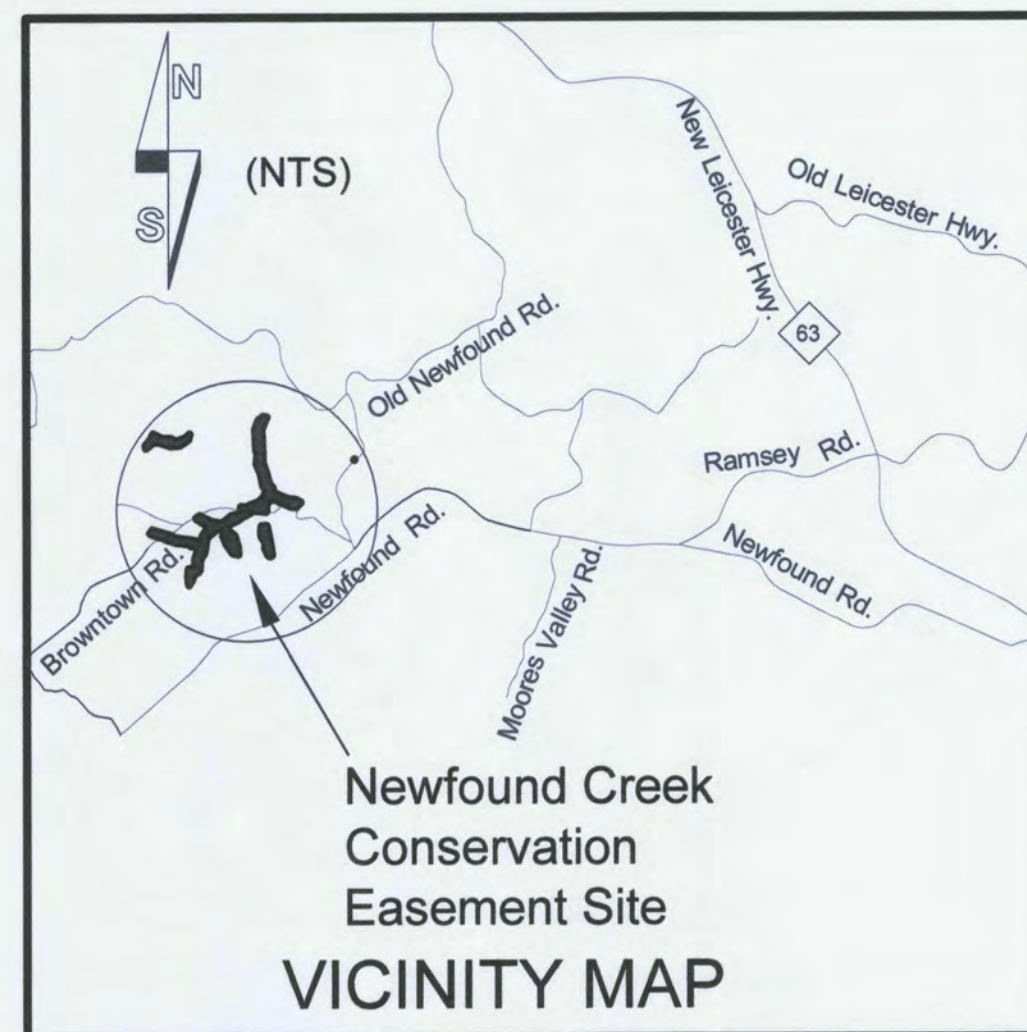
Figure 3
 Restoration Reaches

0 250 500 1,000
 Feet

North Carolina 2010 Ortho Imagery

AN AS-BUILT SURVEY FOR: THE ECOSYSTEM ENHANCEMENT PROGRAM NEWFOUND CREEK STREAM RESTORATION

EEP PROJECT #92497 SCO PROJECT #06-06-750-01



INDEX OF SHEETS

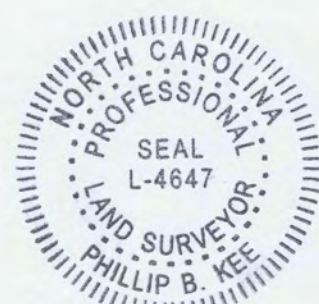
SHEET NUMBER	SHEET TITLE
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1	As-Built Survey Stream Data: Upper Mainstem
2	As-Built Survey Stream Data: Upper Mainstem and Lower Tributary 3
3	As-Built Survey Stream Data: Upper Mainstem and Tributary 5
4	As-Built Survey Stream Data: Upper Mainstem and Lower Mainstem
5	As-Built Survey Stream Data: Tributary 6 and Lower Mainstem
6	As-Built Survey Stream Data: Lower Mainstem
7	As-Built Survey Stream Data: Lower Mainstem
8	As-Built Survey Stream Data: Upper and Lower Tributary 3
9	As-Built Survey Stream Data: Upper Tributary 4
10	As-Built Survey Stream Data: Upper Tributary 4
11	As-Built Survey Stream Data: Upper and Lower Tributary 4
12	As-Built Survey Stream Data: Tributary 7
13	As-Built Survey Stream Data: Tributary 8
14	Longitudinal Profiles Mainstem



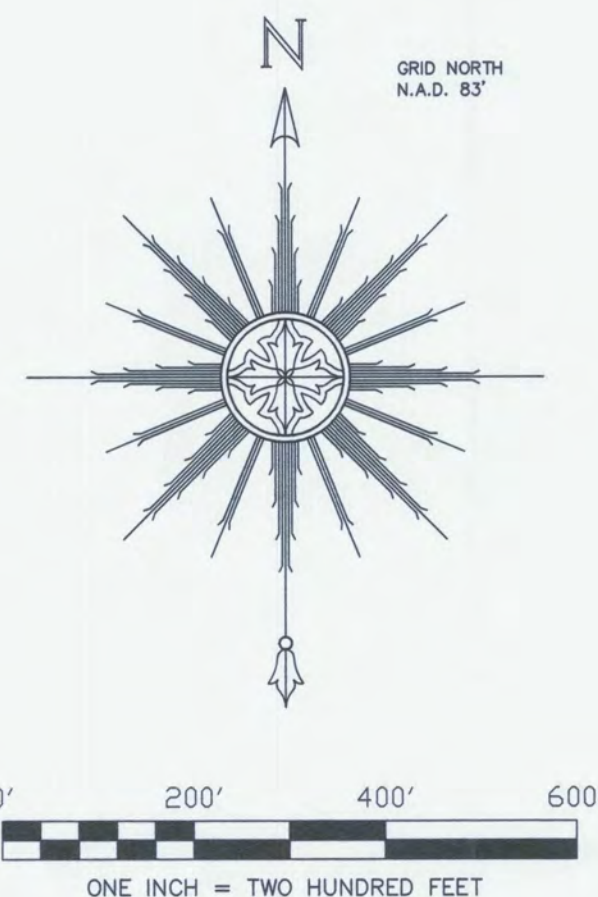
CERTIFICATE OF SURVEY

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WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.



Phillip B. Kee
PHILLIP B. KEE, PLS NC-4647



AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST

PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945

PLAT REFERENCES: PB:122 PG:11-14, PB:145 PG:37 PB:145 PG:85

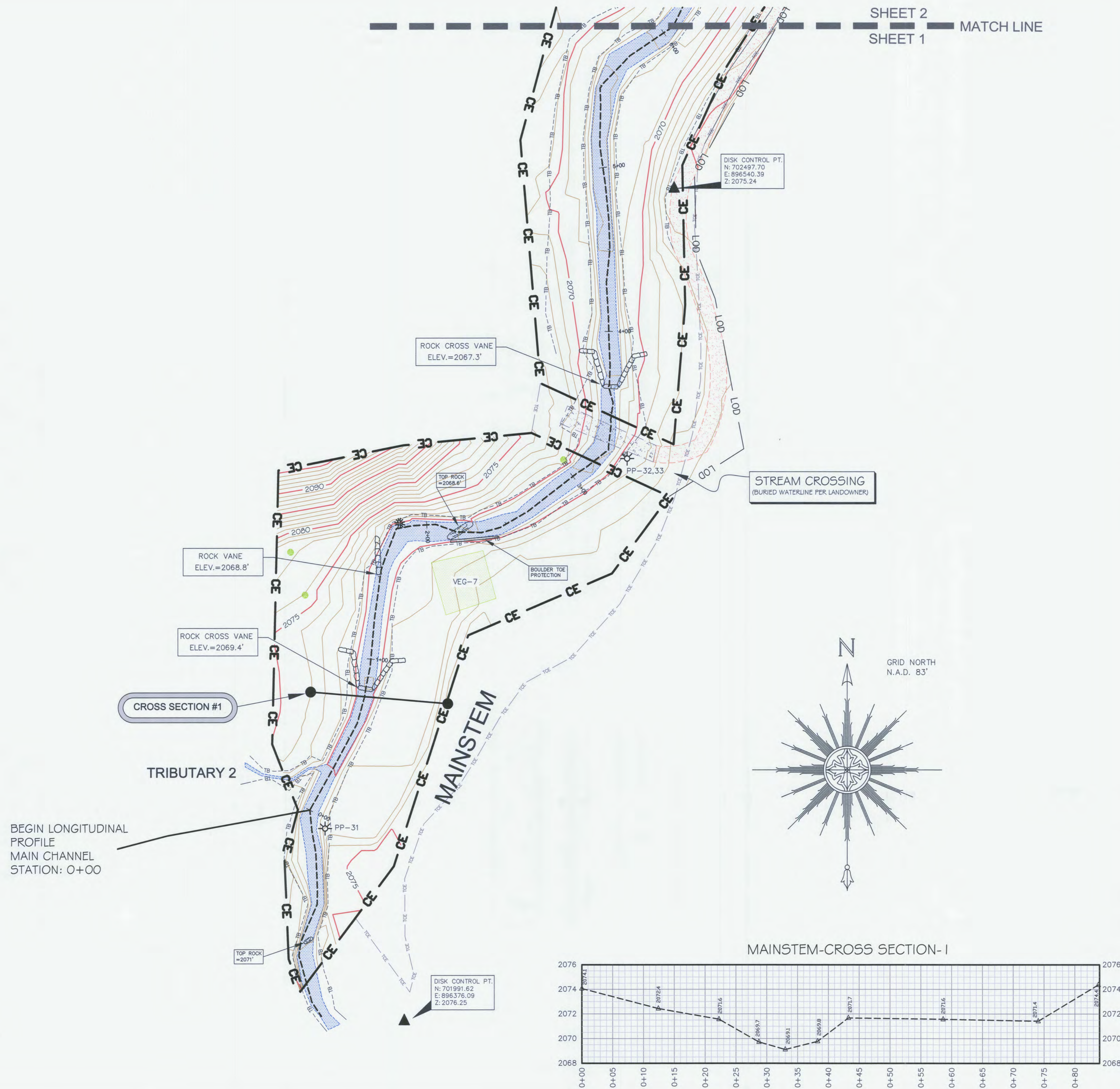
SURVEY BY: PBK,NH,MM,RT,KJ,DD DRAWN BY: PBK CHECKED BY: NH

AS-BUILT SURVEY DATES: 08/26/11 & 02/29/12 JOB #110540

COVER SHEET SHEET SIZE: 24"x36" SCALE: 1"=200'



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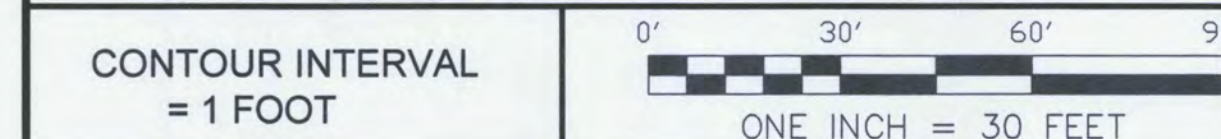
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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LIMITS OF DISTURBANCE
	OVERHEAD WIRE
	TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CPP CORRUGATED PLASTIC PIPE
	CMP CORRUGATED METAL PIPE
	INV INVERT

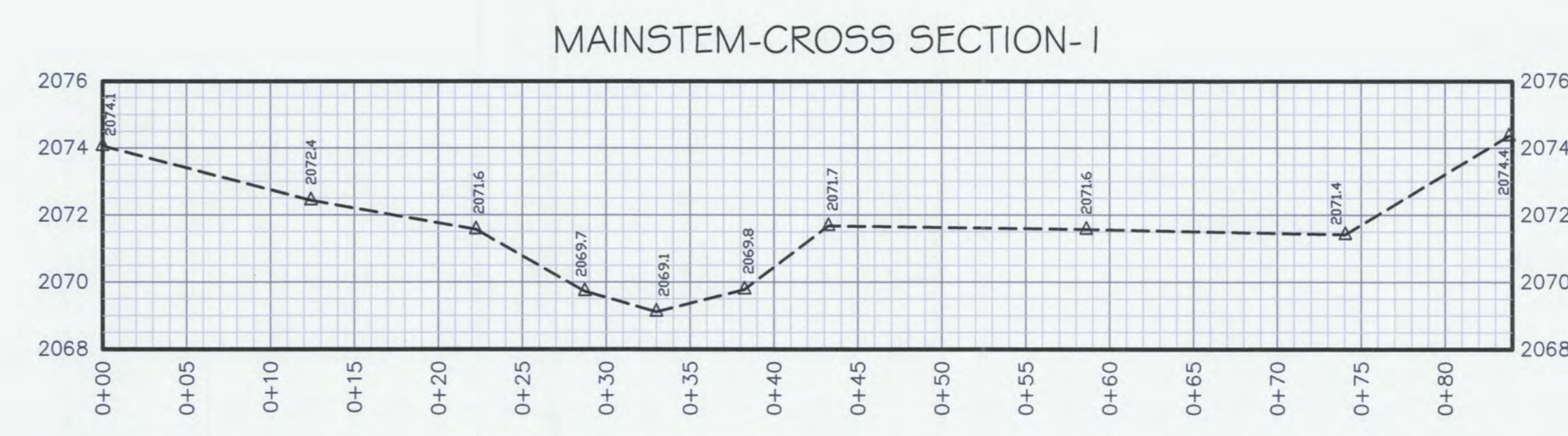


**AN AS-BUILT SURVEY FOR:
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 NEWFOUND CREEK STREAM RESTORATION
 EEP PROJECT #92497 SCO PROJECT #06-06-750-01**

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 LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA
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 PLAT REFERENCES: PB: 122 PG: 11-14, PB: 145 PG: 37 PB: 145 PG: 85
 SURVEY BY: PBK,NH,MM,RT,KJ DRAWN BY: PBK CHECKED BY: NH
 AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 1 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

Kee
 MAPPING & SURVEYING
 P.O. Box 2566
 Asheville, NC 28802
 (828) 645-8275
 www.keemap.com
 License # C-3039



CERTIFICATE OF SURVEY

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WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.

Phillip B. Kee
PHILLIP B. KEE, PLS NC-4647

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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LIMITS OF DISTURBANCE
	OVERHEAD WIRE
	TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NORTH AMERICAN DATUM 1983
	CORRUGATED PLASTIC PIPE
	CORRUGATED METAL PIPE
	INVERT

CONTOUR INTERVAL = 1 FOOT

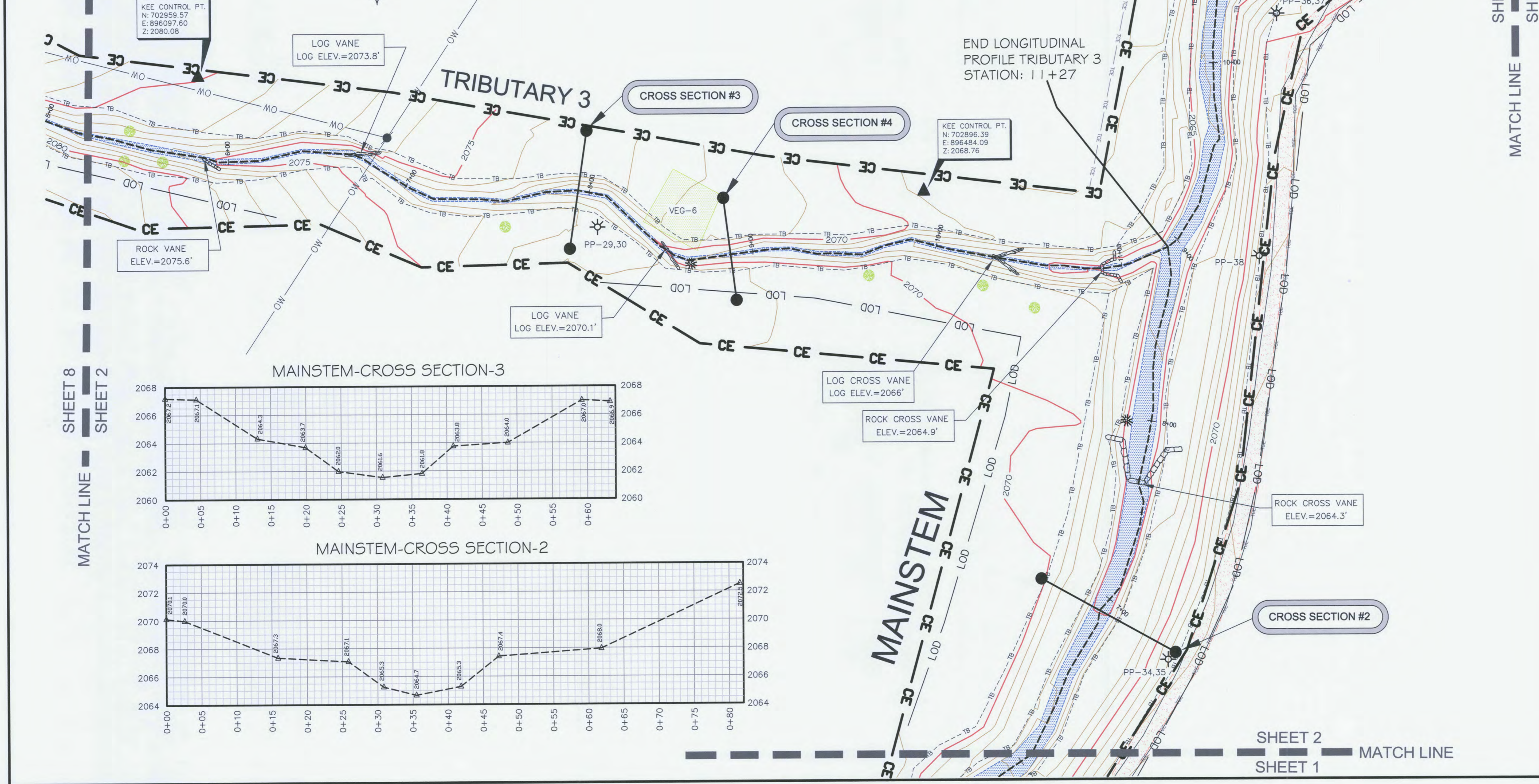
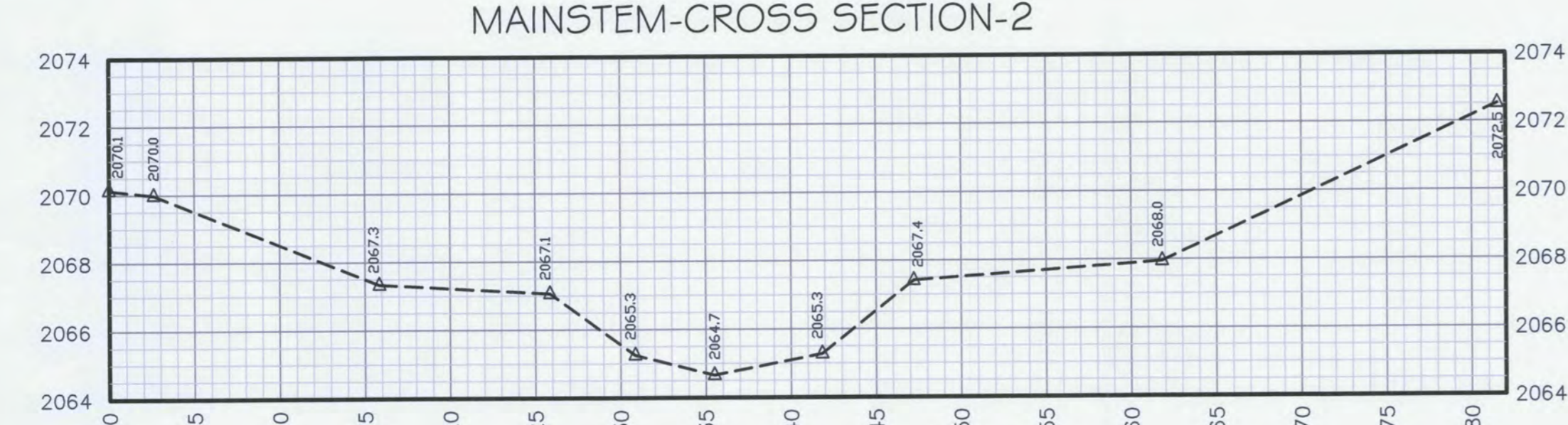
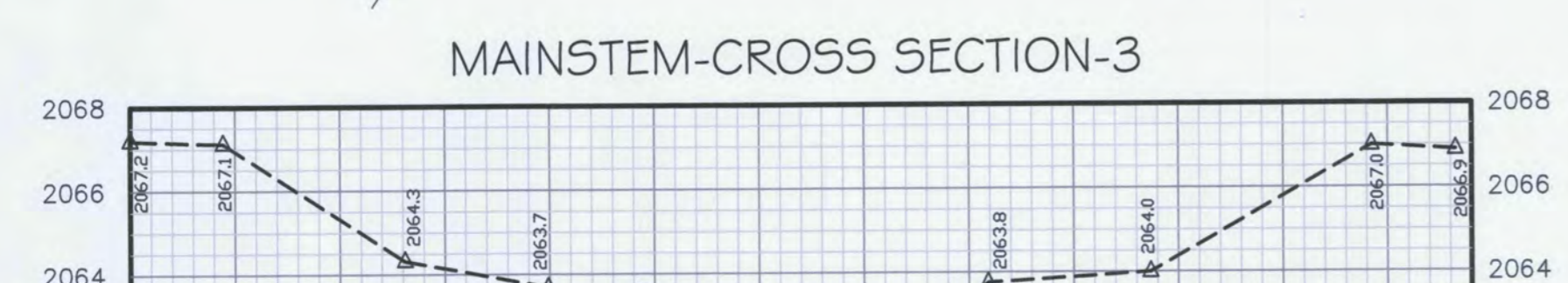
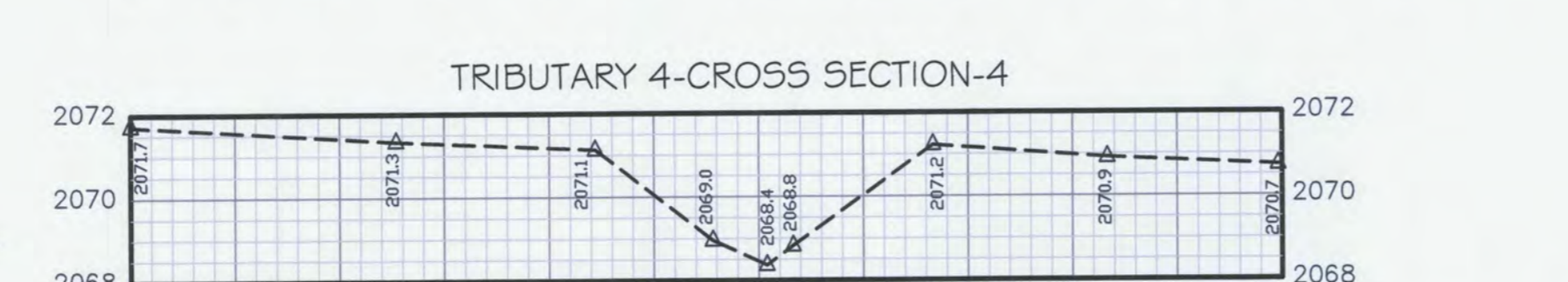
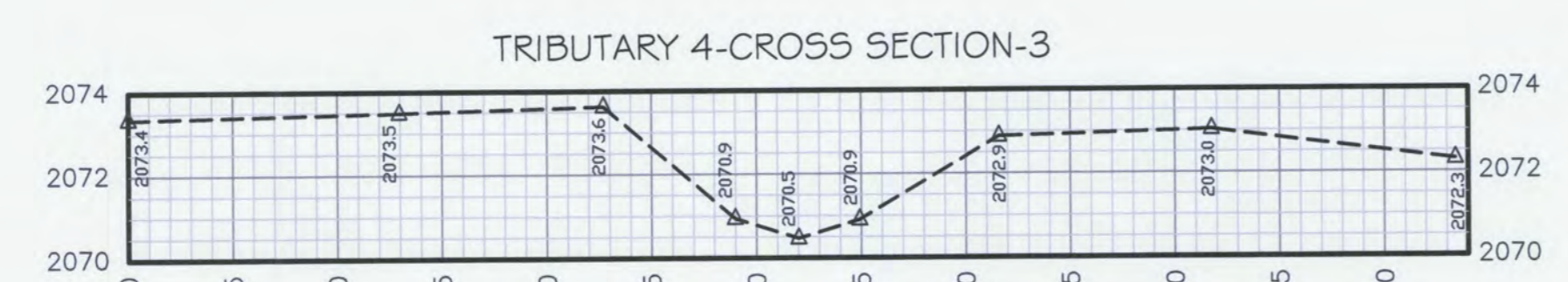
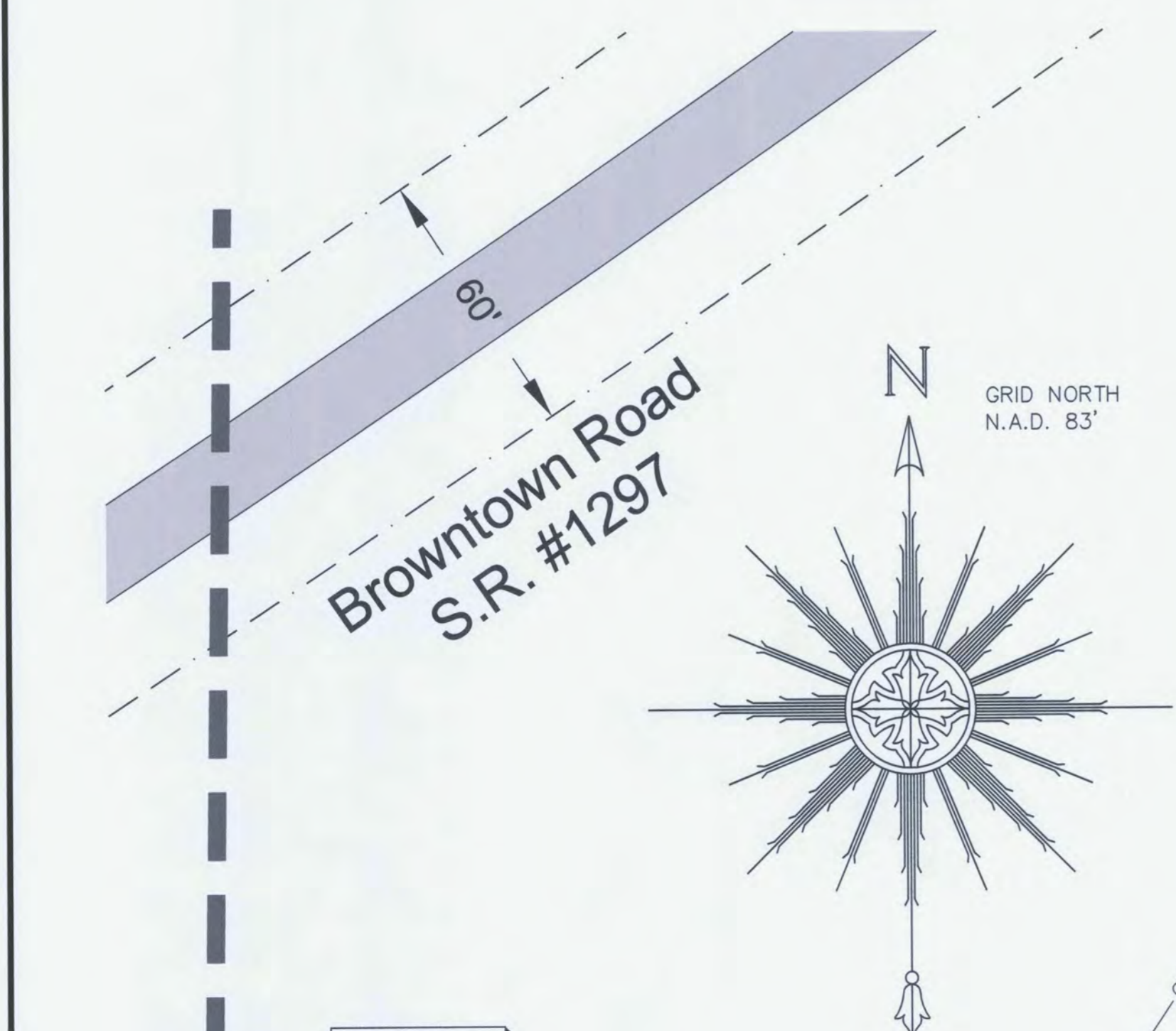
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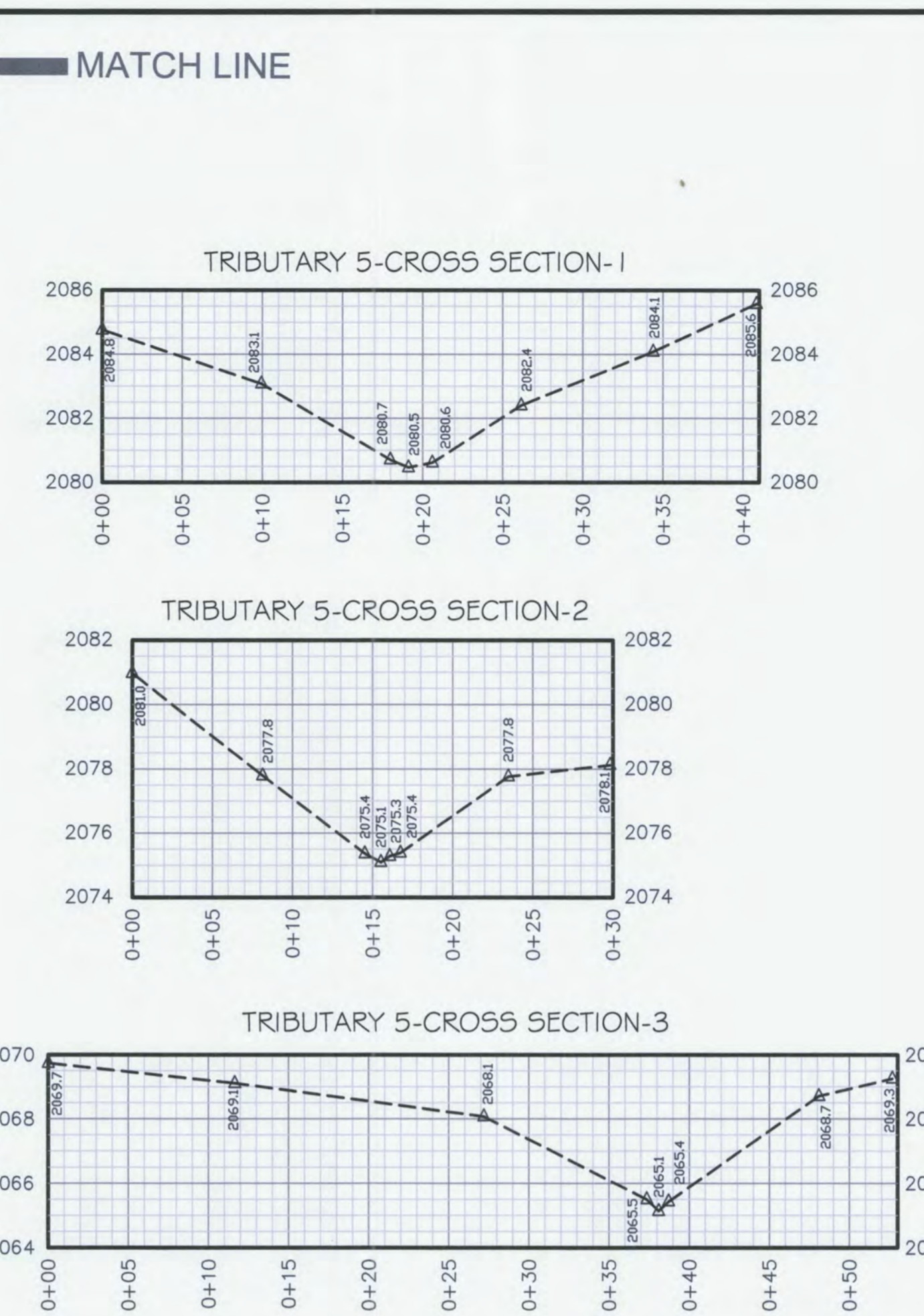
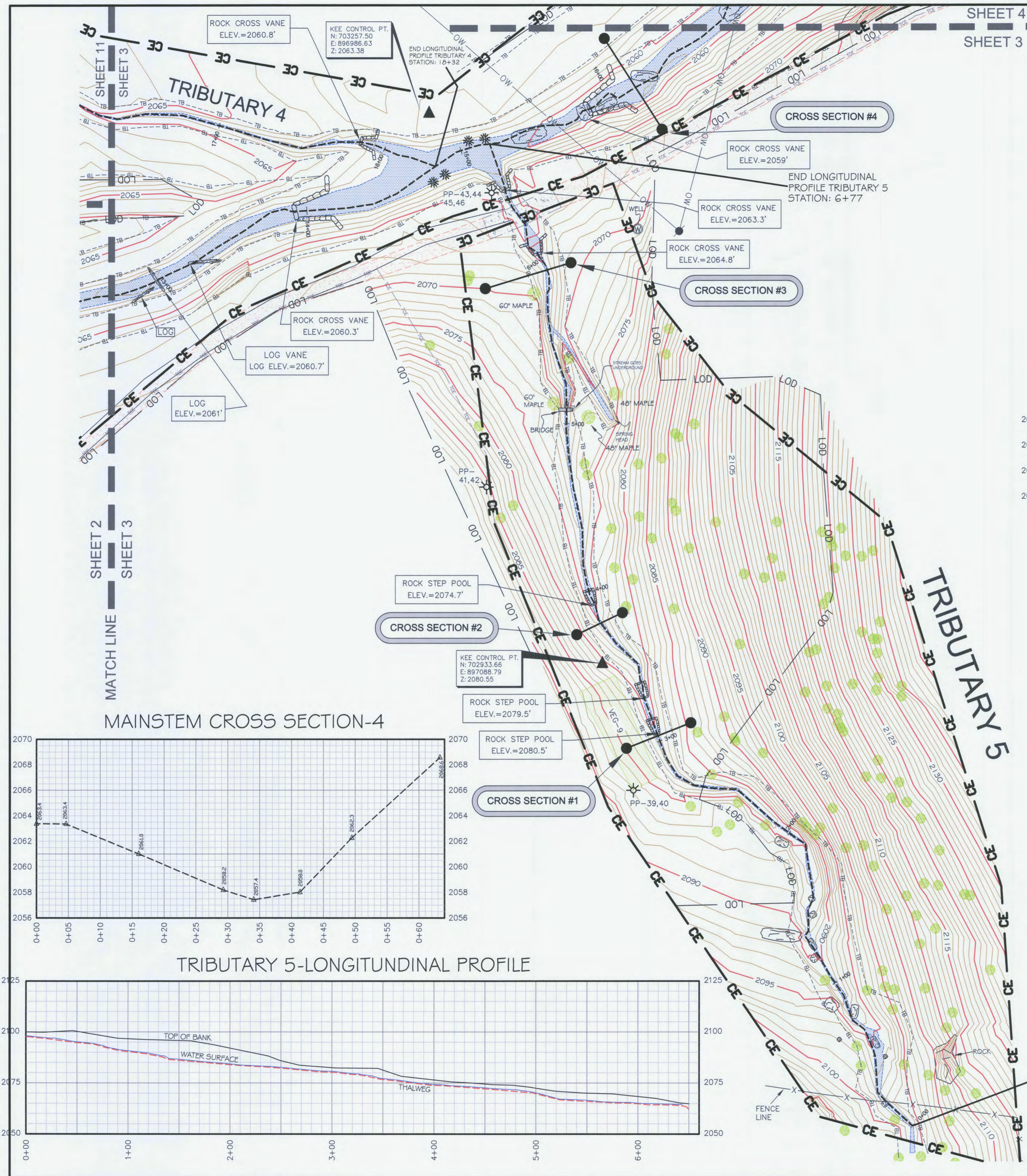
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SHEET #: 2 OF 14 SHEET SIZE: 24"X36" SCALE: 1"=30'

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SHEET 4
 MATCH LINE
 SHEET 3

CERTIFICATE OF SURVEY

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 PHILLIP B. KEE, PLS NC-4647

SEAL
 NORTH CAROLINA
 PROFESSIONAL
 LAND SURVEYOR
 PHILLIP B. KEE
 L-4647

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LEGEND:

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	TREE
	UTILITY POLE
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	THALWEG
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	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CPP CORRUGATED PLASTIC PIPE
	CMP CORRUGATED METAL PIPE
	INV INVERT

CONTOUR INTERVAL = 1 FOOT

0' 30' 60' 90'

ONE INCH = 30 FEET

**AN AS-BUILT SURVEY FOR:
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 EEP PROJECT #92497 SCO PROJECT #06-06-750-01**

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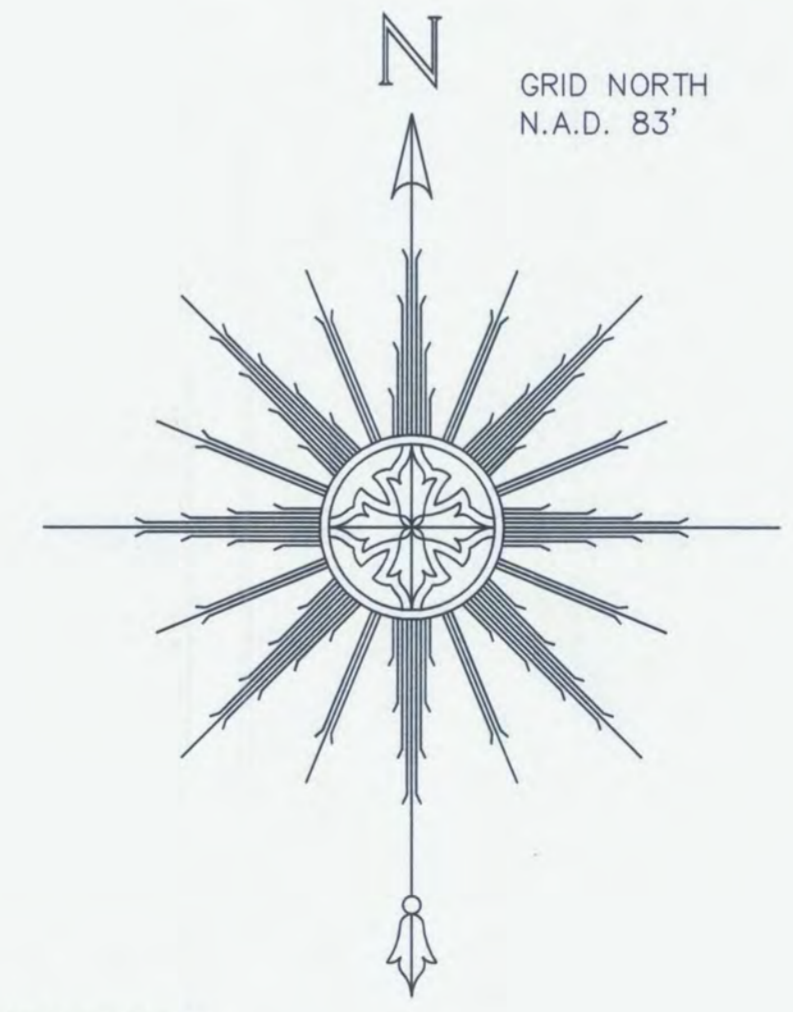
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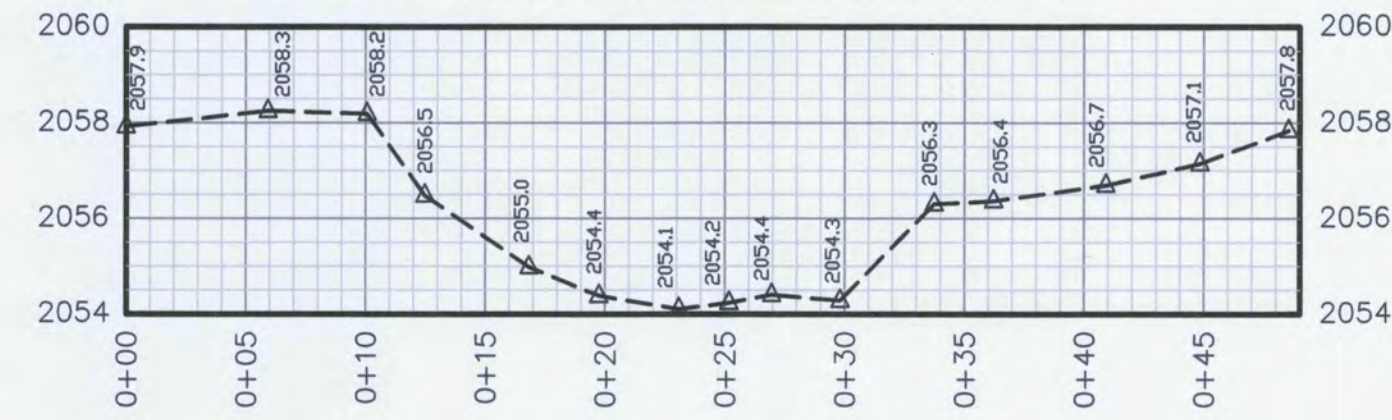
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Kee
 MAPPING & SURVEYING

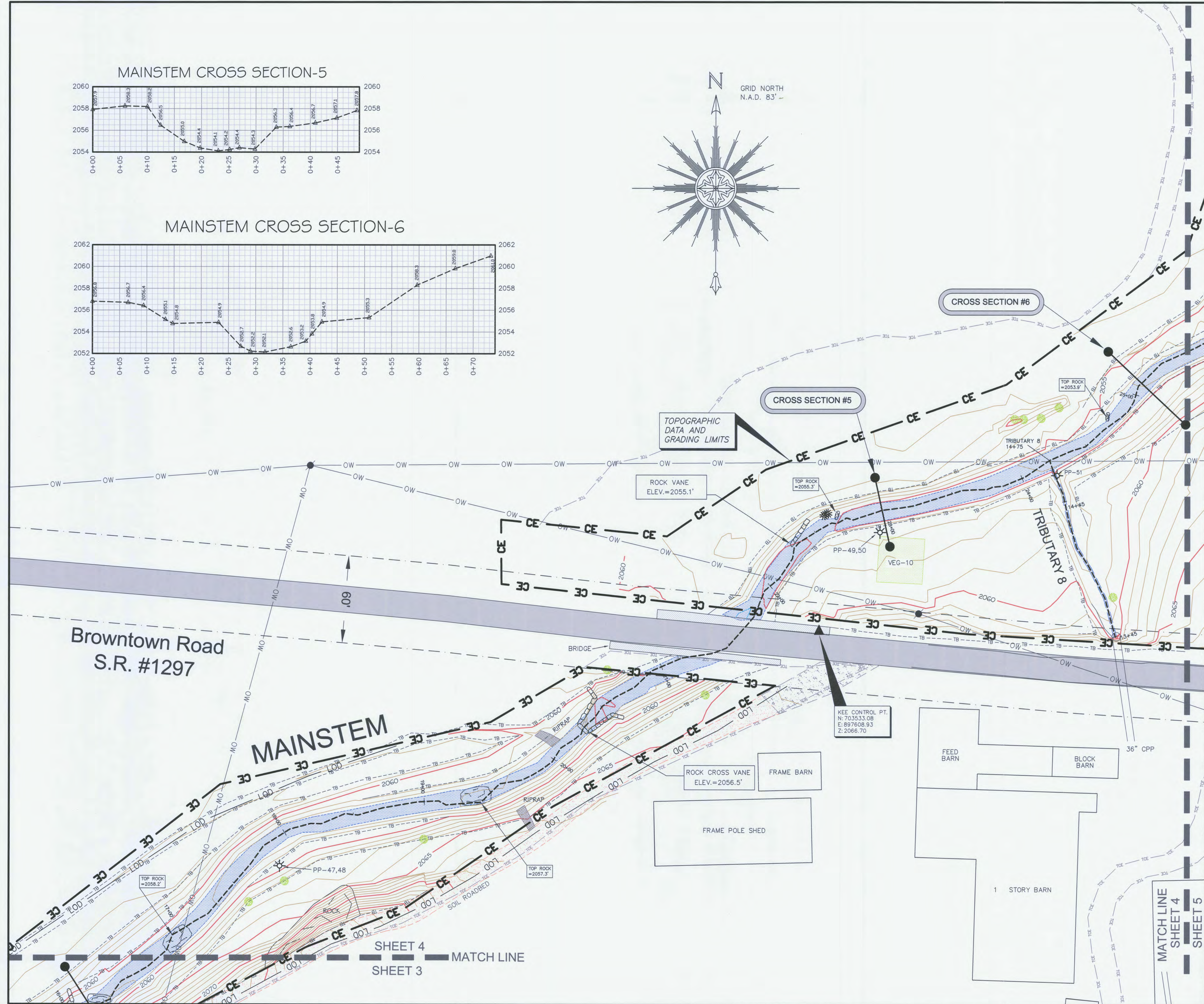
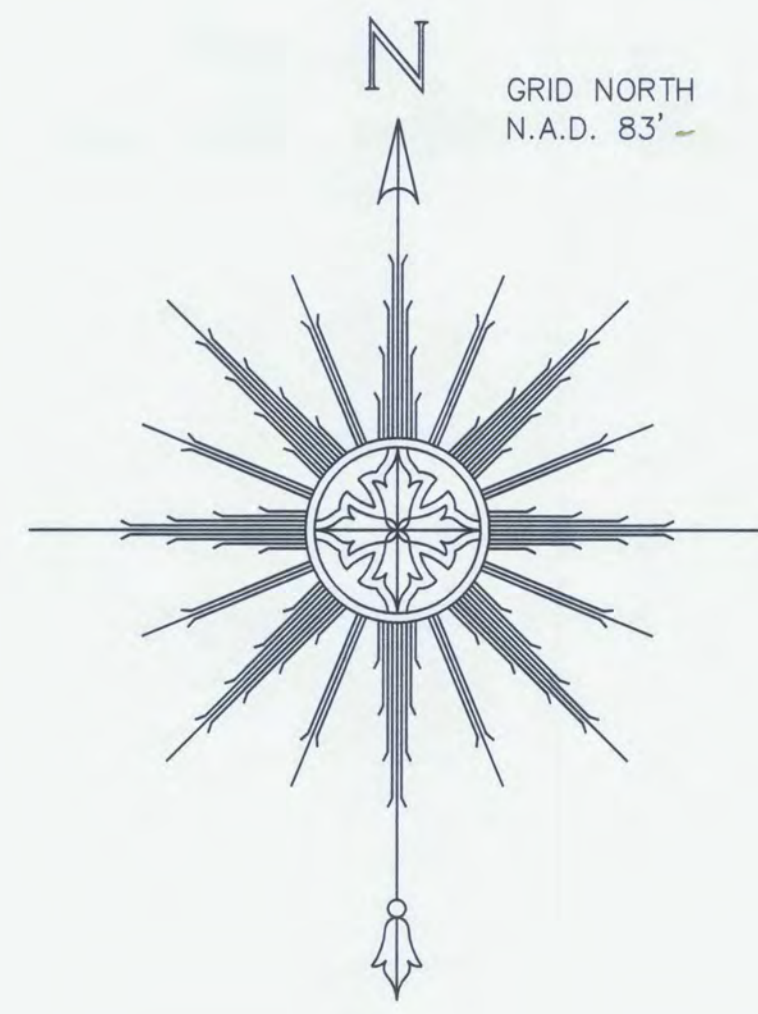
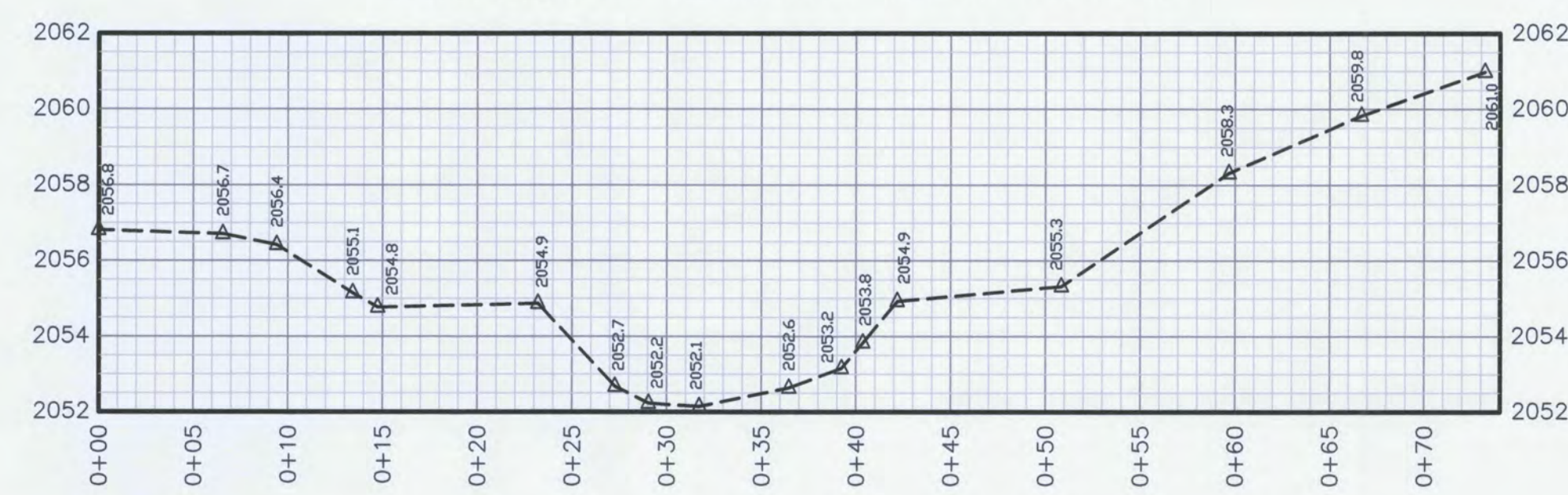
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MAINSTEM CROSS SECTION-5



MAINSTEM CROSS SECTION-6



CERTIFICATE OF SURVEY

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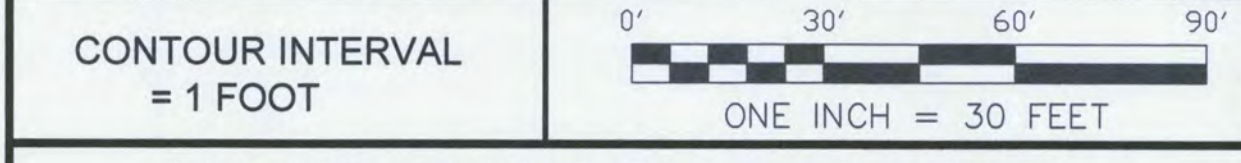
PHILLIP B. KEE
PHILLIP B. KEE, PLS NC-4647

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL L-4647 PHILLIP B. KEE

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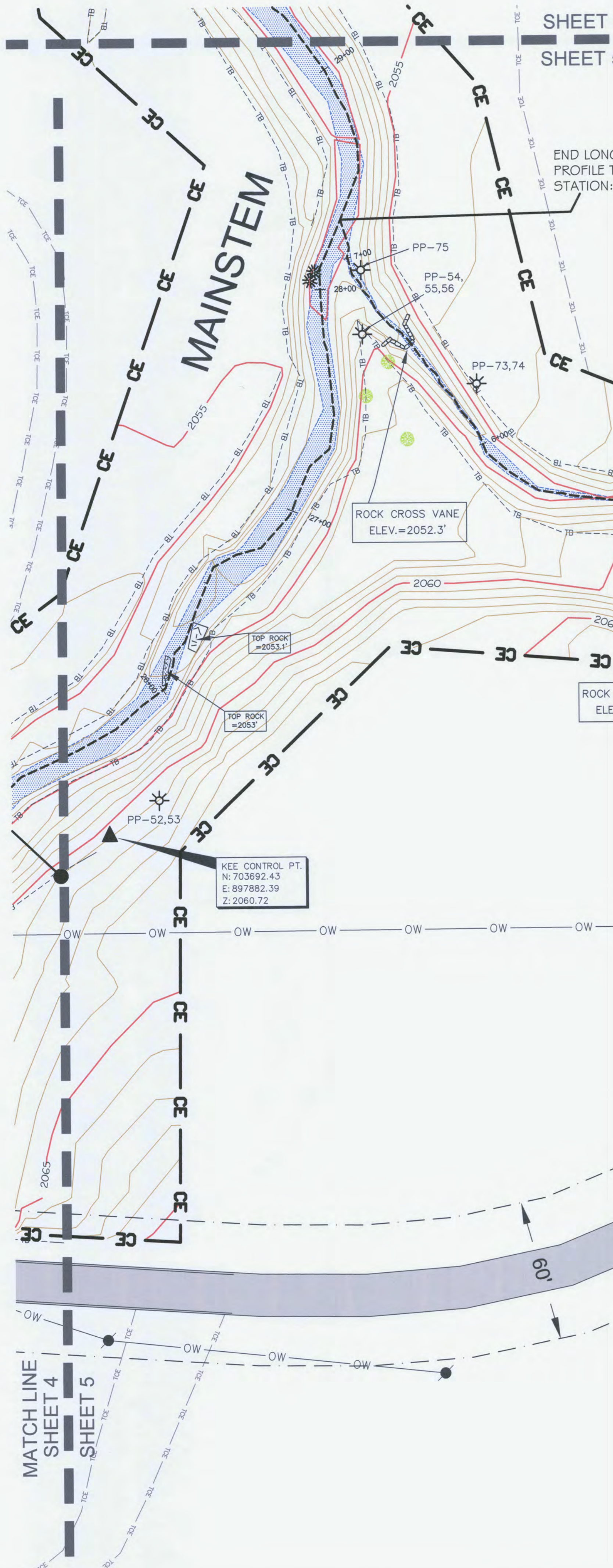
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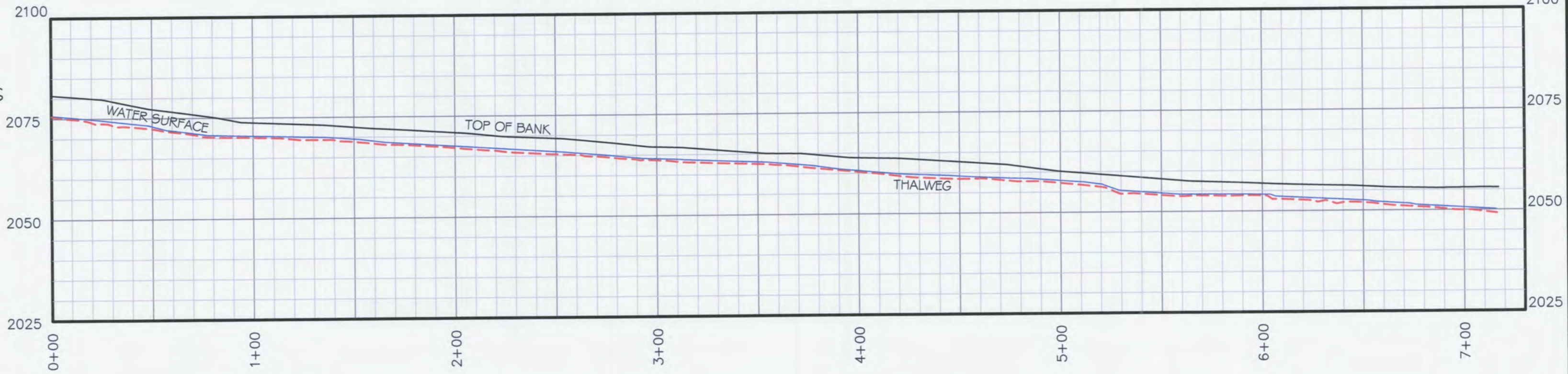
SHEET 4 MATCH LINE
SHEET 3

MATCH LINE
SHEET 4
SHEET 5



SHEET 6
SHEET 5 MATCH LINE

TRIBUTARY 6-LONGITUDINAL PROFILE



CROSS SECTION #2

CROSS SECTION #1

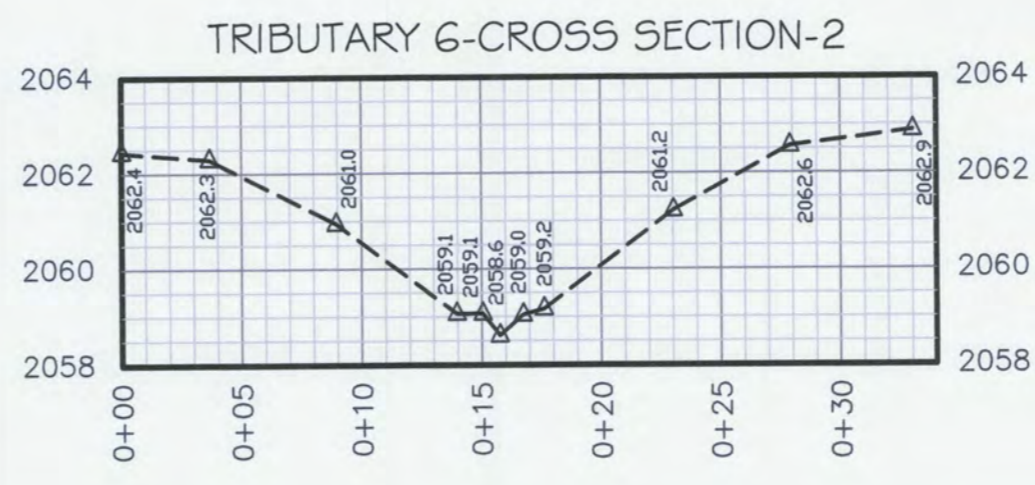
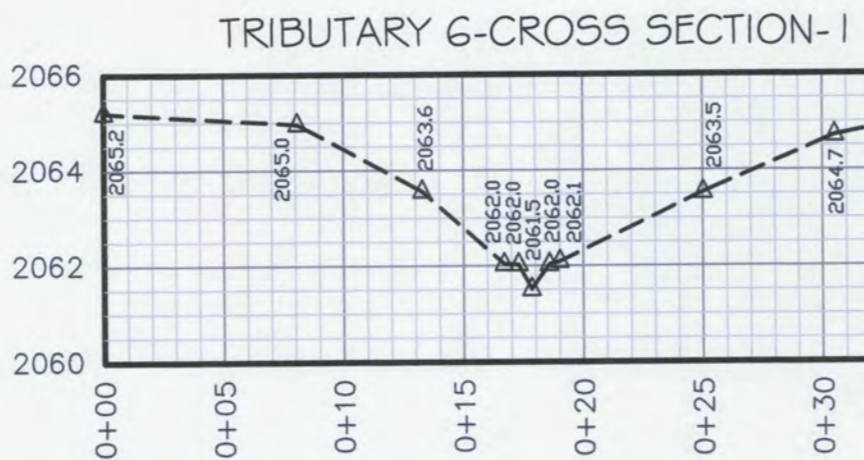
30" CMP
INV. IN=2063.2'
INV. OUT=2062.9'

KEEP CONTROL PT.
N: 703766.49
E: 897882.39
Z: 2060.72

TOPOGRAPHIC
DATA AND
GRADING LIMITS

BEGIN LONGITUDINAL
PROFILE TRIBUTARY 6
STATION: 0+00

Browntown Rd.
S.R. #1297



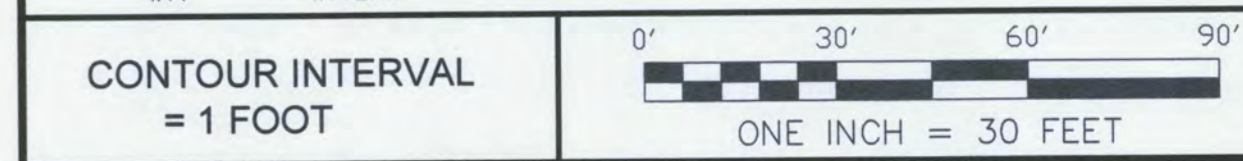
CERTIFICATE OF SURVEY
I, PHILLIP B. KEE CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT SLIDES 7691 AND 8346. THIS MAP MEETS THE SPECIFICATIONS 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.
WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.
Phillip B. Kee
PHILLIP B. KEE, PLS NC-4647



- SURVEYOR'S NOTES:
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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CE CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TCE TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LOD LIMITS OF DISTURBANCE
	OW OVERHEAD WIRE
	TB TOP OF BANK
	EW EDGE OF WATER
	THALWEG
	ROW RIGHT OF WAY
	SR SOIL ROADBED
	STR STREAM
	GRAVEL
	ASPHALT
	VEG-# VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CPP CORRUGATED PLASTIC PIPE
	CMP CORRUGATED METAL PIPE
	INV INVERT



AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
EEP PROJECT #92497 SCO PROJECT #06-06-750-01

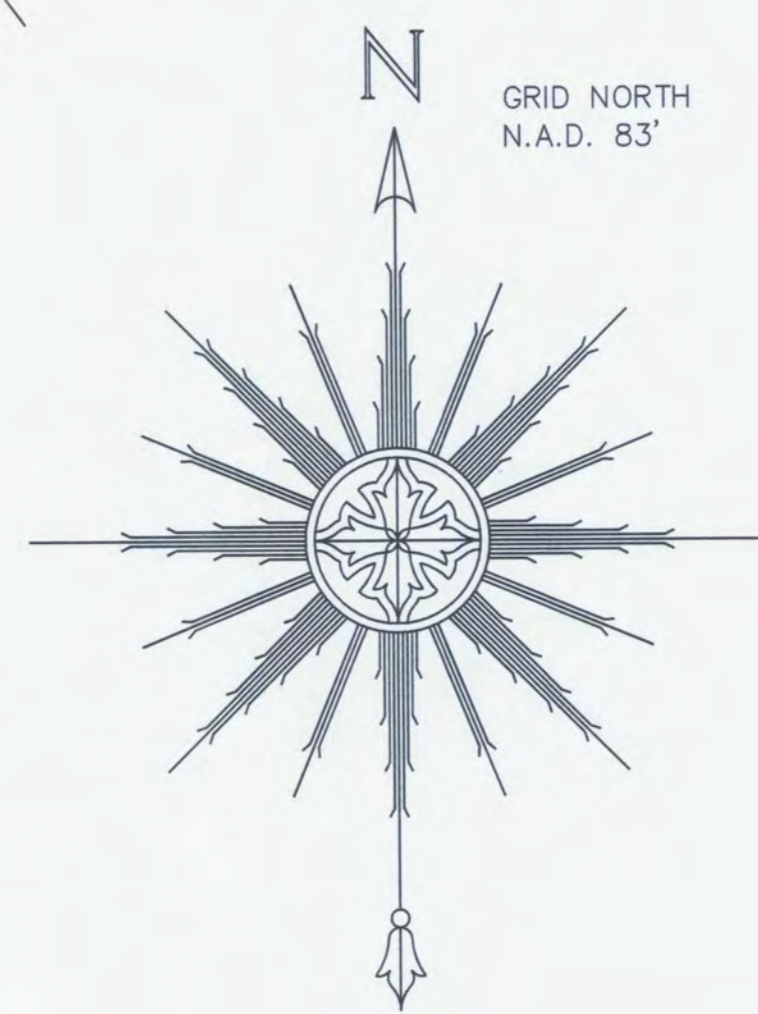
LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

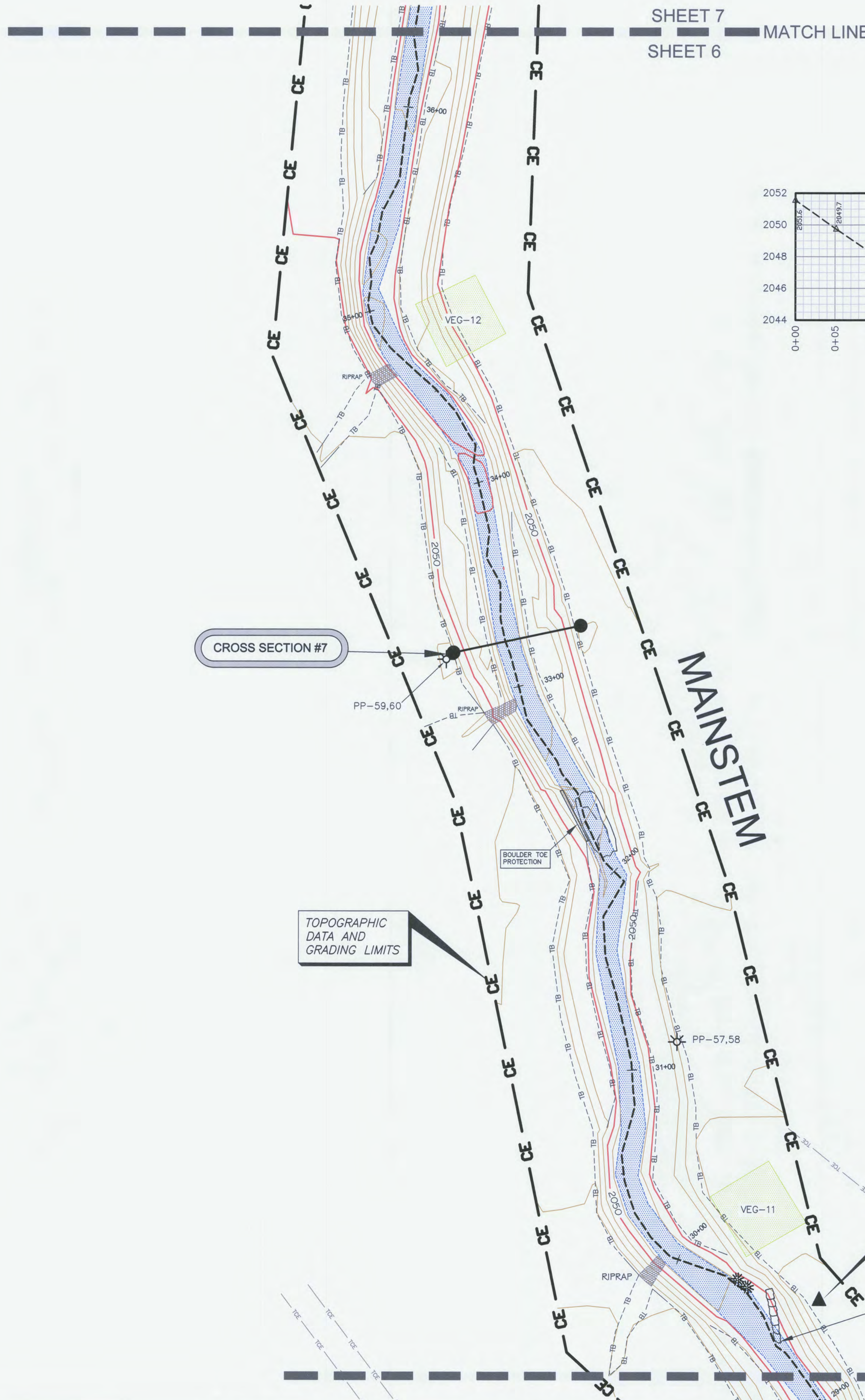
PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST
PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945
PLAT REFERENCES: PB:122 PG:11-14, PB:145 PG:37 PB:145 PG:85

SURVEY BY: PBK,NH,MM,RT,KJ DRAWN BY: PBK CHECKED BY: NH
AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 5 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

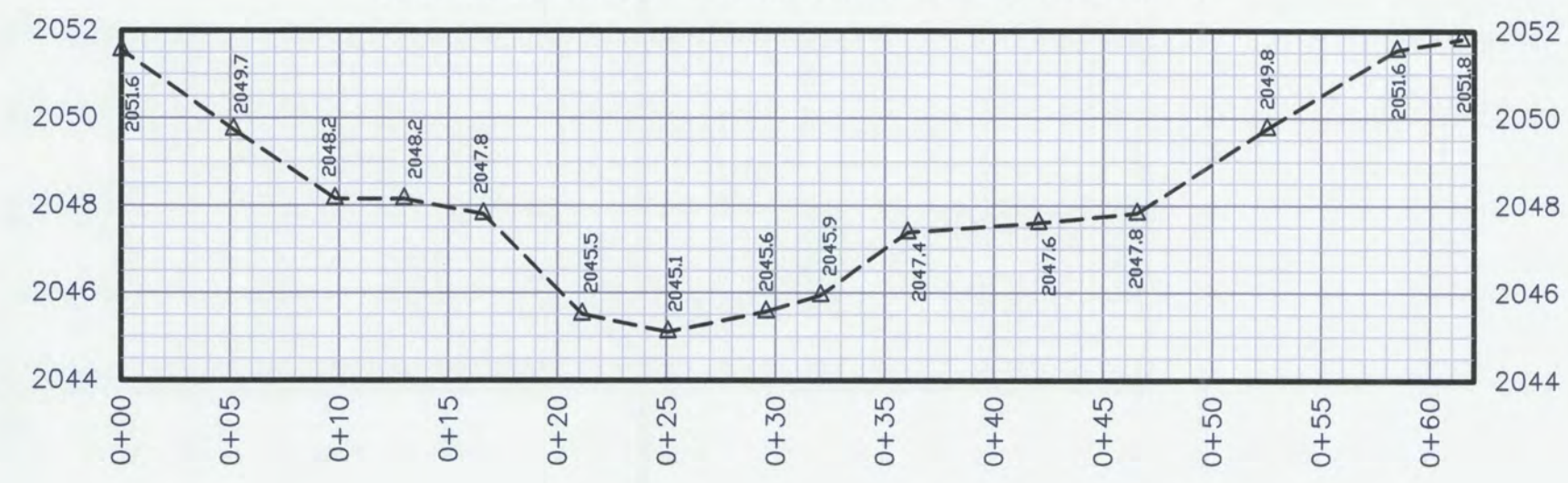
Kee
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Asheville, NC 28802
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License # C-3039





SHEET 7
MATCH LINE
SHEET 6

MAINSTEM CROSS SECTION-7



CERTIFICATE OF SURVEY
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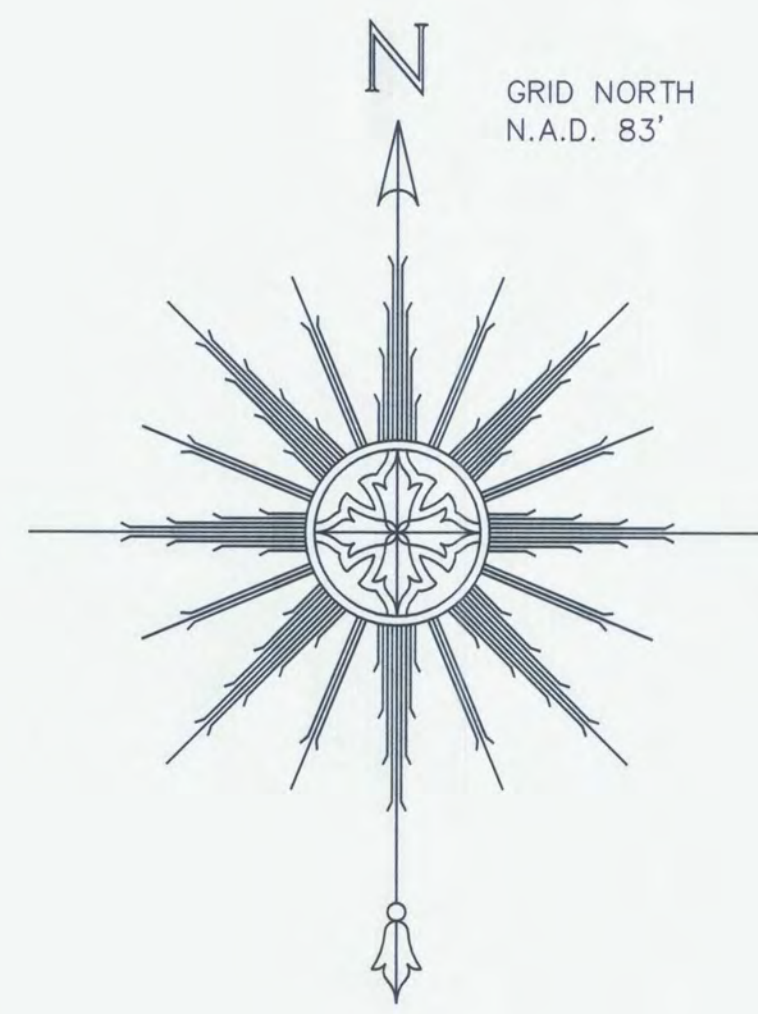
PHILLIP B. KEE, PLS NC-4647



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LEGEND:

- PHOTO POINT (PP-#)
- SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
- 1/2" IRON PIPE SET BY DESIGNER
- ROCK
- LOG VANE
- LOG CROSS VANE
- ROCK CROSS VANE
- ROCK VANE
- ROOTWAD
- TREE
- UTILITY POLE
- CE CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
- TCE TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
- LOD LIMITS OF DISTURBANCE
- OW OVERHEAD WIRE
- TB TOP OF BANK
- EDGE OF WATER
- THALWEG
- RIGHT OF WAY
- SOIL ROADBED
- STREAM
- GRAVEL
- ASPHALT
- VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
- RIPRAP
- NAD NORTH AMERICAN DATUM 1983
- CPP CORRUGATED PLASTIC PIPE
- CMP CORRUGATED METAL PIPE
- INV INVERT



CONTOUR INTERVAL = 1 FOOT
ONE INCH = 30 FEET

AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST
PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945

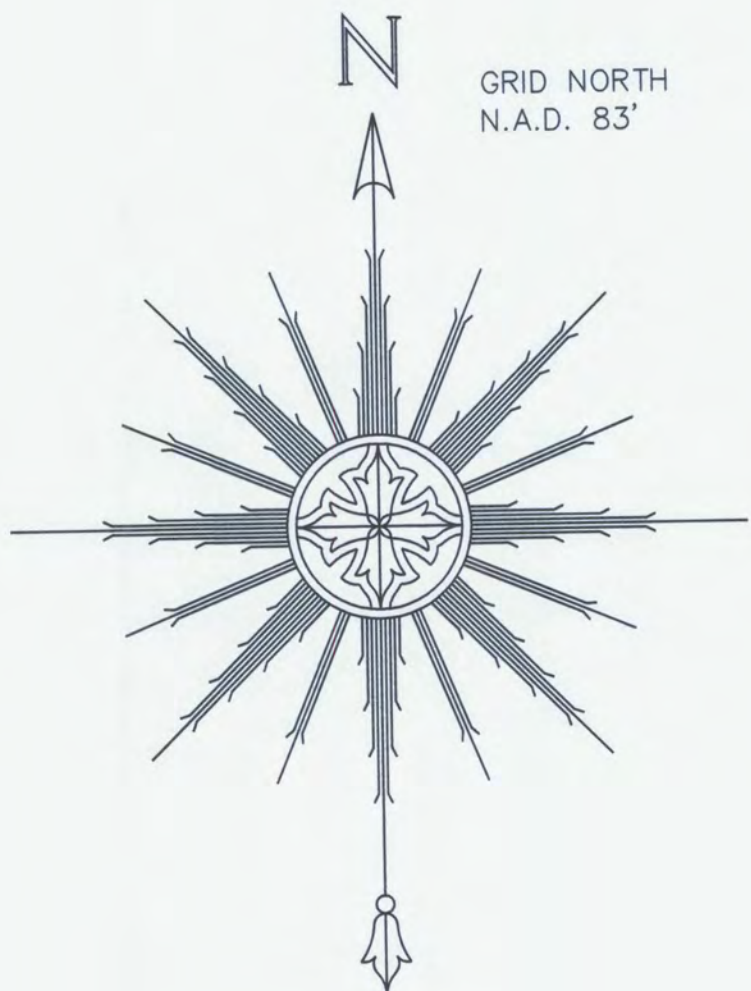
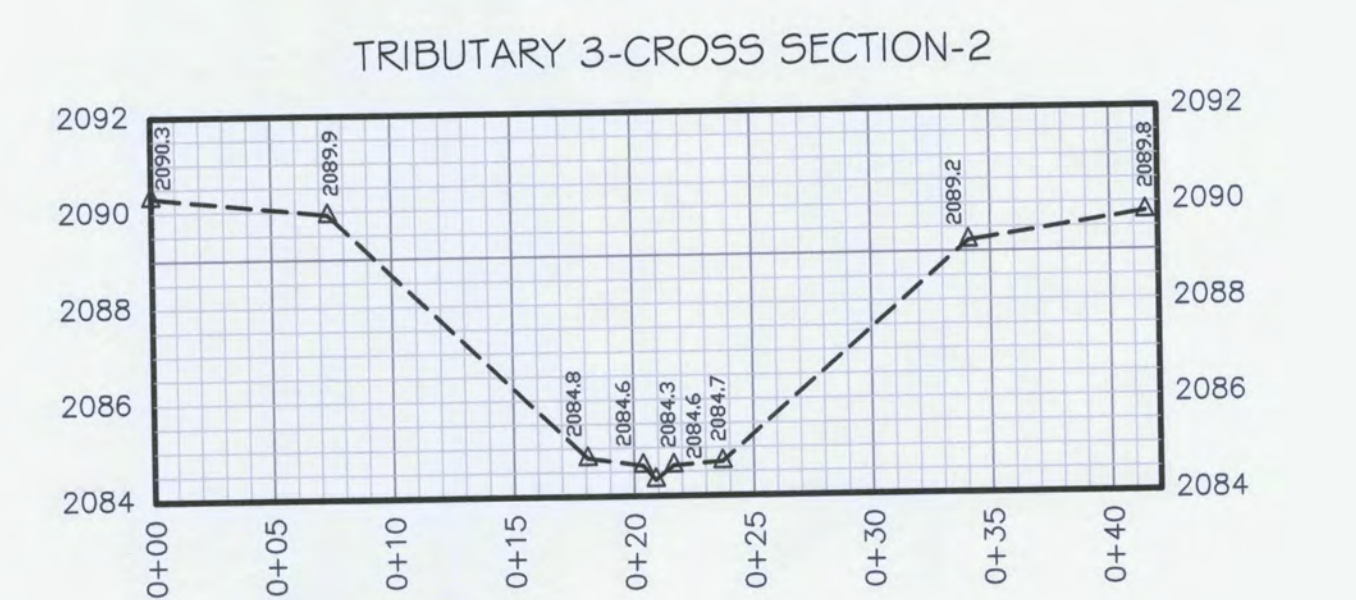
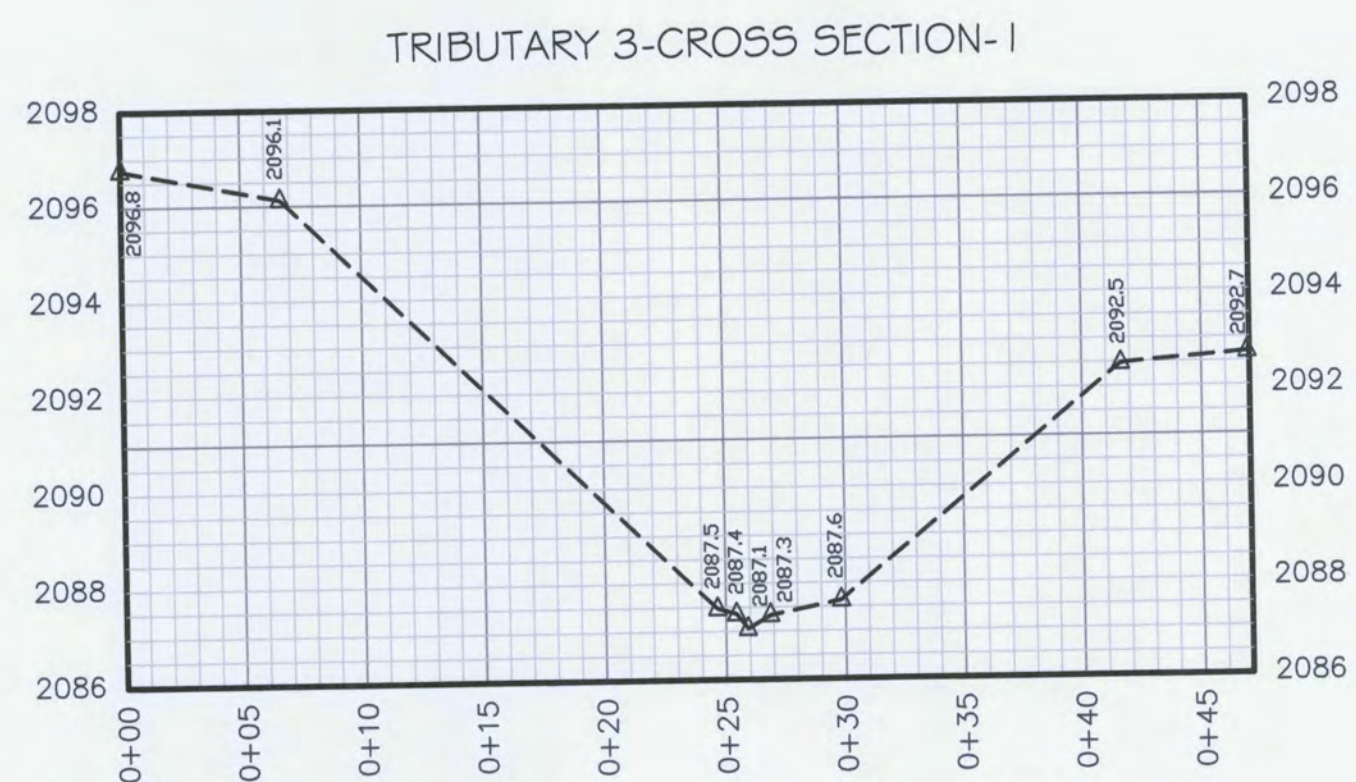
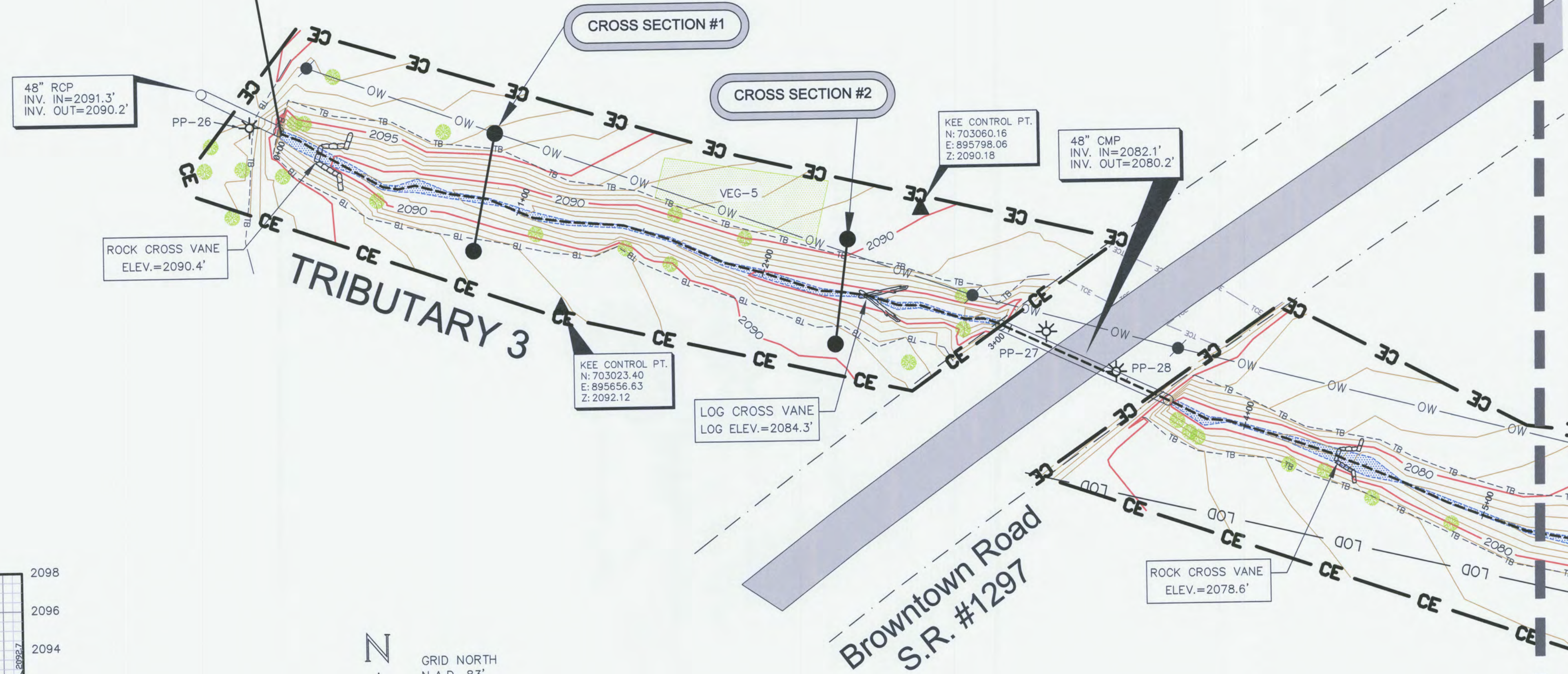
PLAT REFERENCES: PB: 122 PG: 11-14, PB: 145 PG: 37 PB: 145 PG: 85
SURVEY BY: PBK, NH, MM, RT, KJ DRAWN BY: PBK CHECKED BY: NH

AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540
SHEET #: 6 OF 14 SHEET SIZE: 24"X36" SCALE: 1"=30'

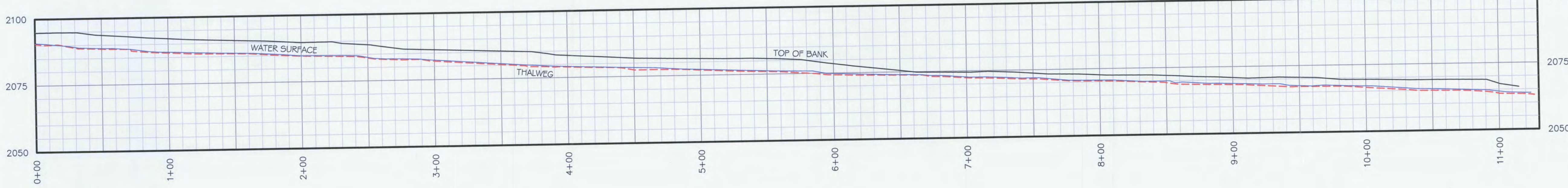
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License # C-3039

SHEET 6
MATCH LINE
SHEET 5

BEGIN LONGITUDINAL PROFILE TRIBUTARY 3 STATION: 0+00



TRIBUTARY 3-LONGITUDINAL PROFILE



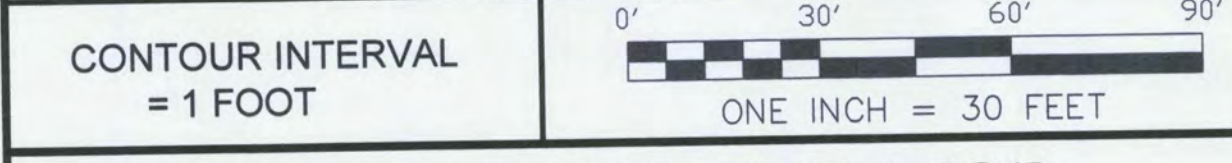
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LEGEND:

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- 1/2" IRON PIPE SET BY DESIGNER
- ROCK
- LOG VANE
- LOG CROSS VANE
- ROCK CROSS VANE
- ROCK VANE
- ROOTWAD
- TREE
- UTILITY POLE
- CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
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- TOP OF BANK
- EDGE OF WATER
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- RIGHT OF WAY
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- GRAVEL
- ASPHALT
- VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
- RIPRAP
- NAD
- CPP
- CMP
- INVERT



CONTOUR INTERVAL = 1 FOOT

**AN AS-BUILT SURVEY FOR:
 THE ECOSYSTEM ENHANCEMENT PROGRAM
 NEWFOUND CREEK STREAM RESTORATION
 EEP PROJECT #92497 SCO PROJECT #06-06-750-01**

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
 LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

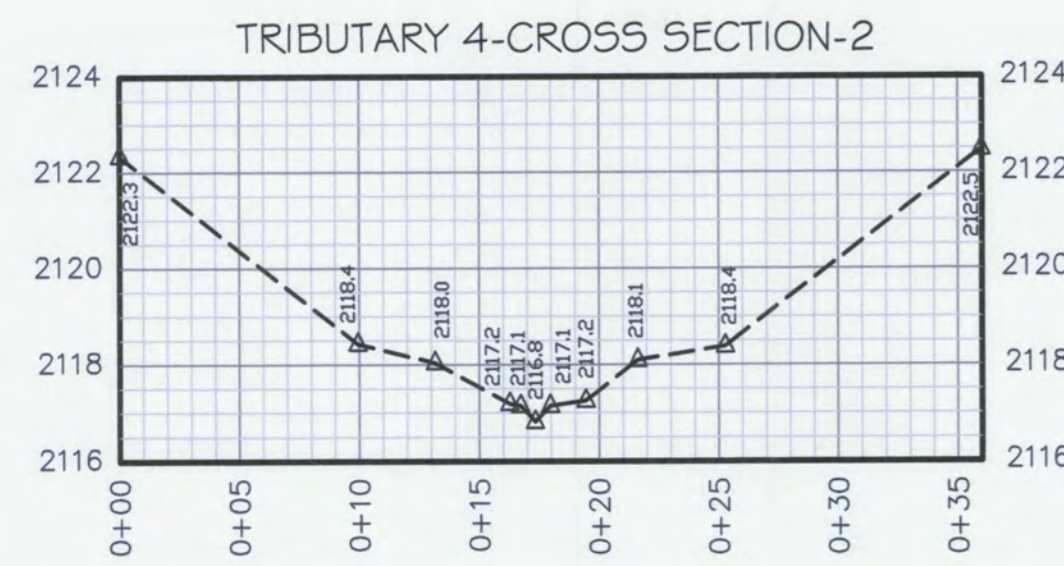
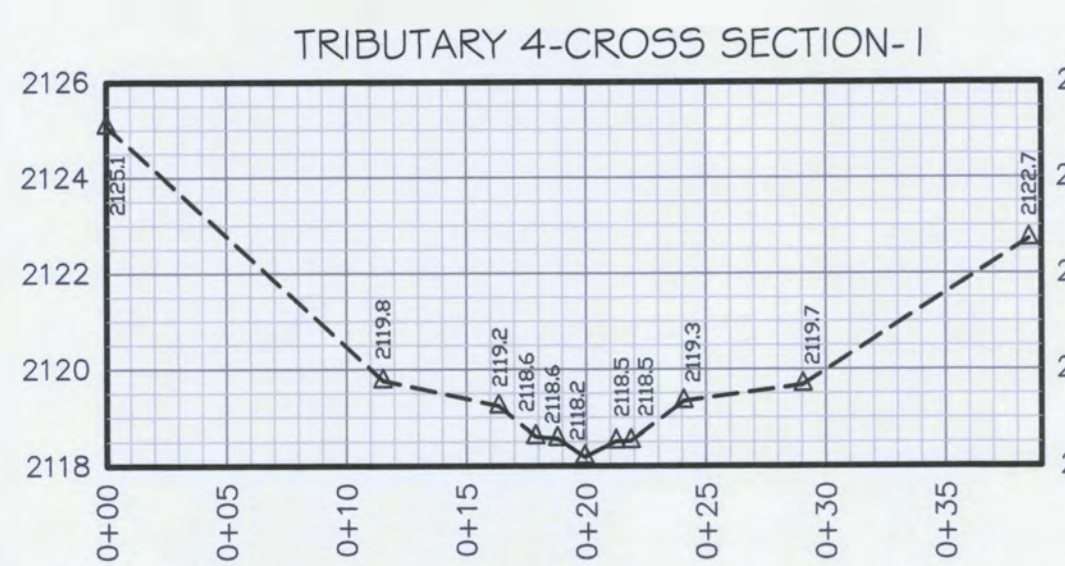
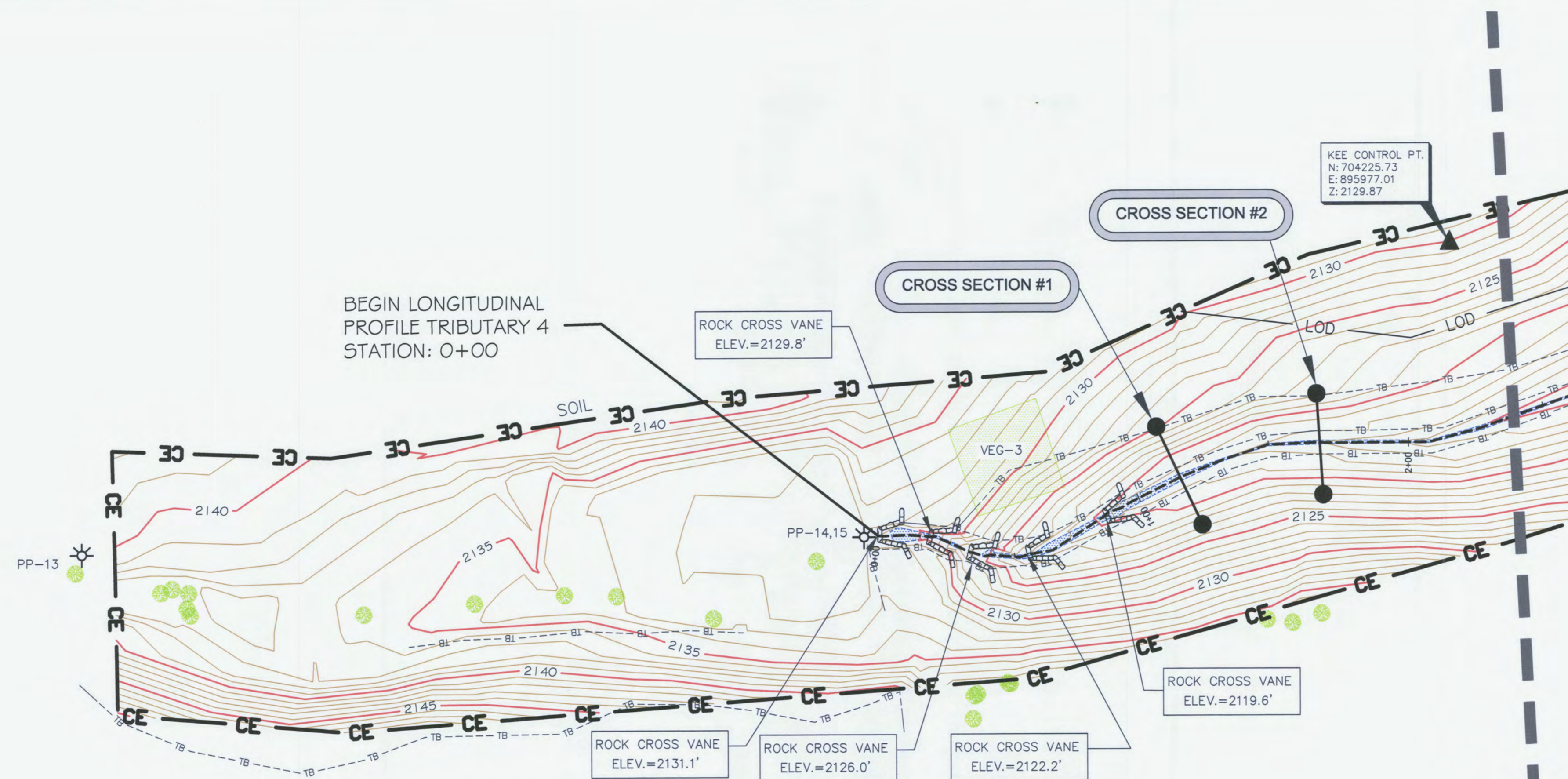
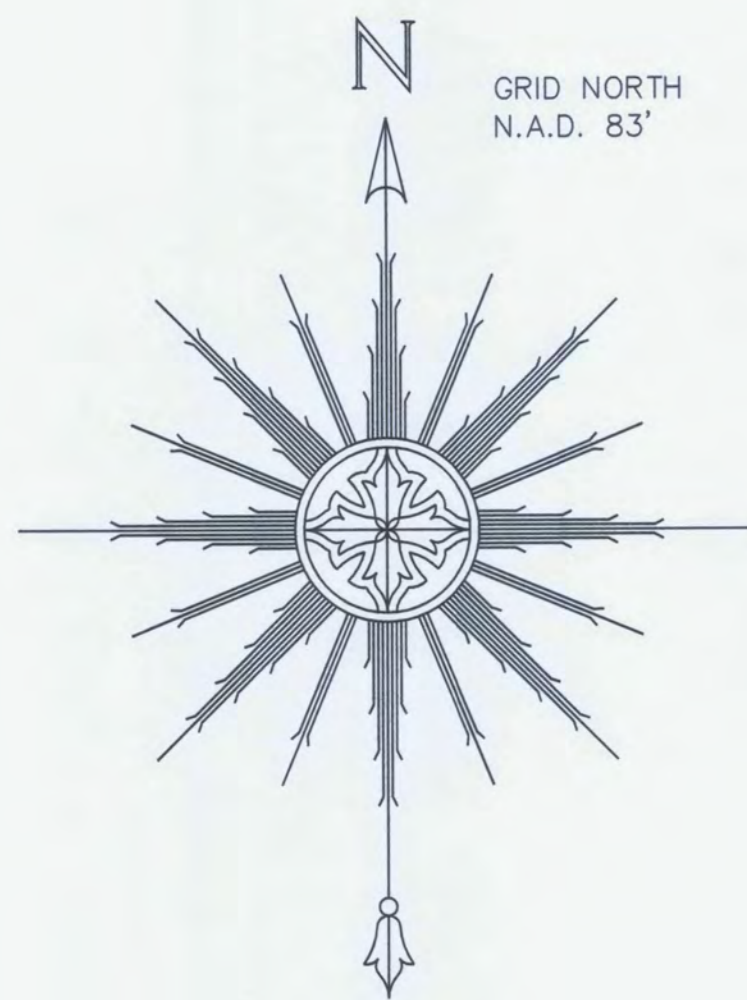
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 AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

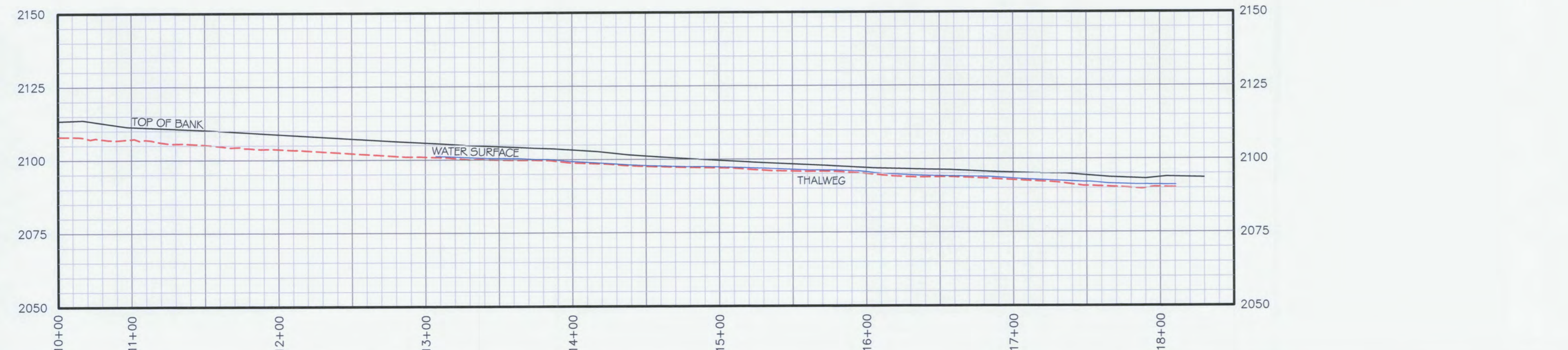
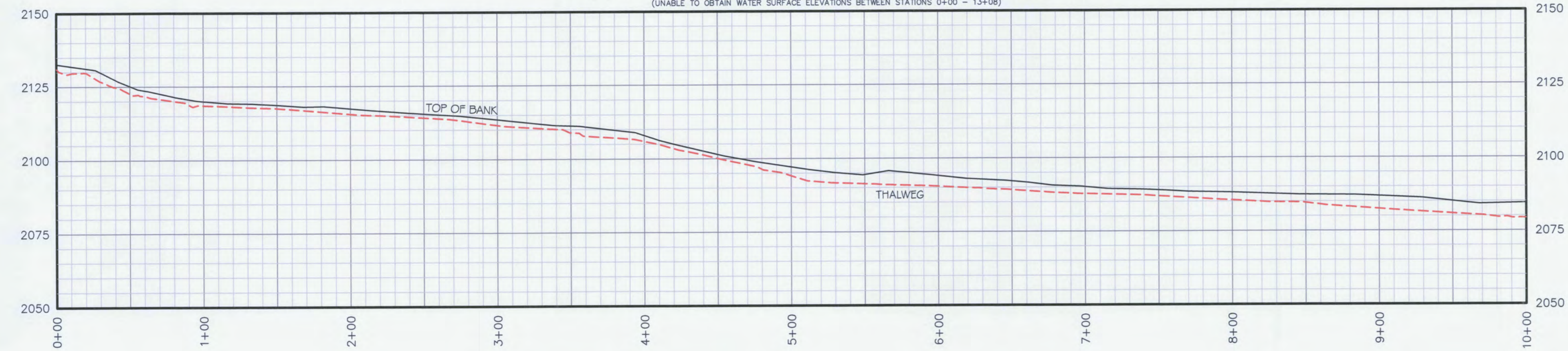
SHEET #: 8 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

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TRIBUTARY 4

TRIBUTARY 4-LONGITUDINAL PROFILE



SHEET 10
SHEET 9
MATCH LINE

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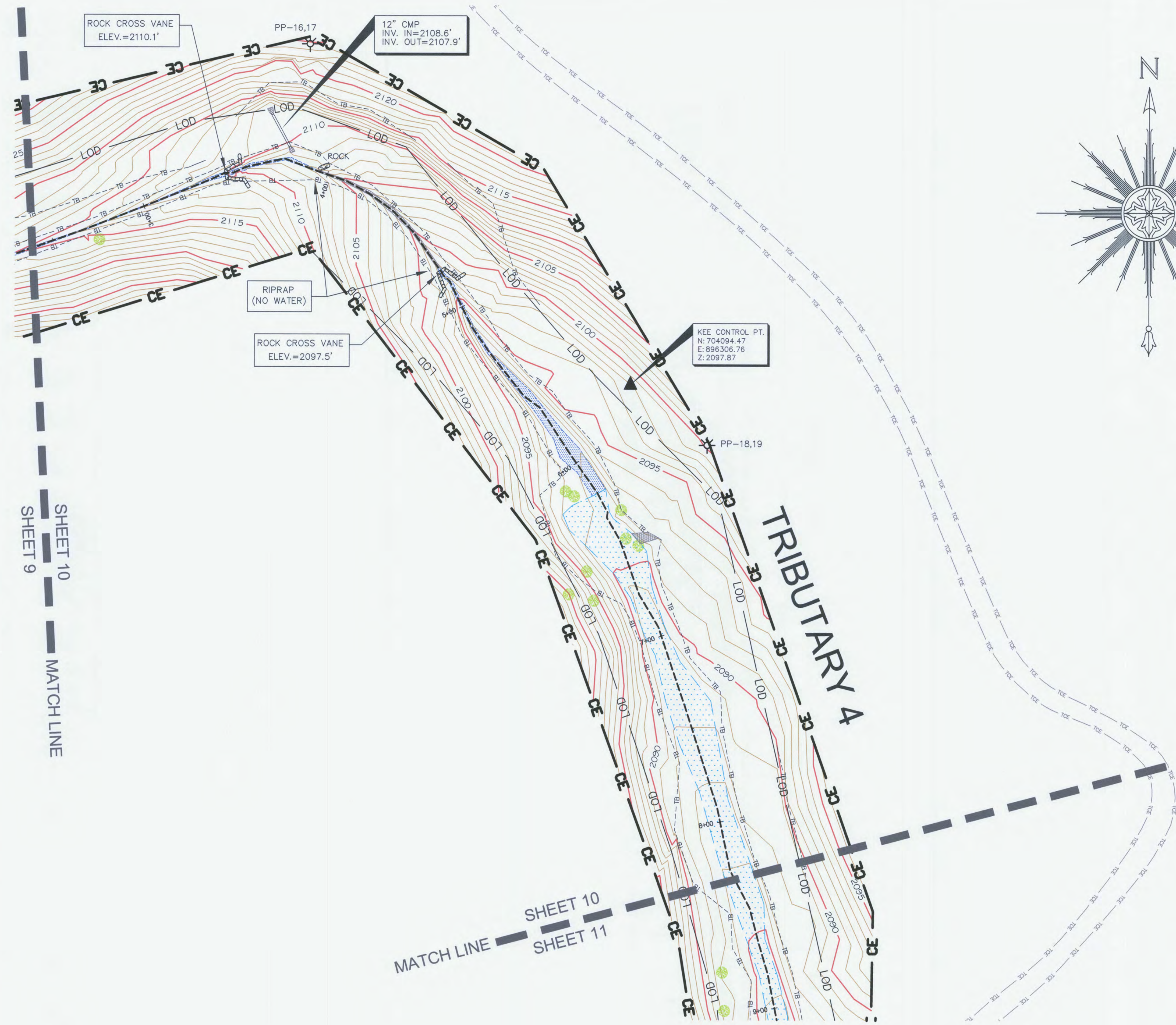
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	ROCK
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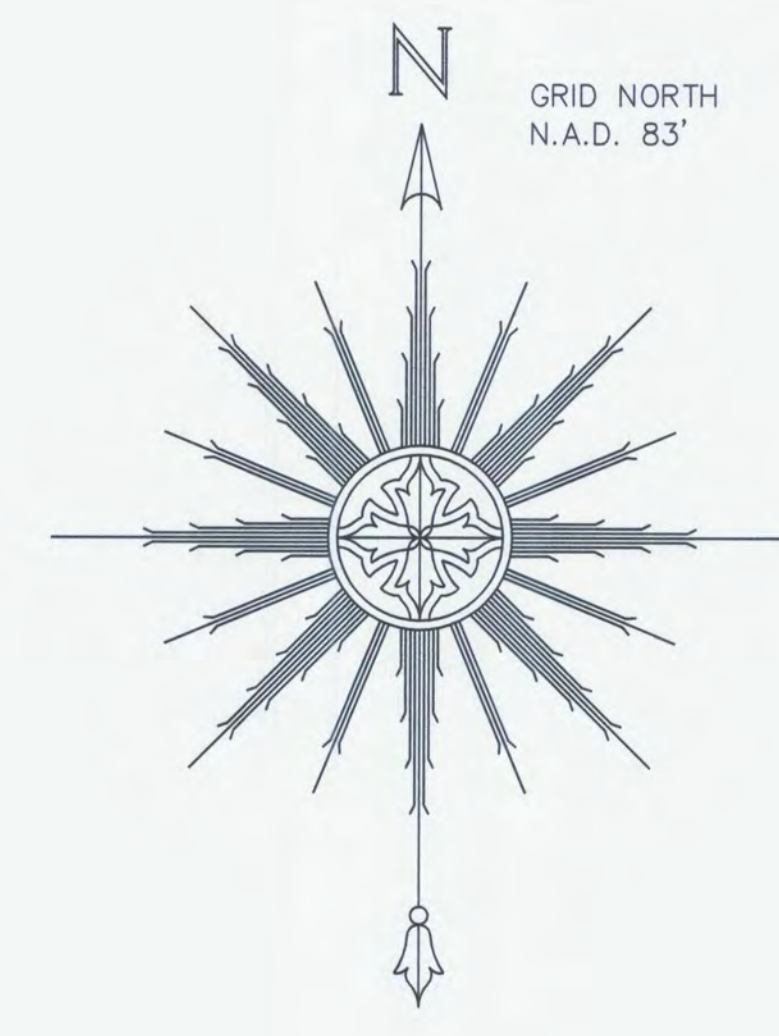
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SHEET 10
SHEET 9
MATCH LINE

SHEET 10
SHEET 11
MATCH LINE



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 - UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.

LEGEND:

- PHOTO POINT (PP-#)
- SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
- 1/2" IRON PIPE SET BY DESIGNER
- ROCK
- LOG VANE
- LOG CROSS VANE
- ROCK CROSS VANE
- ROCK VANE
- ROOTWAD
- TREE
- UTILITY POLE
- CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
- TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
- LIMITS OF DISTURBANCE
- OVERHEAD WIRE
- TOP OF BANK
- EDGE OF WATER
- THALWEG
- RIGHT OF WAY
- SOIL ROADBED
- STREAM
- GRAVEL
- ASPHALT
- VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
- RIPRAP
- NAD NORTH AMERICAN DATUM 1983
- CPP CORRUGATED PLASTIC PIPE
- CMP CORRUGATED METAL PIPE
- INV INVERT

CONTOUR INTERVAL = 1 FOOT

0' 30' 60' 90'
ONE INCH = 30 FEET

**AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION**

ECP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST

PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945
PLAT REFERENCES: PB:122 PG:11-14, PB:145 PG:37 PB:145 PG:85

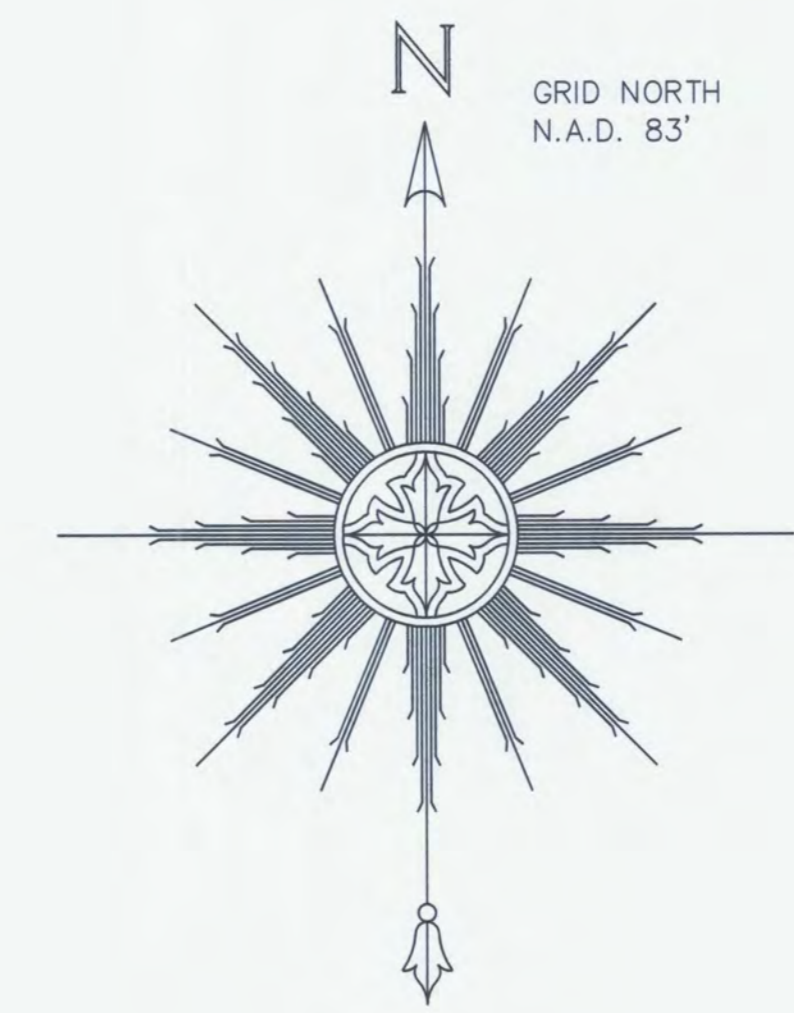
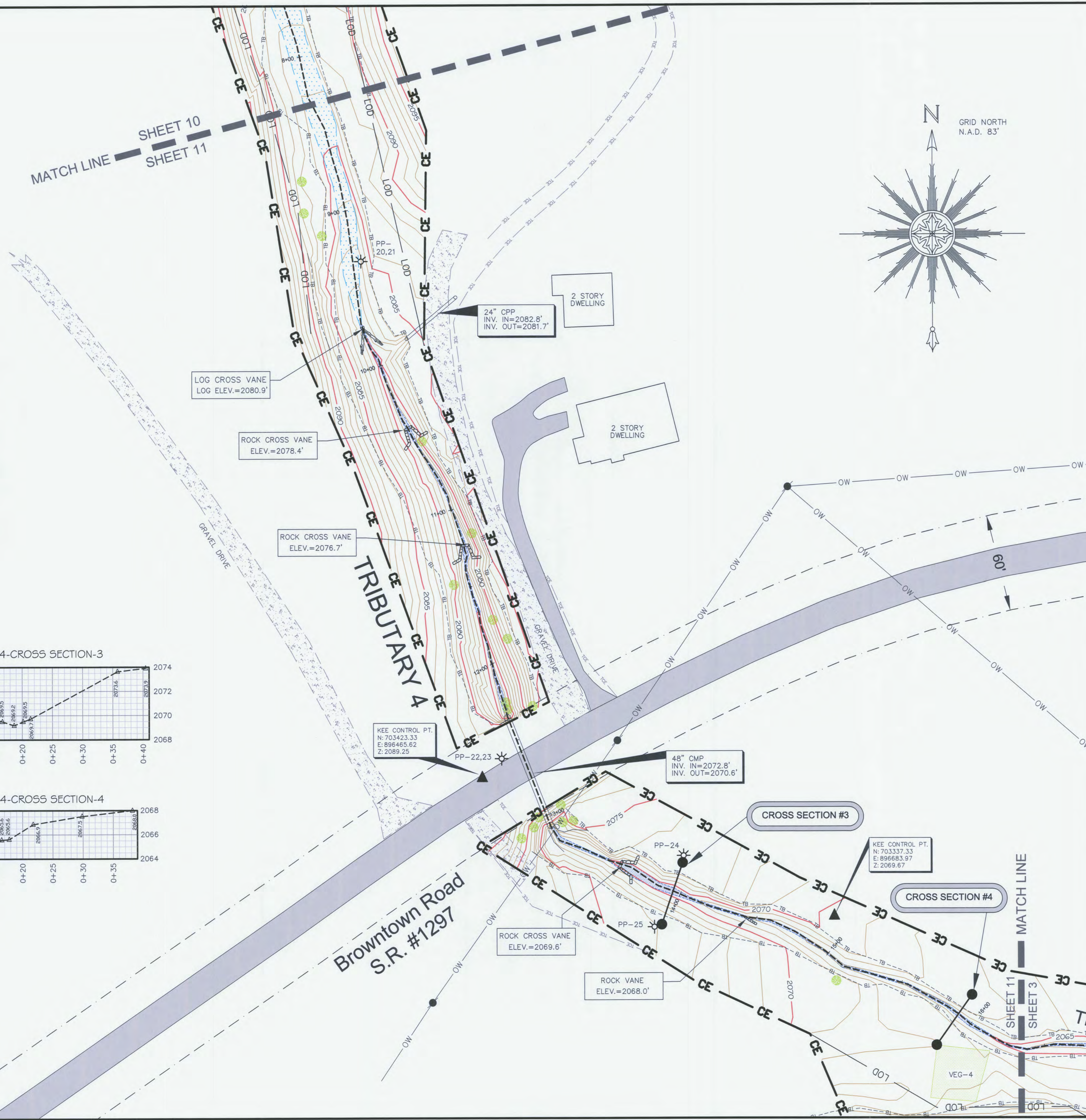
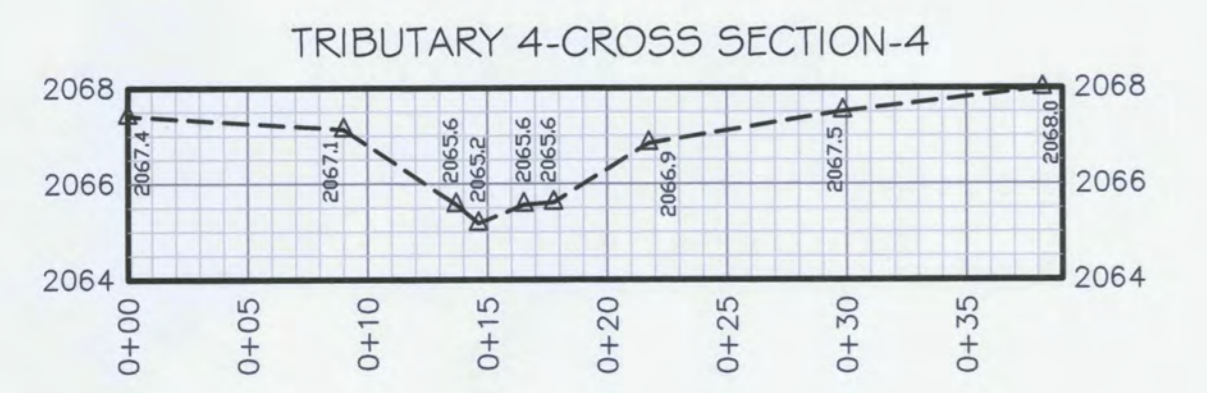
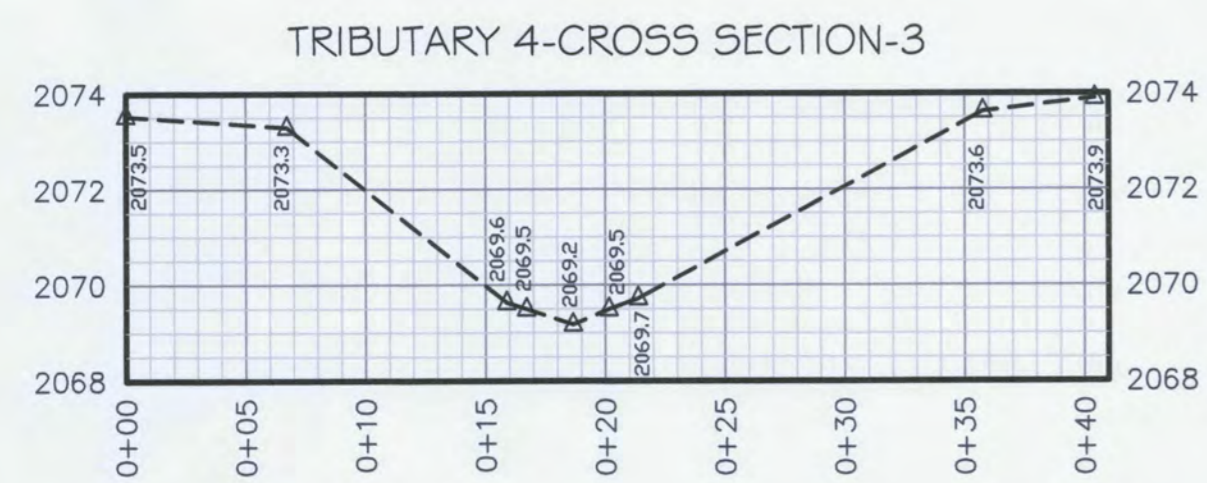
SURVEY BY: PBK,NH,MM,RT,KJ DRAWN BY: PBK CHECKED BY: NH
AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 10 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

Kee
MAPPING & SURVEYING

P.O. Box 2566
Asheville, NC 28802
(828) 645-8275
www.keemap.com
License # C-3039

MATCH LINE
SHEET 10
SHEET 11



CERTIFICATE OF SURVEY

I, PHILLIP B. KEE CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT SLIDES 7691 AND 8346. 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.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.

Phillip B. Kee
PHILLIP B. KEE, PLS NC-4647

- SURVEYOR'S NOTES:
1. ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
 2. PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
 3. CONSERVATION EASEMENT BOUNDARIES SHOWN HEREON WERE TAKEN FROM PLATS; ENTITLED: A CONSERVATION EASEMENT SURVEY FOR THE STATE OF NC; PREPARED BY LANDMARK SURVEYING, INC; NEWFOUND CREEK BEING RECORDED IN THE BUNCOMBE COUNTY REGISTRY.
 4. BY GRAPHIC DETERMINATION, THE CONSERVATION EASEMENT AREA APPEARS TO LIE IN A SPECIAL FLOOD HAZARD AREA (ZONE AE) WHERE BASE FLOOD ELEVATIONS ARE DETERMINED PER THE F.E.M.A. MAP#3700879000J; DATED JANUARY 6, 2010.
 5. STATE PLANE COORDINATES AND ELEVATIONS WERE DERIVED FROM THE EXISTING CONDITIONS TOPOGRAPHIC SURVEY; PREPARED BY ESP ASSOCIATES, PA (704) 793-9855. THE HORIZONTAL DATUM IS NAD83(2011) AND THE VERTICAL DATUM IS NAVD88. ALL COORDINATES SHOWN HEREON ARE GROUND MEASUREMENTS IN US SURVEY FEET.
 6. CROSS SECTION PROFILES ARE FROM LEFT TO RIGHT BANK. PROFILES SHOWN HEREON ARE NOT TO SCALE.
 7. THE LOCATION OF ALL PHOTO POINTS WERE PROVIDED BY URS CORPORATION AND WERE NOT CHECKED FOR ACCURACY.
 8. LIMITS OF DISTURBANCE FOLLOWS THE CONSERVATION EASEMENT BOUNDARY UNLESS SHOWN OTHERWISE.
 9. UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.

LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LIMITS OF DISTURBANCE
	OVERHEAD WIRE
	TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CORRUGATED PLASTIC PIPE
	CORRUGATED METAL PIPE
	INVERT

CONTOUR INTERVAL = 1 FOOT

ONE INCH = 30 FEET

AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST

PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945

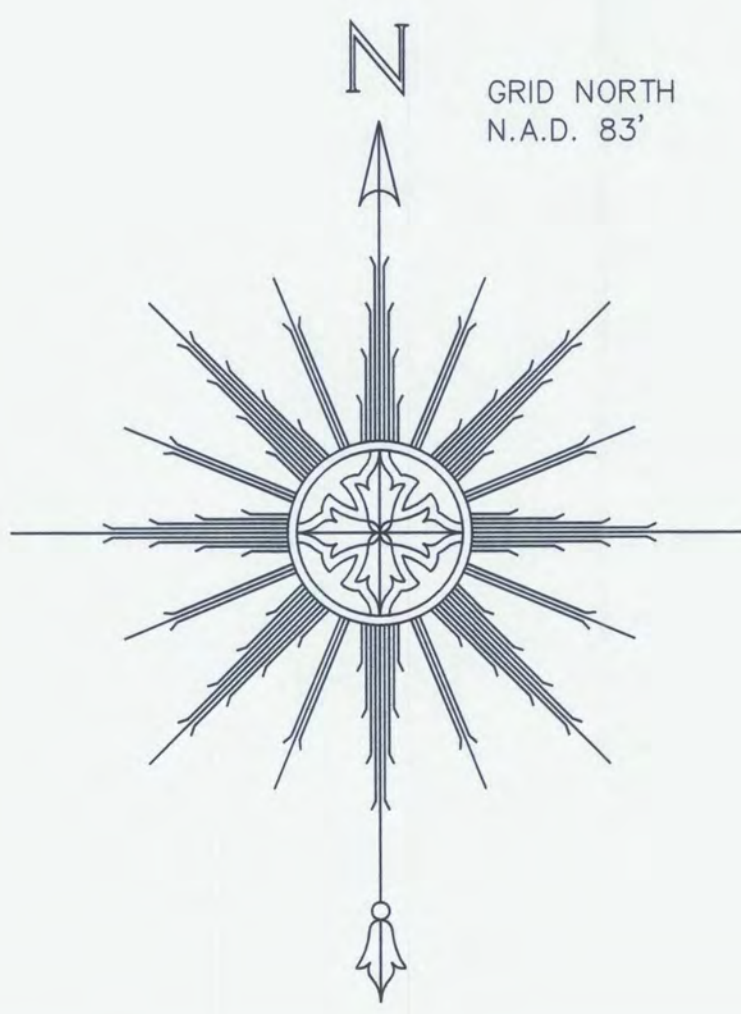
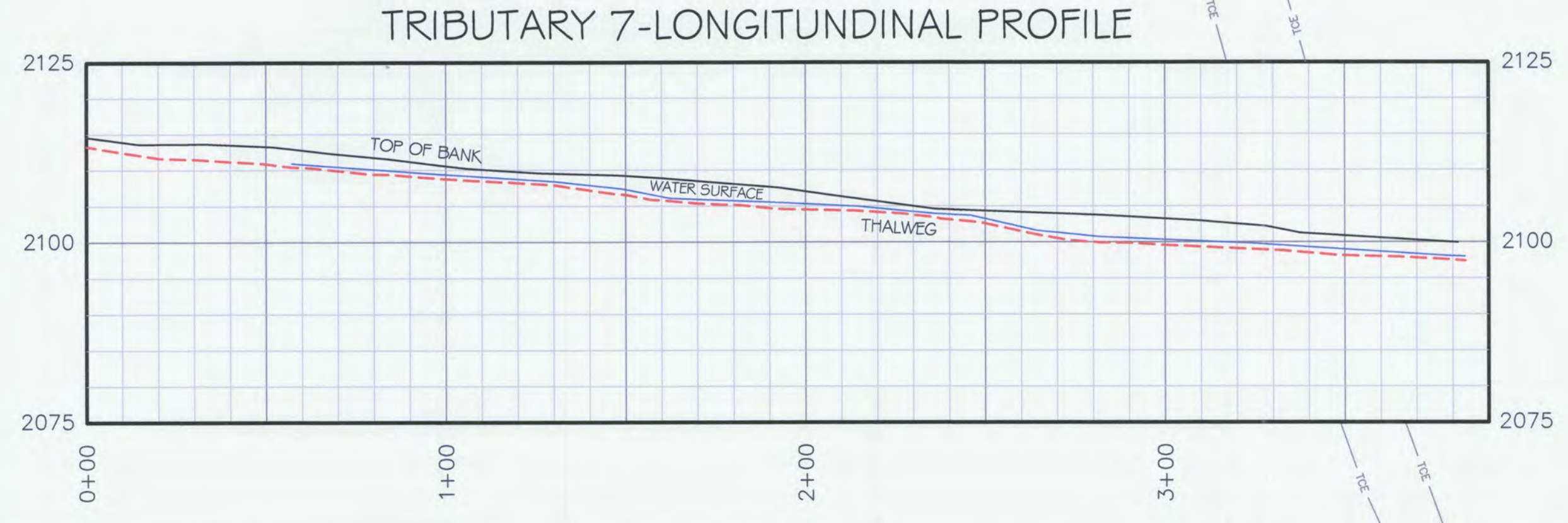
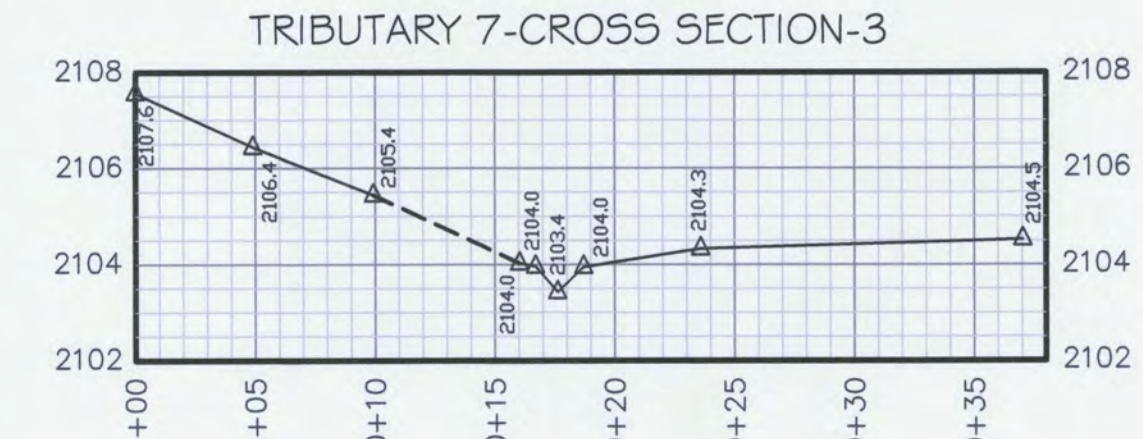
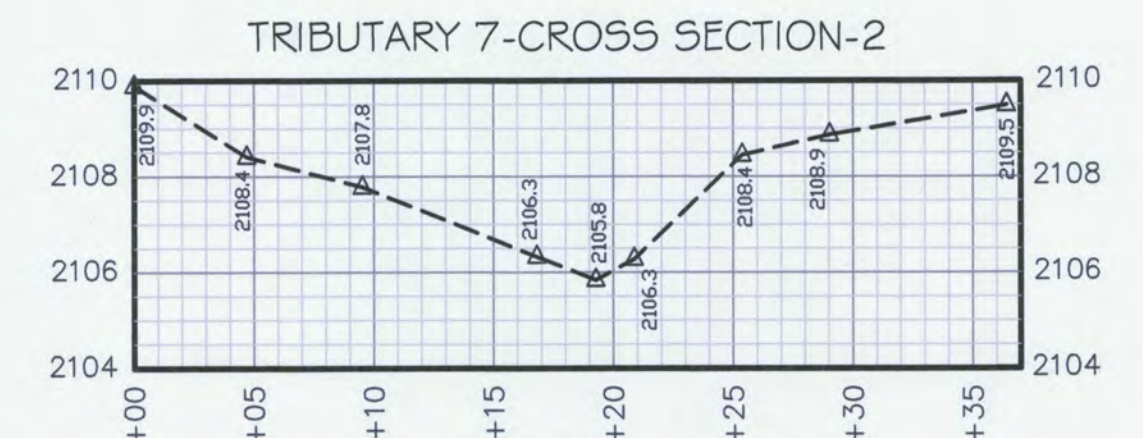
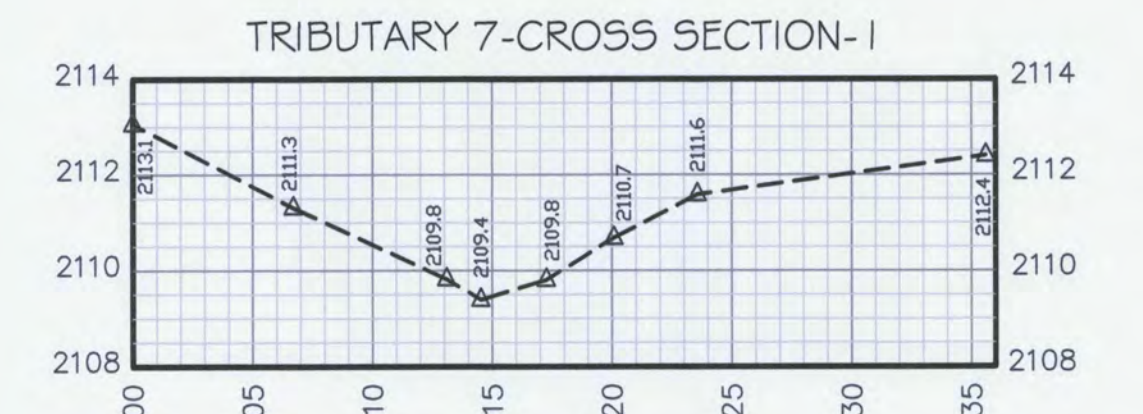
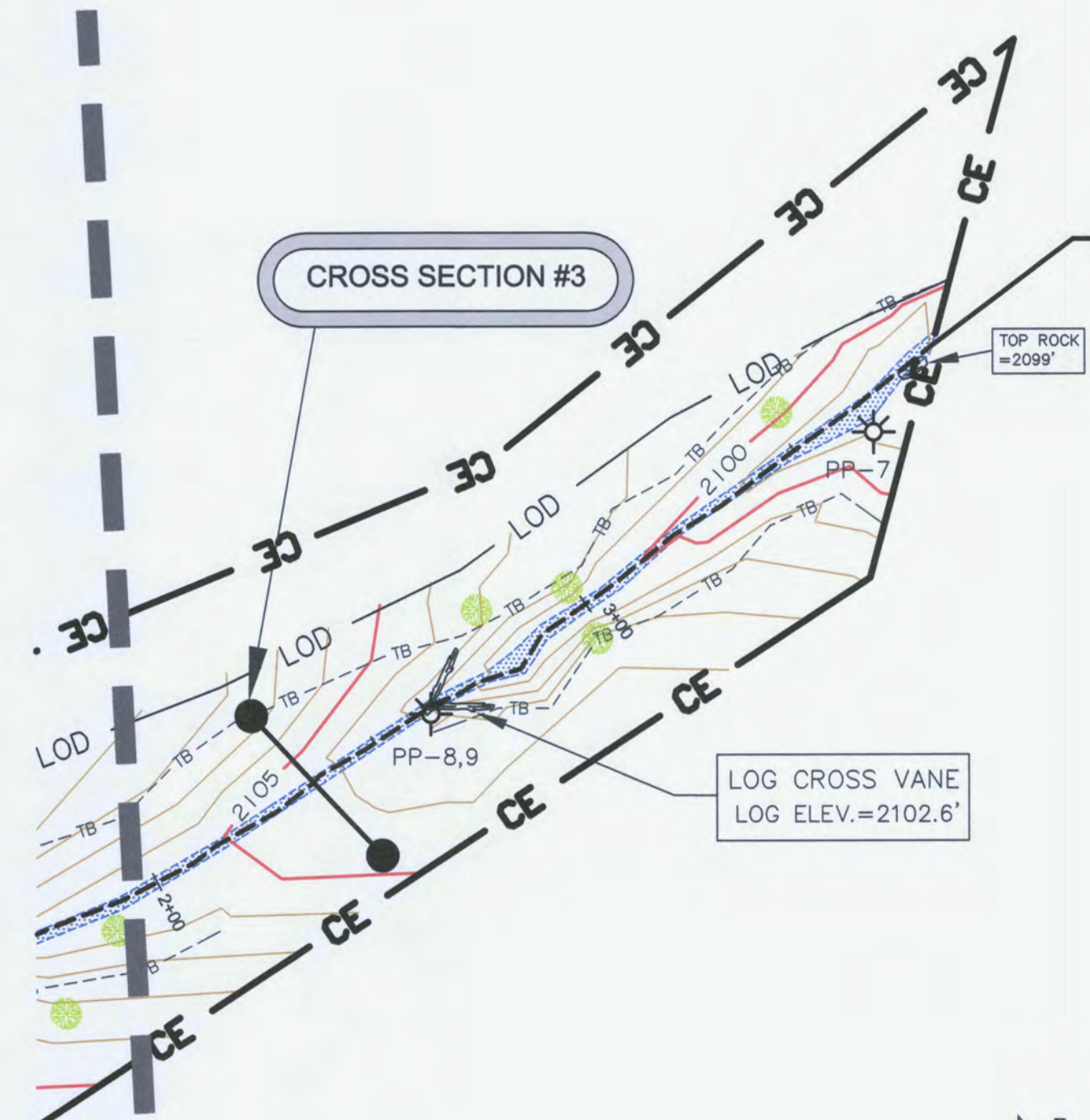
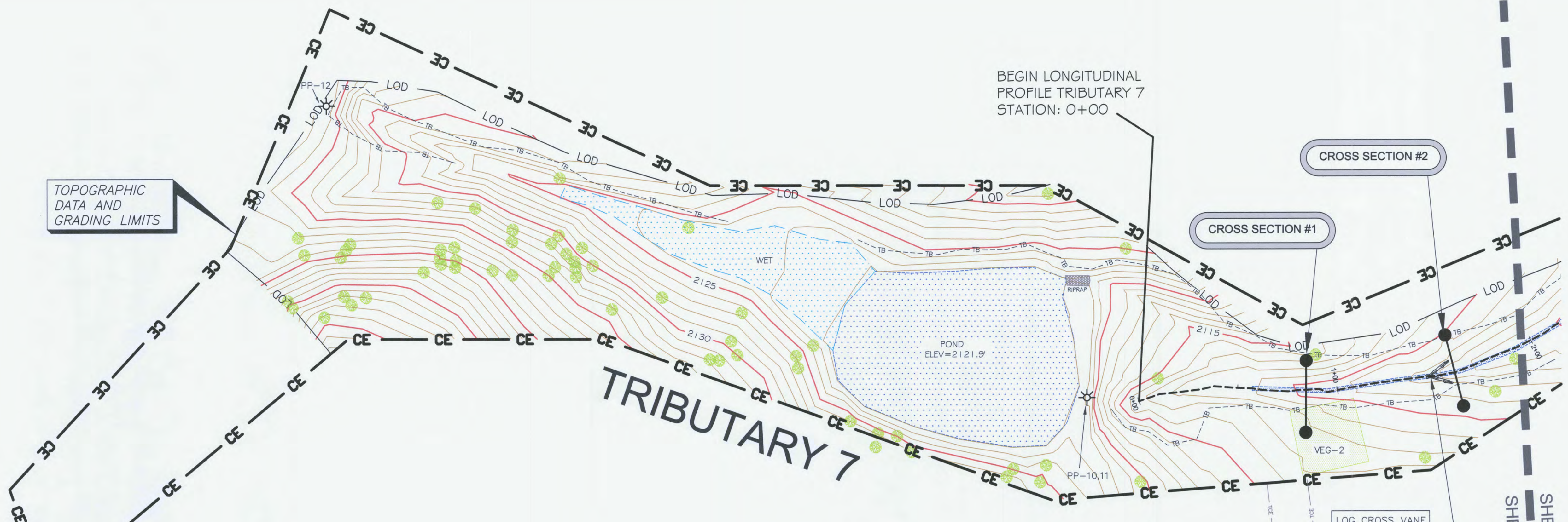
PLAT REFERENCES: PB: 122 PG: 11-14, PB: 145 PG: 37 PB: 145 PG: 85

SURVEY BY: PBK, NH, MM, RT, KJ DRAWN BY: PBK CHECKED BY: NH

AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 11 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

P.O. Box 2566
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CERTIFICATE OF SURVEY
 I, PHILLIP B. KEE, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT SLIDES 7 AND 8346. THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEY AS STATED IN TITLE 21, CHAPTER 56, SECTION 1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED.
 WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.



- SURVEYOR'S NOTES:
- ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LIMITS OF DISTURBANCE
	OVERHEAD WIRE
	TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CPP CORRUGATED PLASTIC PIPE
	CMP CORRUGATED METAL PIPE
	INV INVERT

CONTOUR INTERVAL = 1 FOOT
 ONE INCH = 30 FEET

AN AS-BUILT SURVEY FOR:
 THE ECOSYSTEM ENHANCEMENT PROGRAM
 NEWFOUND CREEK STREAM RESTORATION
 EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
 LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA
 PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST
 PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945
 PLAT REFERENCES: PB: 122 PG: 11-14, PB: 145 PG: 37 PB: 145 PG: 85
 SURVEY BY: PBK, NH, MM, RT, KJ DRAWN BY: PBK CHECKED BY:
 AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #11054

SHEET #: 12 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

 P.O. Box 2566 Asheville, NC 28801
 (828) 645-8275
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 License # C-3039

CERTIFICATE OF SURVEY

I, PHILLIP B. KEE CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT SLIDES 7691 AND 8346. 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.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.

PHILLIP B. KEE, PLS NC-4647

SURVEYOR'S NOTES:

- ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT--(REBAR WITH CONTROL CAP SET)
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LIMITS OF DISTURBANCE
	OVERHEAD WIRE
	TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
	GRAVEL
	ASPHALT
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CORRUGATED PLASTIC PIPE
	CORRUGATED METAL PIPE
	INVERT

CONTOUR INTERVAL = 1 FOOT	<p>ONE INCH = 30 FEET</p>
---------------------------	---------------------------

AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
LEICESTER TOWNSHIP, BUNCOMBE COUNTY, NORTH CAROLINA

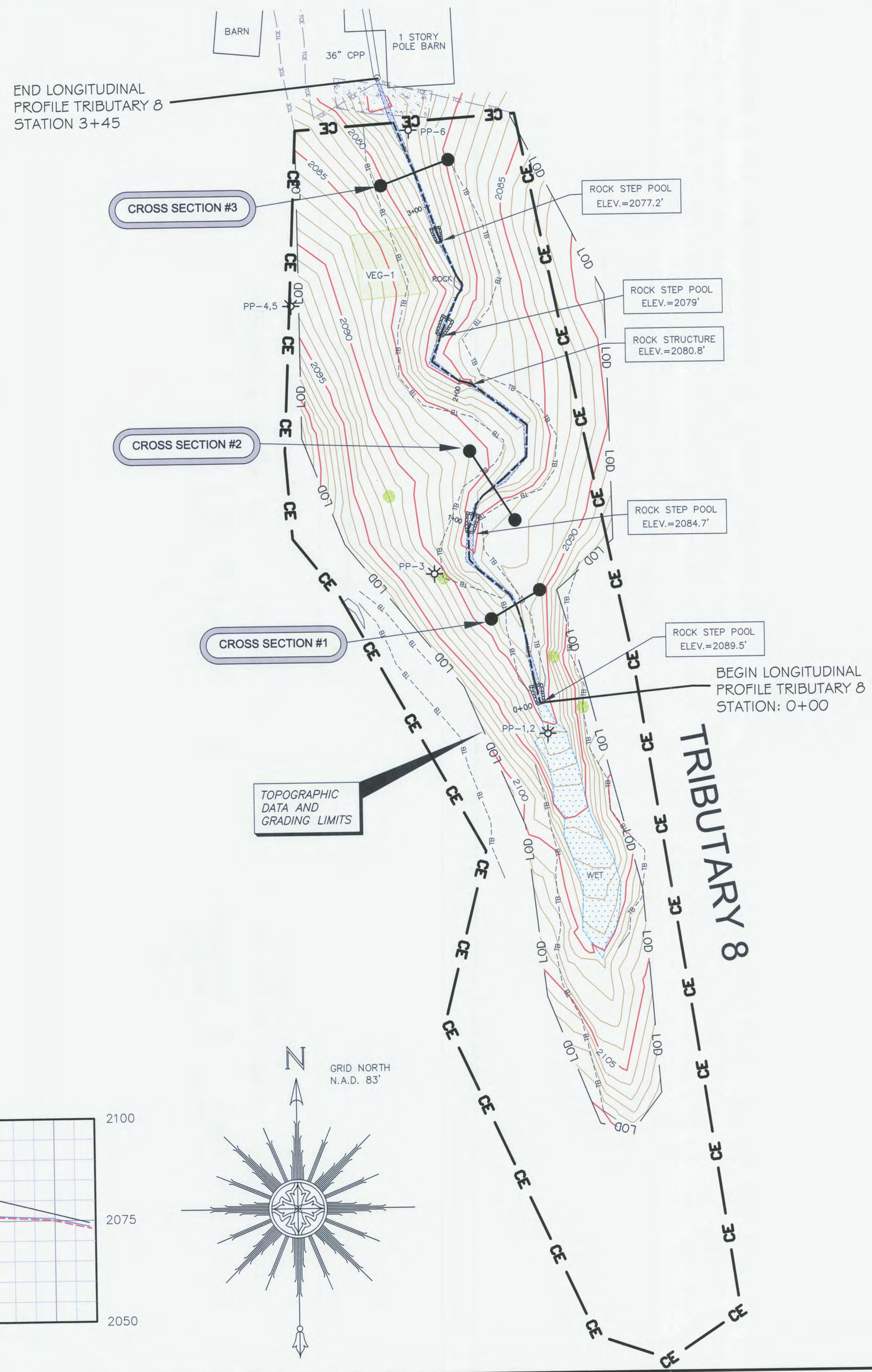
PROPERTY OF: THE MARJORIE LYNN BROWN LIVING TRUST
PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945

PLAT REFERENCES: PB: 122 PG: 11-14, PB: 145 PG: 37 PB: 145 PG: 85

SURVEY BY: PBK, NH, MM, RT, KJ DRAWN BY: PBK CHECKED BY: NH
AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 13 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

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END LONGITUDINAL PROFILE TRIBUTARY 8 STATION 3+45

CROSS SECTION #3

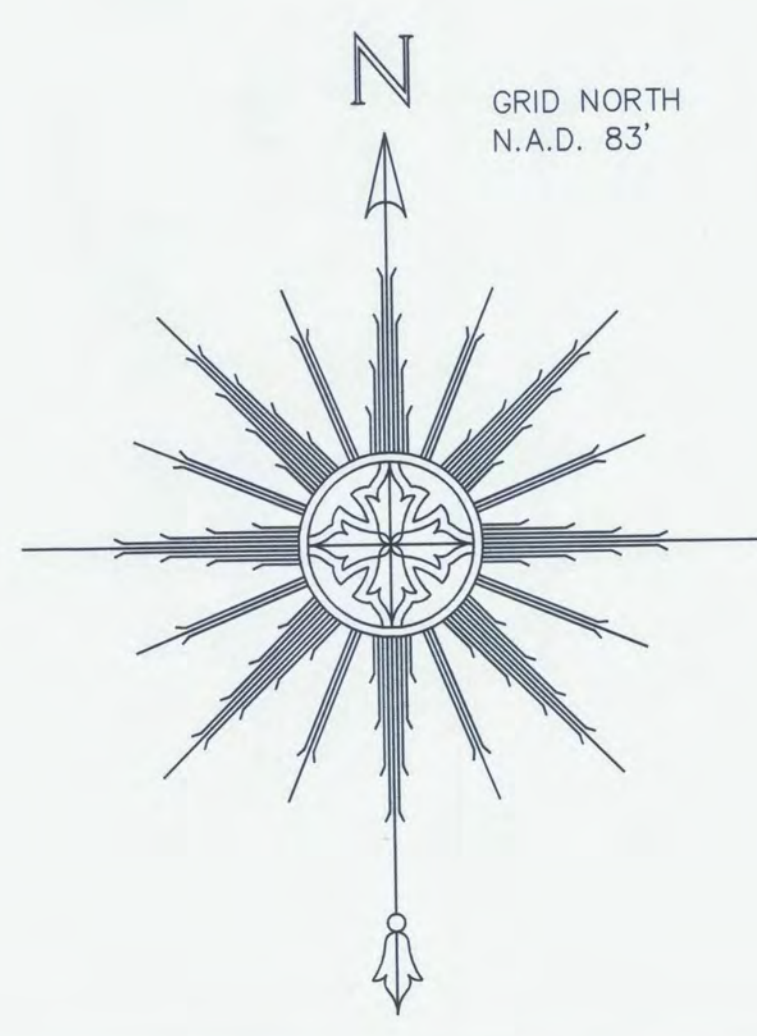
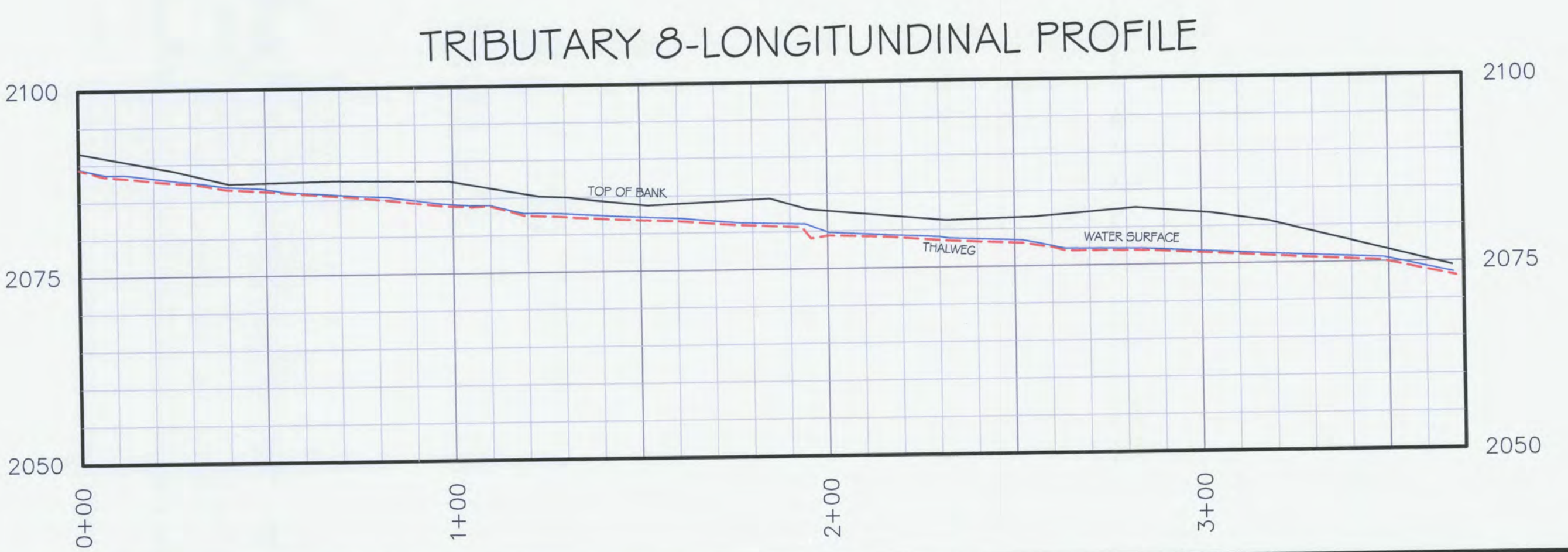
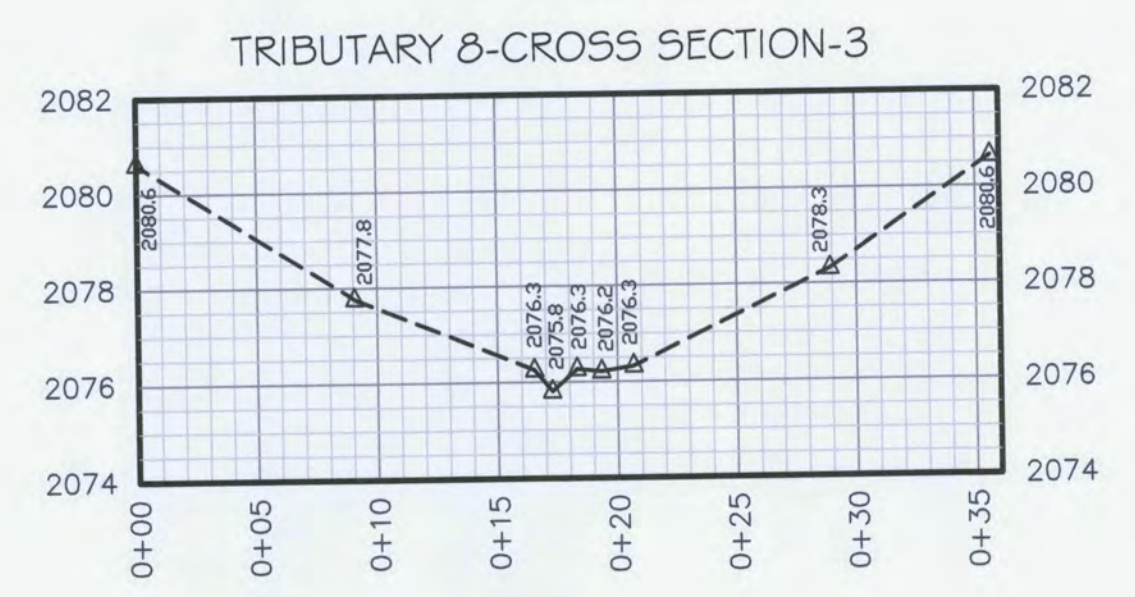
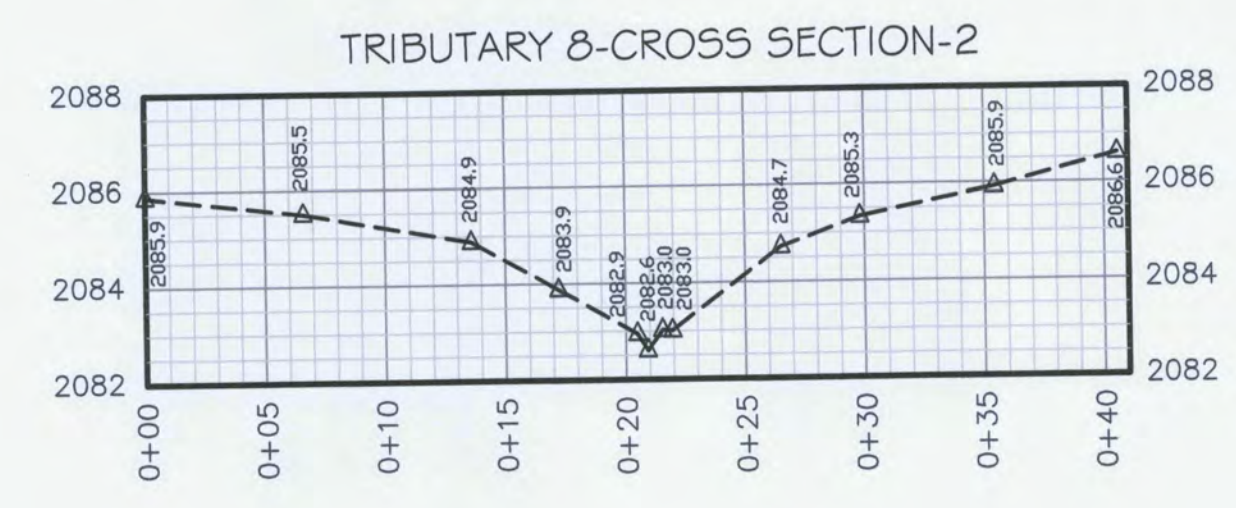
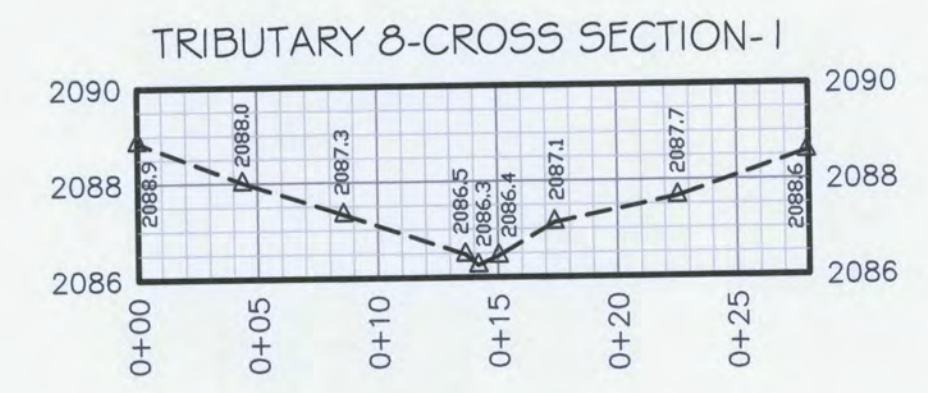
CROSS SECTION #2

CROSS SECTION #1

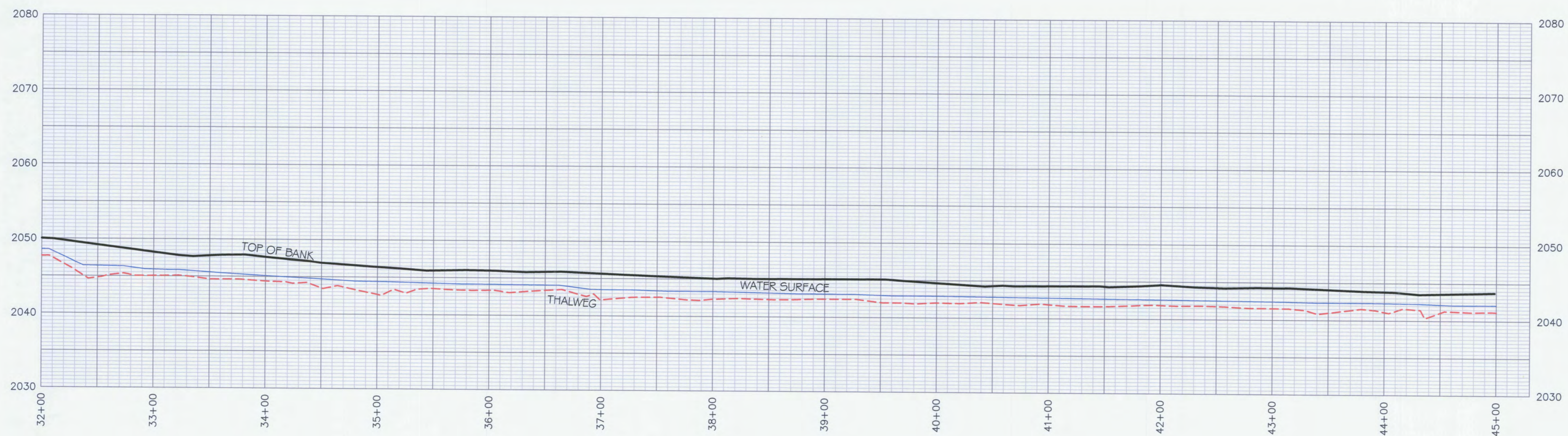
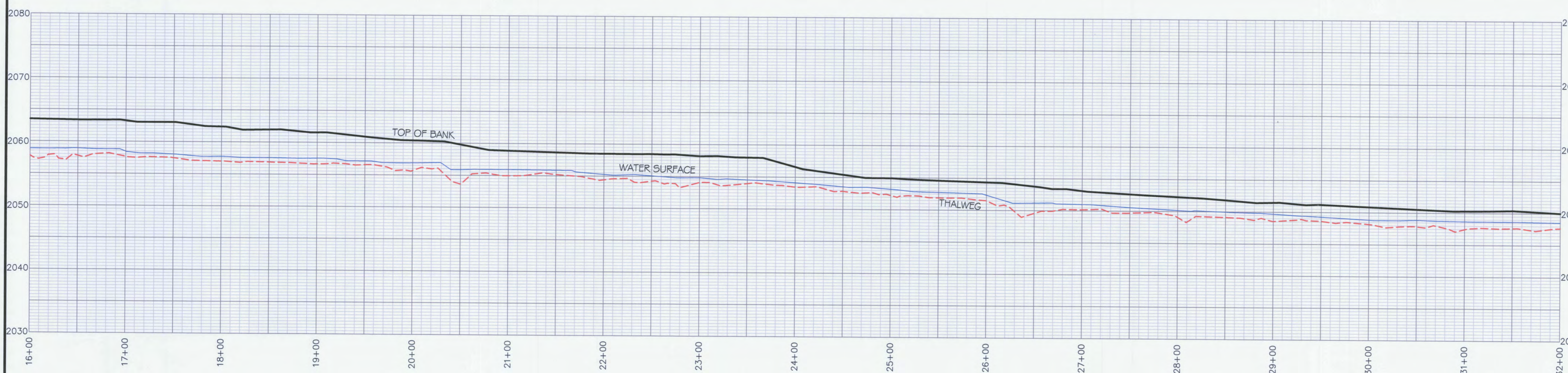
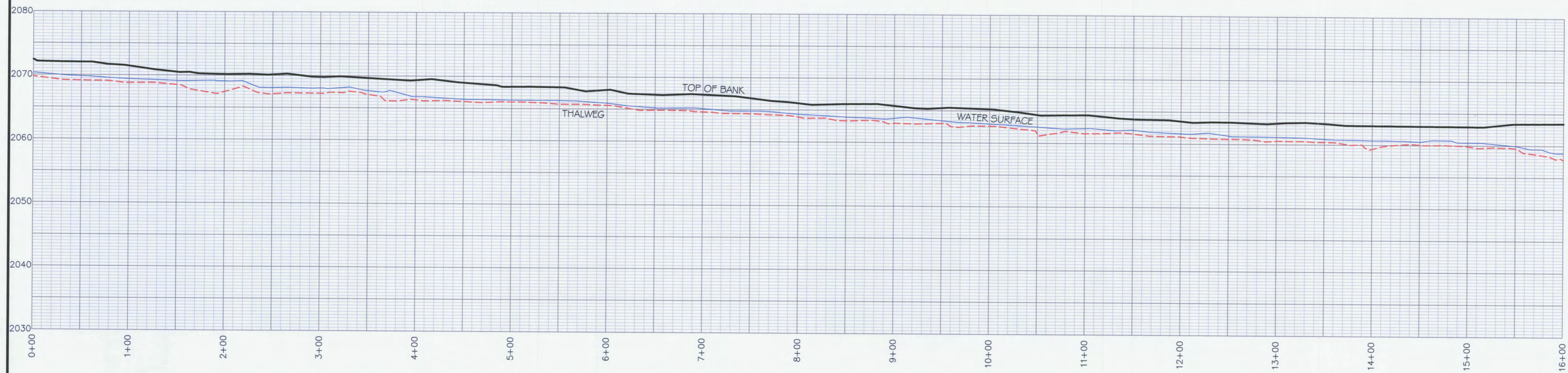
TOPOGRAPHIC DATA AND GRADING LIMITS

TRIBUTARY 8

BEGIN LONGITUDINAL PROFILE TRIBUTARY 8 STATION: 0+00



MAINSTEM-LONGITUNDINAL PROFILE



CERTIFICATE OF SURVEY
 I, PHILLIP B. KEE, CERTIFY THAT THIS PLAN WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT SLIDES 7691 AND 8346. 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.
 WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 19TH DAY OF MARCH, 2012.

Phillip B. Kee
 PHILLIP B. KEE, PLS NC-4647

SEAL
 NORTH CAROLINA PROFESSIONAL LAND SURVEYOR
 PHILLIP B. KEE

- SURVEYOR'S NOTES:**
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LEGEND:

	PHOTO POINT (PP-#)
	SURVEY CONTROL POINT-(REBAR WITH CONTROL CAP SET)
	1/2" IRON PIPE SET BY DESIGNER
	ROCK
	LOG VANE
	LOG CROSS VANE
	ROCK CROSS VANE
	ROCK VANE
	ROOTWAD
	TREE
	UTILITY POLE
	CE CONSERVATION EASEMENT BOUNDARY (NOT SURVEYED)
	TCE TEMPORARY CONSTRUCTION EASEMENT (NOT SURVEYED)
	LOD LIMITS OF DISTURBANCE
	OW OVERHEAD WIRE
	TB TOP OF BANK
	EDGE OF WATER
	THALWEG
	RIGHT OF WAY
	SOIL ROADBED
	STREAM
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	VEGETATION PLOT (VEG-#) 1/2" IRON PIPE AT ALL CORNERS
	RIPRAP
	NAD NORTH AMERICAN DATUM 1983
	CPP CORRUGATED PLASTIC PIPE
	CMP CORRUGATED METAL PIPE
	INV INVERT

CONTOUR INTERVAL = 1 FOOT

0' 30' 60' 90'
 ONE INCH = 30 FEET

AN AS-BUILT SURVEY FOR:
THE ECOSYSTEM ENHANCEMENT PROGRAM
NEWFOUND CREEK STREAM RESTORATION
 EEP PROJECT #92497 SCO PROJECT #06-06-750-01

LOCATED ON BROWNTOWN ROAD, LEICESTER, NC 28748
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PIN: 8790-64-7170 DEED BOOK: 4747 PAGE: 1945
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 AS-BUILT SURVEY DATES: 08/26/11 & 02/17/12 JOB #110540

SHEET #: 14 OF 14 SHEET SIZE: 24"x36" SCALE: 1"=30'

Kee
 MAPPING & SURVEYING

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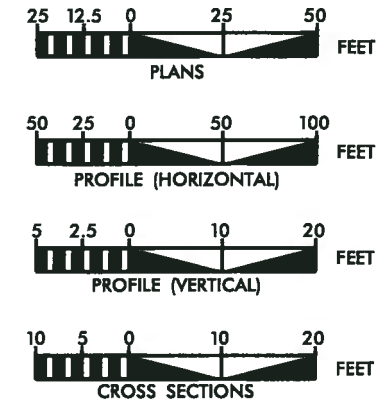
CONSTRUCTION DRAWINGS FOR NEWFOUND CREEK STREAM RESTORATION PROJECT

SCO NUMBER 060675001

STREAM DATA

EXISTING LENGTH (FT)	10524 LF
PROPOSED LENGTH (FT)	10602 LF
PROPOSED STREAM CLASSIFICATION	E4

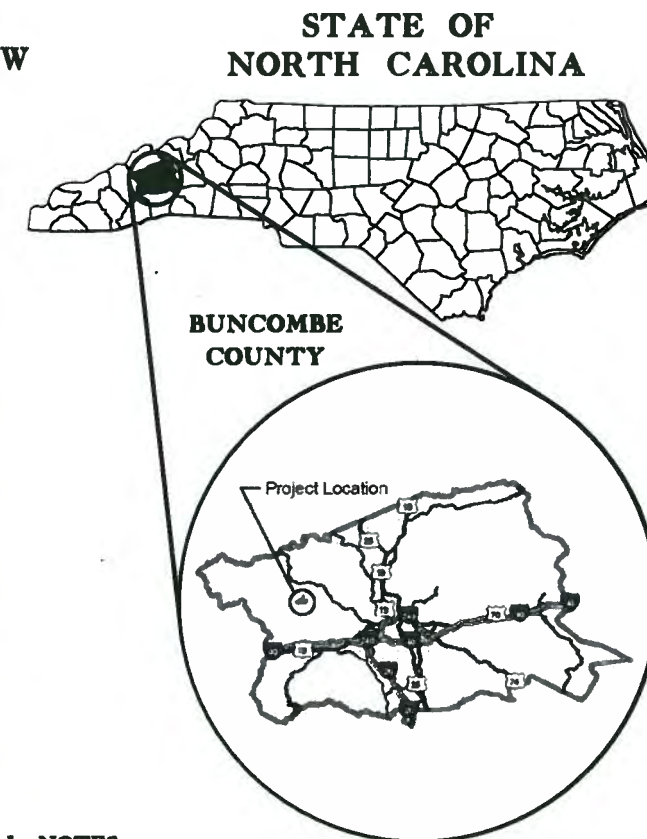
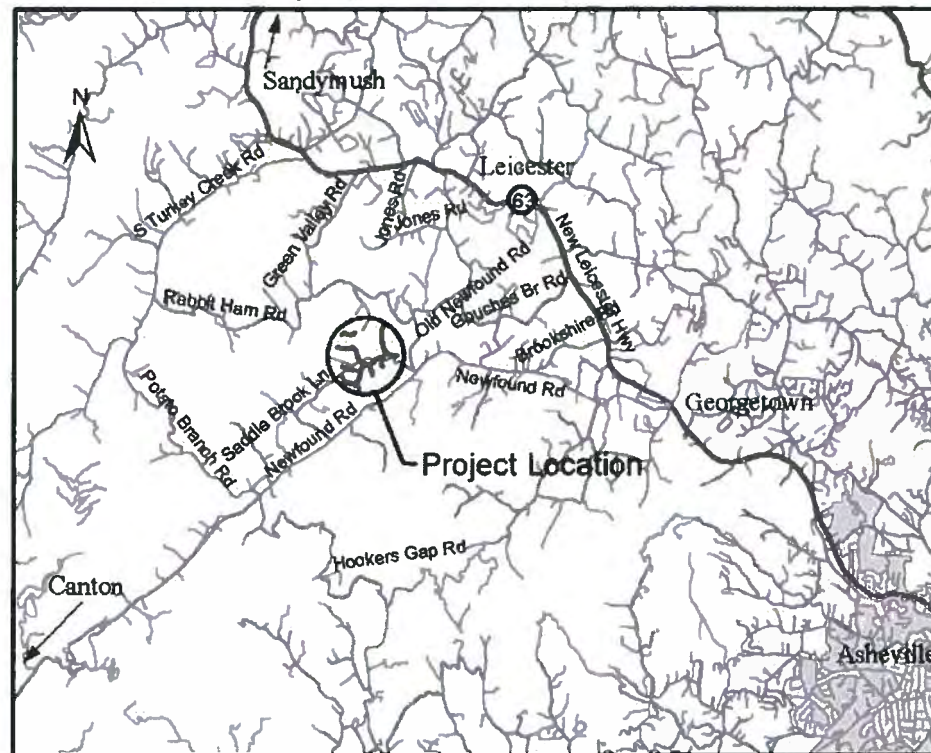
DISTURBED AREA - 22 ACRES



SHEET NO.	DESCRIPTION
AB0	TITLE SHEET
AB1 - AB5	PLAN SHEETS



BUNCOMBE COUNTY, NORTH CAROLINA
MAIN CHANNEL STA. 10+07 LAT. 35°37'39"N 82°42'50"W



SITE DATA

ECOSYSTEM ENHANCEMENT PROGRAM
5 RAVENSCROFT DRIVE #102
ASHEVILLE, NC 28801
CONTACT: HARRY TSOMIDES PHONE: 828-545-7057

URS CORPORATION - NORTH CAROLINA
1600 PERIMETER PARK DRIVE
SUITE 400
MORRISVILLE, NC 27560
CONTACT: KATHLEEN MCKEITHAN PHONE: 919-461-1597

SURVEY PREPARED BY:

ESP ASSOCIATES, PA
4601 CORPORATE DRIVE NW SUITE 165,
CONCORD, NC 28027
CONTACT: RANDY NANCE PHONE: 704-793-9855

CONSERVATION EASEMENT PREPARED BY:

LANDMARK SURVEYING, INC.
109 E. HARDEN STREET
GRAHAM, NC 27243
CONTACT: DOUG YARBROUGH, PLS L-3395

URS
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243

GENERAL NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES DATED JANUARY 2006 UNLESS OTHERWISE NOTED ON THE PLANS
2. CONTRACTOR SHALL PERFORM ALL NECESSARY SUBSURFACE UTILITY INVESTIGATION PRIOR TO COMMENCING CONSTRUCTION

REVISIONS

NO. DATE

Prepared by
URS
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT

TITLE:
AS-BUILT PLAN SHEETS
TITLE SHEET

CLIENT:
NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM



DATE: APRIL 2012

TECHNICIAN: EHJ

CHECKED BY: KMM

ESP PLAN NO. 92491
SCO PLAN NO. 060675001

AB0

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
- NCEEP EASEMENT AS STAKED (KEE MAPPING AND SURVEYING, PA NC-4647)
- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)

BEGIN MAIN CHANNEL
STA 10+00
ENHANCEMENT I
NO MAJOR PATTERN
ADJUSTMENT

CROSS SECTION #1

PRESERVE SLOPE
AND LARGE TREE

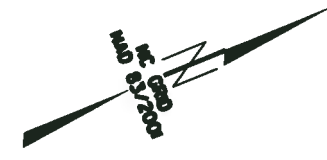
BEGIN MAIN CHANNEL
STA 13+00
RESTORATION

MAINSTEM

VEG-7

BOULDER TOE PROTECTION
ADDED BY BEDROCK IN
CHANNEL

APPROXIMATE LOCATION
OF BURIED WATERLINE



REVISIONS

NO.	DATE

Prepared by

 1800 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919) 461-1100 Fax (919) 461-1415
 NC Lic. # C-2243

PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT

TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM




DATE: MAY 2012
 TECHNICIAN: EHJ
 CHECKED BY: KMM
 DEP. PERM. NO. 92491
 SCO. PERM. NO. 06067800

ABI

REVISIONS	
NO.	DATE

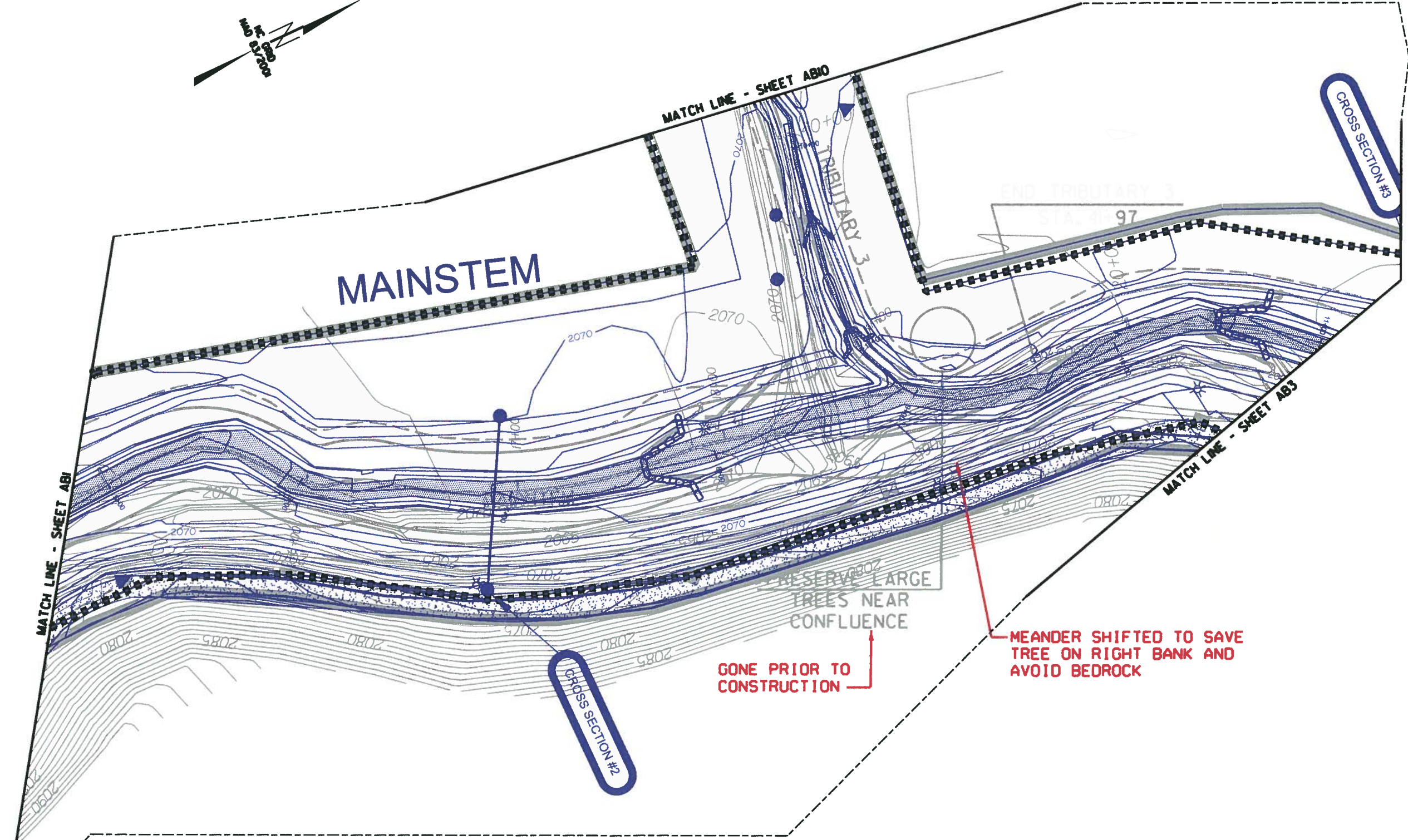
Prepared by
URS
 1600 Penimeter Park Drive, Suite 400
 Micro Point, North Carolina 27600
 Phone (819) 881-1100 FAX (819) 881-1415
 NC Lic.# C-22243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM

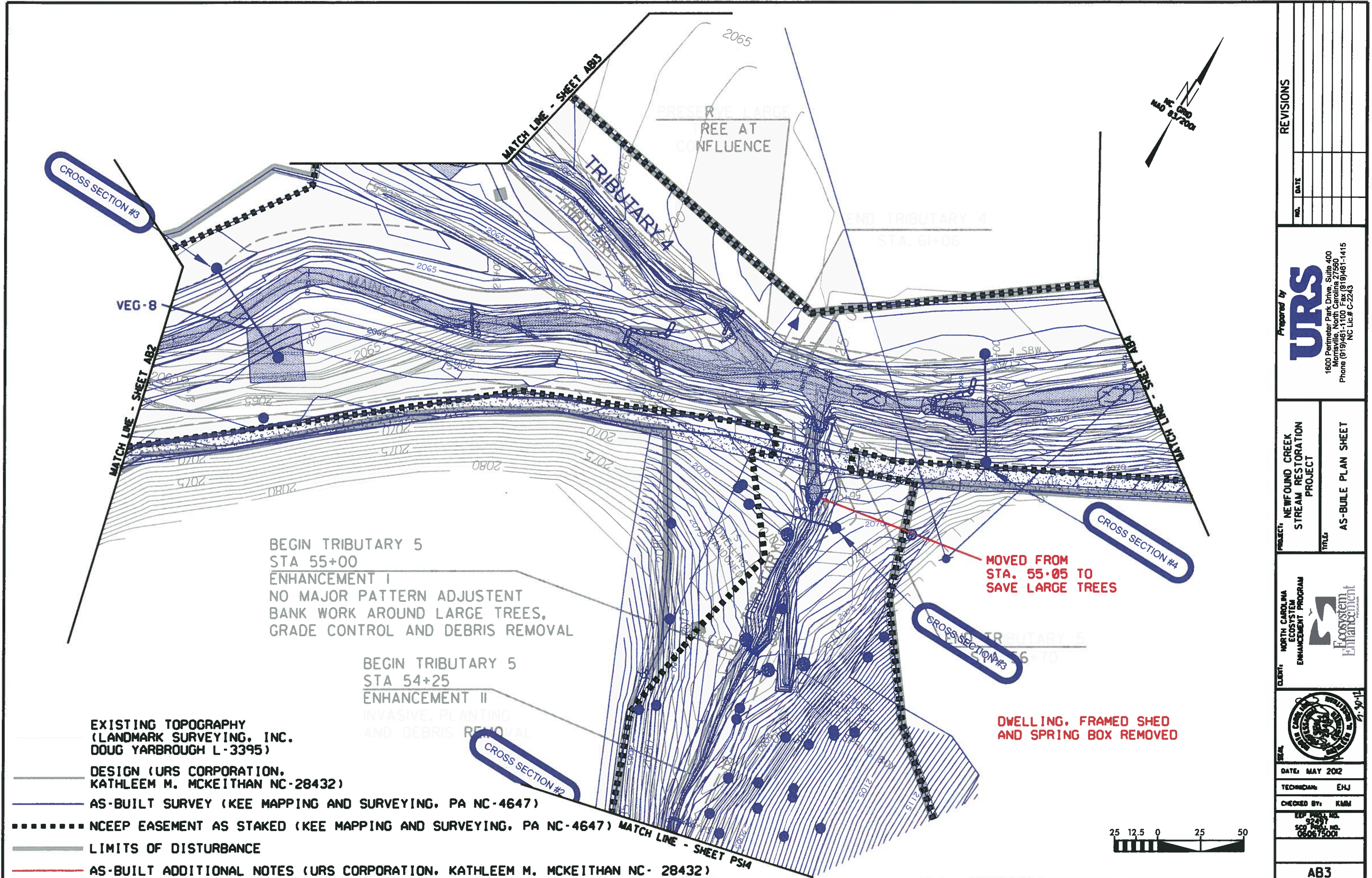



DATE: MAY 2012
 TECHNICIAN: [E.H.]
 CHECKED BY: KMM
 DEP. PLAN. NO. 92497
 SCO. PLAN. NO. 060673001



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)





REVISIONS	
NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919) 461-1100 Fax (919) 461-1415
 NC Lic. # C-2243

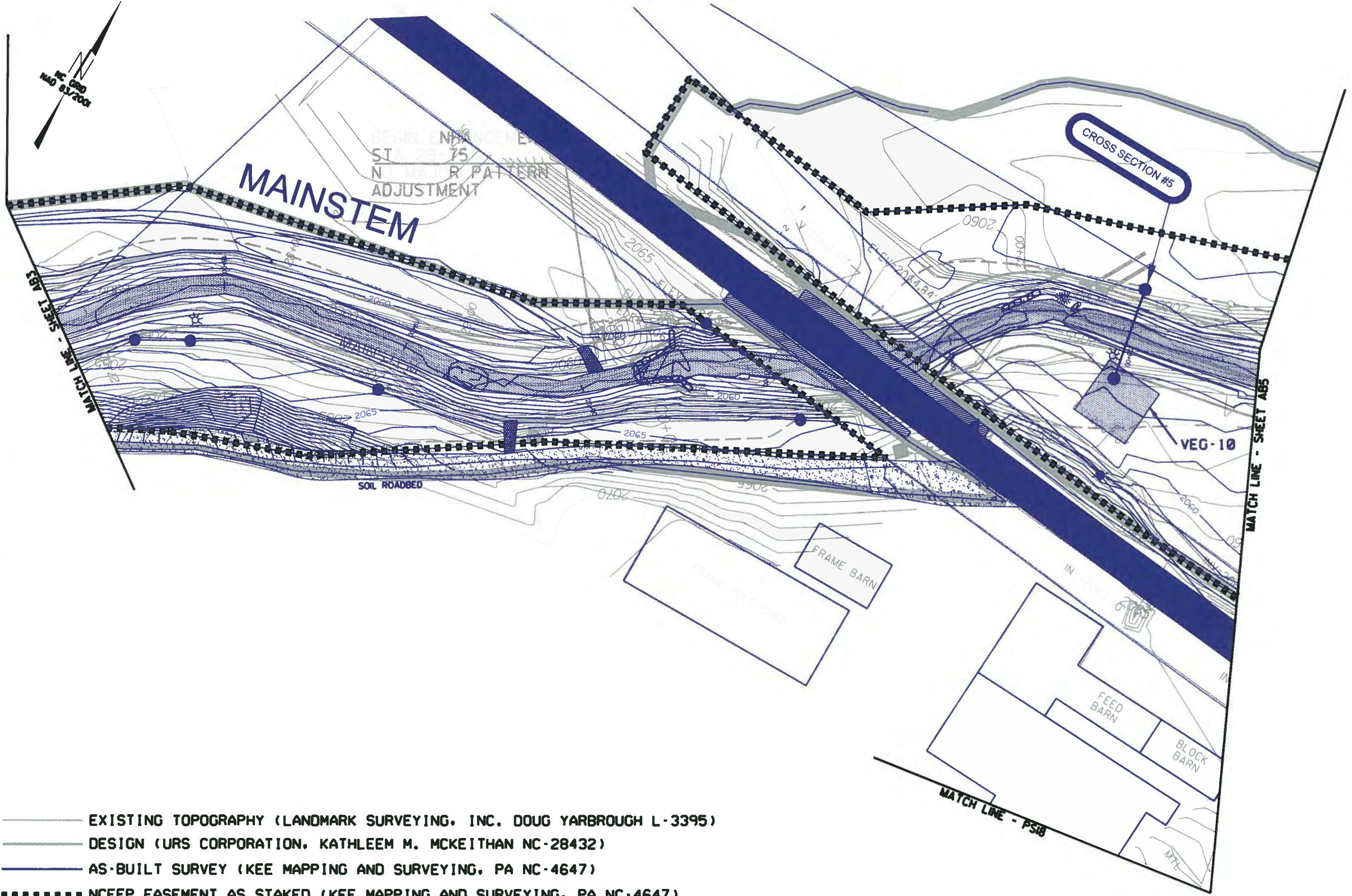
PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2012
 TECHNICIAN: E.H.J.
 CHECKED BY: K.M.M.
 EDP PROJECT NO. 52497
 SCP PROJECT NO. 060675001

AB3



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



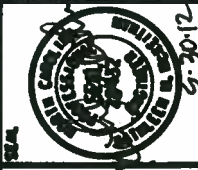
REVISIONS

NO.	DATE

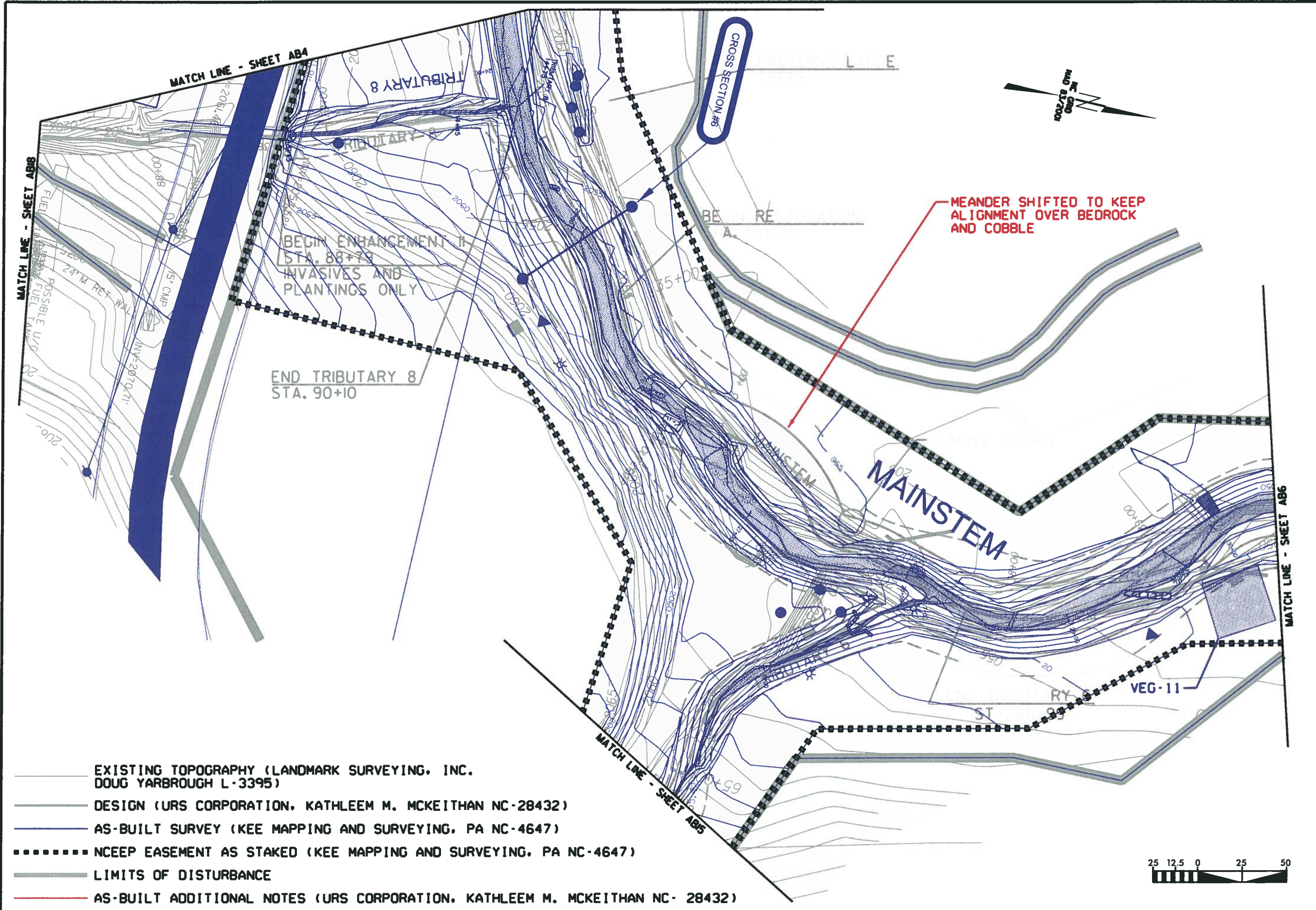
Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

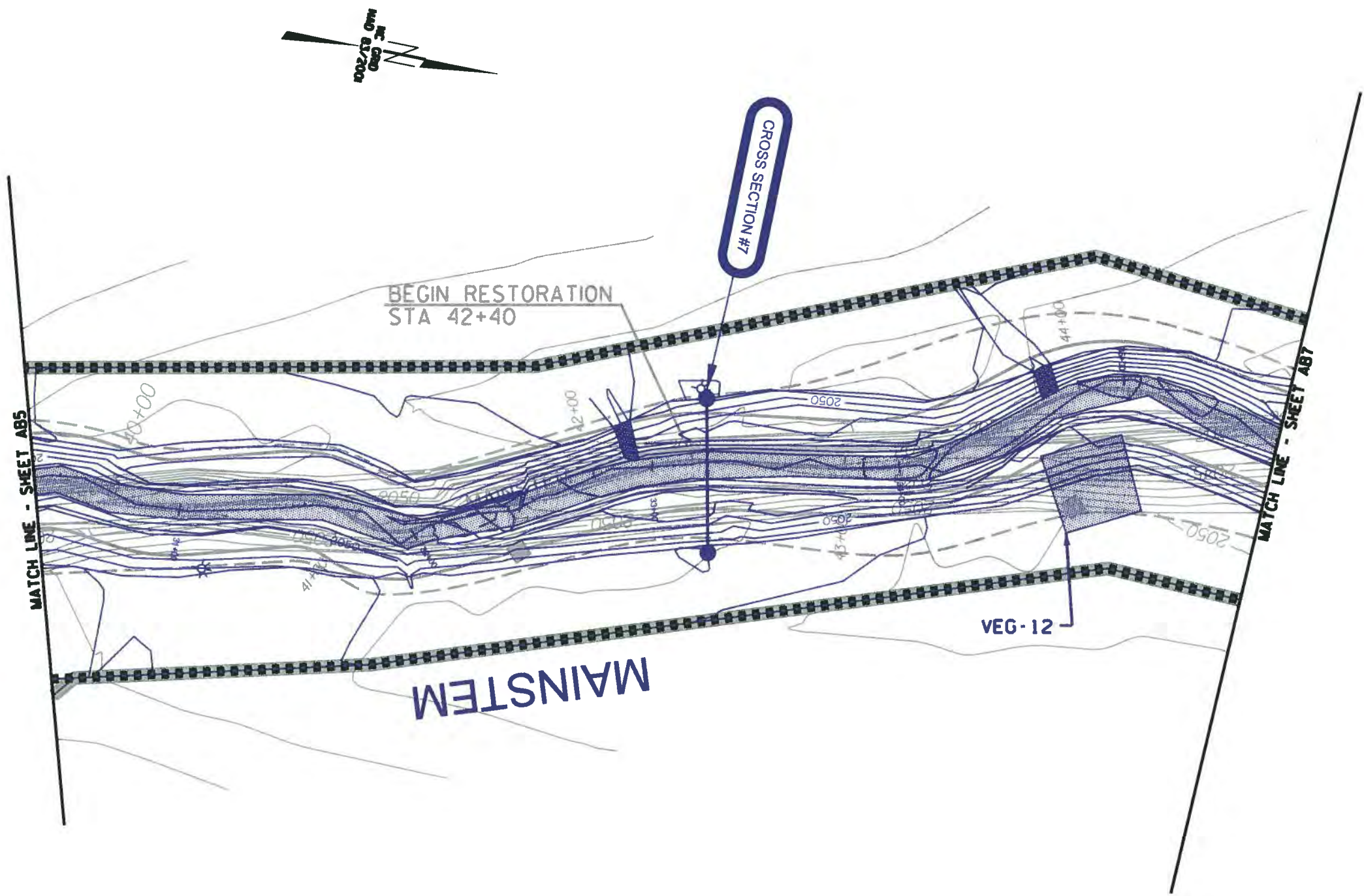
PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2012
 TECHNICIAN: EHJ
 CHECKED BY: KMM
 EEP PROJ. NO. 92497
 SCO PROJ. NO. 080675001





BEGIN RESTORATION
STA 42+40

CROSS SECTION #7

MAINSTEM

VEG-12

MATCH LINE - SHEET AB5

MATCH LINE - SHEET AB7

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT

TITLE:
AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM



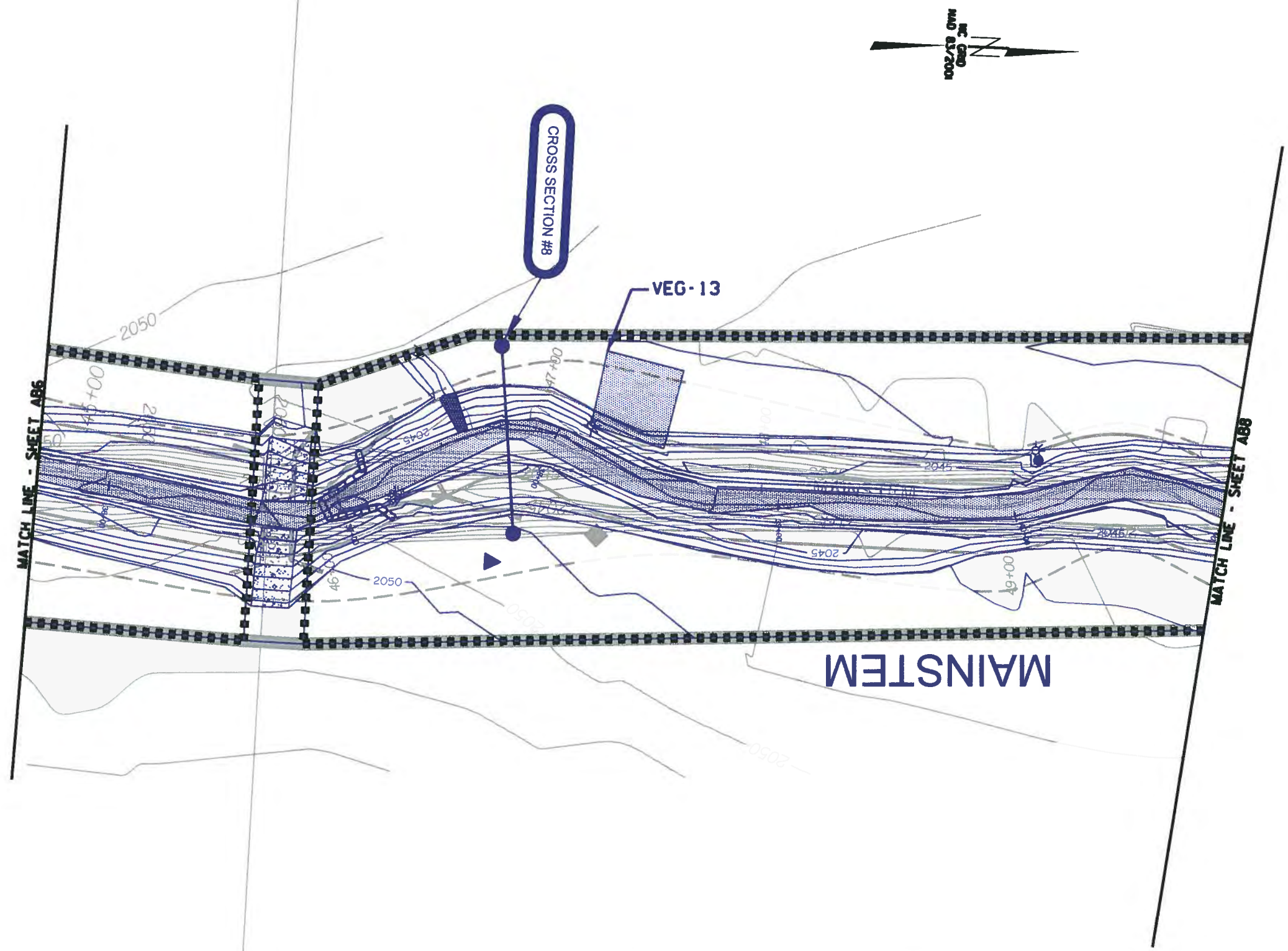
DATE: MAY 2012

TECHNICIAN: EHJ

CHECKED BY: KMM

UP PLAN NO.
92497
SCO PLAN NO.
060675001

AB6



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS	
NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

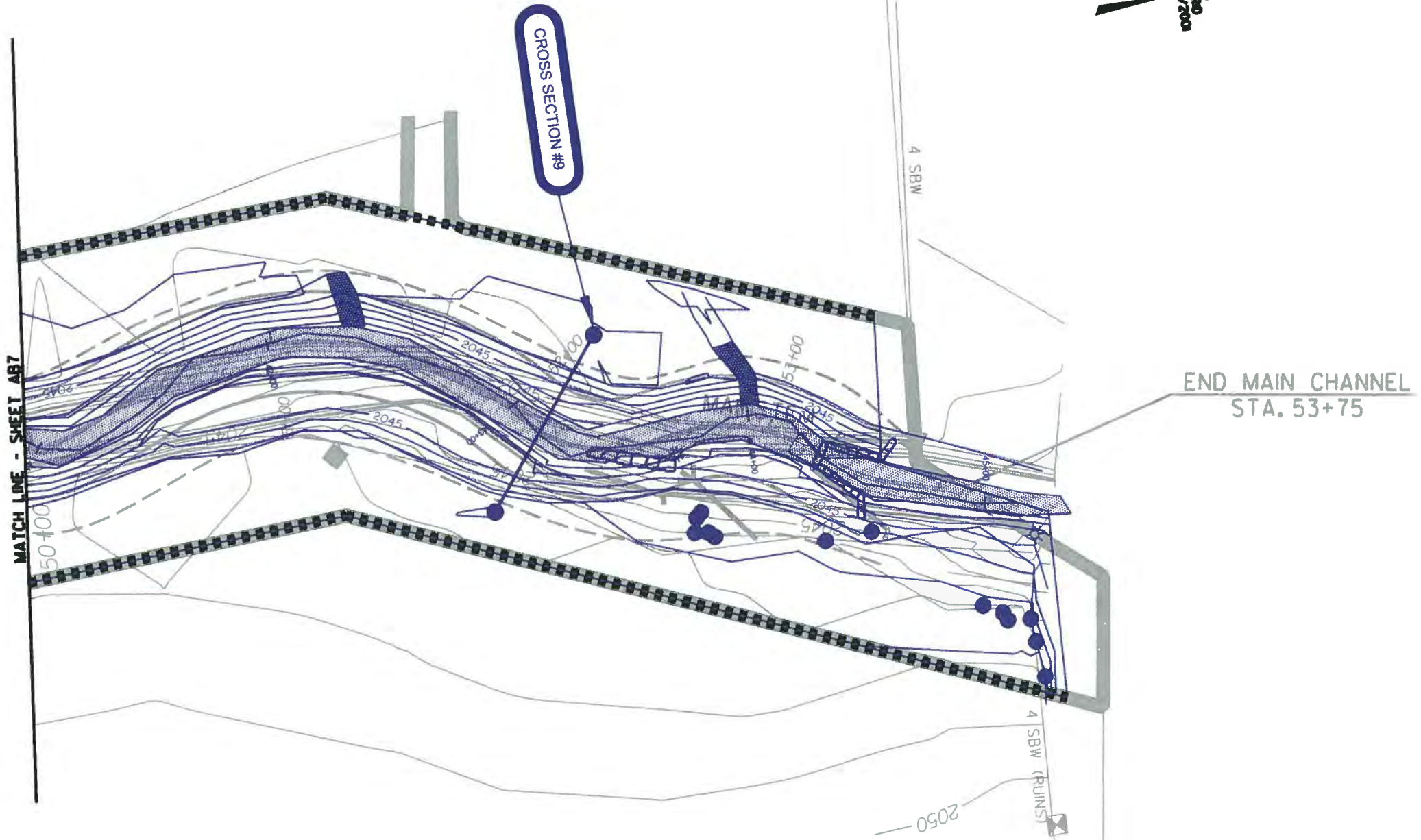
PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM




DATE: MAY 2012
 TECHNICIAN: E.H.J.
 CHECKED BY: K.M.M.
 EEP FILE NO. 92497
 SCD FILE NO. 060673001

AB7



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
- NCEEP EASEMENT AS STAKED (KEE MAPPING AND SURVEYING, PA NC-4647)
- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM

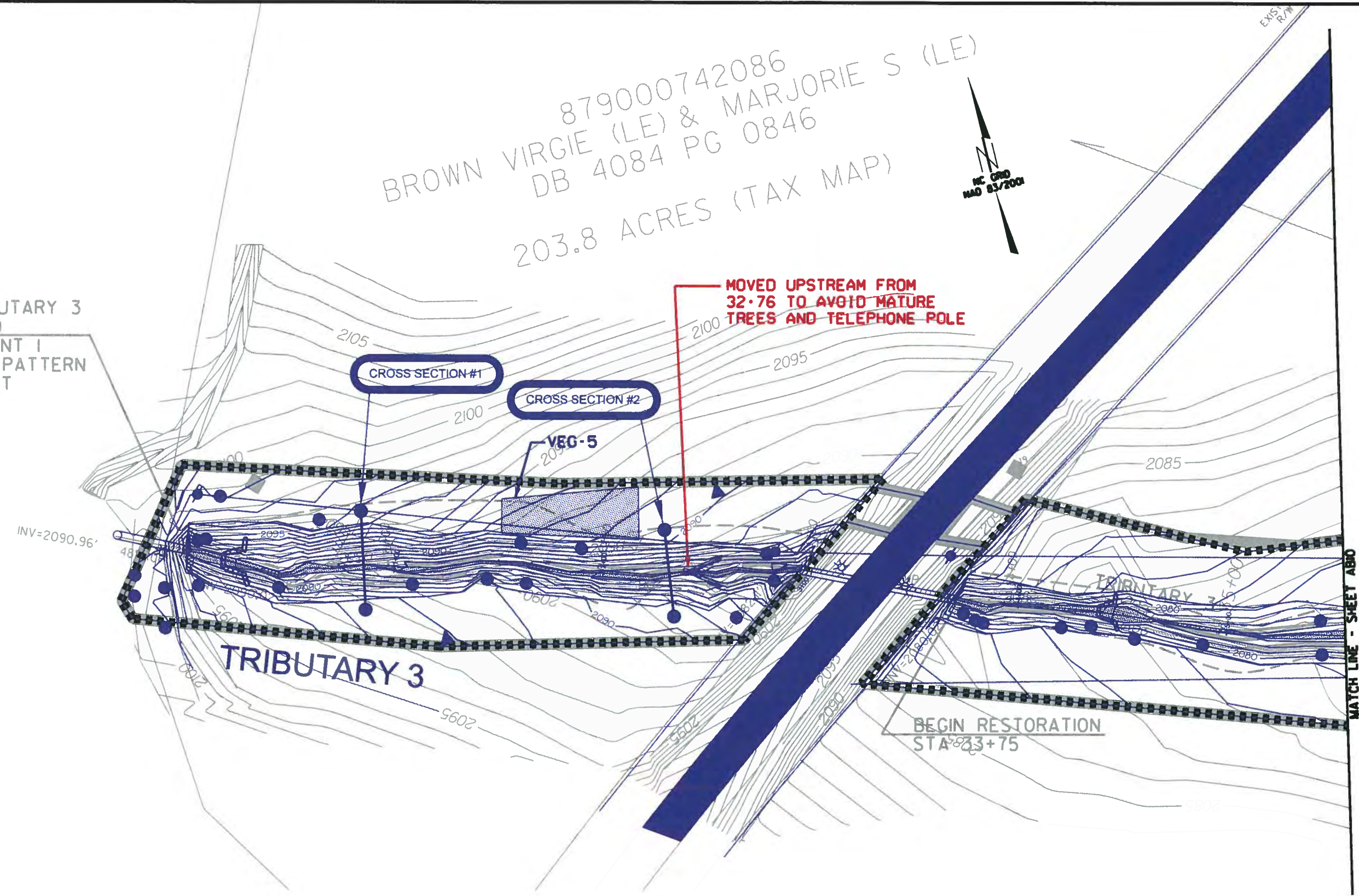


DATE: MAY 2012
 TECHNICIAN: EHJ
 CHECKED BY: KMM
 KEP PROJ. NO. 92497
 SCO PROJ. NO. 060675001

879000742086
 BROWN VIRGIE (LE) & MARJORIE S (LE)
 DB 4084 PG 0846
 203.8 ACRES (TAX MAP)



BEGIN TRIBUTARY 3
 STA 30+00
 ENHANCEMENT I
 NO MAJOR PATTERN
 ADJUSTMENT



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
 1600 Penimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919) 461-1100 Fax (919) 461-1415
 NC Lic.# C-2243

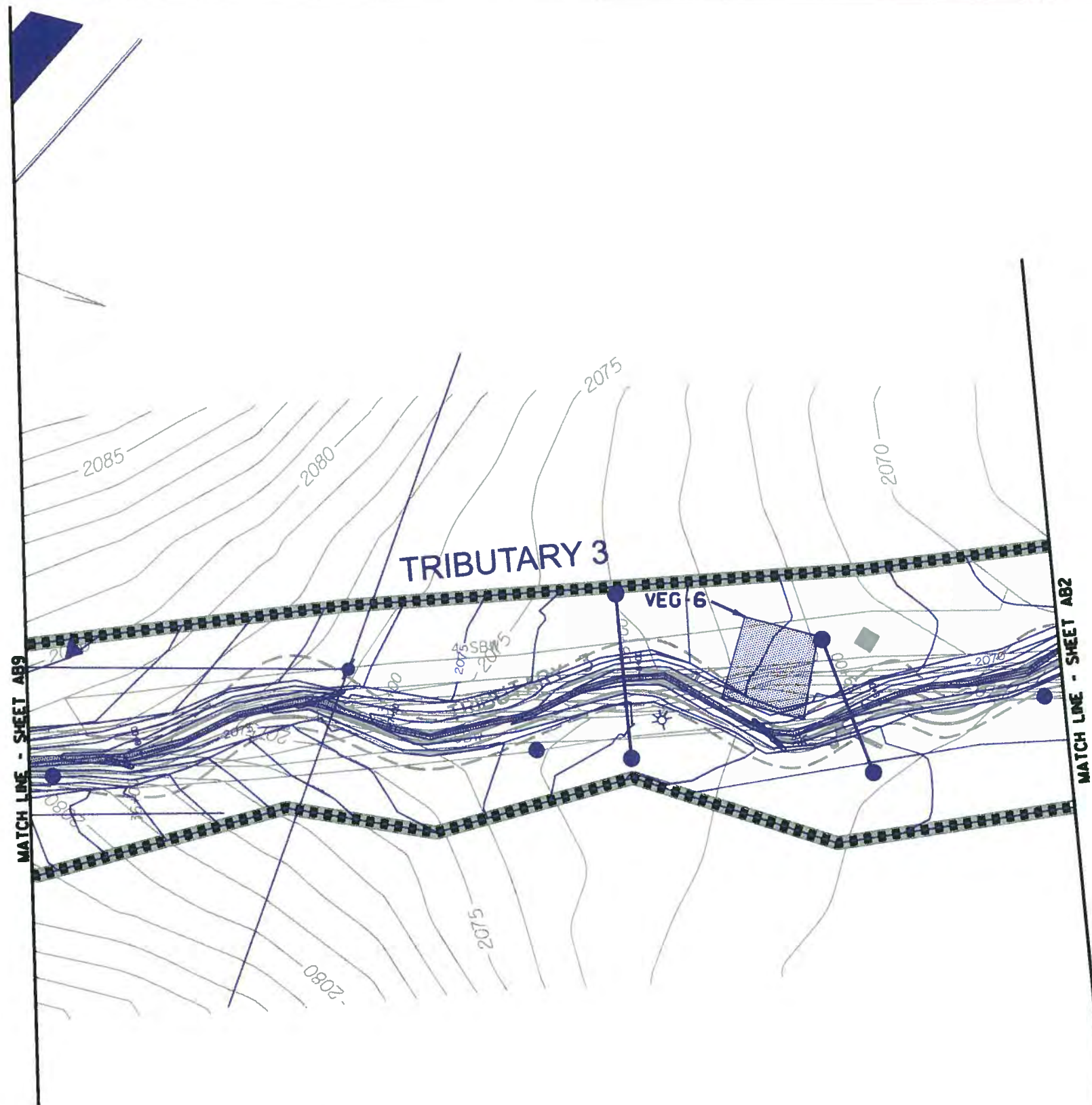
PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT

TITLE:
 AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2012
 TECHNICIAN: EBJ
 CHECKED BY: KMM
 EDP PROJ. NO. 9249
 SCD PROJ. NO. 060675001



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS	
NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (819)461-1100 Fax (819)461-1415
 NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM

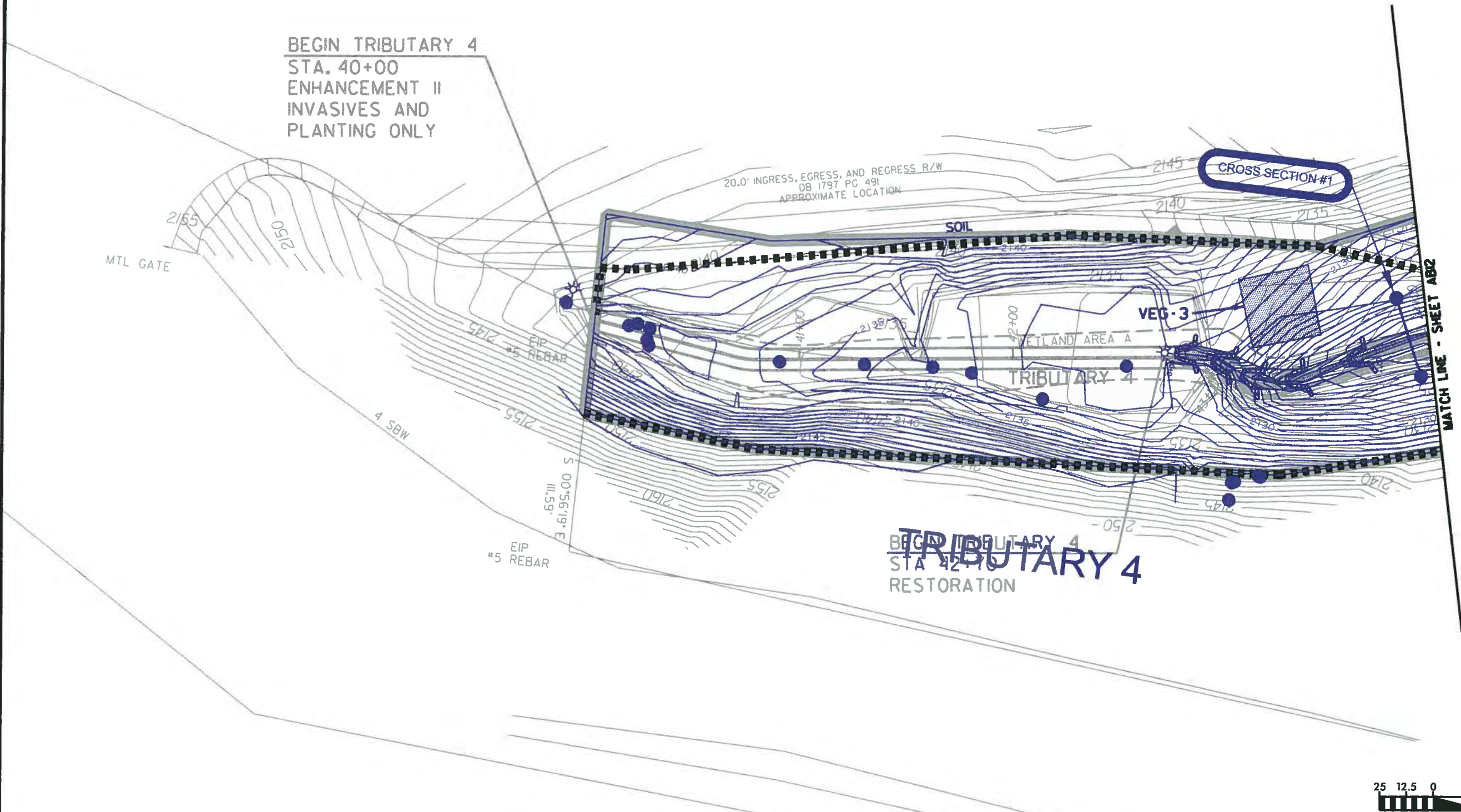



DATE: MAY 2012
 TECHNICIAN: E.H.J.
 CHECKED BY: K.M.M.
 EXP. PERM. NO. 92487
 SCD PERM. NO. 060673001

AB10



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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REVISIONS	
NO.	DATE

Prepared by
URS
 1800 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919) 461-1100 Fax (919) 461-1415
 NC Lic. # C-2243

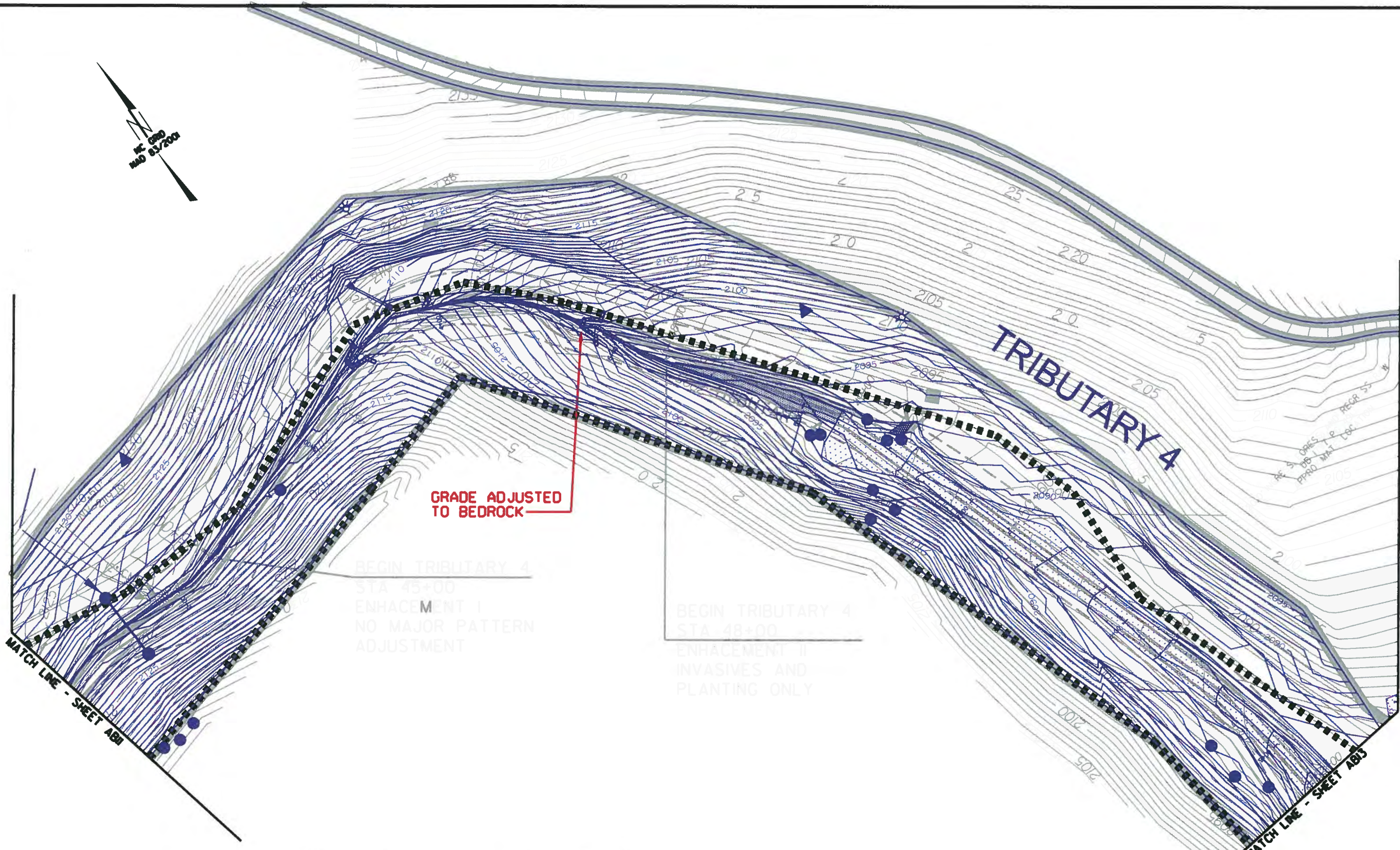
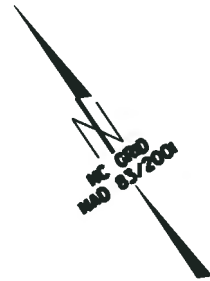
PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEETS

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2002
 TECHNICIAN: EHJ
 CHECKED BY: KMM
 EIP BUILT NO. 92497
 SCD PERM. NO. 060673001

ABII



GRADE ADJUSTED TO BEDROCK

BEGIN TRIBUTARY 4
STA 45+00
ENHANCEMENT I
NO MAJOR PATTERN
ADJUSTMENT

BEGIN TRIBUTARY 4
STA 48+00
ENHANCEMENT II
INVASIVES AND
PLANTING ONLY

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT

TITLE:
 AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2012
 TECHNICIAN: EHL
 CHECKED BY: KMM
 EEP PROJ. NO. 92497
 SCO PROJ. NO. 080673001

EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)

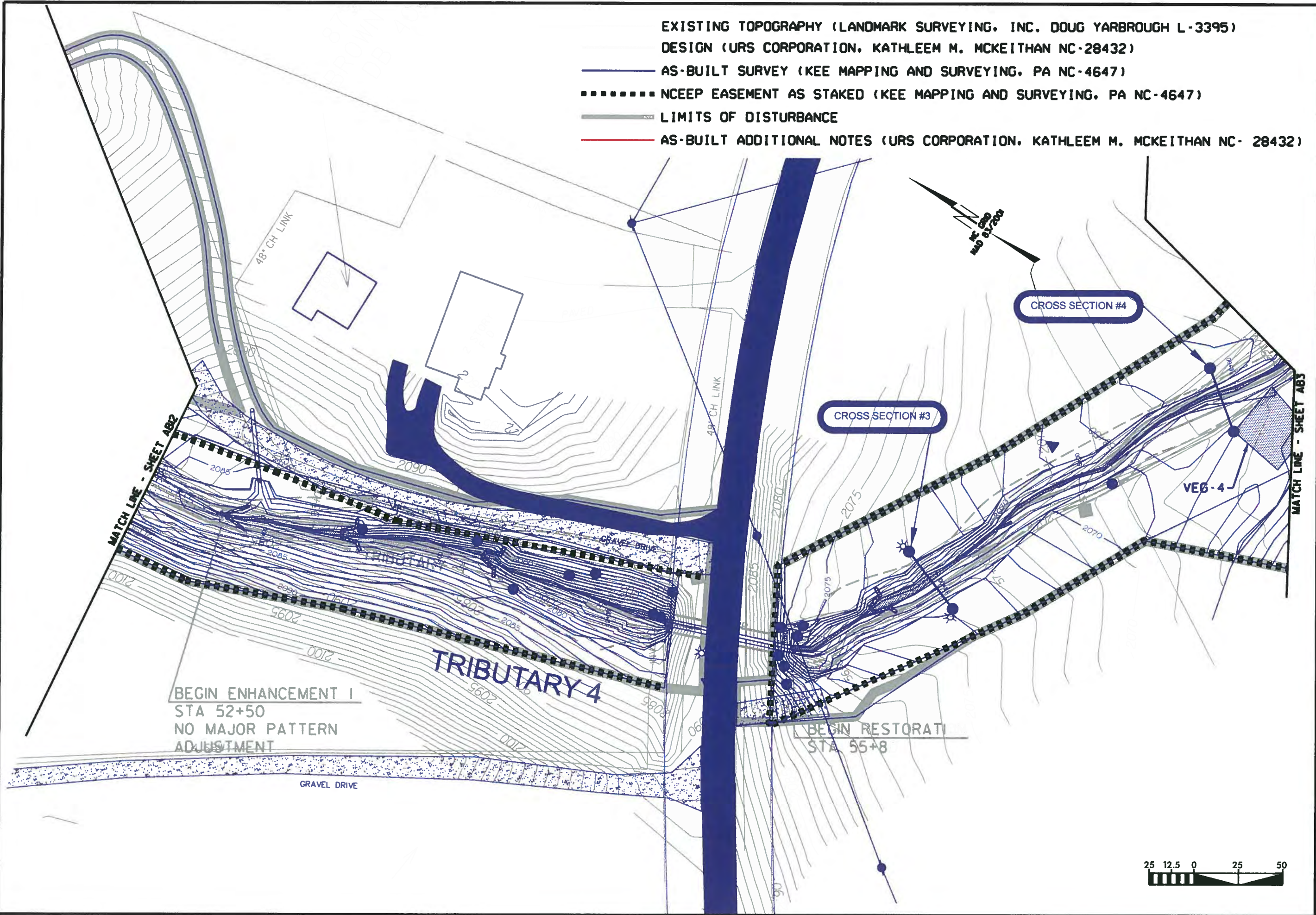
DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)

AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)

NCEP EASEMENT AS STAKED (KEE MAPPING AND SURVEYING, PA NC-4647)

LIMITS OF DISTURBANCE

AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
 1600 Penimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919) 461-1100 Fax (919) 461-1415
 NC Lic. # C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM

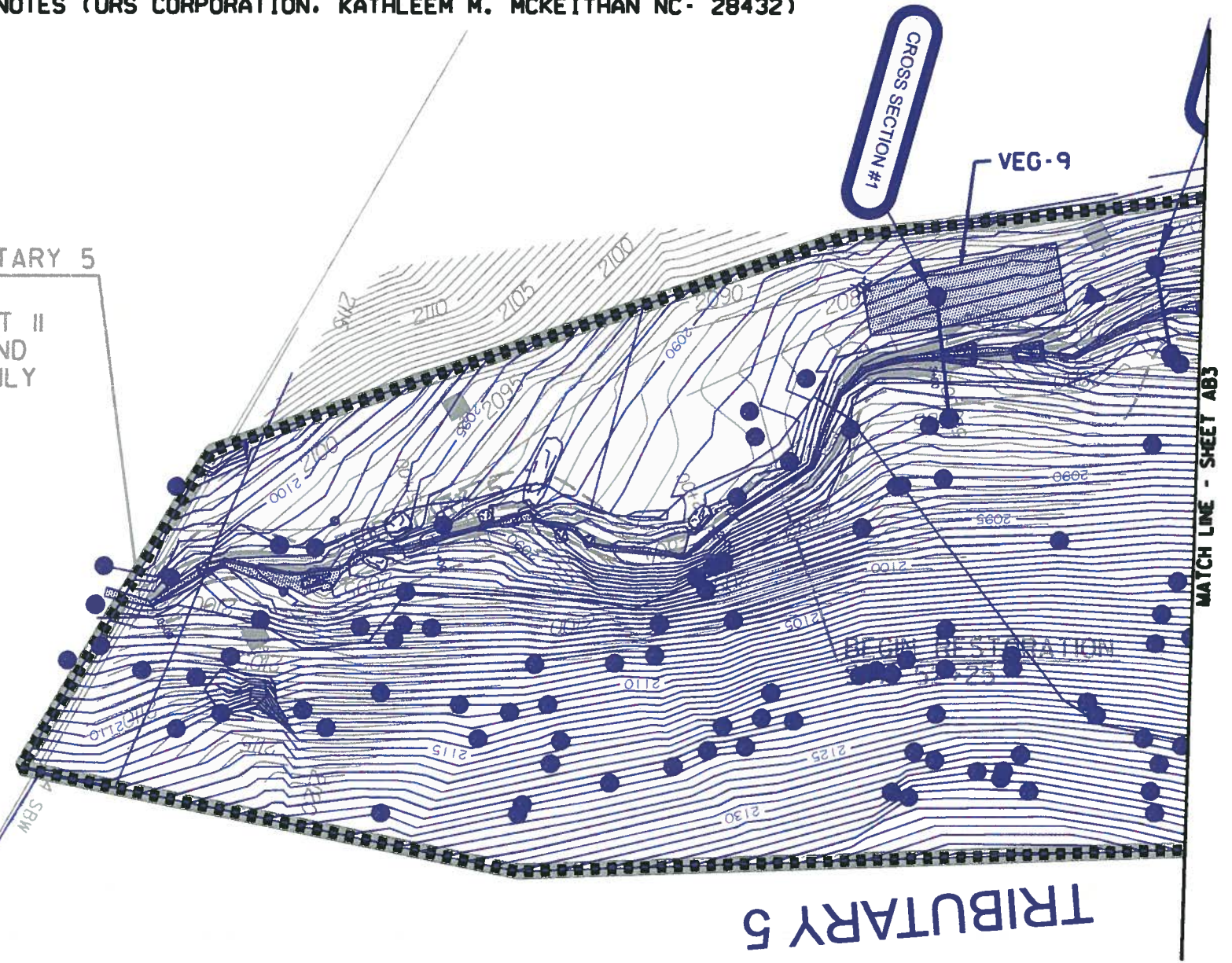


DATE: MAY 2012
 TECHNICIAN: ENJ
 CHECKED BY: KMM
 URS PROJECT NO. 92491
 SCO 1501
 060615001

AB13

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)

BEGIN TRIBUTARY 5
 STA. 50+00
 ENHANCEMENT II
 INVASIVES AND
 PLANTING ONLY



TRIBUTARY 5



REVISIONS

NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT

TITLE:
 AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



DATE: MAY 2002

TECHNOLOGIST: EHV

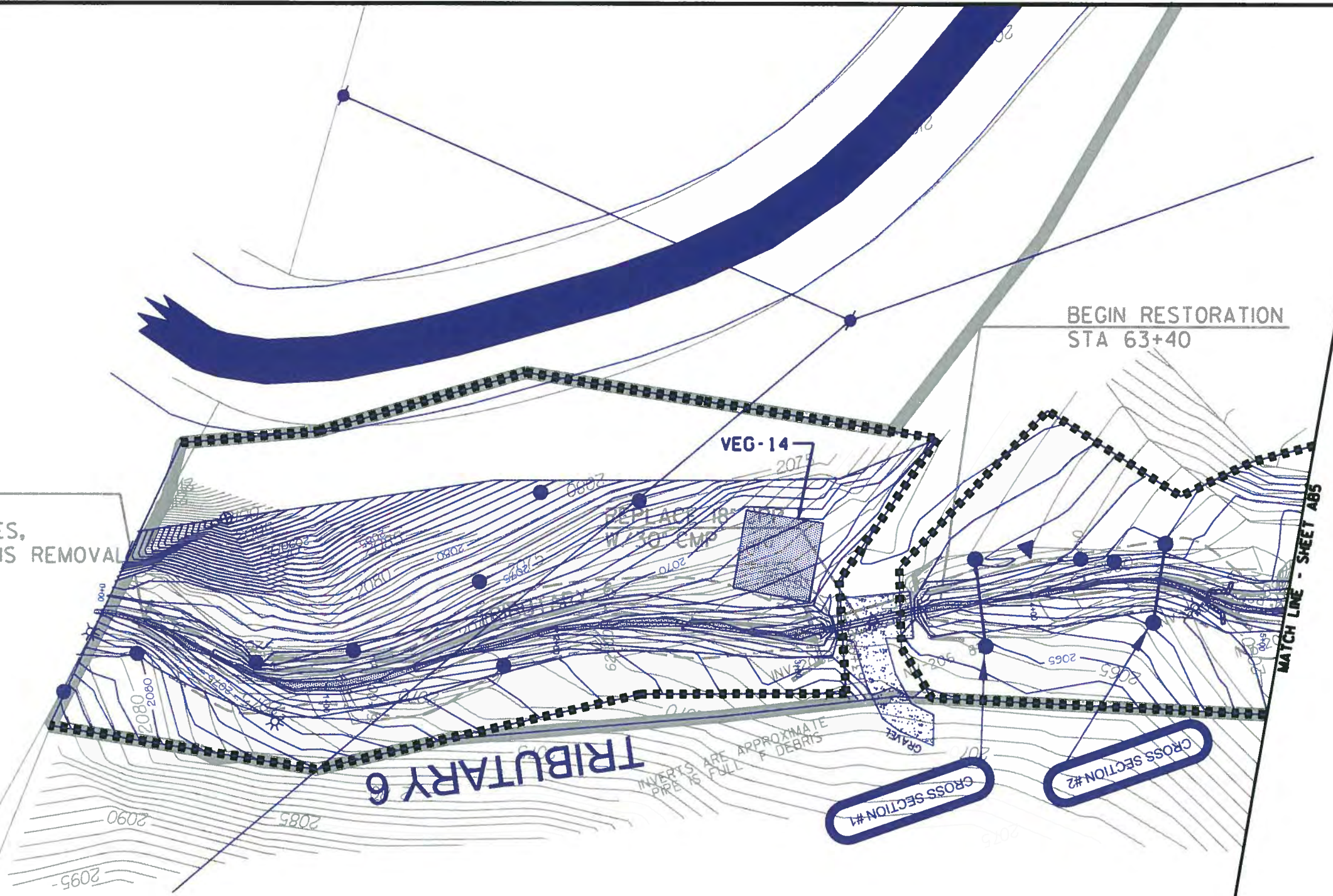
CHECKED BY: KMM

EEP PROJ. NO.
 92497
 SCO PROJ. NO.
 060675001

AB14

BEGIN TRIBUTARY 6
 STA 60+00
 ENHANCEMENT II
 BANK WORK, INVASIVES,
 PLANTING AND DEBRIS REMOVAL

BEGIN RESTORATION
 STA 63+40



- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
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- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
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REVISIONS

NO.	DATE

Prepared by
URS
 1600 Perimeter Park Drive, Suite 400
 Morrisville, North Carolina 27560
 Phone (919)461-1100 Fax (919)461-1415
 NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
 STREAM RESTORATION
 PROJECT
 TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
 ECOSYSTEM
 ENHANCEMENT PROGRAM



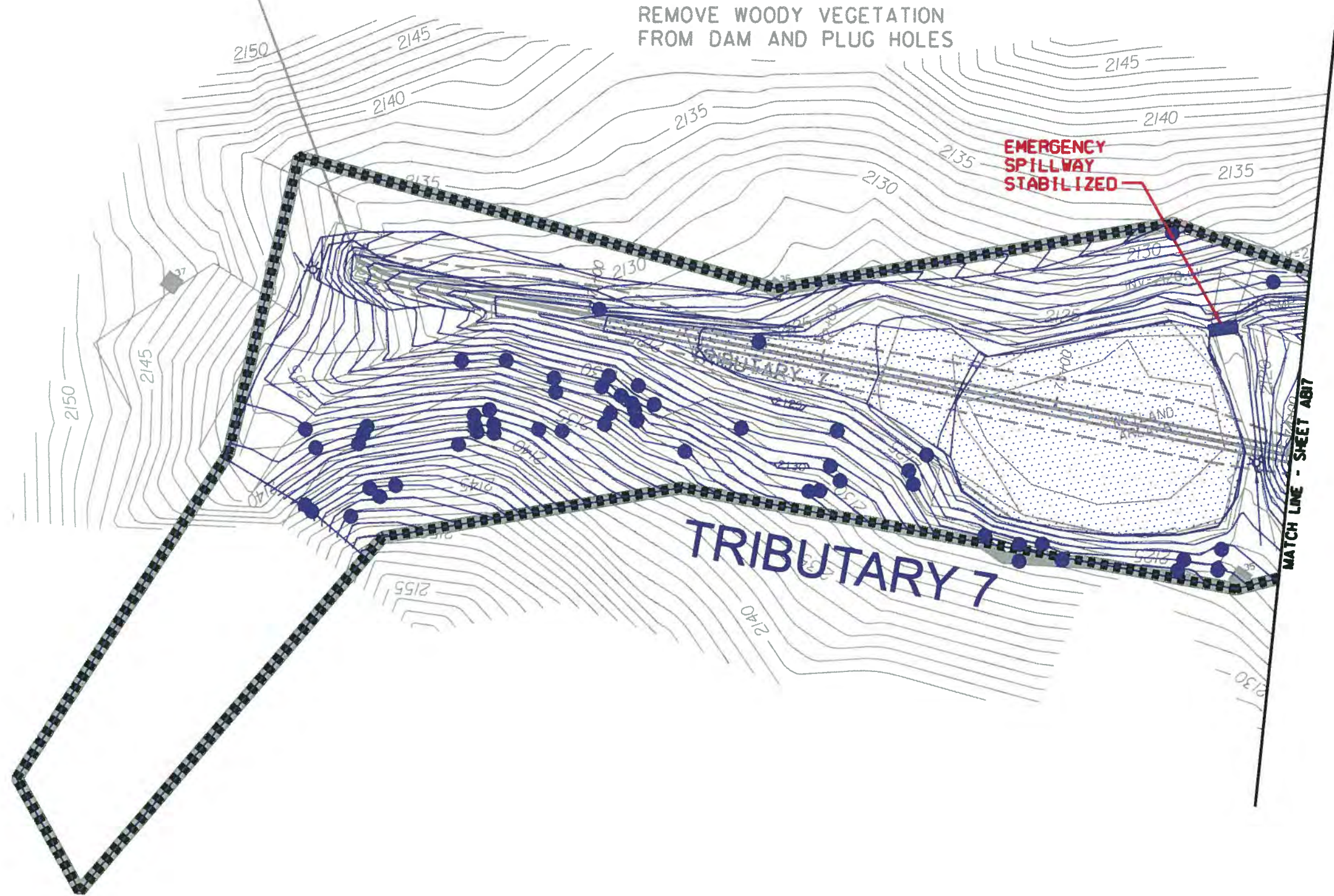
DATE: MAY 2002
 TECHNICIAN: EHJ
 CHECKED BY: KMM
 EUP PRINT NO. 92497
 SCO PRINT NO. 050673001

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
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- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)

BEGIN TRIBUTARY 7
STA 70+00
ENHANCEMENT II
INVASIVES AND
PLANTING ONLY

REMOVE WOODY VEGETATION
FROM DAM AND PLUG HOLES

EMERGENCY
SPILLWAY
STABILIZED



REVISIONS

NO.	DATE

Prepared by
URS
1600 Penimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243

PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT

TITLE:
AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM

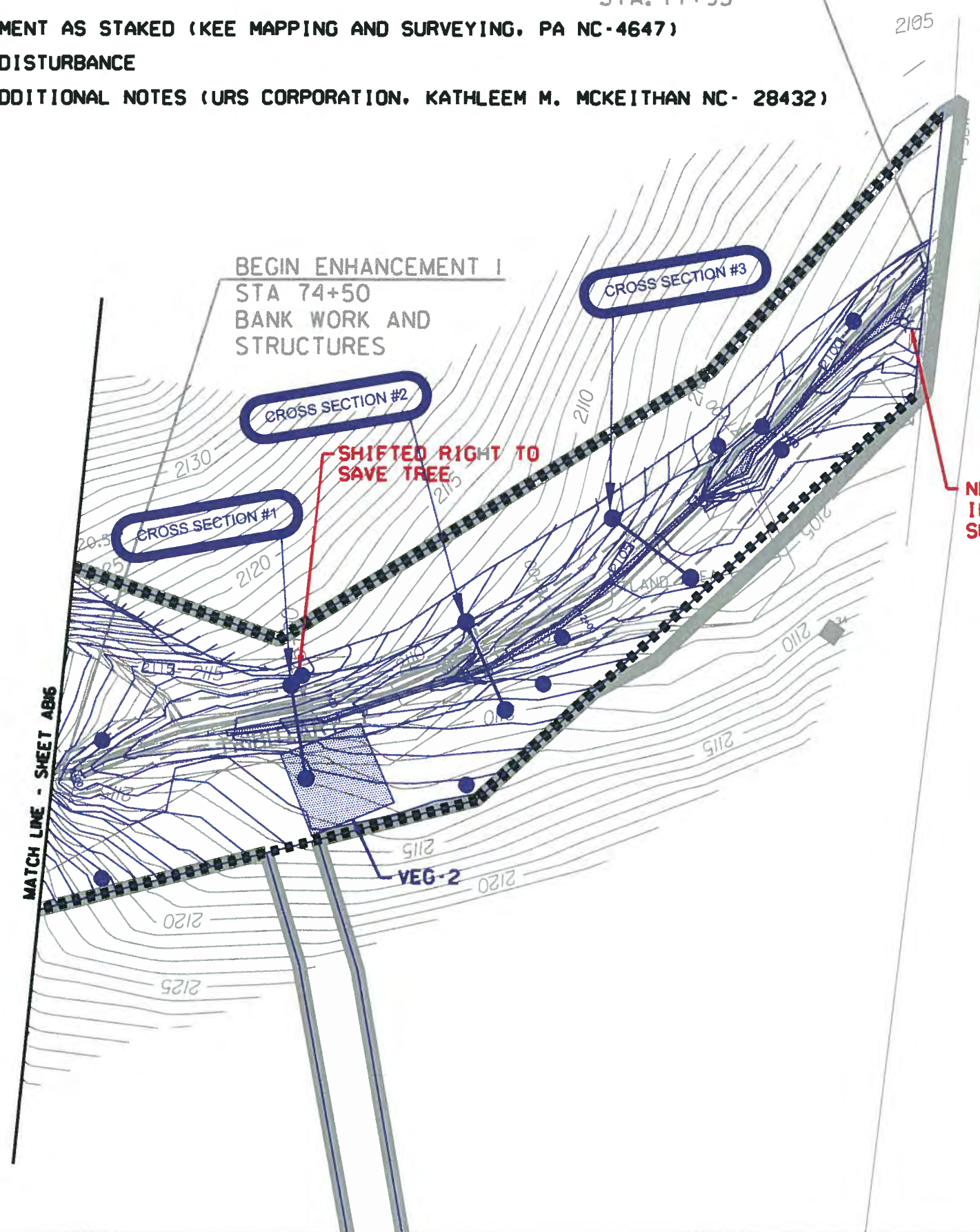


DATE: MAY 2012
TECHNICIAN: EHJ
CHECKED BY: KMM
EEP DRAWING NO. 92491
SCD PROJ. NO. 06-0675001

AB16

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
- NCEEP EASEMENT AS STAKED (KEE MAPPING AND SURVEYING, PA NC-4647)
- LIMITS OF DISTURBANCE
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END TRIBUTARY 7
STA. 77+95



NEW FENCE ADDED
INSIDE/UPSTREAM OF
SURVEYED FENCE

MATCH LINE - SHEET AB16

BEGIN ENHANCEMENT 1
STA 74+50
BANK WORK AND
STRUCTURES

CROSS SECTION #1

CROSS SECTION #2

CROSS SECTION #3

SHIFTED RIGHT TO
SAVE TREE

VEG-2



REVISIONS	
NO.	DATE

Prepared by
URS
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919) 461-1100 Fax (919) 461-1415
NC Lic. # C-2243

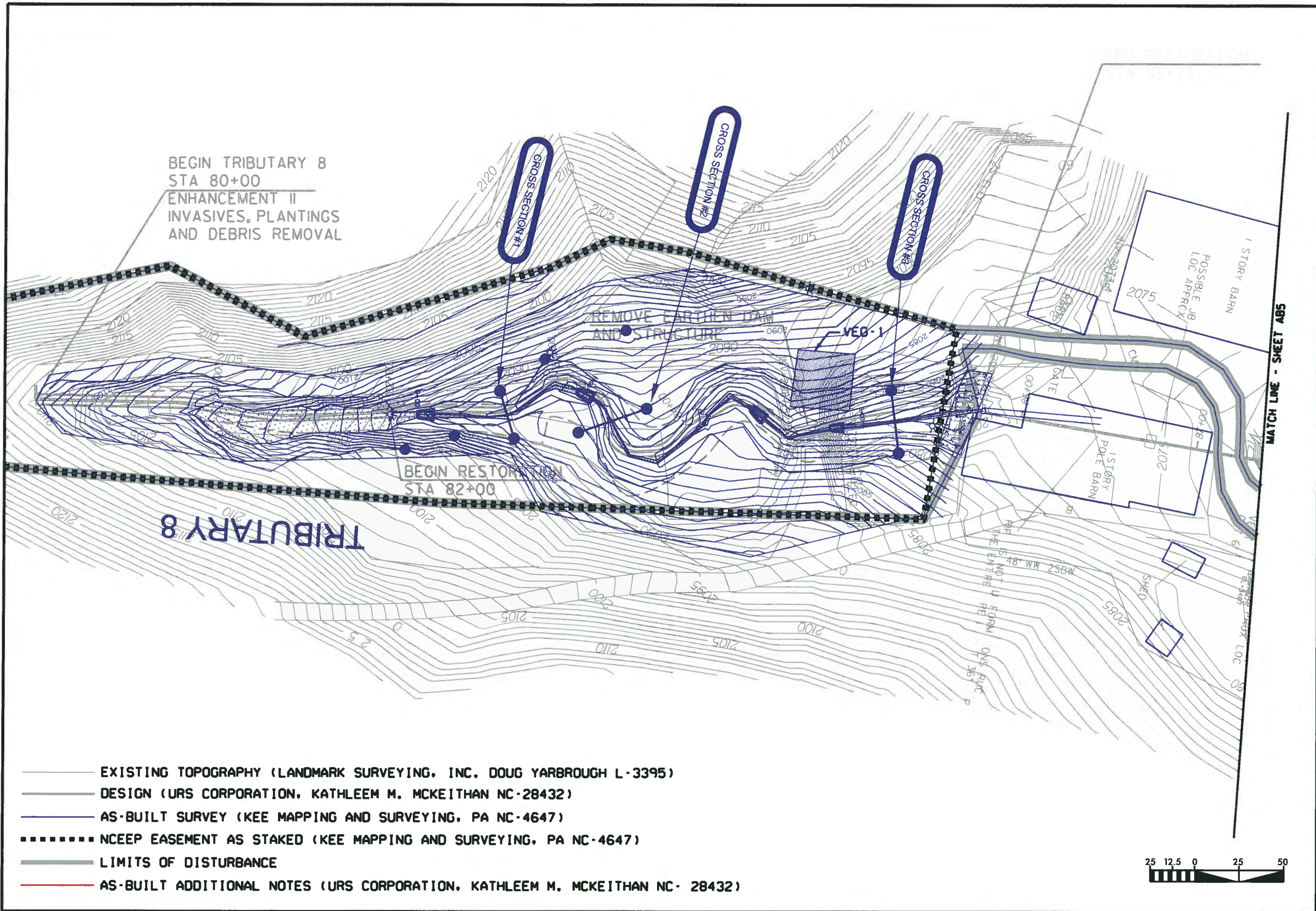
PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT
TITLE: AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM



DATE: MAY 2012
TECHNICIAN: EHJ
CHECKED BY: KMM
EEP PROJ. NO. 92497
SCO PROJ. NO. 060615001

ABI7



BEGIN TRIBUTARY 8
STA 80+00
ENHANCEMENT II
INVASIVES, PLANTINGS
AND DEBRIS REMOVAL

CROSS SECTION #1

CROSS SECTION #2

CROSS SECTION #3

REMOVE EARTHEN DAM
AND STRUCTURE

VEG-1

BEGIN RESTORATION
STA 82+00

TRIBUTARY 8

MATCH LINE - SHEET A85

- EXISTING TOPOGRAPHY (LANDMARK SURVEYING, INC. DOUG YARBROUGH L-3395)
- DESIGN (URS CORPORATION, KATHLEEM M. MCKEITHAN NC-28432)
- AS-BUILT SURVEY (KEE MAPPING AND SURVEYING, PA NC-4647)
- NCEP EASEMENT AS STAKED (KEE MAPPING AND SURVEYING, PA NC-4647)
- LIMITS OF DISTURBANCE
- AS-BUILT ADDITIONAL NOTES (URS CORPORATION, KATHLEEM M. MCKEITHAN NC- 28432)



REVISIONS

NO.	DATE

Prepared by
URS
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)481-1100 Fax (919)481-1415
NC Lic# C-2243

PROJECT: NEWFOUND CREEK
STREAM RESTORATION
PROJECT

TITLE:
AS-BUILT PLAN SHEET

CLIENT: NORTH CAROLINA
ECOSYSTEM
ENHANCEMENT PROGRAM




DATE: MAY 2002
TECHNICIAN: EHU
CHECKED BY: KMM
EIP PROJ. NO. 92497
SCD PROJ. NO. 060673001

AB18

Appendix B: Cross Section Photographs



Mainstem XS1 facing left bank



Mainstem XS1 facing right bank



Mainstem XS2 facing left bank



Mainstem XS2 facing right bank



Mainstem XS3 facing left bank



Mainstem XS3 facing right bank



Mainstem XS4 facing left bank



Mainstem XS4 facing right bank



Mainstem XS5 facing left bank



Mainstem XS5 facing right bank



Mainstem XS6 facing left bank



Mainstem XS6 facing right bank



Mainstem XS7 facing left bank



Mainstem XS7 facing right bank



Mainstem XS8 facing left bank



Mainstem XS8 facing right bank



Mainstem XS9 facing left bank



Mainstem XS9 facing right bank



Tributary 3 XS1 facing left bank



Tributary 3 XS1 facing right bank



Tributary 3 XS2 facing left bank



Tributary 3 XS2 facing right bank



Tributary 3 XS3 facing left bank



Tributary 3 XS3 facing right bank



Tributary 3 XS4 facing left bank



Tributary 3 XS4 facing right bank



Tributary 4 XS1 facing left bank



Tributary 4 XS1 facing right bank



Tributary 4 XS2 facing left bank



Tributary 4 XS2 facing right bank



Tributary 4 XS3 facing left bank



Tributary 4 XS3 facing right bank



Tributary 4 XS4 facing left bank



Tributary 4 XS4 facing right bank



Tributary 5 XS1 facing left bank



Tributary 5 XS1 facing right bank



Tributary 5 XS2 facing left bank



Tributary 5 XS2 facing right bank



Tributary 5 XS3 facing left bank



Tributary 5 XS3 facing right bank



Tributary 6 XS1 facing left bank



Tributary 6 XS1 facing right bank



Tributary 6 XS2 facing left bank



Tributary 6 XS2 facing right bank



Tributary 7 XS1 facing left bank



Tributary 7 XS1 facing right bank



Tributary 7 XS2 facing left bank



Tributary 7 XS2 facing right bank



Tributary 7 XS3 facing left bank



Tributary 7 XS3 facing right bank



Tributary 8 XS1 facing left bank



Tributary 8 XS1 facing right bank



Tributary 8 XS2 facing left bank



Tributary 8 XS2 facing right bank



Tributary 8 XS3 facing left bank



Tributary 8 XS3 facing right bank

Appendix C: Vegetation Plot Photographs and Number of Planted Stems



VP1, Tributary 8, West Bank (16 planted stems)



VP2, Tributary 7, South Bank (19 planted stems)



VP3, Tributary 4, North Bank (22 planted stems)



VP4, Tributary 4, South Bank (12 planted stems)



VP5, Tributary 3, North Bank (18 planted stems)



VP6, Tributary 3, North Bank (20 planted stems)



VP7, Mainstem, East Bank (18 planted stems), 3/27/12



VP8, Mainstem, East Bank (21 planted stems)



VP9, Tributary 5, West Bank (20 planted stems)



VP10, Mainstem, South Bank (20 planted stems)



VP11, Mainstem, East Bank (20 planted stems)



VP12, Mainstem, East Bank (17 planted stems)



VP13, Mainstem, West Bank (20 planted stems)



VP14, Tributary 6, South Bank (22 planted stems)

Appendix D: Photo Station Photographs



PS1, Tributary 8 facing downstream



PS2, Tributary 8 facing upstream



PS3, Tributary 8 facing downstream



PS4, Tributary 8 facing upstream



PS5, Tributary 8 facing east



PS6, Tributary 8 facing upstream



PS7, Tributary 7 facing upstream



PS8, Tributary 7 facing downstream



PS9, Tributary 7 facing upstream



PS10, Tributary 7 facing downstream



PS11, Tributary 7 facing upstream



PS12, Tributary 7 facing downstream



PS13, Tributary 4 facing downstream



PS14, Tributary 4 facing upstream



PS15, Tributary 4 facing downstream



PS16, Tributary 4 facing upstream



PS17, Tributary 4 facing downstream



PS18, Tributary 4 facing upstream



PS19, Tributary 4 facing downstream



PS20, Tributary 4 facing upstream



PS21, Tributary 4 facing downstream



PS22, Tributary 4 facing upstream



PS23, Tributary 4 facing downstream



PS24, Tributary 4 facing upstream



PS25, Tributary 4 facing downstream



PS26, Tributary 3 facing downstream



PS27, Tributary 3 facing upstream



PS28, Tributary 3 facing downstream



PS29, Tributary 3 facing upstream



PS30, Tributary 3 facing downstream, 3/27/12



PS31, Mainstem facing downstream



PS32, Mainstem facing upstream



PS33, Mainstem facing downstream



PS34, Mainstem facing upstream



PS35, Mainstem facing downstream



PS36, Mainstem facing upstream



PS37, Mainstem facing downstream



PS38, Tributary 3 facing upstream at confluence



PS39, Tributary 5 facing upstream



PS40, Tributary 5 facing downstream



PS41, Tributary 5 facing upstream



PS42, Tributary 5 facing downstream



PS43, Tributary 5 facing upstream at road



PS44, Tributary 4 facing upstream at confluence



PS45, Mainstem facing upstream



PS46, Mainstem facing downstream



PS47, Mainstem facing upstream



PS48, Mainstem facing downstream



PS49, Mainstem facing upstream



PS50, Mainstem facing downstream



PS51, Tributary 8 facing upstream



PS52, Mainstem facing upstream



PS53, Mainstem facing downstream



PS54, Mainstem facing upstream



PS55, Mainstem facing downstream



PS56, Tributary 6 facing upstream



PS57, Mainstem facing upstream



PS58, Mainstem facing downstream



PS59, Mainstem facing upstream



PS60, Mainstem facing downstream



PS61, Mainstem facing upstream



PS62, Mainstem facing downstream



PS63, Mainstem facing upstream



PS64, Mainstem facing downstream



PS65, Mainstem facing upstream



PS66, Tributary 6 facing downstream



PS67, Tributary 6 facing upstream



PS68, Tributary 6 facing downstream



PS69, Tributary 6 facing upstream



PS70, Tributary 6 facing downstream



PS71, Tributary 6 facing upstream



PS72, Tributary 6 facing downstream



PS73, Tributary 6 facing upstream



PS74, Tributary 6 facing downstream



PS75, Tributary 6 facing upstream
