Railroad Drainage Ditch Investigation Work Plan

Crawford Creek and Tributary Remediation and Restoration Project – Superior, Wisconsin

November 22, 2024

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Prepared By:
Arcadis U.S., Inc.

Prepared For:
Beazer East, Inc.
USEPA GLNPO

Our Ref:
30242685

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1 Introduction

On behalf of Beazer East, Inc. (Beazer) and the United States Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO), Arcadis U.S., Inc. (Arcadis) has prepared this Railroad Drainage Ditch Investigation Work Plan to present the scope of work and procedures for supplemental investigation activities to be conducted for railroad drainage ditches located near the Great Lakes Legacy Act (GLLA) Crawford Creek and Tributary Remediation and Restoration Project Area (Project Area) and downstream of the Former Koppers Inc. Wood-Treating Facility (Former Koppers Site) in Superior, Wisconsin (**Figure 1**).

2 Background

In May 2024, Arcadis completed screening-level hydrologic and hydraulic (H&H) modeling for two potential remedial options associated with the Sub-Area A Tributary (tributary) portion of the Crawford Creek and Tributary GLLA Project Area. One of the H&H model findings was that during 5-year and greater storm events, the existing culverts beneath the BNSF railroad tracks and East Hammond Avenue do not have sufficient capacity to convey the surface water flows, and, as a result, surface water backs up into a generally E-W oriented drainage ditch that runs parallel to and south of the BNSF railroad tracks (hereinafter referred to as the "BNSF track-side drainage ditch"), spills over into a generally N-S oriented drainage ditch that runs parallel to and east of the Soo Line[1] railroad tracks (hereinafter referred to as the "Soo Line track-side drainage ditch"), and ultimately drains back into the tributary near the Soo Line Railroad crossing (Arcadis 2024b). A LiDAR Site Map depicting this various railroad track-side drainage ditches is provided in **Appendix A**.

3 Objectives

The overall objectives of the investigation activities outlined in the Railroad Drainage Ditch Investigation Work Plan are listed below.

- Conduct field survey to verify whether the railroad drainage ditch topography is consistent with the LiDAR survey data used in the H&H modeling and whether the model-predicted surface water flow pathways are accurate.
- If the LiDAR survey data and model predictions are confirmed, conduct sampling to evaluate the potential presence of Former Koppers Site-related constituents of concern in the railroad drainage ditches.

4 Investigation Scope of Work and Procedures

4.1 Task 1: Topographic Survey

The topographic survey scope of work is summarized on **Figure 2** and includes topographic survey along transects oriented perpendicular to the drainage ditches, as well as more detailed topographic survey in key

[1] As further discussed in Section 6, the "Soo Line" tracks are currently owned by Canadian National Railway Company (CN). They are still referred to as "Soo Line" tracks in this document, because that is how they are identified on Douglas County Wisconsin tax maps.

areas. Survey transects are spaced at approximately 100-foot intervals along the BNSF track-side ditch, and at approximately 200-foot intervals along the Soo Line track-side ditch.

Arcadis will subcontract LHB Inc. of Duluth, MN to conduct the topographic field survey. Surveyed elevations will be referenced to the North American Vertical Datum of 1988 and surveyed horizontal coordinates will be referenced to the State Plane North American Datum of 1983 – Wisconsin North Zone. Survey data will be recorded to the nearest 0.01 foot (horizontal and vertical).

Arcadis will review the topographic survey data survey to verify whether the railroad drainage ditch topography is consistent with the LiDAR survey data used in the H&H modeling, and re-run the H&H model to confirm whether the previous model-predicted surface water flow pathways are correct.

4.2 Task 2: Drainage Ditch Borings/Sampling

If the Task 1 – Topographic Survey activities confirm the LiDAR survey data and previous model-predicted surface water flow pathways, Arcadis will conduct sampling to evaluate the potential presence of Former Koppers Site-related constituents of concern in the railroad drainage ditches. If the Task 1 – Topographic Survey activities do not confirm the LiDAR survey data and previous model-predicted surface water flow pathways, Arcadis will re-evaluate the need for and scope of the drainage ditch sampling (i.e., it may be determined that sampling is not needed, or that the sampling scope of work presented herein needs to be modified).

4.2.1 BNSF Track-Side Drainage Ditch

The sampling scope of work for the BNSF track-side drainage ditch includes the advancement of borings and collection of samples from three locations (RRDD-01, RRDD-02, and RRDD-03) along the northeastern-most portion of the BNSF track-side drainage ditch (**Figure 3**). Based on the completed H&H modeling, this is the section of the railroad drainage ditch system that is most frequently inundated with surface water from the Tributary to Crawford Creek. A fourth sample (RRDD-04) is located on the southwest end of a drainage ditch culvert pipe (**Figure 3**) to assess conditions on this side of the culvert, if needed. Note that the sample locations shown on **Figure 3** are considered preliminary, and may be modified pending the results of the Task 1 – Topographic Survey activities.

At each location, a hand auger boring will be advanced in the center of the drainage ditch channel to a targeted depth of 4 feet. If standing water is present in the drainage ditch, or if water is encountered in the borehole during hand augering, a manually driven Macro-Core® sampler or Lexan™ tube may be used for sample collection instead of a hand auger.

Recovered materials will be photographed and described in detail, including the following as a function of depth:

- Principal component with descriptors (including angularity for very coarse sand and larger particles, plasticity for silt and clay, and dilatancy for silt and silt-sand mixtures);
- Amount and identification of minor component(s) with descriptors;
- Moisture;
- Consistency/density;
- Color; and

- Additional description or comments, such as odor; structure; bedding planes; presence of roots, root holes, organic material, man-made materials, minerals, etc.; mineralogy; cementation; presence of visual impacts such as non-aqueous phase liquid [NAPL], staining, or sheens; etc.

Visual impacts will be classified using the following descriptions used by Beazer during prior investigations:

- Type 1 – Visibly impacted with creosote-like product (e.g., NAPL, free-phase product);
- Type 2 – Visibly impacted with staining or sheens, or exhibits creosote-like odor, but does not contain visible product; and
- Type 3 – No visible impacts (i.e., staining, sheens, product) or odor.

Samples will be collected from the following intervals for laboratory analyses:

- 0 to 0.5 feet;
- 0.5 to 1 feet;
- 1 to 2 feet; and
- 2 to 4 feet (or 2 feet to End of Core if a Macro-Core® sampler or Lexan™ tube is used, and refusal is encountered before 4 feet).

Note that sample intervals may be adjusted in the field to account for observed changes in visual impacts and lithology (i.e., each sample interval will target a single visual observation type and lithologic type, to the extent possible). For example, if the 2- to 3-foot portion of the 2- to 4-foot sampling interval has visual impacts (e.g., NAPL, staining, sheens) and such visual impacts are absent from the 3- to 4-foot portion of the 2- to 4-foot interval, the two portions of the 2- to 4-foot sampling interval would be analyzed separately.

Initially, samples collected from locations RRDD-01 through RRDD-03 will be analyzed for polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, and total organic carbon (TOC). The samples collected at RRDD-04 will be shipped to the laboratories and held pending review of the results for samples from RRDD-01 through RRDD-03, and discussions with WDNR. Expedited turn-around-times for the RRDD-01 through RRDD-03 samples will be requested if necessary, so that hold times for the RRDD-04 samples are not exceeded.

All boreholes will be properly abandoned in accordance with NR 141.25 requirements.

4.2.2 Soo Line Track-Side Drainage Ditch

The sampling scope of work for the Soo Line track-side drainage ditch includes the collection of surface grab samples from four locations (RRDD-05, RRDD-06, RRDD-07, and RRDD-08) along the last 200-foot section of the drainage ditch before its confluence with the Tributary to Crawford Creek (**Figure 3**). Sampling in this section of the drainage ditch is being performed at the request of the Wisconsin Department of Natural Resources (WDNR) (WDNR 2024).

Note that the sample locations shown on **Figure 3** are considered preliminary, and may be modified pending the results of the Task 1 – Topographic Survey activities. In addition, reconnaissance of the Soo Line track-side drainage ditch indicates that it is predominately lined with ballast stone; accordingly, the sample locations shown on **Figure 3** will be modified, as needed, to target locations with visible depositional material on top of or mixed with the surficial ballast stone.

At each location, a stainless-steel scoop or hand trowel will be used to collect a sample of depositional materials from the 0 to 0.5-foot depth interval. As noted above, locations within the drainage ditch with visible depositional material on top of or mixed with the surficial ballast stone will be targeted for sampling. Ballast material will be removed from the depositional material, such that only the depositional material is collected for laboratory analysis.

Recovered materials will be photographed and described in detail, including the following:

- Principal component with descriptors (including angularity for very coarse sand and larger particles, plasticity for silt and clay, and dilatancy for silt and silt-sand mixtures);
- Amount and identification of minor component(s) with descriptors;
- Moisture;
- Consistency/density;
- Color; and
- Additional description or comments, such as odor; structure; bedding planes; presence of roots, root holes, organic material, man-made materials, minerals, etc.; mineralogy; cementation; presence of visual impacts such as NAPL, staining, or sheens; etc.

Visual impacts will be classified using the following descriptions used by Beazer during prior investigations:

- Type 1 – Visibly impacted with creosote-like product (e.g., NAPL, free-phase product);
- Type 2 – Visibly impacted with staining or sheens, or exhibits creosote-like odor, but does not contain visible product; and
- Type 3 – No visible impacts (i.e., staining, sheens, product) or odor.

The Soo Line track-side drainage ditch samples will be analyzed for dioxins/furans and TOC.

5 Quality Assurance/Quality Control

Quality assurance/quality control procedures associated with the implementation of this Railroad Drainage Ditch Investigation Work Plan, including field, laboratory and data review/validation procedures, are outlined in the *2024 Data Gap Investigation Quality Assurance Project Plan* (2024 QAPP; Arcadis 2024a).

6 Property Access

Implementation of the field investigation activities described in this Railroad Drainage Ditch Investigation Work Plan will require access to the properties listed in the table below.

Parcel ID	Owner	Investigation Scope
TS-030-01348-00	BNSF	Survey, Potential Sampling
TS-030-01378-00	BNSF	Survey
TS-030-01349-00[2]	CN	Survey, Potential Sampling

Parcel ID	Owner	Investigation Scope
TS-030-01358-00[2]	CN	Survey
TS-030-01376-00[3]	CN	Survey

Beazer/Arcadis will execute access agreements with the property owners prior to mobilization. Assistance from USEPA and/or WDNR will be requested if necessary.

7 Utility Clearance

If sampling is to be performed, prior to mobilization, Wisconsin One Call (i.e., Diggers Hotline) will be contacted to mark public utilities located within the investigation areas. In accordance with Arcadis standard policies, a minimum of three lines of evidence will be utilized for locating subsurface utilities. The lines of evidence anticipated to be used for this project include contacting Diggers Hotline, conducting an inspection of each location, reviewing available utility maps, discussing utility locations with property owners, and/or "soft digging" with a hand auger. Railroad-specific utility clearance protocols established in access agreements will also be followed.

8 Equipment Cleaning

Non-dedicated/non-disposable sampling equipment will be cleaned prior to use at each sample location and between each sample interval, using the following procedure:

- Scrub with a brush and distilled/deionized water to remove large particles;
- Rinse with distilled/deionized water;
- Scrub with a brush and Alconox™ detergent wash;
- Rinse with distilled/deionized water;
- Rinse with solvent (e.g., hexane); and
- Rinse with distilled/deionized water.

9 Waste Management

Waste materials, including, but not limited to, equipment cleaning fluids, used personal protective equipment, disposable sampling equipment, and excess cuttings from the drainage ditch borings, will be placed into 55-gallon drums. The drums will be staged in a designated area for subsequent characterization (if required) and disposal by Beazer.

[2] Douglas County Wisconsin tax maps indicate these parcels are owned by Soo Line Railroad Co. However, based on review of the property title, Parcel TS-030-01358-00 is owned by CN. Based on review of CN property records, Parcel TS-030-01349-00 is also owned by CN.
[3] Douglas County Wisconsin tax maps indicate this parcel is owned by Wisconsin Department of Natural Resources. However, based on review of CN property records, Parcel TS-030-01376-00 is owned by CN.

10 Reporting

10.1 Task 1: Topographic Survey

Following completion of the Task 1 – Topographic Survey activities, Arcadis will re-run the H&H model and prepare a memo summarizing the survey/modeling results. The memo will include an updated topographic site map and a discussion of whether the field surveyed railroad drainage ditch topography is consistent with the LiDAR survey data used in the previous H&H modeling, and whether the previous model-predicted surface water flow pathways are correct. The memo will also include a discussion of the need for and scope of the drainage ditch sampling, based on the survey/re-modeling results (i.e., it may be determined that sampling is not needed, or that the sampling scope of work needs to be modified).

10.2 Task 2: Drainage Ditch Borings/Sampling

If Task 2 – Drainage Ditch Borings/Sampling is conducted, Arcadis will prepare a report to summarize the scope and findings of the investigation activities, and make recommendations for follow-up activities, if necessary. The report will include tables and boring logs summarizing the drainage ditch boring visual observations, tables summarizing the drainage ditch sample analytical results, maps showing the surveyed boring locations, laboratory reports, data validation reports, and WDNR Forms 4400-122 (Soil Boring Log Information) and 3300-305 (Well/Drillhole/Boring Filling & Sealing Report). The topographic survey memo will also be included as an attachment to the investigation summary report.

11 Schedule

A schedule for field work implementation will be prepared following review and approval of this Railroad Drainage Ditch Investigation Work Plan by Beazer, USEPA and WDNR, and execution of access agreements with BNSF and CN. The survey/modeling memo is anticipated to be completed within 45 days following completion of the field survey. The sampling summary report will be submitted within approximately 45 days following receipt and validation of all laboratory analytical data.

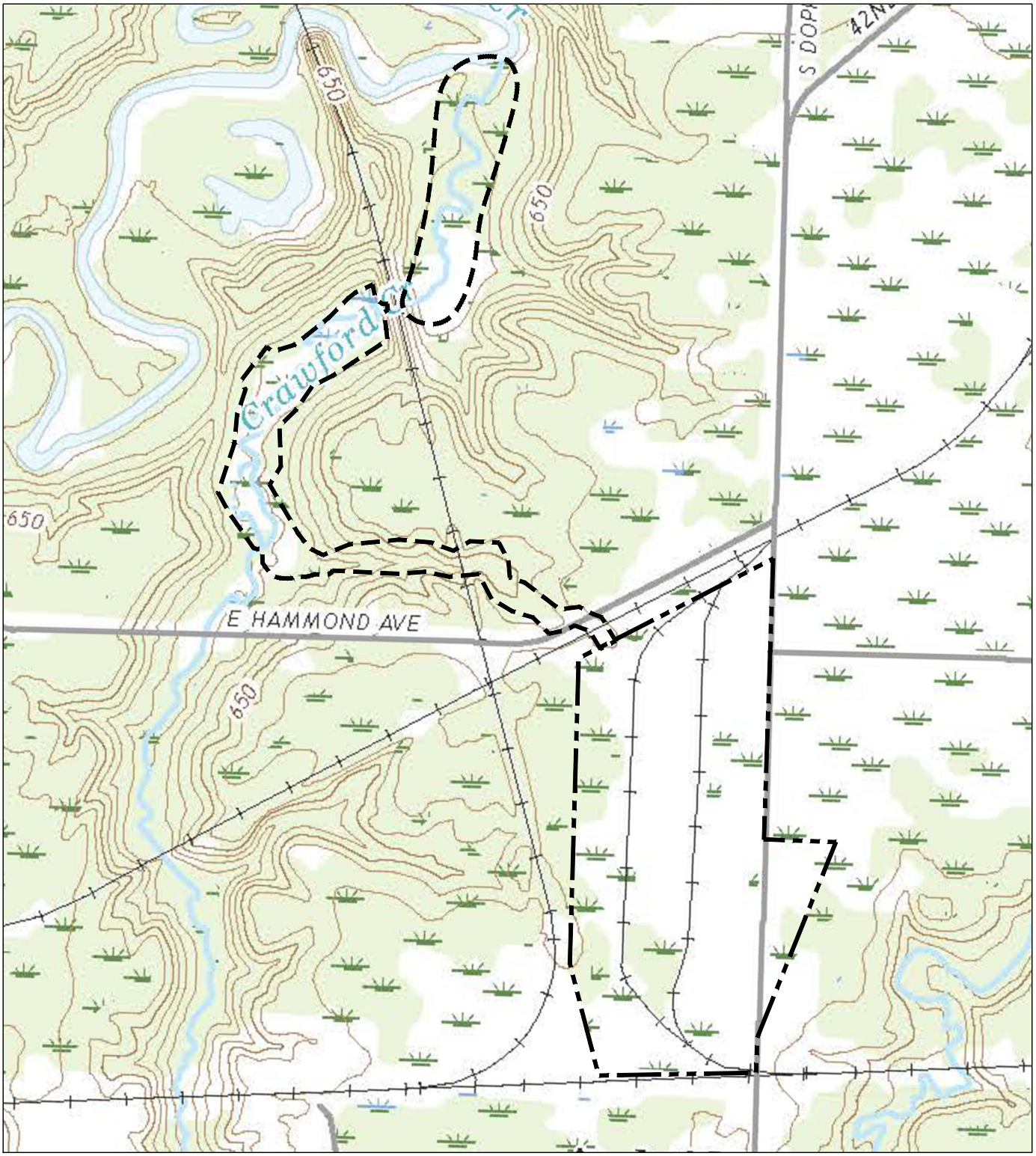
12 References

Arcadis 2024a. 2024 Data Gap Investigation Quality Assurance Project Plan. May 7.

Arcadis 2024b. Sub-Area A Tributary H&H Modeling Tech Memo. May 17.

WDNR 2024. Email from Joseph Graham. DNR Follow-up from 09/13/2024 Crawford Creek GLLA Call. September 13.

Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., SUPERIOR, WI, MN, 2018.

0 1000' 2000'

Approximate Scale: 1 in. = 1000 ft.

LEGEND:

CRAWFORD CREEK AND TRIBUTARY PROJECT AREA

FORMER KOPPERS INC. FACILITY

WISCONSIN

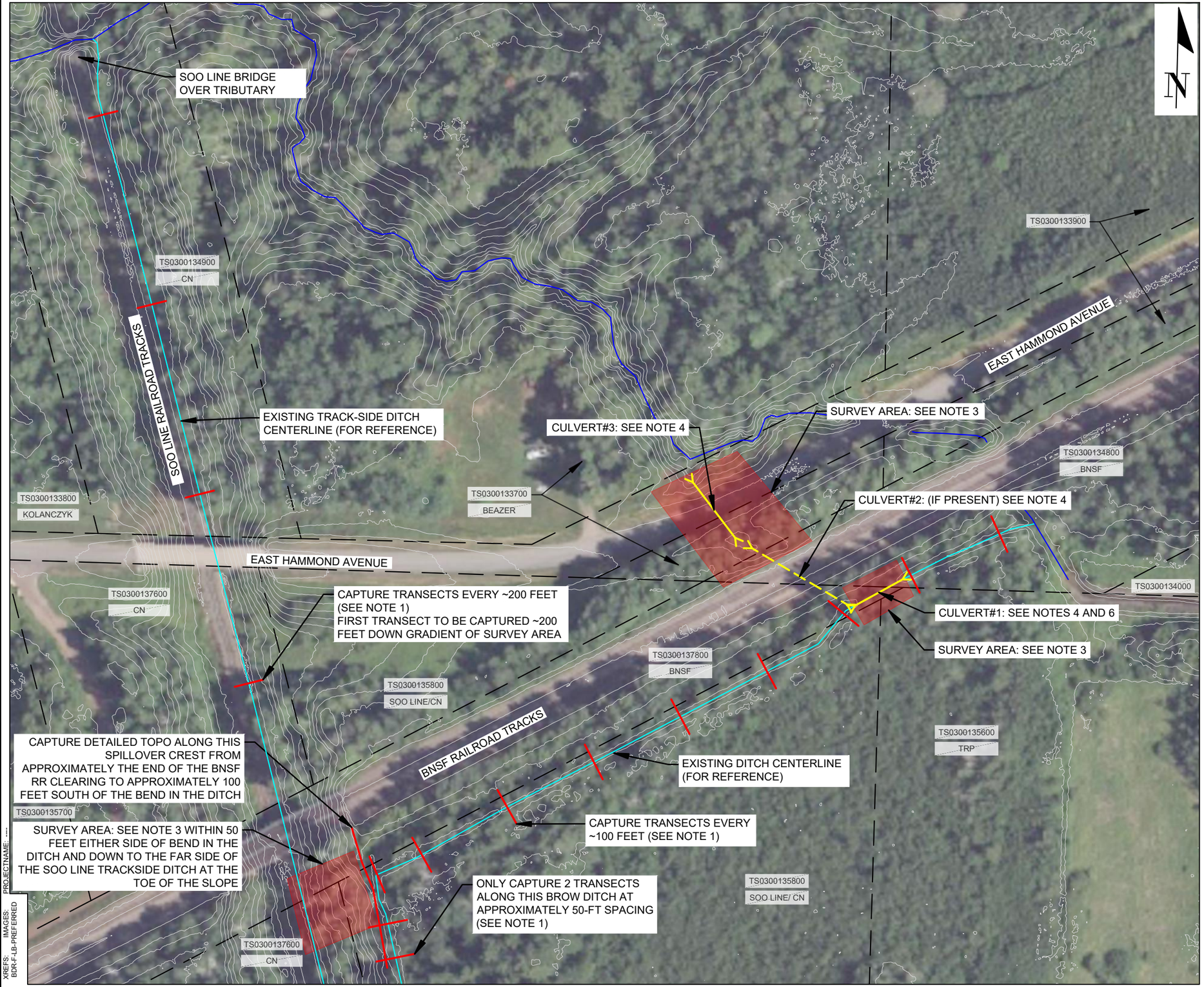
CRAWFORD CREEK AND TRIBUTARY GLLA PROJECT
SUPERIOR, WI

RAILROAD DITCH WORK PLAN

PROJECT AREA LOCATION MAP

ARCADIS

FIGURE 1



LEGEND:

- CONTOURS (2-FT INTERVAL)
- EXISTING DITCH CENTERLINE
- TRIBUTARY TO CRAWFORD CREEK CENTERLINE
- TRANSECT TO BE SURVEYED
- AREA TO BE SURVEYED
- CULVERT
- PROPERTY PARCEL

NOTES:

1. TRANSECTS ON DRAWINGS ARE 40-FEET WIDE, BUT THE ACTUAL LENGTH TO BE SURVEYED WILL BE DETERMINED BY THE SURVEYOR IN THE FIELD TO CAPTURE THE FULL CROSS-SECTIONAL GEOMETRY OF THE CHANNEL(S).
2. SURVEY IS TO BE RECORDED IN FEET USING HORIZONTAL DATUM NAD83 WISCONSIN STATE PLANES NORTH ZONE (FEET), AND VERTICAL DATUM NAVD88 (FEET).
3. LOCATIONS MARKED AS "SURVEY AREAS" SHALL INCLUDE DETAILED TOPO, CRITICAL FEATURES, AND IDENTIFIABLE GRADE BREAKS.
4. ALL LABELED CULVERTS ON THIS FIGURE ARE TO BE SURVEYED AT THEIR RESPECTIVE INLET AND OUTLET INVERTS. SURVEYOR MUST MEASURE AND NOTE THE DIAMETER AND MATERIAL OF EACH CULVERT AND PROVIDE PHOTOS OF INLETS AND OUTLETS.
5. SURVEYOR IS TO REVIEW SURVEY POINTS AND LINKS AND GENERATE BREAKLINES AS NECESSARY PRIOR TO SENDING TO CLIENT (ARCADIS). DELIVERABLES TO INCLUDE ASCII POINTS FILE (WITH POINT DESCRIPTIONS) AND AUTOCAD DWG FILE
6. ENDS OF CULVERT #1 MAY BE PARTIALLY BURIED. UNCOVER BOTH ENDS, AS NECESSARY, TO ALLOW FOR INVERT SURVEY.
7. AUTODESK MICROSOFT IMAGERY (VIA CIVIL 3D), ACCESSED 07/24/2024.
8. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM GROUND SURVEY (PERFORMED BY LHC, INC. ON NOVEMBER 12, 2008) AND LIDAR (FROM DOUGLAS COUNTY ON JANUARY 3, 2024).
9. PARCEL LINES OBTAINED FROM WISCONSIN DEPARTMENT OF ADMINISTRATION, PUBLISHED JUNE 2023.

0 100 200 Feet

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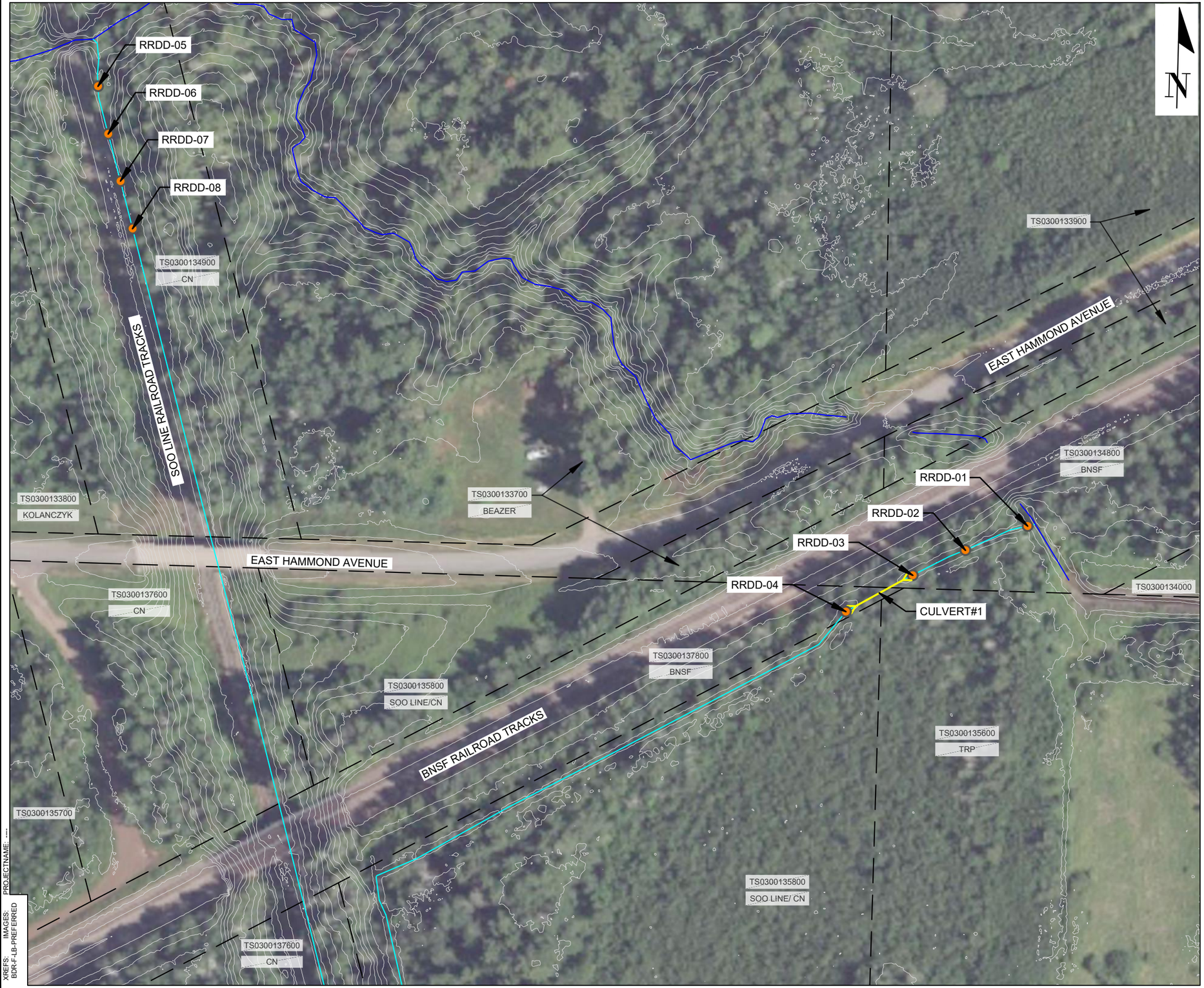
CRAWFORD CREEK AND TRIBUTARY GLLA PROJECT
SUPERIOR, WI
RAILROAD DITCH WORK PLAN

SURVEY SCOPE OF WORK

ARCADIS

FIGURE 2



LEGEND:

- CONTOURS (2-FT INTERVAL)
- EXISTING DITCH CENTERLINE
- TRIBUTARY TO CRAWFORD CREEK CENTERLINE
- PROPERTY PARCELS
- PROPOSED DRAINAGE DITCH SAMPLE LOCATION

NOTES:

1. AUTODESK MICROSOFT IMAGERY (VIA CIVIL 3D), ACCESSED 07/24/2024.
2. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM GROUND SURVEY (PERFORMED BY LHC, INC. ON NOVEMBER 12, 2008) AND LIDAR (FROM DOUGLAS COUNTY ON JANUARY 3, 2024).
3. PARCEL LINES OBTAINED FROM WISCONSIN DEPARTMENT OF ADMINISTRATION, PUBLISHED JUNE 2023.

0 100 200 Feet

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CRAWFORD CREEK AND TRIBUTARY GLLA PROJECT
SUPERIOR, WI

RAILROAD DITCH WORK PLAN

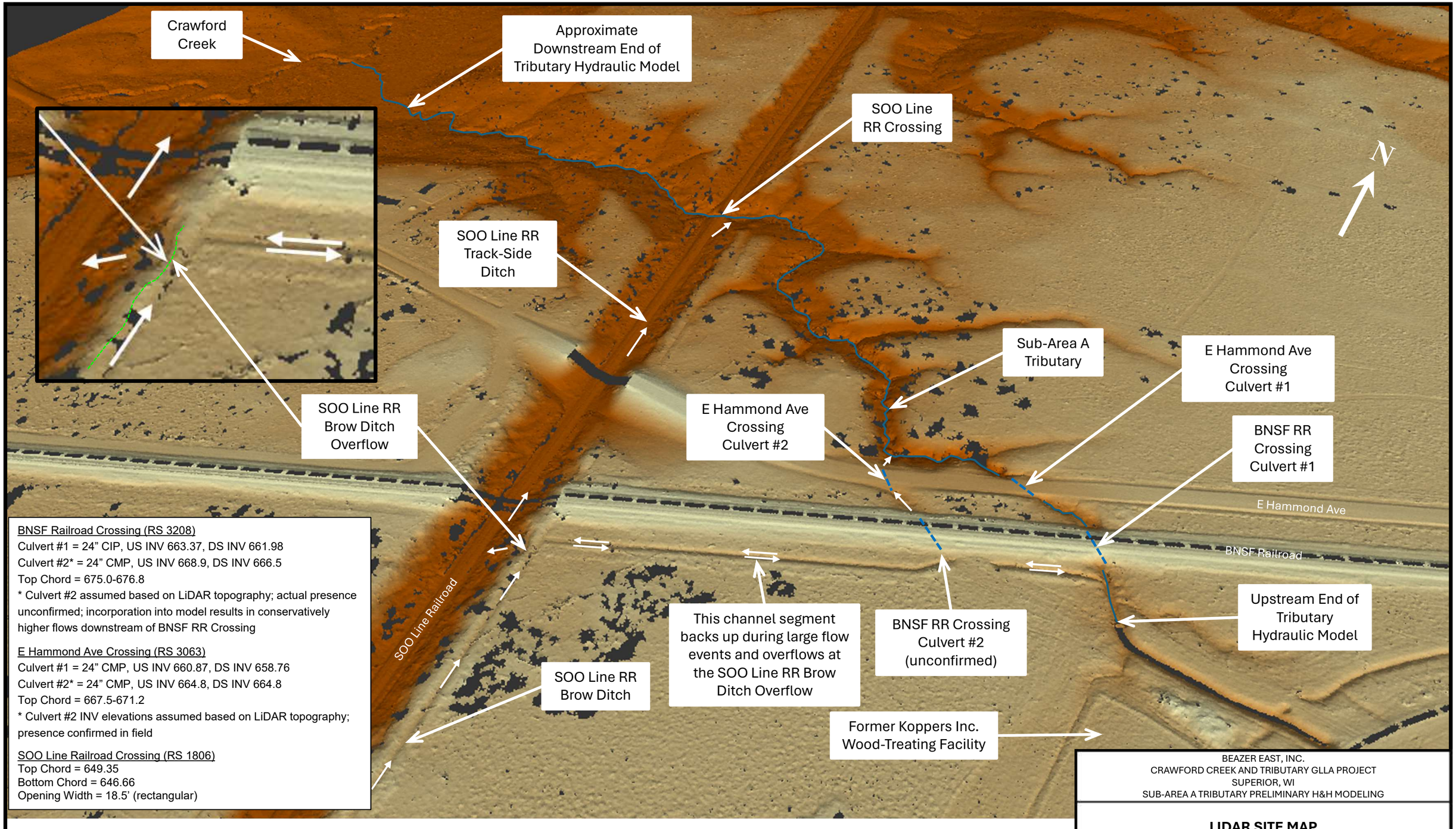
SAMPLING SCOPE OF WORK

ARCADIS

FIGURE 3

Appendix A

LiDAR Site Map



BNSF Railroad Crossing (RS 3208)
Culvert #1 = 24" CIP, US INV 663.37, DS INV 661.98
Culvert #2* = 24" CMP, US INV 668.9, DS INV 666.5
Top Chord = 675.0-676.8
* Culvert #2 assumed based on LiDAR topography; actual presence unconfirmed; incorporation into model results in conservatively higher flows downstream of BNSF RR Crossing

E Hammond Ave Crossing (RS 3063)
Culvert #1 = 24" CMP, US INV 660.87, DS INV 658.76
Culvert #2* = 24" CMP, US INV 664.8, DS INV 664.8
Top Chord = 667.5-671.2
* Culvert #2 INV elevations assumed based on LiDAR topography; presence confirmed in field

SOO Line Railroad Crossing (RS 1806)
Top Chord = 649.35
Bottom Chord = 646.66
Opening Width = 18.5' (rectangular)

LiDAR Source: USGS. 2024. USGS LiDAR Point Cloud WI_12County_B22 152274. (https://nationalmap.gov/3DEP/). Published 1/3/2024. Flown 5/14/2022-5/27/2022.

BEAZER EAST, INC.
CRAWFORD CREEK AND TRIBUTARY GLLA PROJECT
SUPERIOR, WI
SUB-AREA A TRIBUTARY PRELIMINARY H&H MODELING

LIDAR SITE MAP

ARCADIS

FIGURE 1

5/8/2024
LiDAR Birdseye View.pptx