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June 27, 2024

Parag Amin, P.E.
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7014

Subject: Plantasie Creek Interim Floodplain Soil Investigation Report
Hercules/Dyno Nobel Site
Port Ewen, New York
Registry No. 356001

Mr. Amin:

As requested, EHS Support LLC ("EHS Support") is providing the attached *Plantasie Creek Interim Floodplain Soil Investigation Report* (the "June 2024 Interim Report") on behalf of Hercules LLC and Dyno Nobel Inc. (the "Parties") for the ongoing floodplain investigation that is being conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved *Plantasie Creek Floodplain Soil Investigation Work Plan* dated August 2022. The data presented in this Report document the findings of the December 2022 and October 2023 floodplain soil sampling adjacent to Plantasie Creek.

As you are aware, the Parties are currently preparing the work plan for the next planned phase of floodplain soil sampling based on the data presented in this Report and the scope of work discussed with NYSDEC during a meeting on April 3, 2024. However, due to the recent disturbance of Plantasie Creek and its banks by the Town of Esopus from upstream of Mountainview Avenue to Salem Street, a subset of the sampling points may no longer be representative of current conditions. As soon as reasonably possible, the Parties would like to discuss with NYSDEC the next steps and potential modifications to the agreed-upon scope of work that may now be necessary for the ongoing floodplain investigation.

Should you have any questions or require additional information, please feel free to contact me at 850-251-0582 or Gary Long at 215-498-0548.

Sincerely,

Kristin A. VanLandingham, P.E.
Project Manager

cc: Edward Meeks, Hercules LLC
Ian McCary, Hercules LLC
Kathleen Blessing, Dyno Nobel Inc.
Gary Long, EHS Support LLC

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Kristin A. VanLandingham, P.E.
Project Manager

cc: Edward Meeks, Hercules LLC
Ian McCary, Hercules LLC
Kathleen Blessing, Dyno Nobel Inc.
Gary Long, EHS Support LLC

EHS Support

I, Kristin A. VanLandingham, P.E., certify that I am currently a NYS-registered professional engineer and that this *Plantasie Creek Interim Floodplain Soil Investigation Report* dated June 2024 for the Hercules, Inc. site located in Port Ewen, New York was prepared in accordance with all applicable statutes and regulations, and in conformance with the DER *Technical Guidance for Site Investigation and Remediation* (DER-10).

Kristin A. VanLandingham, P.E.
NYS License No. 089610

KRISTIN A. VanLANDINGHAM
089610

06/27/2024
Date

Plantasie Creek Interim Floodplain Soil Investigation Report

Hercules LLC. Site
#356001
Port Ewen, New York

Prepared for:

Hercules LLC
Dyno Nobel Inc.

Prepared by:

EHS Support℠

June 2024

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Acronyms

CO	Consent Order
ECSM	ecological conceptual site model
FEMA	Federal Emergency Management Agency
ft	feet
NYSDEC	New York State Department of Environmental Conservation
SCO	Soil Cleanup Objective
USEPA	United States Environmental Protection Agency

1 Introduction

This *Plantasie Creek Interim Floodplain Soil Investigation Report* ("May 2024 Interim Report") was developed on behalf of Hercules LLC ("Hercules"), a wholly owned subsidiary of Ashland, Inc. ("Ashland"), and Dyno Nobel, Inc. ("Dyno Nobel"), to present the findings from floodplain soil sampling adjacent to Plantasie Creek downstream of the Dyno Nobel Port Ewen Site ("Site"), which was conducted in accordance with New York State Department of Environmental Conservation (NYSDEC) Administrative Order on Consent (Consent Order [CO]) Index # CO 3-20180508-85 effective August 3, 2018. The Site is located at 161 Ulster Avenue, approximately 1 mile south of the Village of Port Ewen in Ulster County, New York (**Figure 1**), and is listed on the New York State Inactive Hazardous Waste Site Index as Site No. 356001.

This May 2024 Interim Report was prepared to present the findings from sampling conducted in accordance with the *Plantasie Creek Floodplain Soil Investigation Work Plan* ("August 2022 Work Plan" [EHS Support, 2022]) that was approved by NYSDEC in August 2022. The August 2022 Work Plan was developed to characterize potential human health and ecological exposure to target metals, including copper, mercury, selenium, and zinc, in surficial soils within the extent of the floodplain that may be regularly inundated by overbank flow from Plantasie Creek. Based on the NYSDEC-approved August 2022 Work Plan, sampling programs were implemented in December 2022 and October 2023 to collect soil samples from the Plantasie Creek floodplain to satisfy the investigation objectives. Analytical data from these sampling events were reviewed and compared with NYSDEC Residential Soil Cleanup Objectives (SCOs) in accordance with the approach outlined in the August 2022 Work Plan. A meeting was held on April 4, 2024, between NYSDEC, Hercules, Dyno Nobel, and EHS Support, to present the findings of the December 2022 and October 2023 floodplain soil sampling events and to discuss identified data gaps and proposed next steps to address identified data gaps for the Plantasie Creek floodplain soil investigation.

The August 2022 Work Plan was developed to investigate potential migration of target metals from on-site sources via overbank transport and deposition to surficial soils within the Plantasie Creek floodplain downstream of the Site. The following were specific objectives of the August 2022 Work Plan:

- Characterize the nature and extent of target metal concentrations in surface soils within the Plantasie Creek floodplain downstream of the Site that may be regularly inundated by overbank flow.
- Evaluate spatial patterns in the distribution of target metal concentrations in surface floodplain soils, including potential longitudinal gradients from source areas, to assess potential overbank transport and deposition as a potential migration pathway.
- Evaluate vertical concentration gradients of target metal concentrations in surface floodplain soils to assess potential overbank transport and deposition as a potential migration pathway.
- Evaluate soil characteristics potentially affecting metal mobility and bioavailability [e.g., pH, total organic carbon).
- Assess potential human health and ecological exposure to target metal concentrations in surface floodplain soils based on comparisons with relevant NYSDEC SCOs (NYSDEC, 2006a and b), and if warranted, provide recommendations for Site-specific evaluations of potential human health or ecological exposure.

This May 2024 Interim Report presents the findings of preliminary analyses of data collected during December 2022 and October 2023 floodplain soil sampling events, including the characterization of the nature and extent of target metals, spatial patterns in the distribution of target metals, and potential human health and ecological exposures to target metals. However, it is important to note that a subset of these data may no longer be representative of current conditions on the floodplain within a portion of the study area following the disturbance of Plantasie Creek and its banks in early May 2024.[1]

Further analyses of the December 2022 and October 2023 floodplain soil sampling data, as well as additional floodplain soil data that may be collected as part of supplemental sampling events to recharacterize the nature and extent of target metals within the disturbed area of the floodplain, will be presented in a comprehensive floodplain soil report that will be submitted to NYSDEC following the completion of the floodplain soil investigation. The following sections summarize the sample design, data analysis approach, results, and an updated conceptual site model based on the December 2022 and October 2023 floodplain soil sampling data.

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[1] Approximately 0.7 mile of Plantasie Creek and its floodplain from upstream of Mountain View Avenue to Salem Street were disturbed as part of stormwater management activities conducted by a contractor hired by the Town of Esopus. The disturbance created by these activities may affect the representativeness of current conditions at a subset of sampling points within transects T3–T8. An assessment of the impact of the disturbance on December 2022 and October 2023 sampling results is ongoing with NYSDEC; supplemental sampling may be warranted to characterize the nature and extent of target metals concentrations within the limits of disturbance of the stormwater management activities.

2 Floodplain Soil Sampling and Analysis

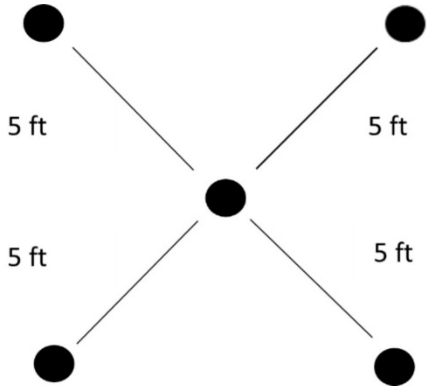
This section provides a summary of the floodplain soil investigation, including the sampling design and methods, sampling results from the December 2022 and October 2023 sampling events, and an updated floodplain soil conceptual model based on sampling results received to date.

2.1 Sampling Design and Methods

In accordance with the August 2022 Work Plan, floodplain soil sampling was conducted during December 2022 and October 2023 to characterize concentrations of target metals potentially transported to the floodplain as suspended solids from Plantasie Creek via overbank transport and deposition pathways (EHS Support, 2022). Floodplain sampling stations were placed on transects aligned perpendicular to the Plantasie Creek channel (**Figure 2**). Soil sampling stations were positioned along each transect based on the floodplain elevation and distance from the channel, which are indicative of flood frequency and potential overbank transport and deposition (Szabo et al., 2020; Thonon et al., 2007; General Electric Company and United States Environmental Protection Agency [USEPA], 2014). The 100-year floodplain, as mapped by the Federal Emergency Management Agency (FEMA, 2009), provided the lateral boundary for sampling along each transect.

The August 2022 Work Plan proposed sampling at stations across 10 transects within the 100-year floodplain downstream of the Site to the head of the Rondout Creek floodplain (**Figure 2**). However, prior to the October 2023 soil sampling event, landowner coordination on property access revealed that a residential development was planned for a property within the sampling area (263 Mountain View Avenue). A review of site development plans with the property owner indicated plans for the construction of a sewer tie-in for the residential development that would traverse Plantasie Creek. As a result of discussions with the property owner, an additional transect (T7.5) was added to characterize target metals in floodplain soils along the proposed alignment of the sewer tie-in (**Figure 2**).

Figure 2 presents the locations of soil sampling stations, as sampled during the December 2022 and October 2023 sampling events. A five-point composite sample was collected at each station, with a subsample centered on the sampling station and four additional subsamples collected approximately 5 feet (ft) from the proposed sampling station as shown below:



An undisturbed soil core was retrieved at each subsampling location from 0 to 24 inches below the vegetative cover using a decontaminated soil auger or dedicated soil auger liner. Consistent with the

August 2022 Work Plan and DER-10 (NYSDEC, 2010a), soil cores were subsampled into the following depth intervals to support specific data objectives (**Table 1**):

- 0–6 inches below the vegetative cover: This interval was evaluated for ecological exposure and for human health exposure via incidental soil ingestion, inhalation of soil, or dermal contact.
- 6–12 inches below the vegetative cover: Characterization of target metal concentrations to 12 inches below ground surface is consistent with USEPA guidance on biologically relevant sampling intervals for ecological risk assessments in terrestrial habitats (USEPA, 2015).
- 12–24 inches below vegetative cover: As recommended by DER-10, a deeper soil horizon was collected.

As described above, five-point composite samples were collected for each interval from subsamples collected from each core. **Table 1** specifies the analyses performed on each sample based on specific data objectives for each interval. Sample handling requirements, analytical methods, and a comparison of laboratory reporting limits and method detection limits to minimum NYSDEC SCOs are presented in **Table 2**. As anticipated in the August 2022 Work Plan, sampling stations along some transects were offset slightly due to conditions encountered in the field, including debris or other obstructions.

Floodplain soil analytical results were compared with the following SCOs (NYSDEC, 2006a and 2006b) for the specific target metals copper, mercury, selenium, and zinc (**Table 3**) to characterize exposure, as described in the August 2022 Work Plan:

- Human Health: NYSDEC SCOs for Unrestricted Use and Restricted Use
- Ecological: NYSDEC SCOs for the Protection of Ecological Resources
- Background: Ecological SCOs below background concentrations estimated using remote or habitat samples collected in the *Statewide Rural Surface Soil Survey* (NYSDEC, 2005), adjusted to the background levels as presented in the *Technical Support Document* (NYSDEC, 2006b)

Residential SCOs for mercury were selected based on exposure to inorganic salts based on site-specific testing of on-site soils and a weight-of-evidence evaluation that indicated that mercury is present in soil as a salt/inorganic complex Hg (II) (EHS Support, 2014). The presence of mercury at the Site is attributed to the historical use of mercury fulminate [mercury(II)Hg(ONC)^{2}] as a primary explosive in manufacturing operations between 1912 and the 1950s. No historical use of elemental mercury or equipment associated with elemental mercury (e.g., switches) has occurred at the Site. The findings of a mercury speciation study conducted using on-site soils were consistent with the historical use of inorganic mercury at the Site, identifying multiple lines of evidence that indicate that mercury in Site soils is in the form of a salt/inorganic complex Hg (II). Based on the evaluation of historical mercury use and site-specific testing of on-site soils, residential SCOs for mercury based on exposure to inorganic salts are most appropriate for the assessment of human health exposure on the Plantasie Creek floodplain.

Results of the comparisons of target metals concentrations in floodplain soil samples to SCOs are described in detail in the following sections. Target metal concentrations were compared with the Residential Use SCOs and the Unrestricted Use SCOs, which are based on the greater value of Ecological SCOs (copper) or rural background concentrations (mercury, selenium, zinc; NYSDEC, 2006b); Unrestricted Use SCOs are protective of ecological receptors.

As discussed in NYSDEC *Soil Cleanup Guidance* (CP-51; NYSDEC, 2010b), comparisons of analytical results to SCOs are used as a screening tool to identify the extent of soil contamination. However, the exceedance of one or more applicable SCOs alone will not trigger the need for remediation or identify unacceptable concentrations of target metals. Consistent with Approach 4 presented in the *Soil Cleanup Guidance* (NYSDEC, 2010b), Site-specific SCOs protective of public health and the environment may be developed for target metals, as warranted, to reflect exposure scenarios expected for floodplain soils.

2.2 Sampling Results

Floodplain soil results from the December 2022 and October 2023 sampling events were analyzed in accordance with the August 2022 Work Plan (EHS Support, 2022) and NYSDEC DER-10 guidance (NYSDEC, 2010a). A summary of analytical data, laboratory analytical reports, and data validation reports from the December 2022 and October 2023 sampling events are provided in **Appendix A** through **Appendix C**, respectively.

The results of the December 2022 and October 2023 floodplain soil sampling events are shown on cross-sectional elevation maps with plan views for each transect:

- Transect 1 (T1): **Figure 3A** through **Figure 3D**
- Transect 2 (T2): **Figure 4A** through **Figure 4D**
- Transect 3 (T3): **Figure 5A** through **Figure 5D**
- Transect 4 (T4): **Figure 6A** through **Figure 6D**
- Transect 5 (T5): **Figure 7A** through **Figure 7D**
- Transect 6 (T6): **Figure 8A** through **Figure 8D**
- Transect 7 (T7): **Figure 9A** through **Figure 9D**
- Transect 7.5 (T7.5): **Figure 10A** through **Figure 10D**
- Transect 8 (T8): **Figure 11A** through **Figure 11D**
- Transect 9 (T9): **Figure 12A** through **Figure 12D**
- Transect 10 (T10): **Figure 13A** through **Figure 13D**

Each figure shows sampled locations and depths across the transect and compares the results with Unrestricted Use and Residential Use SCOs for each respective target metal.

Copper and mercury were the only target metals measured in floodplain soils detected at concentrations exceeding Residential SCOs; neither selenium nor zinc concentrations exceeded Residential Use SCOs in any floodplain soil sample (**Appendix A**). In general, target metal concentrations exceeding Residential SCOs for copper and mercury were constrained to top of bank samples[2] collected nearest to the creek channel, except along transects T1 and T2. The lateral extents of samples with copper and mercury concentrations exceeding Residential SCOs were greatest in samples collected from T1, which had Residential SCO exceedances for copper in a 0–6-inch sample collected approximately 90 feet west of the channel (**Figure 3A**) and mercury in a 0–6-inch sample collected approximately 180 feet west of the channel (**Figure 3B**). Residential SCO exceedances for copper and mercury were identified in samples collected within 90 feet of the channel at transect T2, **Figure 4A** and **Figure 4B**. Downstream of transect T2, copper and mercury concentrations exceeded Residential SCOs only in top of bank core samples nearest the channel, primarily in 0–6-inch samples collected at T3 (**Figure 5A** and **Figure 5B**), T4 (**Figure 6A** and **Figure 6B**), T6 (**Figure 8A** and **Figure 8B**), and T7.5 (**Figure 10A** and **Figure 10B**). Copper and mercury concentrations did not exceed Residential SCOs in any samples collected along transect T7 (**Figure 9A** and **Figure 9B**), T8 (**Figure 11A** and **Figure 11B**), and T9 (**Figure 12A** and

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[2] Top of bank indicates a sampling station nearest to Plantasie Creek (within approximately 50 feet of the stream centerline).

Figure 12B). Copper and mercury concentrations were below Residential SCOs in each sample collected from the 0–6-inch sampling interval at transect T10; however, copper and mercury concentrations in subsurface samples collected at stations T10A and T10B exceeded Residential SCOs (**Figure 13A** and **Figure 13B**).

Unrestricted SCOs exceedances based on ecological SCOs (copper) or rural background concentrations (mercury, selenium, zinc) were generally observed in surface or near surface samples collected nearest to the creek channel (**Figure 3A** to **Figure 13D**). Further analysis will be conducted on the comprehensive floodplain soil dataset at the completion of the investigation to assess Site-specific risks to ecological receptors potentially exposed to target metal concentrations within the spatial extent of Unrestricted SCO exceedances on the Plantasie Creek floodplain.

As previously stated, the exceedance of one or more applicable SCOs alone will not trigger the need for remediation or identify unacceptable concentrations of target metals. Consistent with Approach 4 presented in the *Soil Cleanup Guidance* (NYSDEC, 2010b), Site-specific SCOs protective of public health and the environment (e.g., ecological receptors) may be developed for target metals, as warranted, to reflect exposure scenarios expected for floodplain soils.

The greatest copper and mercury concentrations within each transect were generally observed in the 0–6-inch samples from top of bank cores collected from T1 through T8. Concentrations of copper and mercury in 0–6-inch samples from top of bank cores generally decreased with increasing distance from the Site (**Figure 14**). Mercury and copper were highly correlated between transect T1 and transect T8, with the strongest relationship being within the top of bank cores sampled from 0–6 inches (**Figure 15**).

2.3 Floodplain Soil Conceptual Model Summary

An Ecological Conceptual Site Model (ECSM) presented in the *Fish and Wildlife Impact Analysis Step IIC Investigation Report* (URS, 2011) describes the potential migration of target metals from historical Site operations to downstream areas of Plantasie Creek. This ECSM was summarized and further refined in Section 2.2 of the August 2022 Work Plan based on phased sediment sampling and substrate surveys conducted within Plantasie Creek from the Site downstream to the Rondout Creek floodplain (EHS Support, 2020). This section presents further refinement of the ECSM for floodplain soils based on the findings of December 2022 and October 2023 sampling events, as summarized in **Section 2.2**. However, it is important to reiterate that a subset of the soil analytical data used in the ECSM summary may no longer be representative of current conditions on the floodplain due to the disturbance of Plantasie Creek and its banks in early May 2024. Further updates to the ECSM to reflect post-disturbance conditions will be provided based on supplemental sampling that may be warranted to recharacterize the nature and extent of target metals concentrations within the limits of disturbance.

As stated in the ECSM presented in the August 2022 Work Plan, the distribution of target metals in the Plantasie Creek floodplain soils is expected to be consistent with the distribution of fine-grained depositional sediments. The reach with the greatest potential for overbank transport and deposition of target metals in surficial soils within the Plantasie Creek floodplain lies between the Site boundary to Salem Street (transects T1 through T8) due to its low gradient relative to the reach immediately downstream of Salem Street. Typical floodplain depositional patterns from source areas indicate greater concentrations of constituents in floodplain soils nearest to the source areas, with decreasing concentrations in floodplain soils with increasing distance downstream from the source area

(Saint-Laurent et al., 2013). The deposition of target metals on floodplain soils through overbank transport was also expected to result in greater concentrations in surface soils near the top of bank in the most frequently inundated zones. Decreasing concentrations of target metals were expected at greater depths and moving laterally from the Plantasie Creek channel as the floodplain elevations increase and the frequency of inundation decreases.

As presented in **Section 2.2**, key findings from floodplain soil data collected in December 2022 and October 2023 support the conceptual fate and transport mechanisms for target metals in Plantasie Creek as presented in the ECSM. Target metal concentrations in Plantasie Creek floodplain soils were consistent with the lateral, vertical, and longitudinal trends expected based on conceptual overbank transport and deposition mechanisms. As described in **Section 2.2**, target metal concentrations in floodplain soils generally decreased with

- Increasing lateral distance from the Plantasie Creek channel;
- Increasing depth; and
- Increasing downstream distance from the Site.

Furthermore, the strongest relation between mercury and copper concentrations was observed in top of bank surficial soils between T1 and T8, consistent with expected overbank transport and deposition mechanisms.

There were no exceedances of Residential SCOs for any target metals at transects T8 or T9, indicating that the longitudinal extent of overbank transport and deposition resulting in Residential SCO exceedances does not extend downstream to transect T8. Vertical and lateral concentration gradients of target metals at transect T10 are inconsistent with vertical and lateral concentration trends observed between the depositional reach defined between the Site and Salem Street (T1 to T8).

3 Interim Investigation Summary

This May 2024 Interim Report presents the results and preliminary analyses of Plantasie Creek floodplain soil data collected during December 2022 and October 2023 sampling events. Key findings of preliminary nature and extent characterization, spatial analysis, and human health and ecological exposure assessments include the following:

- Copper and mercury exceedances of Residential SCOs for the protection of human health are constrained to top of bank samples collected nearest to the creek channel, except along transects T1 and T2; neither selenium nor zinc concentrations exceeded Residential Use SCOs in any floodplain soil sample.
- Residential SCOs were not exceeded for any target metals at transects T8 or T9, indicating that the longitudinal extent of overbank transport and deposition resulting in Residential SCO exceedances does not extend downstream to transect T8.
- Unrestricted SCO exceedances based on ecological SCOs (copper) or rural background concentrations (mercury, selenium, zinc) were generally observed in surface or near surface samples collected nearest to the creek channel.
- The exceedance of one or more applicable SCOs alone will not trigger the need for remediation or identify unacceptable concentrations of target metals; Site-specific SCOs protective of public health and the environment may be developed for target metals, as warranted, to reflect exposure scenarios expected for floodplain soils.
- Consistent with conceptual fate and transport mechanisms for target metals, target metal concentrations in floodplain soils generally decreased with
    - Increasing lateral distance from the Plantasie Creek channel;
    - Increasing depth; and
    - Increasing downstream distance from the Site.
- The strongest relation between mercury and copper concentrations was observed in top of bank surficial soils between T1 and T8, consistent with expected overbank transport and deposition mechanisms.

As previously stated, a subset of the floodplain soil data presented in this report may no longer be representative of current conditions on the floodplain within the portion of the study area from upstream of Mountain View Avenue to Salem Street (transects T3 to T8) due to the disturbance of Plantasie Creek and its banks by stormwater management activities conducted by the Town of Esopus in early May 2024. The assessment of the impact of the disturbance on December 2022 and October 2023 sampling results is ongoing with NYSDEC, and supplemental sampling may be warranted to recharacterize the nature and extent of target metals concentrations within the limits of disturbance. The results of any supplemental sampling and analyses of the complete floodplain soil dataset, including December 2022, October 2023, and any supplemental sampling results, will be presented in a comprehensive floodplain soil report that will be submitted to NYSDEC following the completion of the floodplain soil investigation.

4 References

EHS Support. 2014. Revised Corrective Measures Study Report. Port Ewen, Ulster County, NY. January.

EHS Support. 2020. Plantasie Creek – Phase 1 and 2 Sediment Sampling Report. Port Ewen, Ulster County, NY. April.

EHS Support. 2022. Plantasie Creek Floodplain Soil Investigation Work Plan. Port Ewen, Ulster County, NY. August.

Federal Emergency Management Agency. 2009. FEMA Flood Map Service Center, Town of Esopus, 36111C0490E. Accessed at https://msc.fema.gov/portal/home.

General Electric Company and United States Environmental Protection Agency. 2014. Remedial Investigation/Feasibility Study Work Plan, Upper Hudson River Floodplain. September, corrected November 2014.

New York State Department of Environmental Conservation. 2005. Concentrations of Selected Analytes in Rural New York State Surface Soils: A Summary Report on the Statewide Rural Surface Soil Survey. August.

New York State Department of Environmental Conservation. 2006a. 6 NYCRR Part 375. Environmental Remediation Programs. December 14. Accessed at https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375.pdf

New York State Department of Environmental Conservation. 2006b. New York State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document. Accessed at https://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf

New York State Department of Environmental Conservation. 2010a. DER-10/Technical Guidance for Site Investigation and Remediation. Deputy Commissioner, Office of Remediation and Materials Management. May 3. Accessed at https://www.dec.ny.gov/regulations/67386.html

New York State Department of Environmental Conservation. 2010b. CP-51/Soil Cleanup Guidance. Final Commissioner Policy. October 21. Accessed at https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/cpsoil.pdf

Saint-Laurent, D., Gervais-Beaulac, V., Baril, F., Matteau, C., and Berthelot, J-B. 2013. Spatial variability of heavy metal contamination in alluvial soils in relation to flood risk zones in Southern Québec, Canada. *Air, Soil and Water Research, 6*, 1–13. https://doi.org/10.4137/ASWR.S10314.

Szabó, Z., Buró, B., Szabó, J., Tóth, C. A., Baranyai, E., Herman, P., Prokisch, J., Tomor, T., and Szabó, S. 2020. Geomorphology as a driver of heavy metal accumulation patterns in a floodplain. *Water (Switzerland), 12* (2), 563. https://doi.org/10.3390/w12020563

Thonon, I., Middelkoop, H., and van der Perk, M. 2007. The influence of floodplain morphology and river works on spatial patterns of overbank deposition. *Netherland Journal of Geoscience, 86* (1), 63–75. https://doi.org/10.1017/S0016774600021326

United States Environmental Protection Agency. 2015. Determination of the Biologically Relevant Sampling Depth for Terrestrial and Aquatic Ecological Risk Assessments. EPA/600/R-15/176. October. Accessed at https://cfpub.epa.gov/ncea/erasc/recordisplay.cfm?deid=310058

URS. 2011. Fish and Wildlife Impact Analysis Step II C Investigation Report. Dyno Nobel Site. Port Ewen, New York. April 12.

Tables

Table 1
Summary of Soil Sampling Objectives
Plantasie Creek Interim Floodplain Soil Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Floodplain Soil Sampling Interval	Specific Data Objectives	Requested Laboratory Analyses	
		Primary	Ancillary
0–6-inches	1) Evaluate SCOs protective of human health incidental soil ingestion, inhalation of soil, or dermal contact with soil. 2) Provide representative concentrations to 0–12 inches bgs to evaluate ecological exposure. A depth-weighted average of sample results from the 0–6-inch and 6–12-inch sampling intervals will be calculated to establish soil EPCs for ecological exposure pathways in the floodplain. 3) Evaluate the vertical distribution of target metals in soils with the conceptual overbank transport and surface deposition pathway.	Copper Mercury Selenium Zinc	pH TOC Grain Size
6–12 inches	1) Provide representative concentrations to 0–12 inches bgs to evaluate ecological exposure. A depth-weighted average of sample results from the 0–6-inch and 6–12-inch sampling interval will be calculated to establish soil EPCs for ecological exposure pathways in the floodplain. 2) Evaluate the vertical distribution of target metals in soils with the conceptual overbank transport and surface deposition pathway.	Copper Mercury Selenium Zinc	
12–24 inches	1) Characterization of target metal concentrations below exposure intervals recommended by DER-10. 2) Evaluate the vertical distribution of target metals in soils with the conceptual overbank transport and surface deposition pathway.	Copper Mercury Selenium Zinc	NA

Notes:
bgs = below ground surface
EPC = exposure point concentration
SCO = Soil Cleanup Objectives
TOC = total organic carbon

Reference:
New York State Department of Environmental Conservation (NYSDEC). 2010. DER-10/Technical Guidance for Site Investigation and Remediation. Deputy Commissioner, Office of Remediation and Materials Management. May 3.

Table 2
Summary of Analytical Methods and Sample Handling Requirements
Plantasie Creek Interim Floodplain Soil Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Analysis	Method Reference	Units	RL	MDL	Minimum SCO	Minimum Sample Volume Requirement	Hold Time	Sample Container	Preservation
Target Metals									
Mercury	USEPA 7471B	mg/kg	0.0330	0.0212	0.18	100 gram	365 days	Glass or plastic	Cool to 4°C
Copper	USEPA 6020B	mg/kg	0.300	0.205	50	100 gram	180 days	Glass or plastic	Cool to 4°C
Selenium	USEPA 6020B	mg/kg	0.500	0.122	3.9				
Zinc	USEPA 6020B	mg/kg	1.50	0.798	109				
pH	USEPA 9045D	Standard Units	NA	NA	NA	20 gram	7 days	Glass or plastic	Cool to 4°C
Grain size distribution	ASTM D422 (Sieve Only)	% Passing	0.5	0.5	NA	500 gram	NA	Glass or plastic	NA
TOC	Lloyd Kahn	mg/kg	1000	971	NA	100 gram	14 days	Glass or plastic	Cool to 4°C

Notes:
% = percent
°C = degree Celsius
MDL = Method Detection Limit
mg/kg = milligram per kilogram
RL = Reporting Limit
SCO = Soil Cleanup Objective
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

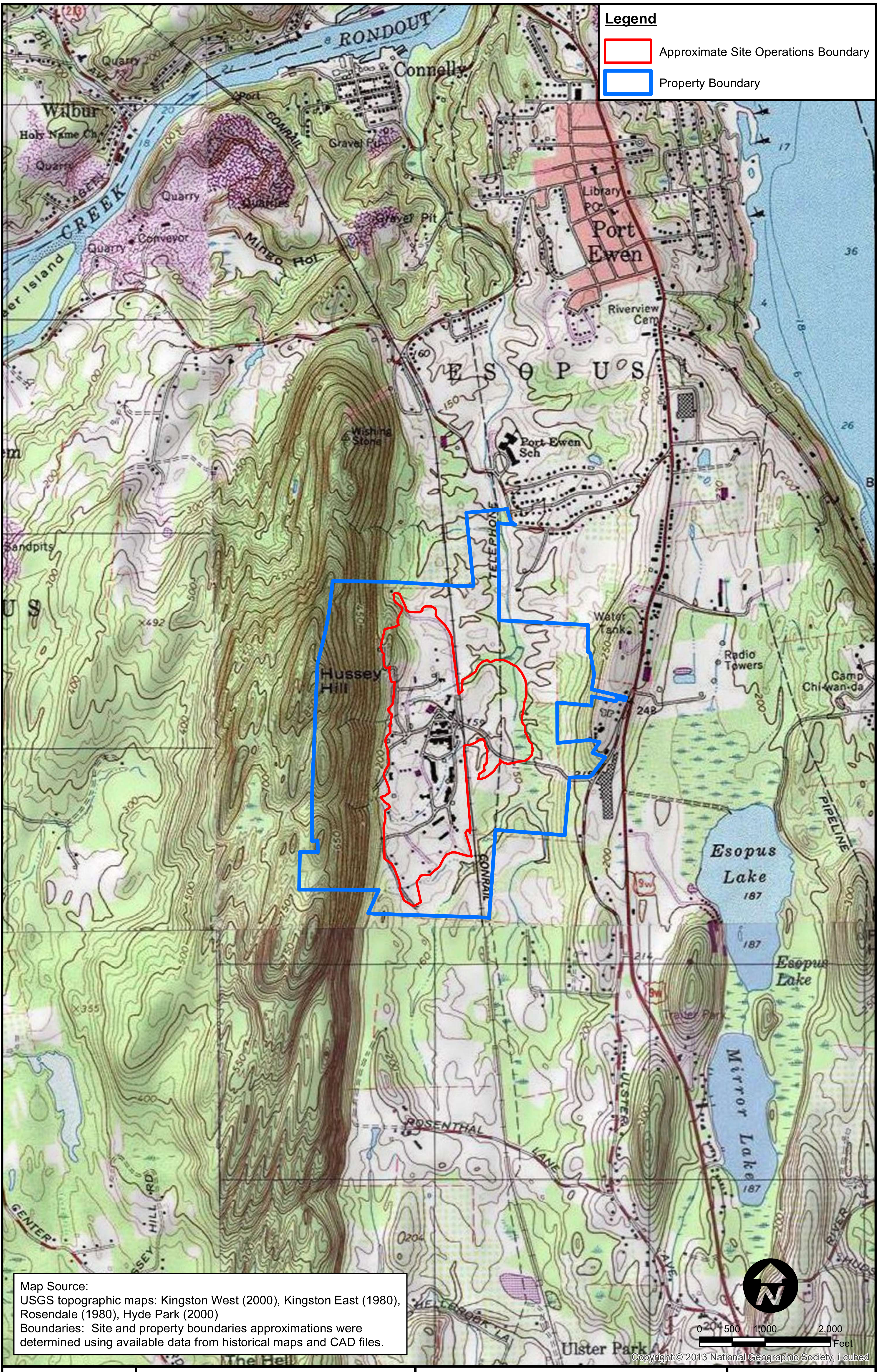
Table 3
Summary of Soil Cleanup Objectives
Plantasie Creek Interim Floodplain Soil Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Analyte	Human Health SCOs		ESCOs (mg/kg)	RSBCs (mg/kg)
	Unrestricted Soil Use SCOs (mg/kg)	Residential Use SCOs (mg/kg)		
Copper	270	270	50	33
Mercury	0.12	1.2	0.1	0.18
Selenium	18	36	1	3.9
Zinc	1100	2200	50	109

Notes:
ESCO = Ecological Soil Cleanup Objective
mg/kg = milligram per kilogram
RSBC = Rural Soil Background Concentration
SCO = Soil Cleanup Objective

Source:
New York State Department of Environmental Conservation (NYSDEC). 2006. New York State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document.

Figures



Legend

🟥 Approximate Site Operations Boundary

🟦 Property Boundary

Map Source:
USGS topographic maps: Kingston West (2000), Kingston East (1980), Rosendale (1980), Hyde Park (2000)
Boundaries: Site and property boundaries approximations were determined using available data from historical maps and CAD files.

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J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20190605_PublicOutreachPosters\11x17_Figures\Figure 1-1 - Site Location Map.mxd

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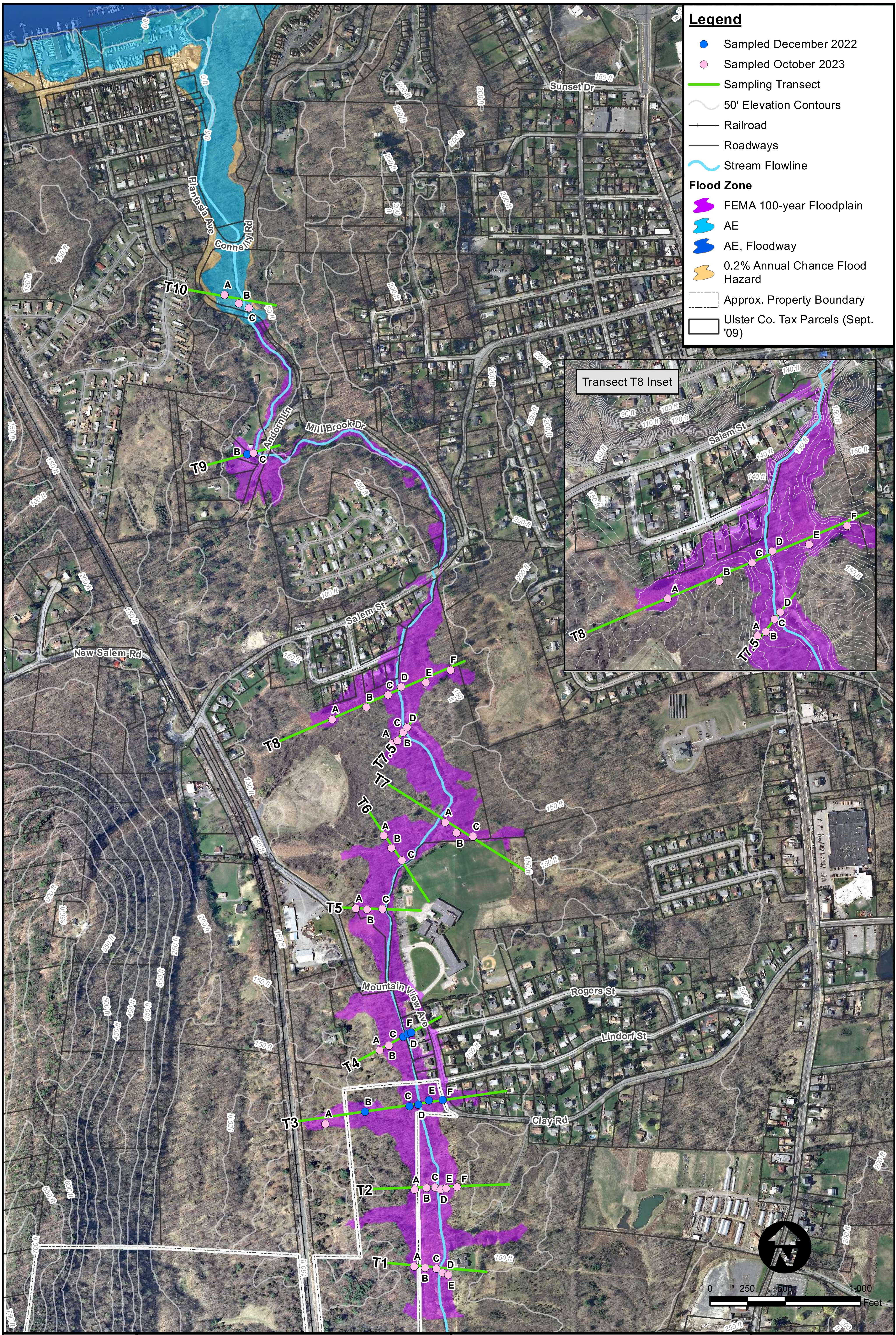
Reviewed By: K. VanLandingham

EHS Support	Downstream Sediment Investigation Dyno Nobel Port Ewen Site Port Ewen, New York	SITE LOCATION MAP	FIGURE 1



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EHS Support

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

Transect Overview

FIGURE 2

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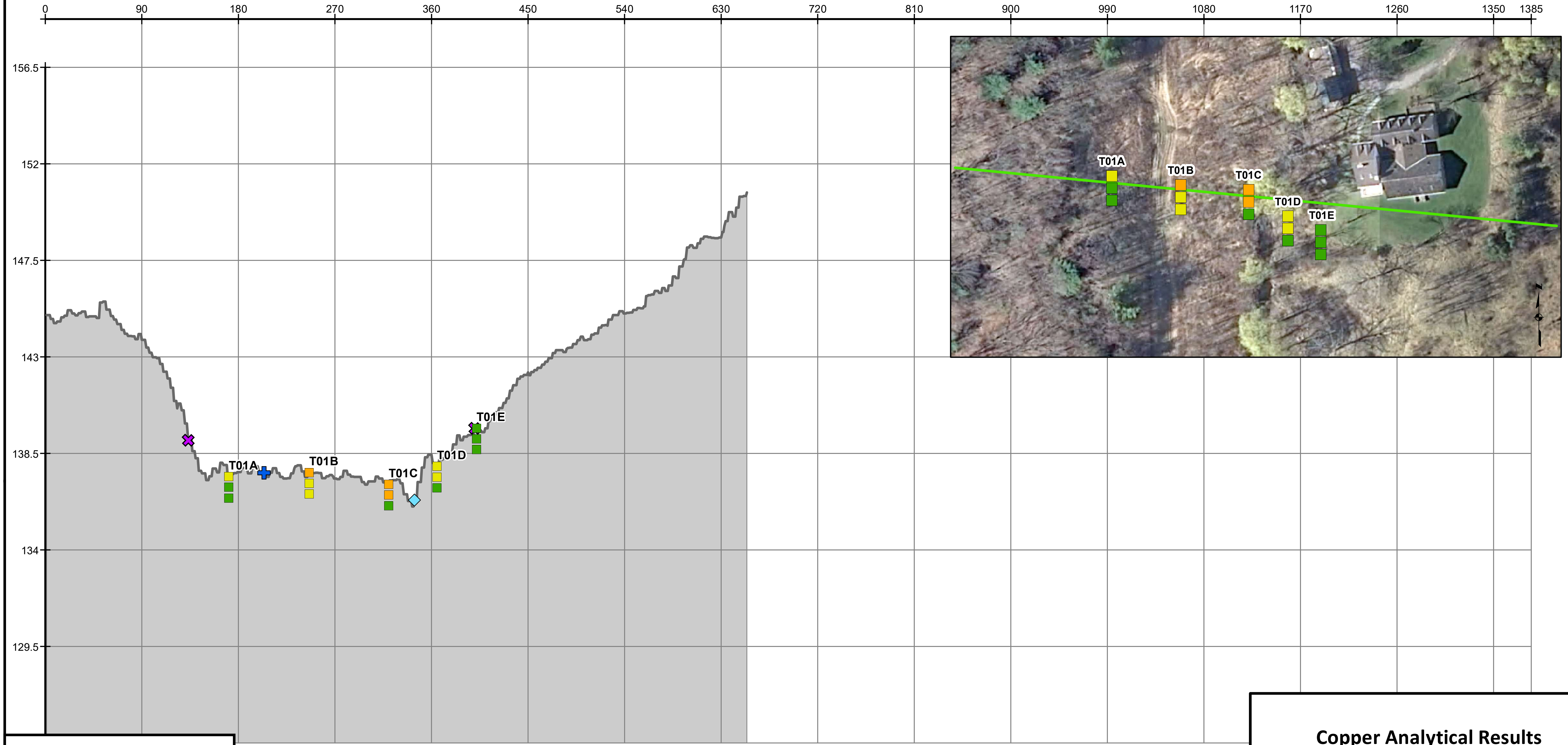

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∿ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 3A

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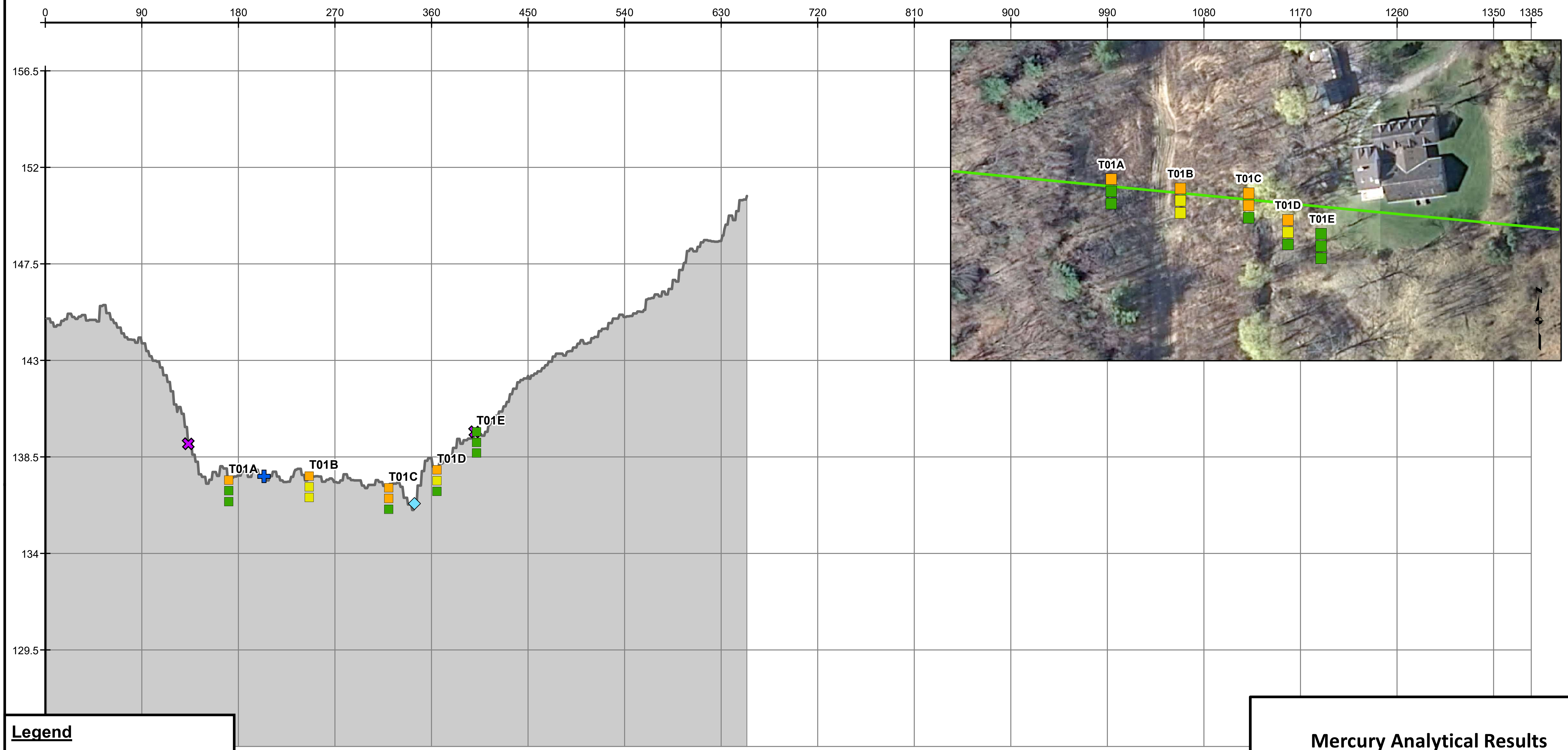

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 3B

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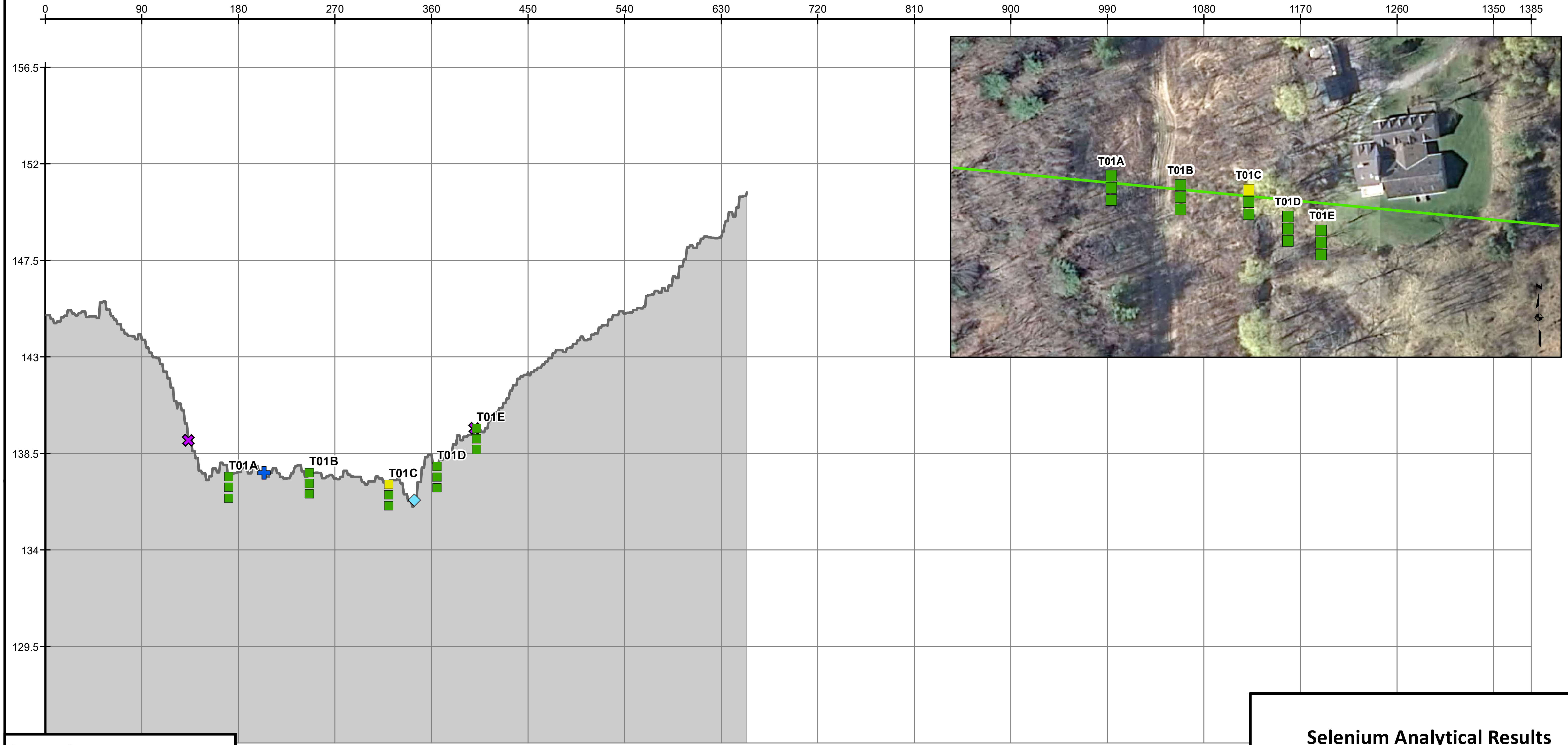

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ∿ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 3C

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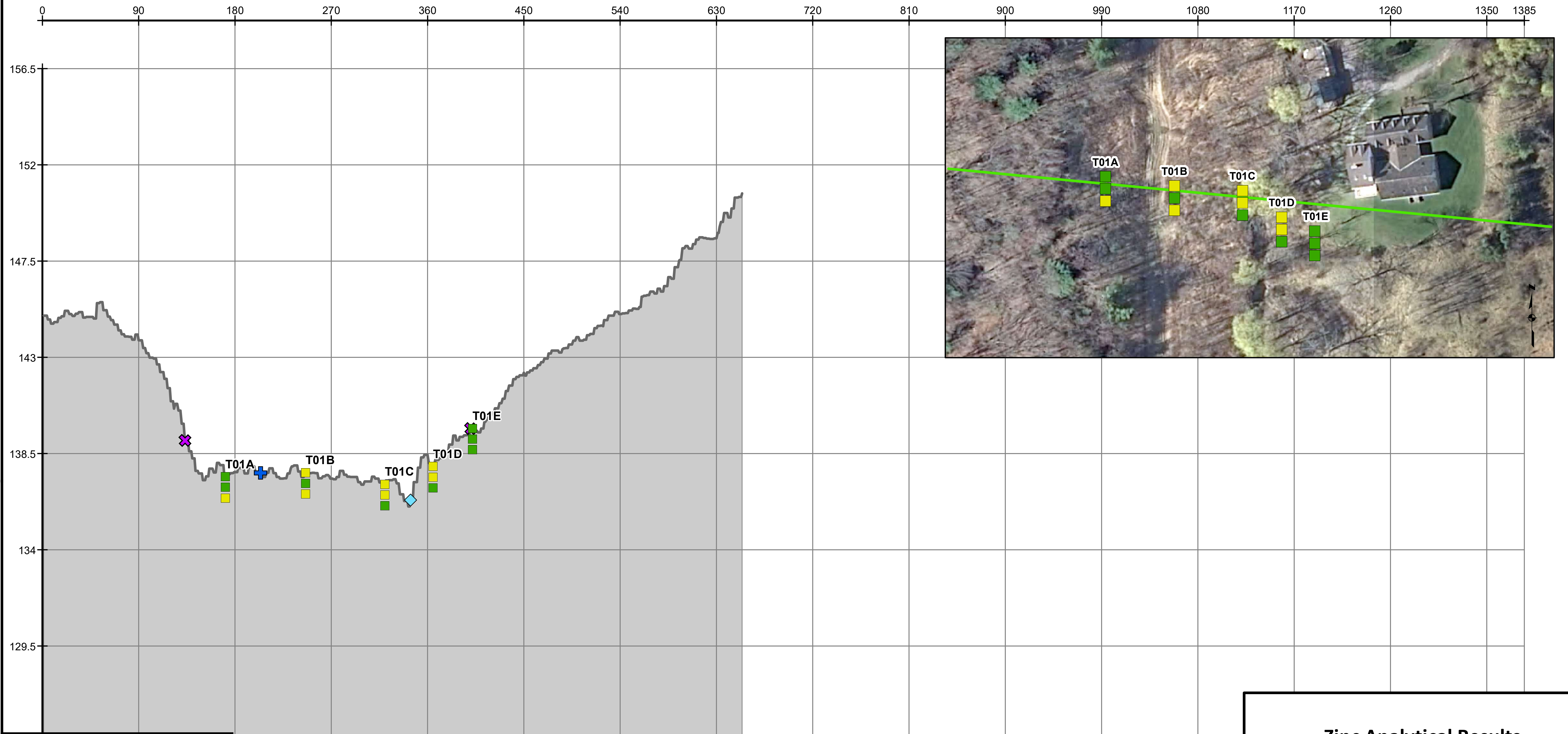

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ∿ Proposed Transect Elevation
- ─ Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 3D

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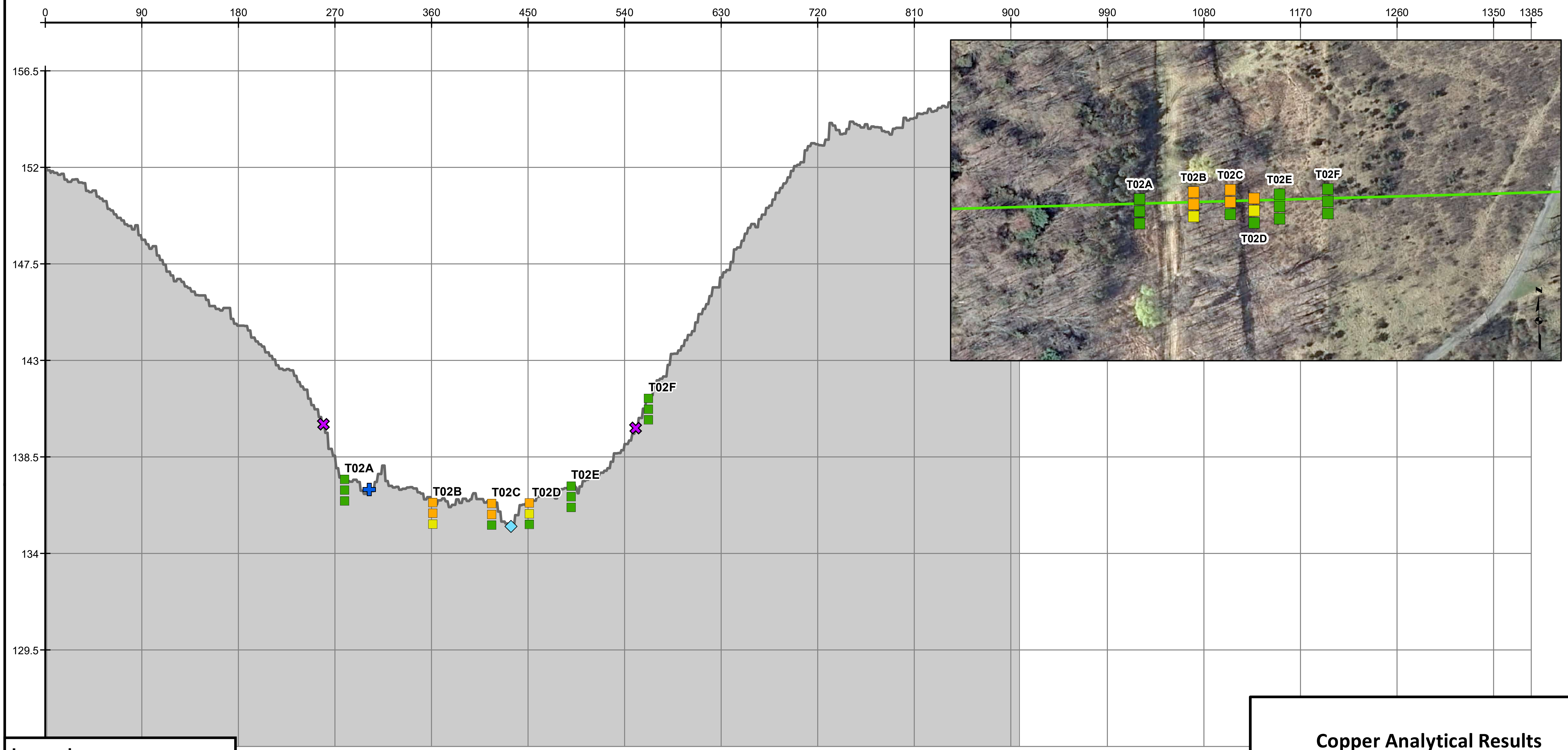

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〜 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 4A

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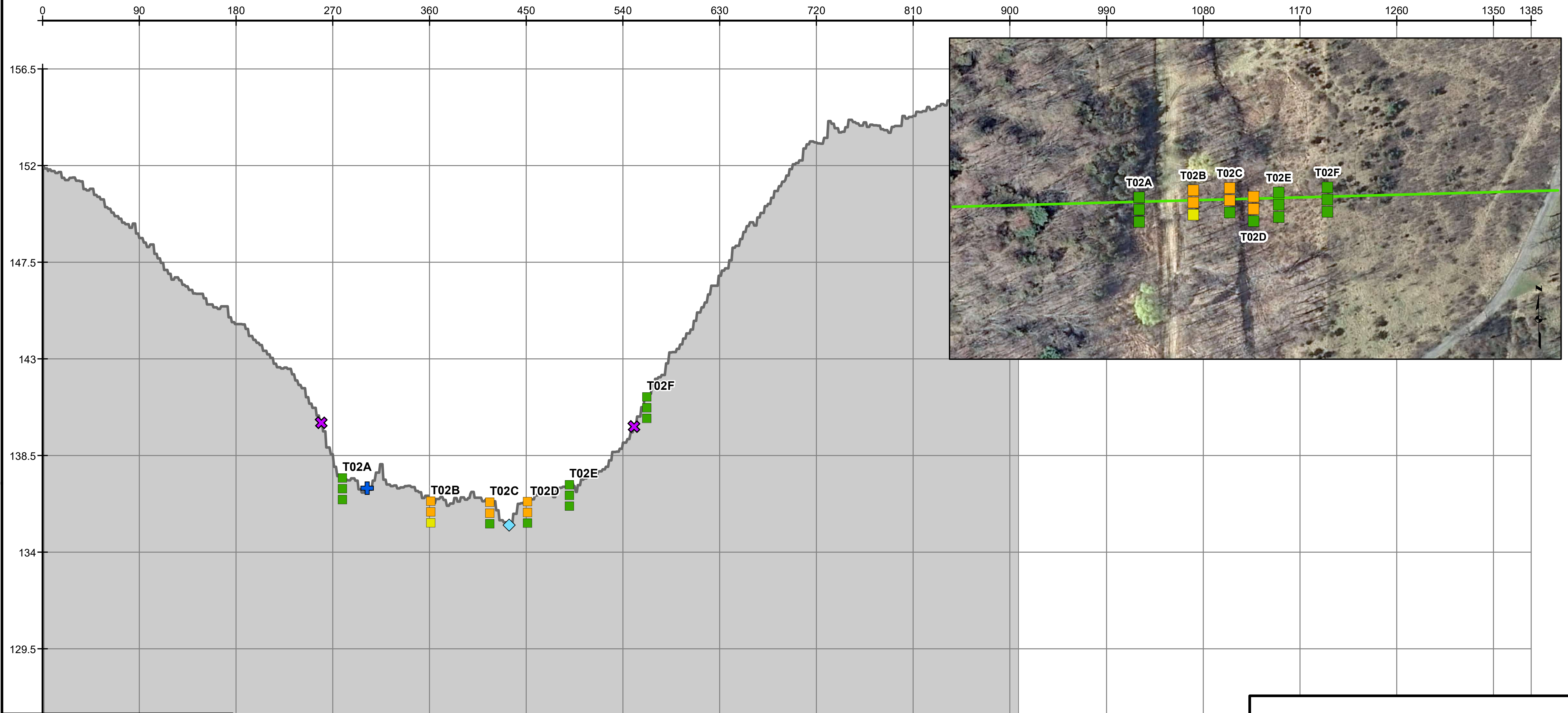

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 4B

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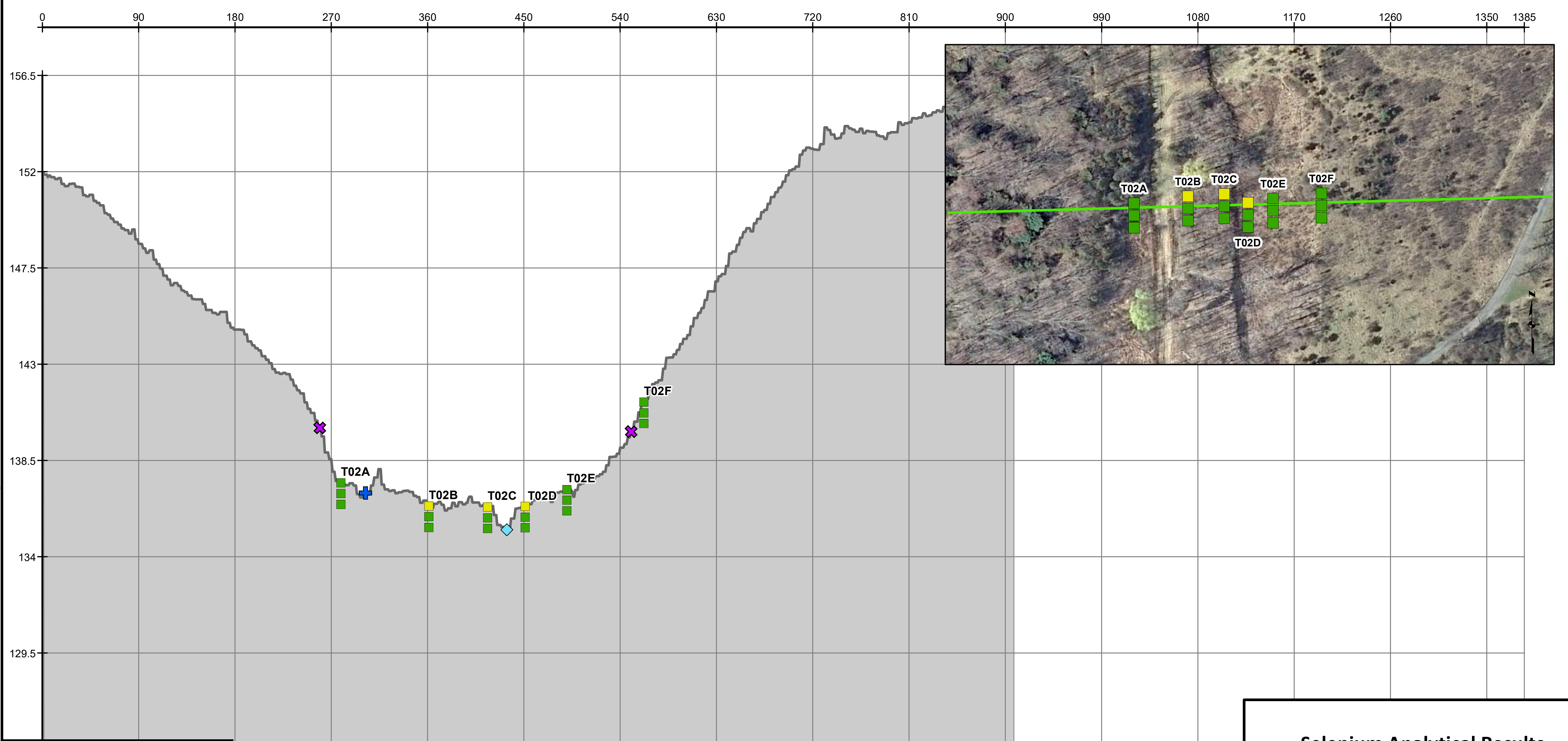

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results Floodplain Soil Sampling Cross Section - Transect T2

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 4C

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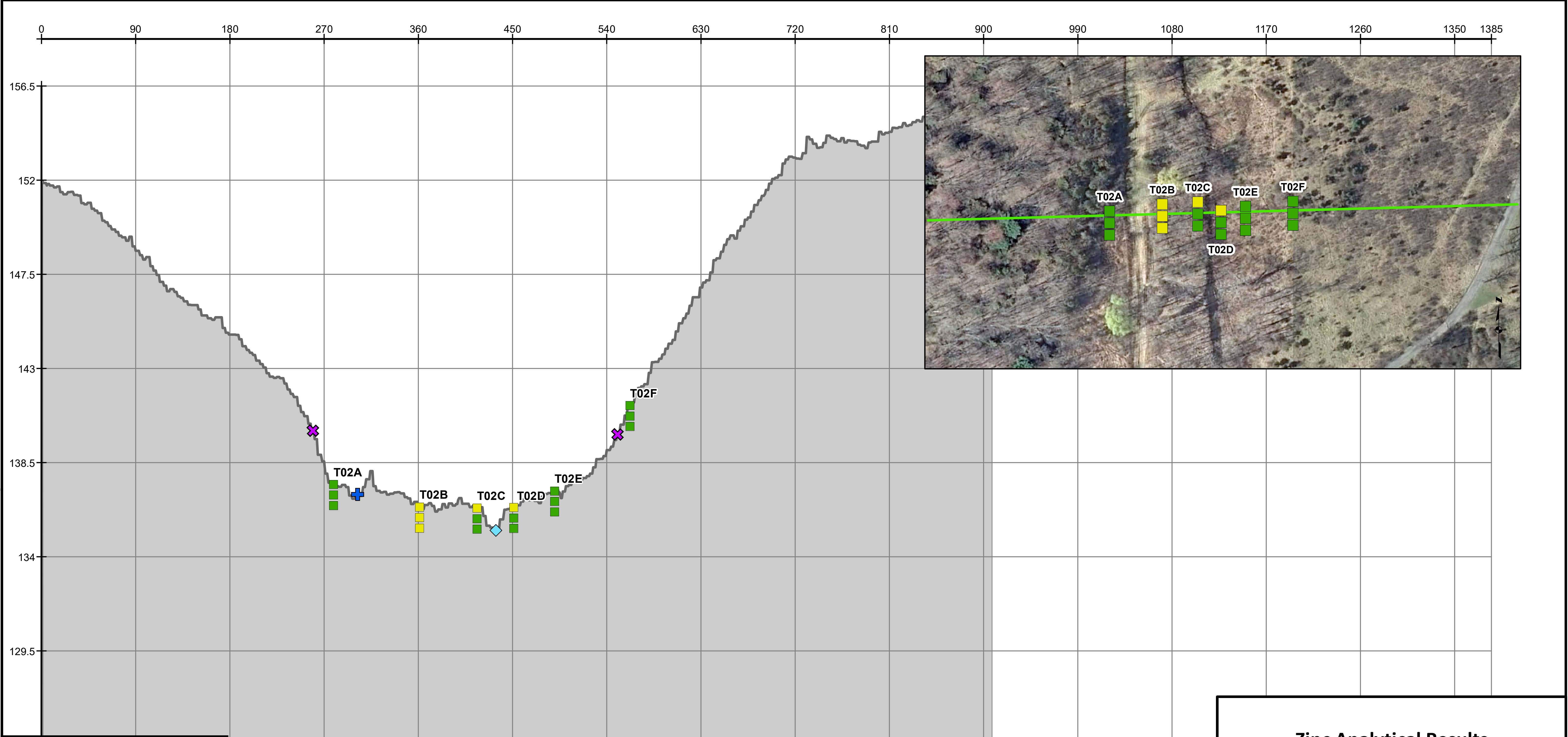

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∼ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 4D

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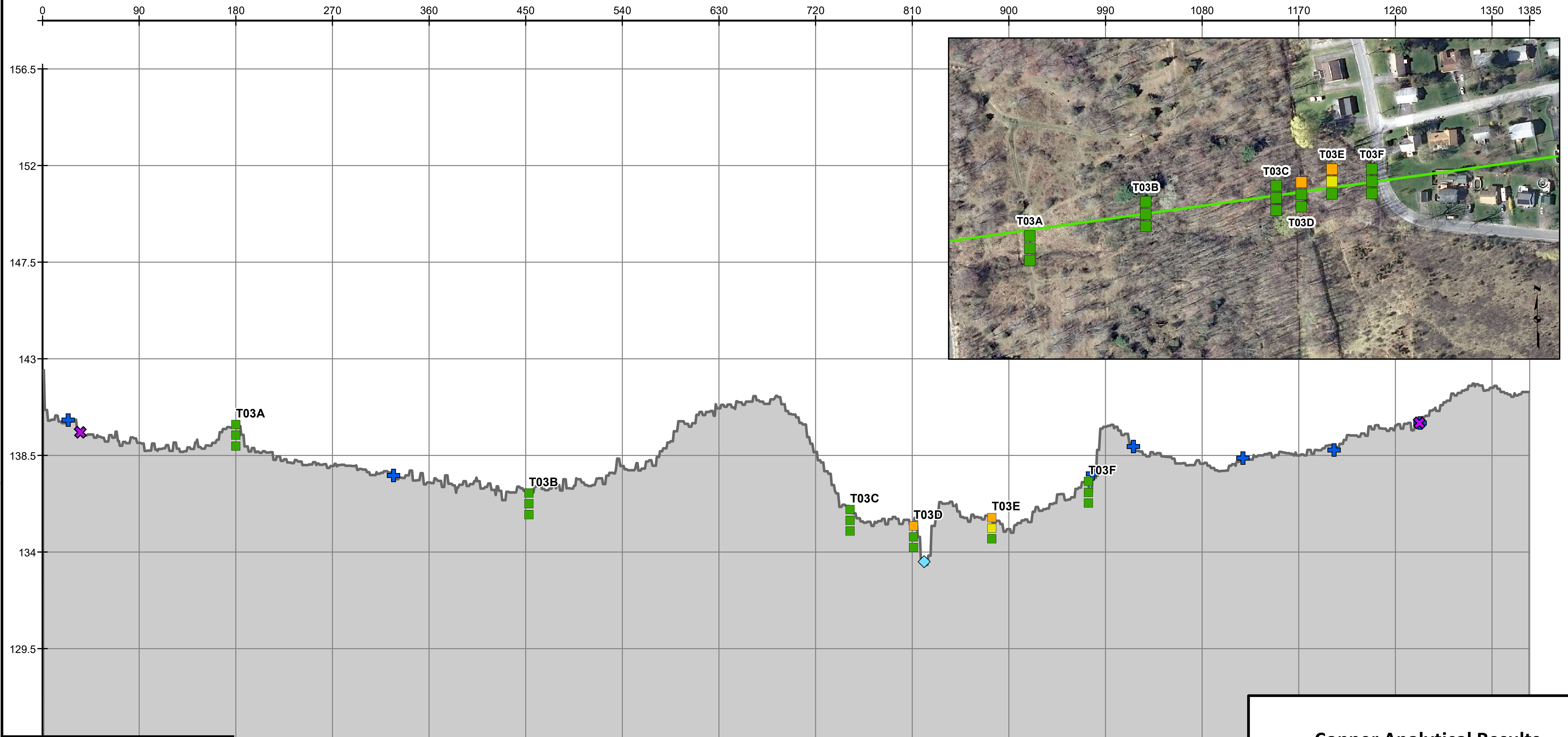

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5A

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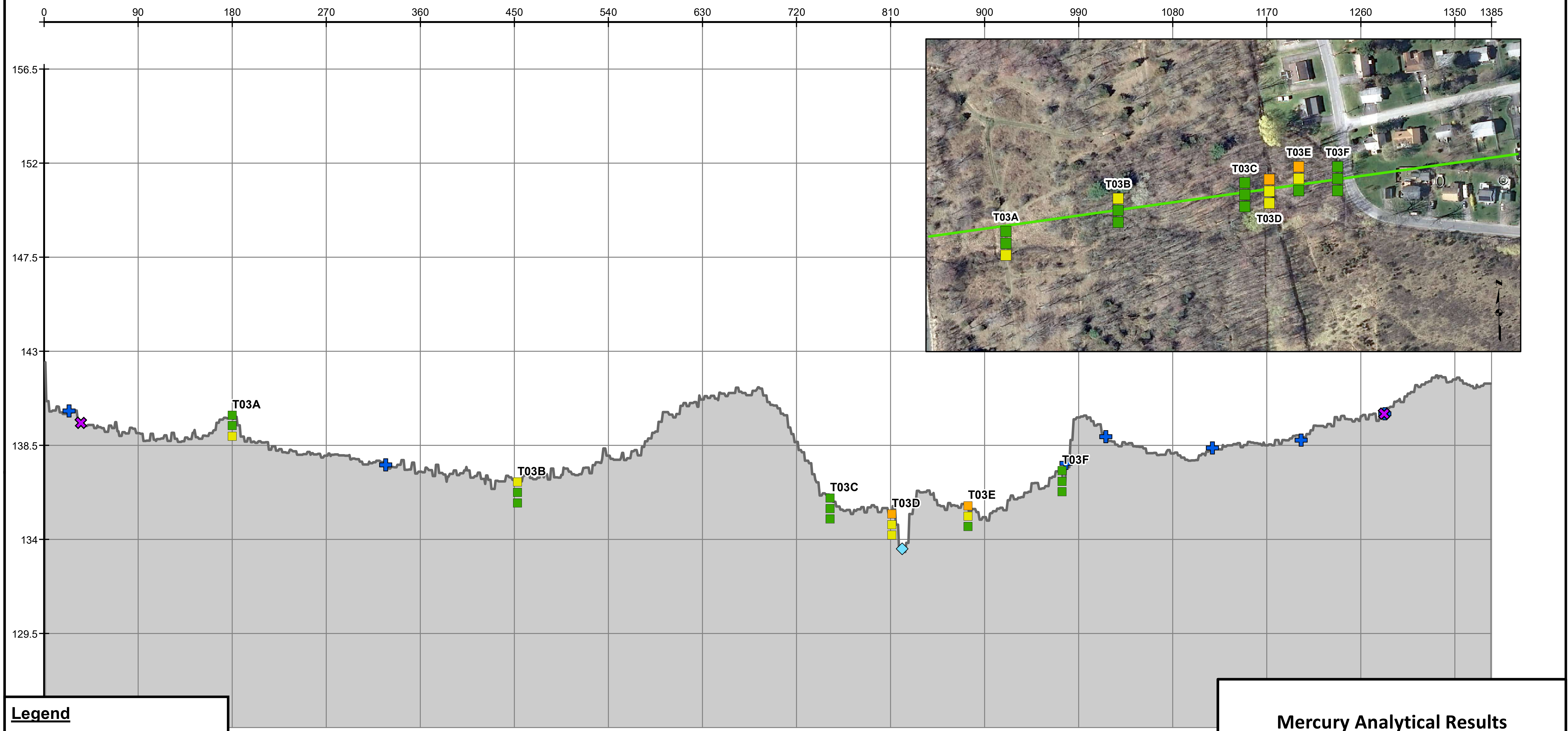

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5B

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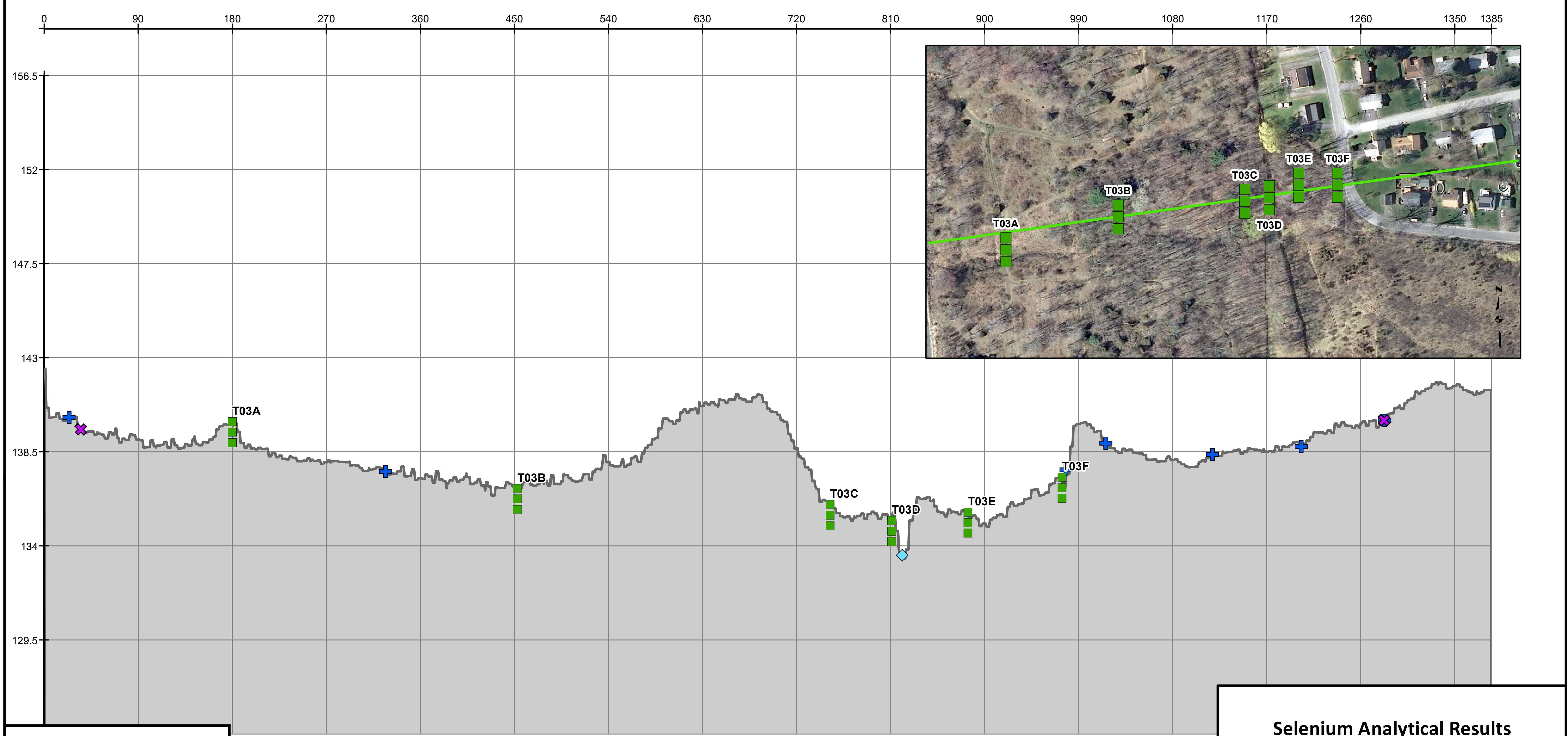

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5C

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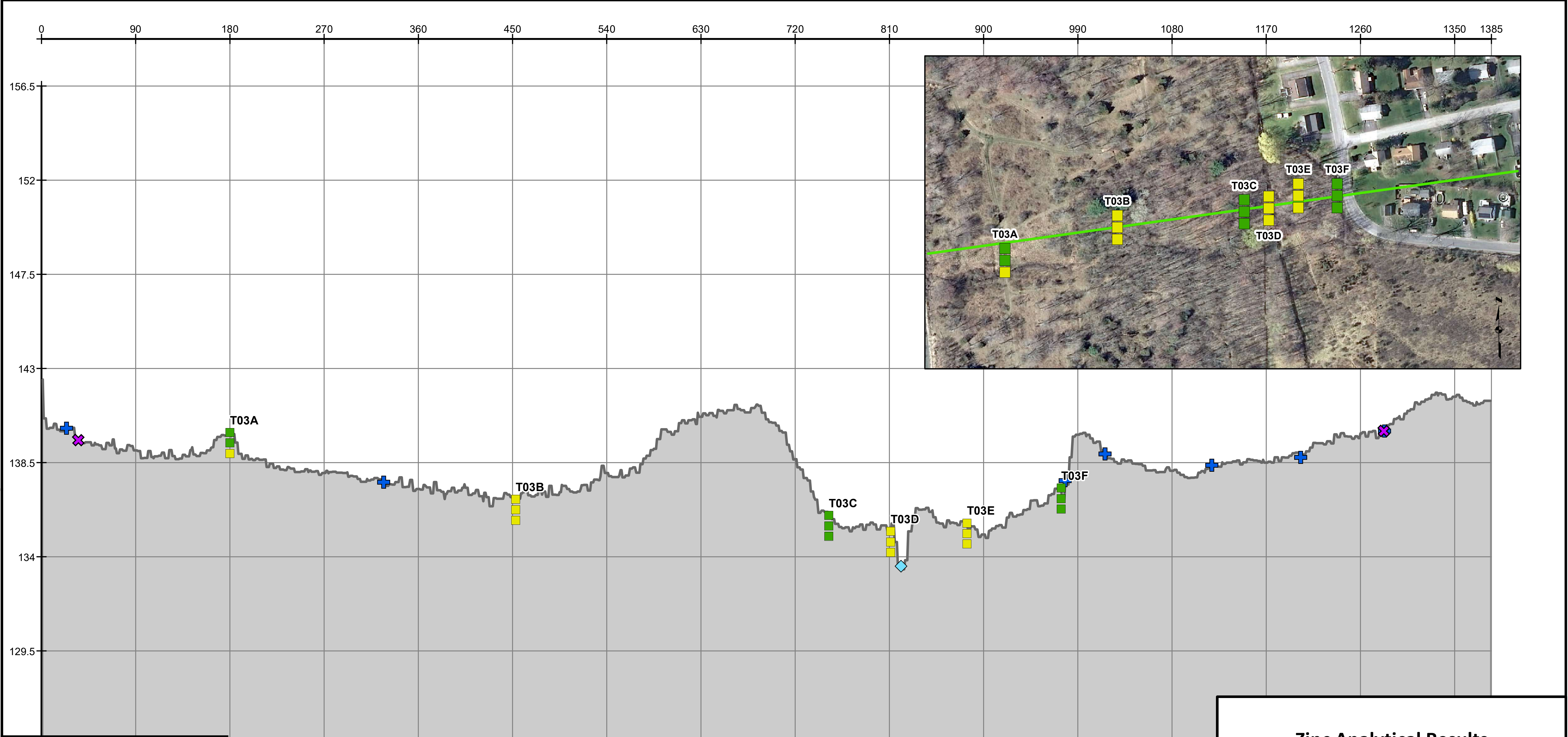

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5D

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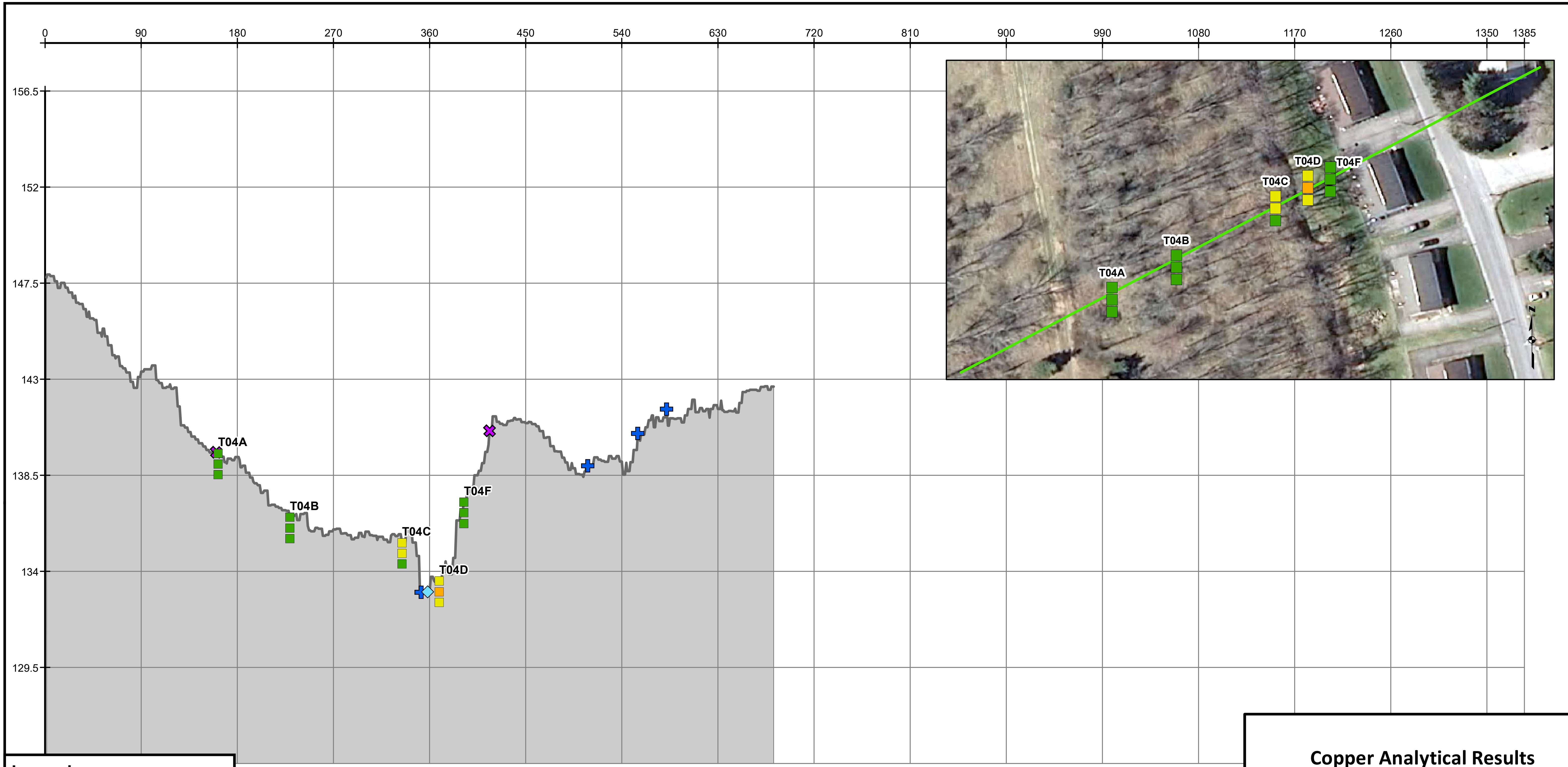

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〜 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6A

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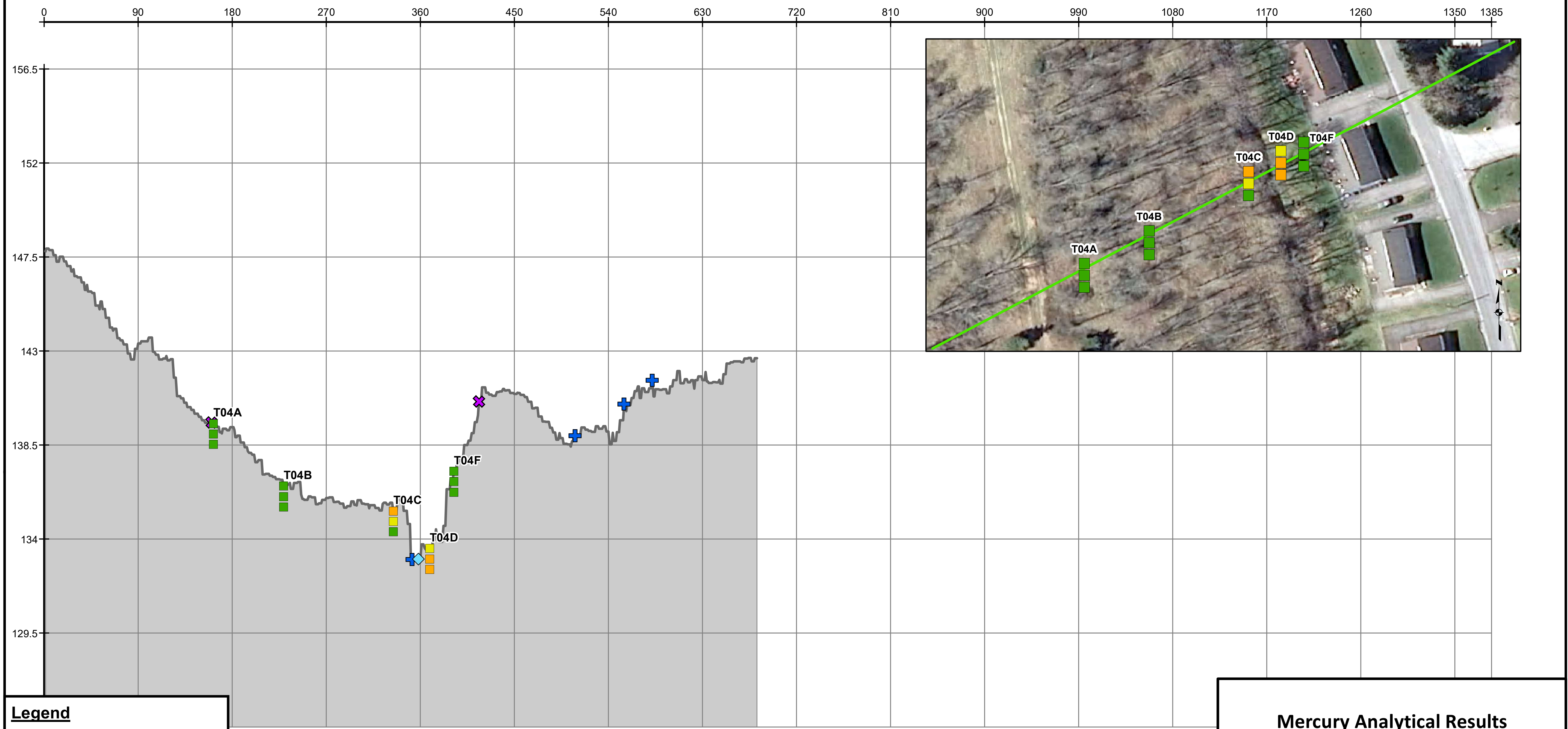

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
0.18	1.2

Mercury Analytical Results Floodplain Soil Sampling Cross Section - Transect T4

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6B

Reviewed By:

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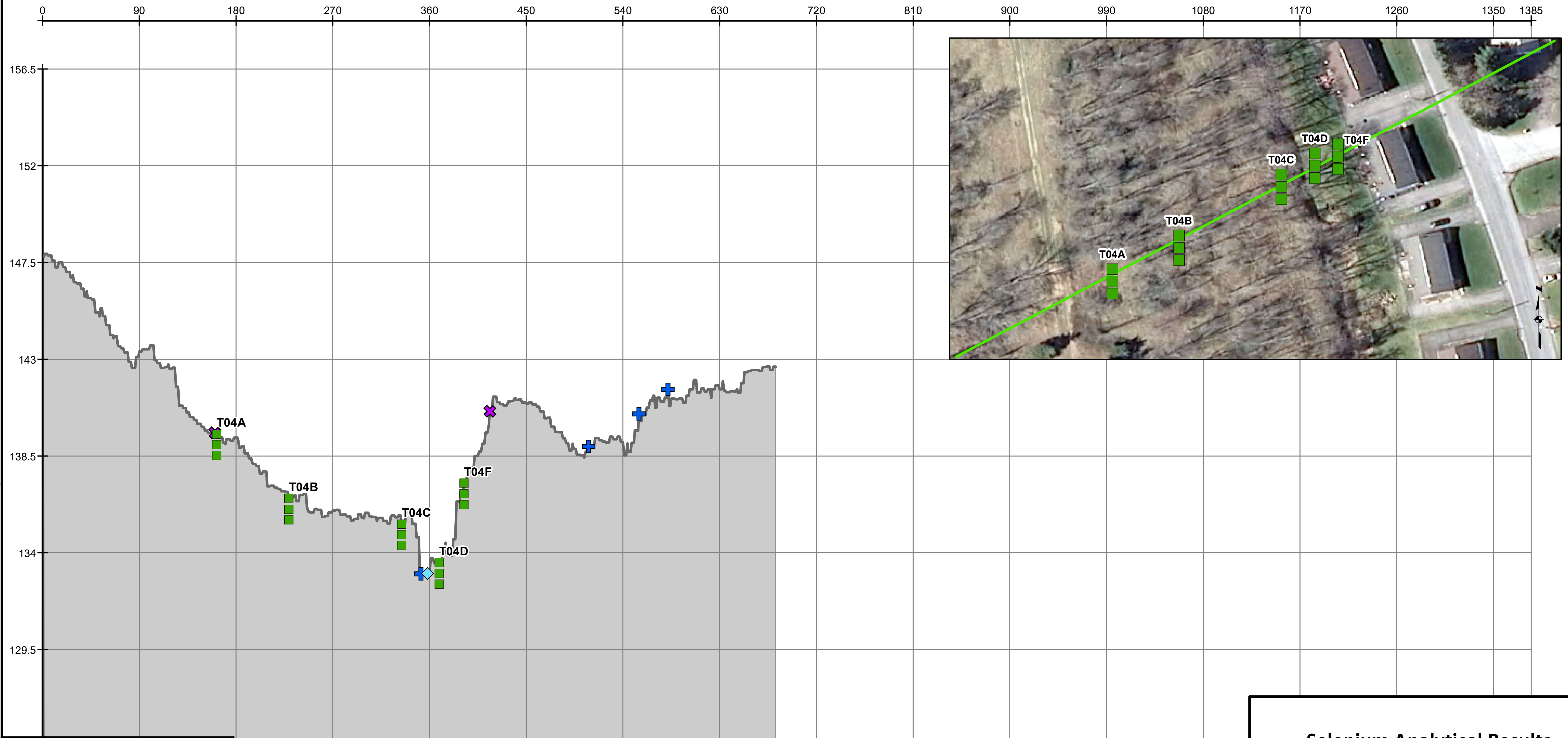

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6C

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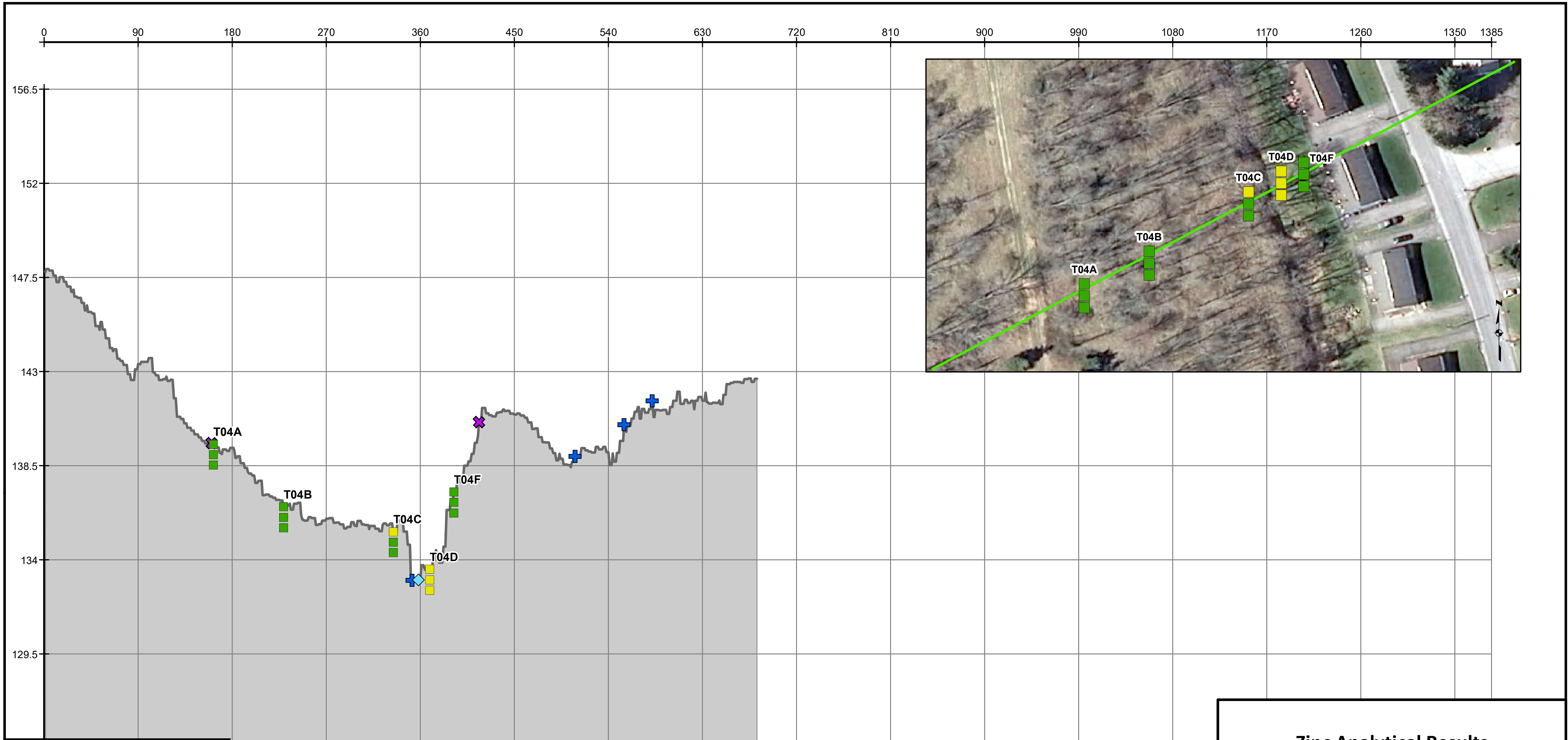

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 6D

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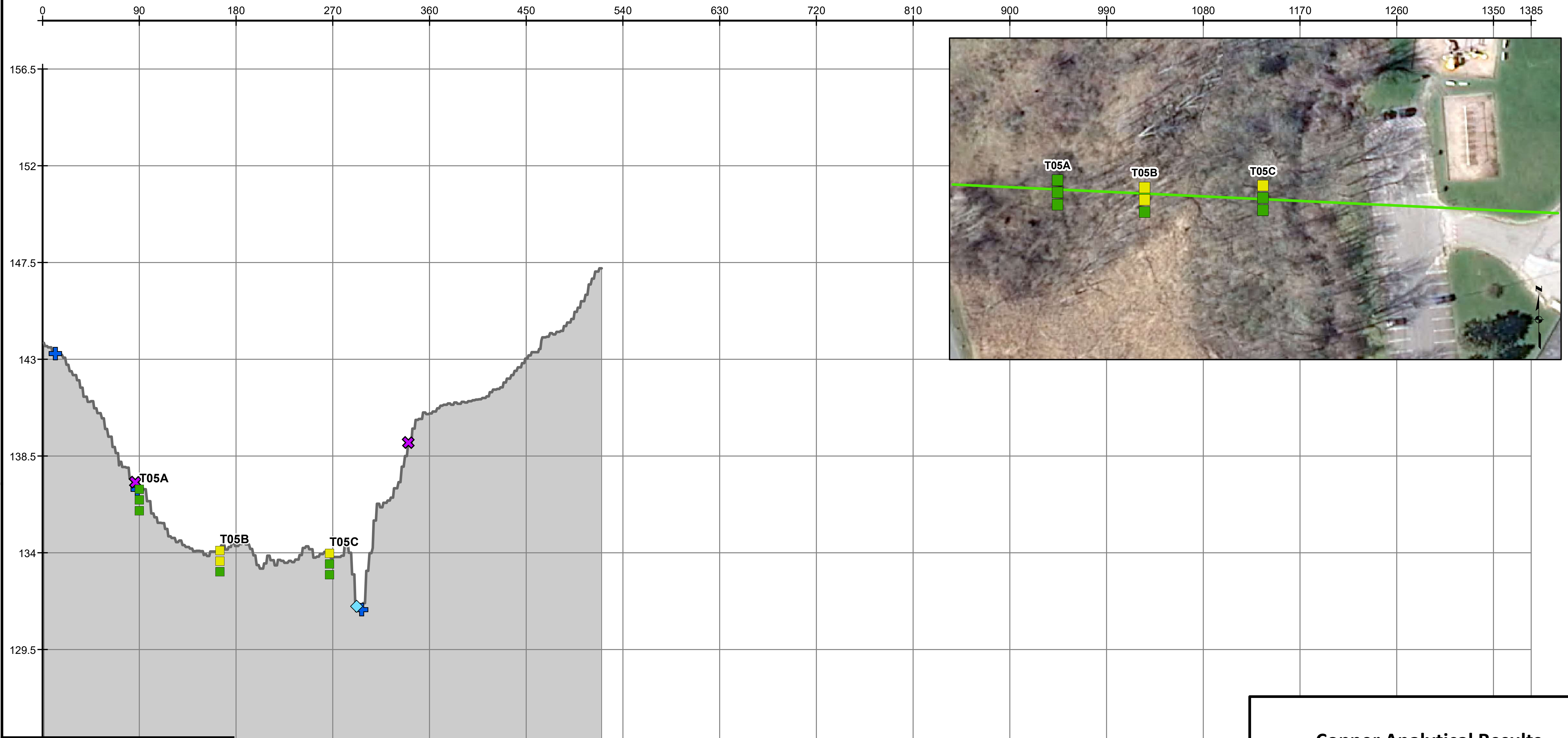

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
50	270

Copper Analytical Results Floodplain Soil Sampling Cross Section - Transect T5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 7A

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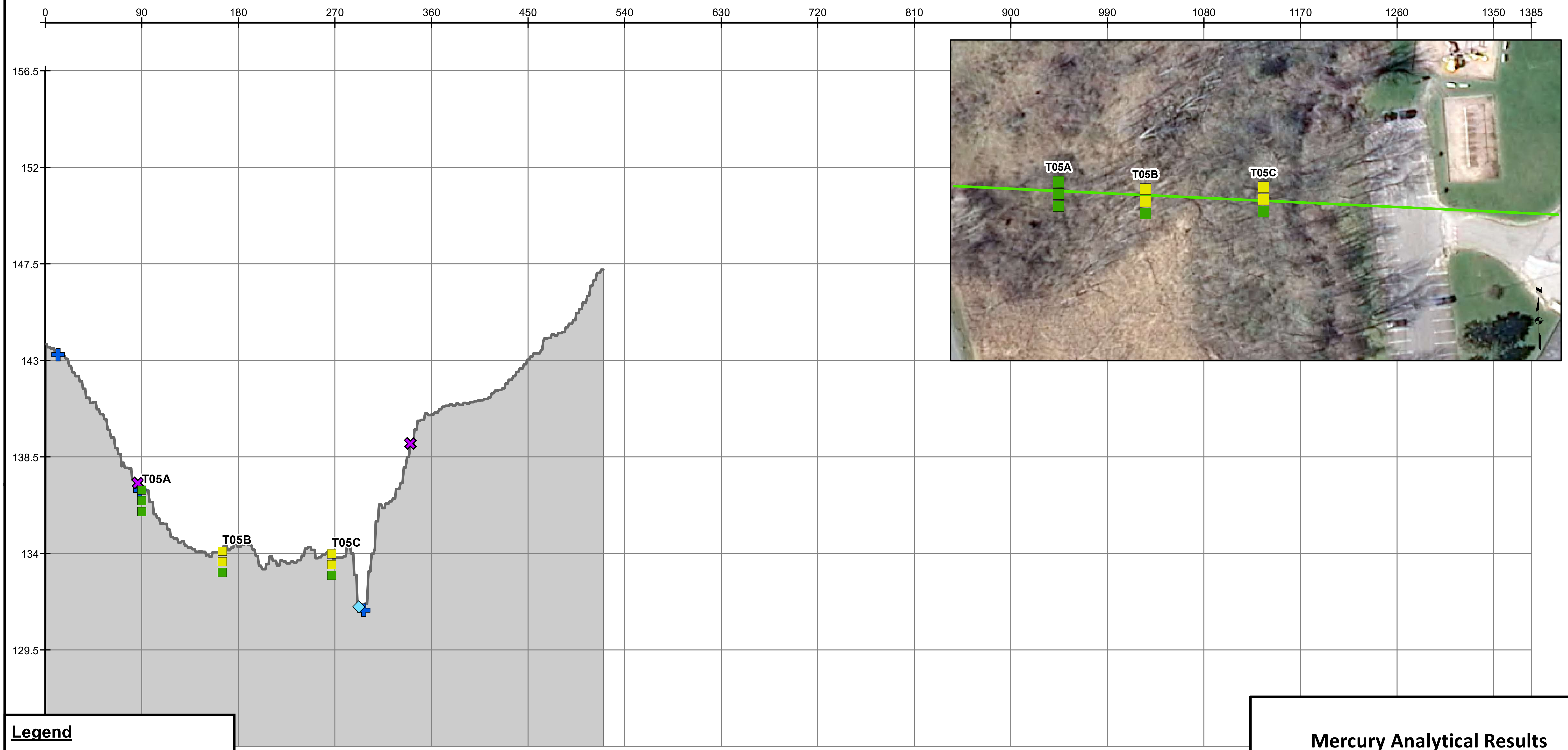

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∿ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 7B

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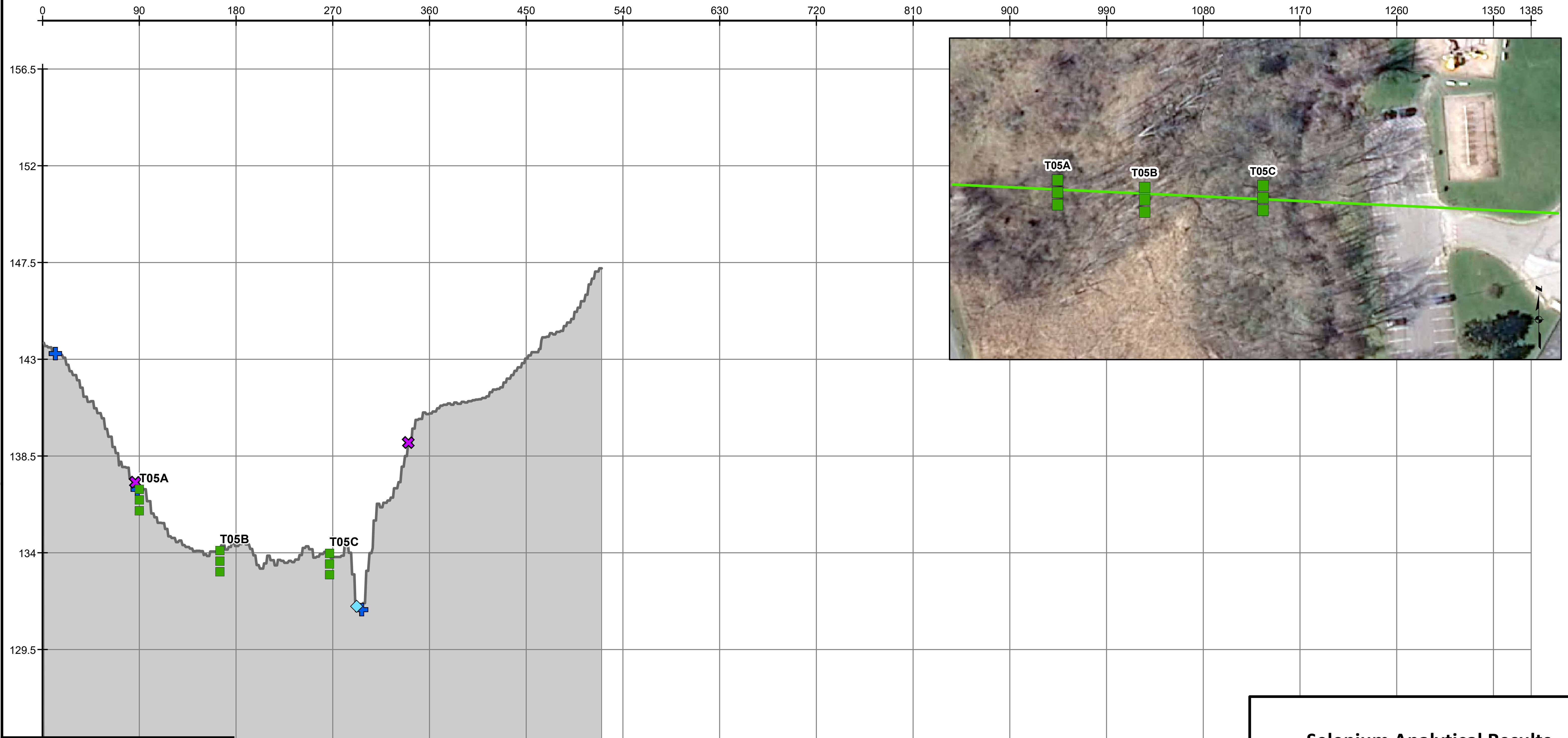

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∼ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 7C

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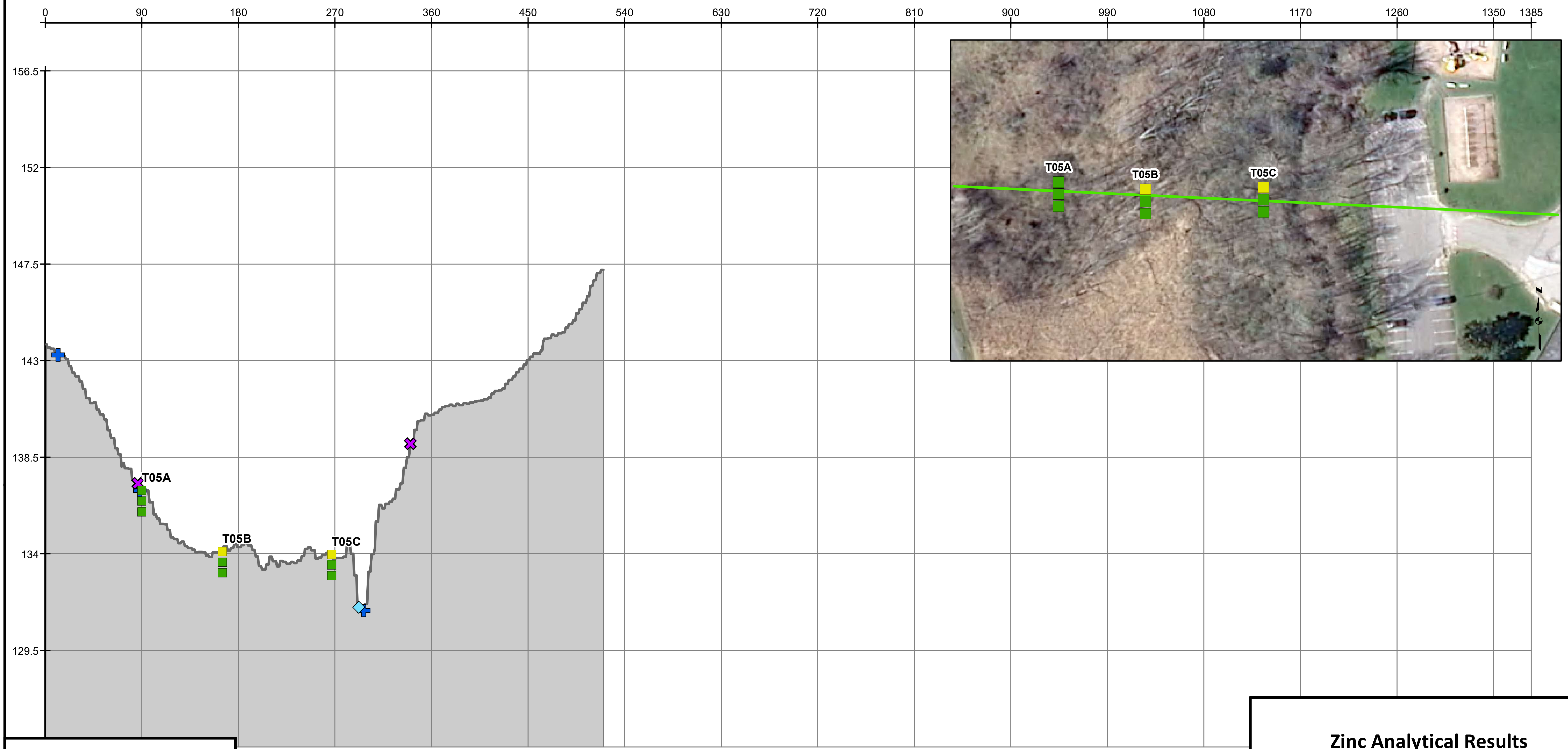

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results Floodplain Soil Sampling Cross Section - Transect T5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 7D

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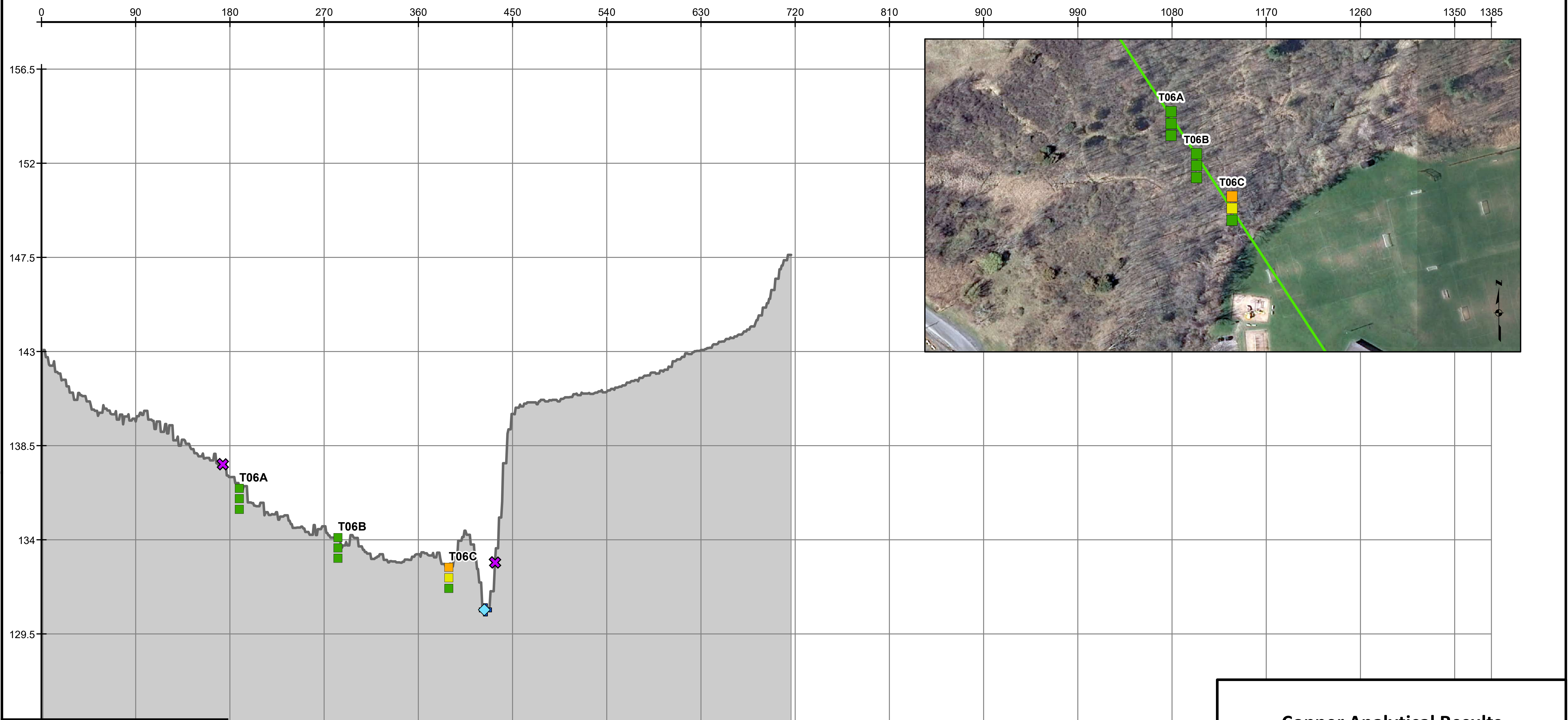

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∼ Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T6

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8A

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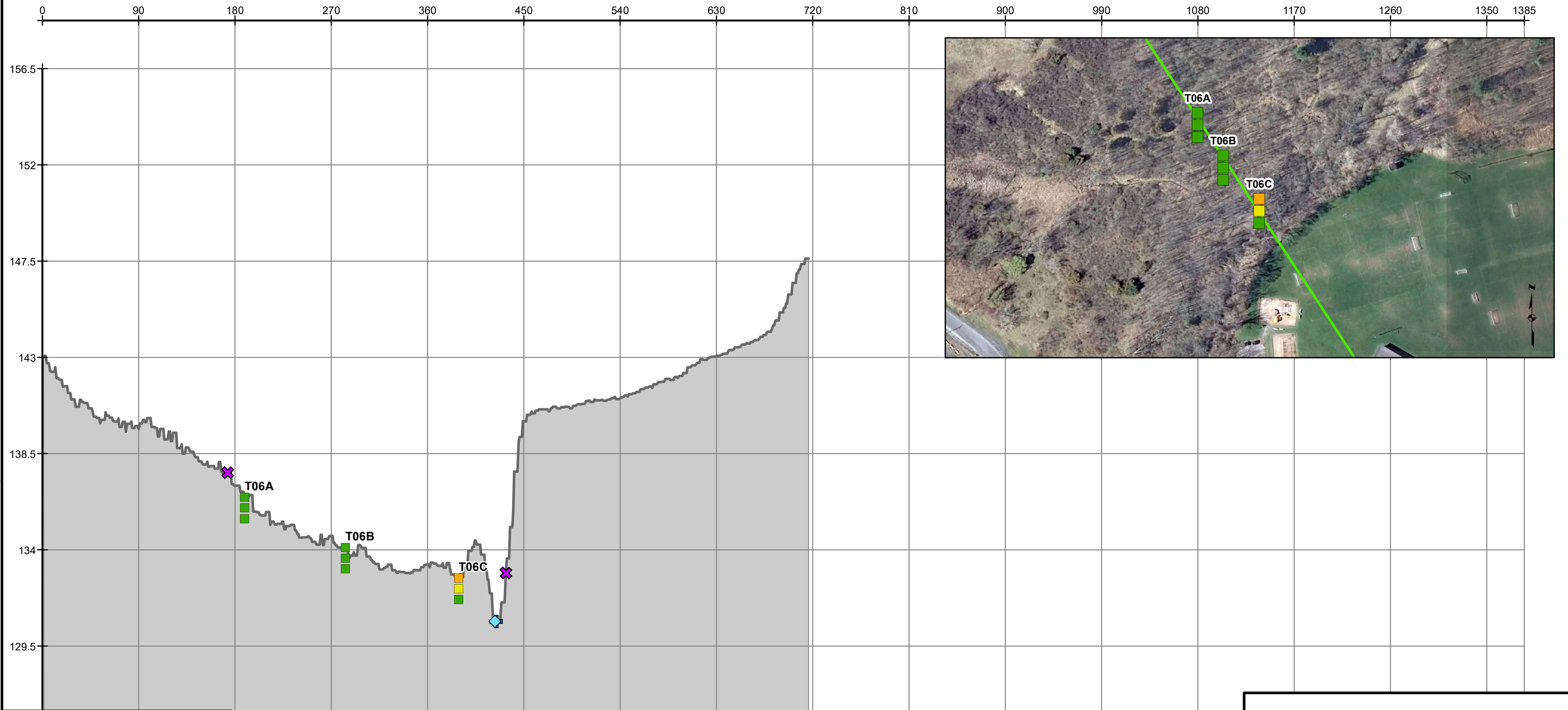

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T6

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8B

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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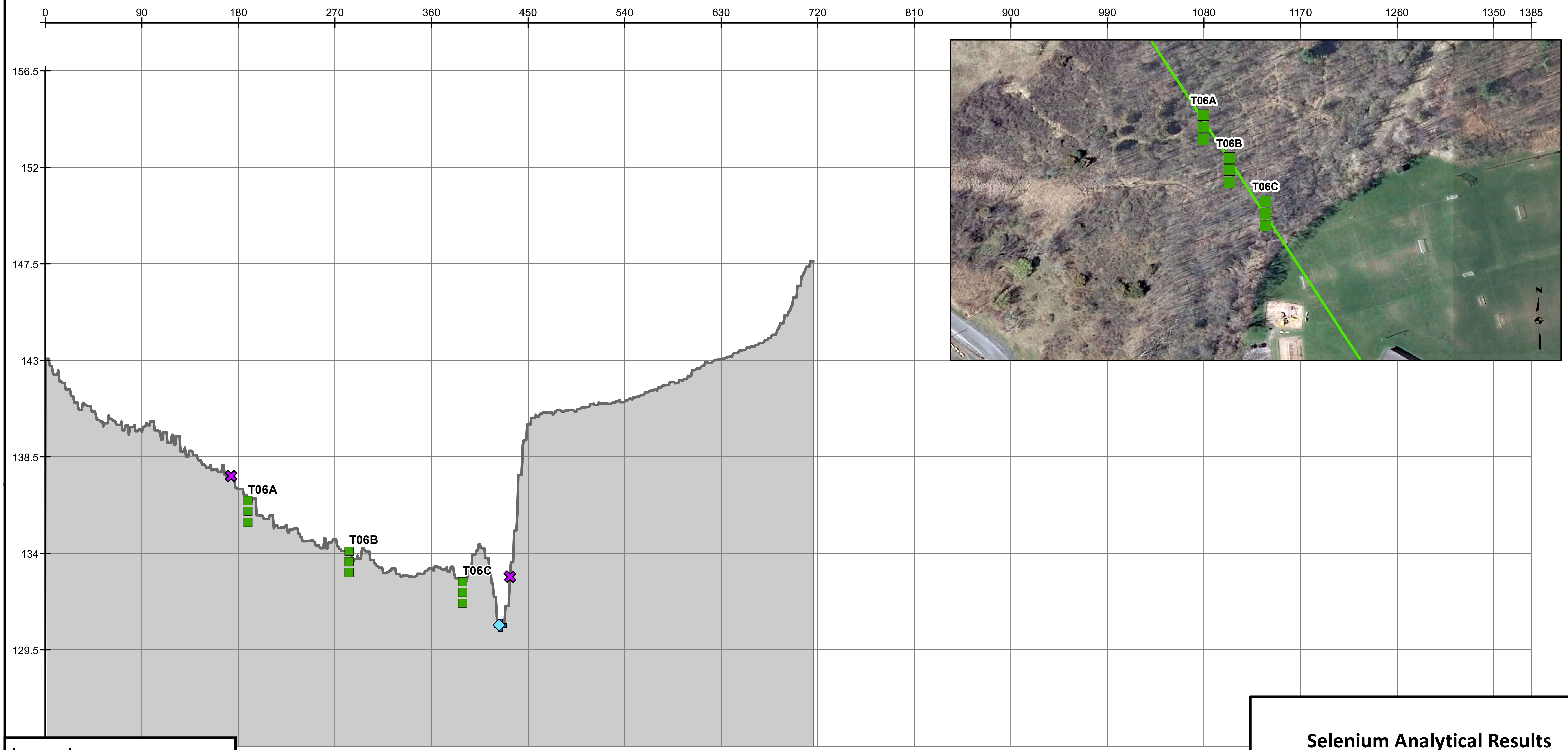

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ∿ Proposed Transect Elevation
- ━ Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T6

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8C

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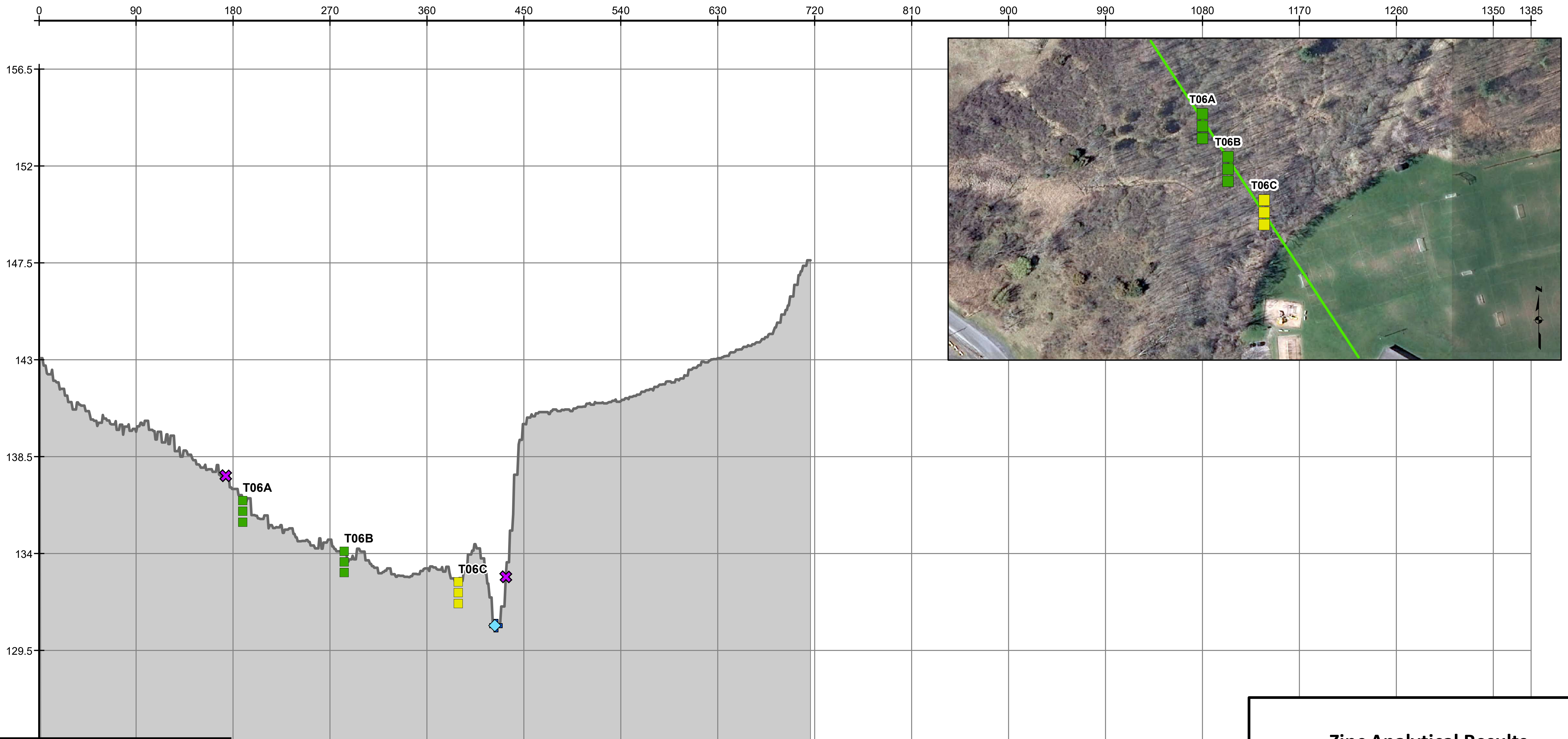

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T6

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 8D

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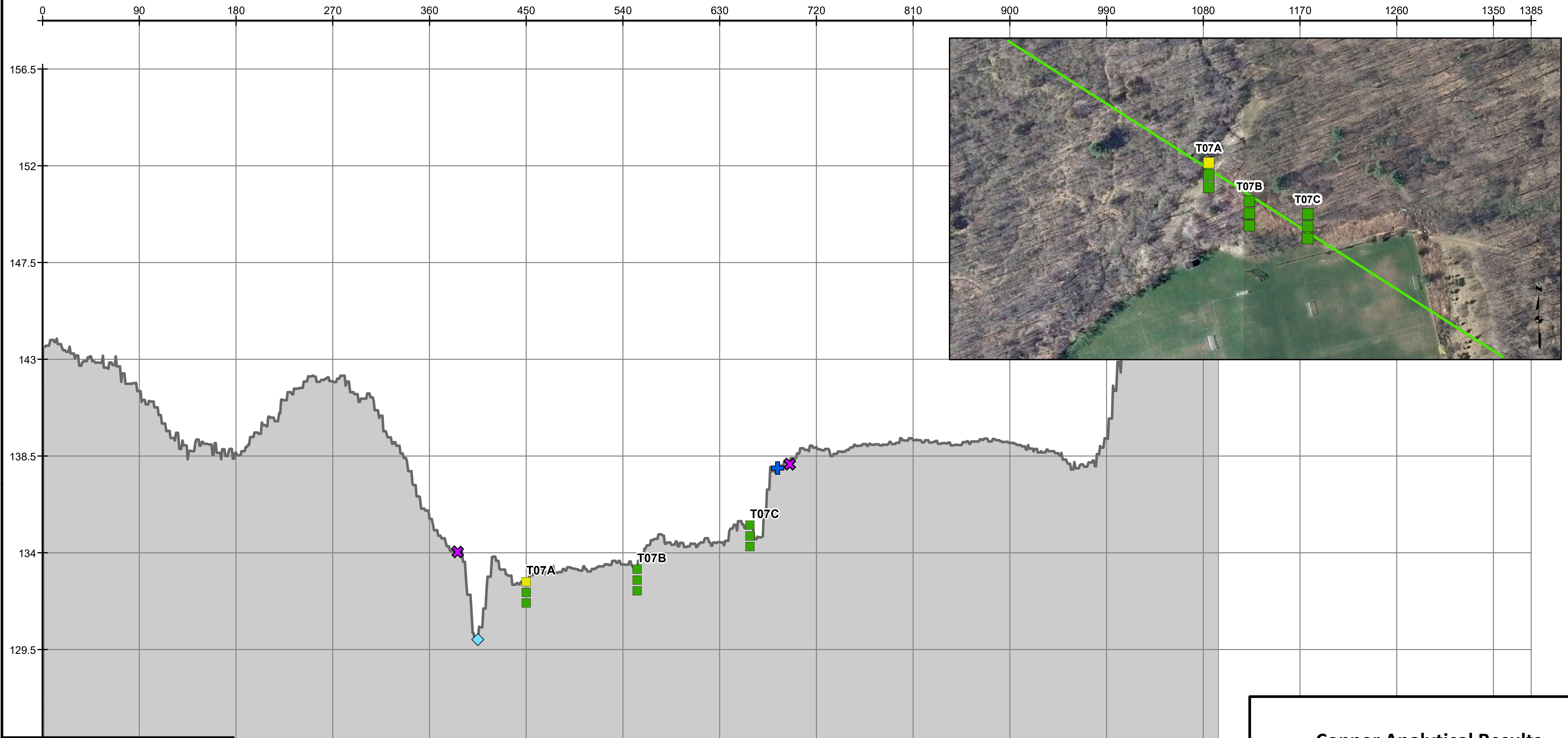

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9A

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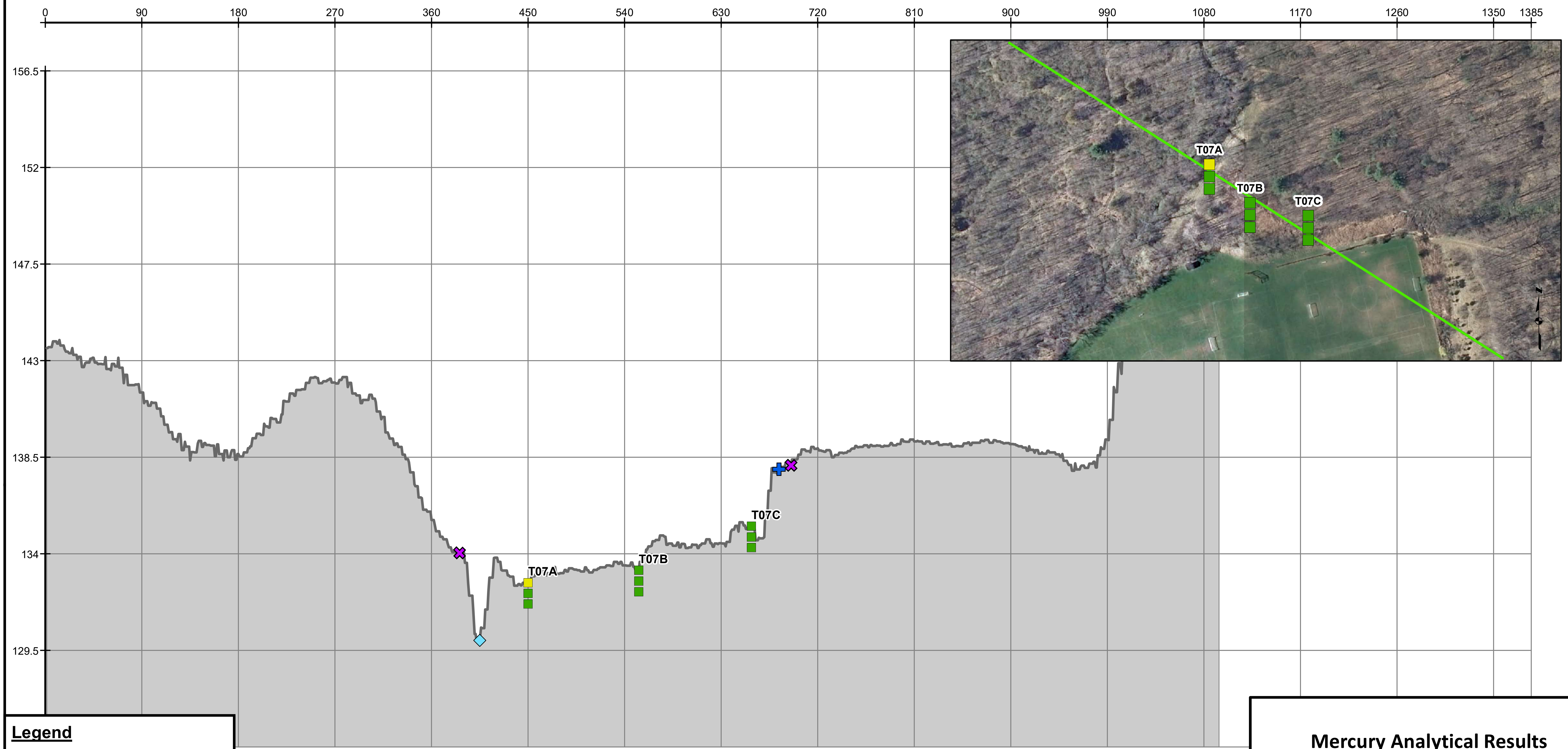

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support℠

FIGURE 9B

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSections\Results_wInset.mxd

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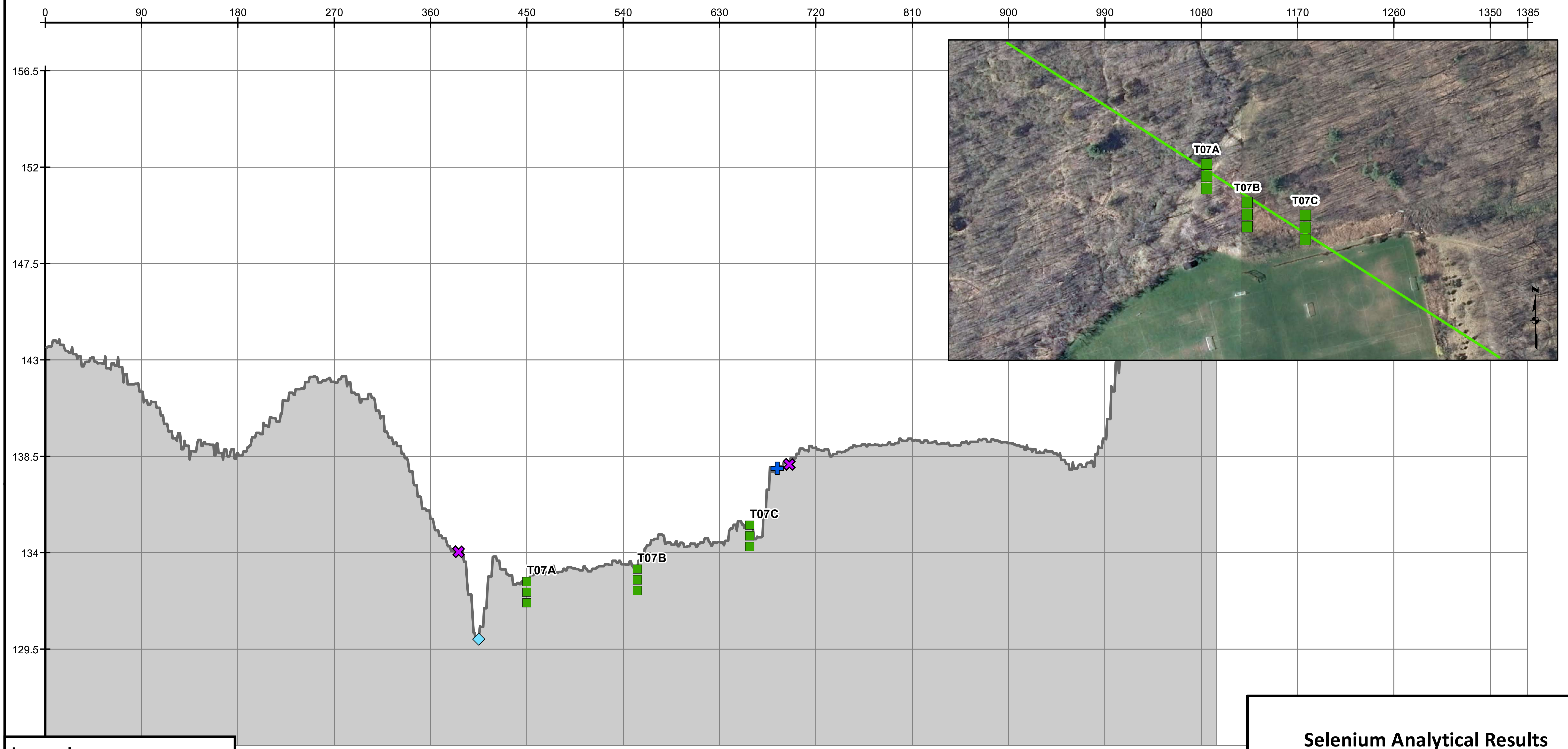

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〜 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9C

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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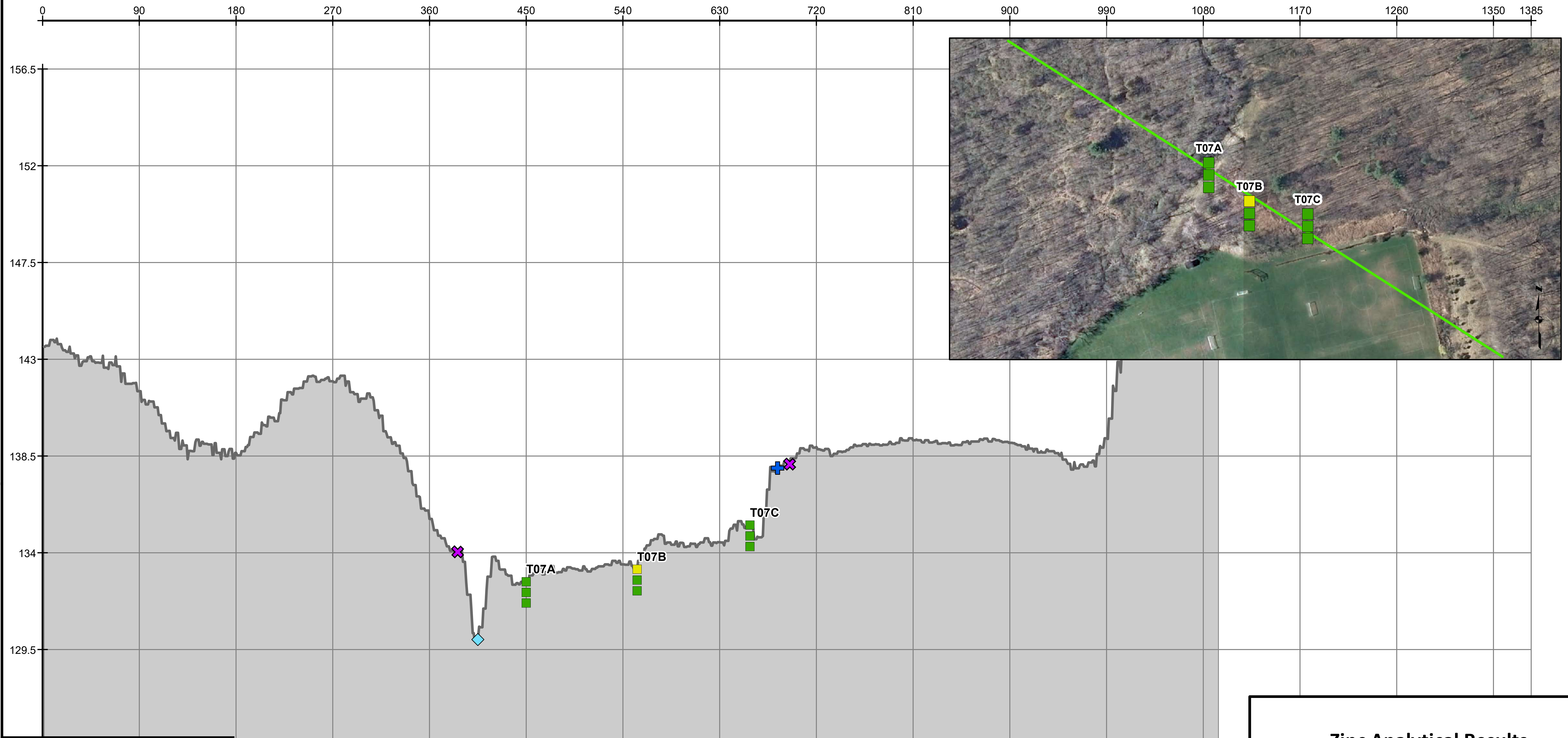

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∼ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 9D

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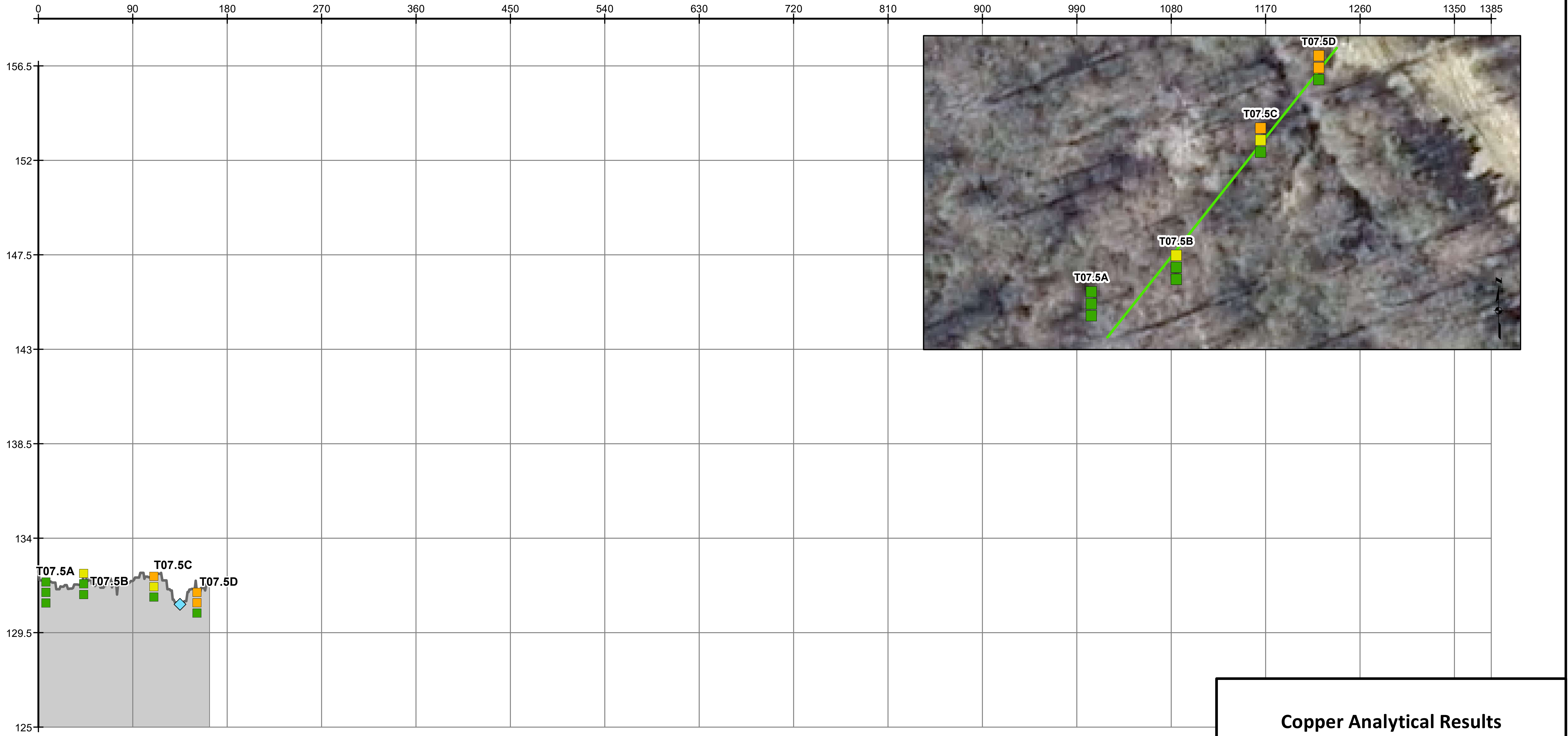

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ◇ Stream Center
- Proposed Transect Elevation
- Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7.5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 10A

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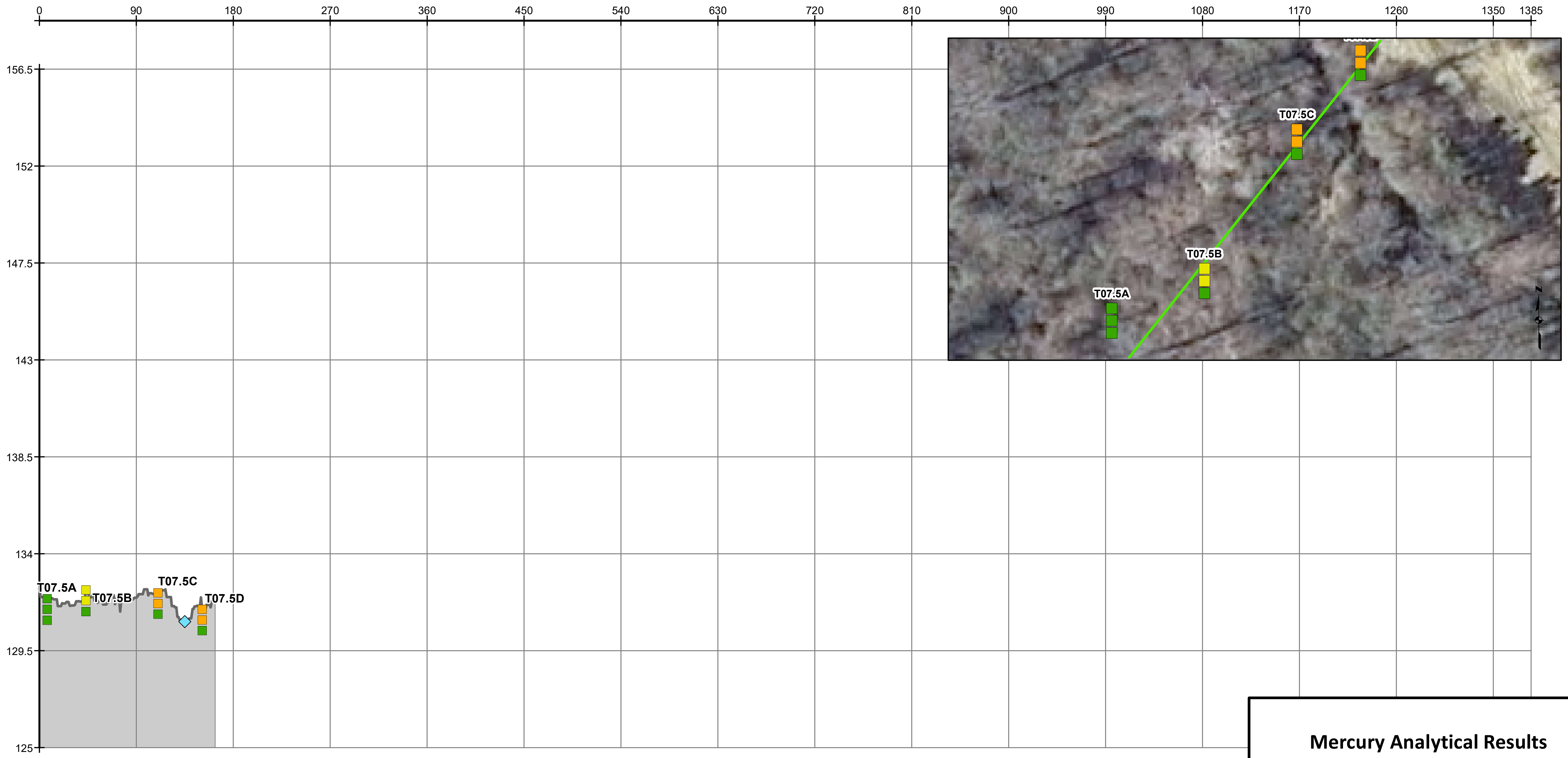

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7.5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 10B

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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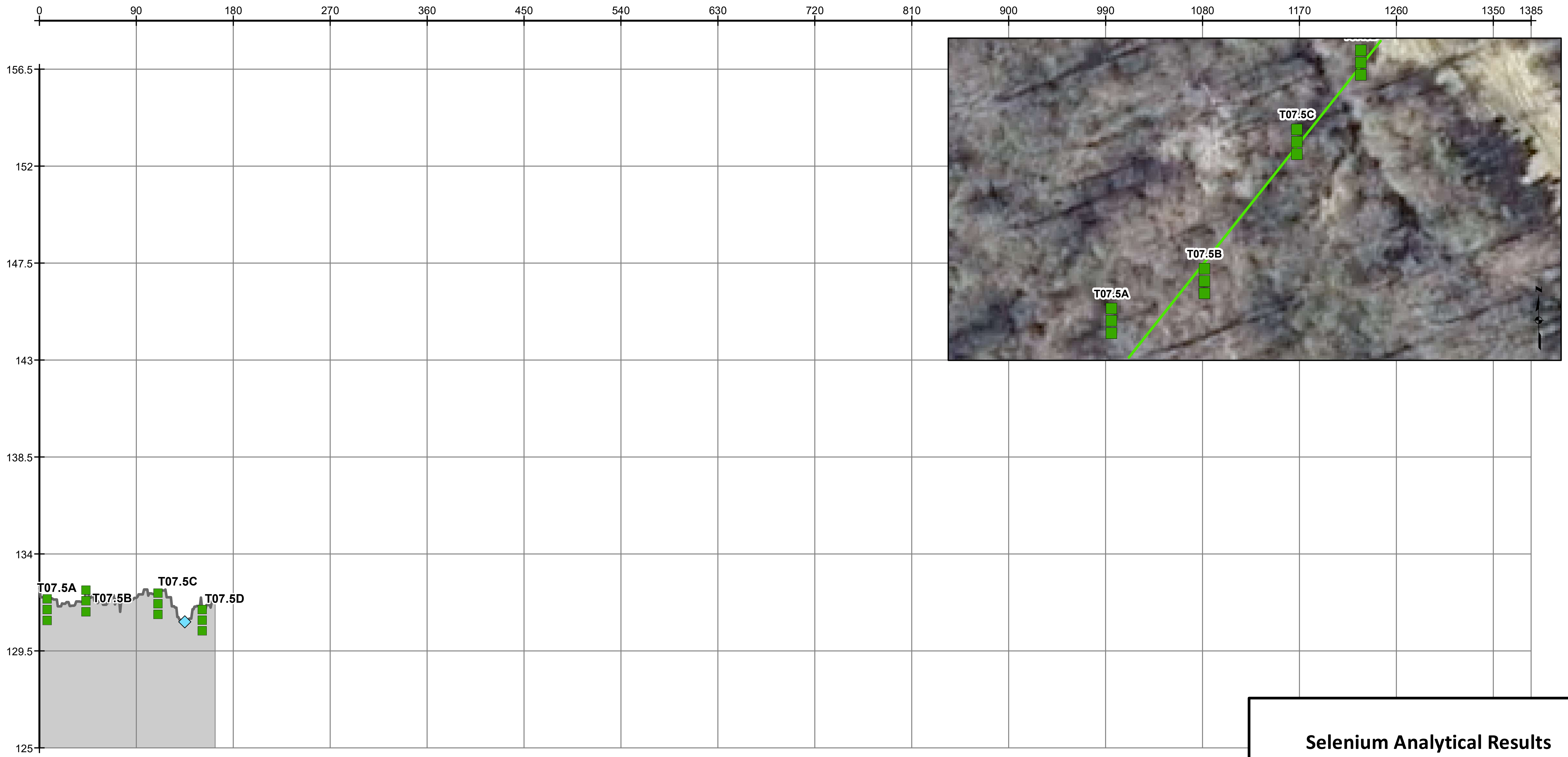

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ◆ Stream Center
- ~ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7.5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 10C

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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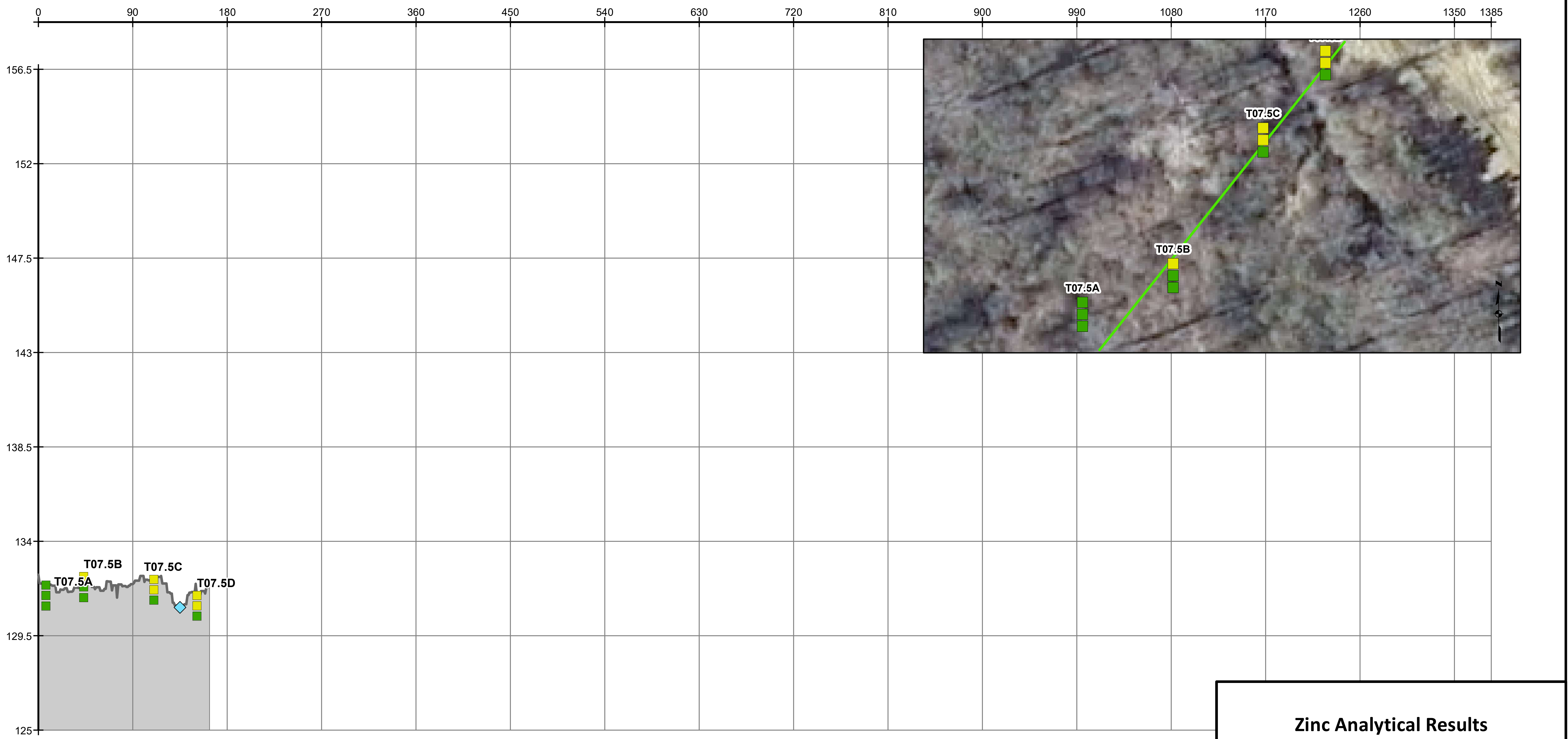


Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T7.5

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 10D

Legend

Zinc Concentration (mg/kg)

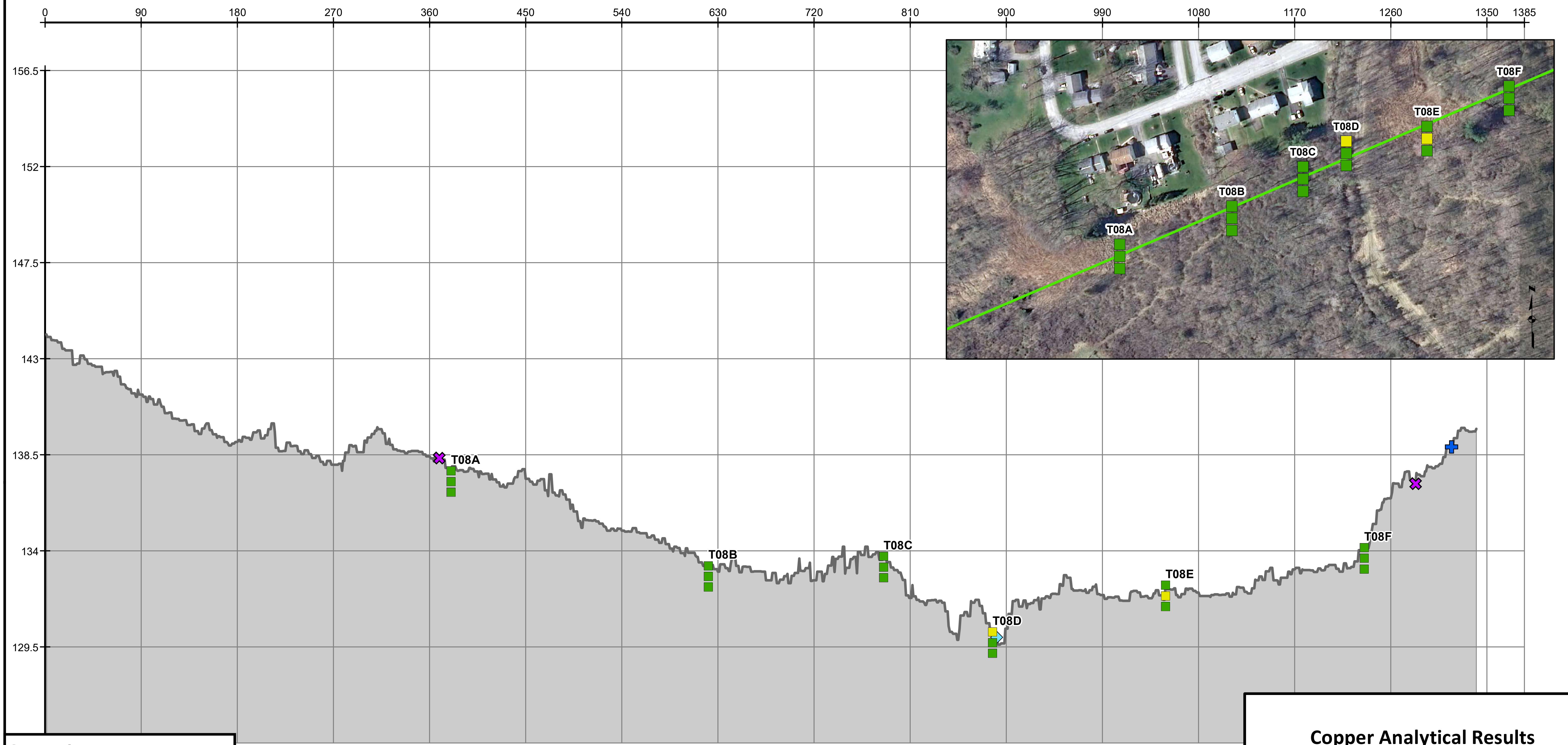
- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Reviewed By:



Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T8

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support™

FIGURE 11A

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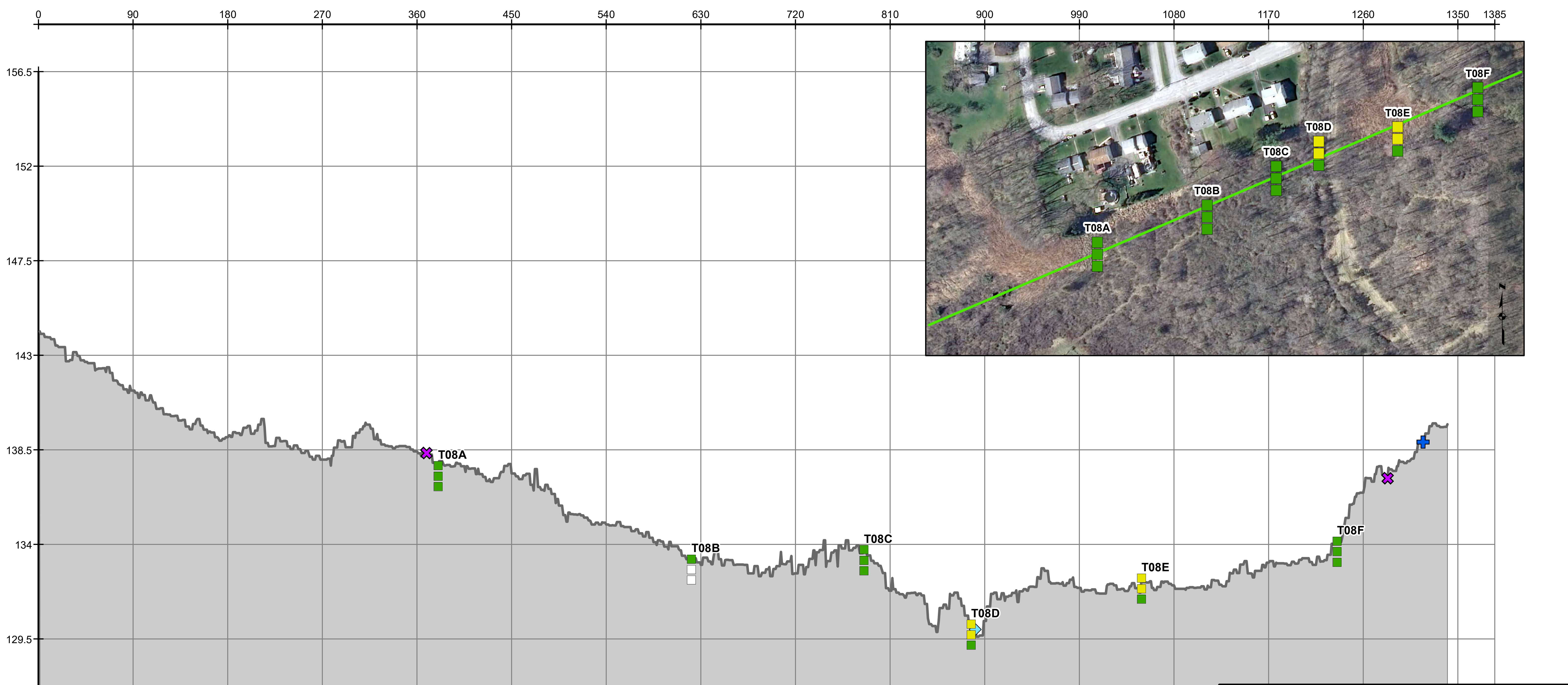

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T8

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 11B

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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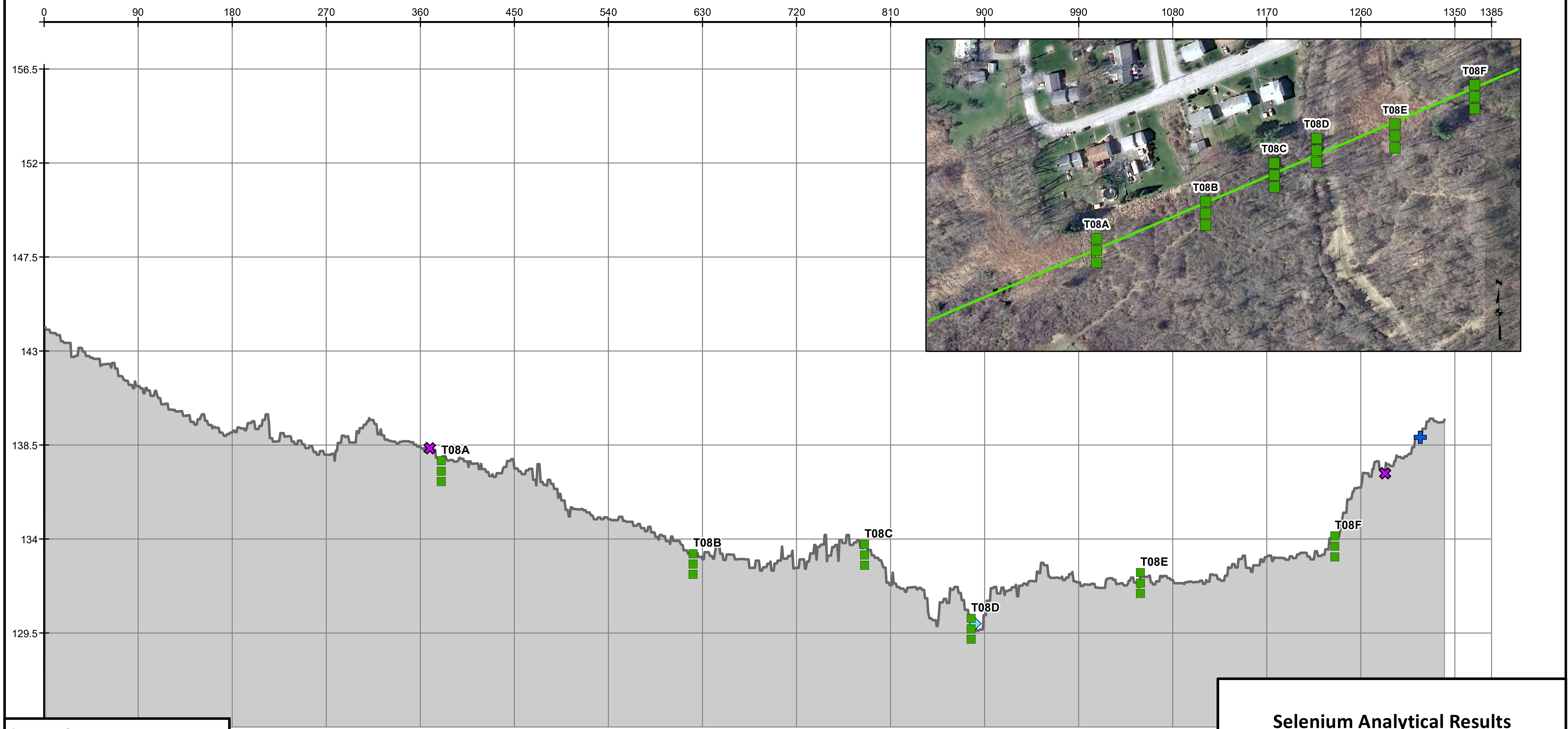

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T8

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support™

FIGURE 11C

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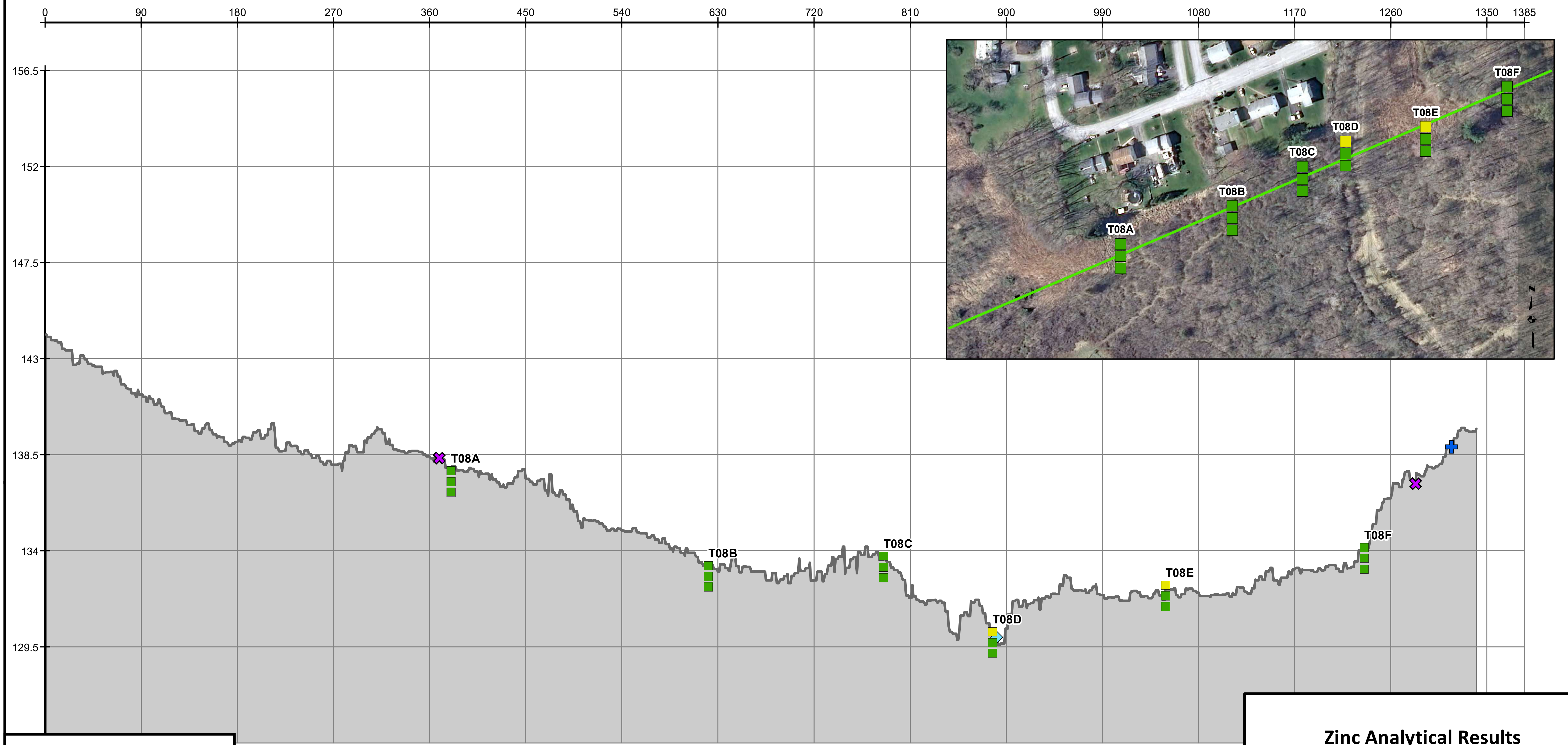

Legend

Zinc Concentration (mg/kg)

🟩	<= 109
🟨	110 - 2200
🟧	> 2200
✖	100y Floodplain Edge
✚	Parcel Boundary
◇	Stream Center
〜	Proposed Transect Elevation
—	Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 4.5 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residental Use SCO (mg/kg)**
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T8

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 11D

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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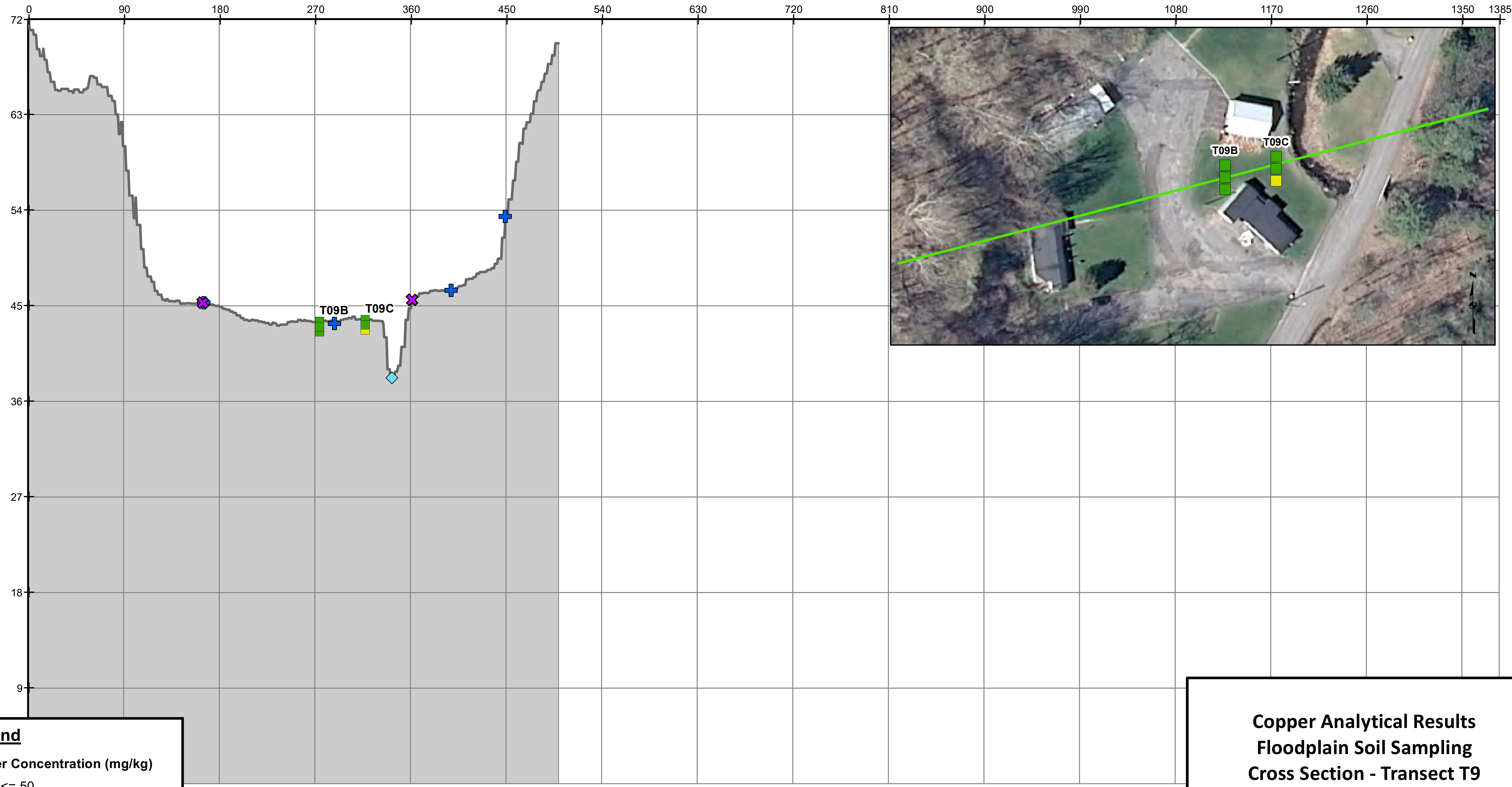

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ∼ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 12A

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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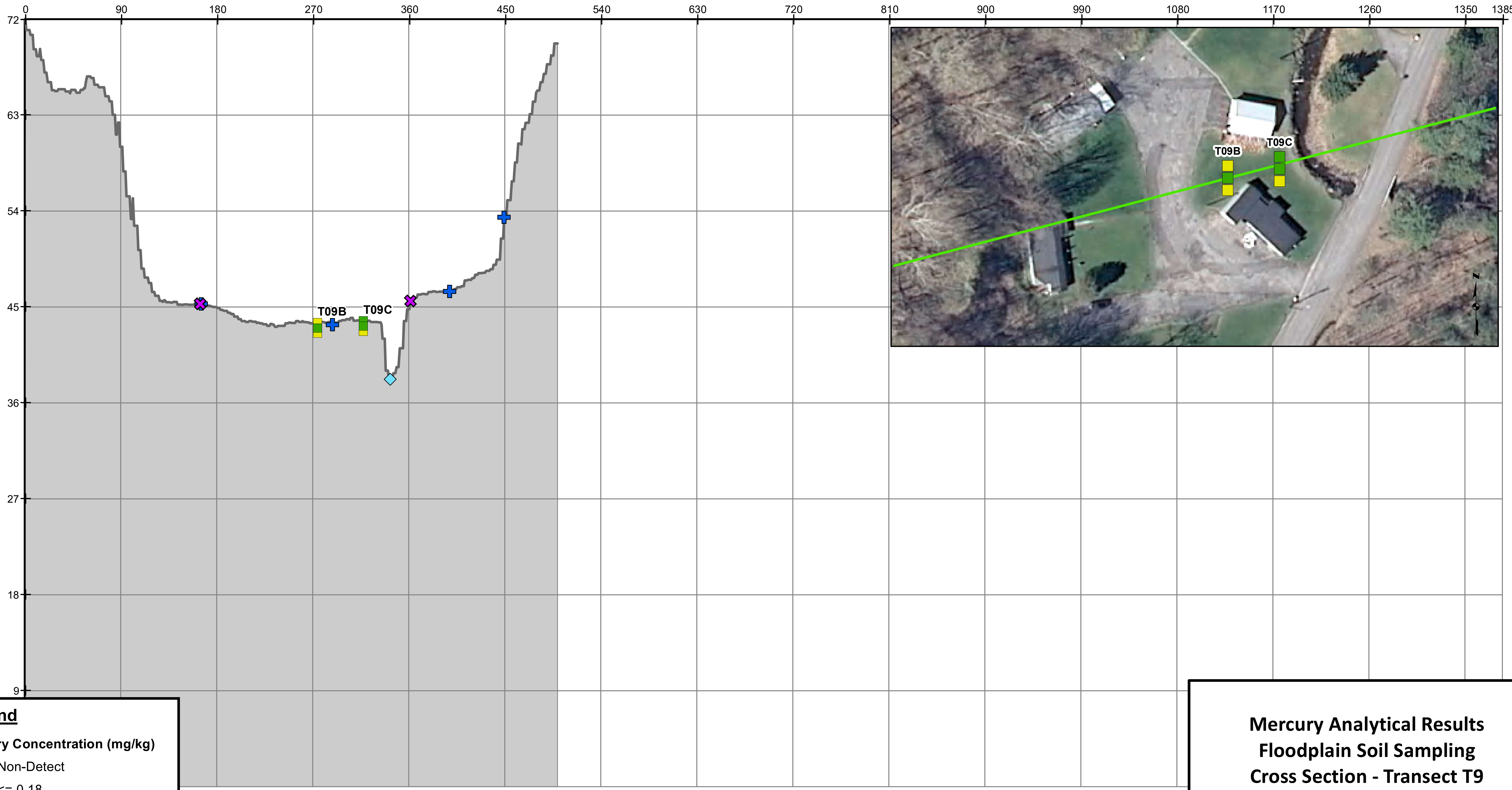

Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〰 Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 12B

Reviewed By:

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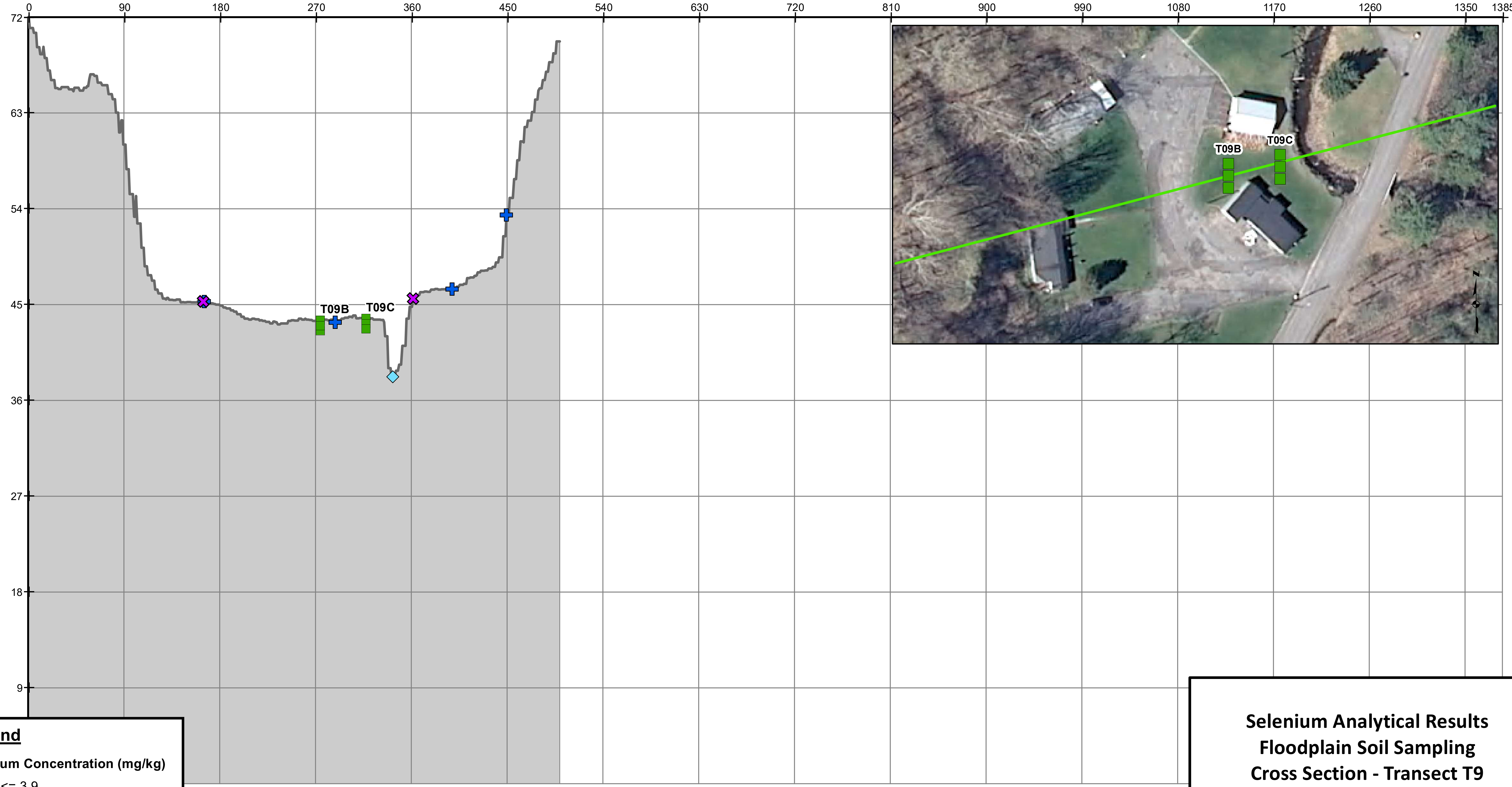

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 12C

Reviewed By:

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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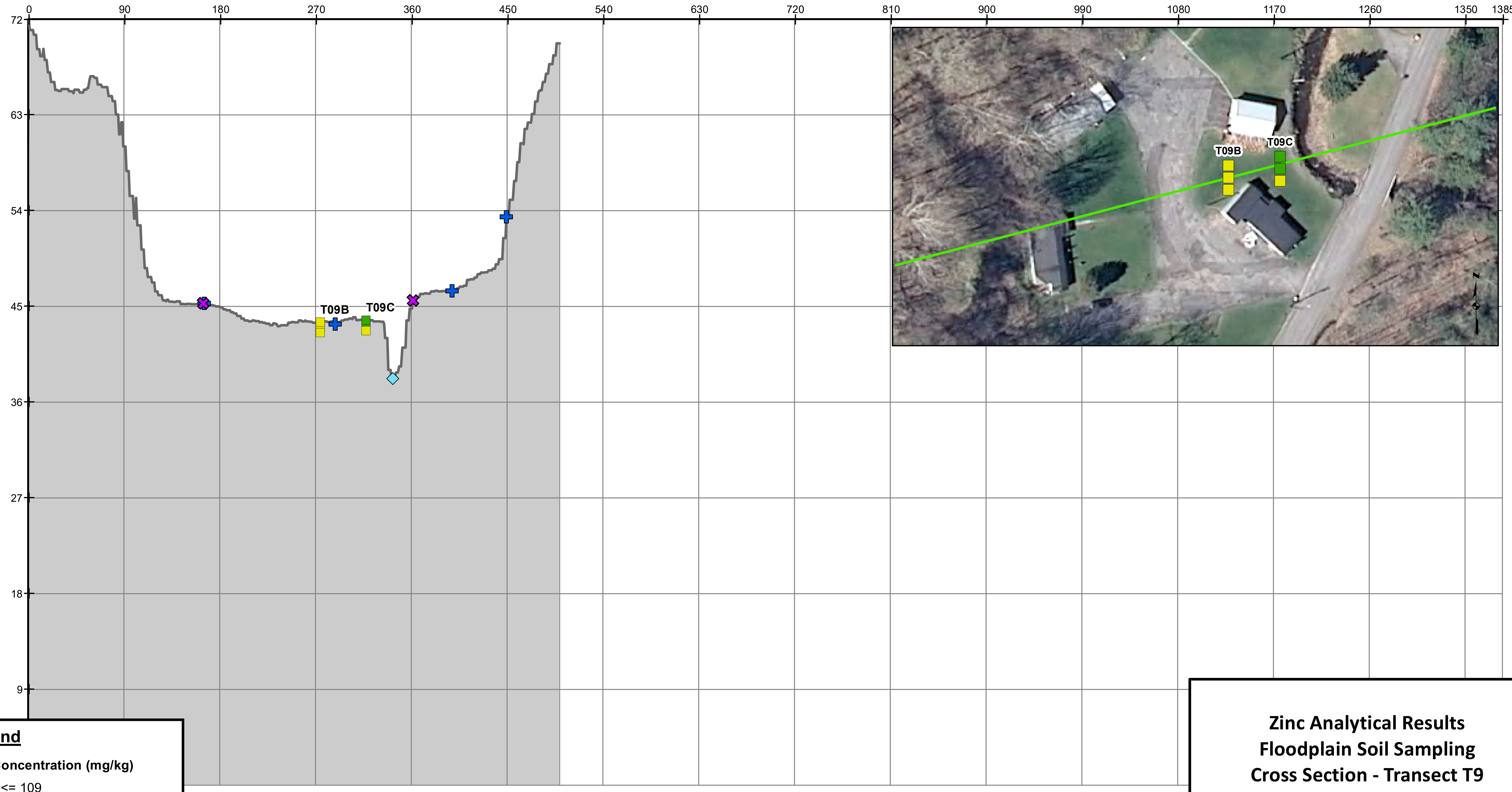

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- ～ Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residental Use SCO (mg/kg)**
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 12D

Reviewed By:

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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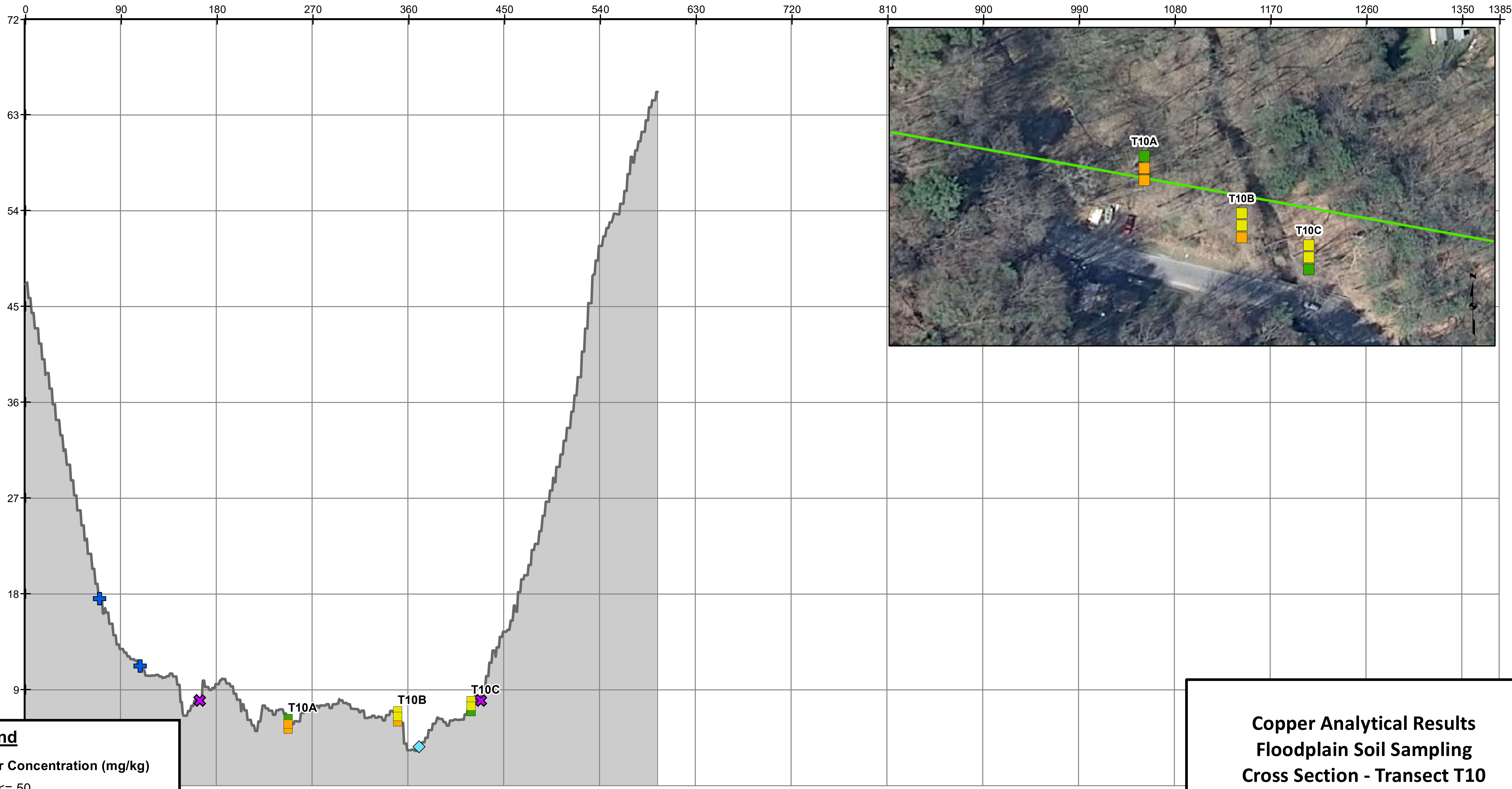

Legend

Copper Concentration (mg/kg)

- 🟩 <= 50
- 🟨 51 - 270
- 🟧 > 270
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ～ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	**Residential Use SCO (mg/kg)**
50	270

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13A

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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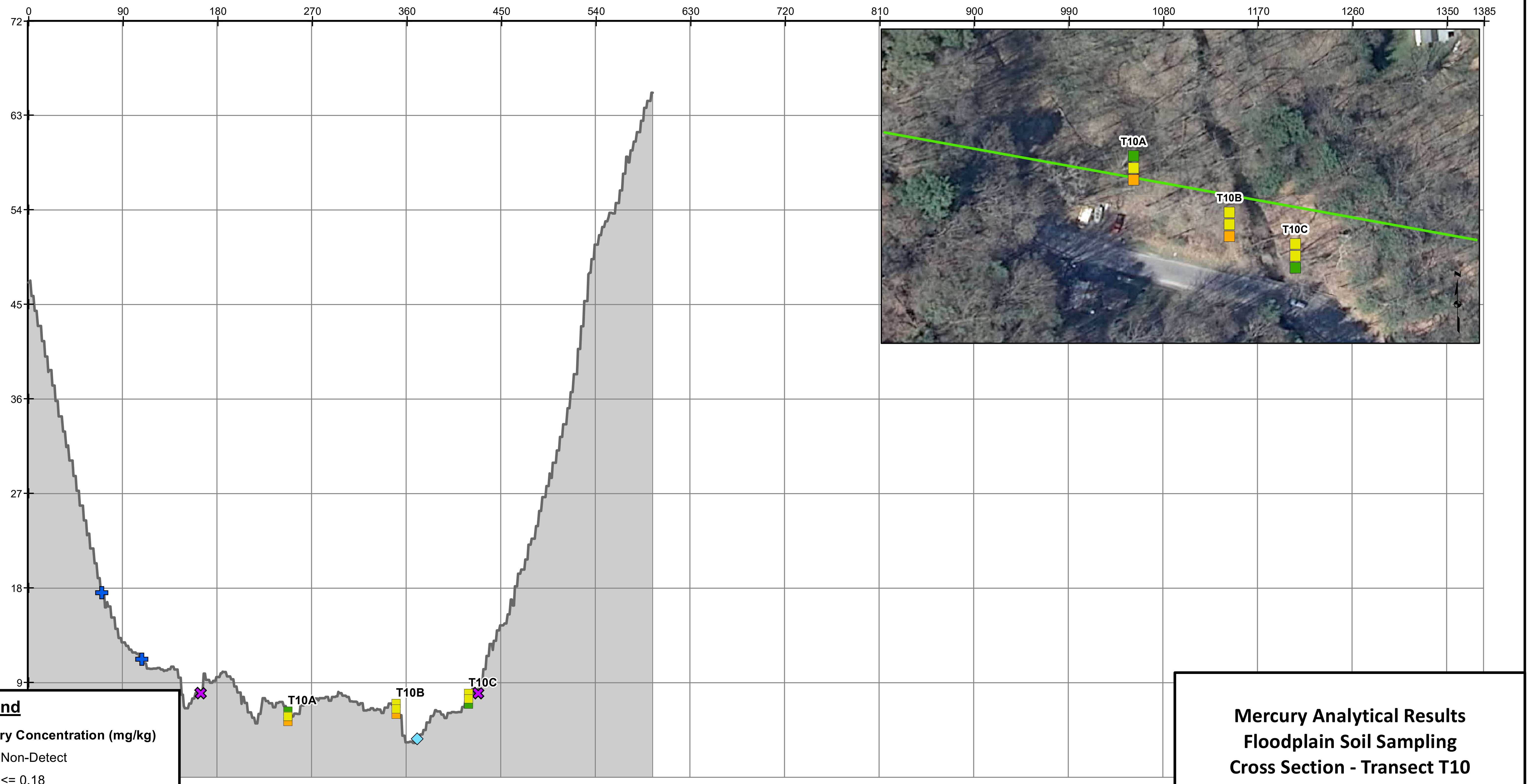
Reviewed By:



Legend

Mercury Concentration (mg/kg)

- ☐ Non-Detect
- 🟩 <= 0.18
- 🟨 0.19 - 1.2
- 🟧 > 1.2
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- ∼ Proposed Transect Elevation
- — Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residential Use SCO (mg/kg)
0.18	1.2

Mercury Analytical Results Floodplain Soil Sampling Cross Section - Transect T10

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13B

Reviewed By:

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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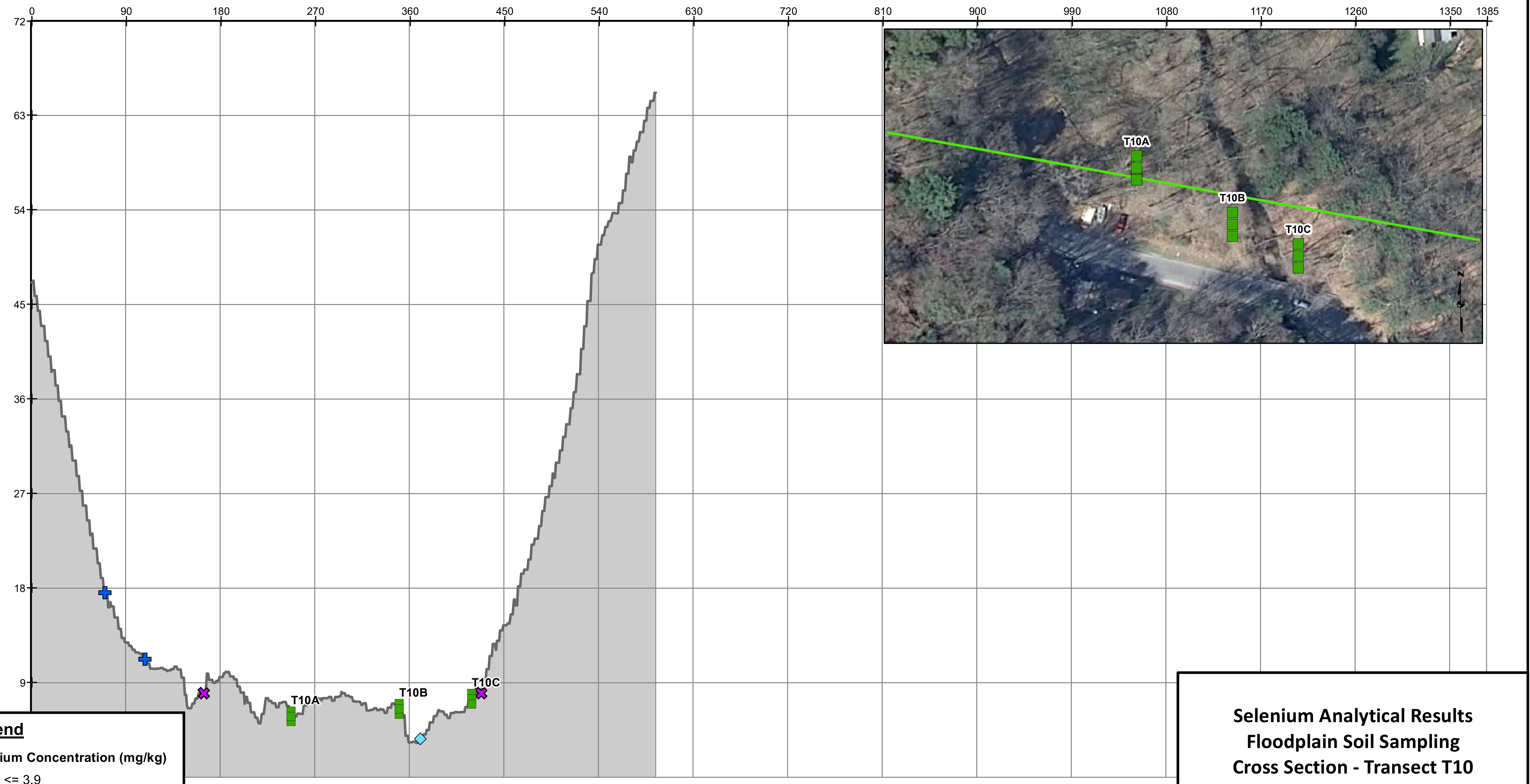

Legend

Selenium Concentration (mg/kg)

- 🟩 <= 3.9
- 🟨 4.0 - 36
- 🟧 > 36
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◇ Stream Center
- 〜 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
3.9	36

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13C

Reviewed By:

J:\EHSS_GIS\C00363_AshlandPortEwen\01_ANALYSIS\20230207_Floodplain_Soil_Results\CrossSectionsResults_wInset.mxd

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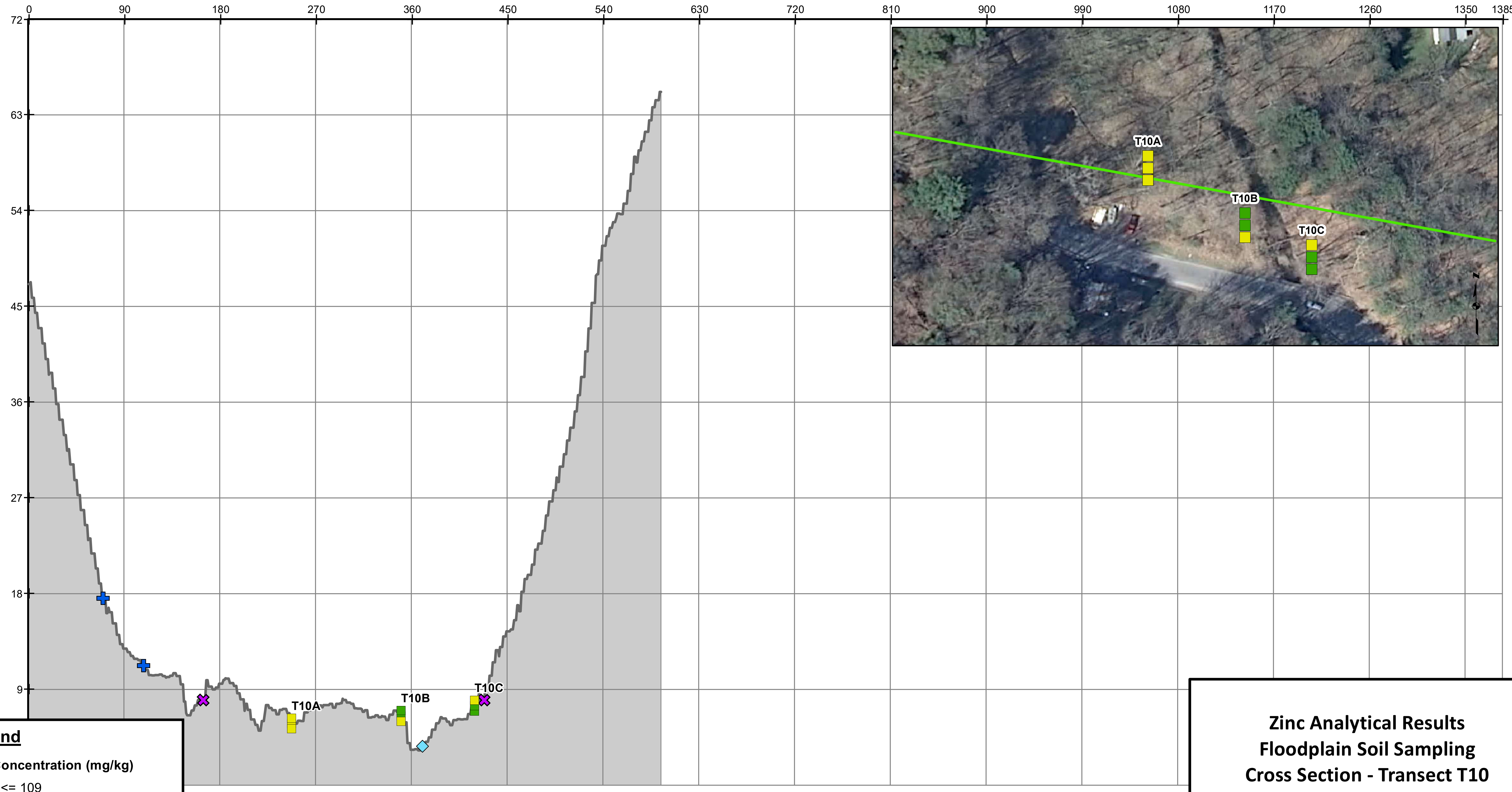

Legend

Zinc Concentration (mg/kg)

- 🟩 <= 109
- 🟨 110 - 2200
- 🟧 > 2200
- ✖ 100y Floodplain Edge
- ✚ Parcel Boundary
- ◆ Stream Center
- 〰 Proposed Transect Elevation
- ― Sampling Transect

Horizontal Scale
1 inch = 90 feet

Vertical Scale
1 inch = 9 feet

SCOs	
Final Unrestricted Use SCO (mg/kg)	Residental Use SCO (mg/kg)
109	2200

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13D

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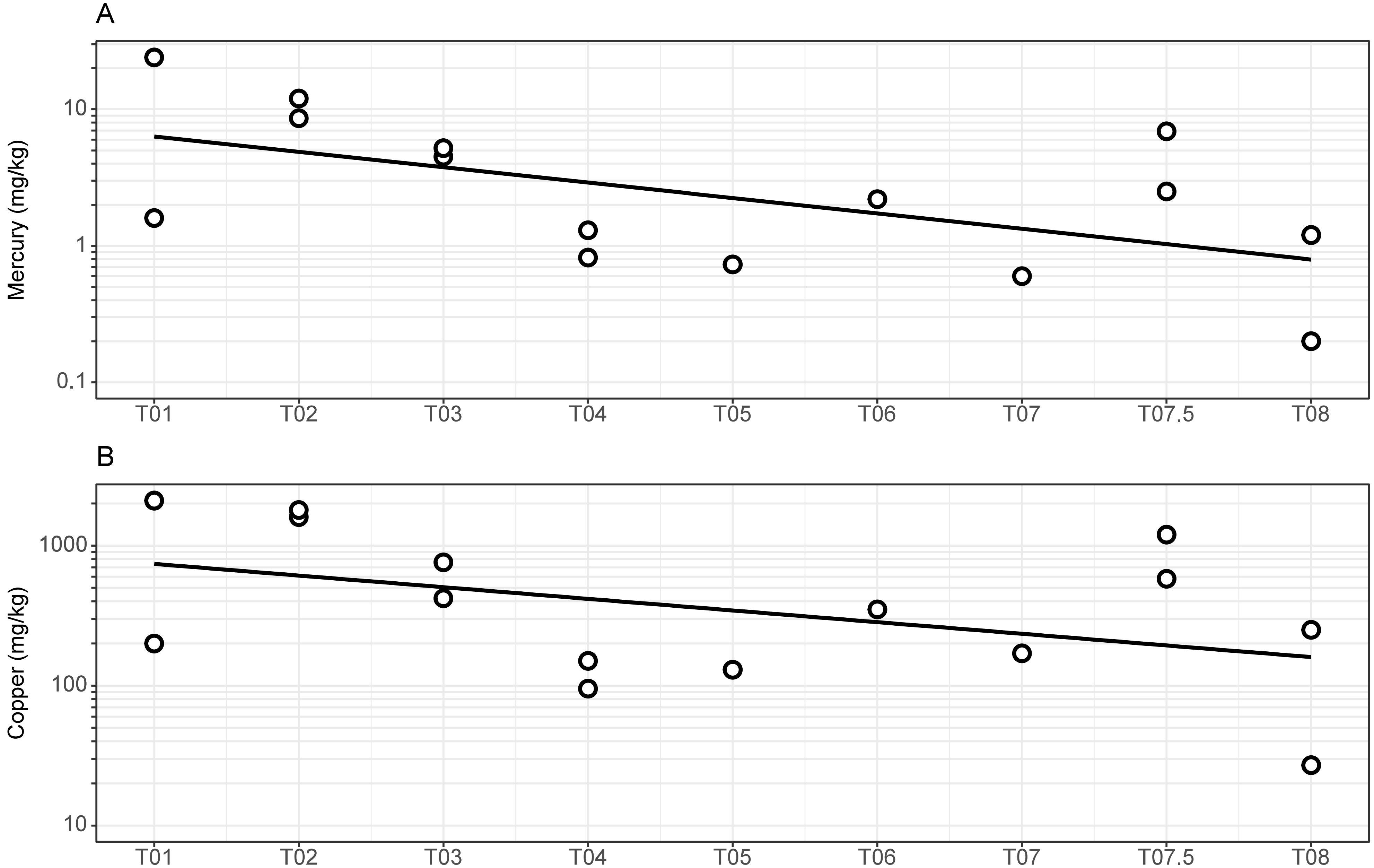
Reviewed By:



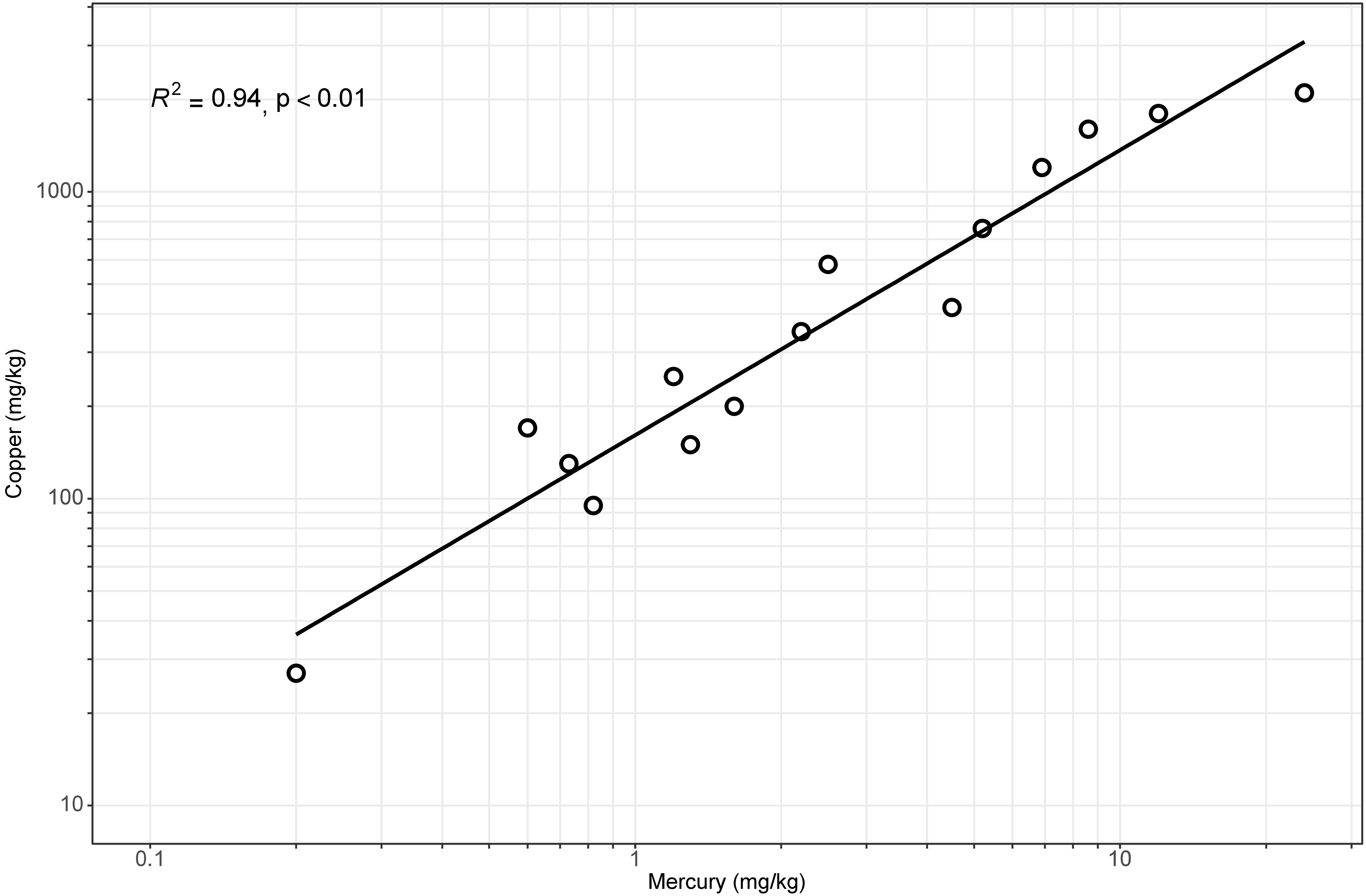
Best fit lines for visualization only.

EHS Support

Downstream Sediment Investigation
Dyno Nobel Port Ewen Site
Port Ewen, New York

Top Bank Shallow Surface Mercury (A) and Copper (B) Concentrations by Transect

FIGURE 14



EHS Support	**Downstream Sediment Investigation** **Dyno Nobel Port Ewen Site** **Port Ewen, New York**	**Transect T1 to Transect T8 Top Bank Shallow Surface Copper-Mercury Regression**	**FIGURE 15**

Appendix A Summary of Plantasie Creek Floodplain Soil Analytical Data

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Location ID					**T01A**		**T01A**		**T01A**		**T01A**		**T01B**		**T01B**		**T01B**		**T01B**		**T01C**	
Sample ID					**T01A-0-6**		**T01A-0-12**		**T01A-6-12**		**T01A-12-24**		**T01B-0-6**		**T01B-0-12**		**T01B-6-12**		**T01B-12-24**		**DUP-10**	
Sample Date					**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**05 Oct 2023**	
Sample Depth					**0-6in**		**0-12in**		**6-12in**		**12-24in**		**0-6in**		**0-12in**		**6-12in**		**12-24in**		**0-6in**	
Sample Type (N: Normal; FD: Field Duplicate)					**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**FD**	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	**180**				34		17		**450**				**110**		**180**		**2300**	**J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**2**	**J**			0.14	J	0.073	J	**1.5**	**J**			**1.1**	**J**	**0.87**	**J**	**19**	**J**
Selenium	7782-49-2	**3.9**	36	mg/kg	2.9				1.2		0.83		2.3				0.69		0.85		**8.6**	**J**
Zinc	7440-66-6	**109**	2200	mg/kg	100				91		**110**		**150**				90		**120**		**310**	**J**
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU			6.9	J							6.7	J						
Temperature	TEMP			deg c			21.1	J							21.1	J						
Total Organic Carbon	TOC			mg/kg			27000								17000							
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%			94.3								91.2							
Gravel	GRAVEL			%			0								0							
Sand	308075-07-2			%			5.7								8.8							
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Location ID					T01C		T01C		T01C		T01C		T01C		T01D		T01D		T01D		T01D	
Sample ID					T01C-0-6		DUP-11		T01C-0-12		T01C-6-12		T01C-12-24		T01D-0-6		T01D-0-12		T01D-6-12		T01D-12-24	
Sample Date					05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023		05 Oct 2023	
Sample Depth					0-6in		6-12in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in		12-24in	
Sample Type (N: Normal; FD: Field Duplicate)					N		FD		N		N		N		N		N		N		N	
Chemical	CAS No.	Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)	Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)	Unit	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	**2100**	**J**	**220**				**350**		18		**200**	**J**			**110**	**J**	35	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**24**	**J**	**0.77**	**J**			**3.2**	**J**	0.096	J	**1.6**	**J**			**0.35**	**J**	0.1	J
Selenium	7782-49-2	**3.9**	36	mg/kg	**7.7**	**J**	1.6				2.2		0.8		1.1				0.76		0.61	
Zinc	7440-66-6	**109**	2200	mg/kg	**330**	**J**	95				**130**		87		**110**	**J**			**120**	**J**	82	
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU					7.6	J							6.7	J				
Temperature	TEMP			deg c					21.1	J							21.5	J				
Total Organic Carbon	TOC			mg/kg					42000								20000					
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%					85.2								69.3					
Gravel	GRAVEL			%					0								0					
Sand	308075-07-2			%					14.8								30.7					
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	**T01E**		**T01E**		**T01E**		**T01E**		**T02A**		**T02A**		**T02A**		**T02A**		**T02B**	
				Sample ID	**T01E-0-6**		**T01E-0-12**		**T01E-6-12**		**T01E-12-24**		**T02A-0-6**		**T02A-0-12**		**T02A-6-12**		**T02A-12-24**		**T02B-0-6**	
				Sample Date	**05 Oct 2023**		**05 Oct 2023**		**05 Oct 2023**		**05 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**		**07 Oct 2023**	
				Sample Depth	**0-6in**		**0-12in**		**6-12in**		**12-24in**		**0-6in**		**0-12in**		**6-12in**		**12-24in**		**0-6in**	
				Sample Type (N: Normal; FD: Field Duplicate)	**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	26	J			23	J	18		17	J			12		13		**390**	**J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.17	J			0.094	J	0.049	J	0.12	J			0.072	J	0.024	J	**1.6**	**J**
Selenium	7782-49-2	**3.9**	36	mg/kg	0.49	J			0.54		0.74		0.88				0.88		0.47	J	**5.9**	
Zinc	7440-66-6	**109**	2200	mg/kg	76	J			83	J	89		80	J			74		73		**150**	**J**
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU			7	J							7	J						
Temperature	TEMP			deg c			21.5	J							21.1	J						
Total Organic Carbon	TOC			mg/kg			22000								26000							
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%			58.9								94.2							
Gravel	GRAVEL			%			3.5								0							
Sand	308075-07-2			%			37.6								5.8							
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T02B		T02B		T02B		T02C		T02C		T02C		T02C		T02D		T02D	
				Sample ID	T02B-0-12		T02B-6-12		T02B-12-24		T02C-0-6		T02C-0-12		T02C-6-12		T02C-12-24		T02D-0-6		T02D-0-12	
				Sample Date	07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023	
				Sample Depth	0-12in		6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg			**520**	**J**	**110**		**1600**	**J**			**280**	**J**	24		**1800**	**J**		
Mercury	7439-97-6	**0.18**	1.2	mg/kg			**5.6**	**J**	**1**	**J**	**8.6**	**J**			**1.4**	**J**	0.093	J	**12**	**J**		
Selenium	7782-49-2	**3.9**	36	mg/kg			2.3		1.3		**4.2**				1.9		1.9		**5**			
Zinc	7440-66-6	**109**	2200	mg/kg			**190**	**J**	**110**		**290**	**J**			94	J	81		**280**	**J**		
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU	6.9	J							7	J							6.9	J
Temperature	TEMP			deg c	21.3	J							21.5	J							21.7	J
Total Organic Carbon	TOC			mg/kg	33000								39000								35000	
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%	84.6								85.3								87.3	
Gravel	GRAVEL			%	0								0								0	
Sand	308075-07-2			%	15.4								14.7								12.7	
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T02D		T02D		T02E		T02E		T02E		T02E		T02F		T02F		T02F	
				Sample ID	T02D-6-12		T02D-12-24		T02E-0-6		T02E-0-12		T02E-6-12		T02E-12-24		T02F-0-6		T02F-0-12		T02F-6-12	
				Sample Date	07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023		07 Oct 2023	
				Sample Depth	6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	**130**	**J**	16		20	J			17	J	17		14	J			13	J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**1.4**	**J**	0.082	J	0.14	J			0.1	J	0.03	J	0.081	J			0.048	J
Selenium	7782-49-2	**3.9**	36	mg/kg	1.8		0.97		0.64				0.7		0.48		0.54				0.48	
Zinc	7440-66-6	**109**	2200	mg/kg	96	J	76		74	J			76	J	74		70	J			67	J
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							6	J							6.9	J		
Temperature	TEMP			deg c							21.2	J							21.2	J		
Total Organic Carbon	TOC			mg/kg							25000								16000			
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							86.5								92.1			
Gravel	GRAVEL			%							0								0			
Sand	308075-07-2			%							13.5								7.9			
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Location ID					T02F		T03A		T03A		T03A		T03A		T03B		T03B		T03B		T03B	
Sample ID					T02F-12-24		T03A-0-6		T03A-0-12		T03A-6-12		T03A-12-24		T03B-0-6		T03B-0-12		T03B-6-12		T03B-12-24	
Sample Date					07 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		07 Dec 2022		07 Dec 2022		07 Dec 2022		07 Dec 2022	
Sample Depth					12-24in		0-6in		0-12in		6-12in		12-24in		0-6in bgs		0-12in bgs		6-12in bgs		12-24in bgs	
Sample Type (N: Normal; FD: Field Duplicate)					N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	18		31	J			16	J	20		20	J			13		16	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.025	J	0.15	J			0.15	J	**0.19**	**J**	**0.23**	**J**			0.12	J	0.11	J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.51		0.74				0.71		1.3		1.8	J			1.6		0.96	
Zinc	7440-66-6	**109**	2200	mg/kg	71		89	J			86	J	**180**		**190**	**J**			**180**	**J**	**320**	**J**
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU													6.6	HF				
pH	PH			SU					5.7	J							6.6	HF				
Temperature	TEMP			deg c					21.6	J							23.6	HF				
Total Organic Carbon	TOC			mg/kg					35000								31000					
GEOPHYSICAL																						
Clay	CLAY			%													24.7					
Fines	FINES			%					91.8													
Gravel	GRAVEL			%					0								0.7					
Sand	308075-07-2			%					8.2								25.2					
Silt	E52456985			%													49.4					

EHS Support

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				Location ID	**T03C**		**T03C**		**T03C**		**T03C**		**T03D**		**T03D**		**T03D**		**T03D**		**T03E**	
				Sample ID	**T03C-0-6**		**T03C-0-12**		**T03C-6-12**		**T03C-12-24**		**T03D-0-6**		**T03D-0-12**		**T03D-6-12**		**T03D-12-24**		**T03E-0-6**	
				Sample Date	**07 Dec 2022**		**07 Dec 2022**		**07 Dec 2022**		**07 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**	
				Sample Depth	**0-6in bgs**		**0-12in bgs**		**6-12in bgs**		**12-24in bgs**		**0-6in bgs**		**0-12in bgs**		**6-12in bgs**		**12-24in bgs**		**0-6in bgs**	
				Sample Type (N: Normal; FD: Field Duplicate)	**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	11				16		23		**420**				46		42		**760**	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.14	J			0.051	J	0.055	J	**4.5**	**J**			**0.96**	**J**	**0.6**	**J**	**5.2**	**J**
Selenium	7782-49-2	**3.9**	36	mg/kg	0.7				0.43	J	0.19	J	2.3				1.9		1.5		2.7	
Zinc	7440-66-6	**109**	2200	mg/kg	72	J			61	J	70	J	**160**	**J**			**120**	**J**	**110**	**J**	**220**	**J**
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU			6.8	HF							6.9	HF						
pH	PH			SU			6.8	HF							6.9	HF						
Temperature	TEMP			deg c			23.5	HF							23.8	HF						
Total Organic Carbon	TOC			mg/kg			13000								19000							
GEOPHYSICAL																						
Clay	CLAY			%			28.1								12.1							
Fines	FINES			%																		
Gravel	GRAVEL			%			0.2								0.1							
Sand	308075-07-2			%			20								25.3							
Silt	E52456985			%			51.7								62.5							

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				Location ID	**T03E**		**T03E**		**T03E**		**T03F**		**T03F**		**T03F**		**T03F**		**T04A**		**T04A**	
				Sample ID	**T03E-0-12**		**T03E-6-12**		**T03E-12-24**		**T03F-0-6**		**T03F-0-12**		**T03F-6-12**		**T03F-12-24**		**T04A-0-6**		**T04A-0-12**	
				Sample Date	**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**06 Dec 2022**		**04 Oct 2023**		**04 Oct 2023**	
				Sample Depth	**0-12in bgs**		**6-12in bgs**		**12-24in bgs**		**0-6in bgs**		**0-12in bgs**		**6-12in bgs**		**12-24in bgs**		**0-6in**		**0-12in**	
				Sample Type (N: Normal; FD: Field Duplicate)	**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**		**N**	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg			**88**		17		20				7.4		18		17	J		
Mercury	7439-97-6	**0.18**	1.2	mg/kg			**1**	**J**	0.12	J	0.07	J			0.057	J	0.066	J	0.086	J		
Selenium	7782-49-2	**3.9**	36	mg/kg			1.8		1		0.59				0.4		0.39	J	0.56			
Zinc	7440-66-6	**109**	2200	mg/kg			**110**	**J**	**110**	**J**	79	J			63	J	68	J	85	J		
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU	6.4	HF							7.6	HF								
pH	PH			SU	6.4	HF							7.6	HF							8	J
Temperature	TEMP			deg c	23.5	HF							23.6	HF							21	J
Total Organic Carbon	TOC			mg/kg	16000								22000								16000	
GEOPHYSICAL																						
Clay	CLAY			%	18.9								25.6									
Fines	FINES			%																	93	
Gravel	GRAVEL			%	1.7								0								0	
Sand	308075-07-2			%	28.9								10.1								7	
Silt	E52456985			%	50.5								64.3									

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Location ID					T04A		T04A		T04B		T04B		T04B		T04B		T04C		T04C		T04C	
Sample ID					T04A-6-12		T04A-12-24		T04B-0-6		T04B-0-12		T04B-6-12		T04B-12-24		T04C-0-6		DUP-04		T04C-0-12	
Sample Date					04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		08 Dec 2022		08 Dec 2022		08 Dec 2022	
Sample Depth					6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in bgs		6-12in bgs		0-12in bgs	
Sample Type (N: Normal; FD: Field Duplicate)					N		N		N		N		N		N		N		FD		N	
Chemical	CAS No.	Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)	Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)	Unit	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	15		21		17				18		21		**150**		**61**			
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.052	J	0.048	J	0.14	J			0.074	J	0.054	J	**1.3**	**J**	**0.64**	**J**		
Selenium	7782-49-2	**3.9**	36	mg/kg	0.58		0.27	J	0.65				0.94		0.87		1.3		1.1			
Zinc	7440-66-6	**109**	2200	mg/kg	72		67		90				99		94		**120**	**J**	86	J		
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																	6.9	HF
pH	PH			SU							7.3	J									6.9	HF
Temperature	TEMP			deg c							21	J									23.7	HF
Total Organic Carbon	TOC			mg/kg							26000										19000	
GEOPHYSICAL																						
Clay	CLAY			%																	22	
Fines	FINES			%							88.9											
Gravel	GRAVEL			%							0										0.4	
Sand	308075-07-2			%							11.1										19.4	
Silt	E52456985			%																	58.2	

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				Location ID	T04C		T04C		T04D		T04D		T04D		T04D		T04F		T04F		T04F	
				Sample ID	T04C-6-12		T04C-12-24		T04D-0-6		T04D-0-12		T04D-6-12		T04D-12-24		T04F-0-6		DUP-02		T04F-0-12	
				Sample Date	08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022		08 Dec 2022	
				Sample Depth	6-12in bgs		12-24in bgs		0-6in bgs		0-12in bgs		6-12in bgs		12-24in bgs		0-6in bgs		0-12in bgs		0-12in bgs	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		FD		N	
Chemical	CAS No.	Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)	Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)	Unit	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	**60**		21		**95**				**650**		**130**		28					
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.51**	**J**	0.17	J	**0.82**	**J**			**4.3**	**J**	**1.4**	**J**	0.089	J				
Selenium	7782-49-2	**3.9**	36	mg/kg	0.99		0.97		0.68				0.91		0.64		0.25	J				
Zinc	7440-66-6	**109**	2200	mg/kg	85	J	74	J	**120**	**J**			**160**	**J**	**110**	**J**	84	J				
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU							7.7	HF									7.5	HF
pH	PH			SU							7.7	HF									7.5	HF
Temperature	TEMP			deg c							23.6	HF									23.6	HF
Total Organic Carbon	TOC			mg/kg							23000										8000	
GEOPHYSICAL																						
Clay	CLAY			%							15.1								7		7.3	
Fines	FINES			%																		
Gravel	GRAVEL			%							13.8								10.2		15.9	
Sand	308075-07-2			%							44.9								47.9		46.7	
Silt	E52456985			%							26.2								34.9		30.1	

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Location ID					T04F		T04F		T05A		T05A		T05A		T05A		T05B		T05B		T05B	
Sample ID					T04F-6-12		T04F-12-24		T05A-0-6		T05A-0-12		T05A-6-12		T05A-12-24		T05B-0-6		T05B-0-12		T05B-6-12	
Sample Date					08 Dec 2022		08 Dec 2022		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023	
Sample Depth					6-12in bgs		12-24in bgs		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in	
Sample Type (N: Normal; FD: Field Duplicate)					N		N		N		N		N		N		N		N		N	
Chemical	CAS No.	Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)	Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)	Unit	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	29		31		12				12		14		**130**				**84**	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.071	J	0.089	J	0.057	J			0.035	J	0.048	J	**1.1**				**0.72**	
Selenium	7782-49-2	**3.9**	36	mg/kg	0.19	J	0.18	J	0.33	J			0.3	J	0.33	J	0.99				0.94	
Zinc	7440-66-6	**109**	2200	mg/kg	80	J	79	J	57				60		56	J	**120**				100	
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							6.3	J							6.5	J		
Temperature	TEMP			deg c							21.3	J							21.6	J		
Total Organic Carbon	TOC			mg/kg							12000								24000			
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							85.6								89			
Gravel	GRAVEL			%							0								0			
Sand	308075-07-2			%							14.4								11			
Silt	E52456985			%																		

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				Location ID	T05B		T05C		T05C		T05C		T05C		T05C		T06A		T06A		T06A	
				Sample ID	T05B-12-24		DUP-05		T05C-0-6		T05C-0-12		T05C-6-12		T05C-12-24		T06A-0-6		DUP-06		T06A-0-12	
				Sample Date	01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		01 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023	
				Sample Depth	12-24in		0-6in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		0-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		FD		N		N		N		N		N		FD		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	19		**130**		**130**				48		12		11					
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.11	J	**0.75**		**0.73**	**J**			**0.33**		0.069	J	0.055	J				
Selenium	7782-49-2	**3.9**	36	mg/kg	0.72		1.4		1.4				1.3	J	0.86		0.42	J				
Zinc	7440-66-6	**109**	2200	mg/kg	77	J	**120**		**120**				97		85	J	61					
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							7	J							6	J	6.6	J
Temperature	TEMP			deg c							21.3	J							21.3	J	21.2	J
Total Organic Carbon	TOC			mg/kg							34000								14000		13000	
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							85.4										86.9	
Gravel	GRAVEL			%							0										0	
Sand	308075-07-2			%							14.6										13.1	
Silt	E52456985			%																		

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				Location ID	T06A		T06A		T06B		T06B		T06B		T06B		T06C		T06C		T06C	
				Sample ID	T06A-6-12		T06A-12-24		T06B-0-6		T06B-0-12		T06B-6-12		T06B-12-24		T06C-0-6		T06C-0-12		T06C-6-12	
				Sample Date	02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023		02 Oct 2023	
				Sample Depth	6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	11		17		10				12		25		**350**				**91**	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.061	J	0.04	J	0.074	J			0.039	J	0.046	J	**2.2**				**0.5**	
Selenium	7782-49-2	**3.9**	36	mg/kg	0.38	J	0.26	J	0.61				0.79		0.2	J	2.1				1.6	
Zinc	7440-66-6	**109**	2200	mg/kg	52	J	53	J	65				59	J	70	J	**170**				**120**	
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							5.8	J							6	J		
Temperature	TEMP			deg c							21.3	J							21.3	J		
Total Organic Carbon	TOC			mg/kg							14000								28000			
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							92.1								73.1			
Gravel	GRAVEL			%							0								0			
Sand	308075-07-2			%							7.9								26.9			
Silt	E52456985			%																		

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				Location ID	T06C		T06C		T07.5A		T07.5A		T07.5A		T07.5A		T07.5B		T07.5B		T07.5B	
				Sample ID	DUP-07		T06C-12-24		T07.5A-0-6		T07.5A-0-12		T07.5A-6-12		T07.5A-12-24		T07.5B-0-6		T07.5B-0-12		T07.5B-6-12	
				Sample Date	02 Oct 2023		02 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023	
				Sample Depth	12-24in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	FD		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	29		28		19				17		14		**110**				33	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.16		0.16		0.096				0.077		0.046	J	**0.52**				**0.23**	
Selenium	7782-49-2	**3.9**	36	mg/kg	1.4		1.3		0.5				0.38		0.31	J	1.9				1.9	
Zinc	7440-66-6	**109**	2200	mg/kg	**110**	**J**	**110**	**J**	74				62		58	J	**130**				99	
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							6.4	J							6.9	J		
Temperature	TEMP			deg c							21.4	J							21.4	J		
Total Organic Carbon	TOC			mg/kg							19000	J							25000			
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							88.5								84.8			
Gravel	GRAVEL			%							0								0			
Sand	308075-07-2			%							11.5								15.2			
Silt	E52456985			%																		

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				Location ID	T07.5B		T07.5C		T07.5C		T07.5C		T07.5C		T07.5D		T07.5D		T07.5D		T07.5D	
				Sample ID	T07.5B-12-24		T07.5C-0-6		T07.5C-0-12		T07.5C-6-12		T07.5C-12-24		T07.5D-0-6		T07.5D-0-12		T07.5D-6-12		T07.5D-12-24	
				Sample Date	03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023	
				Sample Depth	12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in		12-24in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	10		**1200**				**260**		19		**580**				**1400**		28	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.11		**6.9**				**1.3**		0.092		**2.5**				**4.7**		0.13	
Selenium	7782-49-2	**3.9**	36	mg/kg	1.1		1.7				2.2		0.99		2.2				1.3		0.25	J
Zinc	7440-66-6	**109**	2200	mg/kg	91	J	**220**				**170**		78	J	**220**				**190**	**J**	86	J
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU					6.3	J							7	J				
Temperature	TEMP			deg c					21.4	J							21.2	J				
Total Organic Carbon	TOC			mg/kg					32000								32000					
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%					85.1								85.5					
Gravel	GRAVEL			%					0								0					
Sand	308075-07-2			%					14.9								14.5					
Silt	E52456985			%																		

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Location ID					T07A		T07A		T07A		T07A		T07B		T07B		T07B		T07B		T07C	
Sample ID					T07A-0-6		T07A-0-12		T07A-6-12		T07A-12-24		T07B-0-6		T07B-0-12		T07B-6-12		T07B-12-24		T07C-0-6	
Sample Date					03 Oct 2023		03 Oct 2023		03 Oct 2023		03 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023	
Sample Depth					0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in	
Sample Type (N: Normal; FD: Field Duplicate)					N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	**170**				32		32		24	J			18		15		16	J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.6**				0.16		0.09		0.081	J			0.13		0.07	J	0.093	J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.67				0.24	J	0.87		0.85	J			0.79		0.87		0.84	
Zinc	7440-66-6	**109**	2200	mg/kg	100				76	J	98	J	**110**	**J**			87	J	84	J	80	J
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU			8.1	J							6.7	J						
Temperature	TEMP			deg c			21.2	J							21.6	J						
Total Organic Carbon	TOC			mg/kg			14000								26000							
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%			83.9								91.6							
Gravel	GRAVEL			%			0								0							
Sand	308075-07-2			%			16.1								8.4							
Silt	E52456985			%																		

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Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
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				Location ID	T07C		T07C		T07C		T08A		T08A		T08A		T08A		T08B		T08B	
				Sample ID	T07C-0-12		T07C-6-12		T07C-12-24		T08A-0-6		T08A-0-12		T08A-6-12		T08A-12-24		T08B-0-6		T08B-0-12	
				Sample Date	09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023	
				Sample Depth	0-12in		6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg			14		11		11	J			8.5		14		15			
Mercury	7439-97-6	**0.18**	1.2	mg/kg			0.057	J	0.032	J	0.062	J			0.086		0.06	J	0.06	J		
Selenium	7782-49-2	**3.9**	36	mg/kg			0.7		0.55		0.52	J			0.7		0.19	J	0.38	J		
Zinc	7440-66-6	**109**	2200	mg/kg			72	J	56	J	63	J			63	J	60	J	57	J		
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU	7	J							6.8	J							6.2	J
Temperature	TEMP			deg c	21.8	J							21.5	J							21.7	J
Total Organic Carbon	TOC			mg/kg	25000								19000								12000	
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%	88.5								88.2								90.2	
Gravel	GRAVEL			%	1								0								0	
Sand	308075-07-2			%	10.5								11.8								9.8	
Silt	E52456985			%																		

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Plantasie Creek Floodplain Soil Data
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Location ID					T08B		T08B		T08C		T08C		T08C		T08C		T08D		T08D		T08D	
Sample ID					T08B-6-12		T08B-12-24		T08C-0-6		T08C-0-12		T08C-6-12		T08C-12-24		T08D-0-6		DUP-09		T08D-0-12	
Sample Date					09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023	
Sample Depth					6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		0-12in		0-12in	
Sample Type (N: Normal; FD: Field Duplicate)					N		N		N		N		N		N		N		FD		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	14		17		16	J			17		16		**250**	**J**				
Mercury	7439-97-6	**0.18**	1.2	mg/kg	<0.072	U	<0.068	U	0.052	J			0.045	J	0.027	J	**1.2**	**J**				
Selenium	7782-49-2	**3.9**	36	mg/kg	0.3	J	0.19	J	0.4	J			0.3	J	0.21	J	1.1					
Zinc	7440-66-6	**109**	2200	mg/kg	50	J	47	J	60	J			58	J	52	J	**120**	**J**				
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							6.2	J							6.9	J	7.3	J
Temperature	TEMP			deg c							21.6	J							21.8	J	21.8	J
Total Organic Carbon	TOC			mg/kg							13000								22000		22000	
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							89.3										87.6	
Gravel	GRAVEL			%							0										0	
Sand	308075-07-2			%							10.7										12.4	
Silt	E52456985			%																		

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Plantasie Creek Floodplain Soil Data
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Port Ewen, NY

				Location ID	T08D		T08D		T08E		T08E		T08E		T08E		T08F		T08F		T08F	
				Sample ID	T08D-6-12		T08D-12-24		T08E-0-6		T08E-0-12		T08E-6-12		T08E-12-24		T08F-0-6		DUP-12		T08F-0-12	
				Sample Date	04 Oct 2023		04 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023		09 Oct 2023	
				Sample Depth	6-12in		12-24in		0-6in		0-12in		6-12in		12-24in		0-6in		6-12in		0-12in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		N		N		N		N		FD		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	40		13		27	J			**51**		14		16	J	11			
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.22**		0.044	J	**0.2**	**J**			**0.27**		0.094		0.081	J	0.05	J		
Selenium	7782-49-2	**3.9**	36	mg/kg	0.52		0.27	J	1	J			1.1		1.6		0.57		0.66			
Zinc	7440-66-6	**109**	2200	mg/kg	86	J	72	J	**160**	**J**			94	J	88	J	90	J	56	J		
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU							6.5	J									6	J
Temperature	TEMP			deg c							21.6	J									21.5	J
Total Organic Carbon	TOC			mg/kg							43000	J									21000	
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%							91.5										89.4	
Gravel	GRAVEL			%							0										0.3	
Sand	308075-07-2			%							8.5										10.3	
Silt	E52456985			%																		

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Plantasie Creek Floodplain Soil Data
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				Location ID	T08F		T08F		T09B		T09B		T09B		T09B		T09B		T09B		T09C	
				Sample ID	T08F-6-12		T08F-12-24		T09B-0-6		DUP-01		DUP-03		T09B-0-12		T09B-6-12		T09B-12-24		T09C-0-6	
				Sample Date	09 Oct 2023		09 Oct 2023		07 Dec 2022		07 Dec 2022		07 Dec 2022		07 Dec 2022		07 Dec 2022		07 Dec 2022		04 Oct 2023	
				Sample Depth	6-12in		12-24in		0-6in bgs		0-12in bgs		6-12in bgs		0-12in bgs		6-12in bgs		12-24in bgs		0-6in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		FD		FD		N		N		N		N	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																						
Copper	7440-50-8	**50**	270	mg/kg	13		20		43				**52**				40		41		26	J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.049	J	0.043	J	**0.2**	**J**			0.13	J			0.13		**0.3**	**J**	0.16	J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.69		0.7		0.44				0.19	J			0.16	J	0.19	J	0.18	J
Zinc	7440-66-6	**109**	2200	mg/kg	71	J	74	J	**110**	**J**			**160**	**J**			**150**	**J**	**220**	**J**	58	J
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU							7.5	HF			7.5	HF						
pH	PH			SU							7.5	HF			7.5	HF						
Temperature	TEMP			deg c							23.3	HF			23.7	HF						
Total Organic Carbon	TOC			mg/kg							10000				8800							
GEOPHYSICAL																						
Clay	CLAY			%											9.4							
Fines	FINES			%																		
Gravel	GRAVEL			%											5							
Sand	308075-07-2			%											60							
Silt	E52456985			%											25.6							

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				Location ID	T09C		T09C		T09C		T10A		T10A		T10A		T10A		T10A		T10B	
				Sample ID	T09C-0-12		T09C-6-12		T09C-12-24		DUP-08		T10A-0-6		T10A-0-12		T10A-6-12		T10A-12-24		T10B-0-6	
				Sample Date	04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023	
				Sample Depth	0-12in		6-12in		12-24in		0-6in		0-6in		0-12in		6-12in		12-24in		0-6in	
				Sample Type (N: Normal; FD: Field Duplicate)	N		N		N		FD		N		N		N		N		N	
Chemical	CAS No.	Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)	Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)	Unit	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
METALS																						
Copper	7440-50-8	**50**	270	mg/kg			23	J	**63**	**J**	43	J	44	J			**290**	**J**	**1200**	**J**	**95**	**J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg			0.06	J	**0.19**	**J**	0.1	J	0.12	J			**1.1**	**J**	**3.7**	**J**	**0.24**	**J**
Selenium	7782-49-2	**3.9**	36	mg/kg			0.17	J	0.28	J	0.27	J	0.3	J			0.76		1.1		0.29	J
Zinc	7440-66-6	**109**	2200	mg/kg			71	J	**360**	**J**	**130**	**J**	**140**	**J**			**230**	**J**	**210**	**J**	95	J
GENERAL CHEMISTRY																						
Corrosivity	CORROS			SU																		
pH	PH			SU	7.1	J									7.7	J						
Temperature	TEMP			deg c	21.8	J									21.4	J						
Total Organic Carbon	TOC			mg/kg	7400										87000	J						
GEOPHYSICAL																						
Clay	CLAY			%																		
Fines	FINES			%	37.4										39.1							
Gravel	GRAVEL			%	3.3										17							
Sand	308075-07-2			%	59.3										43.9							
Silt	E52456985			%																		

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Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T10B		T10B		T10B		T10C		T10C		T10C		T10C	
				Sample ID	**T10B-0-12**		**T10B-6-12**		**T10B-12-24**		**T10C-0-6**		**T10C-0-12**		**T10C-6-12**		**T10C-12-24**	
				Sample Date	**04 Oct 2023**		**04 Oct 2023**		**04 Oct 2023**		**04 Oct 2023**		**04 Oct 2023**		**04 Oct 2023**		**04 Oct 2023**	
				Sample Depth	**0-12in**		**6-12in**		**12-24in**		**0-6in**		**0-12in**		**6-12in**		**12-24in**	
				Sample Type (N: Normal; FD: Field Duplicate)	**N**		**N**		**N**		**N**		**N**		**N**		**N**	
Chemical	**CAS No.**	**Site-Specific Final Unrestricted Use Soil Cleanup Objective (SCO)**	**Site-Specific Residential/Restricted-Residential Use Soil Cleanup Objective (SCO)**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
METALS																		
Copper	7440-50-8	**50**	270	mg/kg			**140**	**J**	**1100**	**J**	**240**	**J**			**190**	**J**	32	J
Mercury	7439-97-6	**0.18**	1.2	mg/kg			**0.37**	**J**	**1.9**	**J**	**0.73**	**J**			**0.45**	**J**	0.068	J
Selenium	7782-49-2	**3.9**	36	mg/kg			0.25	J	0.8		1				0.39		0.1	J
Zinc	7440-66-6	**109**	2200	mg/kg			91	J	**380**	**J**	**140**	**J**			63	J	32	J
GENERAL CHEMISTRY																		
Corrosivity	CORROS			SU														
pH	PH			SU	8	J							7.2	J				
Temperature	TEMP			deg c	21.6	J							21.8	J				
Total Organic Carbon	TOC			mg/kg	14000								30000					
GEOPHYSICAL																		
Clay	CLAY			%														
Fines	FINES			%	39.2								45.4					
Gravel	GRAVEL			%	4.5								0					
Sand	308075-07-2			%	56.3								54.6					
Silt	E52456985			%														

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Plantasie Creek Floodplain Soil Data
Plantasie Creek Interim Floodplain Investigation Report
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Notes:

Bolded and underlined values indicate exceedances of the Final Unrestricted Use SCO criteria
Highlighted values indicate exceedances of the Residential/Restricted-Use Residential SCO criteria
Gray values indicate a non-detect result
% = percent
bgs = below ground surface
CAS = Chemical Abstracts Service
deg C = Degrees celsius
HF = Field parameter with a holding time of 15 minutes
in = inches
J = Result is less than the reporting limit but greater than or equal to the method detection limit and concentration is an approximate value
MS/MSD = matrix spike/matrix spike duplicate
mg/kg = milligram per kilogram
SCO = Soil Cleanup Objective
SU = standard unit
U = Analyte not detected above the method detection limit

Appendix B Laboratory Analytical Reports

Available upon request

Appendix C Data Validation Reports

EHS Support Validation Report Number: 516

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG):

480-204672-1

Analyses:

Metals

Review Level:

DUSR

Analyses performed by:

Eurofins Lancaster Laboratories Environmental
Lancaster, Pennsylvania

EHS Support

Report Date:

March 12, 2023

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List of Appendices

Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York and were analyzed by United States Environmental Protection Agency (USEPA) SW-846 Methods 6020B for metals and 7470A/7471B for mercury. Additional analyses were performed that were not included in the validation; only metals and mercury data were validated. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1: Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Metals Analysis
480-204672-1	480-204672-3	T03B-0-6	Soil	12/7/2022	X
480-204672-1	480-204672-4	T03B-6-12	Soil	12/7/2022	X
480-204672-1	480-204672-5	T03B-12-24	Soil	12/7/2022	X
480-204672-1	480-204672-7	T03C-0-6	Soil	12/7/2022	X
480-204672-1	480-204672-8	T03C-6-12	Soil	12/7/2022	X
480-204672-1	480-204672-9	T03C-12-24	Soil	12/7/2022	X
480-204672-1	480-204672-11	T04C-0-6	Soil	12/8/2022	X
480-204672-1	480-204672-12	T04C-6-12	Soil	12/8/2022	X
480-204672-1	480-204672-13	T04C-12-24	Soil	12/8/2022	X
480-204672-1	480-204672-15	DUP-04	Soil	12/8/2022	X
480-204672-1	480-204672-22	T03E-6-12	Soil	12/6/2022	X
480-204672-1	480-204672-23	T03D-0-6	Soil	12/6/2022	X
480-204672-1	480-204672-24	T03F-0-6	Soil	12/6/2022	X
480-204672-1	480-204672-25	T04D-6-12	Soil	12/8/2022	X
480-204672-1	480-204672-26	T04D-0-6	Soil	12/8/2022	X
480-204672-1	480-204672-27	T03E-12-24	Soil	12/6/2022	X
480-204672-1	480-204672-28	T04D-12-24	Soil	12/8/2022	X
480-204672-1	480-204672-29	T09B-0-6	Soil	12/7/2022	X
480-204672-1	480-204672-30	T09B-12-24	Soil	12/7/2022	X
480-204672-1	480-204672-31	T03E-0-6	Soil	12/6/2022	X
480-204672-1	480-204672-32	T03F-12-24	Soil	12/6/2022	X
480-204672-1	480-204672-33	T03D-6-12	Soil	12/6/2022	X
480-204672-1	480-204672-34	T03F-6-12	Soil	12/6/2022	X
480-204672-1	480-204672-35	T03D-12-24	Soil	12/6/2022	X
480-204672-1	480-204672-36	DUP-03	Soil	12/7/2022	X

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Metals Analysis
480-204672-1	480-204672-38	T04F-0-6	Soil	12/8/2022	X
480-204672-1	480-204672-39	T04F-6-12	Soil	12/8/2022	X
480-204672-1	480-204672-40	T04F-12-24	Soil	12/8/2022	X
480-204672-1	480-204672-42	T09B-6-12	Soil	12/7/2022	X
480-204672-1	480-204672-43	EQB-SO-20221206	Water	12/6/2022	X
480-204672-1	480-204672-44	EQB-SO-20221207	Water	12/7/2022	X
480-204672-1	480-204672-45	EQB-SO-20221208	Water	12/8/2022	X

SDG = Sample delivery group

1 Data Review Summary

1.1 Guidelines and Qualifiers

Data were reviewed in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Inorganic [USEPA, 2017]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (Table 1-1):

Table 1-1 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

QC = Quality control

1.2 Sample Custody and Receipt

Samples were received in good condition and properly preserved. The chain of custody was properly completed; the gaps between the relinquishing date/time and the receiving date/time are assumed to correspond to the time samples were in the custody of the commercial shipper.

1.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

2 Metals Analysis

2.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in Table 2-1:

Table 2-1 Preservation and Holding Time Requirements - Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by 6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7470A	Water	HNO_3 to pH less than 2	28 days
Mercury by 7471B	Soil	Less than or equal to 6 °C	28 days

°C = Degrees Celsius
HNO_3 = Nitric acid

2.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated. The National Functional Guidelines (USEPA, 2017) require that both of the following are true:

- Mass calibration is within 0.1 atomic mass unit.
- The relative standard deviation among raw results of absolute signals of each analyte must be less than 5 percent.

Acceptance criteria were met.

2.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract required detection limit check standards were analyzed; recoveries were acceptable.

2.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. In short, blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). The following are common types of blanks:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

No qualification of sample results was required based on detections in associated blanks. Copper was detected in two equipment blanks and in one calibration blank. However, the results in associated field samples were significantly greater than the blank result. Therefore, no qualification was needed.

2.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

2.6 Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

A laboratory control sample duplicate is, as the name implies, a separate QC sample that is created just as the laboratory control sample is created. It undergoes the same preparation and analytical procedure. Recoveries of analytes from the laboratory control sample and from the laboratory control sample duplicate are evaluated to access accuracy and bias. The relative percent difference between laboratory control sample and laboratory control sample duplicate results is evaluated to assess precision.

Acceptance criteria were met. Laboratory control sample and laboratory control sample duplicate recoveries, as well as the relative percent difference between laboratory control sample and laboratory control sample duplicate results, were within control limits.

2.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in Table 2-2. Note that matrix spike analyses cannot be evaluated if the unspiked sample concentration of the relevant analyte is greater than or equal to 4x the spike amount.

Table 2-2 Observed Matrix Spike Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
480-204672-12	Zinc	Acceptable	130%	Acceptable
	Mercury	159%	146%	Acceptable
480-204672-42	Zinc	54%	54%	Acceptable

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike results, qualifiers were applied, in accordance with Table 2-3, to:

- All zinc soil results in this data set
- All mercury soil results in this data set except for sample 480-204672-42. This sample was associated with a matrix spike/matrix spike duplicate analysis that exhibited acceptable recoveries and relative percent difference for mercury.

Table 2-3 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

QC Nonconformance	Sample Result	Qualification [a]
%R:	Non-detect	UJ

QC Nonconformance	Sample Result	Qualification [a]
30-74% for most metals including mercury 20-74% for silver, antimony	Detect	J
%R: less than 30% for most metals including mercury less than 20% for silver, antimony	Non-detect	UJ if PDS %R is greater than or equal to 75%
		R if PDS not performed or PDS %R is less than 75%
	Detect	J
%R: greater than 125% for most metals including mercury greater than 150% for silver, antimony	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference: Greater than 20% (aqueous) Greater than 35% (soil/ sediment)	Non-detect	UJ
	Detect	J

[a] See Section 1 for qualifier definitions.
%R = percent recovery
PDS = Post-digestion spike

2.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis that normal field samples do. The analytical results of the two laboratory duplicates are compared to assess precision.

Results associated with laboratory duplicate results outside acceptance limits are shown in Table 2-4.

Table 2-4 Observed Laboratory Duplicate Nonconformances – Metals

Sample	Analyte	Relative Percent Difference
480-204672-33	Mercury	57%

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant laboratory duplicate results, qualifiers were applied to the mercury results for all soil samples in this data set, except for samples 480-204672-12 and 480-204672-42. These samples were associated with a laboratory duplicate analyses that exhibited acceptable results for mercury.

Table 2-5 Laboratory Duplicate Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification [a]
Sample and its duplicate is greater than or equal to 5x the reporting limit and	Detect	J

Quality Control Nonconformance	**Sample Result**	**Qualification** [a]
Relative percent difference is less than or equal to 20% (aqueous) or Relative percent difference is less than or equal to 35% (soil/sediment)		
Sample and/or its duplicate is less than 5x the reporting limit and Absolute difference is less than or equal to 1x the reporting limit (aqueous) or Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)	Non-detect	UJ
	Detect	J

[a] See **Section 1** for qualifier definitions.

2.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a 5-fold dilution, then the calculated results are compared. Serial dilution analysis is evaluated for analytes that were detected in the original sample at concentrations at least 50x the instrument detection limit; the concentration in the undiluted sample must be greater than or equal to 50x the instrument detection limit to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution analysis was performed on samples 480-204672-12 and 480-204672-42.

2.10 Inductively Coupled Plasma-Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met; internal standards associated with reported results exhibited relative intensity values within control limits.

2.11 Field Duplicates

Acceptance criteria (Table 2-6) were met. One parent sample – field duplicate sample pair was included in this SDG.

Table 2-6 Acceptable Parent Sample – Field Duplicate Relationships – Metals

Parent Sample – Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	Relative percent difference is less than or equal to 30% (aqueous) or Relative percent difference is less than or equal to 50% (soil/ sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	Absolute difference is less than or equal to 2x the reporting limit (aqueous) or Absolute difference is less than or equal to 3x the reporting limit (soil/ sediment)

2.12 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. Samples with less than 50 percent solids are listed in Table 2-7:

Table 2-7 Observed Percent Solids Nonconformances - Metals

Sample ID	Percent Solids
480-204672-3	44.1%

Because of this QC exceedance, metals (including mercury) results for this sample have been qualified as estimated in accordance with Table 2-8:

Table 2-8 Percent Solids Nonconformance Actions – Metals

Percent Solids	Sample Result	Sample Result Qualification [a]
Less than 50% but greater than or equal to 10%.	Non-detect	UJ
	Detect	J
Less than 10%.	Non-detect	R
	Detect	J

[a] See **Section 1** for qualifier definitions.

Validation performed by: Amy Coats
EHS Support LLC

3 Reference

USEPA. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T04C-0-6	12/8/2022	Soil	T	6020B	Zinc	mg/kg	120	J	44		480-204672-11	480-204672-1
T04C-0-6	12/8/2022	Soil	T	7471B	Mercury	mg/kg	1.3	J	0.19		480-204672-11	480-204672-1
T04C-6-12	12/8/2022	Soil	T	6020B	Zinc	mg/kg	85	J	31	F1	480-204672-12	480-204672-1
T04C-6-12	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.51	J	0.082	F1	480-204672-12	480-204672-1
T04C-12-24	12/8/2022	Soil	T	6020B	Zinc	mg/kg	74	J	29		480-204672-13	480-204672-1
T04C-12-24	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.17	J	0.072		480-204672-13	480-204672-1
DUP-04	12/8/2022	Soil	T	6020B	Zinc	mg/kg	86	J	36		480-204672-15	480-204672-1
DUP-04	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.64	J	0.088		480-204672-15	480-204672-1
T03E-6-12	12/6/2022	Soil	T	6020B	Zinc	mg/kg	110	J	34		480-204672-22	480-204672-1
T03E-6-12	12/6/2022	Soil	T	7471B	Mercury	mg/kg	1	J	0.083		480-204672-22	480-204672-1
T03D-0-6	12/6/2022	Soil	T	6020B	Zinc	mg/kg	160	J	32		480-204672-23	480-204672-1
T03D-0-6	12/6/2022	Soil	T	7471B	Mercury	mg/kg	4.5	J	0.90		480-204672-23	480-204672-1
T03F-0-6	12/6/2022	Soil	T	6020B	Zinc	mg/kg	79	J	39		480-204672-24	480-204672-1
T04D-6-12	12/8/2022	Soil	T	6020B	Zinc	mg/kg	160	J	30		480-204672-25	480-204672-1
T04D-6-12	12/8/2022	Soil	T	7471B	Mercury	mg/kg	4.3	J	0.76		480-204672-25	480-204672-1
T04D-0-6	12/8/2022	Soil	T	6020B	Zinc	mg/kg	120	J	33		480-204672-26	480-204672-1
T04D-0-6	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.82	J	0.083		480-204672-26	480-204672-1
T03E-12-24	12/6/2022	Soil	T	6020B	Zinc	mg/kg	110	J	35		480-204672-27	480-204672-1
T03E-12-24	12/6/2022	Soil	T	7471B	Mercury	mg/kg	0.12	J	0.079		480-204672-27	480-204672-1
T04D-12-24	12/8/2022	Soil	T	6020B	Zinc	mg/kg	110	J	30		480-204672-28	480-204672-1
T04D-12-24	12/8/2022	Soil	T	7471B	Mercury	mg/kg	1.4	J	0.16		480-204672-28	480-204672-1
T09B-0-6	12/7/2022	Soil	T	6020B	Zinc	mg/kg	110	J	30		480-204672-29	480-204672-1
T09B-0-6	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.2	J	0.077		480-204672-29	480-204672-1
T03B-0-6	12/7/2022	Soil	T	6020B	Copper	mg/kg	20	J	0.63		480-204672-3	480-204672-1
T03B-0-6	12/7/2022	Soil	T	6020B	Selenium	mg/kg	1.8	J	0.63		480-204672-3	480-204672-1
T03B-0-6	12/7/2022	Soil	T	6020B	Zinc	mg/kg	190	J	48		480-204672-3	480-204672-1
T03B-0-6	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.23	J	0.13		480-204672-3	480-204672-1
T09B-12-24	12/7/2022	Soil	T	6020B	Zinc	mg/kg	220	J	130		480-204672-30	480-204672-1
T09B-12-24	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.3	J	0.077		480-204672-30	480-204672-1
T03E-0-6	12/6/2022	Soil	T	6020B	Zinc	mg/kg	220	J	44		480-204672-31	480-204672-1
T03E-0-6	12/6/2022	Soil	T	7471B	Mercury	mg/kg	5.2	J	1.0		480-204672-31	480-204672-1
T03F-12-24	12/6/2022	Soil	T	6020B	Zinc	mg/kg	68	J	32		480-204672-32	480-204672-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T03D-6-12	12/6/2022	Soil	T	6020B	Zinc	mg/kg	120	J	32		480-204672-33	480-204672-1
T03D-6-12	12/6/2022	Soil	T	7471B	Mercury	mg/kg	0.96	J	0.15	F2	480-204672-33	480-204672-1
T03F-6-12	12/6/2022	Soil	T	6020B	Zinc	mg/kg	63	J	27		480-204672-34	480-204672-1
T03D-12-24	12/6/2022	Soil	T	6020B	Zinc	mg/kg	110	J	28		480-204672-35	480-204672-1
T03D-12-24	12/6/2022	Soil	T	7471B	Mercury	mg/kg	0.6	J	0.072		480-204672-35	480-204672-1
DUP-03	12/7/2022	Soil	T	6020B	Zinc	mg/kg	160	J	140		480-204672-36	480-204672-1
DUP-03	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.13	J	0.077		480-204672-36	480-204672-1
T04F-0-6	12/8/2022	Soil	T	6020B	Zinc	mg/kg	84	J	34		480-204672-38	480-204672-1
T04F-0-6	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.089	J	0.073		480-204672-38	480-204672-1
T04F-6-12	12/8/2022	Soil	T	6020B	Zinc	mg/kg	80	J	26		480-204672-39	480-204672-1
T04F-6-12	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.071	J	0.068		480-204672-39	480-204672-1
T03B-6-12	12/7/2022	Soil	T	6020B	Zinc	mg/kg	180	J	36		480-204672-4	480-204672-1
T03B-6-12	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.12	J	0.089		480-204672-4	480-204672-1
T04F-12-24	12/8/2022	Soil	T	6020B	Zinc	mg/kg	79	J	26		480-204672-40	480-204672-1
T04F-12-24	12/8/2022	Soil	T	7471B	Mercury	mg/kg	0.089	J	0.066		480-204672-40	480-204672-1
T09B-6-12	12/7/2022	Soil	T	6020B	Zinc	mg/kg	150	J	26	F1	480-204672-42	480-204672-1
T03B-12-24	12/7/2022	Soil	T	6020B	Zinc	mg/kg	320	J	180		480-204672-5	480-204672-1
T03B-12-24	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.11	J	0.079		480-204672-5	480-204672-1
T03C-0-6	12/7/2022	Soil	T	6020B	Zinc	mg/kg	72	J	35		480-204672-7	480-204672-1
T03C-0-6	12/7/2022	Soil	T	7471B	Mercury	mg/kg	0.14	J	0.087		480-204672-7	480-204672-1
T03C-6-12	12/7/2022	Soil	T	6020B	Zinc	mg/kg	61	J	33		480-204672-8	480-204672-1
T03C-12-24	12/7/2022	Soil	T	6020B	Zinc	mg/kg	70	J	33		480-204672-9	480-204672-1

Notes:
F1 = MS and/or MSD recovery exceeds control limits.
F2 = MS/MSD RPD exceeds control limits
mg/kg = milligrams per kilogram
N = Not applicable
SDG = sample delivery group
T = Total

EHS Support Validation Report Number: 632

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163380-1
Analyses: Metals, General Chemistry
Review Level: DUSR

Analyses performed by: Eurofins Lancaster Laboratories Environmental and Eurofins Lancaster, Pennsylvania and Pittsburgh, Pennsylvania

Report Date:
November 30, 2023

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1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
  - 6020B for metals
  - 7471B for mercury
  - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data is reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG) and data validation report are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163380-1	180-163380-1	T06B-12-24	Soil	10/2/2023	X	
180-163380-1	180-163380-2	T05C-12-24	Soil	10/1/2023	X	
180-163380-1	180-163380-3	T06A-0-12	Soil	10/2/2023		X
180-163380-1	180-163380-4	T05A-12-24	Soil	10/1/2023	X	
180-163380-1	180-163380-5	T06B-6-12	Soil	10/2/2023	X	
180-163380-1	180-163380-6	T06B-0-12	Soil	10/2/2023		X
180-163380-1	180-163380-7	T06A-6-12	Soil	10/2/2023	X	
180-163380-1	180-163380-8	T06C-12-24	Soil	10/2/2023	X	
180-163380-1	180-163380-9	T07.5B-12-24	Soil	10/3/2023	X	
180-163380-1	180-163380-10	T07.5A-12-24	Soil	10/3/2023	X	
180-163380-1	180-163380-11	T07.5C-12-24	Soil	10/3/2023	X	
180-163380-1	180-163380-12	T06A-12-24	Soil	10/2/2023	X	
180-163380-1	180-163380-13	T05B-12-24	Soil	10/1/2023	X	
180-163380-1	180-163380-14	DUP-07	Soil	10/2/2023	X	
180-163380-1	180-163380-15	T07.5D-6-12	Soil	10/3/2023	X	
180-163380-1	180-163380-16	T07.5D-12-24	Soil	10/3/2023	X	
180-163380-1	180-163380-17	T07.5D-0-12	Soil	10/3/2023		X
180-163380-1	180-163380-18	T07A-6-12	Soil	10/3/2023	X	
180-163380-1	180-163380-19	T07A-12-24	Soil	10/3/2023	X	
180-163380-1	180-163380-20	T07A-0-12	Soil	10/3/2023		X

SDG = Sample delivery group

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[1] ASTM International, formerly known as American Society for Testing and Materials.

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Inorganic [USEPA, 2017]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

QC = Quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to the time samples were in the custody of the commercial shipper (FedEx). No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements - Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by 6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7470A	Water	HNO_3 to pH less than 2	28 days
Mercury by 7471B	Soil	Less than or equal to 6 °C	28 days

°C = Degrees Celsius
HNO_3 = Nitric acid

Analyses performed outside of the specified holding times are listed in **Table 4**. Other holding time criteria were met.

Table 4 Observed Preservation and/or Holding Time Nonconformances – Metals

Samples	Analysis	Holding Time	Observed Holding Time
180-163380-2 180-163380-4 180-163380-13	Mercury	28 days	29 days

The samples listed in **Table 4** have been qualified as shown in **Table 5**.

Table 5 Preservation and Holding Time Nonconformance Actions – Metals

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated. The National Functional Guidelines (USEPA, 2017) require that both of the following are true:

- Mass calibration is within 0.1 atomic mass unit.
- The relative standard deviation among raw results of absolute signals of each analyte must be less than 5 percent.

Acceptance criteria were met.

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract required detection limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. In short, blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). The following are common types of blanks:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Laboratory method blank results were non-detect. Equipment blanks associated with the samples in this data set were reported in a separate SDG; their results were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within control limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 6**. Note that matrix spike analyses cannot be evaluated if the unspiked sample concentration of the relevant analyte is greater than or equal to 4x the spike amount.

Table 6 Observed Matrix Spike Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163380-1	Zinc	Acceptable	131%	Acceptable

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike result, qualifiers were applied, in accordance with **Table 7**, to all zinc soil results in this data set.

Table 7 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

QC Nonconformance	Sample Result	Qualification [a]
%R: • 30-74% for most metals including mercury • 20-74% for silver, antimony	Non-detect	UJ
	Detect	J
%R: • less than 30% for most metals including mercury • less than 20% for silver, antimony	Non-detect	UJ if PDS %R is greater than or equal to 75%
		R if PDS not performed or PDS %R is less than 75%
	Detect	J
%R: • greater than 125% for most metals including mercury • greater than 150% for silver, antimony	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference: • Greater than 20% (aqueous) • Greater than 35% (soil/ sediment)	Non-detect	UJ
	Detect	J

[a] See **Section 2** for qualifier definitions.
%R = percent recovery
PDS = Post-digestion spike

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis that normal field samples do. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (Table 8) were met. Laboratory duplicate analysis was performed on sample 180-163380-1. The relationship between selenium results in the parent and laboratory duplicate samples did not meet laboratory control limits. It did meet the criteria applied during validation and is therefore considered acceptable.

Table 8 Acceptable Parent Sample - Laboratory Duplicate Relationships – Metals

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and its lab duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 20% (aqueous) **or** ○ Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or its lab duplicate concentrations(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a 5-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100x the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution analysis was performed on sample 180-163380-1.

3.10 Inductively Coupled Plasma-Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met; internal standards associated with reported results exhibited relative intensity values within control limits.

3.11 Field Duplicates

Acceptance criteria (**Table 9**) were met. One parent sample – field duplicate sample pair was included in this SDG.

Table 9 Acceptable Parent Sample – Field Duplicate Relationships – Metals

Parent Sample – Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 30% (aqueous) **or** ○ Relative percent difference is less than or equal to 50% (soil/ sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 2x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 3x the reporting limit (soil/ sediment)

3.12 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

Notes in the narrative state that sample 180-163380-15 (T07.5D-6-12) “required dilution prior to analysis” for copper and mercury.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table** 10**.**

Table 10 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by 9045	Soil/ Sediment	Less than or equal to 6 °C	7 days
Temperature by 9045	Soil/ Sediment	None	15 minutes
Total organic carbon by Lloyd Kahn	Soil/ Sediment	Less than or equal to 6 °C	14 days

°C = Degrees Celsius

Analyses performed outside of the specified holding times are listed in **Table 11**. All other holding time criteria were met.

Table 11 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163380-3 180-163380-6 180-163380-17 180-163380-20	pH by 9045	7 days	24 – 25 days
	Temperature by 9045	15 minutes	

The samples listed in **Table 11** have been qualified as shown in **Table 12**.

Table 12 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met. The continuing calibration verification results were within limits. The calibration curve exhibited an acceptable correlation coefficient.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met; no detections were reported in Lloyd Kahn laboratory method blanks. Equipment blanks associated with the samples in this data set were reported in a separate SDG; their results were non-detect.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

Not applicable. No matrix spike analysis was reported in this data set.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 13**) were met. Laboratory duplicate analysis was performed on sample 180-163380-6 for pH and temperature.

Table 13 Acceptable Parent Sample - Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 20% (aqueous) **or** ○ Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

4.7 Field Duplicates

Not applicable. The parent sample - field duplicate sample pair in this SDG was not designated for general chemistry analysis.

4.8 Additional Notes

A note in the laboratory report narrative about total organic carbon analysis states: “All samples are analyzed in duplicate with the average results reported. For the following sample, the % RPD of the individual result exceeded 50%. The sample was reanalyzed with acceptable %RPD, and the reanalysis results are reported: T07.5D-0-12 (180-163380-17)”. This did not necessitate any result qualification; the re-analysis was performed within the technical holding time.

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

The laboratory report narrative includes a note stating: “The reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis.”

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 Reference

USEPA. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T06B-12-24	10/2/2023	Soil	T	6020B	Zinc	mg/kg	70	J	31	F1	180-163380-1	180-163380-1
T07.5A-12-24	10/3/2023	Soil	T	6020B	Zinc	mg/kg	58	J	27		180-163380-10	180-163380-1
T07.5C-12-24	10/3/2023	Soil	T	6020B	Zinc	mg/kg	78	J	26		180-163380-11	180-163380-1
T06A-12-24	10/2/2023	Soil	T	6020B	Zinc	mg/kg	53	J	34		180-163380-12	180-163380-1
T05B-12-24	10/1/2023	Soil	T	6020B	Zinc	mg/kg	77	J	35		180-163380-13	180-163380-1
T05B-12-24	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.11	J	0.074	H	180-163380-13	180-163380-1
DUP-07	10/2/2023	Soil	T	6020B	Zinc	mg/kg	110	J	28		180-163380-14	180-163380-1
T07.5D-6-12	10/3/2023	Soil	T	6020B	Zinc	mg/kg	190	J	34		180-163380-15	180-163380-1
T07.5D-12-24	10/3/2023	Soil	T	6020B	Zinc	mg/kg	86	J	24		180-163380-16	180-163380-1
T07.5D-0-12	10/3/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163380-17	180-163380-1
T07.5D-0-12	10/3/2023	Soil	T	9045D	Temperature	deg c	21.2	J	0.1	HF	180-163380-17	180-163380-1
T07A-6-12	10/3/2023	Soil	T	6020B	Zinc	mg/kg	76	J	32		180-163380-18	180-163380-1
T07A-12-24	10/3/2023	Soil	T	6020B	Zinc	mg/kg	98	J	32		180-163380-19	180-163380-1
T05C-12-24	10/1/2023	Soil	T	6020B	Zinc	mg/kg	85	J	36		180-163380-2	180-163380-1
T05C-12-24	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.069	J	0.069	H	180-163380-2	180-163380-1
T07A-0-12	10/3/2023	Soil	T	9045D	pH	SU	8.1	J	0.1	HF	180-163380-20	180-163380-1
T07A-0-12	10/3/2023	Soil	T	9045D	Temperature	deg c	21.2	J	0.1	HF	180-163380-20	180-163380-1
T06A-0-12	10/2/2023	Soil	T	9045D	pH	SU	6.6	J	0.1	HF	180-163380-3	180-163380-1
T06A-0-12	10/2/2023	Soil	T	9045D	Temperature	deg c	21.2	J	0.1	HF	180-163380-3	180-163380-1
T05A-12-24	10/1/2023	Soil	T	6020B	Zinc	mg/kg	56	J	30		180-163380-4	180-163380-1
T05A-12-24	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.048	J	0.072	JH	180-163380-4	180-163380-1
T06B-6-12	10/2/2023	Soil	T	6020B	Zinc	mg/kg	59	J	30		180-163380-5	180-163380-1
T06B-0-12	10/2/2023	Soil	T	9045D	pH	SU	5.8	J	0.1	HF	180-163380-6	180-163380-1
T06B-0-12	10/2/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163380-6	180-163380-1
T06A-6-12	10/2/2023	Soil	T	6020B	Zinc	mg/kg	52	J	32		180-163380-7	180-163380-1
T06C-12-24	10/2/2023	Soil	T	6020B	Zinc	mg/kg	110	J	31		180-163380-8	180-163380-1
T07.5B-12-24	10/3/2023	Soil	T	6020B	Zinc	mg/kg	91	J	36		180-163380-9	180-163380-1

deg c = Degrees Celsius
F1 = MS and/or MSD recovery exceeds control limits.
H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (laboratory qualifier) = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
J (validation qualifier)= The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligrams per kilogram
SDG = sample delivery group
SU = Standard units
T = Total

EHS Support Validation Report Number: 633

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163381-1

Analyses: Metals, General Chemistry

Review Level: DUSR

Analyses performed by: Eurofins Lancaster Laboratories Environmental and Eurofins Lancaster, Pennsylvania and Pittsburgh, Pennsylvania

Report Date:
November 30, 2023

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List of Appendices

1 Sample and Analytical Protocol Summary

Equipment blank samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York and were analyzed using United States Environmental Protection Agency (USEPA) SW-846 Methods:

- 6020B for metals
- 7470A for mercury
- 9060A for total organic carbon
- 9040C for pH

Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163381-1	180-163381-1	EQB 01-20230930	Water	9/30/2023	X	X
180-163381-1	180-163381-2	EQB 02-20231001	Water	10/1/2023	X	X
180-163381-1	180-163381-3	EQB 03-20231002	Water	10/2/2023	X	X
180-163381-1	180-163381-4	EQB 04-20231003	Water	10/3/2023	X	X

SDG = Sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Inorganic [USEPA, 2017a] and Organic [USEPA, 2017b]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

QC = Quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to the time samples were in the custody of the commercial shipper (FedEx) It is assumed that custody was maintained. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements - Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by 6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7470A	Water	HNO_3 to pH less than 2	28 days
Mercury by 7471B	Soil	Less than or equal to 6 °C	28 days

°C = Degrees Celsius
HNO_3 = Nitric acid

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated. The National Functional Guidelines (USEPA, 2017) require that both of the following are true:

- Mass calibration is within 0.1 atomic mass unit.
- The relative standard deviation among raw results of absolute signals of each analyte must be less than 5 percent.

Acceptance criteria were met.

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract required detection limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. In short, blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). The following are common types of blanks:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Results for instrument blanks and laboratory method blanks were non-detect.

The samples in this SDG are equipment blanks that are used to evaluate field sample data reported in separate laboratory reports. Results for these equipment blanks were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

A laboratory control sample duplicate is, as the name implies, a separate QC sample that is created just as the laboratory control sample is created. It undergoes the same preparation and analytical procedure. Recoveries of analytes from the laboratory control sample and from the laboratory control sample duplicate are evaluated to access accuracy and bias. The relative percent difference between laboratory control sample and laboratory control sample duplicate results is evaluated to assess precision.

Acceptance criteria were met. Laboratory control sample and laboratory control sample duplicate recoveries, as well as the relative percent difference between laboratory control sample and laboratory control sample duplicate results, were within control limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable, no matrix spike analysis was reported in this data set.

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis that normal field samples do. The analytical results of the two laboratory duplicates are compared to assess precision.

Not applicable, no laboratory duplicate analysis was reported in this data set.

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a 5-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100x the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Not applicable, no serial dilution analysis was reported in this data set.

3.10 Inductively Coupled Plasma-Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes’ behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met; internal standards associated with reported results exhibited relative intensity values within control limits.

3.11 Field Duplicates

Not applicable, no field duplicate sample was included in this SDG.

3.12 Additional Notes

Not applicable; there are no additional notes to present.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 4**.

Table 4 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
Total organic carbon by 9060	Water	Less than or equal to 6 °C; pH less than 2	28 days
pH by 9040	Water	Less than or equal to 6 °C	15 minutes

°C = Degrees Celsius

Analyses performed outside of the specified holding times are listed in **Table 5**. All other holding time criteria were met.

Table 5 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163381-1 180-163381-2 180-163381-3 180-163381-4	pH by 9040	15 minutes	11-26 days

The samples listed in **Table 5** have been qualified as shown in **Table 6**:.

Table 6 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- Initial calibration verification and continuing calibration verification recoveries, for pH and total organic carbon, were within control limits.
- Correlation coefficients reported for total organic calibration curves were within control limits.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met; results for the total organic carbon method blanks were non-detect.

The samples in this SDG are equipment blanks that are used to evaluate field sample data reported in separate laboratory reports. Total organic carbon results for these equipment blanks were non-detect.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable. No matrix spike/matrix spike duplicate analysis was reported in this data set.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 7**) were met. A laboratory duplicate of sample 180-163381-4 was analyzed for pH. The relationship between parent and duplicate results was within control limits.

Table 7 Acceptable Parent Sample - Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 20% (aqueous) **or** ○ Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

4.7 Field Duplicates

Not applicable. No field duplicate samples were submitted in this SDG.

4.8 Additional Notes

Not applicable; there are no additional notes to present.

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

USEPA. 2017a. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

USEPA. 2017b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
EQB 01-20230930	9/30/2023	Water	T	9040C	pH	SU	5.5	J	0.1	HF	180-163381-1	180-163381-1
EQB 02-20231001	10/1/2023	Water	T	9040C	pH	SU	6.6	J	0.1	HF	180-163381-2	180-163381-1
EQB 03-20231002	10/2/2023	Water	T	9040C	pH	SU	6.6	J	0.1	HF	180-163381-3	180-163381-1
EQB 04-20231003	10/3/2023	Water	T	9040C	pH	SU	6	J	0.1	HF	180-163381-4	180-163381-1

HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (validation qualifier)= The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
SDG = sample delivery group
SU = Standard units
T = Total

EHS Support Validation Report Number: 634

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163382-1
Analyses: Metals, General Chemistry
Review Level: DUSR

Analyses performed by: Eurofins Lancaster Laboratories Environmental and Eurofins Lancaster, Pennsylvania and Pittsburgh, Pennsylvania

Report Date:
November 30, 2023

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1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
    - 6020B for metals
    - 7471B for mercury
    - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data is reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163382-1	180-163382-1	T05A-0-6	Soil	10/1/2023	X	
180-163382-1	180-163382-2	T05A-0-12	Soil	10/1/2023		X
180-163382-1	180-163382-3	T05A-6-12	Soil	10/1/2023	X	
180-163382-1	180-163382-4	T05B-0-6	Soil	10/1/2023	X	
180-163382-1	180-163382-5	T05B-6-12	Soil	10/1/2023	X	
180-163382-1	180-163382-6	T05B-0-12	Soil	10/1/2023		X
180-163382-1	180-163382-7	T05C-0-6	Soil	10/1/2023	X	
180-163382-1	180-163382-8	T05C-6-12	Soil	10/1/2023	X	
180-163382-1	180-163382-9	T05C-0-12	Soil	10/1/2023		X
180-163382-1	180-163382-10	T06A-0-6	Soil	10/2/2023	X	
180-163382-1	180-163382-11	T06B-0-6	Soil	10/2/2023	X	
180-163382-1	180-163382-12	T06C-0-6	Soil	10/2/2023	X	
180-163382-1	180-163382-13	T06C-0-12	Soil	10/2/2023		X
180-163382-1	180-163382-14	T06C-6-12	Soil	10/2/2023	X	
180-163382-1	180-163382-15	DUP-05	Soil	10/1/2023	X	
180-163382-1	180-163382-16	DUP-06	Soil	10/2/2023		X
180-163382-1	180-163382-17	T07.5A-0-6	Soil	10/3/2023	X	
180-163382-1	180-163382-18	T07.5A-6-12	Soil	10/3/2023	X	

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[1] ASTM International, formerly known as American Society for Testing and Materials.

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163382-1	180-163382-19	T07.5A-0-12	Soil	10/3/2023		X
180-163382-1	180-163382-20	T07.5B-0-6	Soil	10/3/2023	X	
180-163382-1	180-163382-21	T07.5B-6-12	Soil	10/3/2023	X	
180-163382-1	180-163382-22	T07.5B-0-12	Soil	10/3/2023		X
180-163382-1	180-163382-23	T07.5C-6-12	Soil	10/3/2023	X	
180-163382-1	180-163382-24	T07.5C-0-6	Soil	10/3/2023	X	
180-163382-1	180-163382-25	T07.5C-0-12	Soil	10/3/2023		X
180-163382-1	180-163382-26	T07.5D-0-6	Soil	10/3/2023	X	
180-163382-1	180-163382-27	T07A-0-6	Soil	10/3/2023	X	

SDG = Sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Inorganic [USEPA, 2017]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 1**).

Table 1 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

QC = Quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to the time samples were in the custody of the commercial shipper (FedEx). No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Relevant preservation and holding time requirements for metals are presented in **Table 2**.

Table 2 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by 6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7470A	Water	HNO_3 to pH less than 2	28 days
Mercury by 7471B	Soil	Less than or equal to 6 °C	28 days

°C = Degrees Celsius
HNO_3 = Nitric acid

Analyses performed outside of the specified holding times are listed in **Table 3**. Other holding time criteria were met.

Table 3 Observed Preservation and/or Holding Time Nonconformances – Metals

Samples	Analysis	Holding Time	Observed Holding Time
180-163382-1 180-163382-3 180-163382-7	Mercury	28 days	29 days

The samples listed in **Table 3** have been qualified as shown in **Table 4**.

Table 4 Preservation and Holding Time Nonconformance Actions – Metals

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated. The National Functional Guidelines (USEPA, 2017) require that both of the following are true:

- Mass calibration is within 0.1 atomic mass unit.
- The relative standard deviation among raw results of absolute signals of each analyte must be less than 5 percent.

Acceptance criteria were met.

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract required detection limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. In short, blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). The following are common types of blanks:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Laboratory method blank results were non-detect. Equipment blanks associated with the samples in this data set were reported in a separate SDG; their results were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument’s ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or ‘clean’ sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Laboratory control samples exhibited recoveries within control limits. However, the recovery of selenium in one linear range check (LRC) sample was outside acceptable limits. Sample results associated with linear range check recoveries outside control limits are listed in **Table 5**:

Table 5 Linear Range Check Sample Nonconformances – Metals

Linear Range Check Sample ID	Analyte	Recovery	Associated Sample
LRC 410-434240/10	Selenium	88%	180-163382-8

Sample results associated with noncompliant linear range check sample recoveries are qualified in accordance with **Table 6**.

Table 6 Linear Range Check Sample Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Sample Result Qualification [a]
Recovery is greater than 110%	Non-detect	No Action
	Detect	J
Recovery is less than 90% but not significantly low	Non-detect	UJ
	Detect	J

[a] See **Section 2** for qualifier definitions.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Acceptance criteria were met. Matrix spike/matrix spike duplicate analyses were performed on sample 180-163382-10 for Method 6020 metals and for mercury. Recoveries, as well as the relative percent difference between the matrix spike and matrix spike duplicate results, were within control limits.

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis that normal field samples do. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 7**) were met. Laboratory duplicates of sample 180-163382-10 were analyzed for mercury and for Method 6020 metals.

Table 7 Acceptable Parent Sample - Laboratory Duplicate Relationships – Metals

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and its lab duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 20% (aqueous) **or** ○ Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or its lab duplicate concentrations(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a 5-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100x the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Not applicable: Serial dilution was performed on sample 180-163382-10. However, this analysis could not be evaluated because no analyte in this sample was detected at a concentration at least 100x the method detection limit.

3.10 Inductively Coupled Plasma-Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met; internal standards associated with reported results exhibited relative intensity values within control limits.

3.11 Field Duplicates

Acceptance criteria (**Table 8**) were met. Two parent sample – field duplicate sample pairs were included in this SDG.

Table 8 Acceptable Parent Sample – Field Duplicate Relationships – Metals

Parent Sample – Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 30% (aqueous) **or** ○ Relative percent difference is less than or equal to 50% (soil/ sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 2x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 3x the reporting limit (soil/ sediment)

3.12 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

Notes in the narrative state that four samples "required dilution prior to analysis" for Method 6020 metals and for mercury. Several additional samples, not listed in that narrative comment, are associated with two-fold dilutions.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 9**.

Table 9 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by 9045	Soil/ Sediment	Less than or equal to 6 °C	7 days
Temperature by 9045	Soil/ Sediment	None	15 minutes
Total organic carbon by Lloyd Kahn	Soil/ Sediment	Less than or equal to 6 °C	14 days

°C = Degrees Celsius

Analyses performed outside of the specified holding times are listed in **Table 10**. All other holding time criteria were met.

Table 10 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163382-2 180-163382-6 180-163382-9 180-163382-13 180-163382-16 180-163382-19 180-163382-22 180-163382-25	pH by 9045	7 days	24 – 26 days
	Temperature by 9045	15 minutes	

The samples listed in **Table 10** have been qualified as shown in **Table 11.**

Table 11 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met. The continuing calibration verification results were within limits. The calibration curve exhibited an acceptable correlation coefficient.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met; no detections were reported in Lloyd Kahn laboratory method blank. Equipment blanks associated with the samples in this data set were reported in a separate SDG; their results were non-detect.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table** 12. Note that matrix spike analyses cannot be evaluated if the unspiked sample concentration of the relevant analyte is greater than or equal to 4x the spike amount.

Table 12 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – General Chemistry

Sample ID	Analyte	Recoveries		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163382-19	Total organic carbon	38%	43%	Acceptable

Because of this excursion, the total organic carbon result for sample 180-163382-19 has been qualified as estimated (J) (**Table 13**).

Table 13 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – General Chemistry

Recovery	Sample Result	Qualification [a]
Matrix spike percent recovery is less than 75% but greater than or equal to 30%	Non-detect	UJ
	Detect	J
Matrix spike percent recovery is less than 30%.	Non-detect	R
	Detect	J
Matrix spike percent recovery is greater than 125%.	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference is greater than the upper acceptance limit	Non-detect	UJ
	Detect	J

[a] See **Section 2** for qualifier definitions.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 14**) were met. Laboratory duplicate analysis was performed on sample 180-163382-19 for pH and temperature.

Table 14 Acceptable Parent Sample - Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit	○ Relative percent difference is less than or equal to 20% (aqueous) **or** ○ Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit	○ Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

4.7 Field Duplicates

Acceptance criteria (**Table 15**) were met. One parent sample – field duplicate sample pair in this SDG was designated for general chemistry analyses.

Table 15 Acceptable Parent Sample – Field Duplicate Relationships – General Chemistry

Parent Sample – Field Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5x the reporting limit.	○ Relative percent difference is less than or equal to 30% (aqueous) **or** ○ Relative percent difference is less than or equal to 50% (soil/ sediment)
Sample and/or field duplicate concentration(s) is/are less than 5x the reporting limit.	○ Absolute difference is less than or equal to 2x the reporting limit (aqueous) **or** ○ Absolute difference is less than or equal to 3x the reporting limit (soil/ sediment)

4.8 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

The laboratory report narrative includes a note stating: “The reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis.”

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 Reference

USEPA. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T05A-0-6	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.057	J	0.082	JH	180-163382-1	180-163382-1
T06C-0-12	10/2/2023	Soil	T	9045D	pH	SU	6	J	0.1	HF	180-163382-13	180-163382-1
T06C-0-12	10/2/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163382-13	180-163382-1
DUP-06	10/2/2023	Soil	T	9045D	pH	SU	6	J	0.1	HF	180-163382-16	180-163382-1
DUP-06	10/2/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163382-16	180-163382-1
T07.5A-0-12	10/3/2023	Soil	T	9045D	pH	SU	6.4	J	0.1	HF	180-163382-19	180-163382-1
T07.5A-0-12	10/3/2023	Soil	T	9045D	Temperature	deg c	21.4	J	0.1	HF	180-163382-19	180-163382-1
T07.5A-0-12	10/3/2023	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	19000	J	1400	F1	180-163382-19	180-163382-1
T05A-0-12	10/1/2023	Soil	T	9045D	pH	SU	6.3	J	0.1	HF	180-163382-2	180-163382-1
T05A-0-12	10/1/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163382-2	180-163382-1
T07.5B-0-12	10/3/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163382-22	180-163382-1
T07.5B-0-12	10/3/2023	Soil	T	9045D	Temperature	deg c	21.4	J	0.1	HF	180-163382-22	180-163382-1
T07.5C-0-12	10/3/2023	Soil	T	9045D	pH	SU	6.3	J	0.1	HF	180-163382-25	180-163382-1
T07.5C-0-12	10/3/2023	Soil	T	9045D	Temperature	deg c	21.4	J	0.1	HF	180-163382-25	180-163382-1
T05A-6-12	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.035	J	0.074	JH	180-163382-3	180-163382-1
T05B-0-12	10/1/2023	Soil	T	9045D	pH	SU	6.5	J	0.1	HF	180-163382-6	180-163382-1
T05B-0-12	10/1/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163382-6	180-163382-1
T05C-0-6	10/1/2023	Soil	T	7471B	Mercury	mg/kg	0.73	J	0.096	H	180-163382-7	180-163382-1
T05C-6-12	10/1/2023	Soil	T	6020B	Selenium	mg/kg	1.3	J	0.49		180-163382-8	180-163382-1
T05C-0-12	10/1/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163382-9	180-163382-1
T05C-0-12	10/1/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163382-9	180-163382-1

deg c = Degrees Celsius
F1 = MS and/or MSD recovery exceeds control limits.
H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (laboratory qualifier) = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
J (validation qualifier) = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligrams per kilogram
SDG = sample delivery group
SU = Standard units
T = Total

EHS Support Validation Report Number: 712

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163683-1
Analyses: Metals, General Chemistry
Review Level: Data Usability Summary Report (DUSR)

Analyses performed by:
Eurofins Lancaster Laboratories Environment Testing in Lancaster, Pennsylvania, and *Eurofins* in Pittsburgh, Pennsylvania and Burlington, Vermont

Report Date:
June 13, 2024

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Appendix

1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York, and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
  - 6020B for metals
  - 7471B for mercury
  - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data are reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163683-1	180-163683-1	T10A-0-6	Soil	10/4/2023	X	
180-163683-1	180-163683-2	T10A-6-12	Soil	10/4/2023	X	
180-163683-1	180-163683-3	T10A-12-24	Soil	10/4/2023	X	
180-163683-1	180-163683-4	T10A-0-12	Soil	10/4/2023		X
180-163683-1	180-163683-5	DUP-08	Soil	10/4/2023	X	
180-163683-1	180-163683-6	T10B-0-6	Soil	10/4/2023	X	
180-163683-1	180-163683-7	T10B-6-12	Soil	10/4/2023	X	
180-163683-1	180-163683-8	T10B-12-24	Soil	10/4/2023	X	
180-163683-1	180-163683-9	T10B-0-12	Soil	10/4/2023		X
180-163683-1	180-163683-10	T10C-0-6	Soil	10/4/2023	X	
180-163683-1	180-163683-11	T10C-0-12	Soil	10/4/2023		X
180-163683-1	180-163683-12	T10C-6-12	Soil	10/4/2023	X	
180-163683-1	180-163683-13	T10C-12-24	Soil	10/4/2023	X	
180-163683-1	180-163683-14	T08D-0-6	Soil	10/4/2023	X	
180-163683-1	180-163683-15	T09C-0-6	Soil	10/4/2023	X	
180-163683-1	180-163683-16	T09C-6-12	Soil	10/4/2023	X	
180-163683-1	180-163683-17	T09C-12-24	Soil	10/4/2023	X	

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[1] ASTM International, formerly known as American Society for Testing and Materials.

SDG	**Lab Sample ID**	**Field Sample ID**	**Sample Matrix**	**Sample Collection Date**	**Analyses**	
					Metals	**General Chemistry**
180-163683-1	180-163683-18	T09C-0-12	Soil	10/4/2023		X
180-163683-1	180-163683-19	T07C-0-6	Soil	10/9/2023	X	
180-163683-1	180-163683-20	T07B-0-6	Soil	10/9/2023	X	
180-163683-1	180-163683-21	T08A-0-6	Soil	10/9/2023	X	
180-163683-1	180-163683-22	T08C-0-6	Soil	10/9/2023	X	
180-163683-1	180-163683-23	T08E-0-6	Soil	10/9/2023	X	
180-163683-1	180-163683-24	T08F-0-6	Soil	10/9/2023	X	

Note:
SDG = sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the USEPA Contract Laboratory Program National Functional Guidelines (Inorganic; USEPA, 2017), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Note:
QC = quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to sample shipment. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by Method 6020	Water	Nitric acid to pH less than 2	180 days
	Soil	None	180 days
Mercury by Method 7470A	Water	Nitric acid to pH less than 2	28 days
Mercury by Method 7471B	Soil	Less than or equal to 6°C	28 days

Note:
°C = degree Celsius

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated.

Acceptance criteria were met:

- The relative standard deviation for each analyte is less than 5 percent.
- Average peak width is less than 0.9 atomic mass units (amu) at 10 percent peak height. This is the criterion applied by the laboratory.

Laboratory staff provided the following information:

- The laboratory's "tune check point-of-failure is 0.9 amu at 10% peak height. . . . There is a trade-off between peak width and sensitivity, so we are tuning to the manufacturer's recommended settings. Our tuning performance specifications are set to meet the newer guidance from EPA 6020 and DOD [Department of Defense] source documents." Laboratory staff also provided the following statements from referenced guidance:
    - "The resolution must also be verified to be less than 0.9 u[2] full width at 10% peak height."[3]
    - "Resolution < 0.9 amu full width at 10% peak height."[4]

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[2] u = unified atomic mass unit

[3] USEPA. 2014. Method 6020B (SW-846): Inductively Coupled Plasma-Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. Method 6020B: Inductively Coupled Plasma - Mass Spectrometry, part of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (epa.gov)

[4] Department of Defense (DoD) and Department of Energy (DOE). 2021. Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. QSM Version 5.4 FINAL (osd.mil)

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract-required quantitation limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

No field sample results have been qualified due to blank contamination. Copper was detected in four instrument blanks associated with samples in this SDG; however, the concentrations in field samples were significantly greater than in the blanks. Therefore, no qualification was needed.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or ‘clean’ sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within acceptance limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 4**. Note that matrix spike analyses cannot be evaluated if the unspiked sample concentration of the relevant analyte is greater than or equal to four times the spike amount.

Table 4 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163683-2	Copper	128 percent	216 percent	Acceptable
	Zinc	126 percent	Acceptable	Acceptable
180-163683-2	Mercury	Less than 30 percent	322 percent	Greater than upper acceptance limit

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike results, qualifiers shown in **Table 5** were applied to results for the metals listed in all field samples in this SDG.

Table 5 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

QC Nonconformance	Sample Result	Qualification[1]
%R: • 30–74 percent for most metals, including mercury • 20–74 percent for silver and antimony	Non-detect	UJ
	Detect	J
%R: • Less than 30 percent for most metals, including mercury • Less than 20 percent for silver and antimony	Non-detect	UJ if PDS %R is greater than or equal to 75 percent
		R if PDS not performed or PDS %R is less than 75 percent
	Detect	J
%R: • Greater than 125 percent for most metals, including mercury • Greater than 150 percent for silver and antimony	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference: • Greater than 20 percent (aqueous) • Greater than 35 percent (soil/sediment)	Non-detect	UJ
	Detect	J

Notes:
[1] See **Table 2** for qualifier definitions.
%R = percent recovery
PDS = post-digestion spike
QC = quality control

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as the normal field samples. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 6**) were met. Laboratory duplicates of sample 180-163683-2 were analyzed for mercury and for Method 6020 metals. The relationship between mercury results was outside laboratory limits but met the criteria applied during validation and is considered acceptable.

Table 6 Acceptable Parent Sample–Laboratory Duplicate Relationships – Metals

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and its lab duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and/or its lab duplicate concentrations(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a five-fold dilution, and then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100 times the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution was performed on sample 180-163683-2; the relationship between results for copper was acceptable. The results for selenium and zinc could not be evaluated because the analytes were not present in the parent sample at sufficient concentrations.

3.10 Inductively Coupled Plasma–Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes’ behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met. Internal standards exhibited relative intensity values within control limits.

3.11 Field Duplicates

Acceptance criteria (**Table 7**) were met. One parent sample–field duplicate sample pair was included in this SDG.

Table 7 Acceptable Parent Sample-Field Duplicate Relationships – Metals

Parent Sample-Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 30 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 2× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 3× the reporting limit (soil/sediment)

3.12 Additional Notes

Notes in the narrative state that four samples “required dilution prior to analysis” for mercury and for USEPA Method 6020 metals.

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. Samples with less than 50 percent solids are listed in **Table 8**.

Table 8 Observed Percent Solids Nonconformances – Metals

Sample ID	Percent Solids
180-163683-20	48.3 percent
180-163683-21	49.8 percent
180-163683-23	44.0 percent

Because of these QC exceedances, metals results for this sample have been qualified as estimated in accordance with **Table 9**.

Table 9 Percent Solids Nonconformance Actions – Metals

Percent Solids	Sample Result	Sample Result Qualification(1)
Less than 50 percent but greater than or equal to 10 percent	Non-detect	UJ
	Detect	J
Less than 10 percent	Non-detect	R
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 10**.

Table 10 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by Method 9045	Soil/ Sediment	Less than or equal to 6°C	7 days
Temperature by Method 9045	Soil/ Sediment	None	15 minutes
Total organic carbon by The Lloyd Kahn Method	Soil/ Sediment	Less than or equal to 6°C	14 days

Note:
°C = degree Celsius

Analyses performed outside of the specified holding times are listed in **Table 11**. All other holding time criteria were met.

Table 11 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163683-4 180-163683-9 180-163683-11 180-163683-18	pH by Method 9045	7 days	26 days
	Temperature by Method 9045	15 minutes	

The samples listed in **Table 11** have been qualified as shown in **Table 12**.

Table 12 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification(1)	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2× holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time	J	R

Note:
[1] See **Table 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed, and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:
- The continuing calibration verification results were within limits.
- The calibration curves exhibited acceptable correlation coefficients.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). Some common types of blanks follow:
- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. No detections were reported in the Lloyd Kahn laboratory method blank or calibration blanks.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or ‘clean’ sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 13**.

Table 13 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – General Chemistry

Sample ID	Analyte	Recoveries		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163683-4	Total organic carbon	Less than 30 percent	37 percent	Acceptable

Because of this excursion, the total organic carbon result for sample 180-163382-19, which was a detection, has been qualified as estimated (J) (**Table 14**).

Table 14 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – General Chemistry

Recovery	Sample Result	Qualification(1)
Matrix spike percent recovery is less than 75 percent but greater than or equal to 30 percent	Non-detect	UJ
	Detect	J
Matrix spike percent recovery is less than 30 percent.	Non-detect	R
	Detect	J
Matrix spike percent recovery is greater than 125 percent.	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference is greater than the upper acceptance limit	Non-detect	UJ
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 15**) were met. Laboratory duplicate analysis was performed on sample 180-163683-4 for pH, temperature, and percent solids.

Table 15 Acceptable Parent Sample–Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

4.7 Field Duplicates

Not applicable; the field duplicate in this SDG was only designated for metals analysis, not general chemistry analysis.

4.8 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, samples designated for general chemistry analysis met this criterion. No results were qualified because of percent solids values.

The laboratory report narrative includes a note stating, “All samples are analyzed in duplicate with the average results reported. For the following sample, the % RPD of the individual results exceeded 50%. The sample was reanalyzed with acceptable %RPD. The reanalysis results were reported: T10B-0-12 (180-163683-9).”

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. 2010. DER-10: Technical Guidance for Site Investigation and Remediation. May 3.

United States Environmental Protection Agency. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T10A-0-6	10/4/2023	T	Soil	6020B	Copper	mg/kg	44	J	0.48		180-163683-1	180-163683-1
T10C-0-6	10/4/2023	T	Soil	6020B	Copper	mg/kg	240	J	0.59	^2	180-163683-10	180-163683-1
T10C-6-12	10/4/2023	T	Soil	6020B	Copper	mg/kg	190	J	1.9	^2	180-163683-12	180-163683-1
T10C-12-24	10/4/2023	T	Soil	6020B	Copper	mg/kg	32	J	0.39	^2	180-163683-13	180-163683-1
T08D-0-6	10/4/2023	T	Soil	6020B	Copper	mg/kg	250	J	2.3	^2	180-163683-14	180-163683-1
T09C-0-6	10/4/2023	T	Soil	6020B	Copper	mg/kg	26	J	0.37	^2	180-163683-15	180-163683-1
T09C-6-12	10/4/2023	T	Soil	6020B	Copper	mg/kg	23	J	0.40	^2	180-163683-16	180-163683-1
T09C-12-24	10/4/2023	T	Soil	6020B	Copper	mg/kg	63	J	0.32	^2	180-163683-17	180-163683-1
T07C-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	16	J	0.58		180-163683-19	180-163683-1
T10A-6-12	10/4/2023	T	Soil	6020B	Copper	mg/kg	290	J	0.67	F1	180-163683-2	180-163683-1
T07B-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	24	J	0.70	^2	180-163683-20	180-163683-1
T08A-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	11	J	0.64	^2	180-163683-21	180-163683-1
T08C-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	16	J	0.44	^2	180-163683-22	180-163683-1
T08E-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	27	J	0.86		180-163683-23	180-163683-1
T08F-0-6	10/9/2023	T	Soil	6020B	Copper	mg/kg	16	J	0.46		180-163683-24	180-163683-1
T10A-12-24	10/4/2023	T	Soil	6020B	Copper	mg/kg	1200	J	26		180-163683-3	180-163683-1
DUP-08	10/4/2023	T	Soil	6020B	Copper	mg/kg	43	J	0.54		180-163683-5	180-163683-1
T10B-0-6	10/4/2023	T	Soil	6020B	Copper	mg/kg	95	J	0.42		180-163683-6	180-163683-1
T10B-6-12	10/4/2023	T	Soil	6020B	Copper	mg/kg	140	J	0.38		180-163683-7	180-163683-1
T10B-12-24	10/4/2023	T	Soil	6020B	Copper	mg/kg	1100	J	20		180-163683-8	180-163683-1
T07B-0-6	10/9/2023	T	Soil	6020B	Selenium	mg/kg	0.85	J	0.70		180-163683-20	180-163683-1
T08E-0-6	10/9/2023	T	Soil	6020B	Selenium	mg/kg	1	J	0.86		180-163683-23	180-163683-1
T10A-0-6	10/4/2023	T	Soil	6020B	Zinc	mg/kg	140	J	36		180-163683-1	180-163683-1
T10C-0-6	10/4/2023	T	Soil	6020B	Zinc	mg/kg	140	J	44		180-163683-10	180-163683-1
T10C-6-12	10/4/2023	T	Soil	6020B	Zinc	mg/kg	63	J	29		180-163683-12	180-163683-1
T10C-12-24	10/4/2023	T	Soil	6020B	Zinc	mg/kg	32	J	30		180-163683-13	180-163683-1
T08D-0-6	10/4/2023	T	Soil	6020B	Zinc	mg/kg	120	J	35		180-163683-14	180-163683-1
T09C-0-6	10/4/2023	T	Soil	6020B	Zinc	mg/kg	58	J	28		180-163683-15	180-163683-1
T09C-6-12	10/4/2023	T	Soil	6020B	Zinc	mg/kg	71	J	30		180-163683-16	180-163683-1
T09C-12-24	10/4/2023	T	Soil	6020B	Zinc	mg/kg	360	J	120		180-163683-17	180-163683-1
T07C-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	80	J	43		180-163683-19	180-163683-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T10A-6-12	10/4/2023	T	Soil	6020B	Zinc	mg/kg	230	J	50	F1	180-163683-2	180-163683-1
T07B-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	110	J	53		180-163683-20	180-163683-1
T08A-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	63	J	48		180-163683-21	180-163683-1
T08C-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	60	J	33		180-163683-22	180-163683-1
T08E-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	160	J	64		180-163683-23	180-163683-1
T08F-0-6	10/9/2023	T	Soil	6020B	Zinc	mg/kg	90	J	35		180-163683-24	180-163683-1
T10A-12-24	10/4/2023	T	Soil	6020B	Zinc	mg/kg	210	J	39		180-163683-3	180-163683-1
DUP-08	10/4/2023	T	Soil	6020B	Zinc	mg/kg	130	J	40		180-163683-5	180-163683-1
T10B-0-6	10/4/2023	T	Soil	6020B	Zinc	mg/kg	95	J	32		180-163683-6	180-163683-1
T10B-6-12	10/4/2023	T	Soil	6020B	Zinc	mg/kg	91	J	28		180-163683-7	180-163683-1
T10B-12-24	10/4/2023	T	Soil	6020B	Zinc	mg/kg	380	J	150		180-163683-8	180-163683-1
T10A-0-6	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.12	J	0.097		180-163683-1	180-163683-1
T10C-0-6	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.73	J	0.099		180-163683-10	180-163683-1
T10C-6-12	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.45	J	0.080		180-163683-12	180-163683-1
T08D-0-6	10/4/2023	T	Soil	7471B	Mercury	mg/kg	1.2	J	0.17		180-163683-14	180-163683-1
T09C-0-6	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.16	J	0.067		180-163683-15	180-163683-1
T09C-12-24	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.19	J	0.066		180-163683-17	180-163683-1
T07C-0-6	10/9/2023	T	Soil	7471B	Mercury	mg/kg	0.093	J	0.088		180-163683-19	180-163683-1
T10A-6-12	10/4/2023	T	Soil	7471B	Mercury	mg/kg	1.1	J	0.20	F1F2	180-163683-2	180-163683-1
T08E-0-6	10/9/2023	T	Soil	7471B	Mercury	mg/kg	0.2	J	0.13		180-163683-23	180-163683-1
T10A-12-24	10/4/2023	T	Soil	7471B	Mercury	mg/kg	3.7	J	0.94		180-163683-3	180-163683-1
DUP-08	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.1	J	0.091		180-163683-5	180-163683-1
T10B-0-6	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.24	J	0.075		180-163683-6	180-163683-1
T10B-6-12	10/4/2023	T	Soil	7471B	Mercury	mg/kg	0.37	J	0.070		180-163683-7	180-163683-1
T10B-12-24	10/4/2023	T	Soil	7471B	Mercury	mg/kg	1.9	J	0.16		180-163683-8	180-163683-1
T10C-0-12	10/4/2023	T	Soil	9045D	pH	SU	7.2	J	0.1	HF	180-163683-11	180-163683-1
T09C-0-12	10/4/2023	T	Soil	9045D	pH	SU	7.1	J	0.1	HF	180-163683-18	180-163683-1
T10A-0-12	10/4/2023	T	Soil	9045D	pH	SU	7.7	J	0.1	HF	180-163683-4	180-163683-1
T10B-0-12	10/4/2023	T	Soil	9045D	pH	SU	8	J	0.1	HF	180-163683-9	180-163683-1
T10C-0-12	10/4/2023	T	Soil	9045D	Temperature	deg c	21.8	J	0.1	HF	180-163683-11	180-163683-1
T09C-0-12	10/4/2023	T	Soil	9045D	Temperature	deg c	21.8	J	0.1	HF	180-163683-18	180-163683-1
T10A-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21.4	J	0.1	HF	180-163683-4	180-163683-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T10B-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163683-9	180-163683-1
T10A-0-12	10/4/2023	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	87000	J	1700	F1	180-163683-4	180-163683-1

Notes:
^2 = result(s) for initial and/or continuing calibration blank is/are outside acceptance limits.
deg c = degree Celsius
F1 = matrix spike and/or matrix spike duplicate recovery exceeds control limits
F2 = matrix spike/matrix spike duplicate relative percent difference exceeds control limits
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client’s request. Sample was analyzed outside of hold time.
J (validation qualifier) = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram per kilogram
SDG = sample delivery group
SU = standard units
T = Total

EHS Support Validation Report Number: 713

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163684-1
Analyses: Metals, General Chemistry
Review Level: Data Usability Summary Report (DUSR)

Analyses performed by: Eurofins
Eurofins Lancaster Laboratories Environment Testing in Lancaster, Pennsylvania, and *Eurofins* in Pittsburgh, Pennsylvania and Burlington, Vermont

Report Date:
June 14, 2024

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Appendix

1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York, and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
  - 6020B for metals
  - 7471B for mercury
  - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data are reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163684-1	180-163684-1	T08D-6-12	Soil	10/4/2023	X	
180-163684-1	180-163684-2	T08D-12-24	Soil	10/4/2023	X	
180-163684-1	180-163684-3	T08D-0-12	Soil	10/4/2023		X
180-163684-1	180-163684-4	DUP-09	Soil	10/4/2023		X
180-163684-1	180-163684-5	T07C-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-6	T07C-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-7	T07C-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-8	T07B-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-9	T07B-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-10	T07B-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-11	T08A-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-12	T08A-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-13	T08A-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-14	T08B-0-6	Soil	10/9/2023	X	
180-163684-1	180-163684-15	T08B-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-16	T08B-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-17	T08B-0-12	Soil	10/9/2023		X

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[1] ASTM International, formerly known as American Society for Testing and Materials.

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163684-1	180-163684-18	T08C-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-19	T08C-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-20	T08C-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-21	T08E-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-22	T08E-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-23	T08E-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-24	T08F-6-12	Soil	10/9/2023	X	
180-163684-1	180-163684-25	T08F-12-24	Soil	10/9/2023	X	
180-163684-1	180-163684-26	T08F-0-12	Soil	10/9/2023		X
180-163684-1	180-163684-27	DUP-12	Soil	10/9/2023	X	

Note:
SDG = sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the USEPA Contract Laboratory Program National Functional Guidelines (Inorganic; USEPA, 2017), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Note:
QC = quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to sample shipment. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by Method 6020	Water	Nitric acid to pH less than 2	180 days
	Soil	None	180 days
Mercury by Method 7470A	Water	Nitric acid to pH less than 2	28 days
Mercury by Method 7471B	Soil	Less than or equal to 6°C	28 days

Note:
°C = degree Celsius

3.2 Inductively Coupled Plasma–Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated.

Acceptance criteria were met.

- The relative standard deviation for each analyte is less than 5 percent.
- Average peak width is less than 0.9 atomic mass units (amu) at 10 percent peak height. This is the criterion applied by the laboratory.

Laboratory staff provided the following information:

- The laboratory's "tune check point-of-failure is 0.9 amu at 10% peak height. . . . There is a trade-off between peak width and sensitivity, so we are tuning to the manufacturer's recommended settings. Our tuning performance specifications are set to meet the newer guidance from EPA 6020 and DOD [Department of Defense] source documents." Laboratory staff also provided the following statements from referenced guidance:
  - "The resolution must also be verified to be less than 0.9 u[2] full width at 10% peak height."[3]
  - "Resolution < 0.9 amu full width at 10% peak height."[4]

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[2] u = unified atomic mass unit

[3] USEPA. 2014. Method 6020B (SW-846): Inductively Coupled Plasma-Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. Method 6020B: Inductively Coupled Plasma - Mass Spectrometry, part of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (epa.gov)

[4] Department of Defense (DoD) and Department of Energy (DOE). 2021. Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. QSM Version 5.4 FINAL (osd.mil)

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract-required quantitation limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Results for the laboratory method blanks and the instrument blanks were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument’s ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within acceptance limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 4**. Matrix spike/matrix spike duplicate analyses were performed on samples 180-163684-1 and 180-163684-22 for metals and mercury. Matrix spike/matrix spike duplicate analysis was performed on sample 180-163684-8 for mercury.

Table 4 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163684-22	Zinc	Acceptable	127 percent	Acceptable

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike results, qualifiers shown in **Table 5** were applied to zinc results for all field samples in this SDG.

Table 5 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

QC Nonconformance	Sample Result	Qualification[(1)]
%R: • 30–74 percent for most metals including mercury • 20–74 percent for silver and antimony	Non-detect	UJ
	Detect	J

QC Nonconformance	Sample Result	Qualification(1)
%R: • Less than 30 percent for most metals including mercury • Less than 20 percent for silver and antimony	Non-detect	UJ if PDS %R is greater than or equal to 75 percent
		R if PDS not performed or PDS %R is less than 75 percent
	Detect	J
%R: • Greater than 125 percent for most metals including mercury • Greater than 150 percent for silver, antimony	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference: • Greater than 20 percent (aqueous) • Greater than 35 percent (soil/ sediment)	Non-detect	UJ
	Detect	J

Notes:
[1] See **Table 2** for qualifier definitions.
%R = percent recovery
PDS = Post-digestion spike

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as the normal field samples. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 6**) were met. Laboratory duplicates of samples 180-163684-1 and 180-163684-22 were analyzed for mercury and for Method 6020 metals. A laboratory duplicate of sample 180-163684-8 was analyzed for mercury.

Table 6 Acceptable Parent Sample - Laboratory Duplicate Relationships – Metals

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and its lab duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)
Sample and/or its lab duplicate concentrations(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a five-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100 times the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution was performed on samples 180-163684-1 and 180-163684-22; the relationships between results for copper were acceptable. The results for selenium and zinc could not be evaluated because the analytes were not present in the parent sample at sufficient concentrations.

3.10 Inductively Coupled Plasma–Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met. Internal standards exhibited relative intensity values within control limits.

3.11 Field Duplicates

Acceptance criteria (**Table 7**) were met. One parent sample-field duplicate sample pair was included in this SDG and designated for metals analysis.

Table 7 Acceptable Parent Sample-Field Duplicate Relationships – Metals

Parent Sample-Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 30 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 2× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 3× the reporting limit (soil/sediment)

3.12 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, samples designated for metals analysis met this criterion. No results were qualified because of percent solids values.

A note in the narrative states, “All samples were analyzed at a 2X dilution.”

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 8**.

Table 8 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by Method 9045	Soil/Sediment	Less than or equal to 6°C	7 days
Temperature by Method 9045	Soil/Sediment	None	15 minutes
Total organic carbon by The Lloyd Kahn Method	Soil/Sediment	Less than or equal to 6°C	14 days

Note:
°C = degree Celsius

Analyses performed outside of the specified holding times are listed in **Table 9**. All other holding time criteria were met.

Table 9 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163684-3 180-163684-4 180-163684-7 180-163684-10 180-163684-13 180-163684-17 180-163684-20 180-163684-23 180-163684-26	pH by Method 9045	7 days	21–26 days
	Temperature by Method 9045	15 minutes	

The samples listed in **Table 9** have been qualified as shown in **Table 10.**

Table 10 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification[1]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2× holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time	J	R

Note:
[1] See **Table 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The continuing calibration verification results were within limits.
- The calibration curves exhibited acceptable correlation coefficients.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. No detections were reported in Lloyd Kahn laboratory method blanks or calibration blanks.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or ‘clean’ sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 11**.

Table 11 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – General Chemistry

Sample ID	Analyte	Recoveries		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163684-23	Total organic carbon	67 percent	68 percent	Acceptable

Because of this excursion, the total organic carbon result for sample 180-163684-23 has been qualified as estimated (J) (**Table 12**).

Table 12 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – General Chemistry

Recovery	Sample Result	Qualification(1)
Matrix spike percent recovery is less than 75 percent but greater than or equal to 30 percent	Non-detect	UJ
	Detect	J
Matrix spike percent recovery is less than 30 percent.	Non-detect	R
	Detect	J
Matrix spike percent recovery is greater than 125 percent.	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference is greater than the upper acceptance limit	Non-detect	UJ
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 13**) were met. Laboratory duplicate analysis was performed on sample 180-163684-23 for pH and temperature and sample 180-163684-20 for percent solids.

Table 13 Acceptable Parent Sample–Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20% (aqueous) **or** • Relative percent difference is less than or equal to 35% (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1x the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2x the reporting limit (soil/sediment)

4.7 Field Duplicates

Acceptance criteria (**Table 14**) were met. One parent sample–field duplicate sample pair was included in this SDG and designated for general chemistry analysis.

Table 14 Acceptable Parent Sample-Field Duplicate Relationships – General Chemistry

Parent Sample-Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 30 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 2× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 3× the reporting limit (soil/sediment)

4.8 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, samples designated for general chemistry analysis met this criterion. No results were qualified because of percent solids values.

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. 2010. DER-10: Technical Guidance for Site Investigation and Remediation. May 3.

United States Environmental Protection Agency. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T08D-6-12	10/4/2023	Soil	T	6020B	Zinc	mg/kg	86	J	36		180-163684-1	180-163684-1
T08A-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	63	J	39		180-163684-11	180-163684-1
T08A-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	60	J	34		180-163684-12	180-163684-1
T08B-0-6	10/9/2023	Soil	T	6020B	Zinc	mg/kg	57	J	38		180-163684-14	180-163684-1
T08B-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	50	J	34		180-163684-15	180-163684-1
T08B-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	47	J	36		180-163684-16	180-163684-1
T08C-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	58	J	35		180-163684-18	180-163684-1
T08C-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	52	J	37		180-163684-19	180-163684-1
T08D-12-24	10/4/2023	Soil	T	6020B	Zinc	mg/kg	72	J	32		180-163684-2	180-163684-1
T08E-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	94	J	49		180-163684-21	180-163684-1
T08E-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	88	J	40	F1	180-163684-22	180-163684-1
T08F-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	71	J	37		180-163684-24	180-163684-1
T08F-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	74	J	37		180-163684-25	180-163684-1
DUP-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	56	J	39		180-163684-27	180-163684-1
T07C-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	72	J	42		180-163684-5	180-163684-1
T07C-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	56	J	35		180-163684-6	180-163684-1
T07B-6-12	10/9/2023	Soil	T	6020B	Zinc	mg/kg	87	J	40		180-163684-8	180-163684-1
T07B-12-24	10/9/2023	Soil	T	6020B	Zinc	mg/kg	84	J	40		180-163684-9	180-163684-1
T07B-0-12	10/9/2023	Soil	T	9045D	pH	SU	6.7	J	0.1	HF	180-163684-10	180-163684-1
T08A-0-12	10/9/2023	Soil	T	9045D	pH	SU	6.8	J	0.1	HF	180-163684-13	180-163684-1
T08B-0-12	10/9/2023	Soil	T	9045D	pH	SU	6.2	J	0.1	HF	180-163684-17	180-163684-1
T08C-0-12	10/9/2023	Soil	T	9045D	pH	SU	6.2	J	0.1	HF	180-163684-20	180-163684-1
T08E-0-12	10/9/2023	Soil	T	9045D	pH	SU	6.5	J	0.1	HF	180-163684-23	180-163684-1
T08F-0-12	10/9/2023	Soil	T	9045D	pH	SU	6	J	0.1	HF	180-163684-26	180-163684-1
T08D-0-12	10/4/2023	Soil	T	9045D	pH	SU	7.3	J	0.1	HF	180-163684-3	180-163684-1
DUP-09	10/4/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163684-4	180-163684-1
T07C-0-12	10/9/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163684-7	180-163684-1
T07B-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163684-10	180-163684-1
T08A-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.5	J	0.1	HF	180-163684-13	180-163684-1
T08B-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.7	J	0.1	HF	180-163684-17	180-163684-1
T08C-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163684-20	180-163684-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T08E-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163684-23	180-163684-1
T08F-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.5	J	0.1	HF	180-163684-26	180-163684-1
T08D-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21.8	J	0.1	HF	180-163684-3	180-163684-1
DUP-09	10/4/2023	Soil	T	9045D	Temperature	deg c	21.8	J	0.1	HF	180-163684-4	180-163684-1
T07C-0-12	10/9/2023	Soil	T	9045D	Temperature	deg c	21.8	J	0.1	HF	180-163684-7	180-163684-1
T08E-0-12	10/9/2023	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	43000	J	1900	F1	180-163684-23	180-163684-1

Notes:
deg c = degree Celsius
F1 = matrix spike and/or matrix spike duplicate recovery exceeds control limits
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (validation qualifier) = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram per kilogram
SDG = sample delivery group
SU = standard unit
T = Total

EHS Support Validation Report Number: 714

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163685-1
Analyses: Metals, General Chemistry
Review Level: Data Usability Summary Report (DUSR)

Analyses performed by: Eurofins *Eurofins Lancaster Laboratories Environment Testing* in Lancaster, Pennsylvania, and *Eurofins* in Pittsburgh, Pennsylvania and Burlington, Vermont

Report Date:
June 16, 2024

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Appendix

1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York, and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
  - 6020B for metals
  - 7471B for mercury
  - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data are reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163685-1	180-163685-1	T04A-0-6	Soil	10/4/2023	X	
180-163685-1	180-163685-2	T03A-0-6	Soil	10/4/2023	X	
180-163685-1	180-163685-3	T03A-6-12	Soil	10/4/2023	X	
180-163685-1	180-163685-4	T03A-0-12	Soil	10/4/2023		X
180-163685-1	180-163685-5	T01C-0-6	Soil	10/5/2023	X	
180-163685-1	180-163685-6	DUP-10	Soil	10/5/2023	X	
180-163685-1	180-163685-7	T01D-0-6	Soil	10/5/2023	X	
180-163685-1	180-163685-8	T01D-6-12	Soil	10/5/2023	X	
180-163685-1	180-163685-9	T01D-0-12	Soil	10/5/2023		X
180-163685-1	180-163685-10	T01E-0-6	Soil	10/5/2023	X	
180-163685-1	180-163685-11	T01E-6-12	Soil	10/5/2023	X	
180-163685-1	180-163685-12	T01E-0-12	Soil	10/5/2023		X
180-163685-1	180-163685-13	T02A-0-6	Soil	10/7/2023	X	
180-163685-1	180-163685-14	T02C-0-6	Soil	10/7/2023	X	
180-163685-1	180-163685-15	T02C-6-12	Soil	10/7/2023	X	
180-163685-1	180-163685-16	T02C-0-12	Soil	10/7/2023		X
180-163685-1	180-163685-17	T02D-0-6	Soil	10/7/2023	X	

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[1] ASTM International, formerly known as American Society for Testing and Materials.

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163685-1	180-163685-18	T02D-6-12	Soil	10/7/2023	X	
180-163685-1	180-163685-19	T02D-0-12	Soil	10/7/2023		X
180-163685-1	180-163685-20	T02F-0-6	Soil	10/7/2023	X	
180-163685-1	180-163685-21	T02F-6-12	Soil	10/7/2023	X	
180-163685-1	180-163685-22	T02F-0-12	Soil	10/7/2023		X
180-163685-1	180-163685-23	T02E-0-6	Soil	10/7/2023	X	
180-163685-1	180-163685-24	T02E-6-12	Soil	10/7/2023	X	
180-163685-1	180-163685-25	T02E-0-12	Soil	10/7/2023		X
180-163685-1	180-163685-26	T02B-0-6	Soil	10/7/2023	X	
180-163685-1	180-163685-27	T02B-6-12	Soil	10/7/2023	X	
180-163685-1	180-163685-28	T02B-0-12	Soil	10/7/2023		X

Note:
SDG = sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the USEPA Contract Laboratory Program National Functional Guidelines (Inorganic; USEPA, 2017]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Note:
QC = quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to sample shipment. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by Method 6020	Water	Nitric acid to pH less than 2	180 days
	Soil	None	180 days
Mercury by Method 7470A	Water	Nitric acid to pH less than 2	28 days
Mercury by Method 7471B	Soil	Less than or equal to 6°C	28 days

Note:
°C = degree Celsius

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated.

Acceptance criteria were met.

- The relative standard deviation for each analyte is less than 5 percent.
- Average peak width is less than 0.9 atomic mass units (amu) at 10 percent peak height. This is the criterion applied by the laboratory.

Laboratory staff provided the following information:

- The laboratory's "tune check point-of-failure is 0.9 amu at 10% peak height. . . . There is a trade-off between peak width and sensitivity, so we are tuning to the manufacturer's recommended settings. Our tuning performance specifications are set to meet the newer guidance from EPA 6020 and DOD [Department of Defense] source documents." Laboratory staff also provided the following statements from referenced guidance:
  - "The resolution must also be verified to be less than 0.9 u[2] full width at 10% peak height."[3]
  - "Resolution < 0.9 amu full width at 10% peak height."[4]

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[2] u = unified atomic mass unit

[3] USEPA. 2014. Method 6020B (SW-846): Inductively Coupled Plasma-Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. Method 6020B: Inductively Coupled Plasma - Mass Spectrometry, part of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (epa.gov)

[4] Department of Defense (DoD) and Department of Energy (DOE). 2021. Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. QSM Version 5.4 FINAL (osd.mil)

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract-required quantitation limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Results for laboratory method blanks, and for instrument blanks that are associated with samples in this SDG, were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within acceptance limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 4**. Note that matrix spike analyses cannot be evaluated if the unspiked sample concentration of the relevant analyte is greater than or equal to 4x the spike amount. The matrix spike/matrix spike duplicate analysis of mercury in sample 80-163685-7 could not be evaluated because the analyte concentration in the unspiked parent sample was too great.

Table 4 Observed Matrix Spike Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-163685-7	Copper	135 percent	321 percent	Greater than upper acceptance limit
	Zinc	Acceptable	126 percent	Acceptable

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike results, qualifiers shown in **Table 5** were applied to results for the listed metals in all field samples in this SDG.

Table 5 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

QC Nonconformance	Sample Result	Qualification[1]
%R: • 30–74 percent for most metals including mercury • 20–74 percent for silver and antimony	Non-detect	UJ
	Detect	J
%R: • Less than 30 percent for most metals including mercury • Less than 20 percent for silver and antimony	Non-detect	UJ if PDS %R is greater than or equal to 75 percent
		R if PDS not performed or PDS %R is less than 75 percent
	Detect	J
%R: • Greater than 125 percent for most metals including mercury • Greater than 150 percent for silver and antimony	Non-detect	No Action
	Detect	J
Matrix spike/matrix spike duplicate relative percent difference: • Greater than 20 percent (aqueous) • Greater than 35 percent (soil/sediment)	Non-detect	UJ
	Detect	J

Notes:
[1] See **Table 2** for qualifier definitions.
%R = percent recovery
PDS = post-digestion spike

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as the normal field samples. The analytical results of the two laboratory duplicates are compared to assess precision.

Results associated with laboratory duplicate results outside acceptance limits are shown in **Table 6**. When the parent and duplicate results are both significantly greater than the associated reporting limit, the relationship between the two results is expressed numerically as the relative percent difference.

Table 6 Observed Laboratory Duplicate Nonconformances – Metals

Sample	Analyte	Relative Percent Difference
180-163685-7	Mercury	NC

Note:
NC = Not compliant. This refers to cases in which the sample and/or duplicate concentration is less than 5× the reporting limit and the difference between the two is outside the acceptance limits.

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant laboratory duplicate results, qualifiers were applied to mercury results in all samples in this SDG.

Table 7 Laboratory Duplicate Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification[(1)]
Sample and its duplicate is greater than or equal to 5x the reporting limit **and** • Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)	Detect	J
Sample and/or its duplicate is less than 5x the reporting limit **and** • Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)	Non-detect	UJ
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions.

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a five-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100 times the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution was performed on sample 180-163685-7; the relationship between results for copper was acceptable. The results for selenium and zinc could not be evaluated because the analytes were not present in the parent sample at sufficient concentrations.

3.10 Inductively Coupled Plasma–Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met. Internal standards exhibited relative intensity values within control limits.

3.11 Field Duplicates

Acceptance criteria (**Table 8**) were met. One parent sample-field duplicate sample pair was included in this SDG.

Table 8 Acceptable Parent Sample–Field Duplicate Relationships – Metals

Parent Sample – Field Duplicate Sample Acceptable Relationships	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 30 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/ sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 2× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 3× the reporting limit (soil/sediment)

3.12 Additional Notes

Notes in the narrative state, “Several samples required dilution prior to analysis.”

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. Samples with less than 50 percent solids are listed in **Table 9**.

Table 9 Observed Percent Solids Nonconformances – Metals

Sample ID	Percent Solids
180-163685-5	48.6 percent
180-163685-6	46.4 percent

Because of these QC exceedances, metals results for this sample have been qualified as estimated in accordance with **Table 10**.

Table 10 Percent Solids Nonconformance Actions – Metals

Percent Solids	Sample Result	Sample Result Qualification(1)
Less than 50 percent but greater than or equal to 10 percent	Non-detect	UJ
	Detect	J
Less than 10 percent	Non-detect	R
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 11**.

Table 11 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by Method 9045	Soil/Sediment	Less than or equal to 6°C	7 days
Temperature by Method 9045	Soil/Sediment	None	15 minutes
Total organic carbon by The Lloyd Kahn Method	Soil/Sediment	Less than or equal to 6°C	14 days

Note:
°C = degree Celsius

Analyses performed outside of the specified holding times are listed in **Table 12**. All other holding time criteria were met.

Table 12 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163685-4 180-163685-9 180-163685-12 180-163685-16 180-163685-19 180-163685-22 180-163685-25 180-163685-28	pH by Method 9045	7 days	23–26 days
	Temperature by Method 9045	15 minutes	

The samples listed in **Table 12** have been qualified as shown in **Table 13**.

Table 13 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification[1]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

Note:
[1] See **Table 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The continuing calibration verification results were within limits.
- The calibration curves exhibited acceptable correlation coefficients.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. No detections were reported in Lloyd Kahn laboratory method blanks or calibration blanks.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable; no matrix spike analysis performed on a sample in this SDG was reported.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 14**) were met. Laboratory duplicate analysis was performed on sample 180-163685-28 for pH and temperature and on sample 180-163685-4 for percent solids.

Table 14 Acceptable Parent Sample-Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

4.7 Field Duplicates

Not applicable; the field duplicate in this SDG was only designated for metals analysis, not general chemistry analysis.

4.8 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, samples designated for general chemistry analysis met this criterion. No results were qualified because of percent solids values.

The laboratory report narrative includes a note stating, “All samples are analyzed in duplicate with the average results reported. For the following sample, the % RPD of the individual result exceeded 50%. The sample was reanalyzed with acceptable %RPD. The reanalysis results were reported: T01D-0-12 (180-163685-9).”

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. 2010. DER-10: Technical Guidance for Site Investigation and Remediation. May 3.

United States Environmental Protection Agency. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T04A-0-6	10/4/2023	Soil	T	6020B	Copper	mg/kg	17	J	0.49		180-163685-1	180-163685-1
T01E-0-6	10/5/2023	Soil	T	6020B	Copper	mg/kg	26	J	0.52		180-163685-10	180-163685-1
T01E-6-12	10/5/2023	Soil	T	6020B	Copper	mg/kg	23	J	0.37		180-163685-11	180-163685-1
T02A-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	17	J	0.48		180-163685-13	180-163685-1
T02C-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	1600	J	26		180-163685-14	180-163685-1
T02C-6-12	10/7/2023	Soil	T	6020B	Copper	mg/kg	280	J	2.1		180-163685-15	180-163685-1
T02D-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	1800	J	29		180-163685-17	180-163685-1
T02D-6-12	10/7/2023	Soil	T	6020B	Copper	mg/kg	130	J	0.45		180-163685-18	180-163685-1
T03A-0-6	10/4/2023	Soil	T	6020B	Copper	mg/kg	31	J	0.58		180-163685-2	180-163685-1
T02F-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	14	J	0.49		180-163685-20	180-163685-1
T02F-6-12	10/7/2023	Soil	T	6020B	Copper	mg/kg	13	J	0.38		180-163685-21	180-163685-1
T02E-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	20	J	0.51		180-163685-23	180-163685-1
T02E-6-12	10/7/2023	Soil	T	6020B	Copper	mg/kg	17	J	0.50		180-163685-24	180-163685-1
T02B-0-6	10/7/2023	Soil	T	6020B	Copper	mg/kg	390	J	2.7		180-163685-26	180-163685-1
T02B-6-12	10/7/2023	Soil	T	6020B	Copper	mg/kg	520	J	2.4		180-163685-27	180-163685-1
T03A-6-12	10/4/2023	Soil	T	6020B	Copper	mg/kg	16	J	0.53		180-163685-3	180-163685-1
T01C-0-6	10/5/2023	Soil	T	6020B	Copper	mg/kg	2100	J	40		180-163685-5	180-163685-1
DUP-10	10/5/2023	Soil	T	6020B	Copper	mg/kg	2300	J	37		180-163685-6	180-163685-1
T01D-0-6	10/5/2023	Soil	T	6020B	Copper	mg/kg	200	J	2.4	F1F2	180-163685-7	180-163685-1
T01D-6-12	10/5/2023	Soil	T	6020B	Copper	mg/kg	110	J	0.44		180-163685-8	180-163685-1
T01C-0-6	10/5/2023	Soil	T	6020B	Selenium	mg/kg	7.7	J	0.81		180-163685-5	180-163685-1
DUP-10	10/5/2023	Soil	T	6020B	Selenium	mg/kg	8.6	J	0.74		180-163685-6	180-163685-1
T04A-0-6	10/4/2023	Soil	T	6020B	Zinc	mg/kg	85	J	37		180-163685-1	180-163685-1
T01E-0-6	10/5/2023	Soil	T	6020B	Zinc	mg/kg	76	J	39		180-163685-10	180-163685-1
T01E-6-12	10/5/2023	Soil	T	6020B	Zinc	mg/kg	83	J	28		180-163685-11	180-163685-1
T02A-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	80	J	36		180-163685-13	180-163685-1
T02C-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	290	J	190		180-163685-14	180-163685-1
T02C-6-12	10/7/2023	Soil	T	6020B	Zinc	mg/kg	94	J	31		180-163685-15	180-163685-1
T02D-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	280	J	220		180-163685-17	180-163685-1
T02D-6-12	10/7/2023	Soil	T	6020B	Zinc	mg/kg	96	J	33		180-163685-18	180-163685-1
T03A-0-6	10/4/2023	Soil	T	6020B	Zinc	mg/kg	89	J	43		180-163685-2	180-163685-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T02F-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	70	J	36		180-163685-20	180-163685-1
T02F-6-12	10/7/2023	Soil	T	6020B	Zinc	mg/kg	67	J	28		180-163685-21	180-163685-1
T02E-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	74	J	39		180-163685-23	180-163685-1
T02E-6-12	10/7/2023	Soil	T	6020B	Zinc	mg/kg	76	J	37		180-163685-24	180-163685-1
T02B-0-6	10/7/2023	Soil	T	6020B	Zinc	mg/kg	150	J	41		180-163685-26	180-163685-1
T02B-6-12	10/7/2023	Soil	T	6020B	Zinc	mg/kg	190	J	36		180-163685-27	180-163685-1
T03A-6-12	10/4/2023	Soil	T	6020B	Zinc	mg/kg	86	J	40		180-163685-3	180-163685-1
T01C-0-6	10/5/2023	Soil	T	6020B	Zinc	mg/kg	330	J	61		180-163685-5	180-163685-1
DUP-10	10/5/2023	Soil	T	6020B	Zinc	mg/kg	310	J	56		180-163685-6	180-163685-1
T01D-0-6	10/5/2023	Soil	T	6020B	Zinc	mg/kg	110	J	36	F1	180-163685-7	180-163685-1
T01D-6-12	10/5/2023	Soil	T	6020B	Zinc	mg/kg	120	J	33		180-163685-8	180-163685-1
T01E-0-6	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.17	J	0.077		180-163685-10	180-163685-1
T01E-6-12	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.094	J	0.075		180-163685-11	180-163685-1
T02A-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.12	J	0.090		180-163685-13	180-163685-1
T02C-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	8.6	J	0.98		180-163685-14	180-163685-1
T02C-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1.4	J	0.17		180-163685-15	180-163685-1
T02D-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	12	J	1.0		180-163685-17	180-163685-1
T02D-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1.4	J	0.16		180-163685-18	180-163685-1
T03A-0-6	10/4/2023	Soil	T	7471B	Mercury	mg/kg	0.15	J	0.080		180-163685-2	180-163685-1
T02E-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.14	J	0.086		180-163685-23	180-163685-1
T02E-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.1	J	0.082		180-163685-24	180-163685-1
T02B-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1.6	J	0.22		180-163685-26	180-163685-1
T02B-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	5.6	J	0.90		180-163685-27	180-163685-1
T03A-6-12	10/4/2023	Soil	T	7471B	Mercury	mg/kg	0.15	J	0.074		180-163685-3	180-163685-1
T01C-0-6	10/5/2023	Soil	T	7471B	Mercury	mg/kg	24	J	6.2		180-163685-5	180-163685-1
DUP-10	10/5/2023	Soil	T	7471B	Mercury	mg/kg	19	J	2.6		180-163685-6	180-163685-1
T01D-0-6	10/5/2023	Soil	T	7471B	Mercury	mg/kg	1.6	J	0.40	F2	180-163685-7	180-163685-1
T01D-6-12	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.35	J	0.076		180-163685-8	180-163685-1
T01E-0-12	10/5/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163685-12	180-163685-1
T02C-0-12	10/7/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163685-16	180-163685-1
T02D-0-12	10/7/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163685-19	180-163685-1
T02F-0-12	10/7/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163685-22	180-163685-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T02E-0-12	10/7/2023	Soil	T	9045D	pH	SU	6	J	0.1	HF	180-163685-25	180-163685-1
T02B-0-12	10/7/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163685-28	180-163685-1
T03A-0-12	10/4/2023	Soil	T	9045D	pH	SU	5.7	J	0.1	HF	180-163685-4	180-163685-1
T01D-0-12	10/5/2023	Soil	T	9045D	pH	SU	6.7	J	0.1	HF	180-163685-9	180-163685-1
T01E-0-12	10/5/2023	Soil	T	9045D	Temperature	deg c	21.5	J	0.1	HF	180-163685-12	180-163685-1
T02C-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.5	J	0.1	HF	180-163685-16	180-163685-1
T02D-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.7	J	0.1	HF	180-163685-19	180-163685-1
T02F-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.2	J	0.1	HF	180-163685-22	180-163685-1
T02E-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.2	J	0.1	HF	180-163685-25	180-163685-1
T02B-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.3	J	0.1	HF	180-163685-28	180-163685-1
T03A-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21.6	J	0.1	HF	180-163685-4	180-163685-1
T01D-0-12	10/5/2023	Soil	T	9045D	Temperature	deg c	21.5	J	0.1	HF	180-163685-9	180-163685-1

Notes:
deg c = degree Celsius
F1 = matrix spike and/or matrix spike duplicate recovery exceeds control limits
F2 = matrix spike/matrix spike duplicate relative percent difference exceeds control limits
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (validation qualifier) = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram per kilogram
SDG = sample delivery group
SU = standard unit
T = Total

EHS Support Validation Report Number: 715

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163686-1
Analyses: Metals, General Chemistry
Review Level: Data Usability Summary Report (DUSR)

Analyses performed by:
Eurofins Lancaster Laboratories Environment Testing in Lancaster, Pennsylvania, and *Eurofins* in Pittsburgh, Pennsylvania and Burlington, Vermont

Report Date:
June 17, 2024

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Appendix

1 Sample and Analytical Protocol Summary

Soil samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York, and were analyzed using the following methods:

- United States Environmental Protection Agency (USEPA) SW-846 Methods
  - 6020B for metals
  - 7471B for mercury
  - 9045D for pH and temperature
- The Lloyd Kahn Method for total organic carbon

Geophysical data are reported from ASTM[1] Method D422. These data were not included in the validation. Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163686-1	180-163686-1	T04A-6-12	Soil	10/4/2023	X	
180-163686-1	180-163686-2	T04A-12-24	Soil	10/4/2023	X	
180-163686-1	180-163686-3	T04A-0-12	Soil	10/4/2023		X
180-163686-1	180-163686-4	T03A-12-24	Soil	10/4/2023	X	
180-163686-1	180-163686-5	T04B-0-6	Soil	10/4/2023	X	
180-163686-1	180-163686-6	T04B-6-12	Soil	10/4/2023	X	
180-163686-1	180-163686-7	T04B-12-24	Soil	10/4/2023	X	
180-163686-1	180-163686-8	T04B-0-12	Soil	10/4/2023		X
180-163686-1	180-163686-9	T01C-0-12	Soil	10/5/2023		X
180-163686-1	180-163686-10	DUP-11	Soil	10/5/2023	X	
180-163686-1	180-163686-11	T01C-6-12	Soil	10/5/2023	X	
180-163686-1	180-163686-12	T01C-12-24	Soil	10/5/2023	X	
180-163686-1	180-163686-13	T01D-12-24	Soil	10/5/2023	X	
180-163686-1	180-163686-14	T01E-12-24	Soil	10/5/2023	X	
180-163686-1	180-163686-15	T02A-6-12	Soil	10/7/2023	X	
180-163686-1	180-163686-16	T02A-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-17	T02A-0-12	Soil	10/7/2023		X

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[1] ASTM International, formerly known as American Society for Testing and Materials.

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163686-1	180-163686-18	T02C-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-19	T02D-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-20	T02F-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-21	T01B-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-22	T01B-0-6	Soil	10/7/2023	X	
180-163686-1	180-163686-23	T01B-6-12	Soil	10/7/2023	X	
180-163686-1	180-163686-24	T01B-0-12	Soil	10/7/2023		X
180-163686-1	180-163686-25	T02E-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-26	T02B-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-27	T01A-0-6	Soil	10/7/2023	X	
180-163686-1	180-163686-28	T01A-6-12	Soil	10/7/2023	X	
180-163686-1	180-163686-29	T01A-12-24	Soil	10/7/2023	X	
180-163686-1	180-163686-30	T01A-0-12	Soil	10/7/2023		X

Note:
SDG = sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the USEPA Contract Laboratory Program National Functional Guidelines (Inorganic; USEPA, 2017), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 2**).

Table 2 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Note:
QC = quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to sample shipment. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by Method 6020	Water	Nitric acid to pH less than 2	180 days
	Soil	None	180 days
Mercury by Method 7470A	Water	Nitric acid to pH less than 2	28 days
Mercury by Method 7471B	Soil	Less than or equal to 6°C	28 days

Note:
°C = degree Celsius

3.2 Inductively Coupled Plasma–Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated.

Acceptance criteria were met.

- The relative standard deviation for each analyte is less than 5 percent.
  Average peak width is less than 0.9 atomic mass units (amu) at 10 percent peak height. This is the criterion applied by the laboratory.

Laboratory staff provided the following information:

- The laboratory's "tune check point-of-failure is 0.9 amu at 10% peak height. . . . There is a trade-off between peak width and sensitivity, so we are tuning to the manufacturer's recommended settings. Our tuning performance specifications are set to meet the newer guidance from EPA 6020 and DOD [Department of Defense] source documents." Laboratory staff also provided the following statements from referenced guidance:
  - "The resolution must also be verified to be less than 0.9 u[2] full width at 10% peak height."[3]
  - "Resolution < 0.9 amu full width at 10% peak height."[4]

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[2] u = unified atomic mass unit

[3] USEPA. 2014. Method 6020B (SW-846): Inductively Coupled Plasma-Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. Method 6020B: Inductively Coupled Plasma - Mass Spectrometry, part of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (epa.gov)

[4] Department of Defense (DoD) and Department of Energy (DOE). 2021. Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. QSM Version 5.4 FINAL (osd.mil)

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:
- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract-required quantitation limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). Some common types of blanks follow:
- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Results for laboratory method blanks and instrument blanks were non-detect.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument’s ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within acceptance limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Acceptance criteria were met. Matrix spike/matrix spike duplicate analysis was performed on sample 180-163686-13 for mercury and Method 6020 metals.

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as the normal field samples. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 4**) were met. Laboratory duplicates of sample 180-163686-13 were analyzed for mercury and Method 6020 metals.

Table 4 Acceptable Parent Sample - Laboratory Duplicate Relationships – Metals

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and its lab duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and/or its lab duplicate concentrations(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a five-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100 times the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Acceptance criteria were met. Serial dilution was performed on sample 180-163686-13; the relationship between results for copper was acceptable. The results for selenium and zinc could not be evaluated because the analytes were not present in the parent sample at sufficient concentrations.

3.10 Inductively Coupled Plasma–Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met. Internal standards exhibited relative intensity values within control limits.

3.11 Field Duplicates

One field duplicate sample was included in this SDG. The parent result-field duplicate result relationships that are outside acceptance limits are shown in **Table 5**. When the parent and field duplicate results are both significantly greater than the associated reporting limit, the relationship between the two results is expressed numerically as the relative percent difference.

Table 5 Observed Field Duplicate Nonconformances – Metals

Samples	Analyte	Parent Sample Result (mg/kg)	Duplicate Sample Result (mg/kg)	Relationship
T01C-6-12/ DUP-11	Mercury	3.2	0.77	NC

Notes:
mg/kg = milligram per kilogram
NC = Not compliant. This refers to cases in which the sample and/or duplicate concentration is less than 5× the reporting limit and the difference between the two is outside the acceptance limits.

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied (**Table 6**). Because of the noncompliant parent sample–field duplicate relationships, qualifiers were applied to mercury results for in all field samples in this SDG.

Table 6 Field Duplicate Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification[1]
Sample and its field duplicate concentrations are greater than or equal to 5x the reporting limit, **and** • Relative percent difference is greater than 30 percent (aqueous) **or** • Relative percent difference is greater than 50 percent (soil/sediment)	Detect	J
Sample and/or its field duplicate concentrations(s) is/are less than 5× the reporting limit, **and** • Absolute difference is greater than 2× the reporting limit (aqueous) **or** • Absolute difference is greater than 3× the reporting limit (soil/sediment)	Non-detect	UJ
	Detect	J

Note:
[1] See **Table 2** for qualifier definitions.

3.12 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

Notes in the narrative state:
- "Samples T01C-6-12 (180-163686-11) and T01B-0-6 (180-163686-22) required dilution prior to analysis on the ICP/MS. The reporting limits have been adjusted accordingly. All samples were analyzed at a 2X dilution."
- "Samples T01C-6-12 (180-163686-11), T01B-12-24 (180-163686-21), T01B-0-6 (180-163686-22), T01B-6-12 (180-163686-23), T02B-12-24 (180-163686-26) and T01A-0-6 (180-163686-27) required dilution prior to analysis for Mercury. The reporting limits have been adjusted accordingly."

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 7**.

Table 7 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
pH by Method 9045	Soil/ Sediment	Less than or equal to 6°C	7 days
Temperature by Method 9045	Soil/ Sediment	None	15 minutes
Total organic carbon by The Lloyd Kahn Method	Soil/ Sediment	Less than or equal to 6°C	14 days

Note:
°C = degree Celsius

Analyses performed outside of the specified holding times are listed in **Table 8**. All other holding time criteria were met.

Table 8 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163686-3 180-163686-8 180-163686-9 180-163686-17 180-163686-24 180-163686-30	pH by Method 9045	7 days	25–28 days
	Temperature by Method 9045	15 minutes	

The samples listed in **Table 8** have been qualified as shown in **Table 9.**

Table 9 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification[1]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2× holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time	J	R

Note:
[1] See **Table 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The continuing calibration verification results were within limits.
- The calibration curve exhibited an acceptable correlation coefficient.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. No detections were reported in Lloyd Kahn laboratory method blank or calibration blanks.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike—that is, a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable. No matrix spike analysis performed on a sample in this data set was reported. .

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Acceptance criteria (**Table 10**) were met. Laboratory duplicate analysis was performed on sample 180-163686-3 for pH, temperature, and percent solids.

Table 10 Acceptable Parent Sample-Laboratory Duplicate Relationships – General Chemistry

Parent Sample and Laboratory Duplicate Sample Concentrations	Difference
Sample and field duplicate concentrations are greater than or equal to 5× the reporting limit	• Relative percent difference is less than or equal to 20 percent (aqueous) **or** • Relative percent difference is less than or equal to 35 percent (soil/sediment)
Sample and/or field duplicate concentration(s) is/are less than 5× the reporting limit	• Absolute difference is less than or equal to 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment)

4.7 Field Duplicates

Not applicable; the field duplicate in this SDG was only designated for metals analysis, not general chemistry analysis.

4.8 Additional Notes

Non-aqueous samples with at least 50 percent solids do not require qualification of inorganic analytes based on the percent solids values. In this data set, this criterion was met; no results were qualified because of percent solids values.

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. 2010. DER-10: Technical Guidance for Site Investigation and Remediation. May 3.

United States Environmental Protection Agency. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
DUP-11	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.77	J	0.082		180-163686-10	180-163686-1
T01C-6-12	10/5/2023	Soil	T	7471B	Mercury	mg/kg	3.2	J	0.43		180-163686-11	180-163686-1
T01C-12-24	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.096	J	0.072		180-163686-12	180-163686-1
T01D-12-24	10/5/2023	Soil	T	7471B	Mercury	mg/kg	0.1	J	0.075		180-163686-13	180-163686-1
T02C-12-24	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.093	J	0.071		180-163686-18	180-163686-1
T02D-12-24	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.082	J	0.076		180-163686-19	180-163686-1
T01B-12-24	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.87	J	0.14		180-163686-21	180-163686-1
T01B-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1.5	J	0.17		180-163686-22	180-163686-1
T01B-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1.1	J	0.14		180-163686-23	180-163686-1
T02B-12-24	10/7/2023	Soil	T	7471B	Mercury	mg/kg	1	J	0.16		180-163686-26	180-163686-1
T01A-0-6	10/7/2023	Soil	T	7471B	Mercury	mg/kg	2	J	0.50		180-163686-27	180-163686-1
T01A-6-12	10/7/2023	Soil	T	7471B	Mercury	mg/kg	0.14	J	0.086		180-163686-28	180-163686-1
T03A-12-24	10/4/2023	Soil	T	7471B	Mercury	mg/kg	0.19	J	0.082		180-163686-4	180-163686-1
T04B-0-6	10/4/2023	Soil	T	7471B	Mercury	mg/kg	0.14	J	0.095		180-163686-5	180-163686-1
T02A-0-12	10/7/2023	Soil	T	9045D	pH	SU	7	J	0.1	HF	180-163686-17	180-163686-1
T01B-0-12	10/7/2023	Soil	T	9045D	pH	SU	6.7	J	0.1	HF	180-163686-24	180-163686-1
T04A-0-12	10/4/2023	Soil	T	9045D	pH	SU	8	J	0.1	HF	180-163686-3	180-163686-1
T01A-0-12	10/7/2023	Soil	T	9045D	pH	SU	6.9	J	0.1	HF	180-163686-30	180-163686-1
T04B-0-12	10/4/2023	Soil	T	9045D	pH	SU	7.3	J	0.1	HF	180-163686-8	180-163686-1
T01C-0-12	10/5/2023	Soil	T	9045D	pH	SU	7.6	J	0.1	HF	180-163686-9	180-163686-1
T02A-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.1	J	0.1	HF	180-163686-17	180-163686-1
T01B-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.1	J	0.1	HF	180-163686-24	180-163686-1
T04A-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21	J	0.1	HF	180-163686-3	180-163686-1
T01A-0-12	10/7/2023	Soil	T	9045D	Temperature	deg c	21.1	J	0.1	HF	180-163686-30	180-163686-1
T04B-0-12	10/4/2023	Soil	T	9045D	Temperature	deg c	21	J	0.1	HF	180-163686-8	180-163686-1
T01C-0-12	10/5/2023	Soil	T	9045D	Temperature	deg c	21.1	J	0.1	HF	180-163686-9	180-163686-1

Notes:
deg c = degree Celsius
HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (validation qualifier) = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
mg/kg = milligram per kilogram
SDG = sample delivery group
SU = standard units
T = Total

EHS Support Validation Report Number: 635

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-163687-1

Analyses: Metals, General Chemistry

Review Level: DUSR

Analyses performed by: Eurofins Lancaster Laboratories Environmental and Eurofins Lancaster, Pennsylvania and Pittsburgh, Pennsylvania

EHS Support℠

Report Date:
November 30, 2023

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List of Appendices

1 Sample and Analytical Protocol Summary

Equipment blank samples were collected at the Dyno Nobel Port Ewen Site in Port Ewen, New York and were analyzed using United States Environmental Protection Agency (USEPA) SW-846 Methods:

- 6020B for metals
- 7470A for mercury
- 9060A for total organic carbon
- 9040C for pH

Samples included in this sample delivery group (SDG), and in this data validation report, are listed in **Table 1**.

Table 1 Sample and Analytical Protocol Summary

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analyses	
					Metals	General Chemistry
180-163687-1	180-163687-1	EQB05-20231004	Water	10/4/2023	X	X
180-163687-1	180-163687-2	EQB06-20231005	Water	10/5/2023	X	X
180-163687-1	180-163687-3	EQB07-20231006	Water	10/6/2023	X	X
180-163687-1	180-163687-4	EQB08-20231007	Water	10/7/2023	X	X
180-163687-1	180-163687-5	EQB09-20231008	Water	10/8/2023	X	X
180-163687-1	180-163687-6	EQB10-20231009	Water	10/9/2023	X	X

SDG = Sample delivery group

2 Data Review Summary

2.1 Guidelines and Qualifiers

Data were reviewed in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines (Inorganic [USEPA, 2017a] and Organic [USEPA, 2017b]), laboratory analytical methods, and professional judgment. It is expected that the laboratory conducted a sufficient quality review of the data before reporting. While quality control (QC) is meant to increase confidence in analytical data, it is important to note that no compound concentration is guaranteed to be accurate, even if all QC criteria are met.

Data validation includes a review of reported results and supporting documentation in the laboratory report. Based on this evaluation, qualifiers may be added, deleted, or modified. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines (**Table 1**).

Table 1 Qualifier Codes and Definitions

Qualifier Code	Definition
U	The analyte was included in the analysis but was not detected above the reported quantitation limit, or the result is considered non-detect as a consequence of associated blank contamination.
UJ	The analyte was included in the analysis but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

QC = Quality control

2.2 Sample Custody and Receipt

The chain of custody was properly completed; the gap between the relinquishing date/time and the receiving date/time is assumed to correspond to the time samples were in the custody of the commercial shipper (FedEx). It is assumed that custody was maintained. No notes were encountered that indicate issues with sample condition upon receipt; samples appear to have been received in good condition and appropriately preserved.

2.3 Assessment Summary and Data Usability

In this SDG, no QC excursions encountered led to the rejection of data. Results reported in this SDG are considered usable. The specific QC variances and data qualification are outlined in this report. Records that have updated qualifiers are presented in **Appendix A.**

3 Metals Analysis

3.1 Preservation and Holding Times

Acceptance criteria were met. Relevant preservation and holding time requirements for metals are presented in **Table 2**.

Table 2 Preservation and Holding Time Requirements – Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by 6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7470A	Water	HNO_3 to pH less than 2	28 days
Mercury by 7471B	Soil	Less than or equal to 6 °C	28 days

°C = Degrees Celsius
HNO_3 = Nitric acid

3.2 Inductively Coupled Plasma-Mass Spectrometry Tune

Inductively coupled plasma-mass spectrometry instruments are tuned to optimize the equipment by adjusting physical and electronic elements. Instrument tuning is periodically checked and adjusted. Peak shape and width, as well as mass accuracy, can be evaluated. The National Functional Guidelines (USEPA, 2017) require that both of the following are true:

- Mass calibration is within 0.1 atomic mass unit.
- The relative standard deviation among raw results of absolute signals of each analyte must be less than 5 percent.

Acceptance criteria were met.

3.3 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- The initial calibration verification and continuing calibration verification recoveries were within limits for all reported metals.
- Contract required detection limit check standards were analyzed; recoveries were acceptable.

3.4 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. In short, blanks are containers of analyte-free water (and in some cases, analyte-free or 'clean' sand when associated samples are solids). The following are common types of blanks:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met. Results for instrument blanks and laboratory method blanks were non-detect.

The samples in this SDG are equipment blanks that are used to evaluate field sample data reported in separate laboratory reports. Mercury was detected in sample 180-163687-4 (EQB08-20231007). This blank is associated with field samples in SDGs 180-163685 and 180-163686. Blank contamination and consequent field sample result qualification are presented in the corollary validation reports.

3.5 Inductively Coupled Plasma Interference Check Sample

Interference check samples are analyzed to determine the validity of the analytical results specifically related to the instrument's ability to overcome interferences that commonly occur in samples. Spectral interference is the overlap of emission from more than one species. This occurs if wavelength separation of interfering species is less than instrument resolution. Laboratories can correct for spectral interferences using inter-element correction and background correction. Interference check sample solutions are analyzed to verify the inter-element and background correction factors. One of the interference check sample solutions includes common interferents as well as target analytes. Interference check sample solutions are analyzed and recovery of target analytes within 20 percent of the true value is considered acceptable.

Acceptance criteria were met.

3.6 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Laboratory control sample recoveries were within control limits.

3.7 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable, no matrix spike analysis was reported in this data set.

3.8 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis that normal field samples do. The analytical results of the two laboratory duplicates are compared to assess precision.

Not applicable, no laboratory duplicate analysis was reported in this data set.

3.9 Serial Dilution

Serial dilution is used to determine whether significant physical or chemical interferences exist due to the sample matrix. A sample is analyzed undiluted and at a 5-fold dilution, then the calculated results are compared. Serial dilution analysis in inductively coupled plasma-mass spectrometry methods is evaluated for analytes that were detected in the original sample at concentrations at least 100x the method detection limit; the concentration in the undiluted sample must be sufficiently great to obtain a meaningful comparison. The results of the inductively coupled plasma serial dilution are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Not applicable, no serial dilution analysis was reported in this data set.

3.10 Inductively Coupled Plasma-Mass Spectrometry Internal Standards

Internal standards are used to correct for a variety of factors. An internal standard has physical and chemical properties that are similar to those of target analytes and is expected to exhibit behavior similar to the analytes' behavior. The ratio of analyte to associated internal standard should be independent of sample matrix or fluctuations in instrument operating conditions. A known quantity of internal standard is added to each sample, standard, and blank and reported quantities of target analytes are calculated based on the relative instrument measurements of the target analyte (whose concentration is unknown) and the associated internal standard (whose concentration is known). In other words, target analytes are quantitated using the internal standards.

Acceptance criteria were met; internal standards associated with reported results exhibited relative intensity values within control limits.

3.11 Field Duplicates

Not applicable, no field duplicate sample was included in this SDG.

3.12 Additional Notes

Not applicable; there are no additional notes to present.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 3**.

Table 3 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
Total organic carbon by 9060	Water	Less than or equal to 6 °C; pH less than 2	28 days
pH by 9040	Water	Less than or equal to 6 °C	15 minutes

°C = Degrees Celsius

Analyses performed outside of the specified holding times are listed in **Table 4**. All other holding time criteria were met.

Table 4 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-163687-1 180-163687-2 180-163687-3 180-163687-4 180-163687-5 180-163687-6	pH by 9040	15 minutes	3-20 days

The samples listed in **Table 4** have been qualified as shown in **Table 5.**

Table 5 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Excursion	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed in less than 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

[a] See **Section 2** for qualifier definitions.

4.2 Calibration

Instrument calibration is the process that determines the relationship between analyte concentration and instrument signal. Standards with known concentrations are analyzed and appropriate concentration values are correlated with the resultant signals. Analytical methods include specific criteria for initial calibrations, which demonstrate acceptable performance at the beginning of an analytical run, and for continuing calibrations, which demonstrate instrument performance throughout the analytical sequence. The objective is to ensure that instruments are calibrated accurately to produce acceptable qualitative and quantitative data for analytes included in the calibration.

Acceptance criteria were met:

- Initial calibration verification and continuing calibration verification recoveries, for pH and total organic carbon, were within control limits.
- Correlation coefficients reported for total organic calibration curves were within control limits.

4.3 Blanks

Blanks are analyzed to identify contamination that may have been introduced into samples. There are several types of blanks that undergo different portions of the process undergone by field samples. Blanks are containers of analyte-free water (and in some cases, analyte-free or ‘clean’ sand when associated samples are solids). Some common types of blanks follow:

- Laboratory method blanks indicate contamination introduced during sample preparation and/or analysis from sources such as reagents, glassware, equipment, sample handling, and ambient laboratory conditions.
- Equipment blanks indicate the effectiveness of the field decontamination procedures as well as contamination from new sampling equipment. They also identify contamination introduced from bottleware and ambient conditions.

Acceptance criteria were met; the result for the total organic carbon method blank was non-detect.

The samples in this SDG are equipment blanks that are used to evaluate field sample data reported in separate laboratory reports. Total organic carbon results for these equipment blanks were non-detect.

4.4 Laboratory Control Sample Analysis

A laboratory control sample is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or ‘clean’ sand). The laboratory control sample undergoes the same preparation and analytical procedure as field samples. The laboratory control sample is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

Acceptance criteria were met. Recoveries were within acceptable limits.

4.5 Matrix Spike/Matrix Spike Duplicate Analysis

A matrix spike is prepared when known concentrations of target analytes are spiked into an aliquot of field sample. The matrix spike undergoes the same preparation and analytical procedure as normal (unspiked) field samples. It is analyzed to evaluate the effects of interferences caused by the sample matrix. Poor spike recoveries could indicate matrix interference issues.

A matrix spike duplicate is an additional replicate of the matrix spike, i.e., a separate aliquot of sample into which the same concentrations of analytes are spiked. The matrix spike and matrix spike duplicate undergo the same preparation and analytical testing as the original sample. Recoveries of analytes from matrix spiked samples and from matrix spiked duplicates are evaluated to assess accuracy and bias. The relative percent difference between the matrix spike result and the matrix spike duplicate result is evaluated to assess precision.

Not applicable. No matrix spike/matrix spike duplicate analysis was reported in this data set.

4.6 Laboratory Duplicate Analysis

When a field sample is split into two sub-samples, these sub-samples are called laboratory duplicates or laboratory replicates. Each undergoes the same preparation and analysis as a normal field sample. The analytical results of the two laboratory duplicates are compared to assess precision.

Not applicable; no laboratory duplicate analysis was reported in this data set.

4.7 Field Duplicates

Not applicable. No field duplicate samples were submitted in this SDG.

4.8 Additional Notes

Not applicable; there are no additional notes to present.

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

USEPA. 2017a. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-540-R-2017-001. January.

USEPA. 2017b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

Appendix A Records with Updated Qualifiers

Table A-1 Records with Updated Qualifiers

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
EQB05-20231004	10/4/2023	Water	T	9040C	pH	SU	5.7	J	0.1	HF	180-163687-1	180-163687-1
EQB06-20231005	10/5/2023	Water	T	9040C	pH	SU	4.9	J	0.1	HF	180-163687-2	180-163687-1
EQB07-20231006	10/6/2023	Water	T	9040C	pH	SU	6.2	J	0.1	HF	180-163687-3	180-163687-1
EQB08-20231007	10/7/2023	Water	T	9040C	pH	SU	6.2	J	0.1	HF	180-163687-4	180-163687-1
EQB09-20231008	10/8/2023	Water	T	9040C	pH	SU	5.4	J	0.1	HF	180-163687-5	180-163687-1
EQB10-20231009	10/9/2023	Water	T	9040C	pH	SU	5.8	J	0.1	HF	180-163687-6	180-163687-1

HF = Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.
J (validation qualifier)= The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
SDG = sample delivery group
SU = Standard units
T = Total