Plantasie Creek Comprehensive Floodplain Soil Sampling Report

Hercules, Inc. Site #356001

Port Ewen, New York

Prepared for:

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May 2025

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Acronyms

CO	Consent Order
CSM	conceptual site model
ESCO	NYSDEC Soil Cleanup Objectives for the Protection of Ecological Resources
FWRIA	Fish and Wildlife Resources Impact Analysis
GE	General Electric Company
NYSDEC	New York State Department of Environmental Conservation
RBSC	Rural Background Soil Concentration
SCO	Soil Cleanup Objective
SGV	sediment guidance value
SWMU	Solid Waste Management Unit
TOC	total organic carbon
USEPA	United States Environmental Protection Agency

1 Introduction

This *Plantasie Creek Comprehensive Floodplain Soil Sampling Report* ("2025 Comprehensive Sampling 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 Hercules/Dyno Nobel Port Ewen Site ("Site"). 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.

The floodplain soil investigation was conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved *Plantasie Creek Floodplain Soil Investigation Work Plan* ("2022 Work Plan"; EHS Support, 2022) and *Plantasie Creek Floodplain Soil Investigation Supplemental Work Plan* ("2024 Supplemental Work Plan"; EHS Support, 2024a). Plantasie Creek and its floodplain are being investigated as part of a NYSDEC Fish and Wildlife Resources Impact Analysis (FWRIA) that is being conducted to support remedial investigations of the Site in accordance with Administrative Order on Consent (Consent Order [CO]) Index # CO 3-20180508-85 effective August 3, 2018.

This 2025 Comprehensive Sampling Report presents the findings from sampling conducted in accordance with the NYSDEC-approved 2022 Work Plan and 2024 Supplemental Work Plan. The 2022 Work Plan was developed to characterize potential ecological impacts and human health exposure to target metals—specifically copper, mercury, selenium, and zinc—in surface and subsurface soils within the extent of the floodplain that may be regularly inundated by overbank flow from Plantasie Creek. Sampling programs were implemented in December 2022 and October 2023 to collect soil samples from the Plantasie Creek floodplain to satisfy the investigation objectives detailed in the 2022 Work Plan. Interim findings, based on analysis of data collected during the December 2022 and October 2023 sampling events, were presented to NYSDEC in the *Plantasie Creek Interim Floodplain Soil Investigation Report* ("2024 Interim Report"; EHS Support, 2024b). Subsequently, the 2024 Supplemental Work Plan was developed to address data gaps detailed in the 2024 Interim Report, namely additional horizontal, vertical, and longitudinal characterization of target metal concentrations to NYSDEC Unrestricted Soil Cleanup Objectives (SCOs). An additional objective of the 2024 Supplemental Work Plan was to recharacterize target metal concentrations within the footprint of a soil disturbance within the floodplain, which occurred in May 2024, as described in **Section 2.3**. Supplemental sampling programs were implemented in October and December 2024 to collect soil samples from the Plantasie Creek floodplain to satisfy the objectives of the 2024 Supplemental Work Plan.

1.1 Investigation Objectives

The 2022 Work Plan was developed to investigate the 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. Specific objectives of the 2022 Work Plan were to:

- 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 on-site 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 [TOC]).
- Assess potential ecological and human health exposure to target metal concentrations in surface floodplain soils based on comparisons to relevant NYSDEC SCOs (NYSDEC, 2006a, 2006b) and, if warranted, provide recommendations for Site-specific evaluations of potential ecological or human health exposure.

The 2024 Supplemental Work Plan was developed to complement the 2022 Work Plan by addressing data gaps identified based on the preliminary analysis of Plantasie Creek floodplain soil data collected during the December 2022 and October 2023 floodplain soil sampling events, as presented in the 2024 Interim Report (EHS Support, 2024b). Specific objectives of the 2024 Supplemental Work Plan included the following:

- Address specific horizontal and vertical data gaps in the characterization of copper, mercury, and zinc concentrations in floodplain soils, identified following the evaluation of data presented in the 2024 Interim Report.
- Further characterize the longitudinal patterns of target metals concentrations in floodplain soils near select residential properties.
- Recharacterize target metals concentrations in floodplain soils at certain previously sampled stations that were potentially affected by the disturbance to portions of the Plantasie Creek floodplain study area in May 2024.

This 2025 Comprehensive Sampling Report presents the findings of analyses of data collected during the 2022, 2023, and 2024 floodplain soil sampling events, including the characterization of the nature and extent of target metal concentrations, spatial patterns in the distribution of target metals, and potential human health and ecological exposures to target metals in floodplain soils. The following report sections summarize the investigation background, sampling design and approach, data analysis approach, sampling results, updated conceptual site model (CSM), investigation findings, and recommendations based on results. The findings of this 2025 Comprehensive Sampling Report will be incorporated into the *Phase 2 FWRIA Comprehensive Ecological Impact Assessment Report* that will be developed for in-stream and floodplain soil for off-site exposure areas downstream of the Site.

2 Investigation Background

Section 2.1 through **Section 2.3** presents the operational history of the Site, past investigations performed within Plantasie Creek and its floodplain, and information regarding the disturbance of Plantasie Creek and its banks in May 2024.

2.1 Operational History

Manufacturing operations at the Site involved the manufacture of blasting cap components, consisting primarily of metal shells, insulated wire, and plastic tubing, and the assembly of these components into various types of blasting caps or initiating devices using purchased explosives. Raw materials procured from off-site sources included explosives, chemicals, uncoated wire, and metal sheets. Raw explosives were stored as powders under water (to reduce the possibility of explosion) in wooden vats located within an underground concrete vault in the Tank House. As of 1991, explosive materials used at the facility included pentaerythritol tetranitrate (PETN), diazodinitrophenol (DDNP), cyclotrimethylene trinitramine (RDX), cyclotetramethylene tetranitramine (HMX), polymer bound explosive (PBX), tetryl, tetrazene, black powder, nitrocellulose, double base propellant, lead azide, lead mononitro-resorcinol (LMNR), and lead styphnate. These explosive materials were combined with barium salts, chromates, lead oxides, perchlorates, molybdenum, tungsten, silicon, zirconium, and boron powders to make the desired product. Prior to 1988, additional starting materials, including selenium, tellurium, and lead powders, were used in earlier product designs. Mercury fulminate was formerly used on-site in the production of certain devices prior to the late 1950s.

During the 1980s and 1990s, production at the facility dropped sharply. In 2003, the number of employees was significantly reduced following a merger of Dyno Nobel with a subsidiary of Ensign-Bickford Industries. Detonator manufacturing ceased at the Site on June 28, 2010. Dyno Nobel personnel who supported other company operations continued to occupy the Site administrative buildings. In 2012, Dyno Nobel began leasing the facility to Maine Drilling and Blasting, a joint venture with Dyno Nobel, who provides blasting services for the construction and quarry markets. Maine Drilling and Blasting operations involve the blending of emulsions and ammonium nitrate, storage and distribution of packaged explosives and bulk blasting agents, and on-site maintenance and repairs to company delivery vehicles.

The solid waste management unit (SWMU) 1/22 Wetland Complex is a series of wetlands located within the active plant area of the Site. The SWMU 1/22 Wetland Complex drains to Plantasie Creek, a tributary to Rondout Creek (**Figure 2**). SWMU 22 is a former landfill located near the center of the wetland complex, and SWMU 1 is a former shooting pond used to detonate off-specification explosives. The SWMU 1/22 Wetland Complex represents the primary source of target metals from Site operations to Plantasie Creek.

2.2 Off-Site Investigations

Ecological investigations have been ongoing at the Site since 2007 as part of a NYSDEC FWRIA. The scope of FWRIA investigations includes the characterization and delineation of target metals—specifically copper, mercury, selenium, and zinc—that may have migrated from the Site and deposited in sediments within Plantasie Creek downstream of the SWMU 1/22 Wetland Complex. A phased sediment

delineation sampling program was conducted and reported to NYSDEC in the *Plantasie Creek Phase 1 and 2 Sediment Sampling Report* ("2020 Sediment Report"; EHS Support, 2020).

Sediment sampling and substrate surveys results from multiple phases of investigation within Plantasie Creek provide the basis for the delineation of target metals concentrations in sediment exceeding NYSDEC Class C freshwater sediment guidance values (SGVs; EHS Support, 2020; NYSDEC, 2014). The results of the downstream sediment delineation sampling indicated decreasing concentrations of target metals in sediment with increasing distance downstream of the Site. The greatest concentrations of target metals within the extent of sediment delineation sampling were observed in samples collected within the reach from the downstream Site boundary to Salem Street, approximately one mile downstream of the Site (**Figure 2**). The findings of these investigations were used to support a CSM regarding the deposition of target metals in fine-grained sediments within Plantasie Creek downstream of the SWMU 1/22 Wetland Complex (EHS Support, 2020).

Sediment investigations previously conducted within Plantasie Creek have adequately characterized and delineated the extent of target metals concentrations exceeding NYSDEC Class C SGVs. However, the potential overbank transport and deposition of target metals onto surficial soils within the floodplain of Plantasie Creek had not previously been investigated or characterized. The 2020 Sediment Report recommended the development of a soil sampling program designed to characterize concentrations of target metals in surficial soils within the extent of the floodplain that may be regularly inundated by overbank flow from Plantasie Creek (EHS Support, 2020). The need for surface soil sampling within the Plantasie Creek floodplain was directed by NYSDEC in a meeting on December 11, 2019, and in comments on the 2020 Sediment Report (EHS Support, 2020) that were provided by NYSDEC in a letter dated April 19, 2021.

The 2022 Work Plan and 2024 Supplemental Work Plan were developed to address the recommendation for additional soil sampling within the Plantasie Creek floodplain. This 2025 Comprehensive Sampling Report presents those sampling results to characterize the nature and extent of target metals concentrations in soils within the extent of the floodplain that may be regularly inundated by overbank flow from Plantasie Creek and to evaluate potential ecological impacts and human health exposure based on comparison of soil concentrations to NYSDEC SCOs.

2.3 Plantasie Creek Floodplain Disturbance

In early May 2024, a portion of Plantasie Creek, its banks, and its floodplain were disturbed as part of stormwater management activities conducted by a contractor on behalf of the Town of Esopus. The disturbance included clearing and earthwork along approximately 0.7 mile of the creek, from upstream of Mountain View Avenue to Salem Street; the limits of the May 2024 disturbance were surveyed and delineated through drone and on-foot reconnaissance in June 2024 (**Figure 2**). As a result of the disturbance, there was uncertainty as to whether a subset of the data collected within the limits of disturbance during the December 2022 and October 2023 floodplain soil sampling was representative of current conditions on the floodplain. Specifically, samples previously collected within the limits of disturbance at T04C, T05C, T06C, T07A, T07.5D, and T08D were identified as being potentially affected by the disturbance, as the soil and topography at these stations may have been altered from the previous sampling event (**Figure 2**). As specified in the 2024 Supplemental Work Plan, these stations were resampled during the October and December 2024 floodplain soil sampling events to assess post-disturbance conditions.

3 Investigation Approach

The approach for investigating the potential downstream migration of target metals from on-site sources to the surficial soils within the Plantasie Creek floodplain was developed based on the CSM presented in the 2022 Work Plan and supplemented with the data gap assessment presented in the 2024 Supplemental Work Plan. **Sections 3.1** through **3.4** present the sampling design, sampling approach, and data analysis approach and describe the implementation of sampling.

3.1 Sampling Design

Floodplain soil sampling was proposed at stations located on 17 transects placed along approximately 1.5 miles of the floodplain of Plantasie Creek, from the Site north to immediately upstream of Mill Brook Road (**Figure 2**; EHS Support, 2022). Floodplain sampling stations were placed along transects aligned perpendicular to the Plantasie Creek channel. Soil sampling stations were positioned along each transect based on floodplain elevation and lateral 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 [GE] & United States Environmental Protection Agency [USEPA], 2014). The 100-year floodplain, as mapped by the Federal Emergency Management Agency (2009), was established as the lateral boundary for sampling along each transect; the 100-year floodplain boundary is consistent with the lateral boundary of other floodplain soil investigations conducted in New York (Parsons, 2011; GE & USEPA, 2014).

As described in the CSM, the reach of Plantasie Creek from the Site to Salem Street is characterized as a low-gradient, depositional environment that contains the greatest concentrations of target metals in instream sediment (EHS Support, 2020). Based on conceptual sediment transport and deposition processes within Plantasie Creek, the greatest potential for overbank transport and deposition of target metals in off-site floodplain soils is expected within this depositional reach. As stated in the CSM, typical floodplain depositional patterns indicate greater concentrations in floodplain soils nearest to the source areas, with floodplain soil concentrations decreasing with increasing distance downstream from the source area (Saint-Laurent et al., 2013).

The 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 (T07.5) was added to characterize target metals in floodplain soils along the proposed alignment of the sewer tie-in (**Figure 2**).

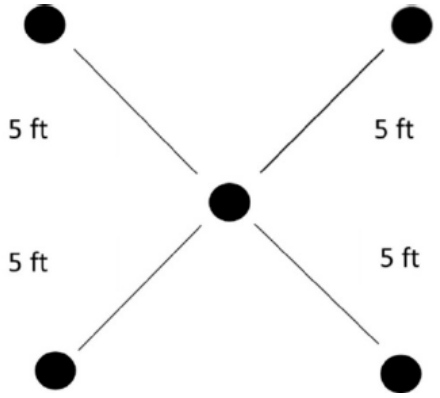
The 2024 Supplemental Work Plan proposed sampling across six additional transects within the 100-year floodplain downstream of the Site to address data gaps identified through the December 2022 and October 2023 floodplain soil investigations (**Figure 2**). These additional transects were added to better understand the longitudinal gradient of target metals in soils within the floodplain. Additional sampling stations were added along existing transects to address horizontal data gaps related to target metal concentrations, and certain stations were resampled at deeper depth intervals to address vertical data gaps. Stations sampled during December 2022 and October 2023 that were within the footprint of the

May 2024 floodplain disturbance (**Section 2.3**) were resampled during October and December 2024 to characterize post-disturbance conditions for comparison with pre-disturbance conditions (**Figure 2**).

3.2 Sampling Approach

In accordance with the 2022 Work Plan and 2024 Supplemental Work Plan, target metal concentrations in Plantasie Creek floodplain soils were characterized at each sampling station using a composite sampling approach. DER-10 (NYSDEC, 2010a) indicates that composite sampling is generally not acceptable when establishing nature and extent over presumably large areas as part of a site characterization or remedial investigation. However, the composite sampling approach used for soil sampling within the Plantasie Creek floodplain was intended to characterize target metal concentrations on a small spatial scale (approximately 25 square feet) immediately surrounding the proposed sampling station. A composite approach was employed to provide a more representative sample of target metal concentrations in floodplain soils than discrete samples that may be biased by inherent heterogeneity and anomalies in the sample (e.g., debris).

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 from the proposed sampling station as shown below:



Soil samples were collected from undisturbed soil cores retrieved at each subsampling point using either a gas-powered soil auger with dedicated soil auger liners or a decontaminated soil hand auger, depending on the conditions encountered at the station. The position of the center subsampling point was recorded using a global positioning system (GPS) unit with sub-meter accuracy.

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.

- 24–36 inches below vegetative cover: Vertical characterization of target metal concentrations at select stations with identified vertical data gaps following the December 2022 and October 2023 sampling events.

Aliquots contained approximately equal soil sample volumes from like depth intervals collected at each of the five subsampling locations at each proposed soil sampling station and were homogenized to similar color and texture. The homogenized soil composite of the five aliquots for each sampling interval was transferred to a laboratory-supplied container and submitted for target metals analysis: copper, mercury, selenium, and zinc (**Table 1** and **Table 2**)**.** Following the collection of samples for target metals, aliquots containing approximately equal soil sample volumes of the composite samples from the 0–6-inch and 6–12-inch interval were composited into a single composite sample for analyses of pH, TOC, and grain size distribution (sieve analysis only; **Table 1**). TOC, pH, and grain size distribution are ancillary parameters used to support the interpretation of target metals results. Soil lithology was described using the Unified Soil Classification System, which is set forth in ASTM International D2488 (NYSDEC, 2010a; ASTM, 2017). Field observations of soil characteristics were noted in the field logbook or field data sheets. Samples were stored on ice for shipment to the laboratory. Decontamination of nondedicated sampling equipment was conducted between sample collection.

Supplemental sampling stations added to support the additional investigation objectives outlined in the 2024 Supplemental Work Plan were sampled to 36 inches below the vegetative cover. However, samples collected from the 24–36-inch sampling interval were placed on laboratory-hold to assess the need for analysis. These samples were released from hold and analyzed for target metals only if concentrations in the 12–24-inch sampling interval for the associated station exceeded SCOs.

3.3 Data Analysis

To support preliminary risk characterization, floodplain soil target metals concentration results from the December 2022, October 2023, October 2024, and December 2024 sampling events were compared to the NYSDEC human health and ecological SCOs (NYSDEC, 2006a, 2006b), as summarized in **Table 3.**

- Human Health: NYSDEC SCOs for Unrestricted Land Use and Residential Land Use
- Ecological: NYSDEC SCOs for the Protection of Ecological Resources (“ESCOs”)
- Background: ESCOs below background concentrations estimated using remote or habitat samples collected in the *Statewide Rural Surface Soil Survey* (NYSDEC, 2005), adjusted to the Rural Background Soil Concentrations (RBSCs) 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 been identified 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 to soil on the Plantasie Creek floodplain.

Target metal concentrations were compared with Residential SCOs and Unrestricted SCOs, which are based on the greater value of ESCOs (copper) or RBSCs (mercury, selenium, zinc; NYSDEC, 2006b)[1]; Unrestricted SCOs are protective of ecological receptors. Target metal concentrations results from the December 2022 and October 2023 floodplain soil sampling events were compared to Unrestricted SCOs, as presented in the 2024 Interim Report, to assess the need for additional sampling based on identified data gaps. Data gaps identified through the comparison of target metal concentrations to Unrestricted SCOs were presented in the 2024 Supplemental Work Plan, and sampling was conducted in October and December 2024 to address these data gaps.

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.

3.4 Implementation

Plantasie Creek floodplain soil sampling events were conducted in December 2022 (3 transects, 9 stations), October 2023 (11 transects, 37 stations), October 2024 (10 transects, 19 stations), and December 2024 (6 transects, 12 stations). As described previously, the December 2022 and October 2023 sampling events were performed in accordance with the 2022 Work Plan to characterize target metals concentrations in the floodplain; the October 2024 and December 2024 sampling events were performed in accordance with the 2024 Supplemental Work Plan to address data gaps identified during December 2022 and October 2023. Deviations from these work plans are described in the following sections.

3.4.1 Deviations from Work Plans

Certain floodplain soil samples proposed in the 2022 Work Plan could not be collected due to conditions encountered in the field. During the December 2022 floodplain soil sampling event, stations T04E and T09A were not sampled because these stations could not be cleared based on information obtained in the utility survey.

Additionally, as detailed in **Section 3.1,** prior to the October 2023 soil sampling event, an additional transect that was not proposed in the 2022 Work Plan (T07.5) was added to the sampling program to characterize target metals in floodplain soils along the proposed alignment of the sewer tie-in planned for a residential development (263 Mountain View Avenue).

[1] NYSDEC did not establish an RBSC for copper; therefore, the ESCO of 50 milligrams per kilogram based on soil-to-earthworm exposure was used as the Unrestricted SCO (NYSDEC, 2006b); the ESCO is within the range of copper concentrations (between the 95th and 98th percentile values) reported in the *Statewide Rural Surface Soil Survey* (NYSDEC, 2005).

Certain floodplain soil samples proposed in the 2024 Supplemental Work Plan were not collected due to conditions encountered in the field, landowners not granting access for sampling, and discussions with NYSDEC following submittal of the 2024 Supplemental Work Plan. During the October 2024 floodplain soil sampling event, soil samples from station T04.75A were not collected due to refusal due to encountering a large rock outcropping just below the ground surface. During the December 2024 floodplain soil sampling event, select stations (T03.25A, T03.25B, T04.25A, T04.25B, T04.5C, and T04.5D) could not be sampled due to landowners not granting property access for sampling.

Following submittal of the 2024 Supplemental Work Plan, comments were received from the NYSDEC Division of Environmental Remediation, Remedial Bureau C via email on October 4, 2024. NYSDEC comments suggested additional sampling or resampling at certain stations to address data gaps related to ESCO exceedances, some of which were not proposed in the 2024 Supplemental Work Plan. Based on rationale provided to NYSDEC in multiple correspondence, including emails (October 13 and December 9, 2024) and a response to comments document submitted to NYSDEC on February 27, 2025, stations proposed by NYSDEC for additional horizontal delineation sampling (T08B, T09B) or vertical delineation resampling (T08A, T08B, T08C, T09B, T09C) were not sampled during the October 2024 or December 2024 floodplain soil sampling events.

4 Investigation Findings

The following sections present the collective findings of the multiple soil sampling events conducted on the Plantasie Creek floodplain downstream of the Site between December 2022 and December 2024. An updated CSM is presented based on the findings of the floodplain soil investigation.

4.1 Sampling Results

Floodplain soil results from the December 2022, October 2023, October 2024, and December 2024 sampling events were analyzed and collectively assessed in accordance with the 2022 Work Plan (EHS Support, 2022). Interim results from the December 2022 and October 2023 sampling events were presented in the 2024 Interim Report (EHS Support, 2024b).

Data gaps from these investigations related to horizontal and vertical characterization of copper, mercury, and zinc to NYSDEC Residential and Unrestricted SCOs were identified in the 2024 Supplemental Work Plan; no data gaps were identified in the characterization of selenium. Additional data gaps were identified in the footprint of the May 2024 disturbance to address uncertainty as to whether a subset of the data collected within the limit of disturbance during the December 2022 and October 2023 floodplain soil sampling was representative of post-disturbance conditions. Additional samples were collected during the October 2024 and December 2024 sampling events to address the identified data gaps in accordance with the 2024 Supplemental Work Plan. A summary of analytical data, laboratory analytical reports, and data validation reports from the December 2022, October 2023, October 2024, and December 2024 sampling events are provided in **Appendix A** through **Appendix C**, respectively.

The collective results of target metals sampling in Plantasie Creek floodplain soil for the sampling events are presented relative to NYSDEC Residential and Unrestricted SCOs on cross-sectional elevation maps for each transect:

- Transect 1 (T01): **Figure 3A** through **Figure 3D**
- Transect 2 (T02): **Figure 4A** through **Figure 4D**
- Transect 3 (T03): **Figure 5A** through **Figure 5D**
- Transect 3.5 (T03.5): **Figure 6A** through **Figure 6D**
- Transect 3.75 (T03.75): **Figure 7A** through **Figure 7D**
- Transect 4 (T04): **Figure 8A** through **Figure 8D**
- Transect 4.5 (T04.5): **Figure 9A** through **Figure 9D**
- Transect 4.75 (T04.75): **Figure 10A** through **Figure 10D**
- Transect 5 (T05): **Figure 11A** through **Figure 11D**
- Transect 6 (T06): **Figure 12A** through **Figure 12D**
- Transect 7 (T07): **Figure 13A** through **Figure 13D**
- Transect 7.5 (T07.5): **Figure 14A** through **Figure 14D**
- Transect 8 (T08): **Figure 15A** through **Figure 15D**
- Transect 9 (T09): **Figure 16A** through **Figure 16D**
- Transect 10 (T10): **Figure 17A** through **Figure 17D**

Floodplain soil sampling results presented in **Figure 3A** through **Figure 17D** represent post-disturbance conditions. Pre-disturbance sampling results from stations that were resampled following the disturbance are superseded on the figures with the post-disturbance sampling results.

In general, the results of Plantasie Creek floodplain soil sampling program indicate decreasing concentration gradients of target metal concentrations longitudinally from the Site to downstream transects, laterally from the top of the bank to the 100-year floodplain extent, and vertically from surface to subsurface intervals.

The following sections summarize comparisons of target metals concentrations in floodplain soils to Residential SCOs and Unrestricted SCOs. As stated in **Section 3.3**, 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 (NYSDEC, 2010b). An evaluation of the potential impact of the May 2024 disturbance on target metals concentrations in floodplain soils within the limit of disturbance is also presented.

4.1.1 Comparisons to Residential SCOs

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 SCOs in any floodplain soil sample (**Appendix A**). At stations with exceedances of Residential SCOs, metals concentrations most commonly decreased with depth into the soil profile (**Appendix A**).

Target metal concentrations exceeding Residential SCOs for copper and mercury were constrained to near bank samples[2] collected nearest to the creek channel, except along transects T01 and T02, where copper and mercury exceedances of Residential SCOs extended laterally into the floodplain. The lateral extents of samples with copper and mercury concentrations exceeding Residential SCOs were greatest in samples collected from T01, 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 T02 (**Figure 4A** and **Figure 4B**).

Downstream of transect T02, copper and mercury concentrations exceeded Residential SCOs only in near bank core samples, including 0–6-inch samples collected at T03 (**Figure 5A** and **Figure 5B**), T03.5 (**Figure 6A** and **Figure 6B**), T04 (**Figure 8A** and **Figure 8B**), T04.5 (**Figure 9A** and **Figure 9B**), T04.75 (**Figure 10A** and **Figure 10B**), T05 (**Figure 11B**), T06 (**Figure 12A** and **Figure 12B**), T07 (**Figure 13A** and **Figure 13B**), T07.5 (**Figure 14A** and **Figure 14B**), and T08 (**Figure 15A**). Copper and mercury concentrations did not exceed Residential SCOs in any samples collected along T09 (**Figure 16A** and **Figure 16B**). 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 17A** and **Figure 17B**).

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

Residential SCOs were only exceeded in one surficial sample for one target metal at transect T08 (copper) and were not exceeded for any target metals at T09, indicating that the longitudinal extent of overbank transport and deposition from the Site that results in Residential SCO exceedances does not extend downstream of transect T08.

4.1.2 Comparisons to Unrestricted SCOs

Concentrations of target metals exceeded the Unrestricted SCOs at multiple stations across the study area. As previously stated, Unrestricted SCOs for target represent the greater value of ESCOs (copper) or RBSCs (mercury, selenium, zinc; NYSDEC, 2006b). Given that Unrestricted SCOs are lower than Residential SCOs, floodplain soil sampling results described in the preceding section that exceed Residential SCOs also exceed Unrestricted SCOs. Target metals concentrations between Unrestricted SCOs and Residential SCOs are described below.

Except for selenium, floodplain soil concentrations between Unrestricted SCOs and Residential SCOs were observed in each sampling transect. Selenium concentrations were below Unrestricted SCOs in all samples, except for near bank surface samples at T01 (**Figure 3C**) and T02 (**Figure 4C**). Exceedances of Unrestricted SCOs for target metals followed a similar spatial pattern as Residential SCO exceedances. Unrestricted SCO exceedances were generally observed in near bank samples and were bounded horizontally and vertically within the sampling transect. At stations with exceedances of Unrestricted SCOs, metals concentrations generally decreased with depth into the soil profile (**Appendix A**).

The results of the Plantasie Creek floodplain soil sampling program generally characterize target metals concentrations to Unrestricted SCOs. However, it is important to emphasize that Unrestricted SCOs for mercury, selenium, and zinc are derived based on RBSCs (NYSDEC, 2006b). Given that Unrestricted SCOs for mercury, selenium, and zinc are representative of concentrations expected to occur naturally in soils, minor exceedances of Unrestricted SCOs are only indicative of concentrations above naturally occurring soil concentrations and not necessarily indicative of concentrations expected to result in adverse effects to ecological receptors or human health. NYSDEC did not establish an RBSC for copper; therefore, the Unrestricted SCO for copper is based on the ESCO of 50 mg/kg (NYSDEC, 2006b). It is important to note that the 50 mg/kg ESCO is within the range of copper concentrations (between the 95th and 98th percentile values) reported in the *Statewide Rural Surface Soil Survey* (NYSDEC, 2005). Therefore, the Unrestricted SCO for copper is indicative of concentrations at the upper range of naturally occurring soil concentrations.

4.1.3 Comparison of Pre- and Post-Disturbance Results

As discussed in **Section 2.3**, stations T04C, T05C, T06C, T07A, T07.5D, and T08D were resampled during the October 2024 and December 2024 sampling events to characterize current, post-disturbance conditions and to address potential uncertainty regarding the representativeness of pre-disturbance soil sampling results. Sampling results for these transects are presented in **Figure 8A** through **Figure 15D**.

Table 4 presents comparisons of target metal concentrations from the 2024 post-disturbance sampling events compared to target metal concentrations measured during 2022 and 2023 pre-disturbance sampling events. As shown in **Table 4**, differences between pre- and post-disturbance sampling results were variable across resampled transects. Surficial (0–6 inches) concentrations in post-disturbance samples exceeded Residential SCOs at sampling stations T07A (copper and mercury) and T08D

(mercury); copper and mercury concentrations were below Residential SCOs in pre-disturbance samples at both stations (**Table 4**). Surficial concentrations in pre- and post-disturbance samples were above Residential SCOs for T04C (mercury), T06C (copper and mercury), and T07.5D (copper and mercury).

Subsurface concentrations in post-disturbance samples exceeded Residential SCOs at sampling stations T04C (mercury), T05C (mercury), and T06C (copper and mercury); copper and mercury concentrations were below Residential SCOs in pre-disturbance samples at comparable subsurface intervals at these stations (**Table 4**). Subsurface (6–12 inches) concentrations of copper and mercury in post-disturbance samples at T07.5D were below Residential SCOs; pre-disturbance mercury and copper concentrations in this sampling interval were above Residential SCOs (**Table 4**).

Zinc concentrations were below Residential SCOs in pre- and post-disturbance samples; however, differences in concentrations relative to Unrestricted SCOs were variable between events (**Table 4**). Selenium concentrations were below Unrestricted SCOs in pre- and post-disturbance samples.

4.2 Updated Conceptual Site Model

The CSM 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 CSM was refined to support the development of the 2022 Work Plan to investigate the potential overbank transport and deposition of target metals in surficial soils within the Plantasie Creek floodplain. This section presents further refinement of the CSM for floodplain soils based on the comprehensive findings of December 2022, October 2023, October 2024, and December 2024 sampling events presented in the previous section.

As stated in the CSM, 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 T01 through T08) due to its low gradient (approximately 0.2 percent slope) relative to the reach immediately downstream of Salem Street (approximately 3.9 percent slope). Typical floodplain depositional patterns from source areas indicate greater concentrations of constituents in floodplain soils nearest to 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 is 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 are expected with increasing distance laterally from the Plantasie Creek channel, as the floodplain elevations increase, and the frequency of inundation decreases. Concentrations of target metals deposited on the floodplain via overbank transport are expected to be greater in surficial soil samples, with decreasing concentrations in deeper soil sampling intervals.

As presented in **Section 4.1**, key findings from the analysis of floodplain soil data collected in December 2022, October 2023, October 2024, and December 2024 support the conceptual fate and transport mechanisms for target metals in Plantasie Creek as presented in the CSM. Target metal concentrations in Plantasie Creek floodplain soils are generally consistent with the lateral, vertical, and

longitudinal trends expected based on conceptual overbank transport and deposition mechanisms. As described in **Section 4.1**, target metal concentrations in floodplain soil generally decreased with:

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

Target metals concentrations were generally greatest in surficial samples collected from near bank stations on floodplain transects, except for transect T10. Concentrations of target metals, particularly copper and mercury, generally decreased laterally, vertically, and longitudinally from near bank stations on transects T1–T9. Target metals concentrations at transect T10 were greater in subsurface sampling intervals at near bank stations, but decreased with lateral distance from the channel.

Residential SCOs were only exceeded in one surficial sample for one target metal at transect T08 (copper) and were not exceeded for any target metals at T09, indicating that the longitudinal extent of overbank transport and deposition resulting in Residential SCO exceedances in surficial soils does not extend downstream of transect T08.

The May 2024 Plantasie Creek floodplain disturbance altered vertical profiles of target metal concentrations within the limit of disturbance. As stated in **Section 4.1.3**, differences between pre- and post-disturbance sampling results were variable across resampled transects. Differences in pre- and post-disturbance concentrations relative to the Residential SCOs were limited to copper and mercury. Given these differences, post-disturbance sampling results are considered most representative of current exposure conditions.

5 Investigation Summary and Recommendations

This 2025 Comprehensive Sampling Report presents the evaluation of Plantasie Creek floodplain soil sampling results from the December 2022, October 2023, October 2024, and December 2024 sampling events. Key findings of the nature and extent of characterization, spatial analysis, and comparisons to SCOs include the following:

- 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.
- Copper and mercury exceedances of Residential SCOs for the protection of human health are constrained to near bank samples, except along transects T01 and T02; neither selenium nor zinc concentrations exceed Residential SCOs in any floodplain soil sample.
- Residential SCOs were only exceeded in one surficial sample for one target metal at transect T08 (copper) and were not exceeded for any target metals at T09, indicating that the longitudinal extent of overbank transport and deposition resulting in Residential SCO exceedances in surficial soils does not extend downstream of transect T08.
- Exceedances of the Residential SCOs for copper and mercury along transect T10 were identified in subsurface sampling intervals, which is inconsistent with vertical concentration trends observed elsewhere throughout the depositional reach defined between the Site and Salem Street (T01–T08).
- Unrestricted SCO exceedances based on ESCOs (copper), or rural background concentrations (mercury, selenium, zinc) were most commonly observed in samples collected nearest to the creek channel, with the frequency of exceedances decreasing with increasing lateral distance from the creek channel.
- The May 2024 disturbance of the Plantasie Creek floodplain altered the profile of target metals concentrations at stations within the disturbance footprint (T04C, T05C, T06C, T07A, T07.5D, and T08D). Differences between pre- and post-disturbance sampling results were variable across resampled transects; however, differences in pre- and post-disturbance concentrations relative to the Residential SCOs were limited to copper and mercury.

Based on the collective findings of the floodplain soil sampling program presented in this report, further evaluation of SCO exceedances is warranted. 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 (NYSDEC, 2010b). Therefore, further evaluation of relevant Site-specific human health exposure pathways—specifically direct contact exposure and incidental ingestion exposure pathways—is warranted at stations with samples containing copper and mercury concentrations exceeding Residential SCOs; no further human health exposure evaluation is warranted for selenium and zinc given concentrations below Residential SCOs in all analyzed samples.

Further evaluation of Site-specific ecological exposure is warranted at stations with samples containing target metal concentrations exceeding Unrestricted SCOs. As previously stated, Unrestricted SCOs for mercury, selenium, and zinc are based on RBSCs; NYSDEC did not establish an RBSC for copper; however, the ESCO used as a basis for the Unrestricted SCO is within the range of copper concentrations reported in the *Statewide Rural Surface Soil Survey* (NYSDEC, 2005). Given that the Unrestricted SCOs are within the range of rural background concentrations for target metals, further evaluation of Site-specific

ecological exposure pathways is warranted to support risk-based decision-making for ecological receptors. The Site-specific ecological exposure assessment will include evaluations of direct contact exposure to soil invertebrates and terrestrial plants and wildlife ingestion exposure to birds and mammals. The findings of the Site-specific ecological exposure evaluations will be presented as part of the *Phase 2 FWRIA Comprehensive Ecological Impact Assessment Report* that will be developed for in-stream and floodplain soil for off-site exposure areas downstream of the Site.

The Site-specific human health and ecological exposure evaluation of SCO exceedances will be used to support risk-based remedial decision-making for floodplain soils, including the potential implementation of an interim remedial measure. Site-specific SCOs protective of public health and the environment may be developed for target metals, as warranted, to reflect exposure scenarios expected for Plantasie Creek floodplain soils.

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Tables

Table 1
Summary of Soil Sampling Objectives
Plantasie Creek Comprehensive Floodplain Soil Sampling 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 ecological exposure and human health exposure via incidental soil ingestion, inhalation of soil, or dermal contact with soil. 2) 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) Evaluate SCOs protective of ecological exposure, consistent with USEPA guidance on biologically relevant sampling intervals for ecological risk assessments in terrestrial habitats. 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 as 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
24–36 inches	1) Vertical characterization of target metal concentrations at stations with identified vertical data gaps following the December 2022 and October 2023 sampling events. 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 Objective
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

References:
New York State Department of Environmental Conservation. (2010, May 3). *DER-10/Technical Guidance for Site Investigation and Remediation.* Deputy Commissioner, Office of Remediation and Materials Management.
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Table 2
Summary of Analytical Methods and Sample Handling Requirements
Plantasie Creek Comprehensive Floodplain Soil Sampling 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 Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

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

Notes:

Unrestricted Use SCOs are based on the greater value of ESCOs or RSBCs and are protective of ecological receptors.
ESCO = Ecological Soil Cleanup Objective
mg/kg = milligram per kilogram
RSBC = Rural Soil Background Concentration
SCO = Soil Cleanup Objective

Table 4
Summary of Disturbance Area Results
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

Station	Sample Year	Analyte	Copper				Mercury				Selenium				Zinc			
		Depth Interval	0–6 in	6–12 in	12–24 in	24–36 in	0–6 in	6–12 in	12–24 in	24–36 in	0–6 in	6–12 in	12–24 in	24–36 in	0–6 in	6–12 in	12–24 in	24–36 in
		Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
T04C	2022	mg/kg	150	61	21	--	1.3	0.64	0.17	--	1.3	1.1	0.97	--	120	86	74	--
	2024	mg/kg	0.21	220	25	--	2.3	1.9	0.18	--	0.12	1	0.8	--	4.7	120	86	--
T05C	2023	mg/kg	130	48	12	--	0.75	0.33	0.069	--	1.4	1.3	0.86	--	120	97	85	--
	2024	mg/kg	150	130	110	25	0.93	1.7	0.62	0.15	1	0.89	1.1	1.1	100	100	110	92
T06C	2023	mg/kg	350	91	29	--	2.2	0.5	0.16	--	2.1	1.6	1.4	--	170	120	110	--
	2024	mg/kg	580	310	250	40	2.4	3.1	2.2	0.2	1.7	1.2	1.3	1.3	180	130	130	120
T07.5D	2023	mg/kg	580	1400	28	--	2.5	4.7	0.13	--	2.2	1.3	0.25	--	220	190	86	--
	2024	mg/kg	410	61	120	29	2.5	0.29	0.17	0.14	1.3	0.3	0.37	0.34	150	69	81	80
T07A	2023	mg/kg	170	32	32	--	0.6	0.16	0.09	--	0.67	0.24	0.87	--	100	76	98	--
	2024	mg/kg	560	100	40	30	2.4	0.63	0.27	0.11	1.7	0.58	0.21	0.21	160	100	79	99
T08D	2023	mg/kg	250	40	13	--	1.2	0.22	0.044	--	1.1	0.52	0.27	--	120	86	72	--
	2024	mg/kg	340	86	31	--	1.1	0.36	0.054	--	1.4	0.56	0.54	--	130	83	77	--

Notes:
Green dot indicates no exceedance of respective SCO.
Yellow dot indicates exceedance of Unrestricted Use SCO.
Red dot indicates exceedance of Residential Land Use SCO.

-- = no sample collected
in = inch
mg/kg = miligram per kilogram
SCO = Soil Cleanup Objective

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.

0 250 500 1,000 2,000 Feet

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

SITE LOCATION MAP

FIGURE 1

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

Legend

- Sampled December 2024
- Sampled October 2024
- Sampled October 2023
- Sampled December 2022
- Not Sampled
- Proposed Sampling Transect
- Sampling Transect
- Area of May 2024 Disturbance
- Stream and Ditch
- 50' Elevation Contours
- Railroad
- Roadways
- Stream Flowline

Flood Zone

- FEMA 100-year Floodplain
- AE
- 0.2% Annual Chance Flood Hazard
- Approx. Property Boundary
- Ulster Co. Tax Parcels (Sept. '09)

T10 T9 T8 T7.5 T7 T6 T5 T4.75 T4.5 T4.25 T4 T3.75 T3.5 T3.25 T3 T2 T1

Andorn Ln
Mill Brook Dr
Salem St
New Salem Rd
Mountain View Ave
Rogers St
Lindorf St
Clay Rd

0 250 500 1,000 Feet

INTERNAL REVIEW

Reviewed By: EHS Support	Downstream Sediment Investigation Dyno Nobel Port Ewen Site Port Ewen, New York	Comprehensive Supplemental Floodplain Soil Sampling Transect Overview	FIGURE 2

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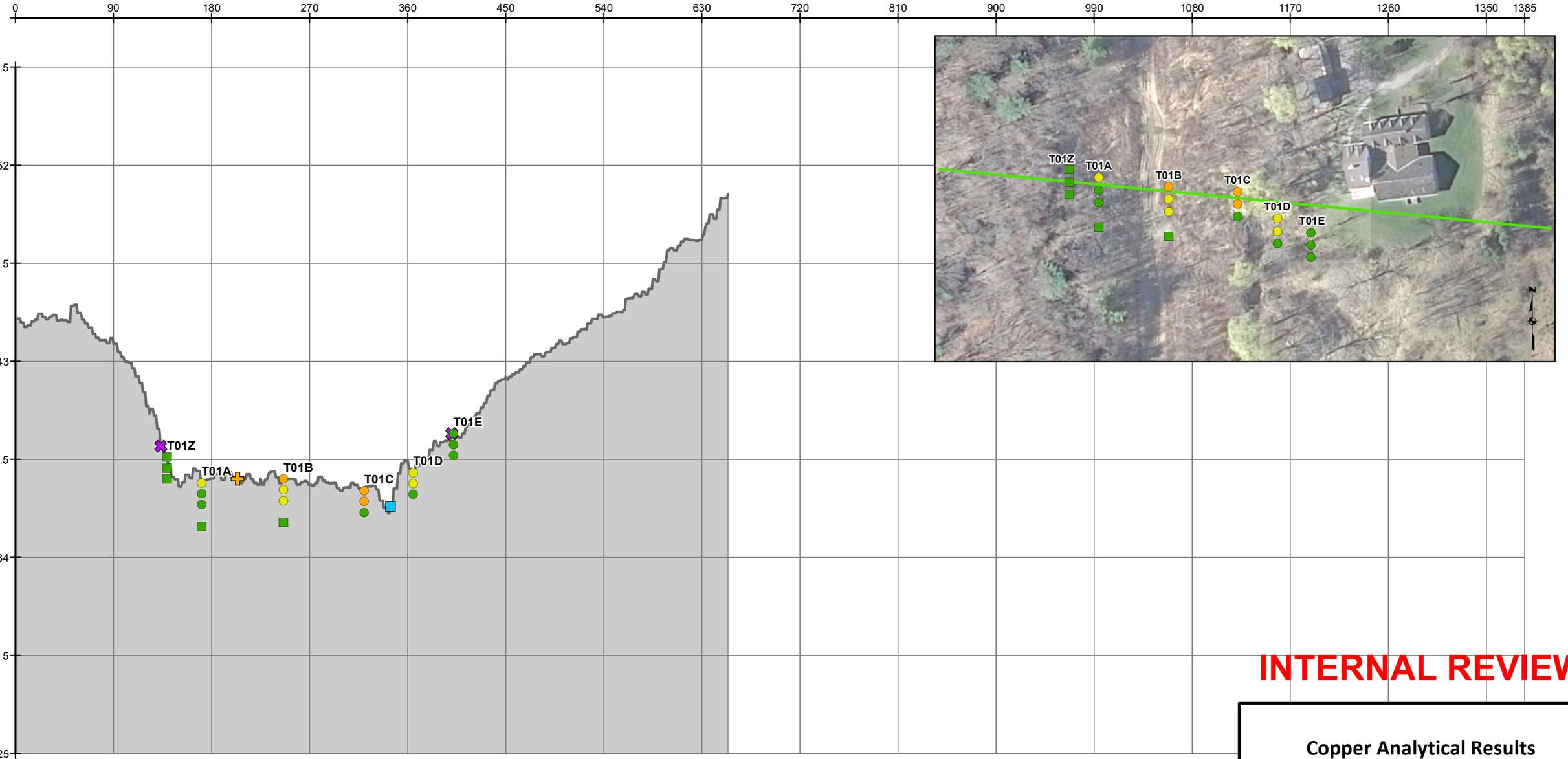

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Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 3A

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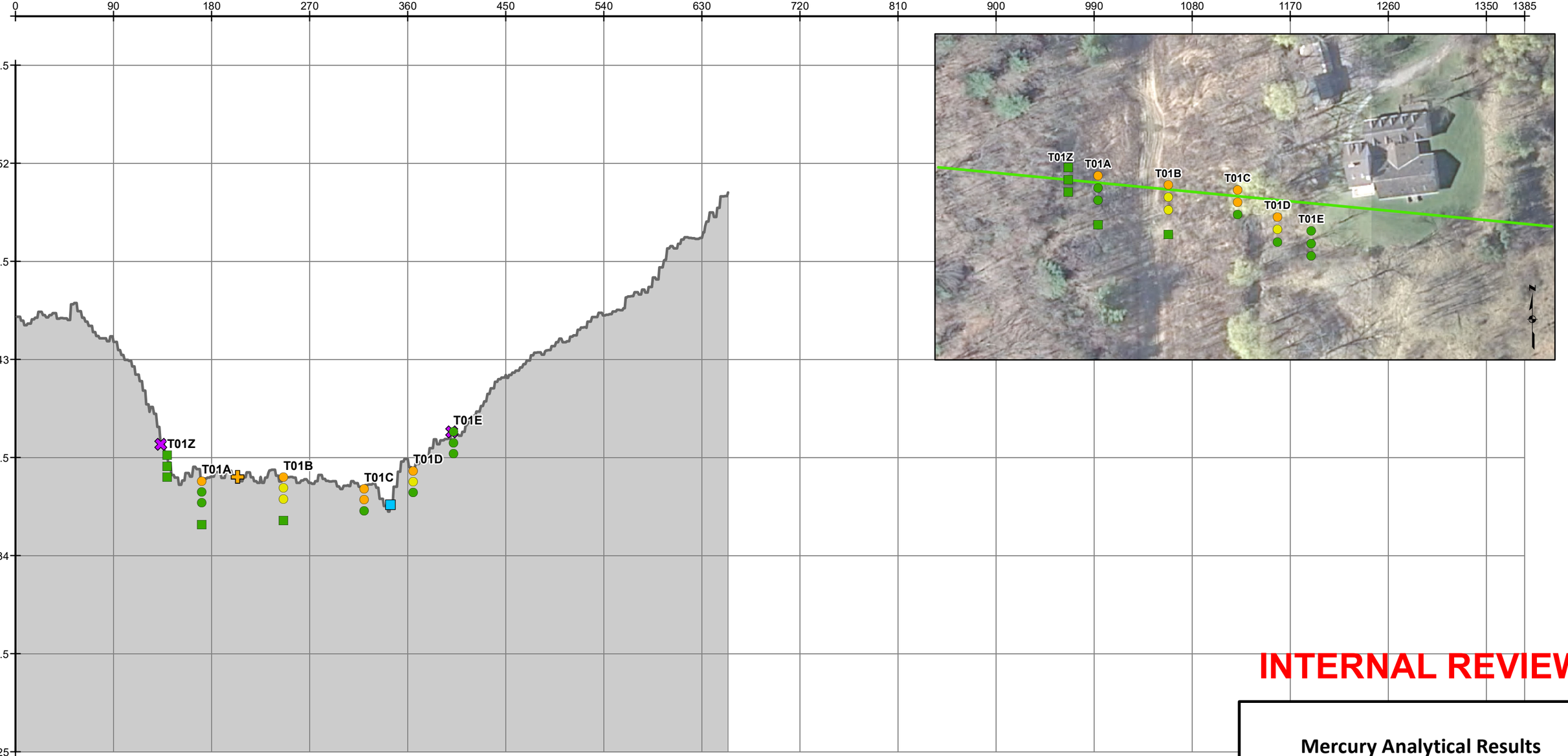

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Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 3B

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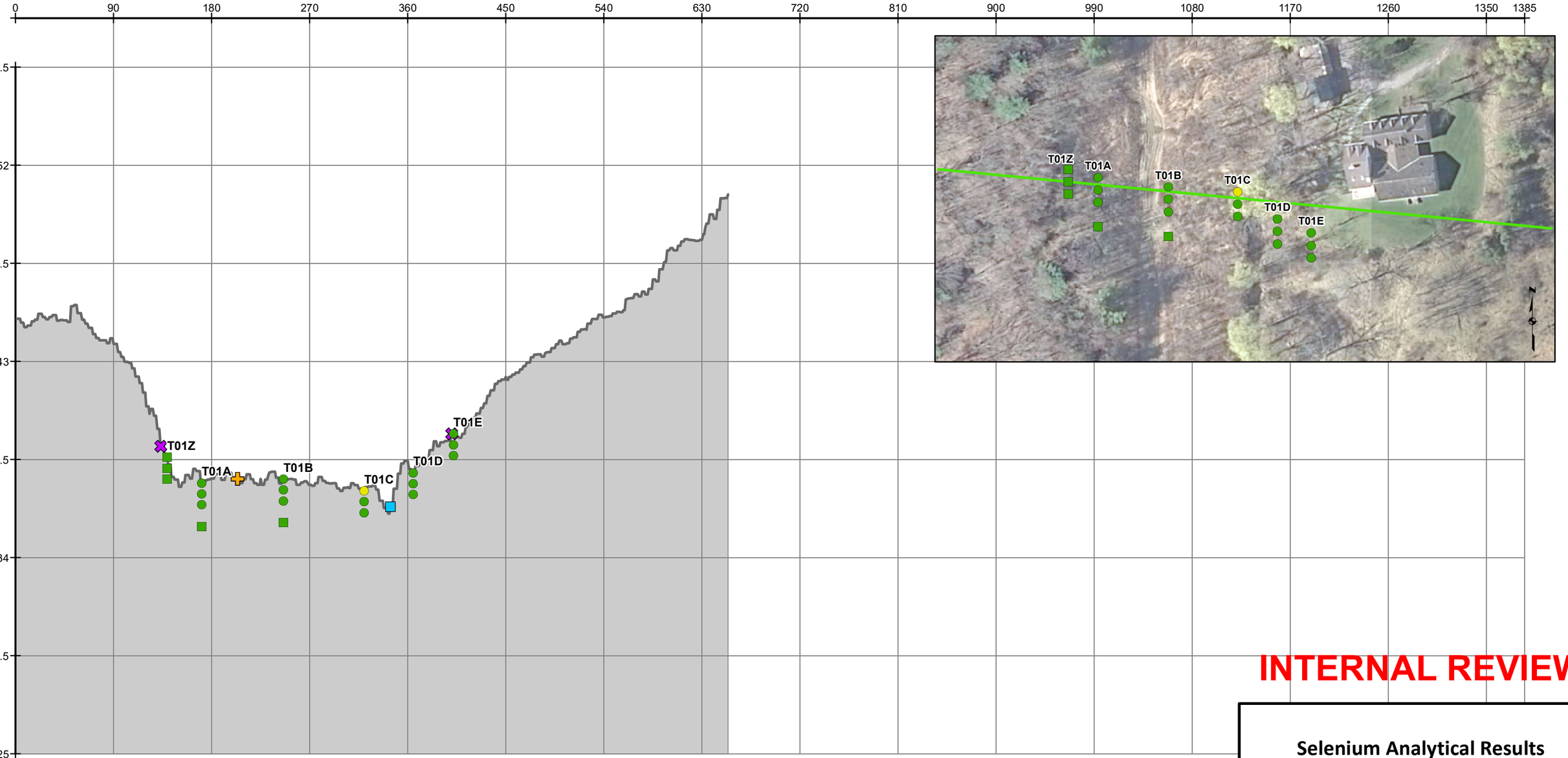

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 3C

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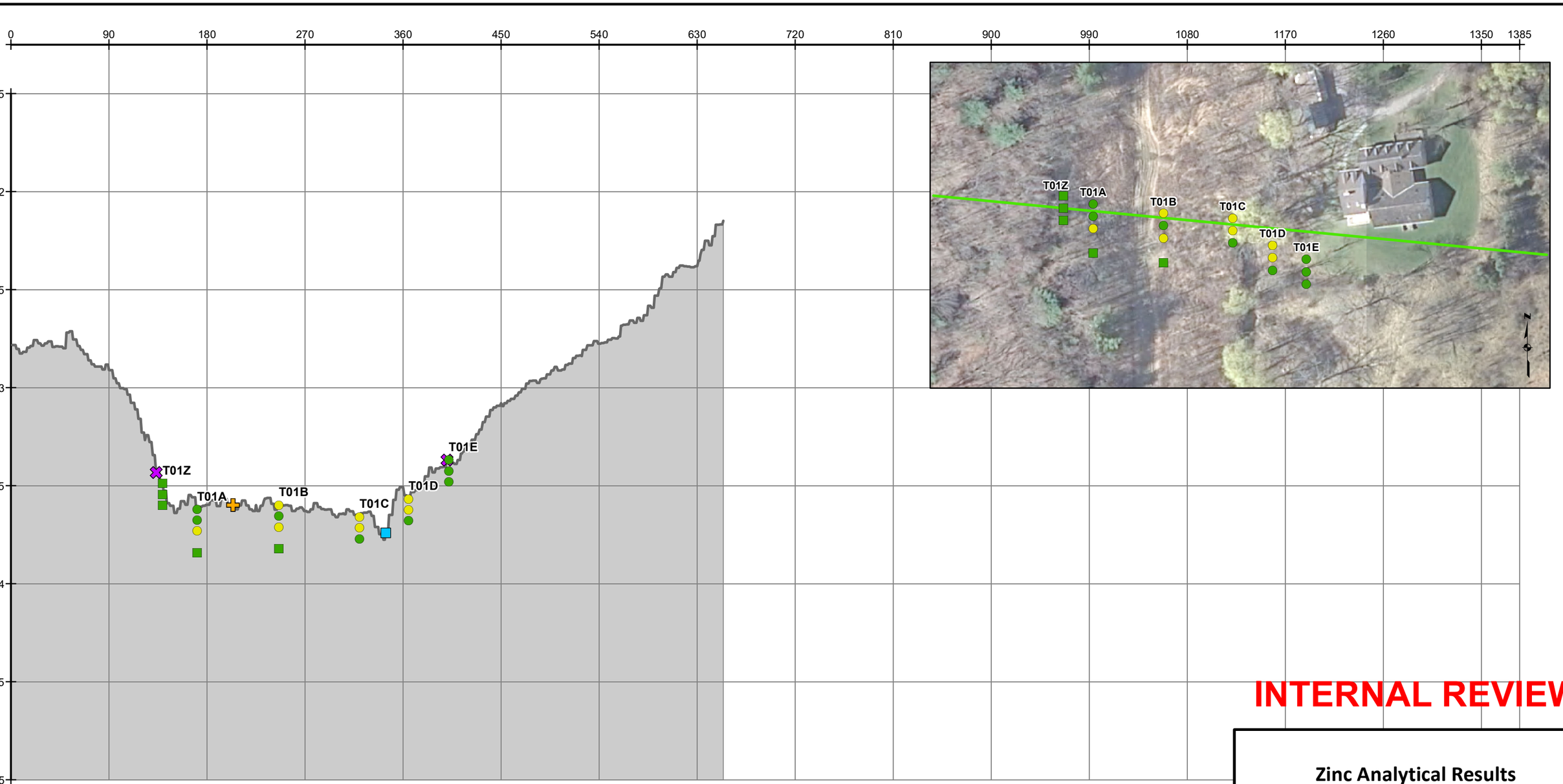

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T1

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 3D

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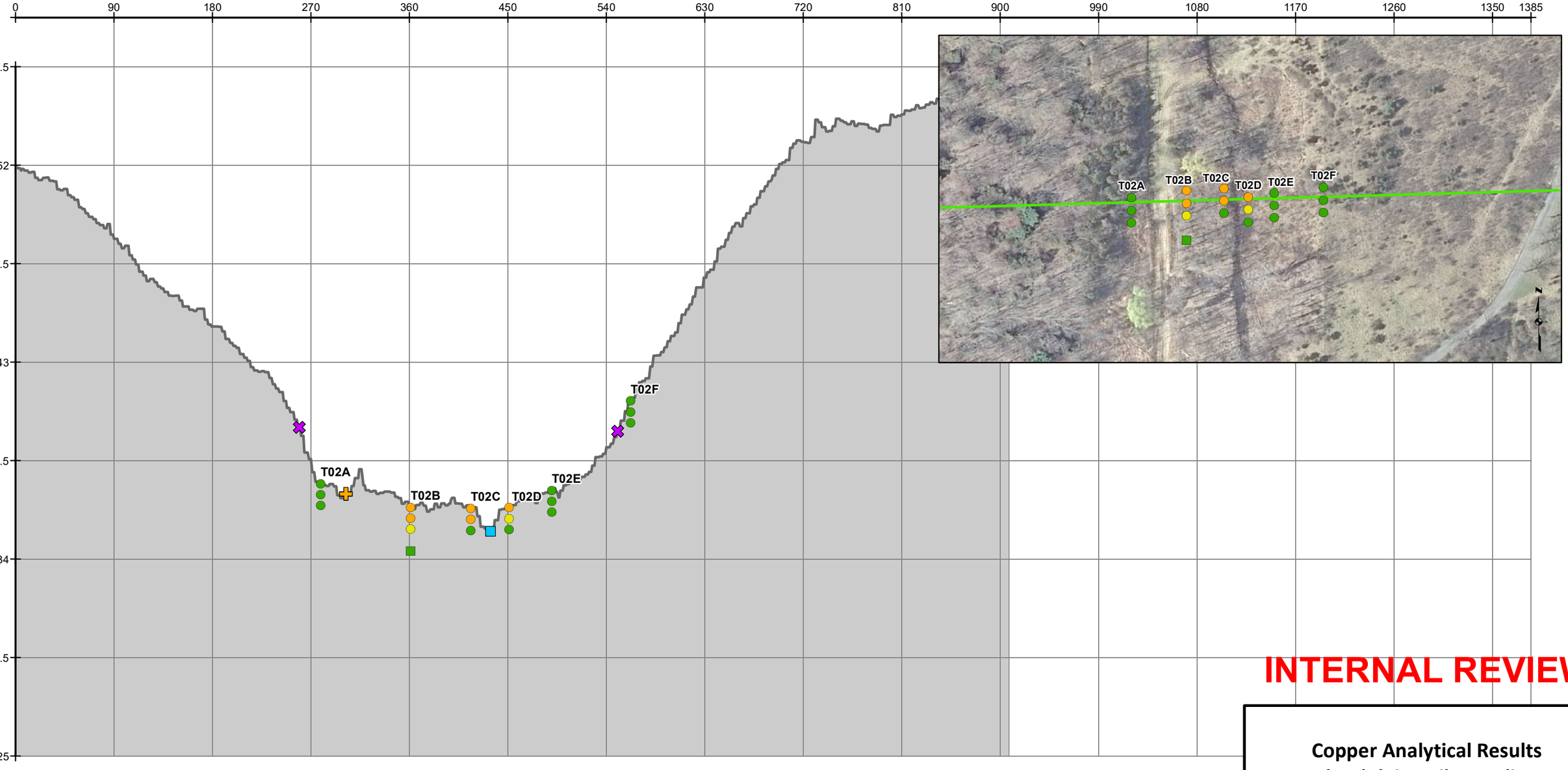

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 4A

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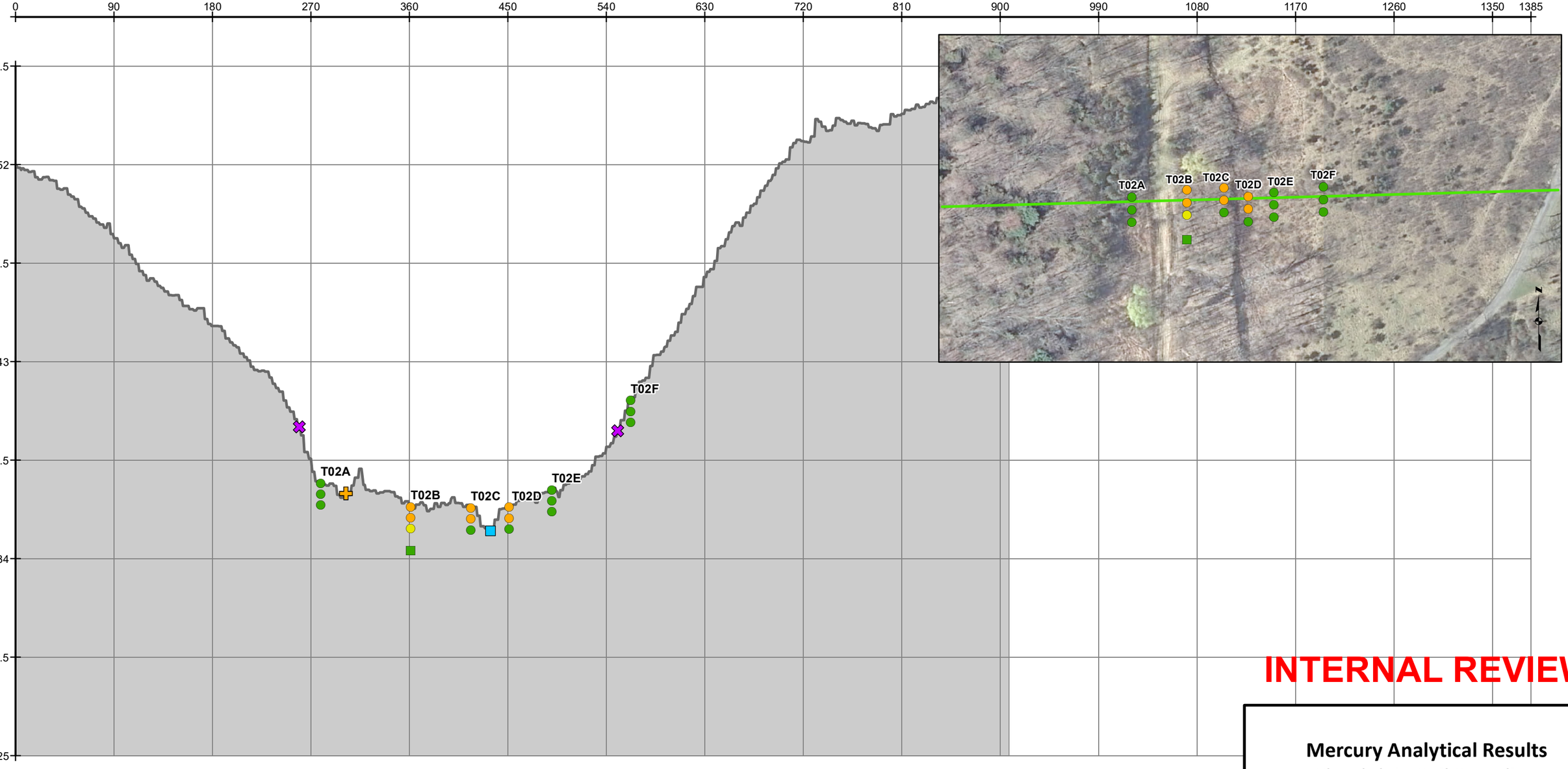

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)
- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 4B

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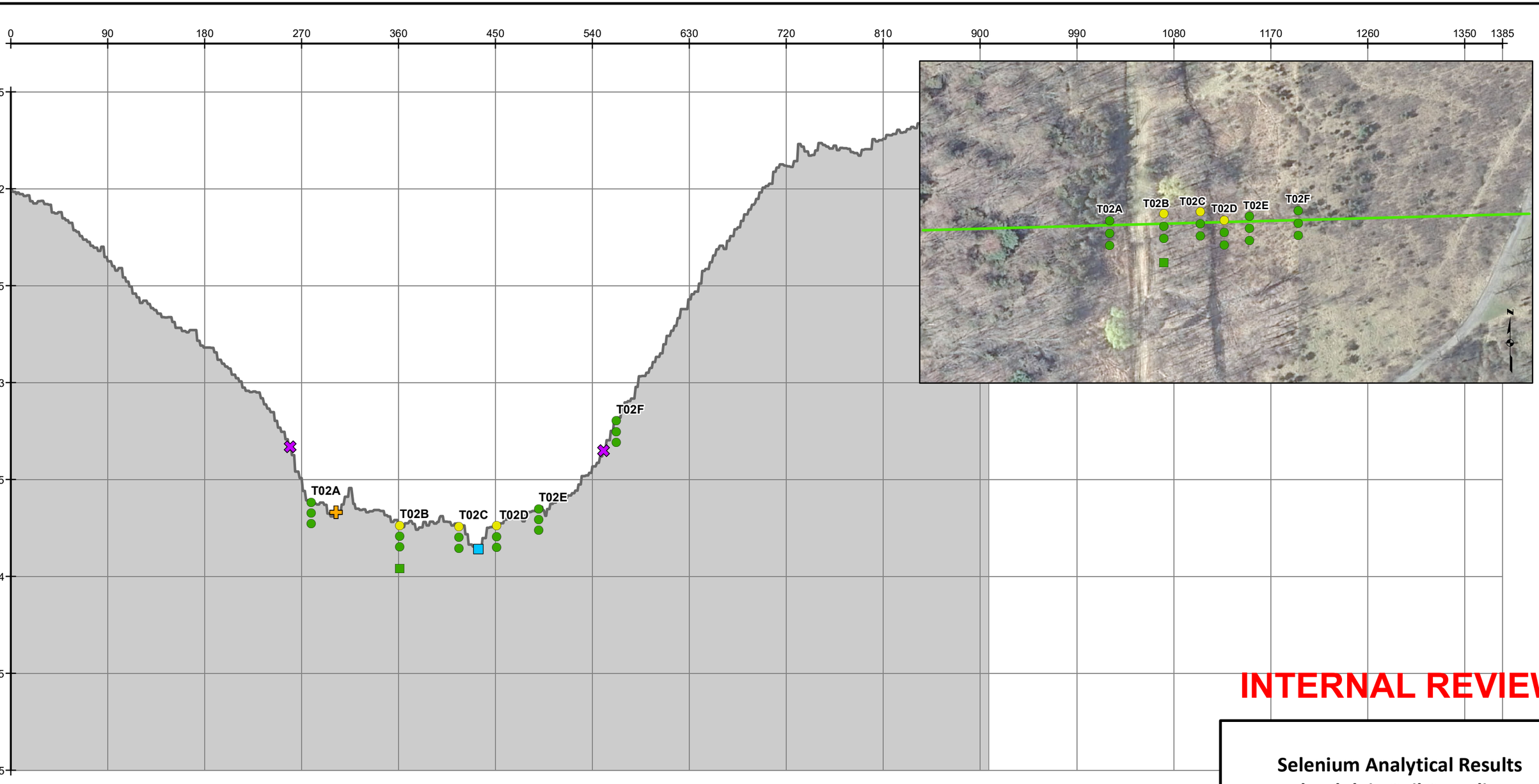

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 4C

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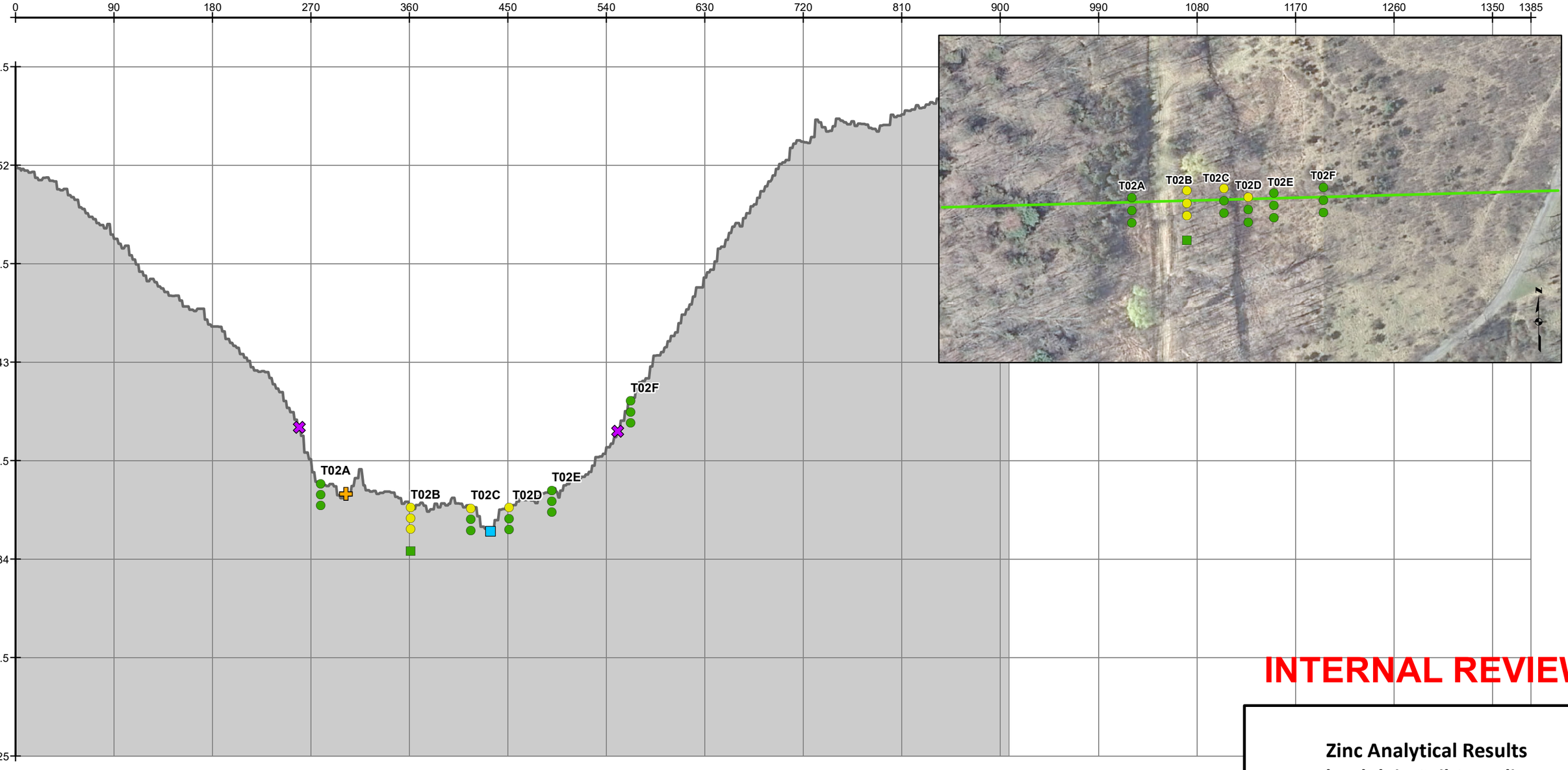

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T2

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 4D

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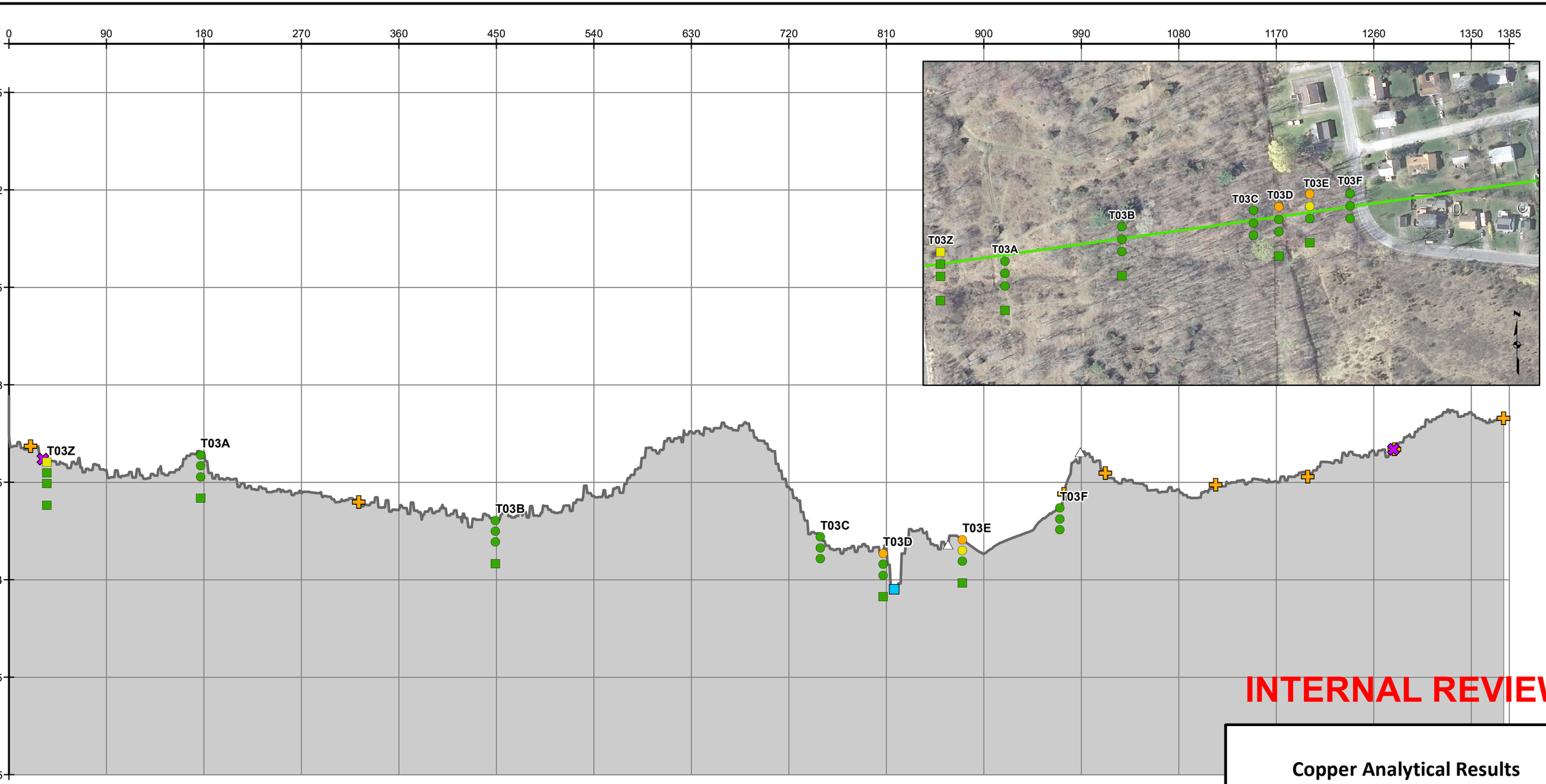

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5A

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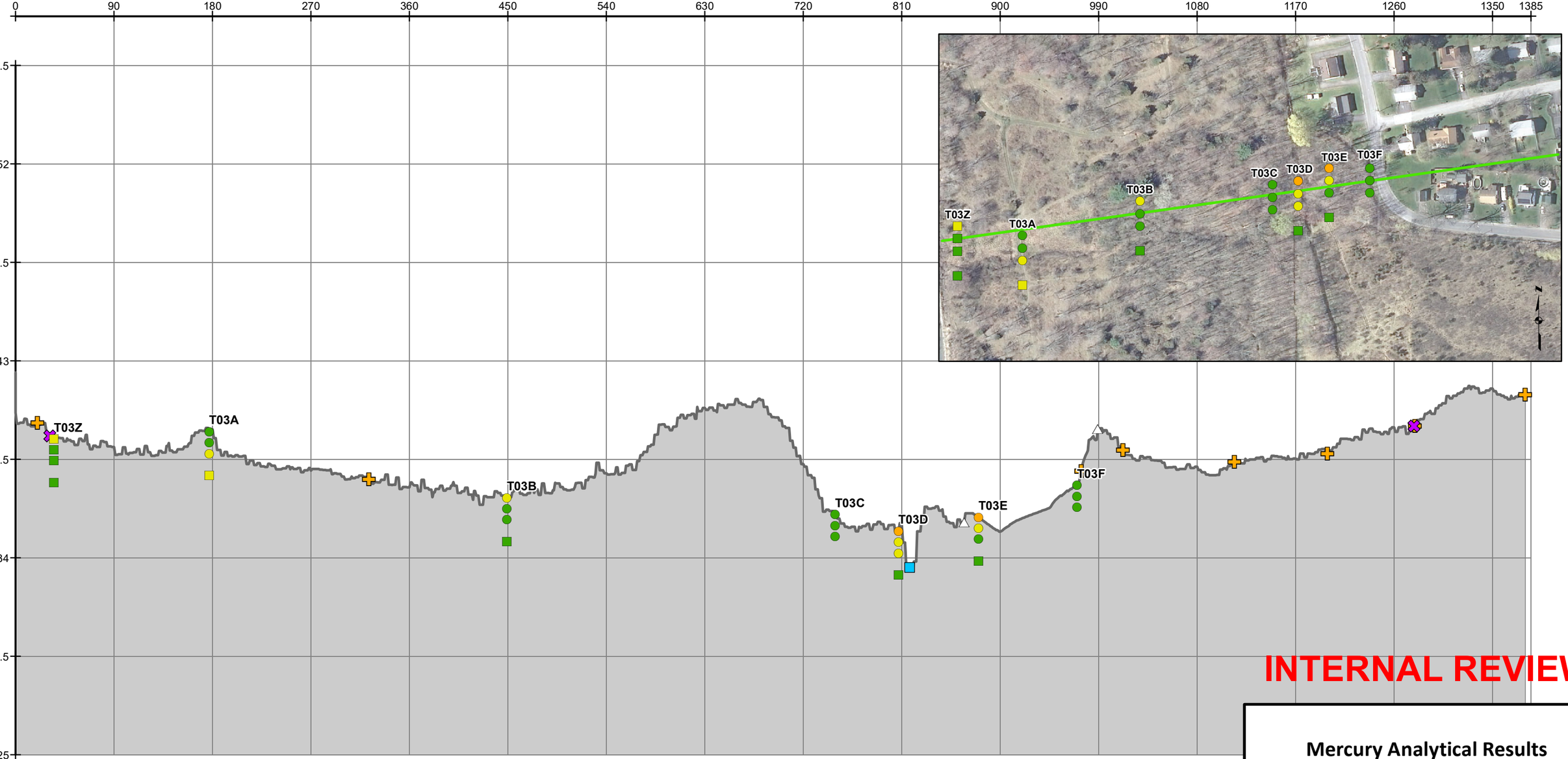

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5B

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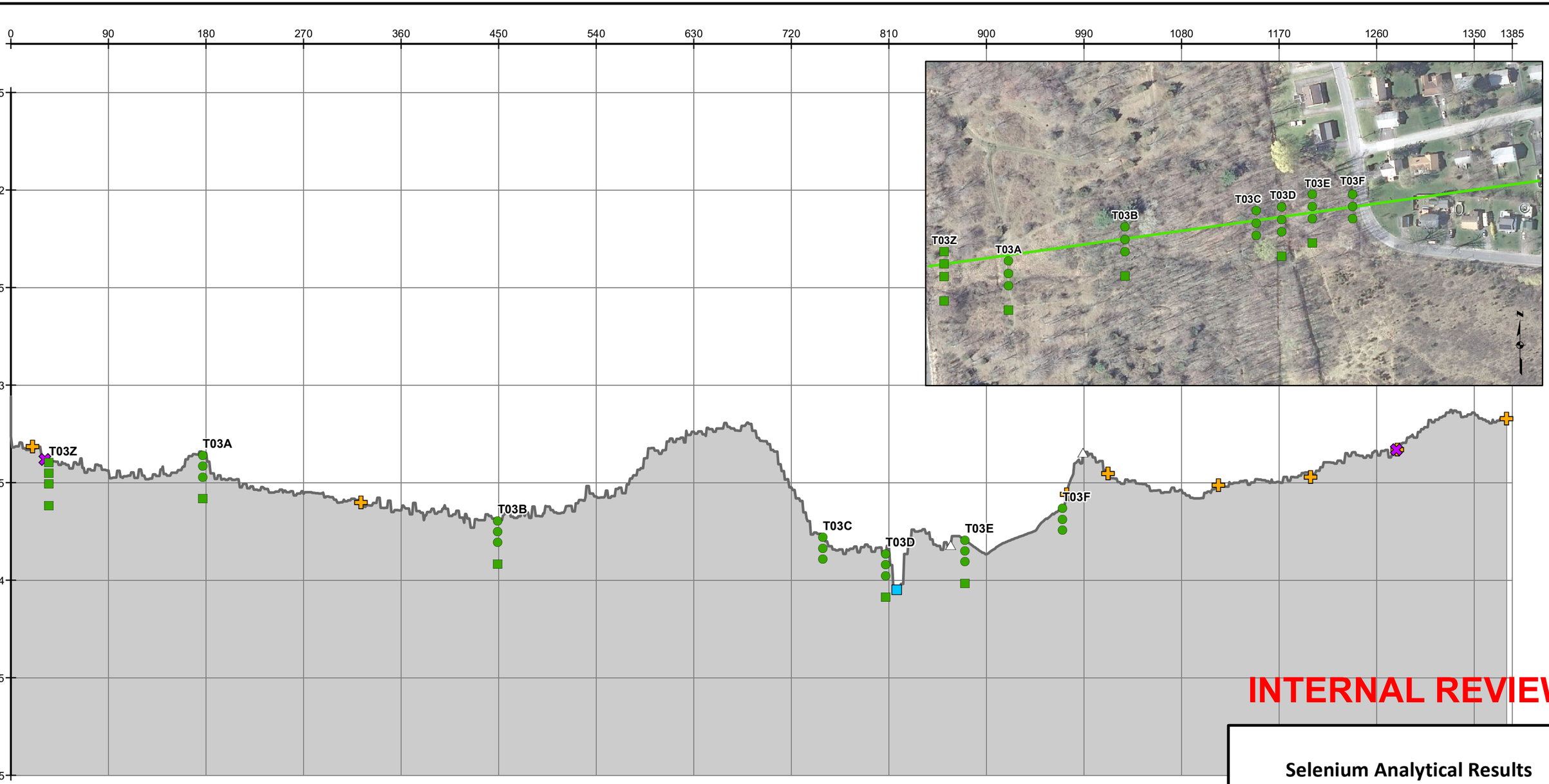

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5C

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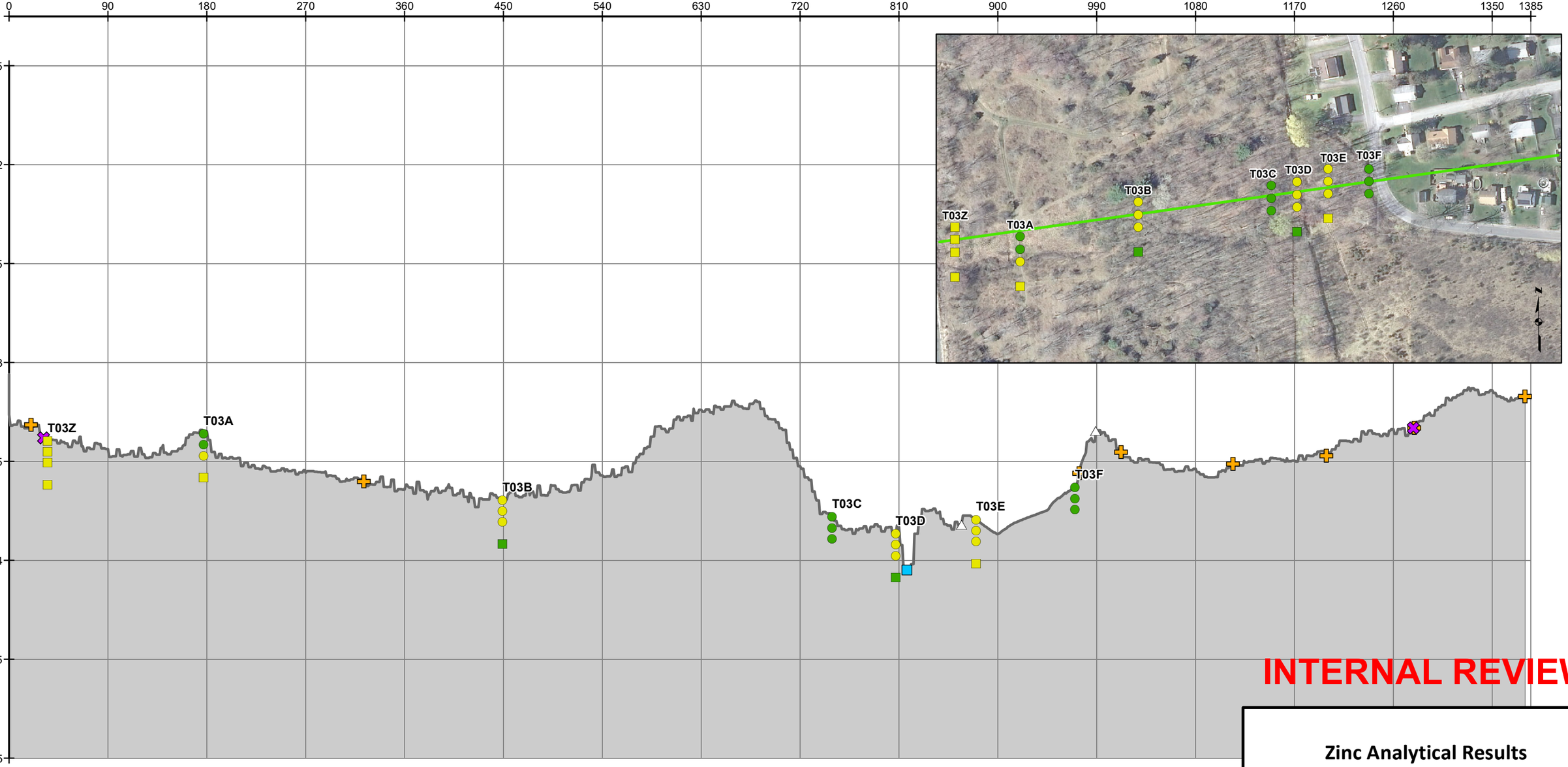

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 5D

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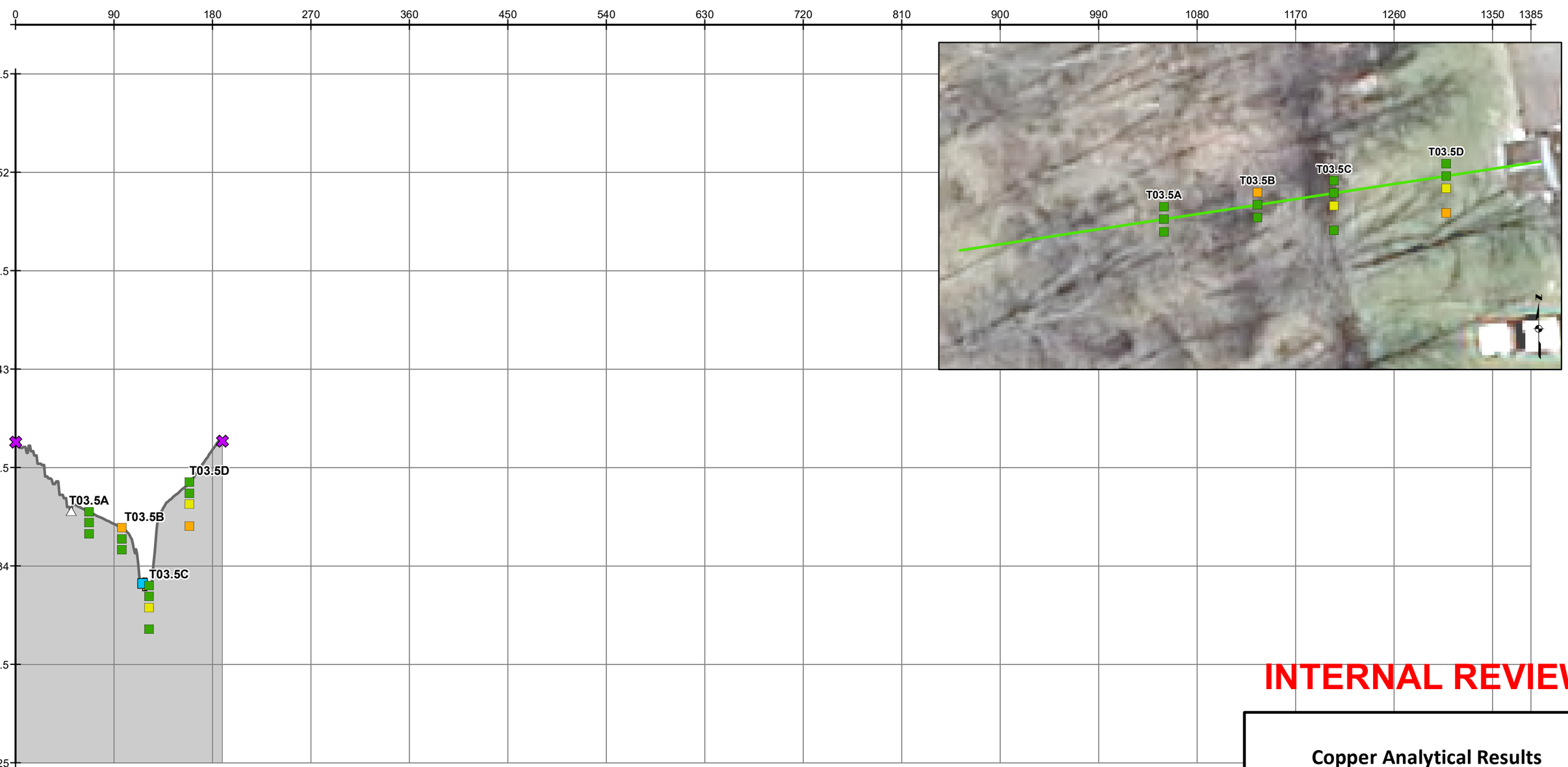

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)
- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6A

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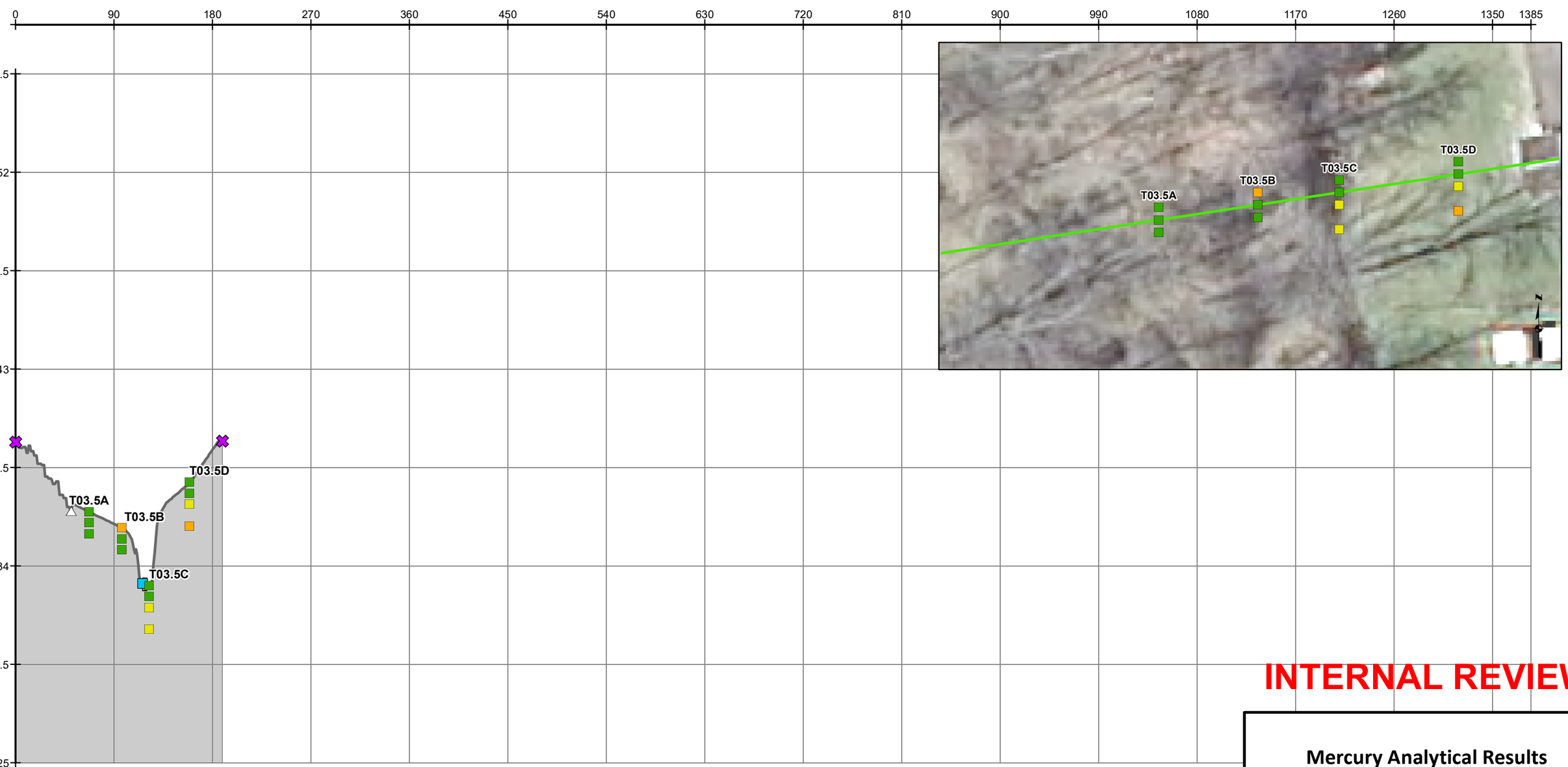

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)
- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6B

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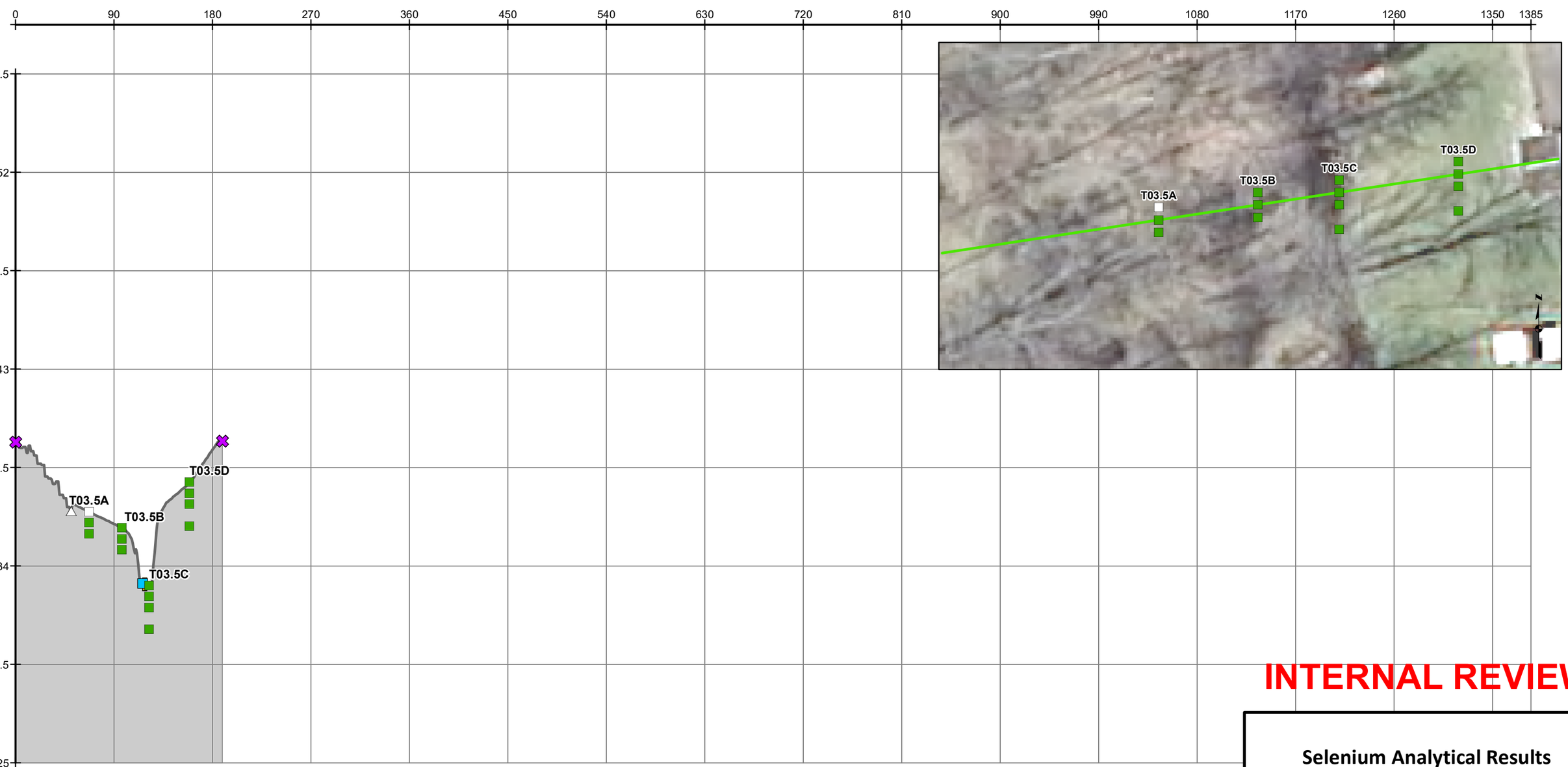

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)
- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 6C

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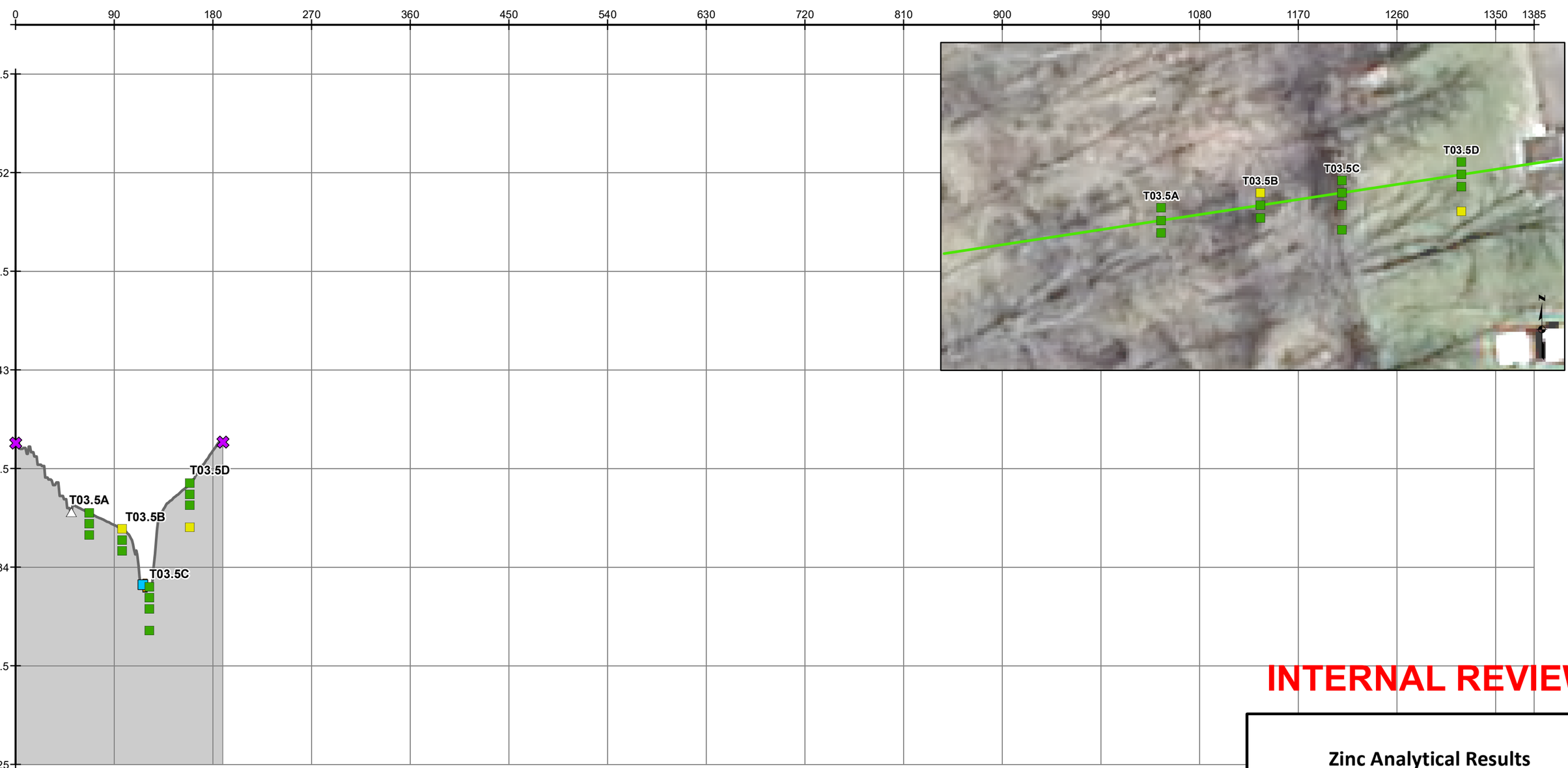

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 6D

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Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 7A

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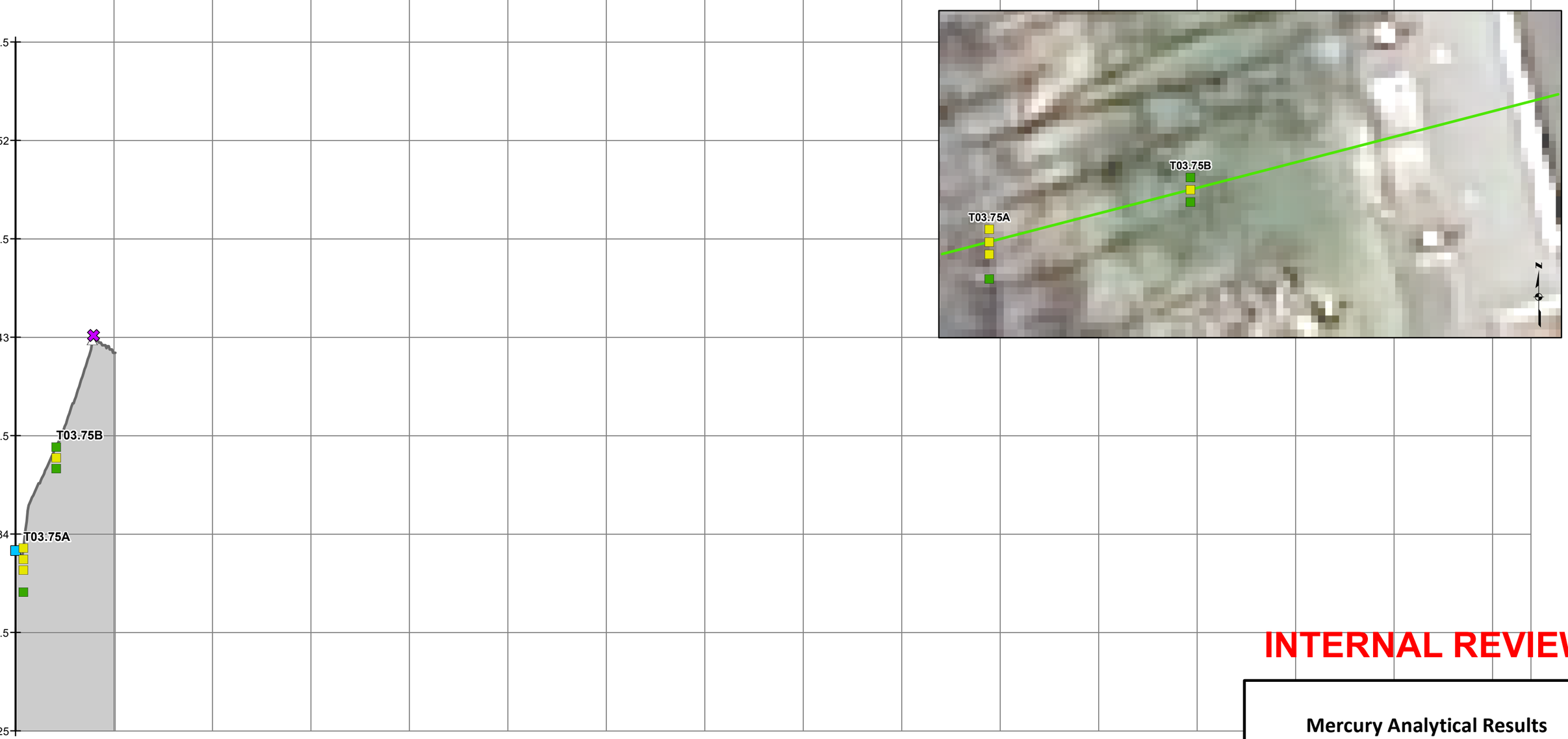

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 7B

Reviewed By:

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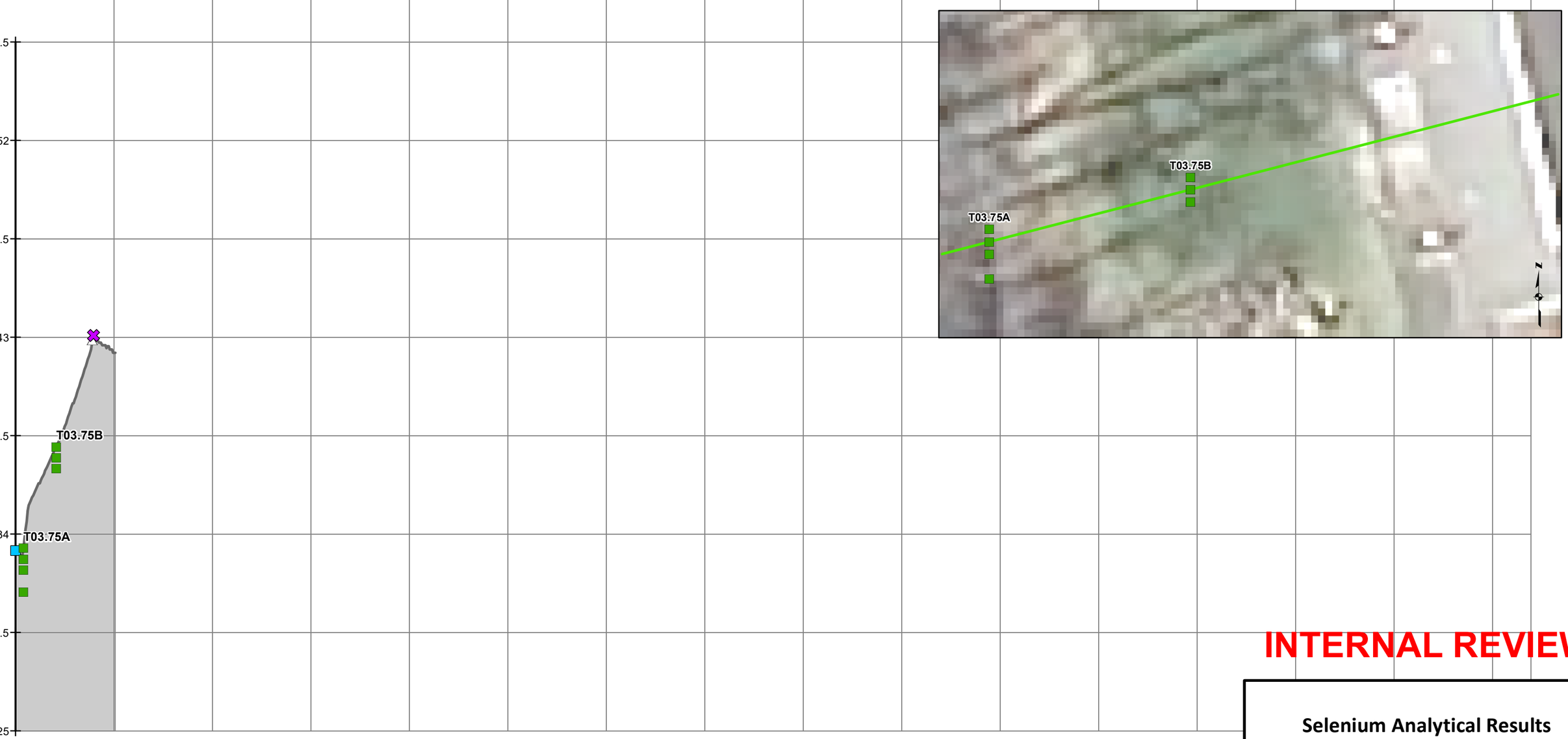

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 7C

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Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T3.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 7D

Reviewed By:

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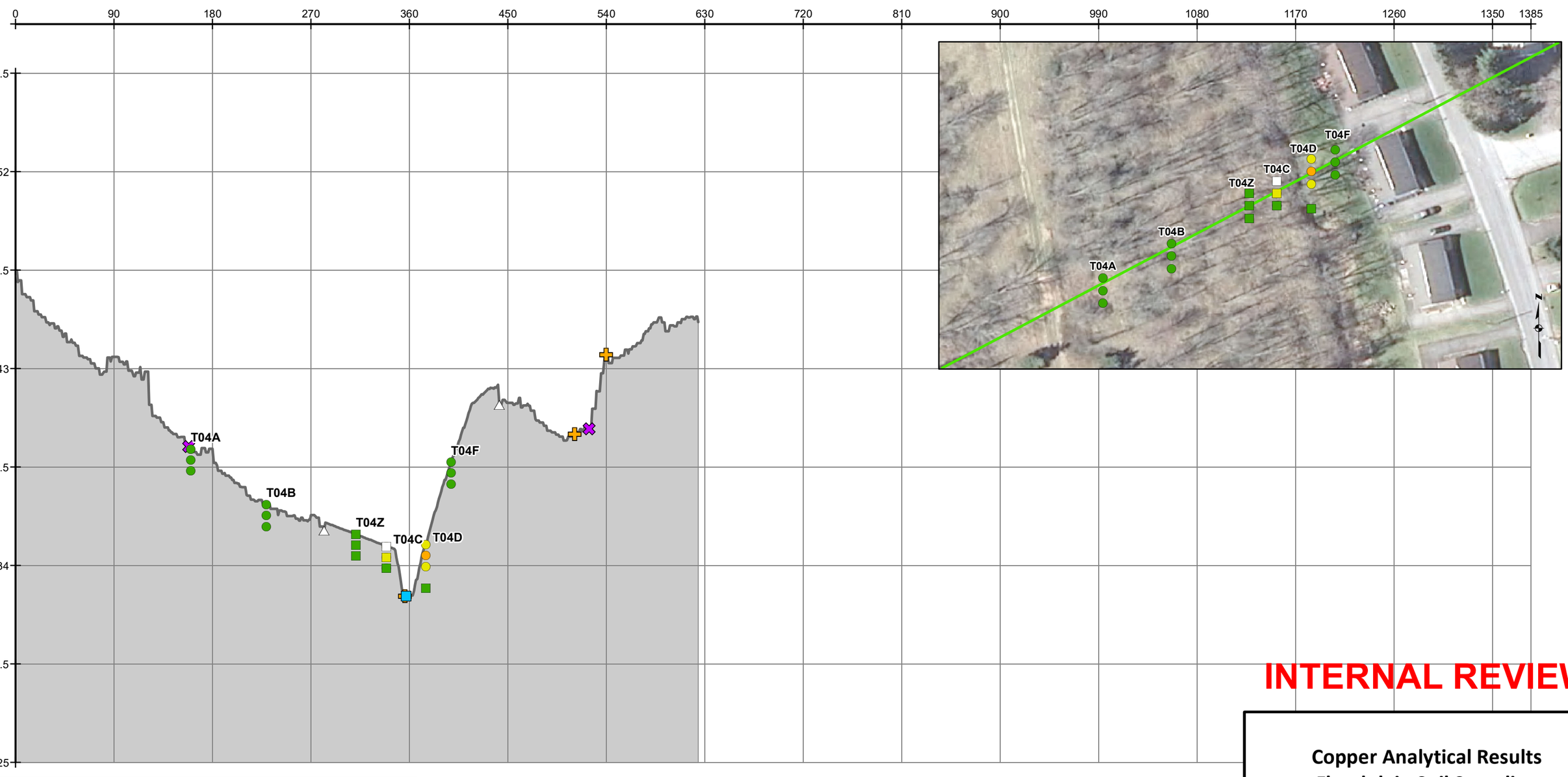

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8A

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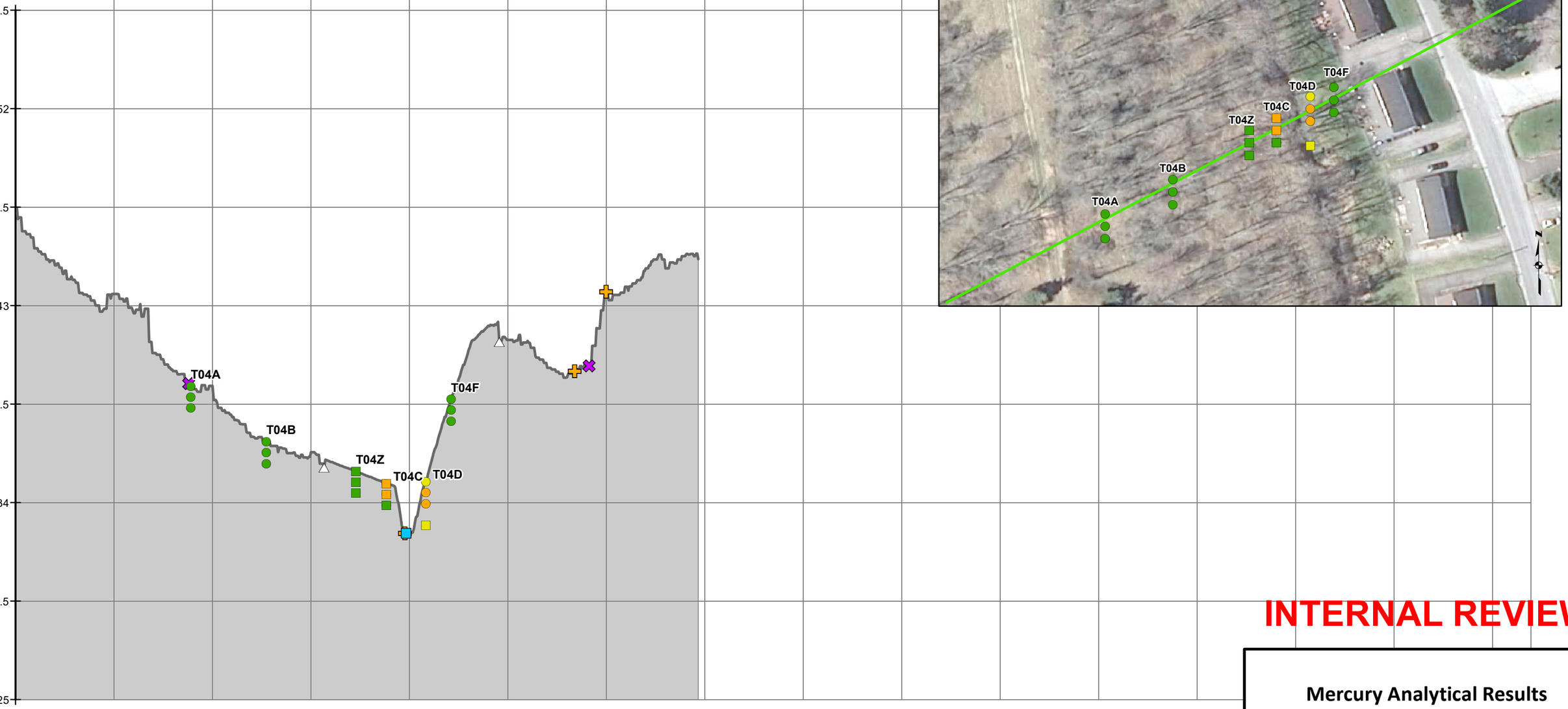

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8B

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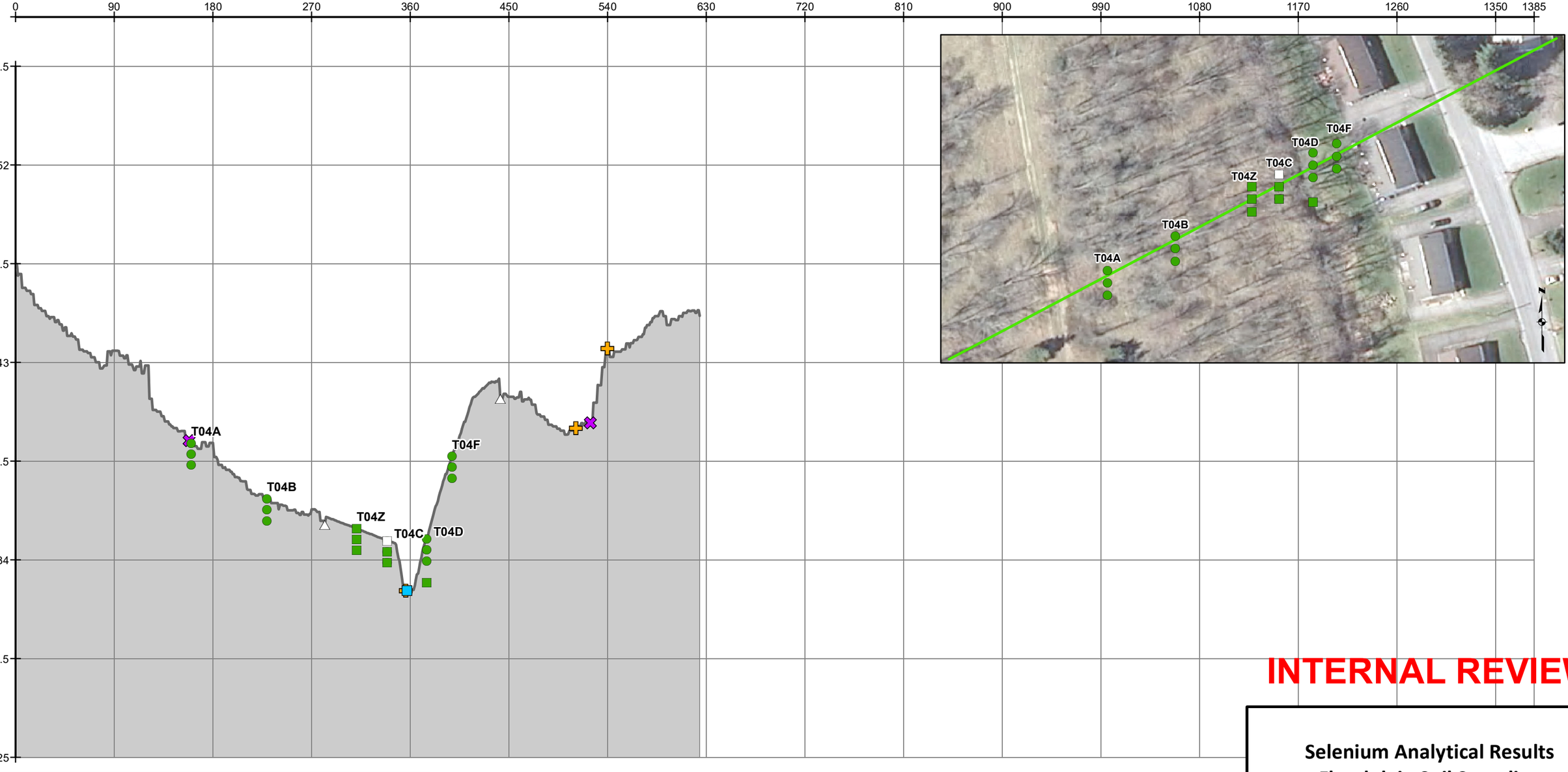

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8C

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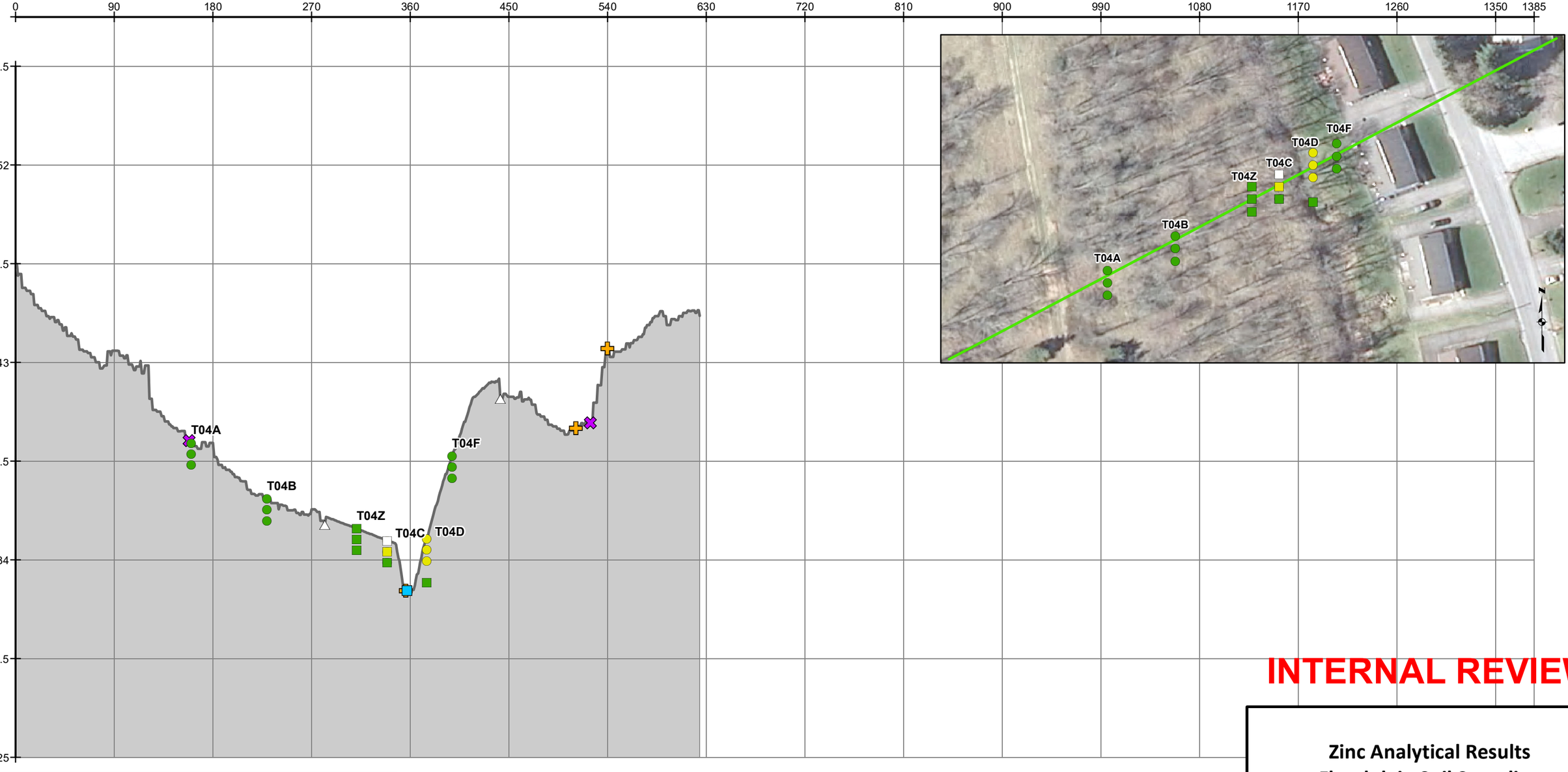

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 8D

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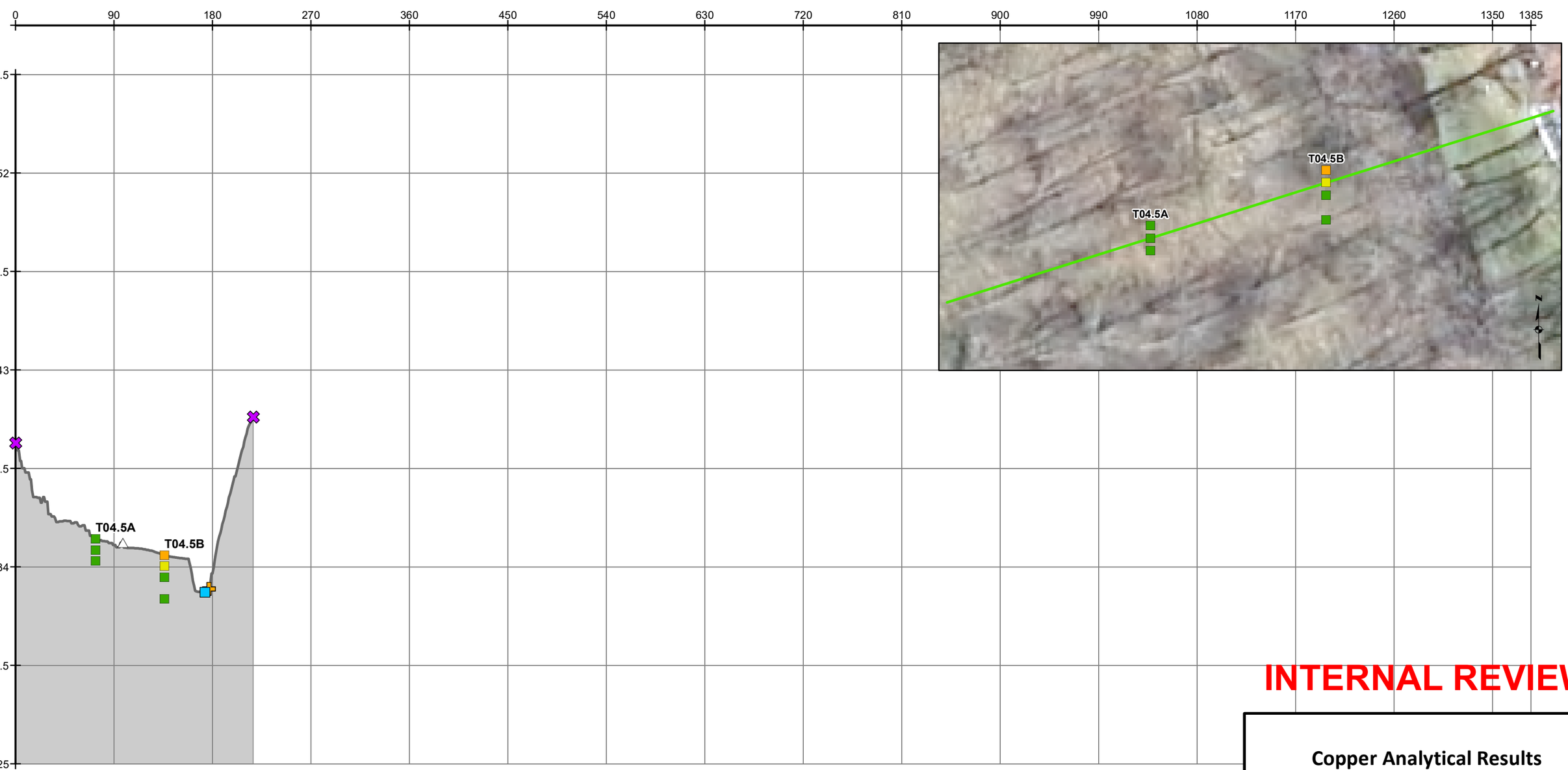

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9A

Reviewed By:

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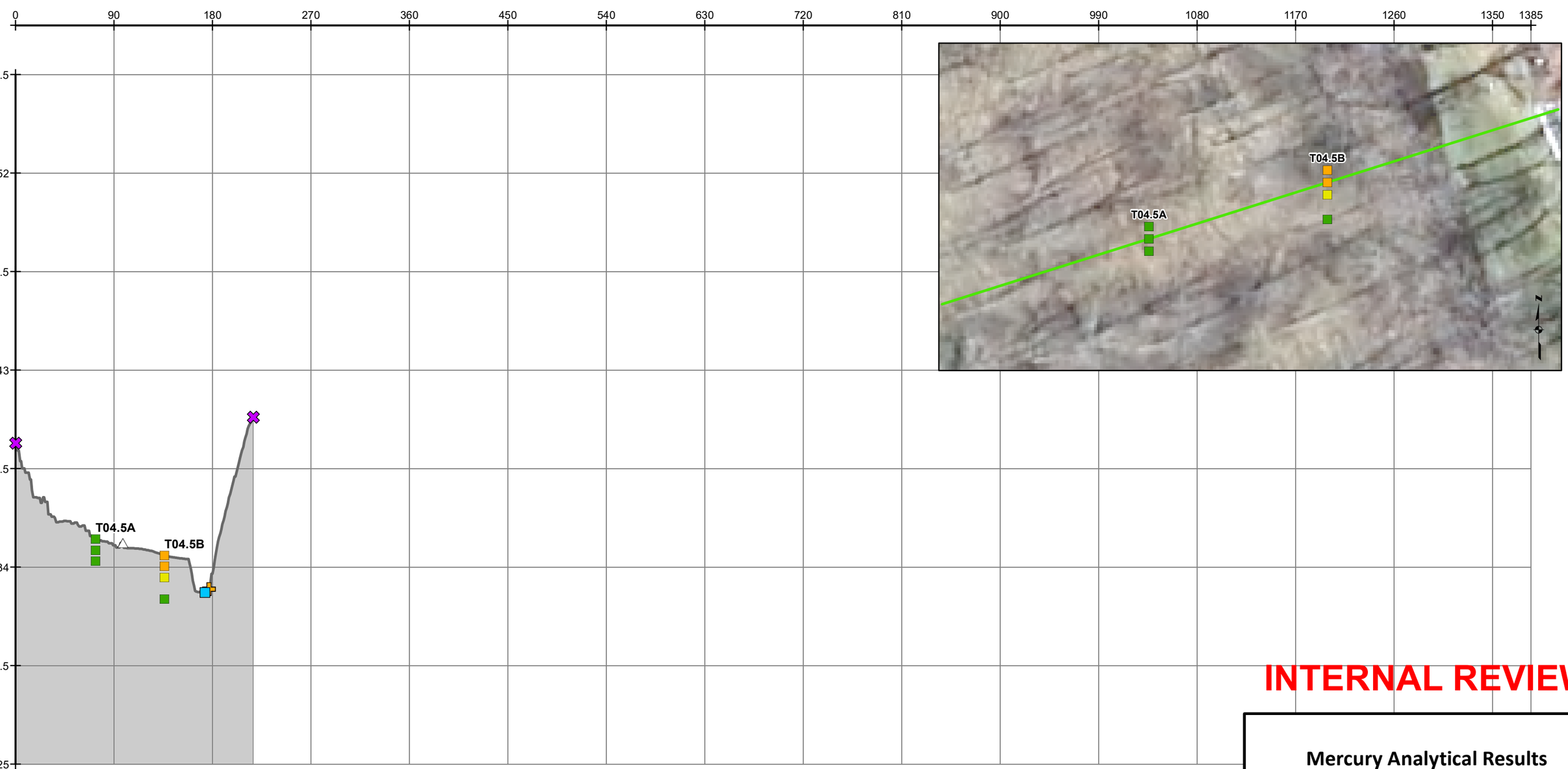

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9B

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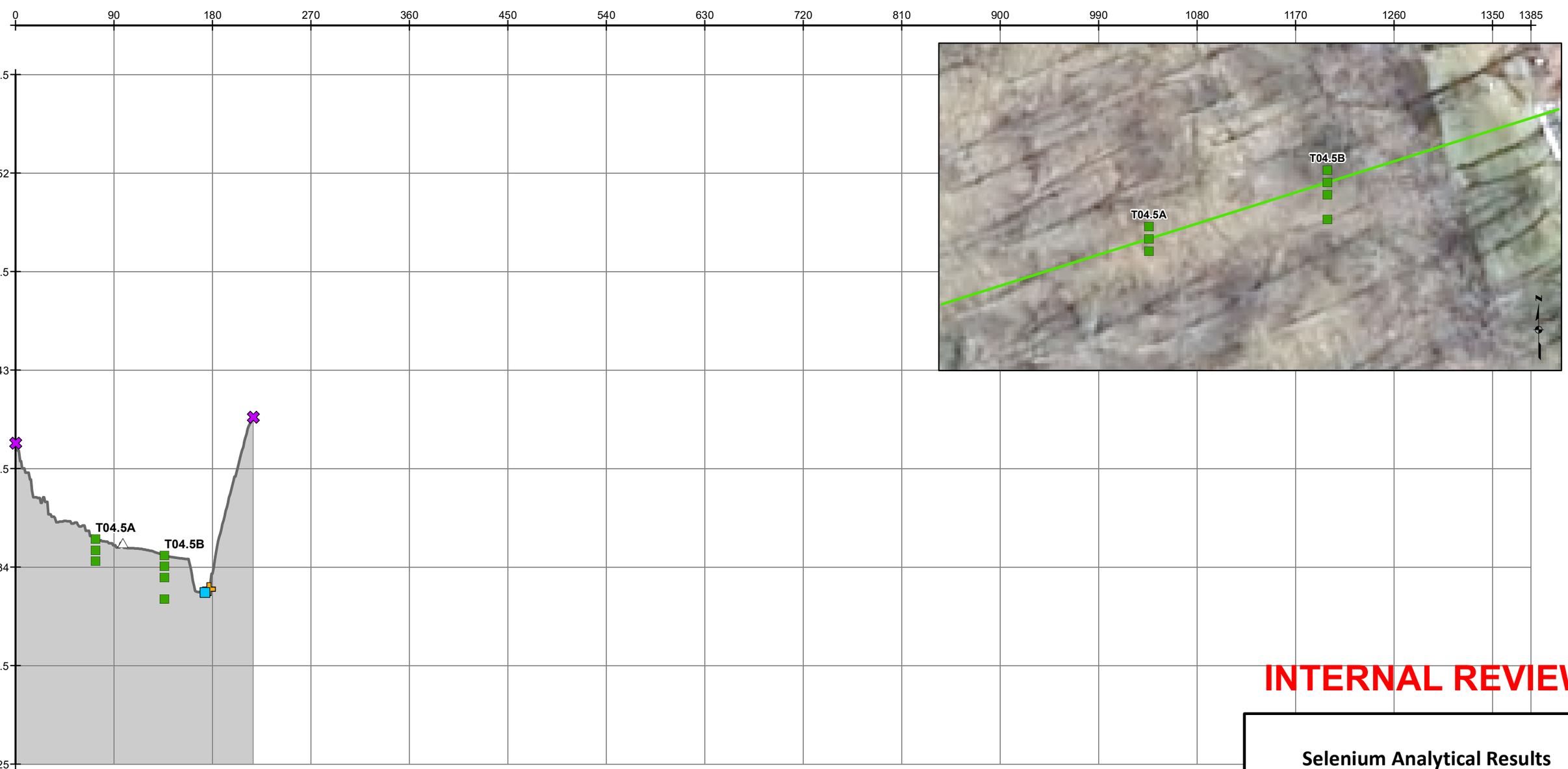

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9C

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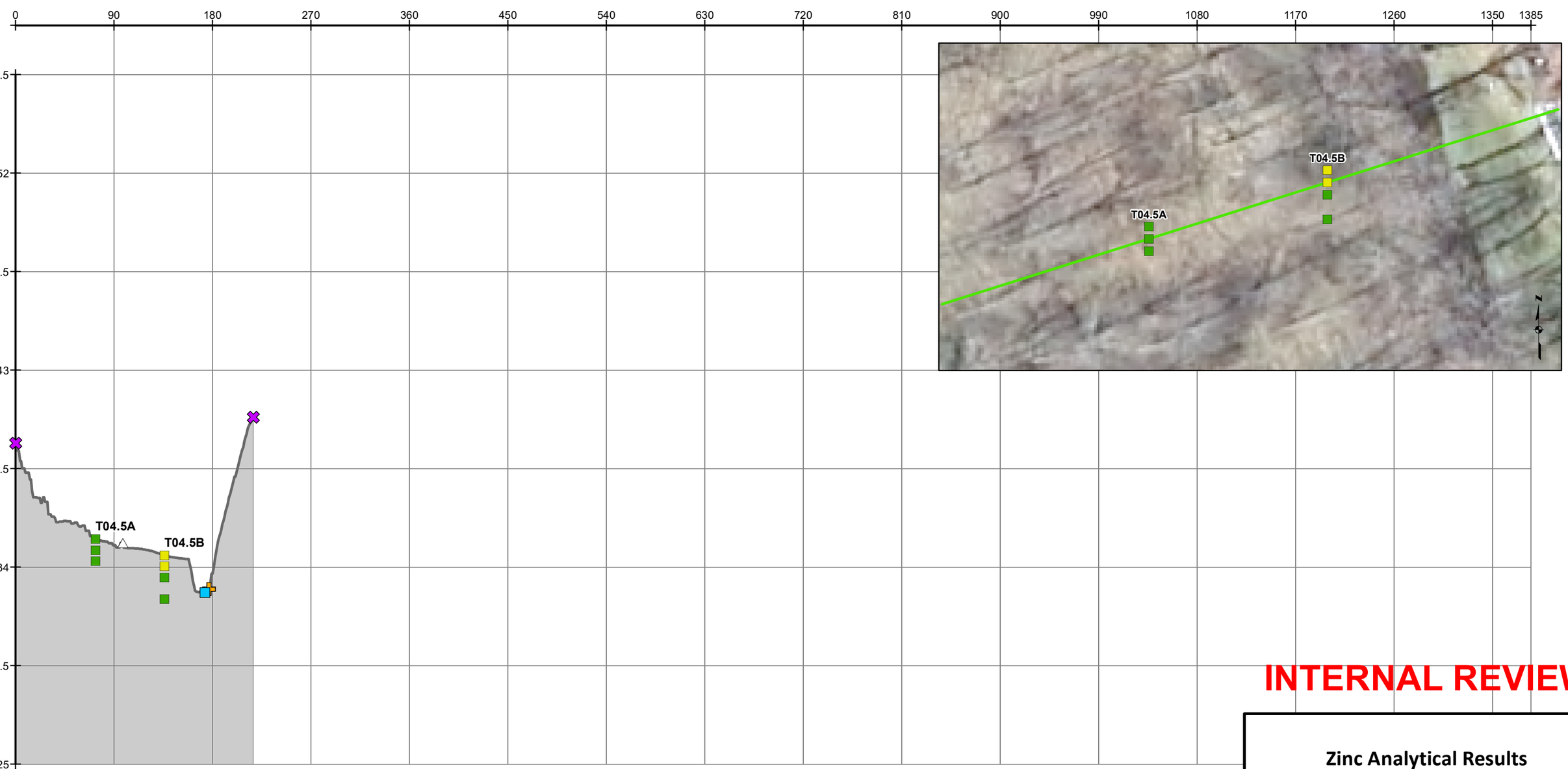

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 9D

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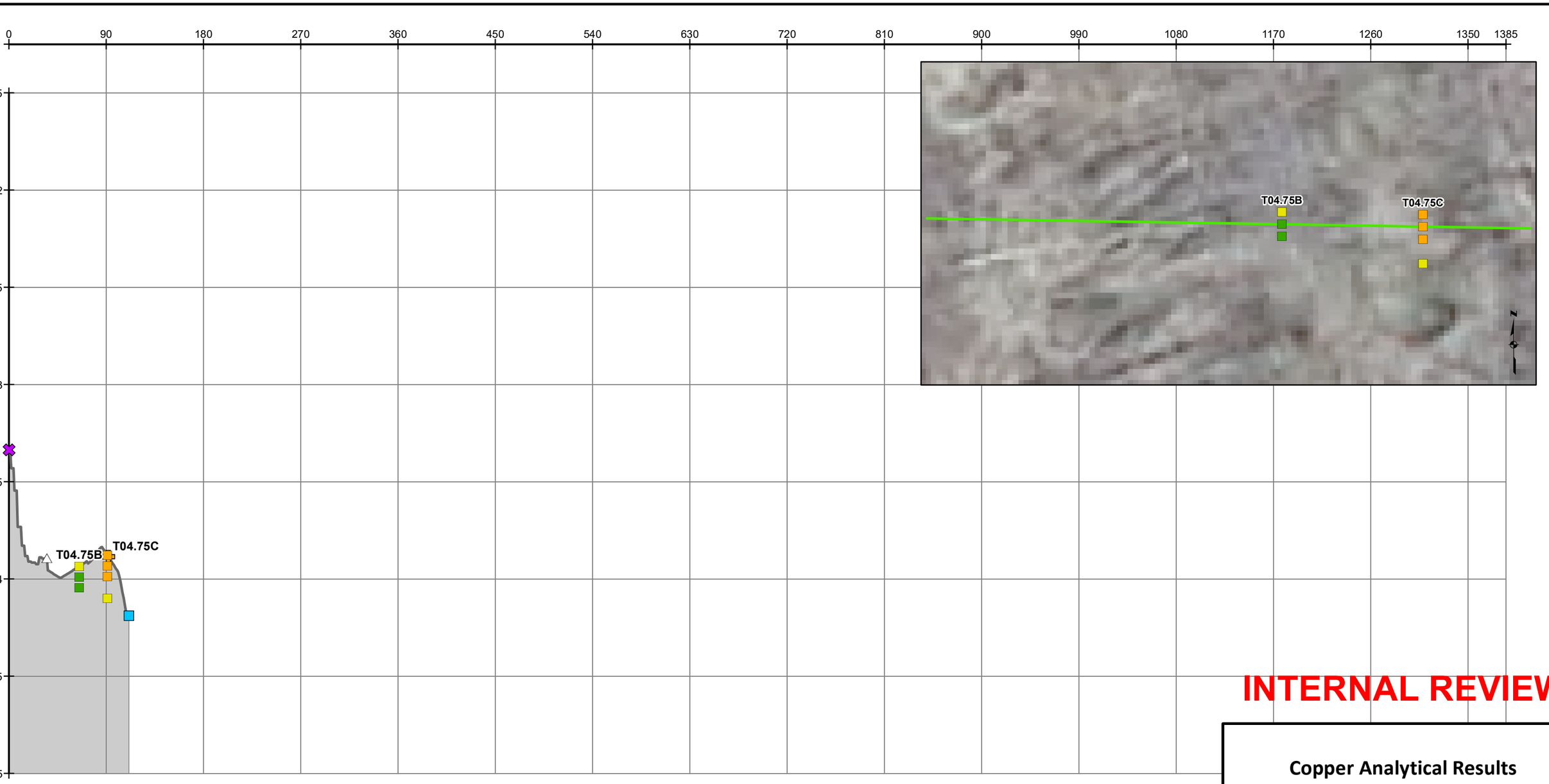

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 10A

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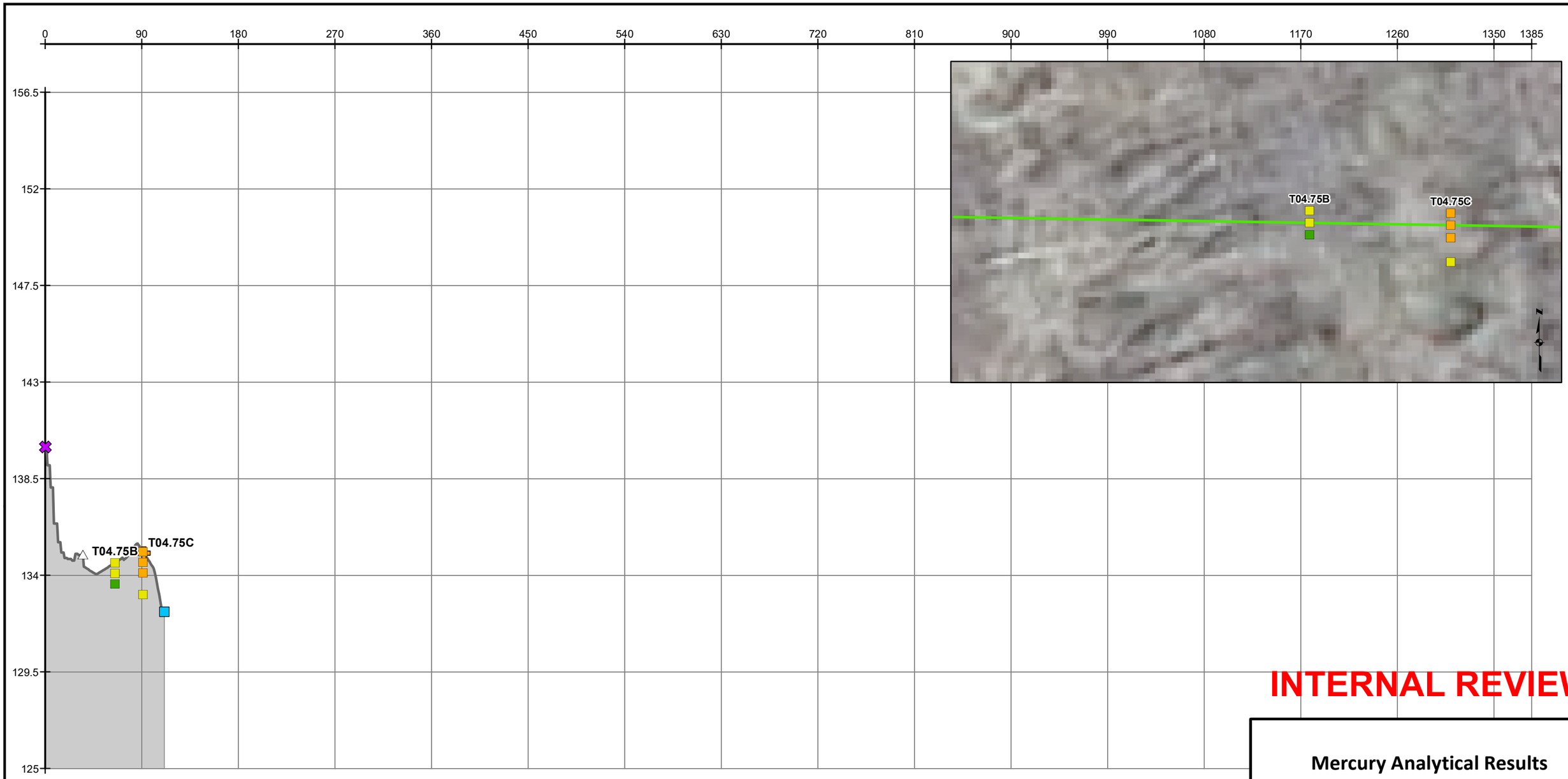

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 10B

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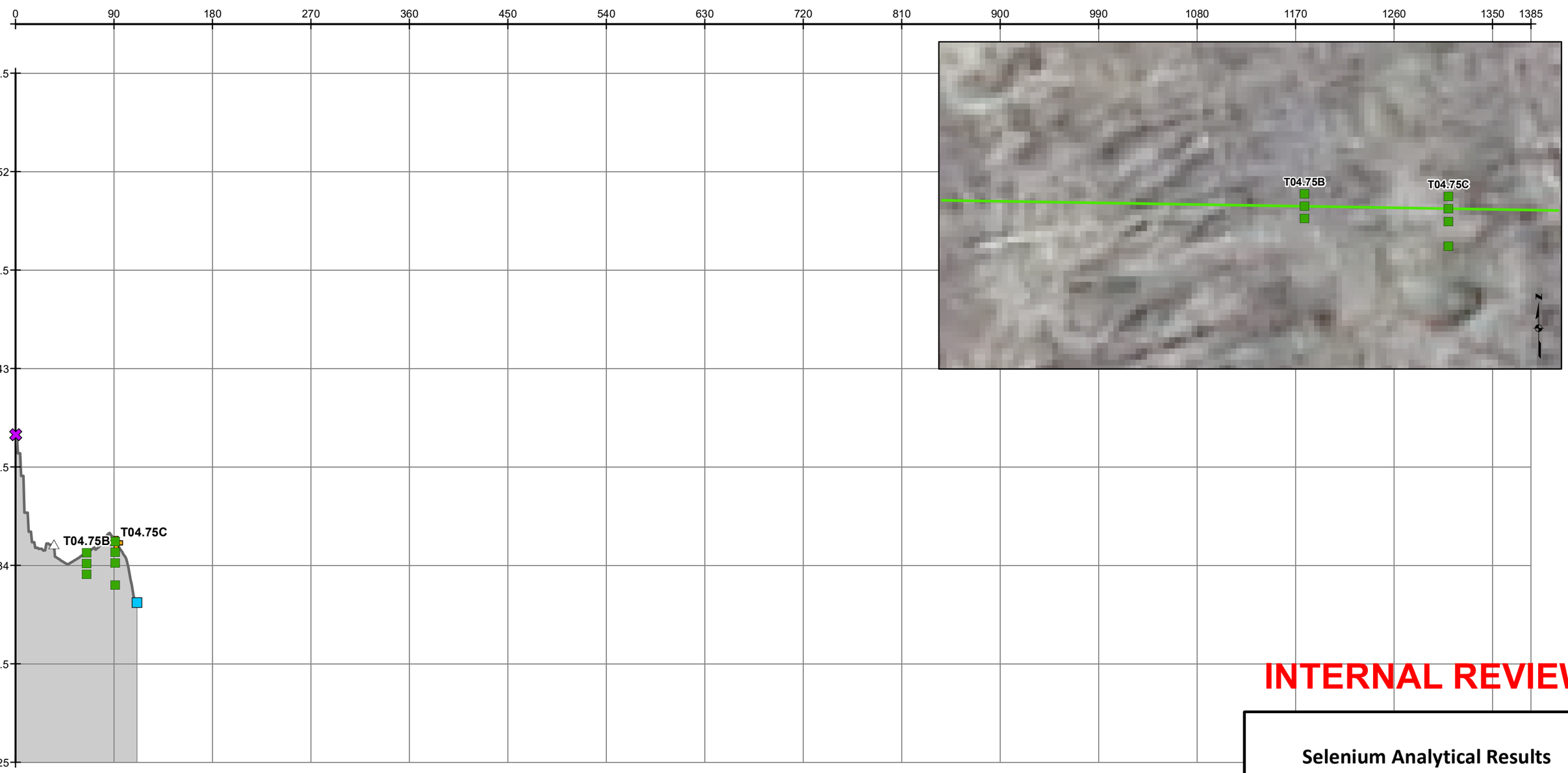

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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 T4.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 10C

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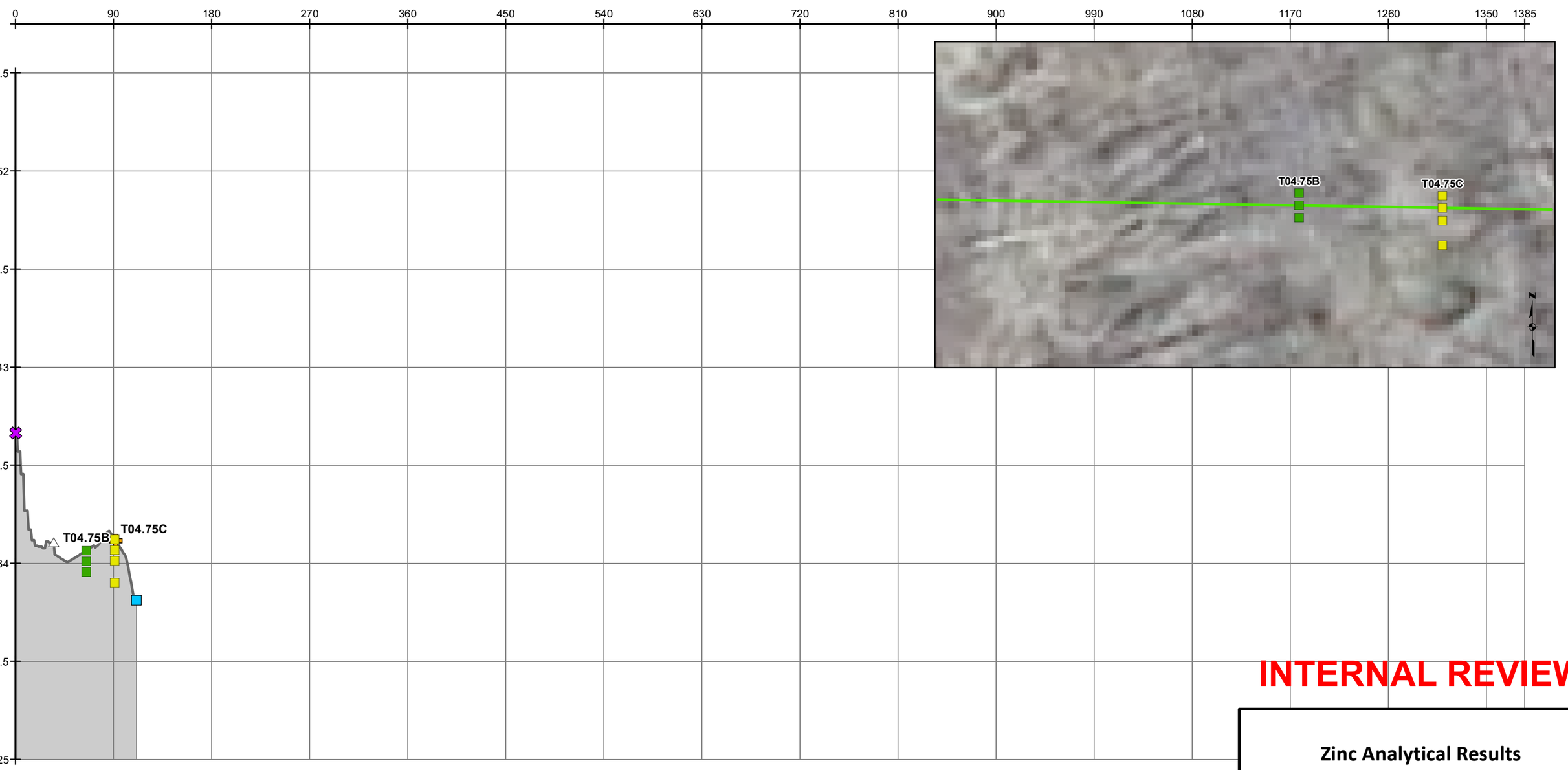

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T4.75

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 10D

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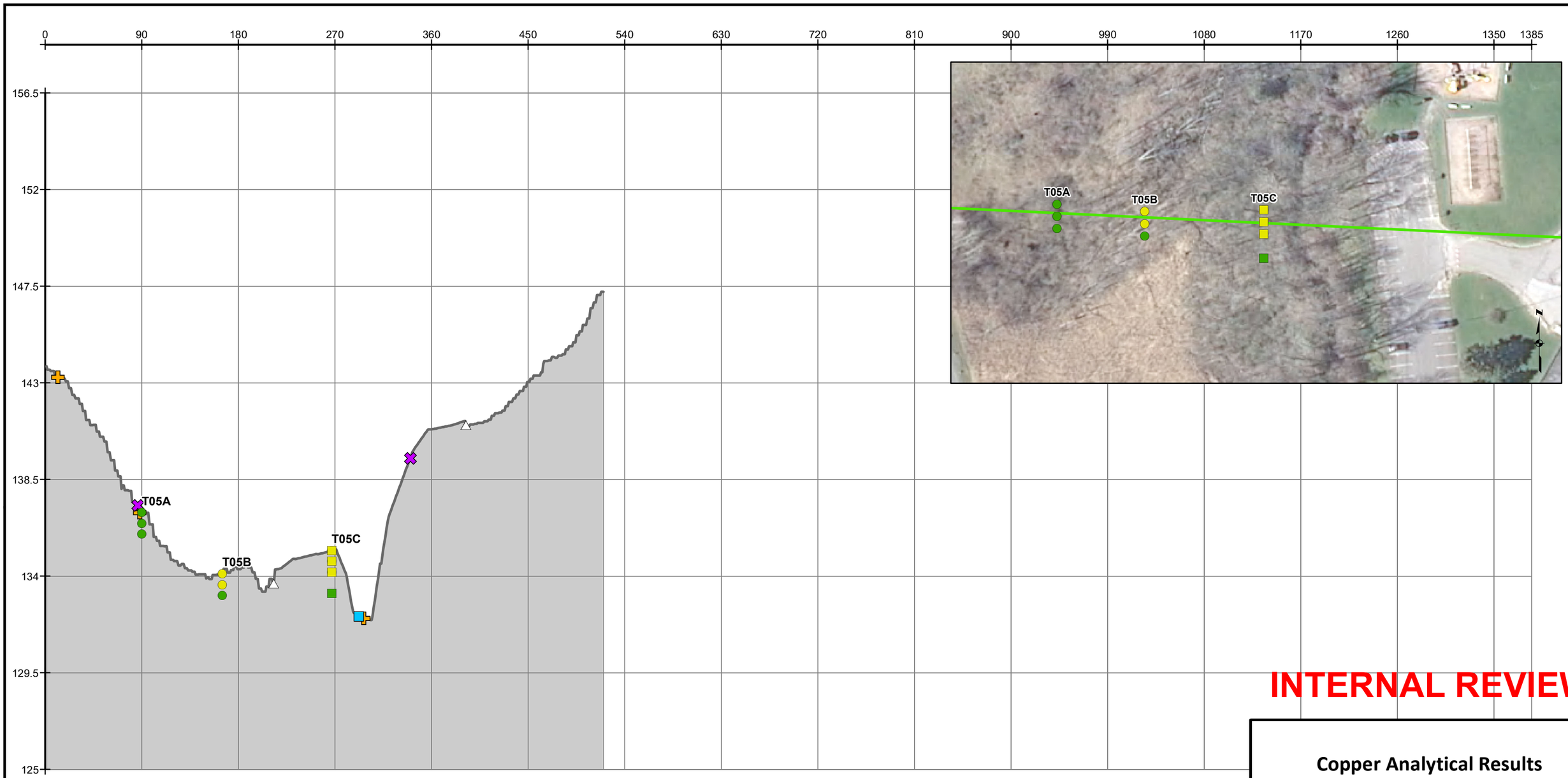

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 11A

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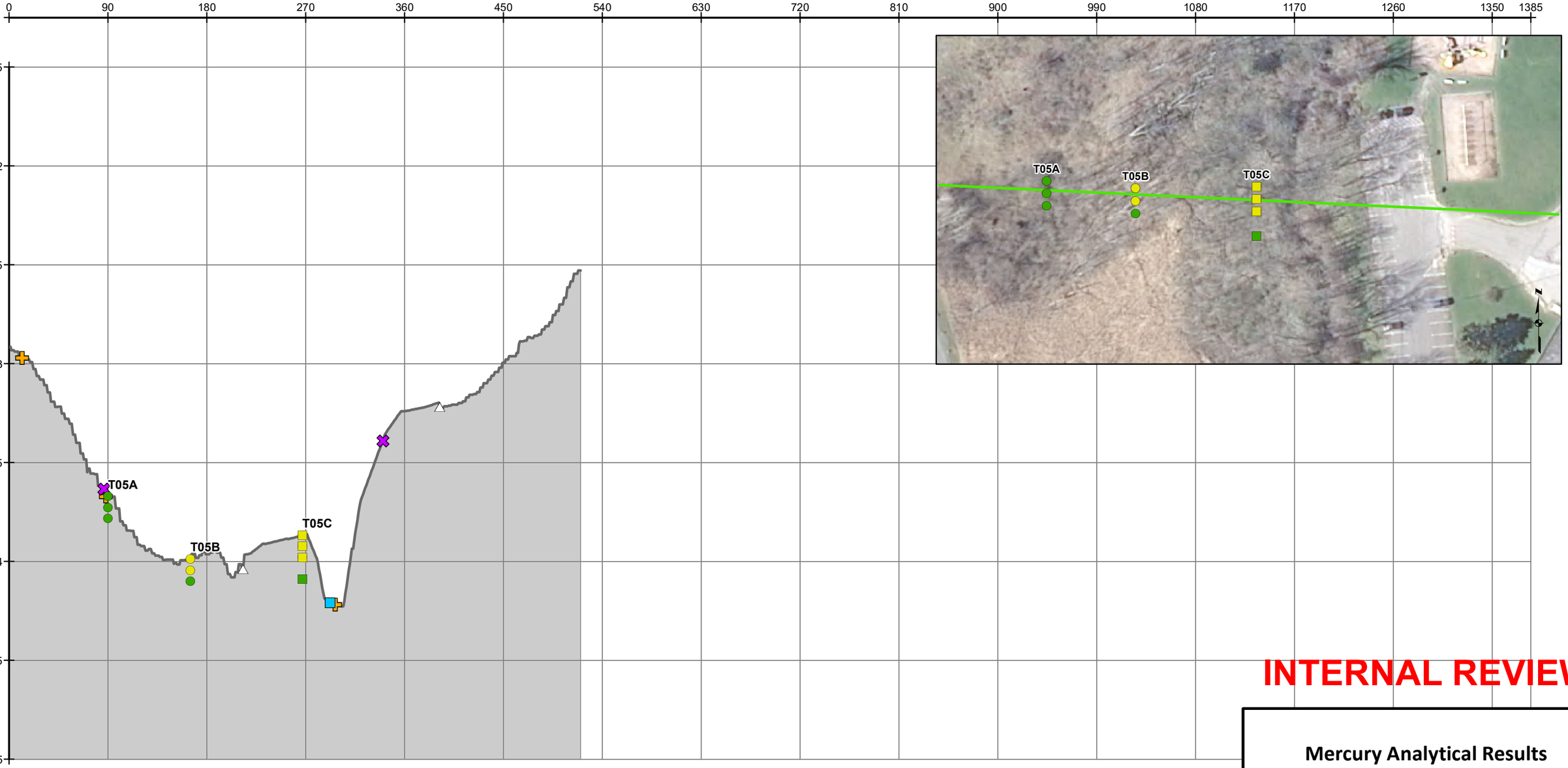

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 11B

Reviewed By:

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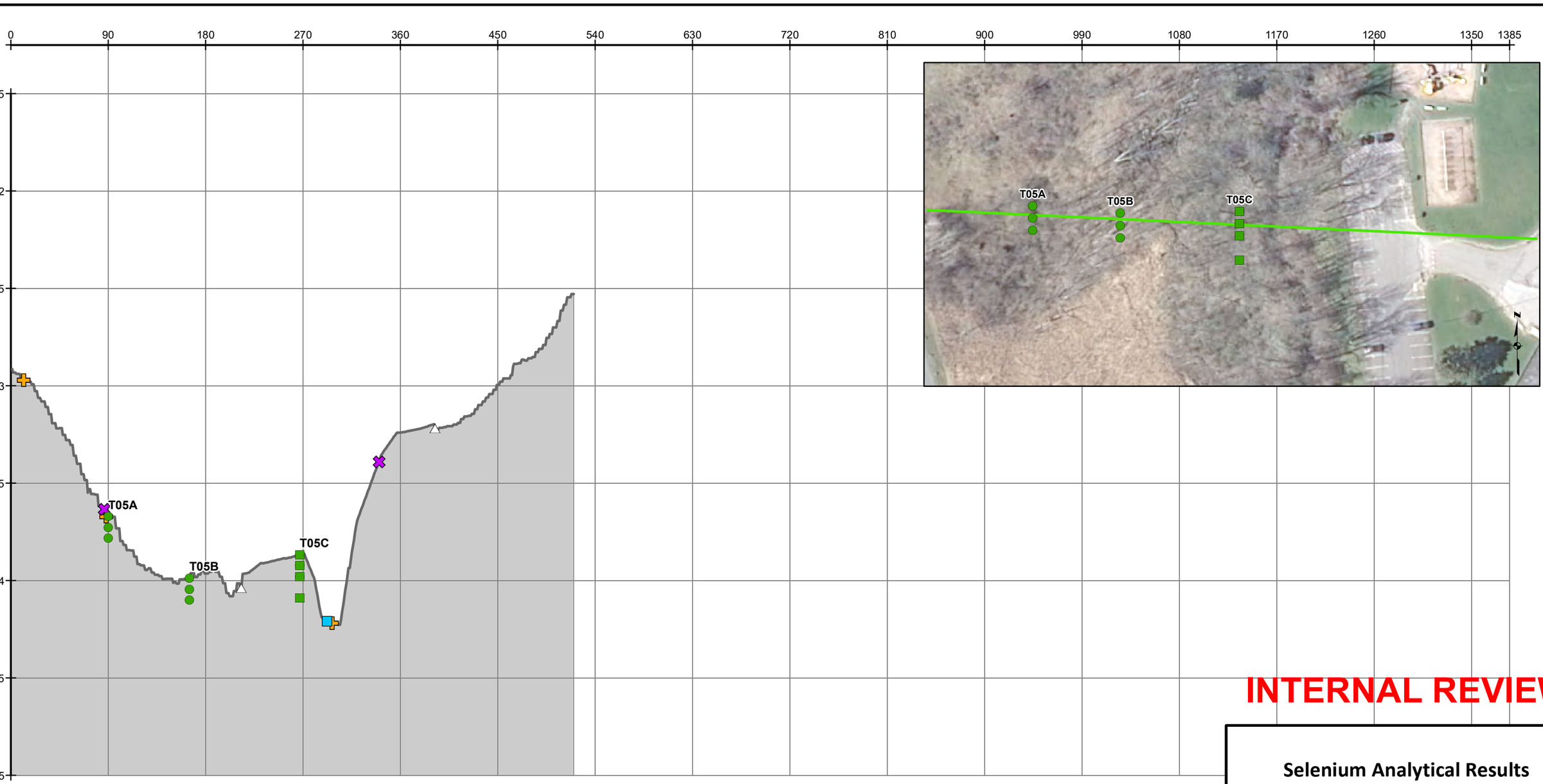

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 11C

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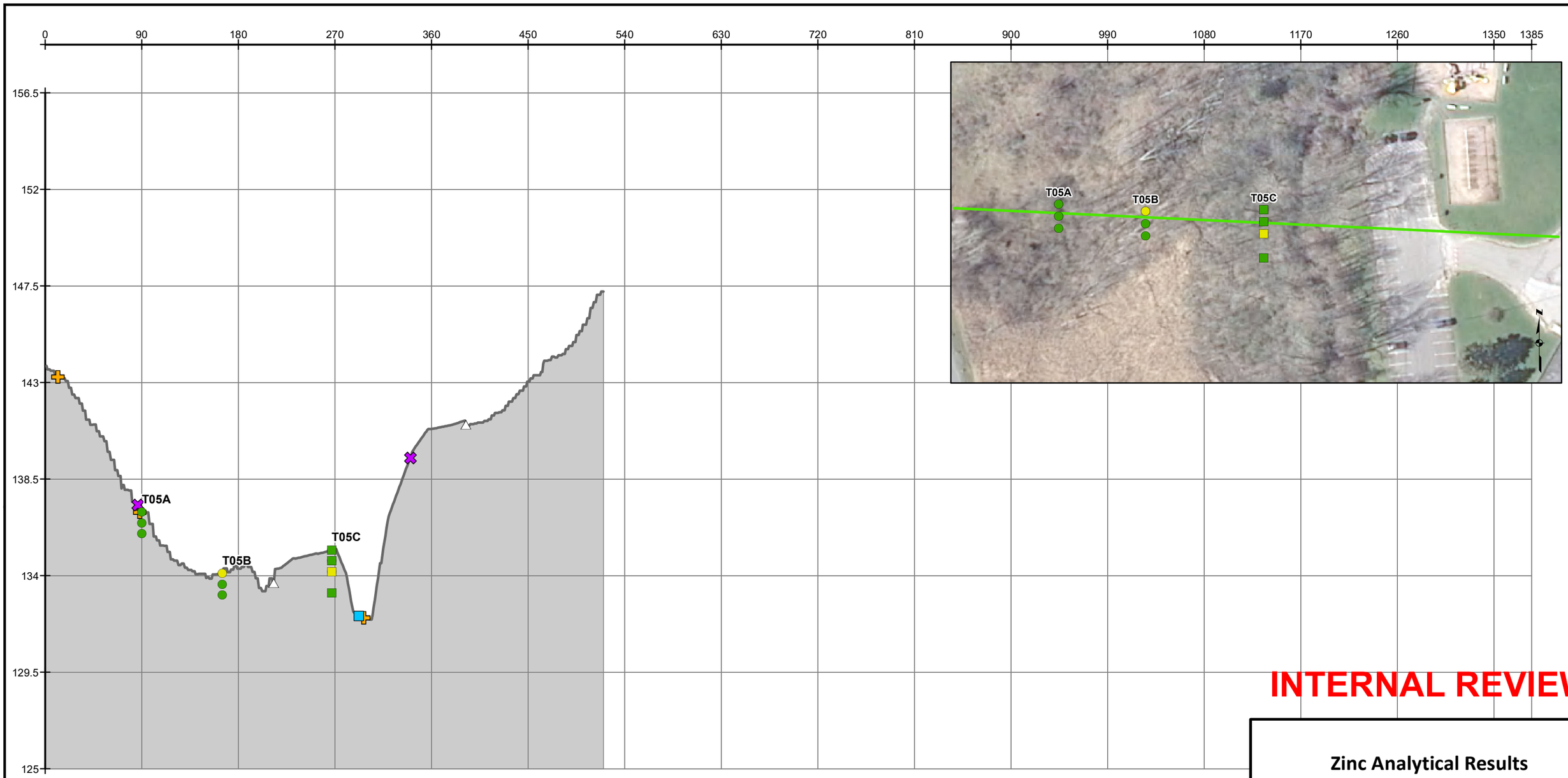

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 11D

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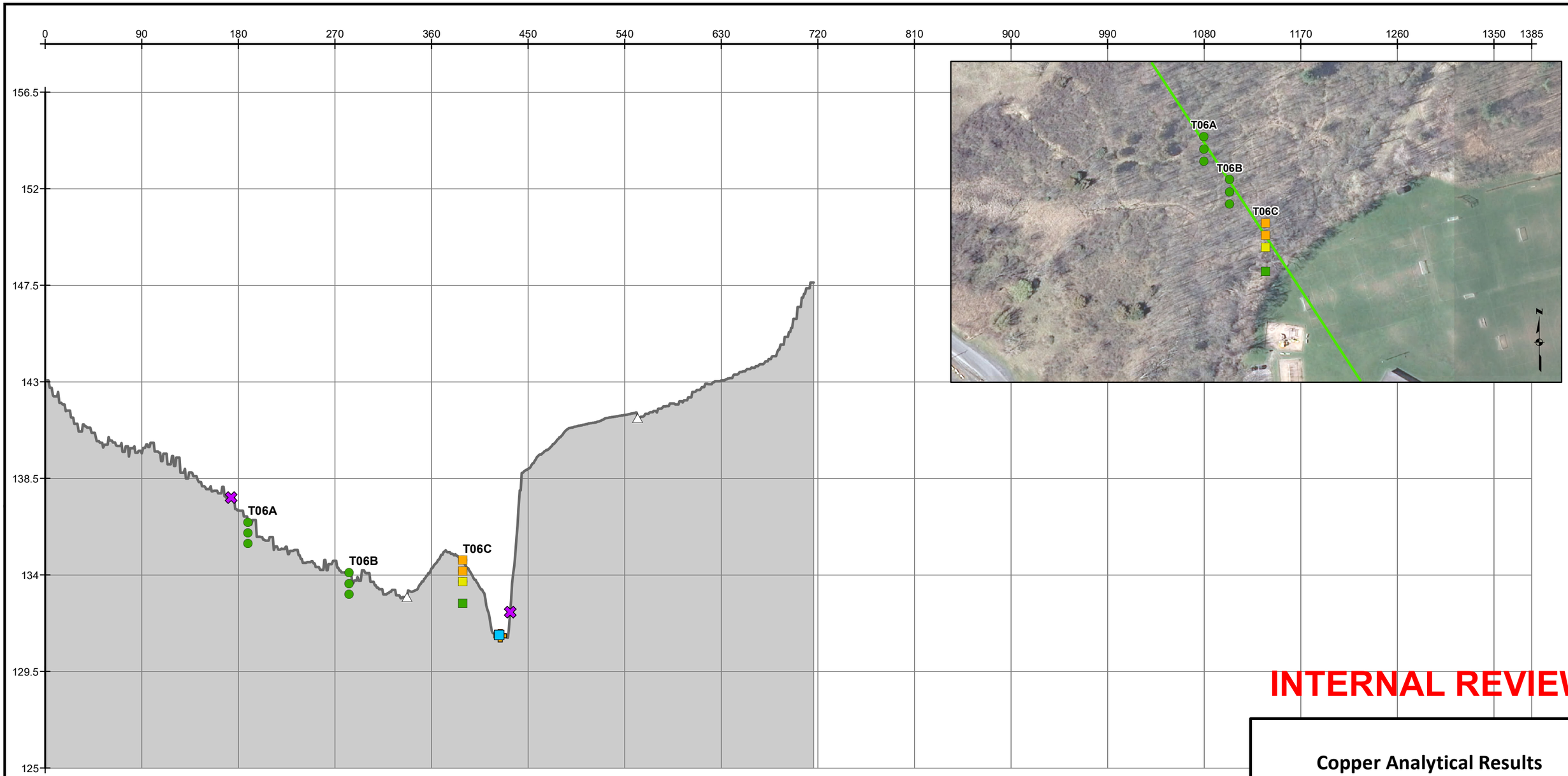

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T6

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 12A

Reviewed By:

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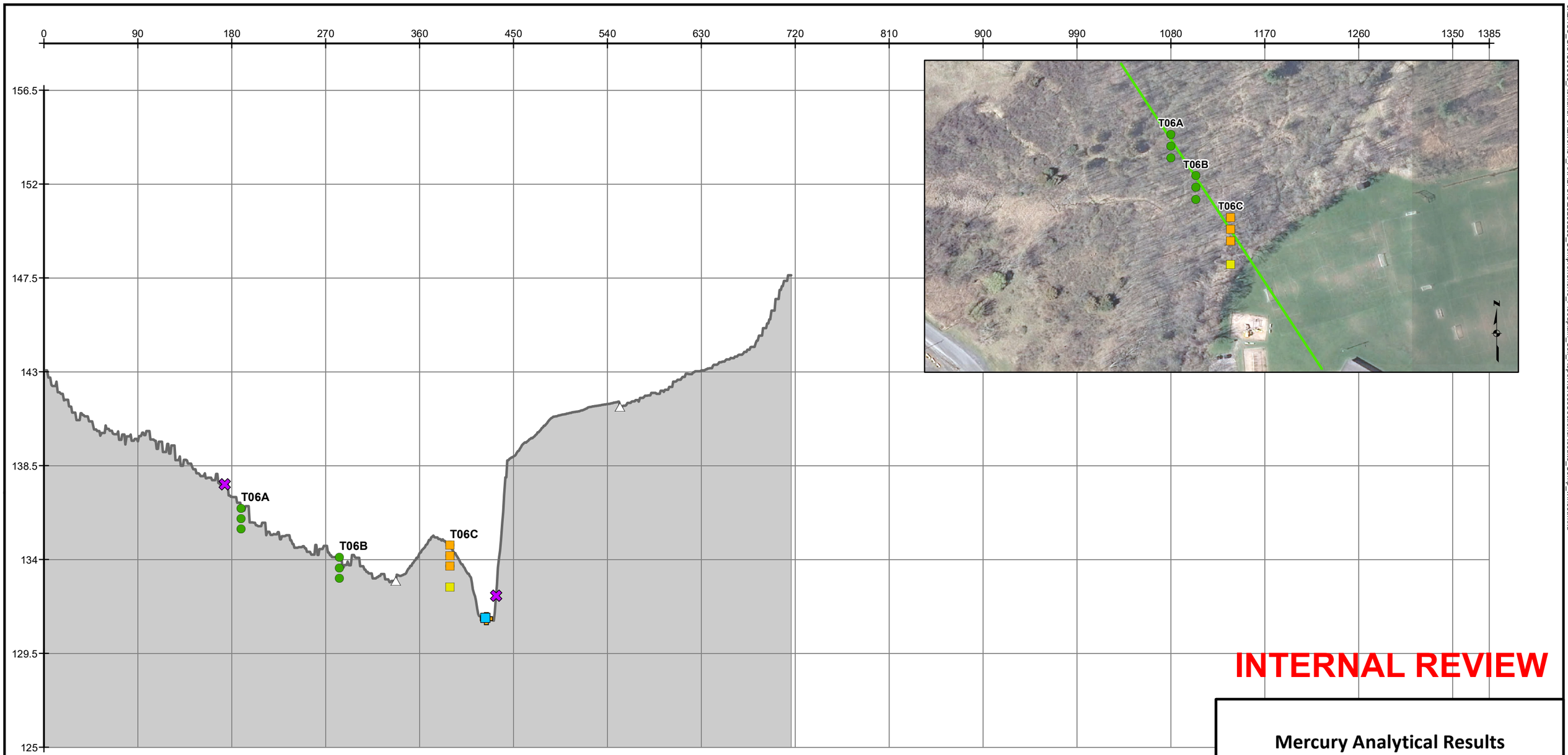

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 12B

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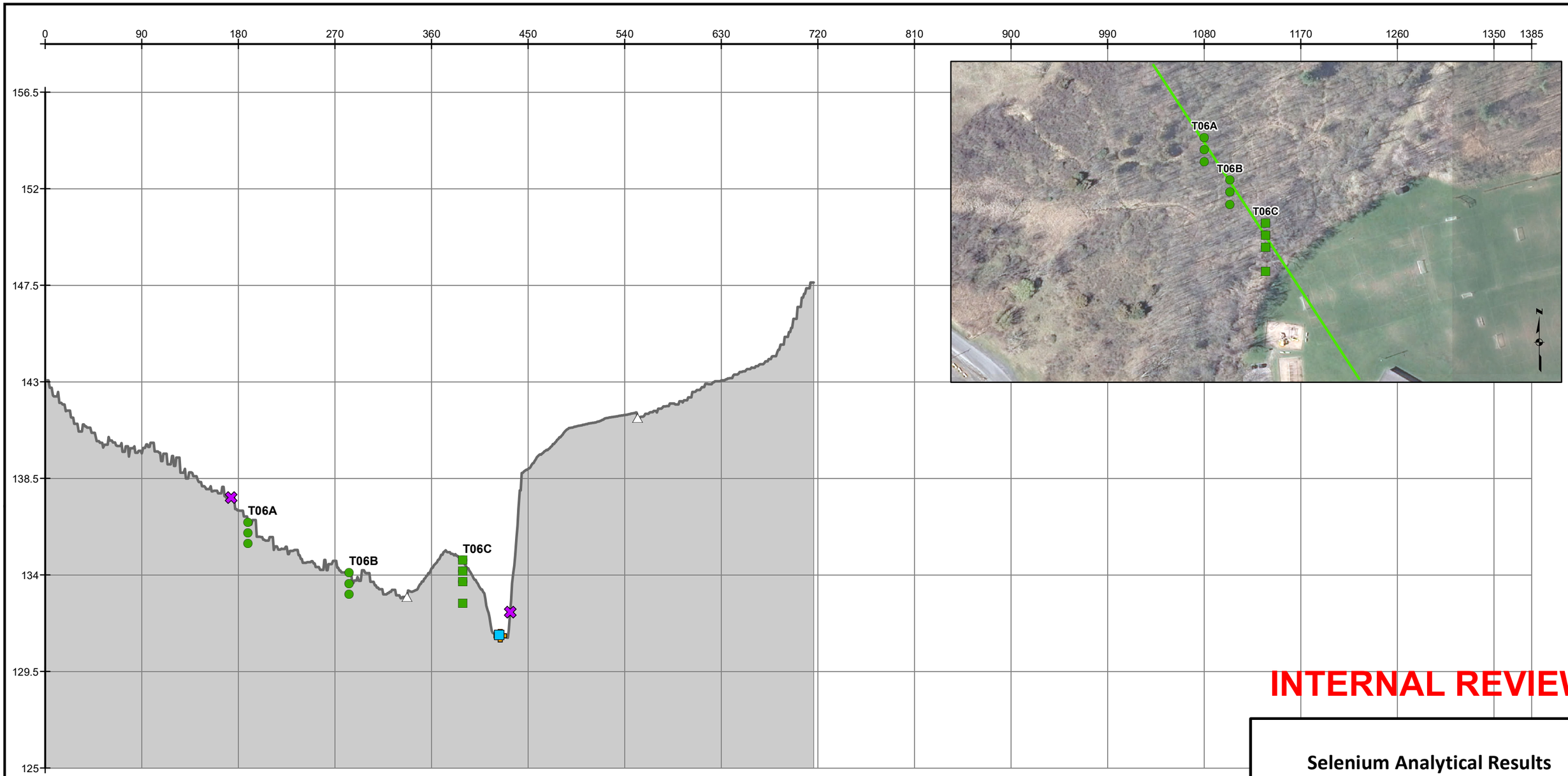

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 12C

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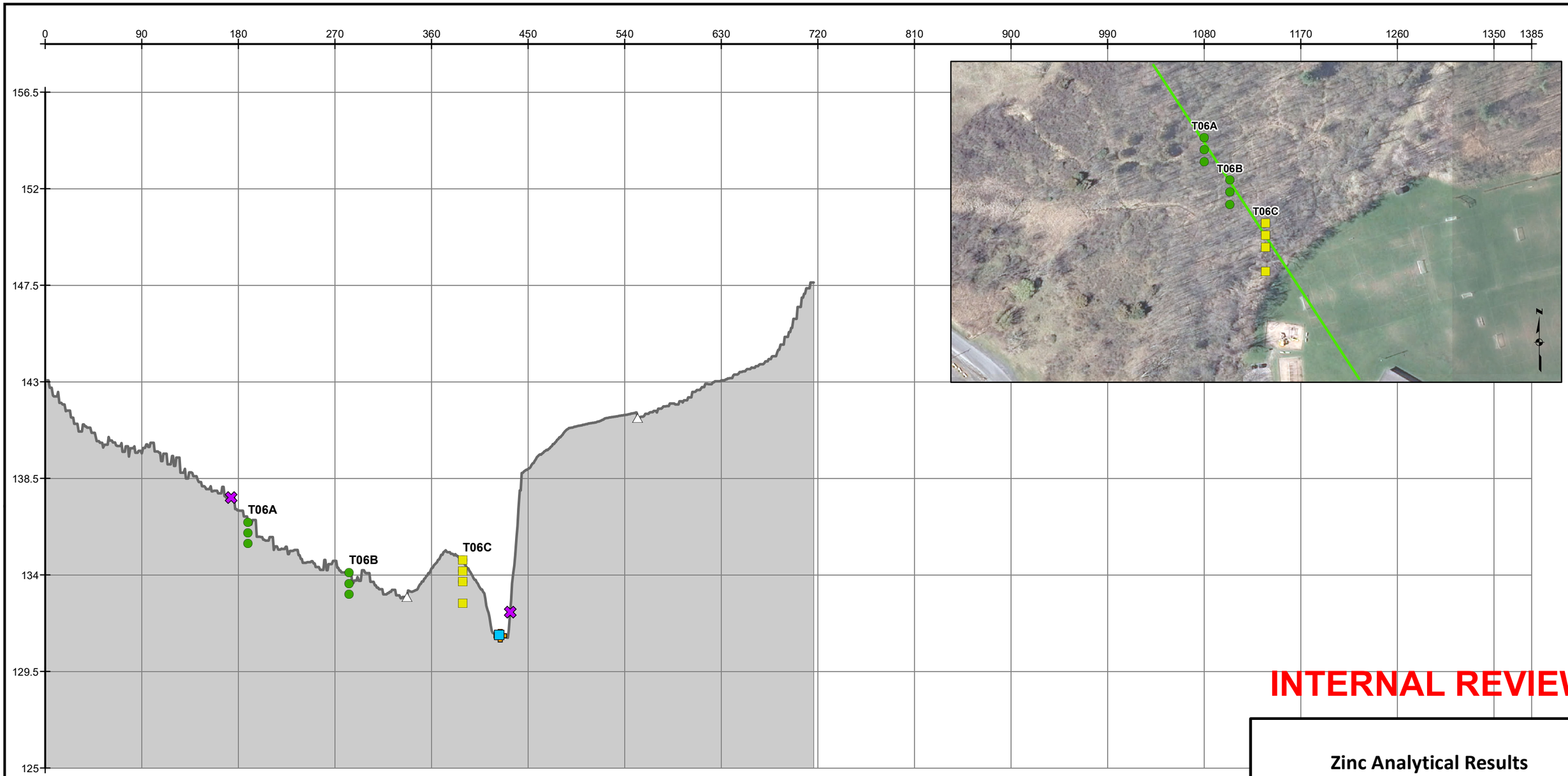

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 12D

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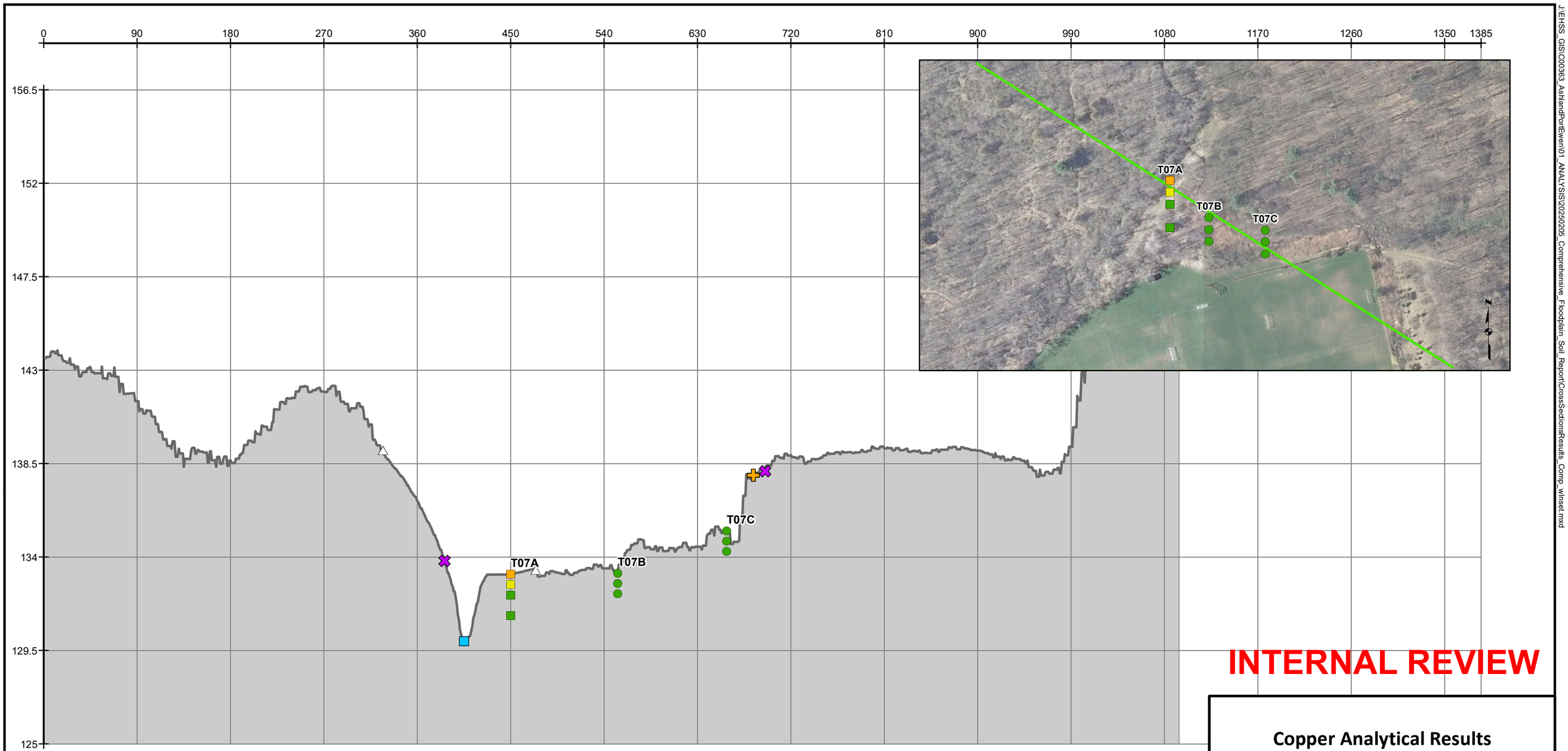

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)
- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 13A

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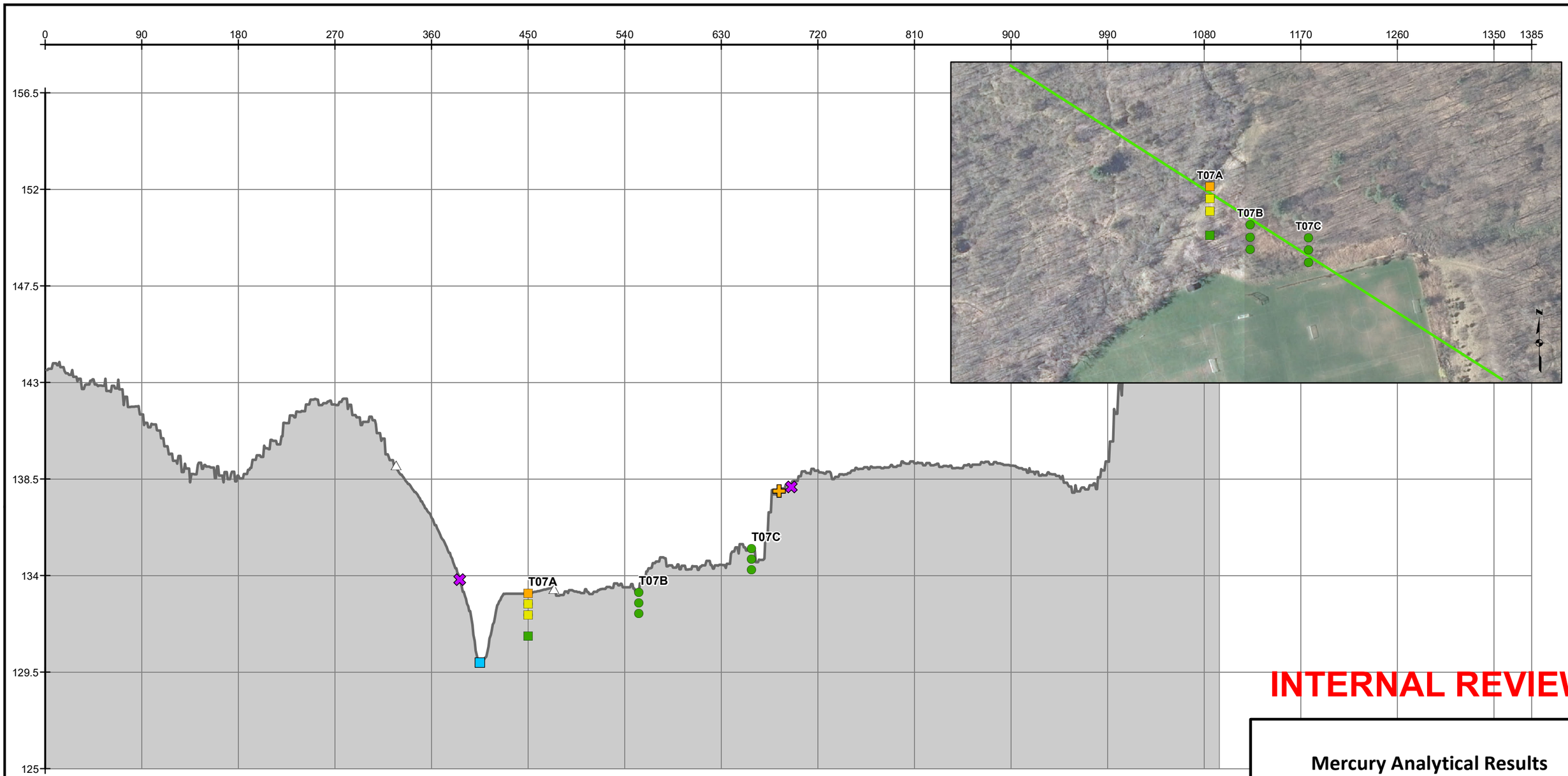

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)
- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13B

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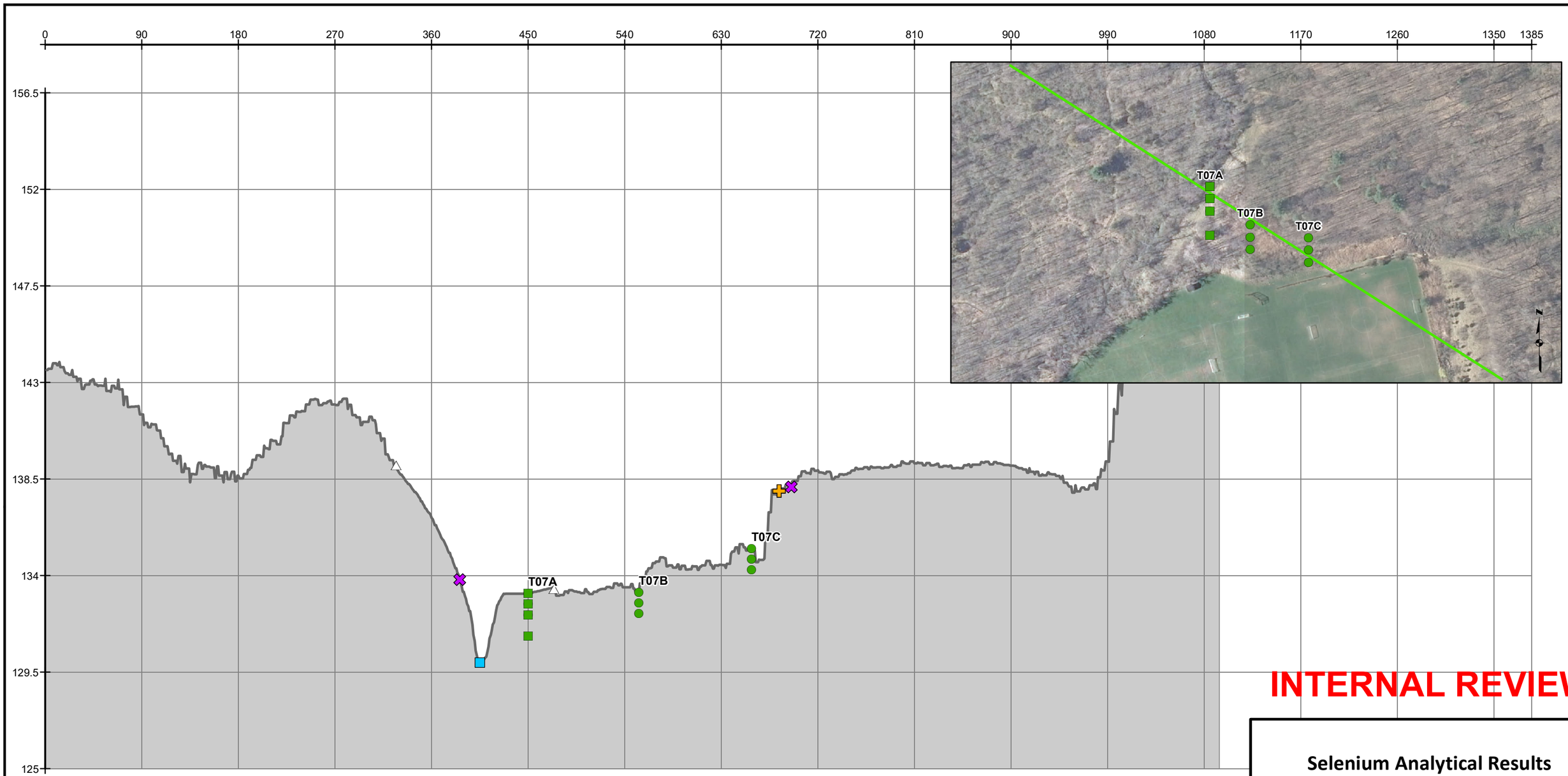

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 13C

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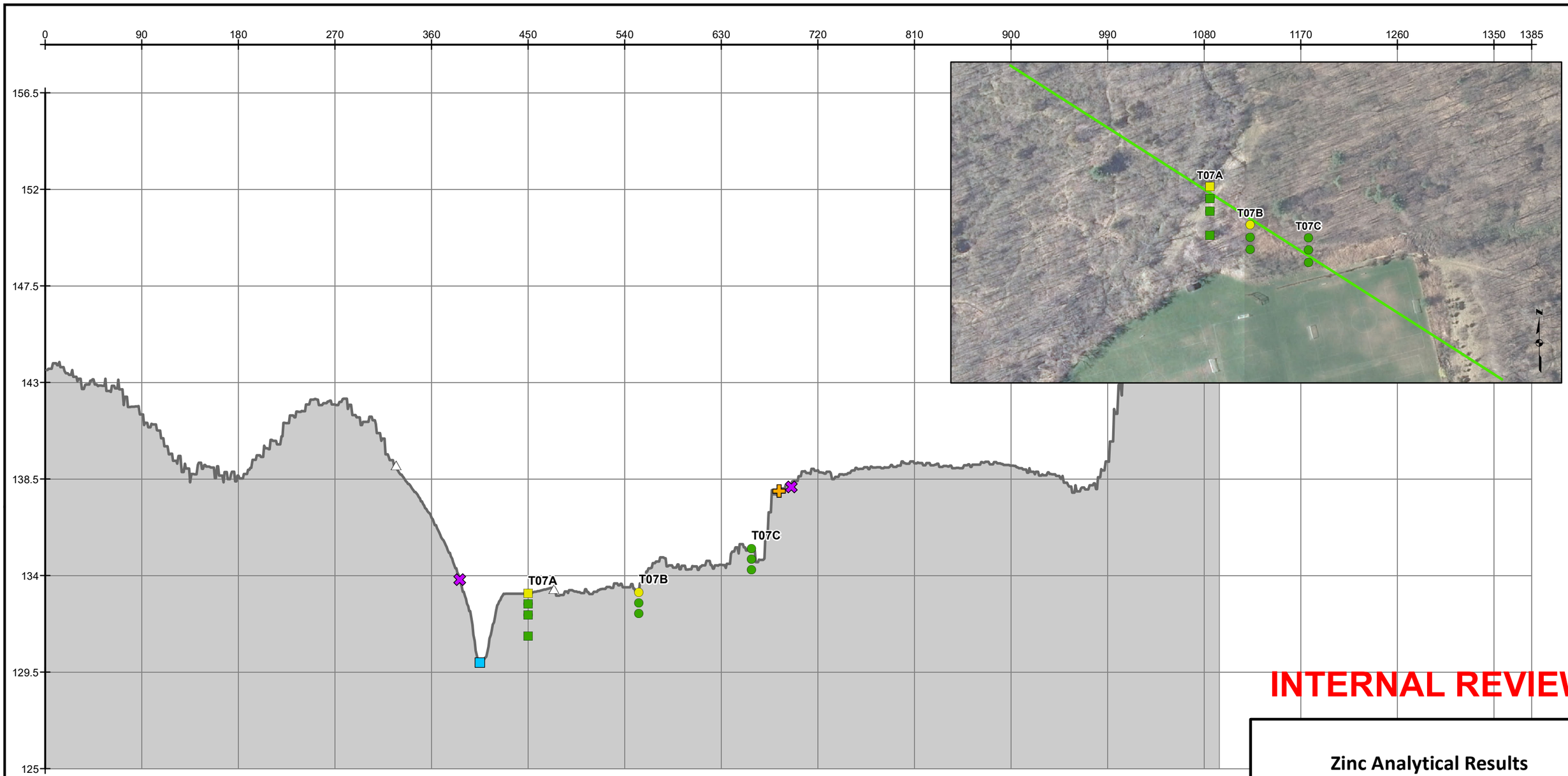

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 13D

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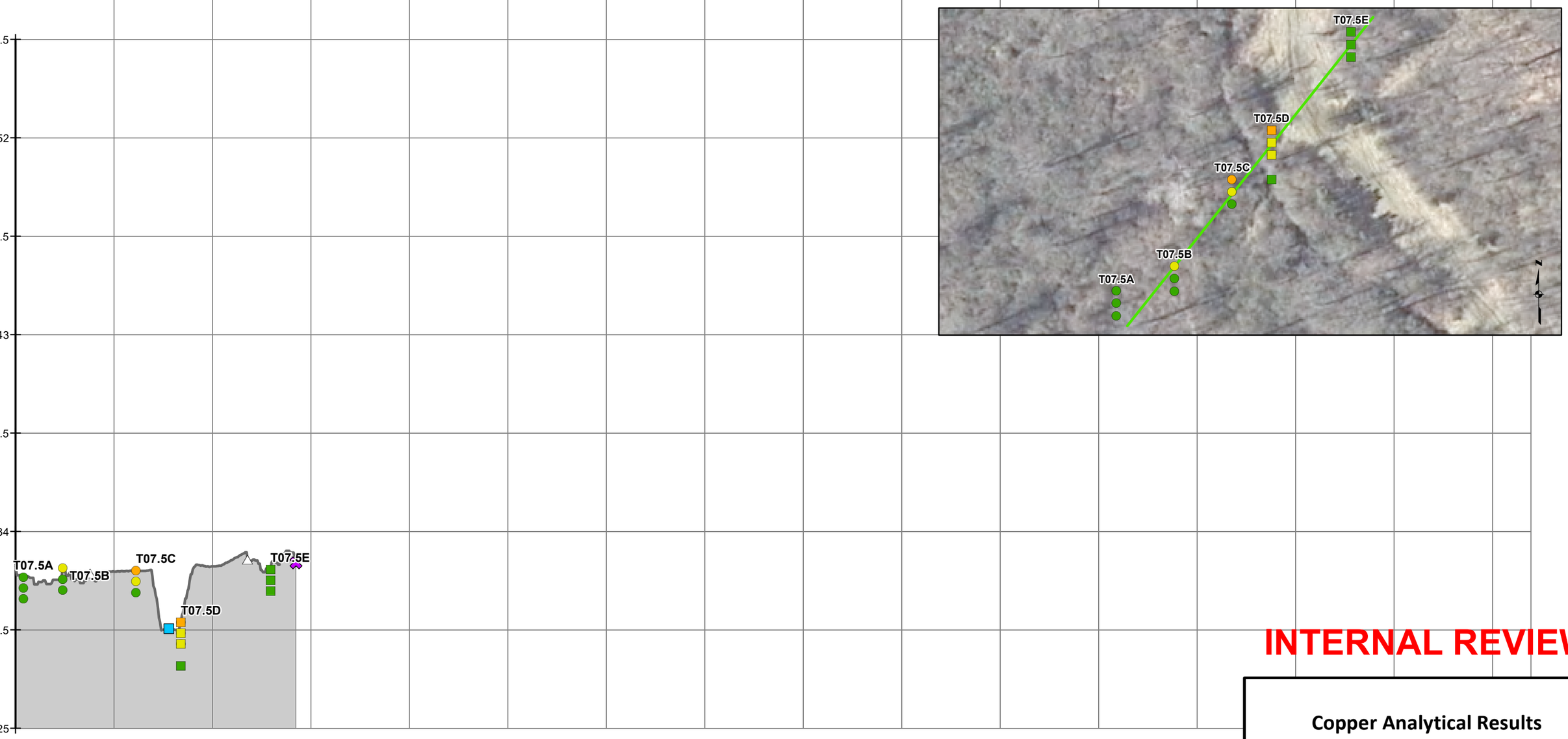

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 14A

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Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 14B

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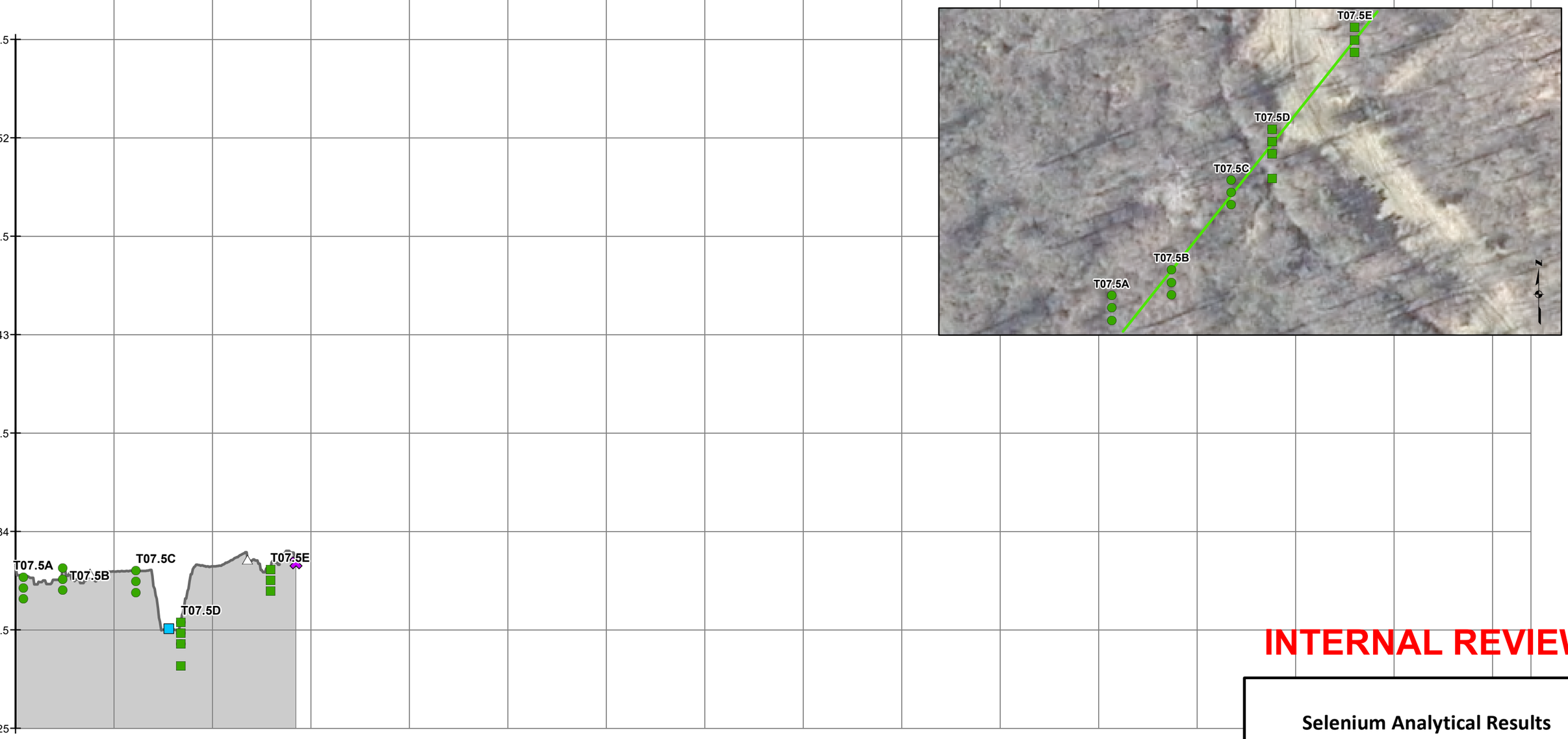

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 14C

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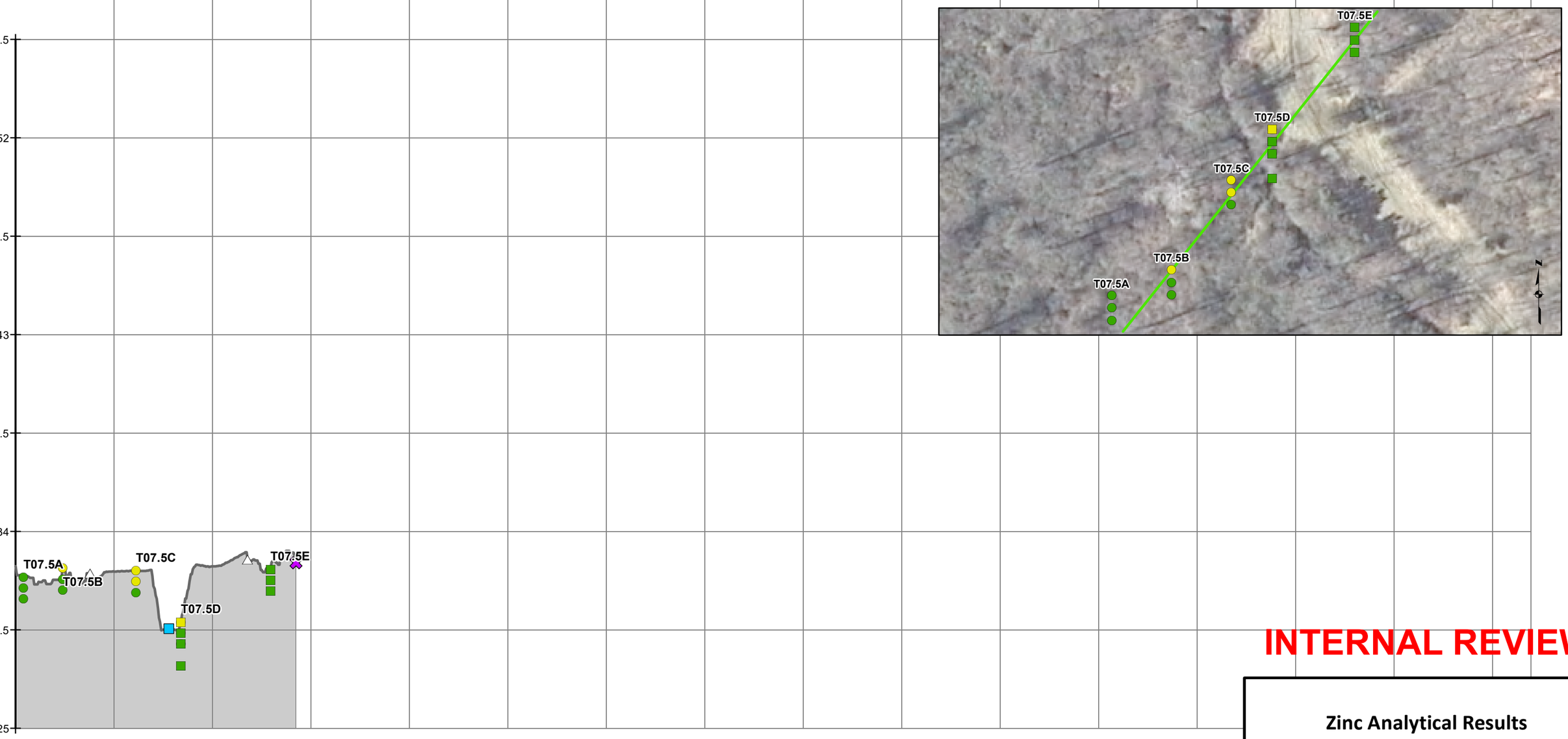

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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 T7.5

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 14D

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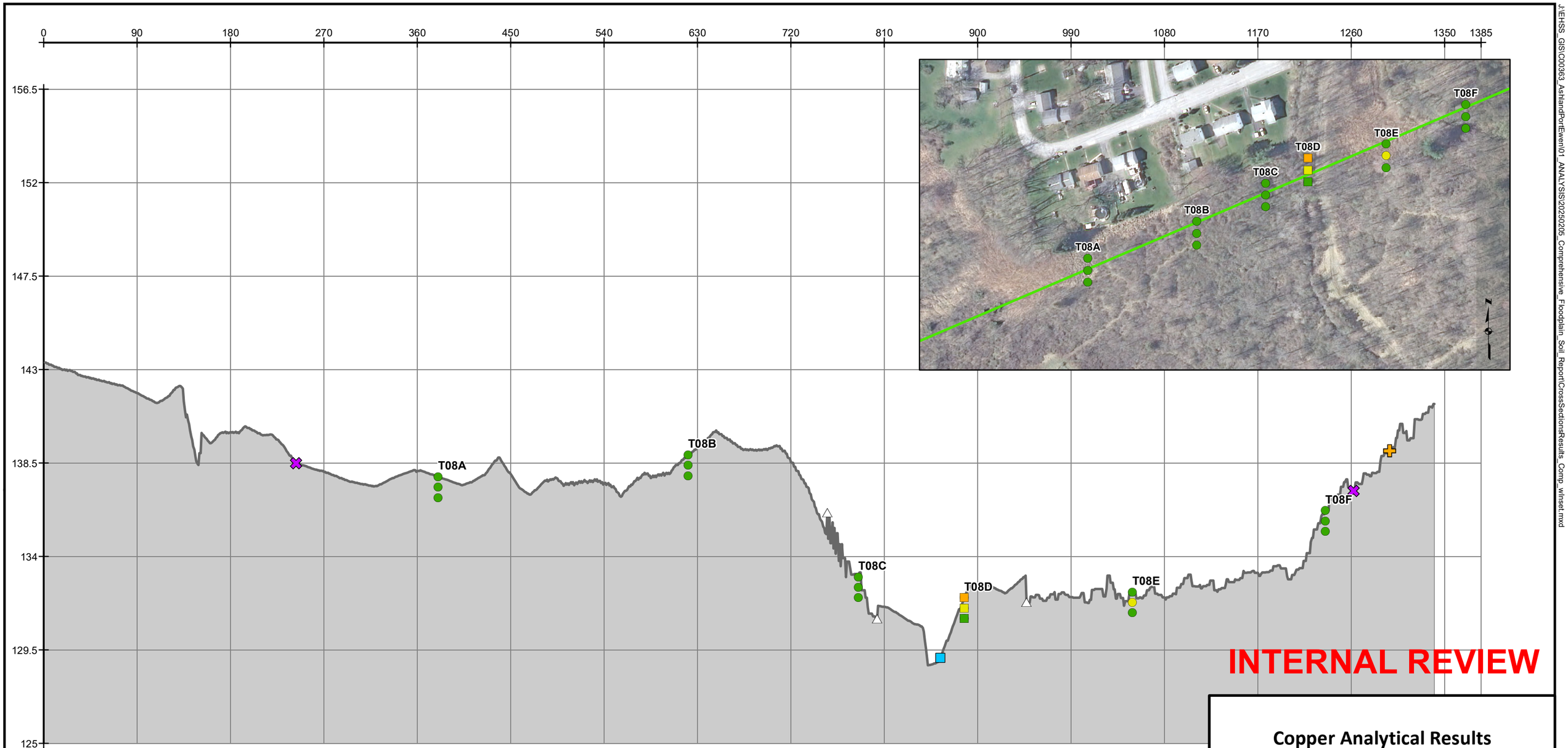

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)
- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 15A

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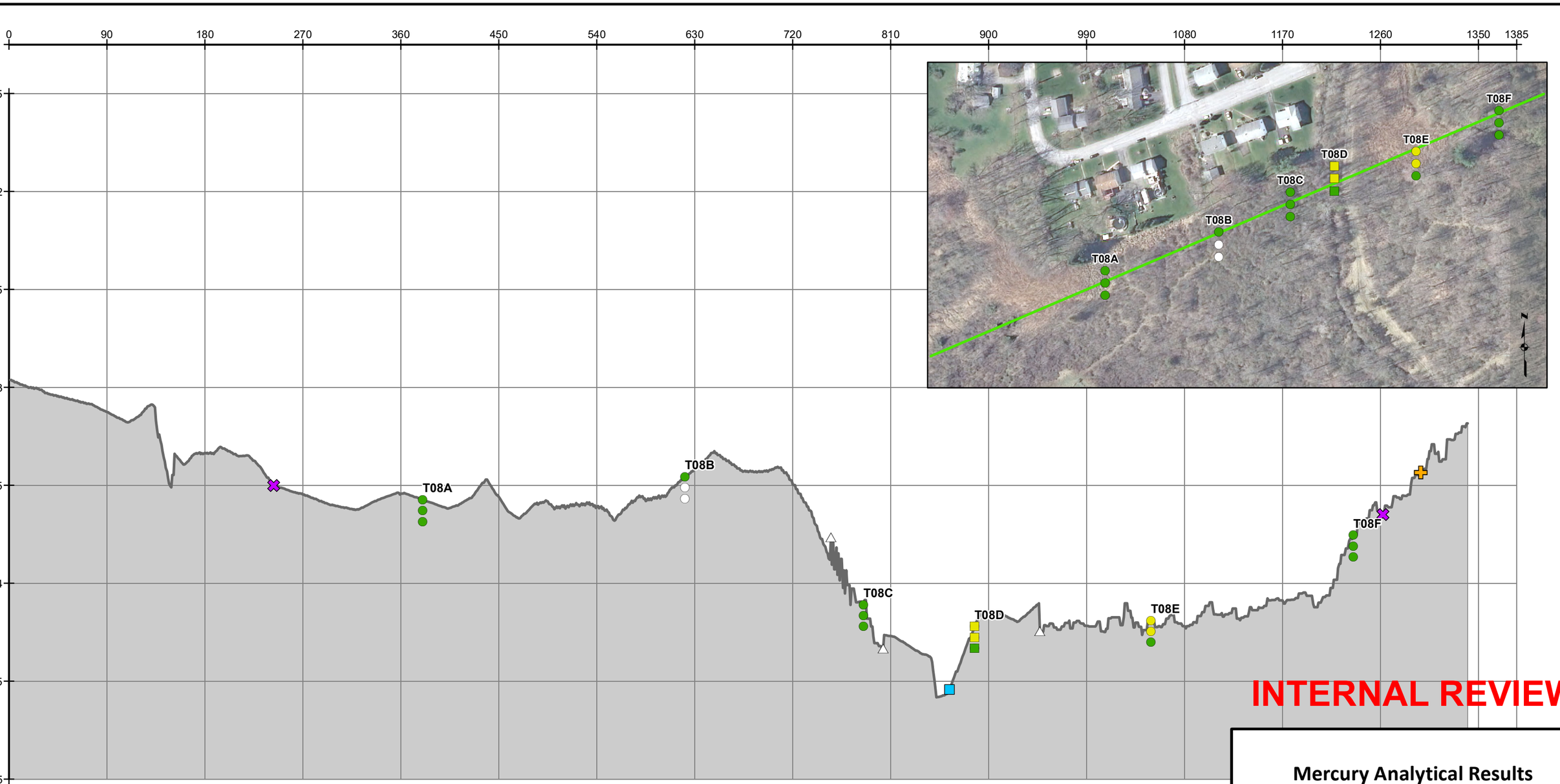

INTERNAL REVIEW

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)
- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 15B

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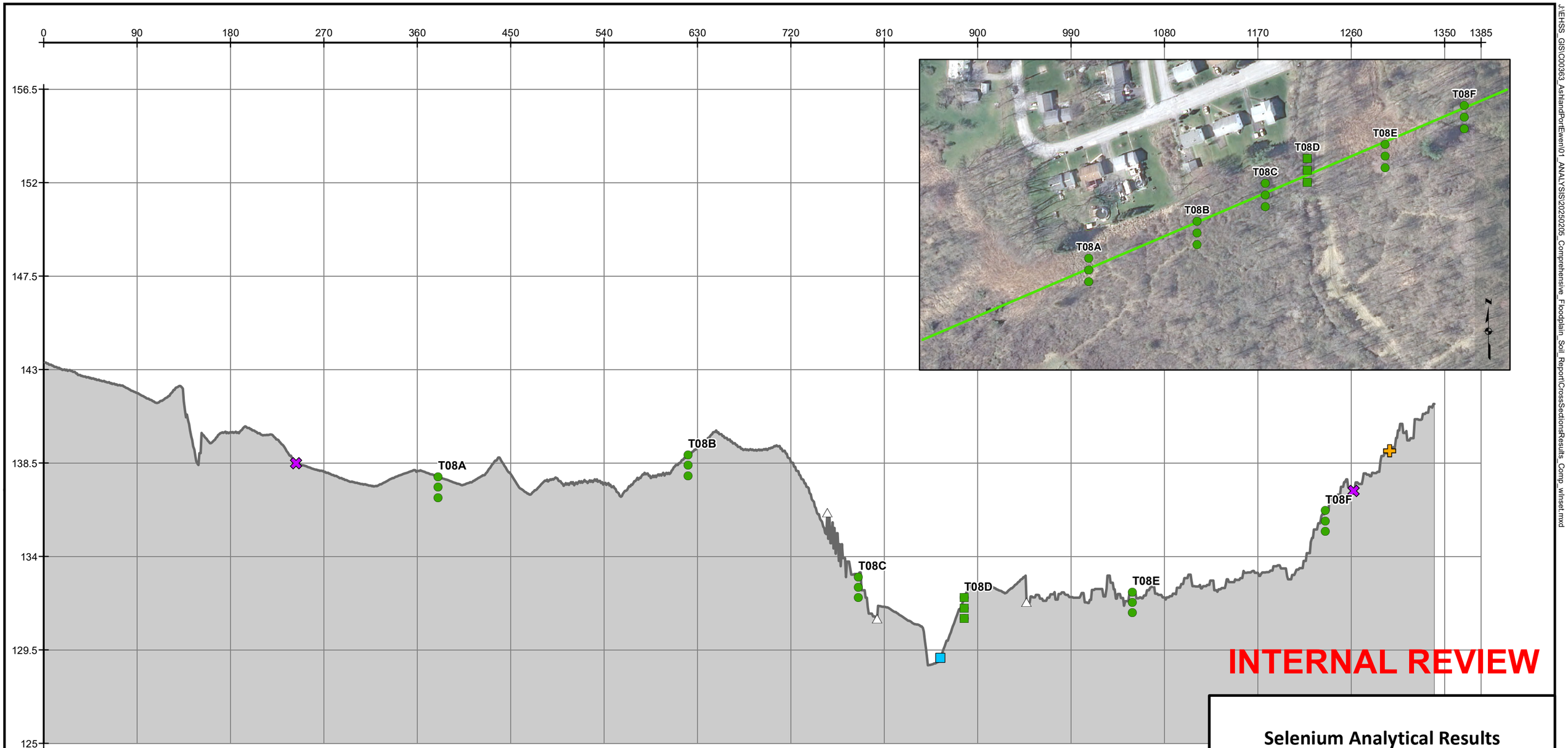

INTERNAL REVIEW

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 15C

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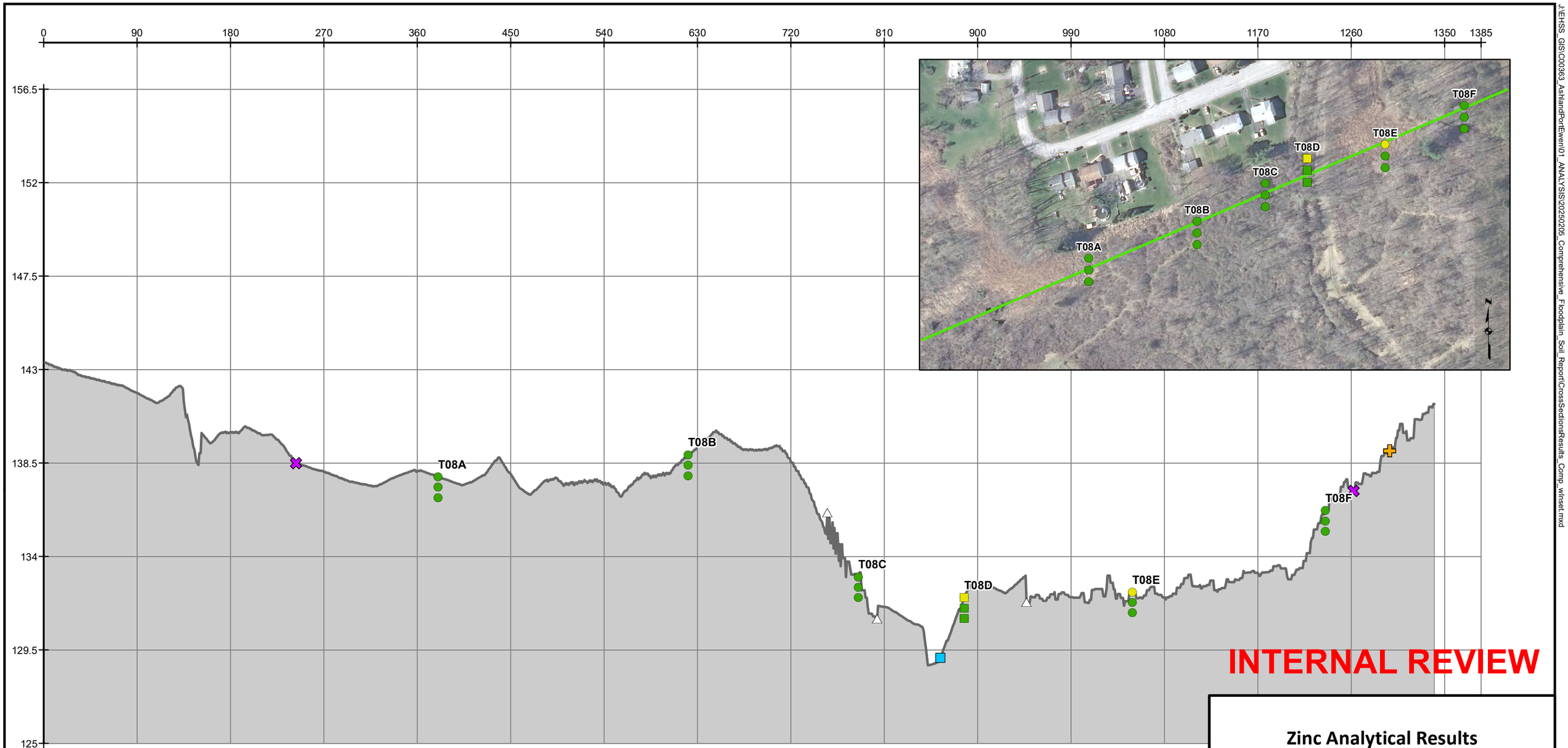

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)
- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 15D

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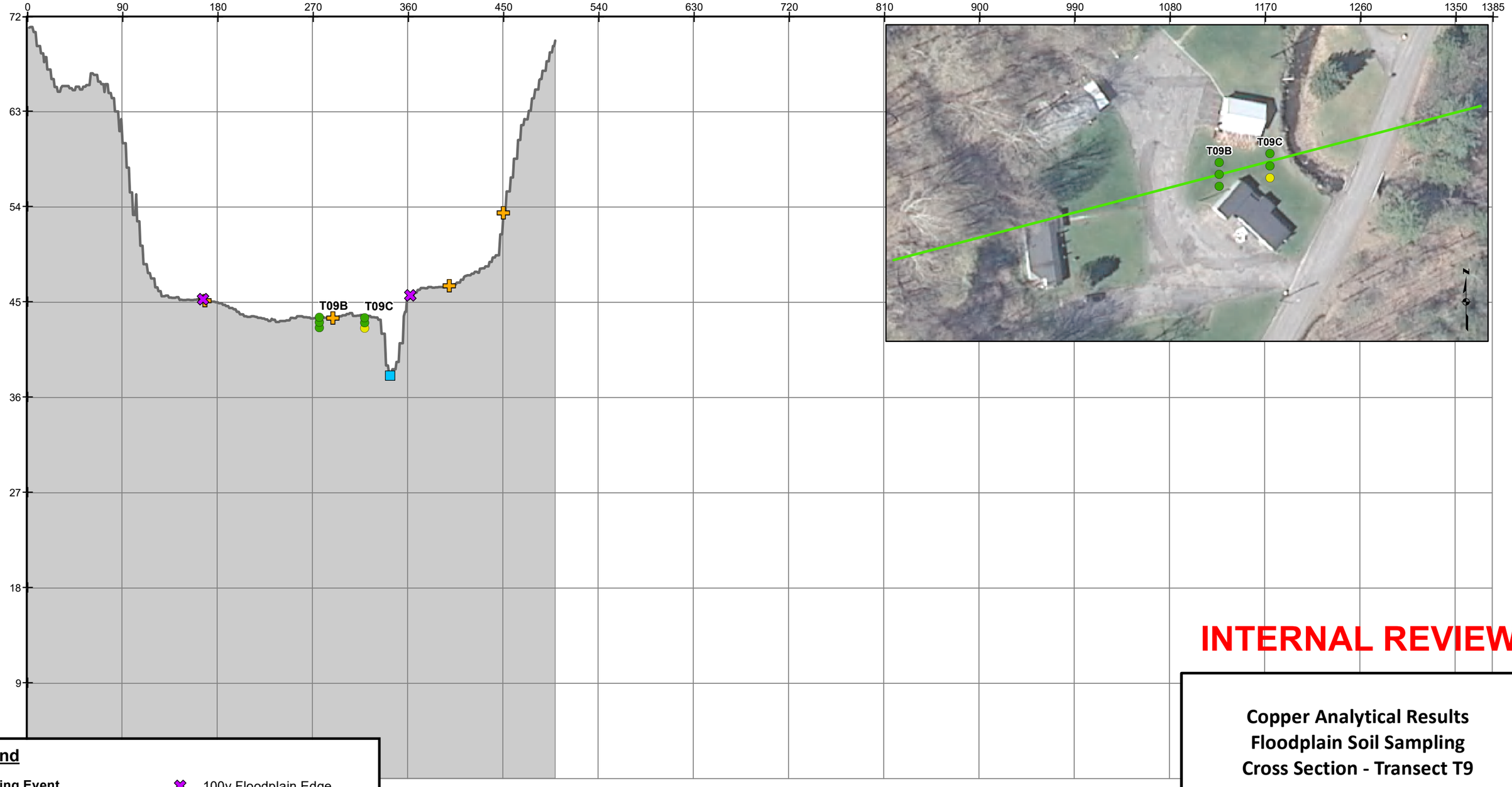

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)
- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

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FIGURE 16A

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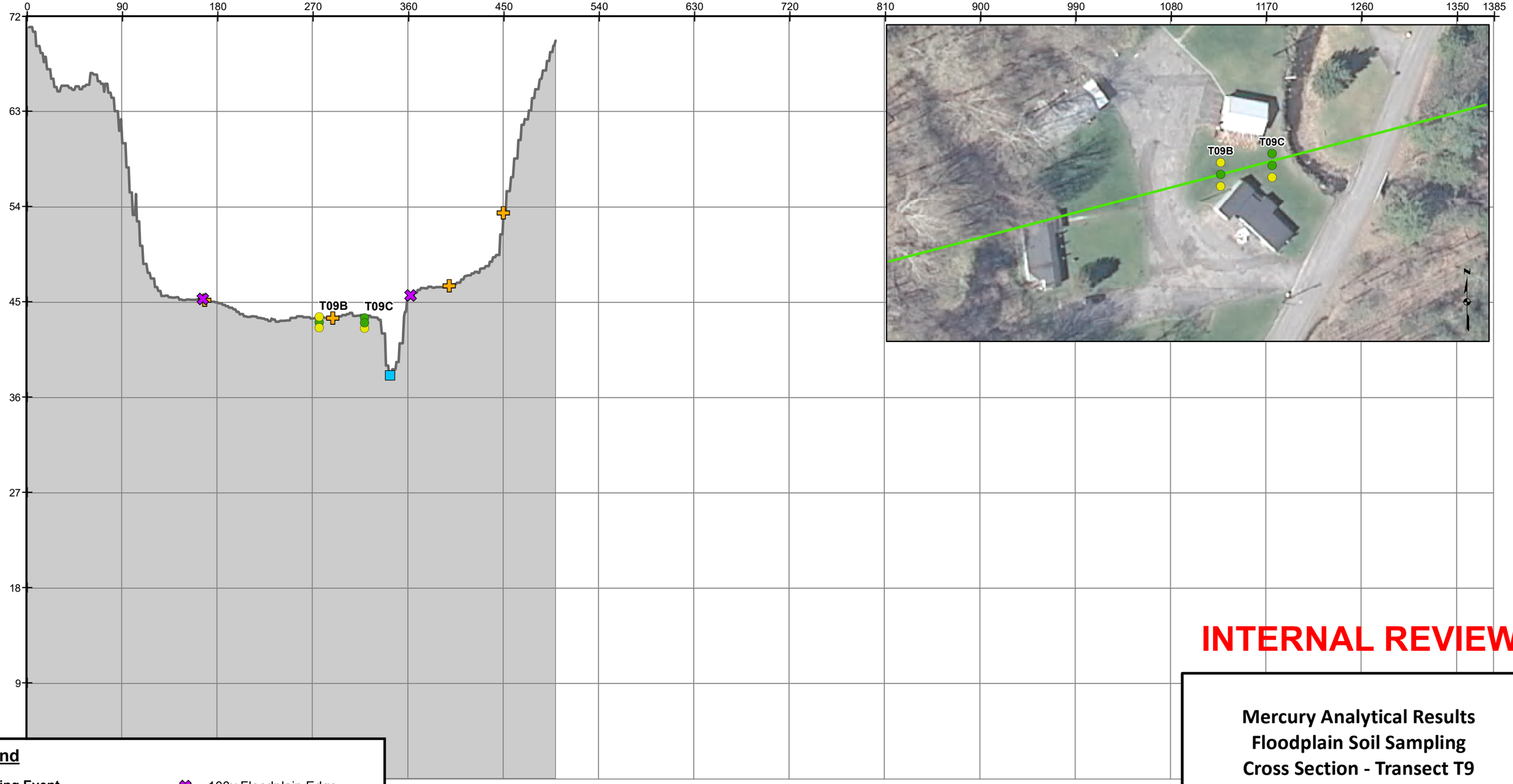

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 16B

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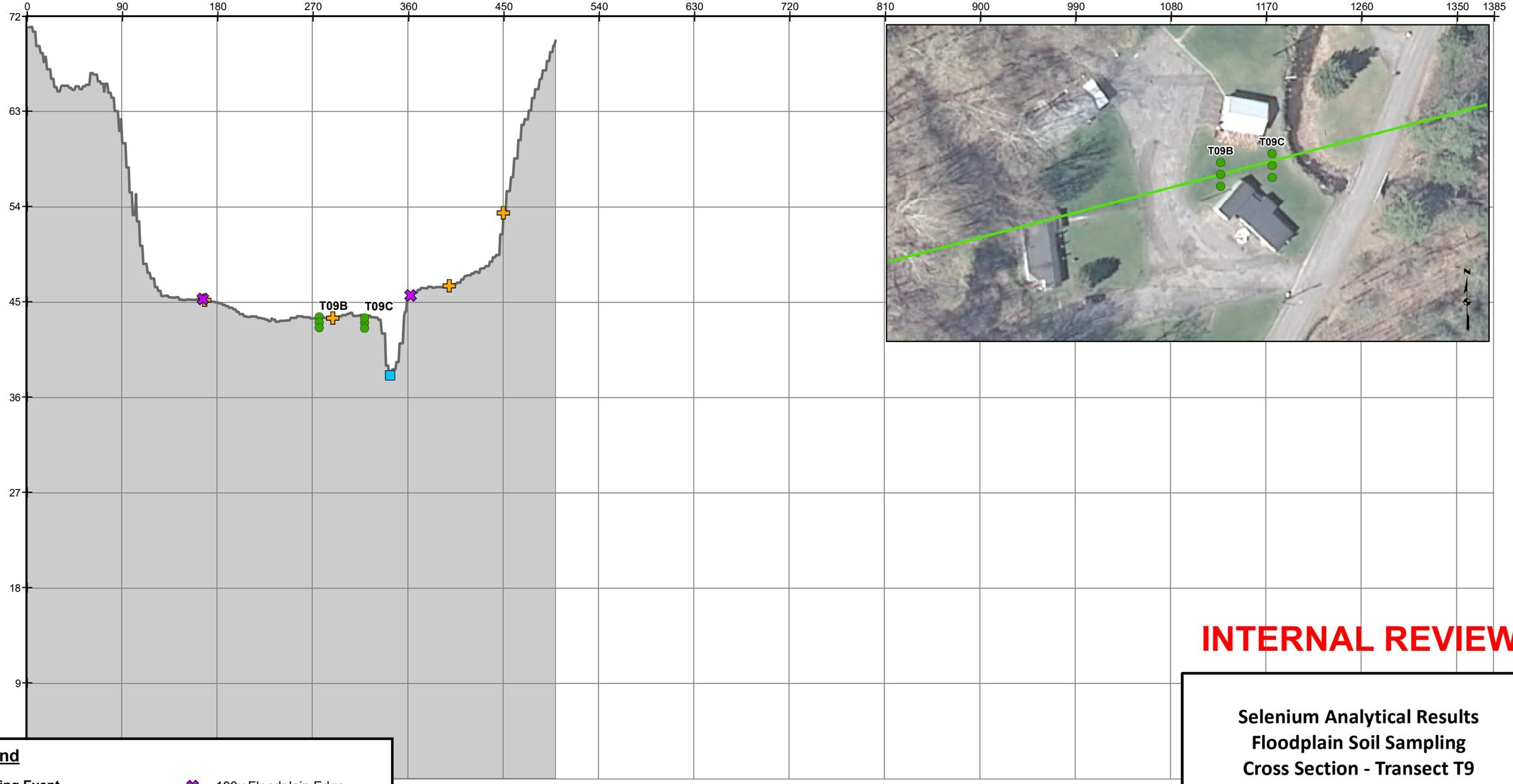

Legend

Sampling Event
- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)
- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 16C

Reviewed By:

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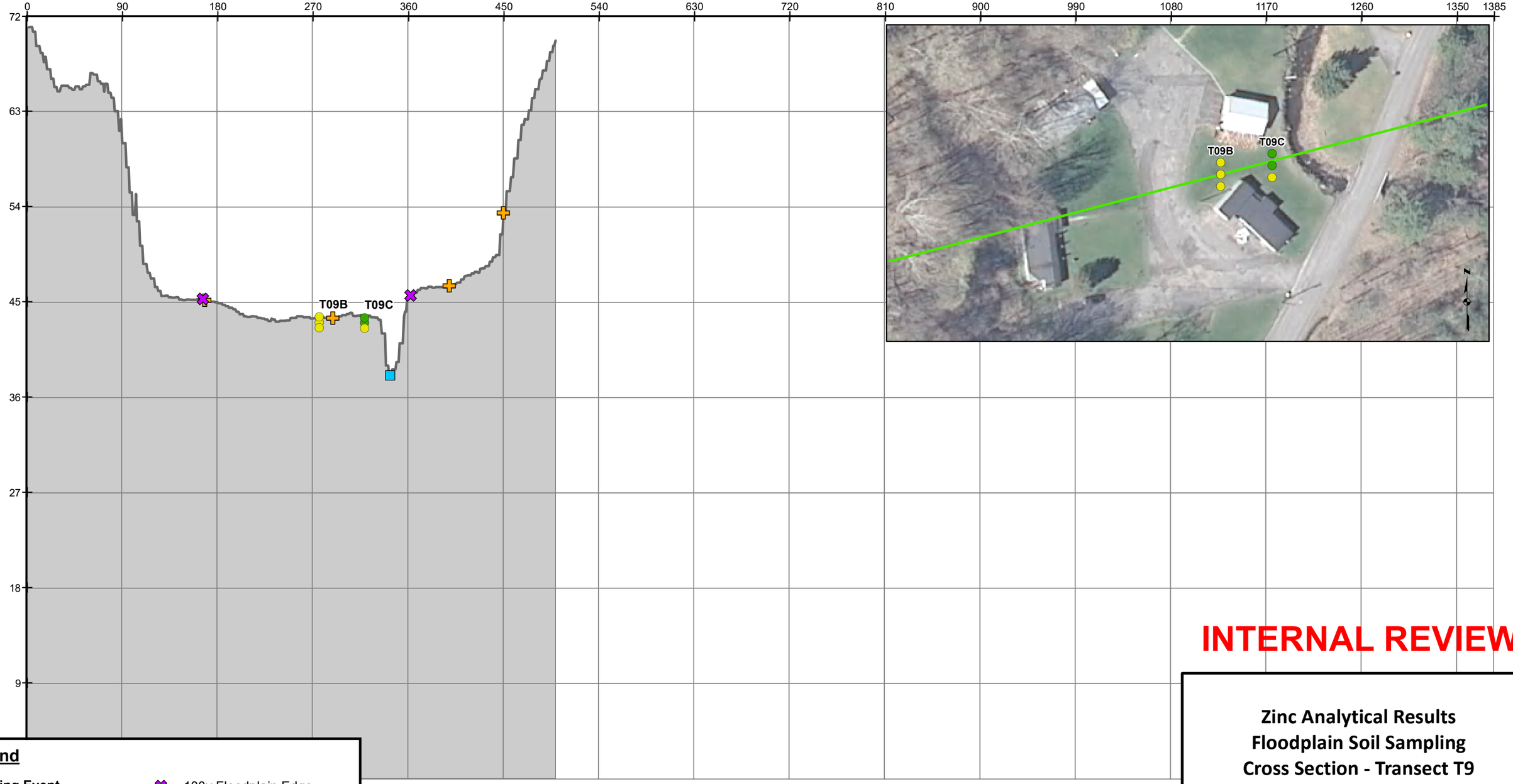

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T9

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 16D

Reviewed By:

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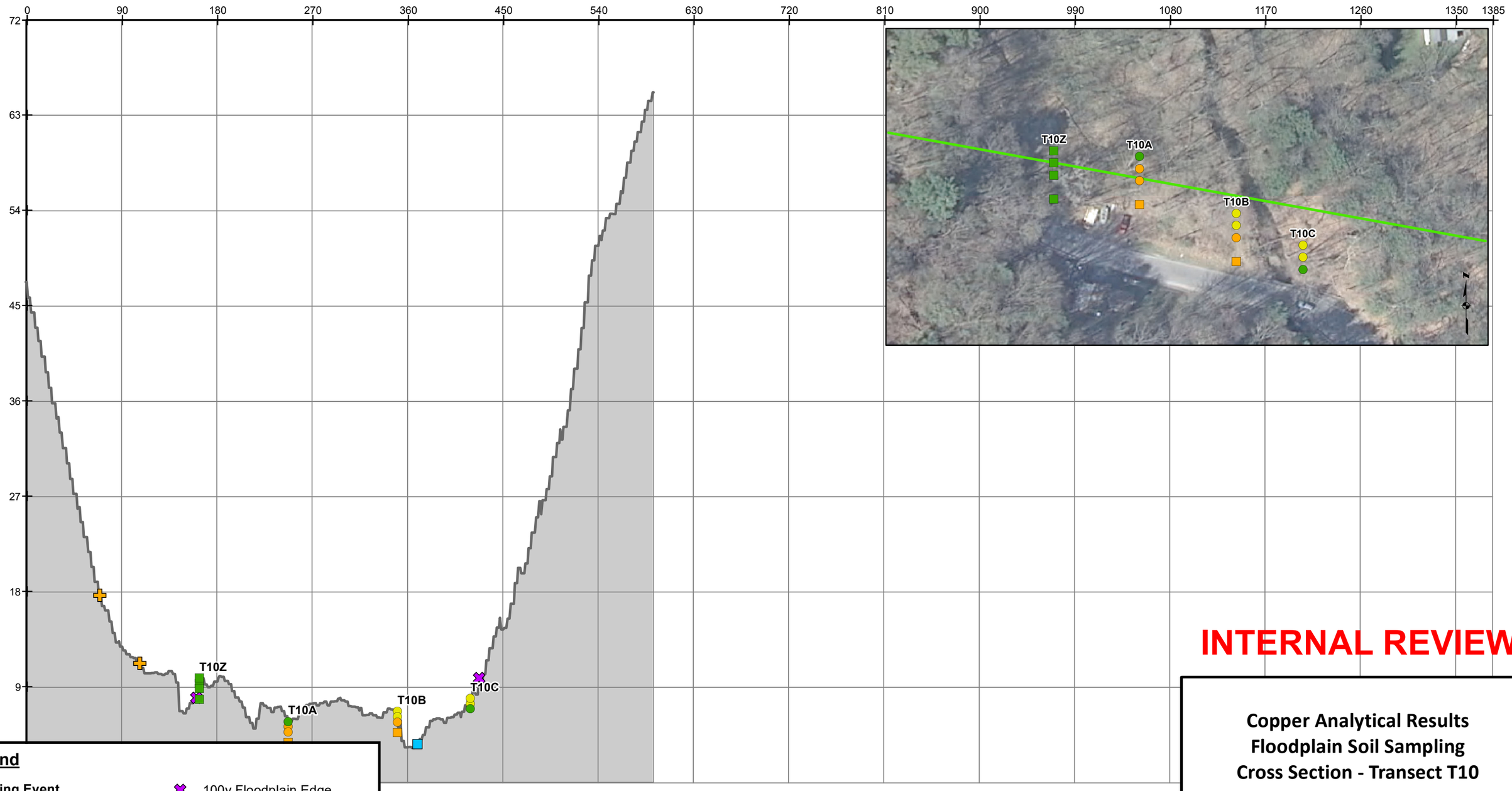

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Copper Concentration (mg/kg)

- Non-Detect
- < = 50
- 51 - 270
- > 270

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Copper Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 17A

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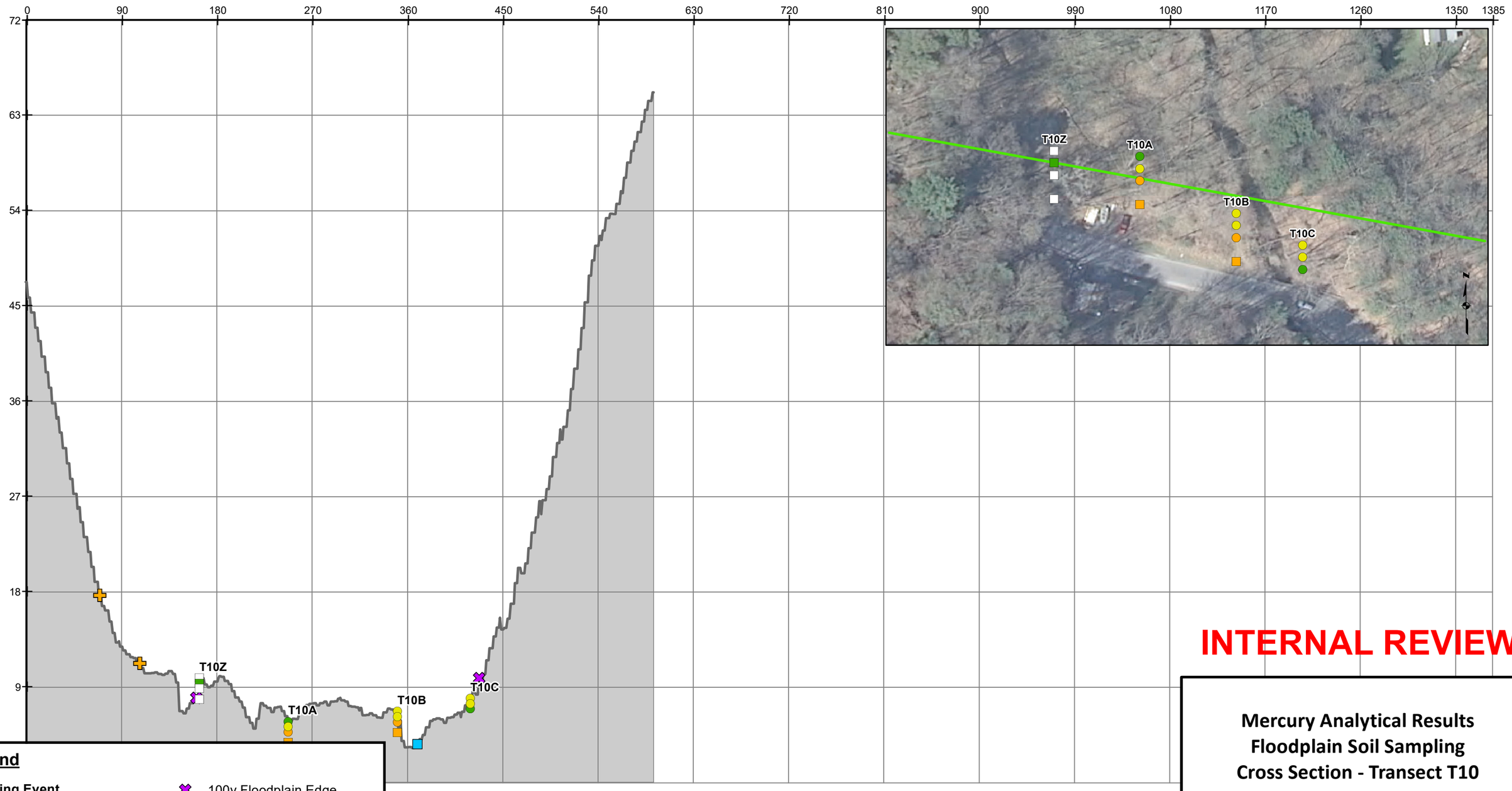

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Mercury Concentration (mg/kg)

- Non-Detect
- <= 0.18
- 0.19 - 1.2
- > 1.2

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Mercury Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 17B

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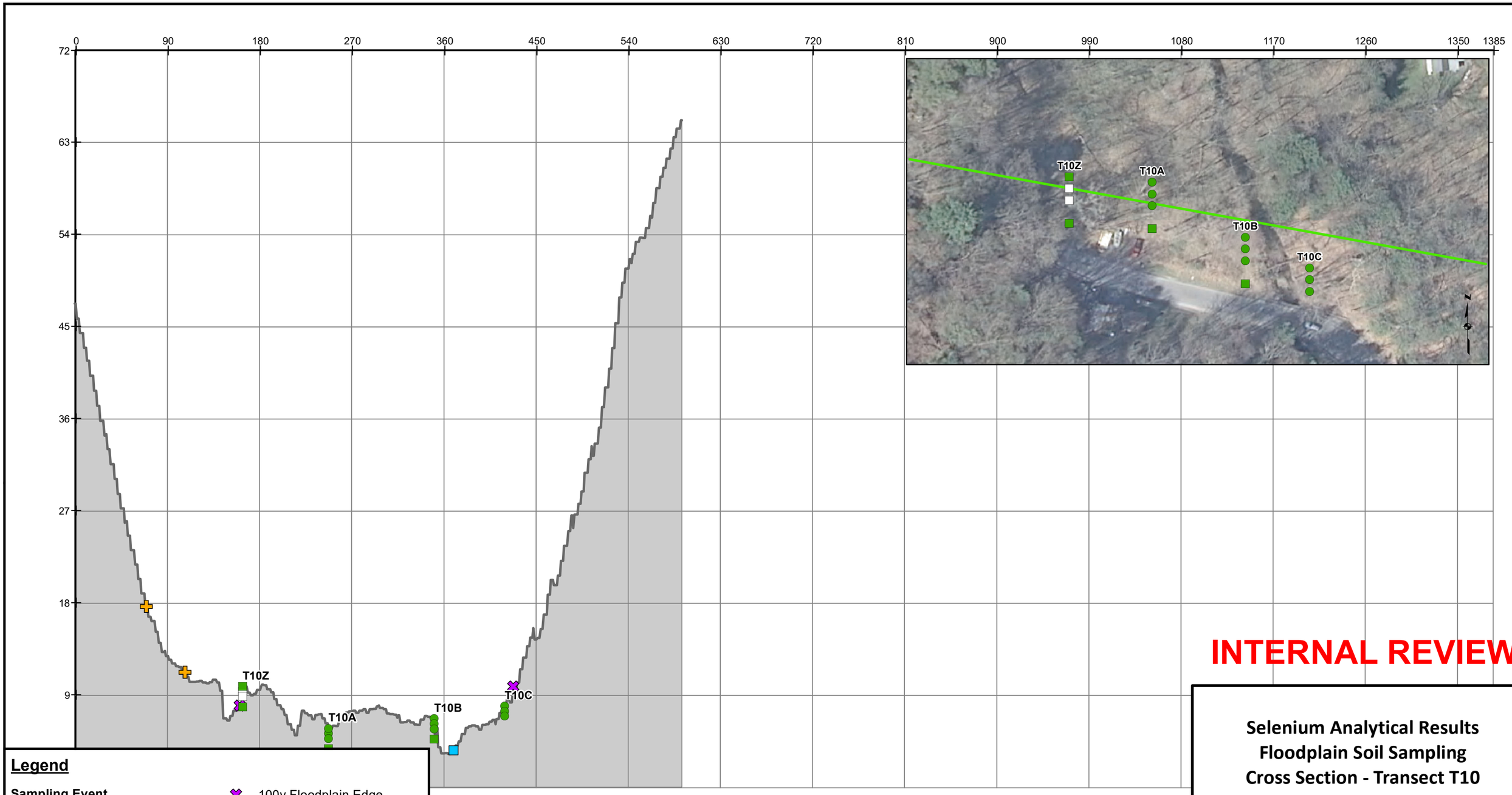

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Selenium Concentration (mg/kg)

- Non-Detect
- < = 3.9
- 4.0 - 36
- > 36

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Selenium Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 17C

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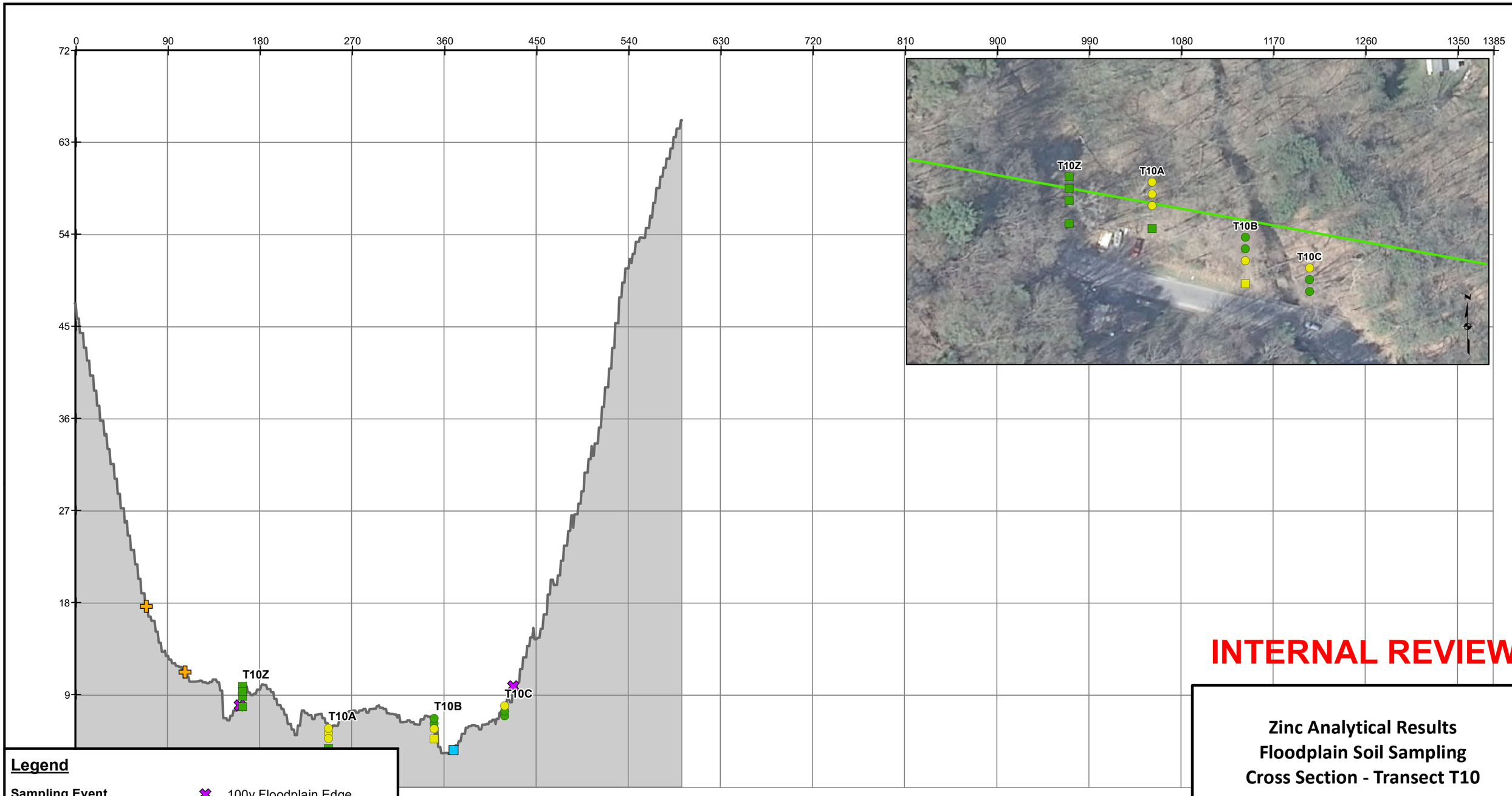

Legend

Sampling Event

- Initial (2022-2023)
- Supplemental (2024)

Zinc Concentration (mg/kg)

- Non-Detect
- <= 109
- 110 - 2200
- > 2200

- 100y Floodplain Edge
- Parcel Boundary
- Stream Center
- 2024 DEM Edge
- Proposed Transect Elevation

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

Reviewed By:

INTERNAL REVIEW

Zinc Analytical Results
Floodplain Soil Sampling
Cross Section - Transect T10

2025 Plantasie Creek Comprehensive Floodplain Report
Dyno Nobel Port Ewen Site
Port Ewen, New York

EHS Support

FIGURE 17D

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Appendix A Summary of Plantasie Creek Floodplain Soil Analytical Data

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T01A	T01A	T01A	T01A	T01A	T01B	T01B	T01B	T01B	T01B
				Sample ID	T01A-0-6	T01A-0-12	T01A-6-12	T01A-12-24	T01A-24-36	T01B-0-6	T01B-0-12	T01B-6-12	T01B-12-24	T01B-24-36
				Sample Date	07 Oct 2023	07 Oct 2023	07 Oct 2023	07 Oct 2023	15 Dec 2024	07 Oct 2023	07 Oct 2023	07 Oct 2023	07 Oct 2023	15 Dec 2024
				Sample Depth	0–6in	0–12in	6–12in	12–24in	24–36in	0–6in	0–12in	6–12in	12–24in	24–36in
				Sample Type	N	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	Result Qual
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	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**180**	--	34	17	16 J	**450**	--	**110**	**180**	39 J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**2** J	--	0.14 J	0.073 J	0.18 J	**1.5** J	--	**1.1** J	**0.87** J	0.098 J
Selenium	7782-49-2	**3.9**	36	mg/kg	2.9	--	1.2	0.83	0.53	2.3	--	0.69	0.85	0.51
Zinc	7440-66-6	**109**	2200	mg/kg	100	--	91	**110**	74	**150**	--	90	**120**	94

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T01C	T01C	T01C	T01C	T01C	T01C	T01D	T01D	T01D	T01D
				Sample ID	DUP-10	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	05 Oct 2023
				Sample Depth	0–6in	0–6in	6–12in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in	12–24in
				Sample Type	FD	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	Result Qual
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	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**2300 J**	**2100 J**	**220**	--	**350**	18	**200 J**	--	**110 J**	35
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**19 J**	**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	**8.6 J**	**7.7 J**	1.6	--	2.2	0.8	1.1	--	0.76	0.61
Zinc	7440-66-6	**109**	2200	mg/kg	**310 J**	**330 J**	95	--	**130**	87	**110 J**	--	**120 J**	82

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T01E	T01E	T01E	T01E	T02A	T02A	T02A	T02A	T02B	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	T02B-0-12
				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	07 Oct 2023
				Sample Depth	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	7 J	--	--	--	7 J	--	--	--	6.9 J
Temperature	TEMP	--	--	deg c	--	21.5 J	--	--	--	21.1 J	--	--	--	21.3 J
Total Organic Carbon	TOC	--	--	mg/kg	--	22000	--	--	--	26000	--	--	--	33000
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	58.9	--	--	--	94.2	--	--	--	84.6
Gravel	GRAVEL	--	--	%	--	3.5	--	--	--	0	--	--	--	0
Sand	308075-07-2	--	--	%	--	37.6	--	--	--	5.8	--	--	--	15.4
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
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**	--

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T02B	T02B	T02B	T02C	T02C	T02C	T02C	T02D	T02D	T02D
				Sample ID	T02B-6-12	T02B-12-24	T02B-24-36	T02C-0-6	T02C-0-12	T02C-6-12	T02C-12-24	T02D-0-6	T02D-0-12	T02D-6-12
				Sample Date	07 Oct 2023	07 Oct 2023	15 Dec 2024	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	24–36in	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	7 J	--	--	--	6.9 J	--
Temperature	TEMP	--	--	deg c	--	--	--	--	21.5 J	--	--	--	21.7 J	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	39000	--	--	--	35000	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	85.3	--	--	--	87.3	--
Gravel	GRAVEL	--	--	%	--	--	--	--	0	--	--	--	0	--
Sand	308075-07-2	--	--	%	--	--	--	--	14.7	--	--	--	12.7	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**520 J**	**110**	23 J	**1600 J**	--	**280 J**	24	**1800 J**	--	**130 J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**5.6 J**	**1 J**	0.047 J	**8.6 J**	--	**1.4 J**	0.093 J	**12 J**	--	**1.4 J**
Selenium	7782-49-2	**3.9**	36	mg/kg	2.3	1.3	1.2	**4.2**	--	1.9	1.9	**5**	--	1.8
Zinc	7440-66-6	**109**	2200	mg/kg	**190 J**	**110**	96	**290 J**	--	94 J	81	**280 J**	--	96 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T02D	T02E	T02E	T02E	T02E	T02F	T02F	T02F	T02F	T03A
				Sample ID	T02D-12-24	T02E-0-6	T02E-0-12	T02E-6-12	T02E-12-24	T02F-0-6	T02F-0-12	T02F-6-12	T02F-12-24	T03A-0-6
				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	04 Oct 2023
				Sample Depth	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in
				Sample Type	N	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	Result Qual
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	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	16	20 J	--	17 J	17	14 J	--	13 J	18	31 J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.082 J	0.14 J	--	0.1 J	0.03 J	0.081 J	--	0.048 J	0.025 J	0.15 J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.97	0.64	--	0.7	0.48	0.54	--	0.48	0.51	0.74
Zinc	7440-66-6	**109**	2200	mg/kg	76	74 J	--	76 J	74	70 J	--	67 J	71	89 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T03A	T03A	T03A	T03A	T03B	T03B	T03B	T03B	T03B	T03C
				Sample ID	T03A-0-12	T03A-6-12	T03A-12-24	T03A-24-36	T03B-0-6	T03B-0-12	T03B-6-12	T03B-12-24	T03B-24-36	T03C-0-6
				Sample Date	04 Oct 2023	04 Oct 2023	04 Oct 2023	24 Oct 2024	07 Dec 2022	07 Dec 2022	07 Dec 2022	07 Dec 2022	25 Oct 2024	07 Dec 2022
				Sample Depth	0–12in	6–12in	12–24in	24–36in	0–6in bgs	0–12in bgs	6–12in bgs	12–24in bgs	24–36in	0–6in bgs
				Sample Type	N	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	Result Qual
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	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	--	16 J	20	13 J	20 J	--	13	16	21 J	11
Mercury	7439-97-6	**0.18**	1.2	mg/kg	--	0.15 J	**0.19 J**	**0.19 J**	**0.23 J**	--	0.12 J	0.11 J	0.047 J	0.14 J
Selenium	7782-49-2	**3.9**	36	mg/kg	--	0.71	1.3	1.2	1.8 J	--	1.6	0.96	0.11 J	0.7
Zinc	7440-66-6	**109**	2200	mg/kg	--	86 J	**180**	**290**	**190 J**	--	**180 J**	**320 J**	76	72 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T03C	T03C	T03C	T03D	T03D	T03D	T03D	T03D	T03E	T03E
				Sample ID	T03C-0-12	T03C-6-12	T03C-12-24	T03D-0-6	T03D-0-12	T03D-6-12	T03D-12-24	T03D-24-36	T03E-0-6	T03E-0-12
				Sample Date	07 Dec 2022	07 Dec 2022	07 Dec 2022	06 Dec 2022	06 Dec 2022	06 Dec 2022	06 Dec 2022	25 Oct 2024	06 Dec 2022	06 Dec 2022
				Sample Depth	0–12in bgs	6–12in bgs	12–24in bgs	0–6in bgs	0–12in bgs	6–12in bgs	12–24in bgs	24–36in	0–6in bgs	0–12in bgs
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	6.8 HF	--	--	--	6.9 HF	--	--	--	--	6.4 HF
pH	PH	--	--	SU	6.8 HF	--	--	--	6.9 HF	--	--	--	--	6.4 HF
Temperature	TEMP	--	--	deg c	23.5 HF	--	--	--	23.8 HF	--	--	--	--	23.5 HF
Total Organic Carbon	TOC	--	--	mg/kg	13000	--	--	--	19000	--	--	--	--	16000
GEOPHYSICAL														
Clay	CLAY	--	--	%	28.1	--	--	--	12.1	--	--	--	--	18.9
Fines	FINES	--	--	%	--	--	--	--	--	--	--	--	--	--
Gravel	GRAVEL	--	--	%	0.2	--	--	--	0.1	--	--	--	--	1.7
Sand	308075-07-2	--	--	%	20	--	--	--	25.3	--	--	--	--	28.9
Silt	E52456985	--	--	%	51.7	--	--	--	62.5	--	--	--	--	50.5
METALS														
Copper	7440-50-8	**50**	270	mg/kg	--	16	23	**420**	--	46	42	17 J	**760**	--
Mercury	7439-97-6	**0.18**	1.2	mg/kg	--	0.051 J	0.055 J	**4.5 J**	--	**0.96 J**	**0.6 J**	0.05 J	**5.2 J**	--
Selenium	7782-49-2	**3.9**	36	mg/kg	--	0.43 J	0.19 J	2.3	--	1.9	1.5	0.53	2.7	--
Zinc	7440-66-6	**109**	2200	mg/kg	--	61 J	70 J	**160 J**	--	**120 J**	**110 J**	82	**220 J**	--

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T03E	T03E	T03E	T03F	T03F	T03F	T03F	T04A	T04A	T04A
				Sample ID	T03E-6-12	T03E-12-24	T03E-24-36	T03F-0-6	T03F-0-12	T03F-6-12	T03F-12-24	T04A-0-6	T04A-0-12	T04A-6-12
				Sample Date	06 Dec 2022	06 Dec 2022	26 Oct 2024	06 Dec 2022	06 Dec 2022	06 Dec 2022	06 Dec 2022	04 Oct 2023	04 Oct 2023	04 Oct 2023
				Sample Depth	6–12in bgs	12–24in bgs	24–36in	0–6in bgs	0–12in bgs	6–12in bgs	12–24in bgs	0–6in	0–12in	6–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	7.6 HF	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	7.6 HF	--	--	--	8 J	--
Temperature	TEMP	--	--	deg c	--	--	--	--	23.6 HF	--	--	--	21 J	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	22000	--	--	--	16000	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	25.6	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	--	--	--	93	--
Gravel	GRAVEL	--	--	%	--	--	--	--	0	--	--	--	0	--
Sand	308075-07-2	--	--	%	--	--	--	--	10.1	--	--	--	7	--
Silt	E52456985	--	--	%	--	--	--	--	64.3	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**88**	17	12 J	20	--	7.4	18	17 J	--	15
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**1 J**	0.12 J	0.074 J	0.07 J	--	0.057 J	0.066 J	0.086 J	--	0.052 J
Selenium	7782-49-2	**3.9**	36	mg/kg	1.8	1	1.3	0.59	--	0.4	0.39 J	0.56	--	0.58
Zinc	7440-66-6	**109**	2200	mg/kg	**110 J**	**110 J**	**110**	79 J	--	63 J	68 J	85 J	--	72

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

				Location ID	T04A	T04B	T04B	T04B	T04B	T04C	T04C	T04C	T04C	T04C
				Sample ID	T04A-12-24	T04B-0-6	T04B-0-12	T04B-6-12	T04B-12-24	T04C-0-6	T04C-0-6	DUP-04	T04C-0-12	T04C-0-12
				Sample Date	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023	08 Dec 2022	25 Oct 2024	08 Dec 2022	08 Dec 2022	25 Oct 2024
				Sample Depth	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in bgs	0–6in	6–12in bgs	0–12in bgs	0–12in
				Sample Type	N	N	N	N	N	N	N	FD	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	6.9 HF	--
pH	PH	--	--	SU	--	--	7.3 J	--	--	--	--	--	6.9 HF	8.4 J
Temperature	TEMP	--	--	deg c	--	--	21 J	--	--	--	--	--	23.7 HF	20.8 J
Total Organic Carbon	TOC	--	--	mg/kg	--	--	26000	--	--	--	--	--	19000	28000 J
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	22	--
Fines	FINES	--	--	%	--	--	88.9	--	--	--	--	--	--	88.9
Gravel	GRAVEL	--	--	%	--	--	0	--	--	--	--	--	0.4	1.1
Sand	308075-07-2	--	--	%	--	--	11.1	--	--	--	--	--	19.4	10
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	58.2	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	21	17	--	18	21	**150**	0.21 UJ	**61**	--	--
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.048 J	0.14 J	--	0.074 J	0.054 J	**1.3 J**	**2.3 J**	**0.64 J**	--	--
Selenium	7782-49-2	**3.9**	36	mg/kg	0.27 J	0.65	--	0.94	0.87	1.3	0.12 U	1.1	--	--
Zinc	7440-66-6	**109**	2200	mg/kg	67	90	--	99	94	**120 J**	4.7 UJ	86 J	--	--

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T04C	T04C	T04C	T04C	T04D	T04D	T04D	T04D	T04D	T04F
				Sample ID	T04C-6-12	T04C-6-12	T04C-12-24	T04C-12-24	T04D-0-6	T04D-0-12	T04D-6-12	T04D-12-24	T04D-24-36	T04F-0-6
				Sample Date	08 Dec 2022	25 Oct 2024	08 Dec 2022	25 Oct 2024	08 Dec 2022	08 Dec 2022	08 Dec 2022	08 Dec 2022	13 Dec 2024	08 Dec 2022
				Sample Depth	6–12in bgs	6–12in	12–24in bgs	12–24in	0–6in bgs	0–12in bgs	6–12in bgs	12–24in bgs	24–36in	0–6in bgs
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	7.7 HF	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	--	7.7 HF	--	--	--	--
Temperature	TEMP	--	--	deg c	--	--	--	--	--	23.6 HF	--	--	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	--	23000	--	--	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	15.1	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	--	--	--	--	--
Gravel	GRAVEL	--	--	%	--	--	--	--	--	13.8	--	--	--	--
Sand	308075-07-2	--	--	%	--	--	--	--	--	44.9	--	--	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	26.2	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**60**	**220 J**	21	25 J	**95**	--	**650**	**130**	41 J	28
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.51 J**	**1.9 J**	0.17 J	0.18 J	**0.82 J**	--	**4.3 J**	**1.4 J**	**0.73 J**	0.089 J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.99	1	0.97	0.8	0.68	--	0.91	0.64	0.89	0.25 J
Zinc	7440-66-6	**109**	2200	mg/kg	85 J	**120 J**	74 J	86	**120 J**	--	**160 J**	**110 J**	98	84 J

Appendix A
Plantasie Creek Floodplain Soil Data
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				Location ID	T04F	T04F	T04F	T04F	T05A	T05A	T05A	T05A	T05B	T05B
				Sample ID	DUP-02	T04F-0-12	T04F-6-12	T04F-12-24	T05A-0-6	T05A-0-12	T05A-6-12	T05A-12-24	T05B-0-6	T05B-0-12
				Sample Date	08 Dec 2022	08 Dec 2022	08 Dec 2022	08 Dec 2022	01 Oct 2023	01 Oct 2023	01 Oct 2023	01 Oct 2023	01 Oct 2023	01 Oct 2023
				Sample Depth	0–12in bgs	0–12in bgs	6–12in bgs	12–24in bgs	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in
				Sample Type	FD	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	7.5 HF	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	7.5 HF	--	--	--	6.3 J	--	--	--	6.5 J
Temperature	TEMP	--	--	deg c	--	23.6 HF	--	--	--	21.3 J	--	--	--	21.6 J
Total Organic Carbon	TOC	--	--	mg/kg	--	8000	--	--	--	12000	--	--	--	24000
GEOPHYSICAL														
Clay	CLAY	--	--	%	7	7.3	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	85.6	--	--	--	89
Gravel	GRAVEL	--	--	%	10.2	15.9	--	--	--	0	--	--	--	0
Sand	308075-07-2	--	--	%	47.9	46.7	--	--	--	14.4	--	--	--	11
Silt	E52456985	--	--	%	34.9	30.1	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	--	--	29	31	12	--	12	14	**130**	--
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**	--
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	--
Zinc	7440-66-6	**109**	2200	mg/kg	--	--	80 J	79 J	57	--	60	56 J	**120**	--

Appendix A
Plantasie Creek Floodplain Soil Data
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Dyno Nobel Port Ewen Site
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				Location ID	T05B	T05B	T05C	T05C	T05C	T05C	T05C	T05C	T05C	T05C
				Sample ID	T05B-6-12	T05B-12-24	DUP-05	T05C-0-6	T05C-0-6	DUP-05	T05C-0-12	T05C-0-12	T05C-6-12	T05C-6-12
				Sample Date	01 Oct 2023	01 Oct 2023	01 Oct 2023	01 Oct 2023	26 Oct 2024	26 Oct 2024	01 Oct 2023	26 Oct 2024	01 Oct 2023	26 Oct 2024
				Sample Depth	6–12in	12–24in	0–6in	0–6in	0–6in	6–12in	0–12in	0–12in	6–12in	6–12in
				Sample Type	N	N	FD	N	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	--	--	7 J	7.7 J	--	--
Temperature	TEMP	--	--	deg c	--	--	--	--	--	--	21.3 J	20.8 J	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	--	--	34000	17000 J	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	--	85.4	92.7	--	--
Gravel	GRAVEL	--	--	%	--	--	--	--	--	--	0	0.4	--	--
Sand	308075-07-2	--	--	%	--	--	--	--	--	--	14.6	6.9	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**84**	19	**130**	**130**	**150 J**	**130 J**	--	--	48	**110 J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.72**	0.11 J	**0.75**	**0.73 J**	**0.93 J**	**1.7 J**	--	--	**0.33**	**1.2 J**
Selenium	7782-49-2	**3.9**	36	mg/kg	0.94	0.72	1.4	1.4	1	0.83	--	--	1.3 J	0.89
Zinc	7440-66-6	**109**	2200	mg/kg	100	77 J	**120**	**120**	100 J	100 J	--	--	97	96 J

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				Location ID	T05C	T05C	T05C	T06A	T06A	T06A	T06A	T06A	T06B	T06B
				Sample ID	T05C-12-24	T05C-12-24	T05C-24-36	T06A-0-6	DUP-06	T06A-0-12	T06A-6-12	T06A-12-24	T06B-0-6	T06B-0-12
				Sample Date	01 Oct 2023	26 Oct 2024	26 Oct 2024	02 Oct 2023	02 Oct 2023	02 Oct 2023	02 Oct 2023	02 Oct 2023	02 Oct 2023	02 Oct 2023
				Sample Depth	12–24in	12–24in	24–36in	0–6in	0–12in	0–12in	6–12in	12–24in	0–6in	0–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	6 J	6.6 J	--	--	--	5.8 J
Temperature	TEMP	--	--	deg c	--	--	--	--	21.3 J	21.2 J	--	--	--	21.3 J
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	14000	13000	--	--	--	14000
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	86.9	--	--	--	92.1
Gravel	GRAVEL	--	--	%	--	--	--	--	--	0	--	--	--	0
Sand	308075-07-2	--	--	%	--	--	--	--	--	13.1	--	--	--	7.9
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	12	**110 J**	25	11	--	--	11	17	10	--
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.069 J	**0.62 J**	0.15 J	0.055 J	--	--	0.061 J	0.04 J	0.074 J	--
Selenium	7782-49-2	**3.9**	36	mg/kg	0.86	1.1	1.1	0.42 J	--	--	0.38 J	0.26 J	0.61	--
Zinc	7440-66-6	**109**	2200	mg/kg	85 J	**110**	92	61	--	--	52 J	53 J	65	--

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				Location ID	T06B	T06B	T06C	T06C	T06C	T06C	T06C	T06C	T06C	T06C
				Sample ID	T06B-6-12	T06B-12-24	T06C-0-6	T06C-0-6	T06C-0-12	T06C-0-12	T06C-6-12	T06C-6-12	DUP-07	T06C-12-24
				Sample Date	02 Oct 2023	02 Oct 2023	02 Oct 2023	27 Oct 2024	02 Oct 2023	27 Oct 2024	02 Oct 2023	27 Oct 2024	02 Oct 2023	02 Oct 2023
				Sample Depth	6–12in	12–24in	0–6in	0–6in	0–12in	0–12in	6–12in	6–12in	12–24in	12–24in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	6 J	8.1 J	--	--	--	--
Temperature	TEMP	--	--	deg c	--	--	--	--	21.3 J	20.8 J	--	--	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	28000	23000	--	--	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	73.1	94.1	--	--	--	--
Gravel	GRAVEL	--	--	%	--	--	--	--	0	0	--	--	--	--
Sand	308075-07-2	--	--	%	--	--	--	--	26.9	5.9	--	--	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	12	25	**350**	**580 J**	--	--	**91**	**310 J**	29	28
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.039 J	0.046 J	**2.2**	**2.4 J**	--	--	**0.5**	**3.1 J**	0.16	0.16
Selenium	7782-49-2	**3.9**	36	mg/kg	0.79	0.2 J	2.1	1.7	--	--	1.6	1.2	1.4	1.3
Zinc	7440-66-6	**109**	2200	mg/kg	59 J	70 J	**170**	**180 J**	--	--	**120**	**130**	**110 J**	**110 J**

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Plantasie Creek Floodplain Soil Data
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Port Ewen, NY

				Location ID	T06C		T06C		T07.5A		T07.5A		T07.5A		T07.5A		T07.5B		T07.5B		T07.5B		T07.5B	
				Sample ID	T06C-12-24		T06C-24-36		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		T07.5B-12-24	
				Sample Date	27 Oct 2024		27 Oct 2024		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		24–36in		0–6in		0–12in		6–12in		12–24in		0–6in		0–12in		6–12in		12–24in	
				Sample Type	N		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	Result	Qual
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	--	--	%	--		--		--		--		--		--		--		--		--		--	
METALS																								
Copper	7440-50-8	**50**	270	mg/kg	**250**	J	40	J	19		--		17		14		**110**		--		33		10	
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**2.2**	J	**0.2**	J	0.096		--		0.077		0.046	J	**0.52**		--		**0.23**		0.11	
Selenium	7782-49-2	**3.9**	36	mg/kg	1.3		1.3		0.5		--		0.38		0.31	J	1.9		--		1.9		1.1	
Zinc	7440-66-6	**109**	2200	mg/kg	**130**		**120**		74		--		62		58	J	**130**		--		99		91	J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T07.5C	T07.5C	T07.5C	T07.5C	T07.5D	T07.5D	T07.5D	T07.5D	T07.5D	T07.5D
				Sample ID	T07.5C-0-6	T07.5C-0-12	T07.5C-6-12	T07.5C-12-24	T07.5D-0-6	T07.5D-0-6	T07.5D-0-12	T07.5D-0-12	T07.5D-6-12	T07.5D-6-12
				Sample Date	03 Oct 2023	03 Oct 2023	03 Oct 2023	03 Oct 2023	03 Oct 2023	22 Oct 2024	03 Oct 2023	22 Oct 2024	03 Oct 2023	22 Oct 2024
				Sample Depth	0–6in	0–12in	6–12in	12–24in	0–6in	0–6in	0–12in	0–12in	6–12in	6–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	6.3 J	--	--	--	--	7 J	7.9 J	--	--
Temperature	TEMP	--	--	deg c	--	21.4 J	--	--	--	--	21.2 J	20.3 J	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	32000	--	--	--	--	32000	8100	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	85.1	--	--	--	--	85.5	80.2	--	--
Gravel	GRAVEL	--	--	%	--	0	--	--	--	--	0	0	--	--
Sand	308075-07-2	--	--	%	--	14.9	--	--	--	--	14.5	19.8	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**1200**	--	**260**	19	**580**	**410 J**	--	--	**1400**	**61 J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**6.9**	--	**1.3**	0.092	**2.5**	**2.5 J**	--	--	**4.7**	**0.29 J**
Selenium	7782-49-2	**3.9**	36	mg/kg	1.7	--	2.2	0.99	2.2	1.3	--	--	1.3	0.3 J
Zinc	7440-66-6	**109**	2200	mg/kg	**220**	--	**170**	78 J	**220**	**150 J**	--	--	**190 J**	69 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T07.5D	T07.5D	T07.5D	T07A	T07A	T07A	T07A	T07A	T07A	T07A
				Sample ID	T07.5D-12-24	T07.5-D-12-24	T07.5D-24-36	T07A-0-6	T07A-0-6	T07A-0-12	T07A-0-12	T07A-6-12	T07A-6-12	T07A-12-24
				Sample Date	03 Oct 2023	22 Oct 2024	22 Oct 2024	03 Oct 2023	26 Oct 2024	03 Oct 2023	26 Oct 2024	03 Oct 2023	26 Oct 2024	03 Oct 2023
				Sample Depth	12–24in	12–24in	24–36in	0–6in	0–6in	0–12in	0–12in	6–12in	6–12in	12–24in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	--	8.1 J	7.9 J	--	--	--
Temperature	TEMP	--	--	deg c	--	--	--	--	--	21.2 J	20.9 J	--	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	--	14000	30000 J	--	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	83.9	87	--	--	--
Gravel	GRAVEL	--	--	%	--	--	--	--	--	0	0.8	--	--	--
Sand	308075-07-2	--	--	%	--	--	--	--	--	16.1	12.2	--	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	28	**120 J**	29	**170**	**560 J**	--	--	32	**100 J**	32
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.13	0.17 J	0.14 J	**0.6**	**2.4 J**	--	--	0.16	**0.63 J**	0.09
Selenium	7782-49-2	**3.9**	36	mg/kg	0.25 J	0.37 J	0.34 J	0.67	1.7	--	--	0.24 J	0.58	0.87
Zinc	7440-66-6	**109**	2200	mg/kg	86 J	81	80	100	**160 J**	--	--	76 J	100 J	98 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T07A	T07A	T07B	T07B	T07B	T07B	T07C	T07C	T07C	T07C
				Sample ID	T07A-12-24	T07A-24-36	T07B-0-6	T07B-0-12	T07B-6-12	T07B-12-24	T07C-0-6	T07C-0-12	T07C-6-12	T07C-12-24
				Sample Date	26 Oct 2024	26 Oct 2024	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	12–24in	24–36in	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in	12–24in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	6.7 J	--	--	--	7 J	--	--
Temperature	TEMP	--	--	deg c	--	--	--	21.6 J	--	--	--	21.8 J	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	26000	--	--	--	25000	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	91.6	--	--	--	88.5	--	--
Gravel	GRAVEL	--	--	%	--	--	--	0	--	--	--	1	--	--
Sand	308075-07-2	--	--	%	--	--	--	8.4	--	--	--	10.5	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	40 J	30	24 J	--	18	15	16 J	--	14	11
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.27 J**	0.11 J	0.081 J	--	0.13	0.07 J	0.093 J	--	0.057 J	0.032 J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.21 J	0.21 J	0.85 J	--	0.79	0.87	0.84	--	0.7	0.55
Zinc	7440-66-6	**109**	2200	mg/kg	79	99	**110 J**	--	87 J	84 J	80 J	--	72 J	56 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T08A	T08A	T08A	T08A	T08B	T08B	T08B	T08B	T08C	T08C
				Sample ID	T08A-0-6	T08A-0-12	T08A-6-12	T08A-12-24	T08B-0-6	T08B-0-12	T08B-6-12	T08B-12-24	T08C-0-6	T08C-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	09 Oct 2023
				Sample Depth	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in	0–12in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	6.8 J	--	--	--	6.2 J	--	--	--	6.2 J
Temperature	TEMP	--	--	deg c	--	21.5 J	--	--	--	21.7 J	--	--	--	21.6 J
Total Organic Carbon	TOC	--	--	mg/kg	--	19000	--	--	--	12000	--	--	--	13000
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	88.2	--	--	--	90.2	--	--	--	89.3
Gravel	GRAVEL	--	--	%	--	0	--	--	--	0	--	--	--	0
Sand	308075-07-2	--	--	%	--	11.8	--	--	--	9.8	--	--	--	10.7
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	11 J	--	8.5	14	15	--	14	17	16 J	--
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.062 J	--	0.086	0.06 J	0.06 J	--	0.072 U	0.068 U	0.052 J	--
Selenium	7782-49-2	**3.9**	36	mg/kg	0.52 J	--	0.7	0.19 J	0.38 J	--	0.3 J	0.19 J	0.4 J	--
Zinc	7440-66-6	**109**	2200	mg/kg	63 J	--	63 J	60 J	57 J	--	50 J	47 J	60 J	--

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T08C	T08C	T08D	T08D	T08D	T08D	T08D	T08D	T08D
				Sample ID	T08C-6-12	T08C-12-24	T08D-0-6	T08D-0-6	DUP-09	T08D-0-12	T08D-0-12	T08D-6-12	T08D-6-12	T08D-12-24
				Sample Date	09 Oct 2023	09 Oct 2023	04 Oct 2023	22 Oct 2024	04 Oct 2023	04 Oct 2023	22 Oct 2024	04 Oct 2023	22 Oct 2024	04 Oct 2023
				Sample Depth	6–12in	12–24in	0–6in	0–6in	0–12in	0–12in	0–12in	6–12in	6–12in	12–24in
				Sample Type	N	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	--	--	6.9 J	7.3 J	7.6 J	--	--	--
Temperature	TEMP	--	--	deg c	--	--	--	--	21.8 J	21.8 J	20.2 J	--	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	--	--	22000	22000	26000	--	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	87.6	86.7	--	--	--
Gravel	GRAVEL	--	--	%	--	--	--	--	--	0	0	--	--	--
Sand	308075-07-2	--	--	%	--	--	--	--	--	12.4	13.3	--	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	17	16	**250 J**	**340 J**	--	--	--	40	**86 J**	13
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.045 J	0.027 J	**1.2 J**	**1.1 J**	--	--	--	**0.22**	**0.36 J**	0.044 J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.3 J	0.21 J	1.1	1.4	--	--	--	0.52	0.56	0.27 J
Zinc	7440-66-6	**109**	2200	mg/kg	58 J	52 J	**120 J**	**130 J**	--	--	--	86 J	83	72 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T08D	T08E	T08E	T08E	T08E	T08F	T08F	T08F	T08F	T08F
				Sample ID	T08D-12-24	T08E-0-6	T08E-0-12	T08E-6-12	T08E-12-24	T08F-0-6	DUP-12	T08F-0-12	T08F-6-12	T08F-12-24
				Sample Date	22 Oct 2024	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	12–24in	0–6in	0–12in	6–12in	12–24in	0–6in	6–12in	0–12in	6–12in	12–24in
				Sample Type	N	N	N	N	N	N	FD	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	Result Qual
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	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	31 J	27 J	--	**51**	14	16 J	11	--	13	20
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.054 J	**0.2 J**	--	**0.27**	0.094	0.081 J	0.05 J	--	0.049 J	0.043 J
Selenium	7782-49-2	**3.9**	36	mg/kg	0.54	1 J	--	1.1	1.6	0.57	0.66	--	0.69	0.7
Zinc	7440-66-6	**109**	2200	mg/kg	77	**160 J**	--	94 J	88 J	90 J	56 J	--	71 J	74 J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T09B	T09B	T09B	T09B	T09B	T09B	T09C	T09C	T09C	T09C
				Sample ID	T09B-0-6	DUP-01	DUP-03	T09B-0-12	T09B-6-12	T09B-12-24	T09C-0-6	T09C-0-12	T09C-6-12	T09C-12-24
				Sample Date	07 Dec 2022	07 Dec 2022	07 Dec 2022	07 Dec 2022	07 Dec 2022	07 Dec 2022	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023
				Sample Depth	0–6in bgs	0–12in bgs	6–12in bgs	0–12in bgs	6–12in bgs	12–24in bgs	0–6in	0–12in	6–12in	12–24in
				Sample Type	N	FD	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	7.5 HF	--	7.5 HF	--	--	--	--	--	--
pH	PH	--	--	SU	--	7.5 HF	--	7.5 HF	--	--	--	7.1 J	--	--
Temperature	TEMP	--	--	deg c	--	23.3 HF	--	23.7 HF	--	--	--	21.8 J	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	10000	--	8800	--	--	--	7400	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	9.4	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	--	--	--	--	--	37.4	--	--
Gravel	GRAVEL	--	--	%	--	--	--	5	--	--	--	3.3	--	--
Sand	308075-07-2	--	--	%	--	--	--	60	--	--	--	59.3	--	--
Silt	E52456985	--	--	%	--	--	--	25.6	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	43	--	**52**	--	40	41	26 J	--	23 J	**63 J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**0.2 J**	--	0.13 J	--	0.13	**0.3 J**	0.16 J	--	0.06 J	**0.19 J**
Selenium	7782-49-2	**3.9**	36	mg/kg	0.44	--	0.19 J	--	0.16 J	0.19 J	0.18 J	--	0.17 J	0.28 J
Zinc	7440-66-6	**109**	2200	mg/kg	**110 J**	--	**160 J**	--	**150 J**	**220 J**	58 J	--	71 J	**360 J**

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T10A	T10A	T10A	T10A	T10A	T10A	T10B	T10B	T10B	T10B
				Sample ID	DUP-08	T10A-0-6	T10A-0-12	T10A-6-12	T10A-12-24	T10A-24-36	T10B-0-6	T10B-0-12	T10B-6-12	T10B-12-24
				Sample Date	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023	12 Dec 2024	04 Oct 2023	04 Oct 2023	04 Oct 2023	04 Oct 2023
				Sample Depth	0–6in	0–6in	0–12in	6–12in	12–24in	24–36in	0–6in	0–12in	6–12in	12–24in
				Sample Type	FD	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	Result Qual
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--	--	--	--	--	--	--	--	--	--
pH	PH	--	--	SU	--	--	7.7 J	--	--	--	--	8 J	--	--
Temperature	TEMP	--	--	deg c	--	--	21.4 J	--	--	--	--	21.6 J	--	--
Total Organic Carbon	TOC	--	--	mg/kg	--	--	87000 J	--	--	--	--	14000	--	--
GEOPHYSICAL														
Clay	CLAY	--	--	%	--	--	--	--	--	--	--	--	--	--
Fines	FINES	--	--	%	--	--	39.1	--	--	--	--	39.2	--	--
Gravel	GRAVEL	--	--	%	--	--	17	--	--	--	--	4.5	--	--
Sand	308075-07-2	--	--	%	--	--	43.9	--	--	--	--	56.3	--	--
Silt	E52456985	--	--	%	--	--	--	--	--	--	--	--	--	--
METALS														
Copper	7440-50-8	**50**	270	mg/kg	43 J	44 J	--	**290 J**	**1200 J**	**300 J**	**95 J**	--	**140 J**	**1100 J**
Mercury	7439-97-6	**0.18**	1.2	mg/kg	0.1 J	0.12 J	--	**1.1 J**	**3.7 J**	**9.2 J**	**0.24 J**	--	**0.37 J**	**1.9 J**
Selenium	7782-49-2	**3.9**	36	mg/kg	0.27 J	0.3 J	--	0.76	1.1	0.51 J	0.29 J	--	0.25 J	0.8
Zinc	7440-66-6	**109**	2200	mg/kg	**130 J**	**140 J**	--	**230 J**	**210 J**	99 J	95 J	--	91 J	**380 J**

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

				Location ID	T10B		T10C		T10C		T10C		T10C	
				Sample ID	T10B-24-36		T10C-0-6		T10C-0-12		T10C-6-12		T10C-12-24	
				Sample Date	12 Dec 2024		04 Oct 2023		04 Oct 2023		04 Oct 2023		04 Oct 2023	
				Sample Depth	24–36in		0–6in		0–12in		6–12in		12–24in	
				Sample Type	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
GENERAL CHEMISTRY														
Corrosivity	CORROS	--	--	SU	--		--		--		--		--	
pH	PH	--	--	SU	--		--		7.2	J	--		--	
Temperature	TEMP	--	--	deg c	--		--		21.8	J	--		--	
Total Organic Carbon	TOC	--	--	mg/kg	--		--		30000		--		--	
GEOPHYSICAL														
Clay	CLAY	--	--	%	--		--		--		--		--	
Fines	FINES	--	--	%	--		--		45.4		--		--	
Gravel	GRAVEL	--	--	%	--		--		0		--		--	
Sand	308075-07-2	--	--	%	--		--		54.6		--		--	
Silt	E52456985	--	--	%	--		--		--		--		--	
METALS														
Copper	7440-50-8	**50**	270	mg/kg	**2200**	J	**240**	J	--		**190**	J	32	J
Mercury	7439-97-6	**0.18**	1.2	mg/kg	**10**	J	**0.73**	J	--		**0.45**	J	0.068	J
Selenium	7782-49-2	**3.9**	36	mg/kg	1.1	J	1		--		0.39		0.1	J
Zinc	7440-66-6	**109**	2200	mg/kg	**440**	J	**140**	J	--		63	J	32	J

Appendix A
Plantasie Creek Floodplain Soil Data
Plantasie Creek Comprehensive Floodplain Soil Sampling Report
Dyno Nobel Port Ewen Site
Port Ewen, NY

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 = degree Celsius
FD = field duplicate
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
mg/kg = milligram per kilogram
N = normal sample
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

EHS Support℠

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

[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

EHS Support℠

Report Date: November 30, 2023

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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

EHS Support℠

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	

[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: 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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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

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

EHS Support

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	

[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]

[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

EHS Support

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

[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]

[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	pH by Method 9045	7 days	21–26 days
180-163684-13 180-163684-17 180-163684-20 180-163684-23 180-163684-26	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

EHS Support℠

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	

[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]

[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	pH by Method 9045	7 days	23–26 days
180-163685-16 180-163685-19 180-163685-22 180-163685-25 180-163685-28	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).”

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

EHS Support

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

[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]

[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: 797

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG):

180-181919 -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

Report Date:

January 12, 2025

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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

Additional analyses were performed by the laboratory; samples were analyzed at Eurofins in Burlington, Vermont, for grain size by ASTM[1] Method D422. No results of grain size analyses 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	Analyses	
					Metals	General Chemistry
180-181919-1	180-181919-1	T08D-6-12	Soil	10/22/2024	X	
180-181919-1	180-181919-2	T08D-12-24	Soil	10/22/2024	X	
180-181919-1	180-181919-4	T07.5-D-12-24	Soil	10/22/2024	X	
180-181919-1	180-181919-6	T07.5-E-6-12	Soil	10/22/2024	X	
180-181919-1	180-181919-7	T07.5-E-12-24	Soil	10/22/2024	X	
180-181919-1	180-181919-10	T04Z-0-6	Soil	10/23/2024	X	
180-181919-1	180-181919-11	T04Z-6-12	Soil	10/23/2024	X	
180-181919-1	180-181919-12	T04Z-12-24	Soil	10/23/2024	X	
180-181919-1	180-181919-14	T04Z-0-12	Soil	10/23/2024		X
180-181919-1	180-181919-15	T03.5A-6-12	Soil	10/23/2024	X	
180-181919-1	180-181919-16	T03.5A-12-24	Soil	10/23/2024	X	
180-181919-1	180-181919-18	DUP-02	Soil	10/23/2024	X	
180-181919-1	180-181919-19	T03Z-12-24	Soil	10/24/2024	X	
180-181919-1	180-181919-21	T03A-24-36	Soil	10/24/2024	X	
180-181919-1	180-181919-22	T04.5B-0-6	Soil	10/24/2024	X	
180-181919-1	180-181919-23	T04.5B-6-12	Soil	10/24/2024	X	
180-181919-1	180-181919-24	T04.5B-12-24	Soil	10/24/2024	X	

[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
180-181919-1	180-181919-26	T04.5B-0-12	Soil	10/24/2024		X
180-181919-1	180-181919-27	T03.5B-12-24	Soil	10/25/2024	X	
180-181919-1	180-181919-29	T04C-12-24	Soil	10/25/2024	X	
180-181919-1	180-181919-31	T03B-24-36	Soil	10/25/2024	X	
180-181919-1	180-181919-32	T03D-24-36	Soil	10/25/2024	X	
180-181919-1	180-181919-33	T04.75B-12-24	Soil	10/26/2024	X	
180-181919-1	180-181919-35	DUP-03	Soil	10/26/2024	X	
180-181919-1	180-181919-36	T03E-24-36	Soil	10/26/2024	X	
180-181919-1	180-181919-37	T07C-12-24	Soil	10/26/2024	X	
180-181919-1	180-181919-39	T04.75C-6-12	Soil	10/26/2024	X	
180-181919-1	180-181919-40	T04.75C-12-24	Soil	10/26/2024	X	
180-181919-1	180-181919-42	T05C-12-24	Soil	10/26/2024	X	
180-181919-1	180-181919-44	T06C-6-12	Soil	10/27/2024	X	
180-181919-1	180-181919-45	T06C-12-24	Soil	10/27/2024	X	
180-181919-1	180-181919-46	T06C-24-36	Soil	10/27/2024	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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 technical guidance (NYSDEC, 2010), 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

A note in the narrative states that the collection dates written on sample bottles for several samples includes “12” as the month. With that exception, the chain of custody was properly completed; the gap between relinquishing date/time and receiving date/time is assumed to be associated with sample shipment. 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

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 by Method 6010/6020	Soil/sediment	None	180 days
Mercury by Method 7471	Soil/sediment	Less than or equal to 6 °C	28 days

Note:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 4**.

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

Sample	Analysis	Holding Time	Observed Holding Time
180-181919-29	7471A	28 days	29 days

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

Table 5 Preservation and Holding Time Nonconformance Actions – Metals

Quality Control Nonconformance	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2× holding time.	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time.	J	R

Note:
[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.

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]

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. 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 were qualified due to blank contamination. Copper was detected in two laboratory method blanks and in an equipment blank. However, detections in associated field samples were significantly greater than in the blank. Therefore, no qualification was needed. Results were

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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*. 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, Appendix B, Table B-9*. QSM Version 5.4 FINAL (osd.mil)

non-detect for calibration blanks associated with reported results. Equipment blanks are included in the laboratory SDG 180-182004-1.

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. Recoveries of linear range check standards were also 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—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 6.** 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 6 Observed Matrix Spike Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-181919-29	Mercury	66 percent	Acceptable	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 (**Table 7**) were applied to mercury results for all field samples in this SDG.

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

Quality Control Nonconformance	Sample Result	Qualification[1]
%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 percent
		R if PDS not performed or PDS %R is less than 75 percent
	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

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 8**) were met. Laboratory duplicate analysis was performed on samples 180-181919-12 and 180-181919-29. The relationship between parent sample 180-181919-29 and its duplicate for selenium failed to meet laboratory criteria; it meets 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 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 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 is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results are deemed acceptable when the percent difference between the original analysis and the diluted analysis is less than or equal to 10 percent.

Serial dilution analysis results that were outside control limits are shown in **Table 9**.

Table 9 Observed Serial Dilution Nonconformances – Metals

Sample	Analyte	% Difference
180-181919-12	Copper	11 percent

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. As a consequence of the noncompliant serial dilution result, qualifiers were applied to copper results for all field samples in this SDG (**Table 10**).

Table 10 Serial Dilution Nonconformance Actions – Metals

Serial Dilution % Difference	Sample Result	Qualification[1]
Greater than upper acceptance limit	Detect	J

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

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 11**) were met. Two parent sample–field duplicate sample pairs were included in this SDG.

Table 11 Acceptable Parent Sample–Field Duplicate Relationships – Metals

Parent Sample – Field 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 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 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

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

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.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 12**.

Table 12 Preservation and Holding Time Requirements – General Chemistry

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

Note:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 13**.

Table 13 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Sample	Analysis	Holding Time	Observed Holding Time
180-181919-14 180-181919-26	Temperature	15 minutes	26–27 days
180-181919-14 180-181919-26	pH	7 days	26–27 days
180-181919-14	Total organic carbon	14 days	15 days

The samples in **Table 13** have been qualified as shown in **Table 14**:

Table 14 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Nonconformance	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2× holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time	J	R

Note:
[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:

- Calibration curves exhibited acceptable correlation coefficients or correlation factors.
- Initial and continuing calibration verification results were within 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 laboratory method blanks and instrument 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—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.

Not applicable – no laboratory duplicate analysis was reported.

4.7 Field Duplicates

Not applicable – the field duplicates in this SDG were not designated for general chemistry analysis.

4.8 Additional Notes

The laboratory report narrative includes the following note: “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.“

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, May 3). *DER-10: Technical Guidance for Site Investigation and Remediation*. https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

United States Environmental Protection Agency. (2017, January). *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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	10/22/2024	Soil	T	6020B	Copper	mg/kg	86	J	0.16	B	180-181919-1	180-181919-1
T08D-6-12	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.36	J	0.023		180-181919-1	180-181919-1
T04Z-0-6	10/23/2024	Soil	T	6020B	Copper	mg/kg	17	J	0.20	B	180-181919-10	180-181919-1
T04Z-0-6	10/23/2024	Soil	T	7471A	Mercury	mg/kg	0.1	J	0.027		180-181919-10	180-181919-1
T04Z-6-12	10/23/2024	Soil	T	6020B	Copper	mg/kg	10	J	0.20	B	180-181919-11	180-181919-1
T04Z-12-24	10/23/2024	Soil	T	6020B	Copper	mg/kg	19	J	0.21	B	180-181919-12	180-181919-1
T04Z-0-12	10/23/2024	Soil	T	9045D	pH	SU	6.8	J	0.1	HF	180-181919-14	180-181919-1
T04Z-0-12	10/23/2024	Soil	T	9045D	Temperature	deg c	20.2	J	0.1	HF	180-181919-14	180-181919-1
T04Z-0-12	10/23/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	17000	J	1300	H	180-181919-14	180-181919-1
T03.5A-6-12	10/23/2024	Soil	T	6020B	Copper	mg/kg	12	J	0.17	B	180-181919-15	180-181919-1
T03.5A-12-24	10/23/2024	Soil	T	6020B	Copper	mg/kg	22	J	0.18	B	180-181919-16	180-181919-1
DUP-02	10/23/2024	Soil	T	6020B	Copper	mg/kg	24	J	0.21	B	180-181919-18	180-181919-1
T03Z-12-24	10/24/2024	Soil	T	6020B	Copper	mg/kg	15	J	0.21	B	180-181919-19	180-181919-1
T03Z-12-24	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.083	J	0.024		180-181919-19	180-181919-1
T08D-12-24	10/22/2024	Soil	T	6020B	Copper	mg/kg	31	J	0.21	B	180-181919-2	180-181919-1
T03A-24-36	10/24/2024	Soil	T	6020B	Copper	mg/kg	13	J	0.20	B	180-181919-21	180-181919-1
T03A-24-36	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.19	J	0.027		180-181919-21	180-181919-1
T04.5B-0-6	10/24/2024	Soil	T	6020B	Copper	mg/kg	380	J	1.1	B	180-181919-22	180-181919-1
T04.5B-0-6	10/24/2024	Soil	T	7471A	Mercury	mg/kg	4.7	J	0.30		180-181919-22	180-181919-1
T04.5B-6-12	10/24/2024	Soil	T	6020B	Copper	mg/kg	240	J	1.0	B	180-181919-23	180-181919-1
T04.5B-6-12	10/24/2024	Soil	T	7471A	Mercury	mg/kg	2.4	J	0.14		180-181919-23	180-181919-1
T04.5B-12-24	10/24/2024	Soil	T	6020B	Copper	mg/kg	47	J	0.18	B	180-181919-24	180-181919-1
T04.5B-12-24	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.35	J	0.024		180-181919-24	180-181919-1
T04.5B-0-12	10/24/2024	Soil	T	9045D	pH	SU	7.2	J	0.1	HF	180-181919-26	180-181919-1
T04.5B-0-12	10/24/2024	Soil	T	9045D	Temperature	deg c	20.2	J	0.1	HF	180-181919-26	180-181919-1
T03.5B-12-24	10/25/2024	Soil	T	6020B	Copper	mg/kg	22	J	0.19	B	180-181919-27	180-181919-1
T04C-12-24	10/25/2024	Soil	T	6020B	Copper	mg/kg	25	J	0.23	B	180-181919-29	180-181919-1
T04C-12-24	10/25/2024	Soil	T	7471A	Mercury	mg/kg	0.18	J	0.025	HF1	180-181919-29	180-181919-1
T03B-24-36	10/25/2024	Soil	T	6020B	Copper	mg/kg	21	J	0.18		180-181919-31	180-181919-1
T03D-24-36	10/25/2024	Soil	T	6020B	Copper	mg/kg	17	J	0.18	B	180-181919-32	180-181919-1
T04.75B-12-24	10/26/2024	Soil	T	6020B	Copper	mg/kg	24	J	0.20		180-181919-33	180-181919-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
DUP-03	10/26/2024	Soil	T	6020B	Copper	mg/kg	23	J	0.14	B	180-181919-35	180-181919-1
T03E-24-36	10/26/2024	Soil	T	6020B	Copper	mg/kg	12	J	0.18	B	180-181919-36	180-181919-1
T07C-12-24	10/26/2024	Soil	T	6020B	Copper	mg/kg	40	J	0.20		180-181919-37	180-181919-1
T07C-12-24	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.27	J	0.022		180-181919-37	180-181919-1
T04.75C-6-12	10/26/2024	Soil	T	6020B	Copper	mg/kg	1400	J	9.0		180-181919-39	180-181919-1
T04.75C-6-12	10/26/2024	Soil	T	7471A	Mercury	mg/kg	8	J	0.49		180-181919-39	180-181919-1
T07.5-D-12-24	10/22/2024	Soil	T	6020B	Copper	mg/kg	120	J	0.22	B	180-181919-4	180-181919-1
T07.5-D-12-24	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.17	J	0.023		180-181919-4	180-181919-1
T04.75C-12-24	10/26/2024	Soil	T	6020B	Copper	mg/kg	850	J	1.1		180-181919-40	180-181919-1
T04.75C-12-24	10/26/2024	Soil	T	7471A	Mercury	mg/kg	5.7	J	0.27		180-181919-40	180-181919-1
T05C-12-24	10/26/2024	Soil	T	6020B	Copper	mg/kg	110	J	0.25		180-181919-42	180-181919-1
T05C-12-24	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.62	J	0.028		180-181919-42	180-181919-1
T06C-6-12	10/27/2024	Soil	T	6020B	Copper	mg/kg	310	J	1.2		180-181919-44	180-181919-1
T06C-6-12	10/27/2024	Soil	T	7471A	Mercury	mg/kg	3.1	J	0.13		180-181919-44	180-181919-1
T06C-12-24	10/27/2024	Soil	T	6020B	Copper	mg/kg	250	J	1.2		180-181919-45	180-181919-1
T06C-12-24	10/27/2024	Soil	T	7471A	Mercury	mg/kg	2.2	J	0.14		180-181919-45	180-181919-1
T06C-24-36	10/27/2024	Soil	T	6020B	Copper	mg/kg	40	J	0.17		180-181919-46	180-181919-1
T06C-24-36	10/27/2024	Soil	T	7471A	Mercury	mg/kg	0.2	J	0.026		180-181919-46	180-181919-1
T07.5-E-6-12	10/22/2024	Soil	T	6020B	Copper	mg/kg	19	J	0.19	B	180-181919-6	180-181919-1
T07.5-E-6-12	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.085	J	0.021		180-181919-6	180-181919-1
T07.5-E-12-24	10/22/2024	Soil	T	6020B	Copper	mg/kg	22	J	0.20	B	180-181919-7	180-181919-1

Notes:
B = Compound was found in the blank and sample.
deg c = degree Celsius
F1 = Matrix spike and/or matrix spike duplicate recovery exceeds control limits.
J (laboratory qualifier) = Result is less than the reporting limit but greater than or equal to the method detection limit 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 = milligram per kilogram
SDG = sample delivery group
SU = standard unit
T = Total

EHS Support Validation Report Number: 798

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG):

180-182003-1

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

Report Date:

January 24, 2025

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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

Additional analyses were performed by the laboratory; samples were analyzed at Eurofins in Burlington, Vermont, for grain size by ASTM[1] Method D422. No results of grain size analyses 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	Analyses	
					Metals	General Chemistry
180-182003-1	180-182003-1	T08D-0-6	Soil	10/22/2024	X	
180-182003-1	180-182003-2	T08D-0-12	Soil	10/22/2024		X
180-182003-1	180-182003-3	T07.5D-0-6	Soil	10/22/2024	X	
180-182003-1	180-182003-4	T07.5D-6-12	Soil	10/22/2024	X	
180-182003-1	180-182003-5	T07.5D-0-12	Soil	10/22/2024		X
180-182003-1	180-182003-6	T07.5E-0-6	Soil	10/22/2024	X	
180-182003-1	180-182003-7	T07.5E-0-12	Soil	10/22/2024		X
180-182003-1	180-182003-8	T04.5A-0-6	Soil	10/23/2024	X	
180-182003-1	180-182003-9	T04.5A-6-12	Soil	10/23/2024	X	
180-182003-1	180-182003-11	T04.5A-0-12	Soil	10/23/2024		X
180-182003-1	180-182003-12	T03.5A-0-6	Soil	10/23/2024	X	
180-182003-1	180-182003-13	DUP-01	Soil	10/23/2024	X	
180-182003-1	180-182003-14	T03.5A-0-12	Soil	10/23/2024		X
180-182003-1	180-182003-15	T03Z-0-6	Soil	10/24/2024	X	
180-182003-1	180-182003-16	T03Z-6-12	Soil	10/24/2024	X	
180-182003-1	180-182003-16	T03Z-6-12	Soil	10/24/2024	X	
180-182003-1	180-182003-17	T03Z-0-12	Soil	10/24/2024		X

[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
180-182003-1	180-182003-18	T03.5B-0-6	Soil	10/25/2024	X	
180-182003-1	180-182003-19	T03.5B-6-12	Soil	10/25/2024	X	
180-182003-1	180-182003-20	T03.5B-0-12	Soil	10/25/2024		X
180-182003-1	180-182003-21	T04C-0-6	Soil	10/25/2024	X	
180-182003-1	180-182003-22	T04C-6-12	Soil	10/25/2024	X	
180-182003-1	180-182003-23	T04C-0-12	Soil	10/25/2024		X
180-182003-1	180-182003-24	T04.75B-0-12	Soil	10/26/2024		X
180-182003-1	180-182003-25	T04.75B-0-6	Soil	10/26/2024	X	
180-182003-1	180-182003-26	T04.75B-6-12	Soil	10/26/2024	X	
180-182003-1	180-182003-27	T07C-0-6	Soil	10/26/2024	X	
180-182003-1	180-182003-28	T07C-6-12	Soil	10/26/2024	X	
180-182003-1	180-182003-29	T07C-0-12	Soil	10/26/2024		X
180-182003-1	180-182003-30	T04.75C-0-6	Soil	10/26/2024	X	
180-182003-1	180-182003-31	T04.75C-0-12	Soil	10/26/2024		X
180-182003-1	180-182003-32	DUP-04	Soil	10/26/2024		X
180-182003-1	180-182003-33	T05C-0-6	Soil	10/26/2024	X	
180-182003-1	180-182003-34	T05C-6-12	Soil	10/26/2024	X	
180-182003-1	180-182003-35	T05C-0-12	Soil	10/26/2024		X
180-182003-1	180-182003-36	DUP-05	Soil	10/26/2024	X	
180-182003-1	180-182003-37	T06C-0-6	Soil	10/27/2024	X	
180-182003-1	180-182003-38	T06C-0-12	Soil	10/27/2024		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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 technical guidance (NYSDEC, 2010), 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 relinquishing date/time and receiving date/time is assumed to be associated with sample shipment. 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

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 by Method 6010/6020	Soil/sediment	None	180 days
Mercury by Method 7471	Soil/sediment	Less than or equal to 6 °C	28 days

Note:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 4**.

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

Sample	Analysis	Holding Time	Observed Holding Time
180-182003-27	Method 7471A	28 days	30 days

The samples in Table 4 have been qualified as shown in Table 5:

Table 5 Preservation and Holding Time Nonconformance Actions – Metals

Quality Control Nonconformance	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2× holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time	J	R

Note:
[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.

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]

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.

Calibration results outside control limits are presented in **Table 6**. Other initial calibration verification and continuing calibration verification recoveries were within limits. Contract-required detection limit check standards were analyzed; recoveries were acceptable.

Table 6 Observed Calibration Nonconformances – Metals

Calibration	Analyte	Quality Control Nonconformance	Associated Sample
CCV 410-576556/20	Selenium	CCV %R = 111 percent	180-182003-12

Notes:
CCV = continuing calibration verification
%R = Percent recovered

The selenium results for sample 180-182003-12 were qualified as shown in **Table 7**.

Table 7 Initial and Continuing Calibration Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification [a]
ICV and/or CCV recovery is greater than upper acceptance limit.	Non-detect	No Action
	Detect	J

[2] u = unified atomic mass unit

[3] USEPA. (2014). *Method 6020B (SW-846): Inductively Coupled Plasma-Mass Spectrometry, Revision 2, Section 10.1*. 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, Appendix B, Table B-9*. QSM Version 5.4 FINAL (osd.mil)

Quality Control Nonconformance	Sample Result	Qualification [a]
ICV and/or CCV recovery is less than lower acceptance limit.	Non-detect	UJ
	Detect	J

Notes:
[a] See **Section 2** for qualifier definitions.
CCV = continuing calibration verification
ICV = initial calibration verification

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 were qualified due to blank contamination. Copper was detected in instrument blanks and in an equipment blank. However, detections in associated field samples were either non-detect or were significantly greater than in the blank. Therefore, no qualification was needed. Method blank results were non-detect. Equipment blanks are included in the laboratory SDG 180-182004-1.

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. Recoveries of linear range check standards were also 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—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 8.** 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 8 Observed Matrix Spike Nonconformances – Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-182003-33	Copper	Less than 30 percent*	Less than 30 percent*	NA
180-182003-16	Zinc	69%	Acceptable	Acceptable

Notes:
* A post-digestion spike was performed on this sample. Copper yielded a 93 percent recovery.
NA = Not applicable – when a recovery is significantly low, that recovery determines the relevant result qualification. In these cases, the relative percent difference is of no consequence.

For inorganic analyses in which samples undergo batch digestion or batch distillation, batch qualifications are applied. Because of the noncompliant matrix spike result, qualifiers (**Table 9**) were applied to copper and zinc results for all field samples in this SDG.

Table 9 Matrix Spike/Matrix Spike Duplicate Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification[1]
%R: • 30–74% for most metals, including mercury • 20–74% for silver, antimony	Non-detect	UJ
	Detect	J

Quality Control Nonconformance	Sample Result	Qualification[1]
%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 percent
		R if PDS not performed or PDS %R is less than 75 percent
	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

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 10**. 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 10 Observed Laboratory Duplicate Nonconformances – Metals

Sample	Analyte	Relative Percent Difference
180-182003-33	Copper	45%
	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 (RL) 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 copper and mercury results for all field samples in this SDG.

Table 11 Laboratory Duplicate Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Qualification [a]
Sample and its duplicate is greater than or equal to 5× the reporting limit and • Relative percent difference is less than or equal to 20% (aqueous) **or** • Relative percent difference is less than or equal to 35% (soil/sediment)	Detect	J
Sample and/or its duplicate is less than 5× 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:
[a] See **Section 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, and then the calculated results are compared. Serial dilution analysis is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results 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 180-182003-16 and 180-182003-33.

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 12**) were met. Two parent sample–field duplicate sample pairs were included in this SDG and analyzed for metals.

Table 12 Acceptable Parent Sample–Field Duplicate Relationships – Metals

Parent Sample–Field 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 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 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

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

Results for several samples were reported from dilutions.

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.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 13**.

Table 13 Preservation and Holding Time Requirements – General Chemistry

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

Note:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 14**.

Table 14 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Sample	Analysis	Holding Time	Observed Holding Time
All samples in this SDG	Temperature	15 minutes	24–28 days
All samples in this SDG	pH	7 days	24–28 days

The samples in **Table 14** have been qualified as shown in **Table 15**:

Table 15 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Nonconformance	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2× holding time.	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time.	J	R

Notes:
[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:

- Calibration curves exhibited acceptable correlation coefficients or correlation factors.
- Initial and continuing calibration verification results were within 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 laboratory method blanks and instrument 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—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 16**. 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 16 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances – General Chemistry

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-182003-35	Total organic carbon	Less than 30 percent	Less than 30 percent	NA
180-182003-29	Total organic carbon	Less than 30 percent	Less than 30 percent	NA

Note:
NA = Not applicable – when a recovery is significantly low, that recovery determines the relevant result qualification. In these cases, the relative percent difference is of no consequence.

Because of these excursions, total organic carbon results for the listed samples have been qualified in accordance with **Table 17**.

Table 17 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

Note:
[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 18**) were met. Laboratory duplicate analysis of pH and temperature was performed on sample 180-182003-29.

Table 18 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 1× the reporting limit (aqueous) **or** • Absolute difference is less than or equal to 2× the reporting limit (soil/sediment).

4.7 Field Duplicates

Acceptance criteria (**Table 12**) were met. One parent sample–field duplicate sample pair was included in this SDG and analyzed for general chemistry parameters.

Table 19 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 5× 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 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

The laboratory report narrative included the statements below. The total organic carbon results for samples 180-182003-23 and 180-182003-31 have consequently been qualified as estimated.

- "All samples are analyzed in duplicate with the average results reported. For samples T04.75C-0-12 (180-182003-31), the % RPD of the individual result exceeded 50%. The samples were reanalyzed with acceptable %RPD. However, the reanalysis of the sample was outside of holding time. Therefore, both sets of results are reported." The initial analysis is considered reportable.
- "All samples are analyzed in duplicate with the average results reported. For samples T04C-0-12 (180-182003-23), the % RPD of the individual result exceeded 50%. The sample was reanalyzed and the %RPD failure repeated due to the non-homogeneous nature of the sample. The results of the original analysis are reported due to the reanalysis was outside of holding time."

The laboratory report narrative includes the following note: “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.“

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

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United States Environmental Protection Agency. (2017, January). *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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-0-6	10/22/2024	Soil	T	6020B	Copper	mg/kg	340	J	1.2		180-182003-1	180-182003-1
T08D-0-6	10/22/2024	Soil	T	6020B	Zinc	mg/kg	130	J	5.4		180-182003-1	180-182003-1
T08D-0-6	10/22/2024	Soil	T	7471A	Mercury	mg/kg	1.1	J	0.056		180-182003-1	180-182003-1
T04.5A-12-24	10/23/2024	Soil	T	6020B	Copper	mg/kg	29	J	0.16		180-182003-10	180-182003-1
T04.5A-12-24	10/23/2024	Soil	T	6020B	Zinc	mg/kg	77	J	3.6		180-182003-10	180-182003-1
T04.5A-0-12	10/23/2024	Soil	T	9045D	pH	SU	8.3	J	0.1	HF	180-182003-11	180-182003-1
T04.5A-0-12	10/23/2024	Soil	T	9045D	Temperature	deg c	20.3	J	0.1	HF	180-182003-11	180-182003-1
T03.5A-0-6	10/23/2024	Soil	T	6020B	Copper	mg/kg	13	J	0.25		180-182003-12	180-182003-1
T03.5A-0-6	10/23/2024	Soil	T	6020B	Selenium	mg/kg	0.7	U	0.70	U^+	180-182003-12	180-182003-1
T03.5A-0-6	10/23/2024	Soil	T	6020B	Zinc	mg/kg	74	J	5.6		180-182003-12	180-182003-1
DUP-01	10/23/2024	Soil	T	6020B	Copper	mg/kg	14	J	0.22		180-182003-13	180-182003-1
DUP-01	10/23/2024	Soil	T	6020B	Zinc	mg/kg	78	J	4.8		180-182003-13	180-182003-1
DUP-01	10/23/2024	Soil	T	7471A	Mercury	mg/kg	0.086	J	0.028		180-182003-13	180-182003-1
T03.5A-0-12	10/23/2024	Soil	T	9045D	pH	SU	7.2	J	0.1	HF	180-182003-14	180-182003-1
T03.5A-0-12	10/23/2024	Soil	T	9045D	Temperature	deg c	20.2	J	0.1	HF	180-182003-14	180-182003-1
T03Z-0-6	10/24/2024	Soil	T	6020B	Copper	mg/kg	83	J	0.27		180-182003-15	180-182003-1
T03Z-0-6	10/24/2024	Soil	T	6020B	Zinc	mg/kg	280	J	30		180-182003-15	180-182003-1
T03Z-0-6	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.24	J	0.034		180-182003-15	180-182003-1
T03Z-6-12	10/24/2024	Soil	T	6020B	Copper	mg/kg	19	J	0.20		180-182003-16	180-182003-1
T03Z-6-12	10/24/2024	Soil	T	6020B	Zinc	mg/kg	190	J	4.4	F1	180-182003-16	180-182003-1
T03Z-6-12	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.13	J	0.026		180-182003-16	180-182003-1
T03Z-0-12	10/24/2024	Soil	T	9045D	pH	SU	6.5	J	0.1	HF	180-182003-17	180-182003-1
T03Z-0-12	10/24/2024	Soil	T	9045D	Temperature	deg c	20.5	J	0.1	HF	180-182003-17	180-182003-1
T03.5B-0-6	10/25/2024	Soil	T	6020B	Copper	mg/kg	340	J	1.1	^2	180-182003-18	180-182003-1
T03.5B-0-6	10/25/2024	Soil	T	6020B	Zinc	mg/kg	150	J	5.0		180-182003-18	180-182003-1
T03.5B-0-6	10/25/2024	Soil	T	7471A	Mercury	mg/kg	1.7	J	0.051		180-182003-18	180-182003-1
T03.5B-6-12	10/25/2024	Soil	T	6020B	Copper	mg/kg	28	J	0.21	^2	180-182003-19	180-182003-1
T03.5B-6-12	10/25/2024	Soil	T	6020B	Zinc	mg/kg	81	J	4.7		180-182003-19	180-182003-1
T03.5B-6-12	10/25/2024	Soil	T	7471A	Mercury	mg/kg	0.13	J	0.024		180-182003-19	180-182003-1
T08D-0-12	10/22/2024	Soil	T	9045D	pH	SU	7.6	J	0.1	HF	180-182003-2	180-182003-1
T08D-0-12	10/22/2024	Soil	T	9045D	Temperature	deg c	20.2	J	0.1	HF	180-182003-2	180-182003-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T03.5B-0-12	10/25/2024	Soil	T	9045D	pH	SU	8.2	J	0.1	HF	180-182003-20	180-182003-1
T03.5B-0-12	10/25/2024	Soil	T	9045D	Temperature	deg c	20.8	J	0.1	HF	180-182003-20	180-182003-1
T04C-0-6	10/25/2024	Soil	T	6020B	Copper	mg/kg	0.21	UJ	0.21	U^+	180-182003-21	180-182003-1
T04C-0-6	10/25/2024	Soil	T	6020B	Zinc	mg/kg	4.7	UJ	4.7	U	180-182003-21	180-182003-1
T04C-0-6	10/25/2024	Soil	T	7471A	Mercury	mg/kg	2.3	J	0.12		180-182003-21	180-182003-1
T04C-6-12	10/25/2024	Soil	T	6020B	Copper	mg/kg	220	J	0.85		180-182003-22	180-182003-1
T04C-6-12	10/25/2024	Soil	T	6020B	Zinc	mg/kg	120	J	3.8		180-182003-22	180-182003-1
T04C-6-12	10/25/2024	Soil	T	7471A	Mercury	mg/kg	1.9	J	0.054		180-182003-22	180-182003-1
T04C-0-12	10/25/2024	Soil	T	9045D	pH	SU	8.4	J	0.1	HF	180-182003-23	180-182003-1
T04C-0-12	10/25/2024	Soil	T	9045D	Temperature	deg c	20.8	J	0.1	HF	180-182003-23	180-182003-1
T04C-0-12	10/25/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	28000	J	1300		180-182003-23	180-182003-1
T04.75B-0-12	10/26/2024	Soil	T	9045D	pH	SU	7.5	J	0.1	HF	180-182003-24	180-182003-1
T04.75B-0-12	10/26/2024	Soil	T	9045D	Temperature	deg c	20.9	J	0.1	HF	180-182003-24	180-182003-1
T04.75B-0-6	10/26/2024	Soil	T	6020B	Copper	mg/kg	100	J	0.18		180-182003-25	180-182003-1
T04.75B-0-6	10/26/2024	Soil	T	6020B	Zinc	mg/kg	80	J	4.1		180-182003-25	180-182003-1
T04.75B-0-6	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.62	J	0.025		180-182003-25	180-182003-1
T04.75B-6-12	10/26/2024	Soil	T	6020B	Copper	mg/kg	33	J	0.19	^2	180-182003-26	180-182003-1
T04.75B-6-12	10/26/2024	Soil	T	6020B	Zinc	mg/kg	57	J	4.2		180-182003-26	180-182003-1
T04.75B-6-12	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.27	J	0.022		180-182003-26	180-182003-1
T07C-0-6	10/26/2024	Soil	T	6020B	Copper	mg/kg	560	J	1.2	^2	180-182003-27	180-182003-1
T07C-0-6	10/26/2024	Soil	T	6020B	Zinc	mg/kg	160	J	5.1		180-182003-27	180-182003-1
T07C-0-6	10/26/2024	Soil	T	7471A	Mercury	mg/kg	2.4	J	0.13	H	180-182003-27	180-182003-1
T07C-6-12	10/26/2024	Soil	T	6020B	Copper	mg/kg	100	J	0.17	^2	180-182003-28	180-182003-1
T07C-6-12	10/26/2024	Soil	T	6020B	Zinc	mg/kg	100	J	3.8		180-182003-28	180-182003-1
T07C-6-12	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.63	J	0.025		180-182003-28	180-182003-1
T07C-0-12	10/26/2024	Soil	T	9045D	pH	SU	7.9	J	0.1	HF	180-182003-29	180-182003-1
T07C-0-12	10/26/2024	Soil	T	9045D	Temperature	deg c	20.9	J	0.1	HF	180-182003-29	180-182003-1
T07C-0-12	10/26/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	30000	J	1300	F1F2	180-182003-29	180-182003-1
T07.5D-0-6	10/22/2024	Soil	T	6020B	Copper	mg/kg	410	J	1.1		180-182003-3	180-182003-1
T07.5D-0-6	10/22/2024	Soil	T	6020B	Zinc	mg/kg	150	J	4.9		180-182003-3	180-182003-1
T07.5D-0-6	10/22/2024	Soil	T	7471A	Mercury	mg/kg	2.5	J	0.13		180-182003-3	180-182003-1
T04.75C-0-6	10/26/2024	Soil	T	6020B	Copper	mg/kg	1600	J	11		180-182003-30	180-182003-1
T04.75C-0-6	10/26/2024	Soil	T	6020B	Zinc	mg/kg	280	J	24		180-182003-30	180-182003-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T04.75C-0-6	10/26/2024	Soil	T	7471A	Mercury	mg/kg	5.4	J	0.25		180-182003-30	180-182003-1
T04.75C-0-12	10/26/2024	Soil	T	9045D	pH	SU	8.3	J	0.1	HF	180-182003-31	180-182003-1
T04.75C-0-12	10/26/2024	Soil	T	9045D	Temperature	deg c	20.9	J	0.1	HF	180-182003-31	180-182003-1
T04.75C-0-12	10/26/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	35000	J	1300		180-182003-31	180-182003-1
DUP-04	10/26/2024	Soil	T	9045D	pH	SU	7.2	J	0.1	HF	180-182003-32	180-182003-1
DUP-04	10/26/2024	Soil	T	9045D	Temperature	deg c	20.9	J	0.1	HF	180-182003-32	180-182003-1
T05C-0-6	10/26/2024	Soil	T	6020B	Copper	mg/kg	150	J	0.16	F1	180-182003-33	180-182003-1
T05C-0-6	10/26/2024	Soil	T	6020B	Zinc	mg/kg	100	J	3.5		180-182003-33	180-182003-1
T05C-0-6	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.93	J	0.047	F2	180-182003-33	180-182003-1
T05C-6-12	10/26/2024	Soil	T	6020B	Copper	mg/kg	110	J	0.18	^2	180-182003-34	180-182003-1
T05C-6-12	10/26/2024	Soil	T	6020B	Zinc	mg/kg	96	J	3.9		180-182003-34	180-182003-1
T05C-6-12	10/26/2024	Soil	T	7471A	Mercury	mg/kg	1.2	J	0.049		180-182003-34	180-182003-1
T05C-0-12	10/26/2024	Soil	T	9045D	pH	SU	7.7	J	0.1	HF	180-182003-35	180-182003-1
T05C-0-12	10/26/2024	Soil	T	9045D	Temperature	deg c	20.8	J	0.1	HF	180-182003-35	180-182003-1
T05C-0-12	10/26/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	17000	J	1200	F1	180-182003-35	180-182003-1
DUP-05	10/26/2024	Soil	T	6020B	Copper	mg/kg	130	J	0.19	^2	180-182003-36	180-182003-1
DUP-05	10/26/2024	Soil	T	6020B	Zinc	mg/kg	100	J	4.2		180-182003-36	180-182003-1
DUP-05	10/26/2024	Soil	T	7471A	Mercury	mg/kg	1.7	J	0.050		180-182003-36	180-182003-1
T06C-0-6	10/27/2024	Soil	T	6020B	Copper	mg/kg	580	J	0.83	^2	180-182003-37	180-182003-1
T06C-0-6	10/27/2024	Soil	T	6020B	Zinc	mg/kg	180	J	19		180-182003-37	180-182003-1
T06C-0-6	10/27/2024	Soil	T	7471A	Mercury	mg/kg	2.4	J	0.13		180-182003-37	180-182003-1
T06C-0-12	10/27/2024	Soil	T	9045D	pH	SU	8.1	J	0.1	HF	180-182003-38	180-182003-1
T06C-0-12	10/27/2024	Soil	T	9045D	Temperature	deg c	20.8	J	0.1	HF	180-182003-38	180-182003-1
T07.5D-6-12	10/22/2024	Soil	T	6020B	Copper	mg/kg	61	J	0.16		180-182003-4	180-182003-1
T07.5D-6-12	10/22/2024	Soil	T	6020B	Zinc	mg/kg	69	J	3.6		180-182003-4	180-182003-1
T07.5D-6-12	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.29	J	0.024		180-182003-4	180-182003-1
T07.5D-0-12	10/22/2024	Soil	T	9045D	pH	SU	7.9	J	0.1	HF	180-182003-5	180-182003-1
T07.5D-0-12	10/22/2024	Soil	T	9045D	Temperature	deg c	20.3	J	0.1	HF	180-182003-5	180-182003-1
T07.5E-0-6	10/22/2024	Soil	T	6020B	Copper	mg/kg	30	J	0.20		180-182003-6	180-182003-1
T07.5E-0-6	10/22/2024	Soil	T	6020B	Zinc	mg/kg	75	J	4.4		180-182003-6	180-182003-1
T07.5E-0-6	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.13	J	0.024		180-182003-6	180-182003-1
T07.5E-0-12	10/22/2024	Soil	T	9045D	pH	SU	6.8	J	0.1	HF	180-182003-7	180-182003-1
T07.5E-0-12	10/22/2024	Soil	T	9045D	Temperature	deg c	20.2	J	0.1	HF	180-182003-7	180-182003-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T04.5A-0-6	10/23/2024	Soil	T	6020B	Copper	mg/kg	26	J	0.16		180-182003-8	180-182003-1
T04.5A-0-6	10/23/2024	Soil	T	6020B	Zinc	mg/kg	75	J	3.6		180-182003-8	180-182003-1
T04.5A-6-12	10/23/2024	Soil	T	6020B	Copper	mg/kg	30	J	0.16		180-182003-9	180-182003-1
T04.5A-6-12	10/23/2024	Soil	T	6020B	Zinc	mg/kg	88	J	3.7		180-182003-9	180-182003-1

Notes:
^+ = Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
deg c = degree Celsius
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.
F1 = Matrix spike and/or matrix spike duplicate recovery exceeds control limits.
F2 = Matrix spike/matrix spike duplicate relative percent difference exceeds control limits.
J (laboratory qualifier) = Result is less than the reporting limit but greater than or equal to the method detection limit 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 = milligram per kilogram
SDG = sample delivery group
SU = standard unit
T = Total
U (laboratory qualifier) = Not detected at a concentration equal to or greater than the quantitation limit
U (validation qualifier) = 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.

EHS Support Validation Report Number: 799

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG):

180-182004-1

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

Report Date:

January 24, 2025

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Appendix

1 Sample and Analytical Protocol Summary

Equipment blanks 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
  - 7470A for mercury
  - 9040C for pH
  - 9060A for total organic carbon

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
180-182004-1	180-182004-1	EQB01-20241022	Water	10/22/2024	X	X
180-182004-1	180-182004-2	EQB02-20241023	Water	10/23/2024	X	X
180-182004-1	180-182004-3	EQB03-20242024	Water	10/24/2024	X	X
180-182004-1	180-182004-4	EQB04-20241025	Water	10/25/2024	X	X
180-182004-1	180-182004-5	EQB05-20241026	Water	10/26/2024	X	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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 technical guidance (NYSDEC, 2010), 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 relinquishing date/time and receiving date/time is assumed to be associated with sample shipment. 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 by Method 6010/6020	Water	pH less than 2	180 days
Mercury by Method 7470	Water	pH less than 2	28 days

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.

Tune reports were not included in the laboratory report. This did not lead to any result qualification. The samples included in this SDG are equipment blanks that are used to assess results for soil samples in SDGs 180-181919-1 and 180-182003-1.

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.

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.

Results for method blanks and instrument blanks in this data set were non-detect. The samples in this data set are equipment blanks that are associated with samples in SDGs 180-181919-1 and 180-182003-1.

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—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.

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.

Not applicable – no laboratory duplicate analysis performed on a sample in this data set was reported.

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 is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results 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 performed on a sample in this data set was reported.

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

Not applicable – no field duplicates were included in this SDG.

3.12 Additional Notes

Sample results associated with linear range check (LRC) recoveries outside control limits are listed in **Table 4**:

Table 4 Observed Linear Range Check Standard Nonconformances – Metals

LRC Sample ID	Analyte	LRC Recovery	Associated Samples
410-579341/8	Selenium	82%	180-182004-2 180-182004-4 180-182004-5

Sample results associated with noncompliant linear range check recoveries are qualified in accordance with **Table 5**:

Table 5 Linear Range Check Standard Nonconformance Actions – Metals

Quality Control Nonconformance	Sample Result	Sample Result Qualification [a]
Recovery is greater than upper acceptance limit.	Non-detect	No Action
	Detect	J
Recovery is less than the lower acceptance limit.	Non-detect	UJ
	Detect	J

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

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 6**.

Table 6 Preservation and Holding Time Requirements – General Chemistry

Method	Matrix	Preservation	Holding Time
Total organic carbon by Method 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

Note:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 7**.

Table 7 Observed Preservation and/or Holding Time Nonconformances – General Chemistry

Sample	Analysis	Holding Time	Observed Holding Time
180-182004-1 – 180-182004-5	pH	15 minutes	6–28 days

The samples in **Table 7** have been qualified as shown in **Table 8**:

Table 8 Preservation and Holding Time Nonconformance Actions – General Chemistry

Quality Control Nonconformance	Qualification [a]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2× holding time.	J	UJ
Technical holding time exceeded; analysis performed in more than 2× holding time.	J	R

Note:
[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:

- Calibration curves exhibited acceptable correlation coefficients or correlation factors.
- Initial and continuing calibration verification results were within 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.

Results for the method blank and instrument blanks in this data set were non-detect. The samples in this data set are equipment blanks that are associated with samples in SDGs 180-181919-1 and 180-182003-1.

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.

Laboratory duplicate analysis of total organic carbon was performed on one sample in this SDG; parent and duplicate results were non-detect.

4.7 Field Duplicates

Not applicable – no field duplicates were included in this SDG.

4.8 Additional Notes

Not applicable – no additional notes to report.

Amy Coats

Validation performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. (2010, May 3). DER-10: Technical Guidance for Site Investigation and Remediation. https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

United States Environmental Protection Agency. (2017, January). National Functional Guidelines for Inorganic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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
EQB01-20241022	10/22/2024	Water	T	9040C	pH	SU	5.5	J	0.1	HF	180-182004-1	180-182004-1
EQB02-20241023	10/23/2024	Water	T	6020B	Selenium	µg/L	0.28	UJ	0.28	U	180-182004-2	180-182004-1
EQB02-20241023	10/23/2024	Water	T	9040C	pH	SU	5.4	J	0.1	HF	180-182004-2	180-182004-1
EQB03-20242024	10/24/2024	Water	T	9040C	pH	SU	5.5	J	0.1	HF	180-182004-3	180-182004-1
EQB04-20241025	10/25/2024	Water	T	6020B	Selenium	µg/L	0.28	UJ	0.28	U	180-182004-4	180-182004-1
EQB04-20241025	10/25/2024	Water	T	9040C	pH	SU	5.6	J	0.1	HF	180-182004-4	180-182004-1
EQB05-20241026	10/26/2024	Water	T	6020B	Selenium	µg/L	0.28	UJ	0.28	U	180-182004-5	180-182004-1
EQB05-20241026	10/26/2024	Water	T	9040C	pH	SU	5.3	J	0.1	HF	180-182004-5	180-182004-1

Notes:
µg/L = microgram per liter
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 reporting limit but greater than or equal to the method detection limit 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.
SDG = sample delivery group
SU = standard unit
T = Total
U (laboratory qualifier) = Not detected at a concentration equal to or greater than the quantitation limit
U (validation qualifier) = 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.

EHS Support Validation Report Number: 819

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Group (SDG): 180-181919-2

Analyses: Metals

Review Level: Data Usability Summary Report (DUSR)

Analyses performed by:
Eurofins Lancaster Laboratories Environment Testing
Lancaster, Pennsylvania

EHS Support

Report Date:

April 22, 2025

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Appendix

1 Sample and Analytical Protocol Summary

Sediment 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
  - 7471A for mercury

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
180-181919-2	180-181919-5	T07.5D-24-36	Sediment	10/22/2024	X
180-181919-2	180-181919-25	T04.5B-24-36	Sediment	10/24/2024	X
180-181919-2	180-181919-20	T03Z-24-36	Sediment	10/24/2024	X
180-181919-2	180-181919-38	T07C-24-36	Sediment	10/26/2024	X
180-181919-2	180-181919-41	T04.75C-24-36	Sediment	10/26/2024	X
180-181919-2	180-181919-43	T05C-24-36	Sediment	10/26/2024	X

Notes:
Gen chem = general chemistry
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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance (NYSDEC, 2010), laboratory analytical methods, and professional judgment. It was assumed 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 receiving date/time is assumed to be associated with sample shipment. It is assumed that custody was maintained. No notes were encountered that indicated 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**. Acceptance criteria for 6020 field samples were met.

Table 3 Preservation and Holding Time Requirements—Metals

Method	Matrix	Preservation	Holding Time
Metals (except mercury and hexavalent chromium) by Method 6020	Soil/sediment	None	180 days
Mercury by Method 7471	Soil/sediment	Less than or equal to 6°C	28 days

Notes:
°C = degree Celsius

Analyses performed outside of specified holding times are listed in **Table 4**. The laboratory narrative states, "The samples in this report were released from hold by the client on December 4, 2024. The Mercury was outside the holding time at the time of the request. The data was reported and flagged."

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

Sample	Analysis	Holding Time	Observed Holding Time
180-81919-5	Method 7471	28 days	52 days
180-81919-20			49 days
180-81919-25			53 days
180-81919-38			52 days
180-81919-41			51 days
180-81919-43			48 days

Results for the samples in **Table 4** have been qualified as shown in **Table 5**.

Table 5 Preservation and Holding Time Nonconformance Actions–Metals

Quality Control Nonconformance	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

Notes:
[1] See **Table 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.

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[1] full width at 10% peak height."[2]
- "Resolution < 0.9 amu full width at 10% peak height."[3]

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.

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.

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.

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[1] u = unified atomic mass unit

[2] USEPA. (2014, July). Method 6020B (SW-846): Inductively Coupled Plasma—Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. https://19january2021snapshot.epa.gov/sites/static/files/2015-12/documents/6020b.pdf

[3] Department of Defense and Department of Energy. (2021). Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Appendix B, Table B-9. https://www.denix.osd.mil/edqw/denix-files/sites/43/2021/10/QSM-Version-5.4-FINAL.pdf

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. Common types of blanks include the following:

- 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 calibration blanks and laboratory method 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

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 (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 analysis was performed on sample 180-187919-38 for Method 7471. 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.

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 duplicate analysis was performed on sample 180-181919-38 for Method 7471. The relationship between parent and duplicate results for mercury failed to meet lab criteria but met the criteria applied during validation and is therefore 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 5x 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 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 five-fold dilution, then the calculated results are compared. Serial dilution analysis is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results 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 performed on a sample in this data set was reported.

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 internal standards.

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

3.11 Field Duplicates

Not applicable—no field duplicate sample was submitted in this SDG.

3.12 Additional Notes

Linear range check standards were analyzed and their recoveries were within control limits.

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

Percent moisture analysis was performed for the following samples: 180-181919-5, 180-181919-20, 180-181919-25, 180-181919-38, 180-181919-41, and 180-181919-43. 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.

Method 6020 data were reported from dilutions for the following samples: 180-181919-5, 180-181919-20, 180-181919-25, 180-181919-38, 180-181919-41, and 180-181919-43.

Validation performed by: Maria Melendez
EHS Support LLC

Peer review performed by: Amy Coats
EHS Support LLC

4 References

New York State Department of Environmental Conservation. (2010, May 3). *DER-10: Technical Guidance for Site Investigation and Remediation*. Office of Remediation and Materials Management. https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

United States Environmental Protection Agency. (2017, January). *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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
T03Z-24-36	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.039	J	0.023	JH	180-181919-20	180-181919-2
T04.5B-24-36	10/24/2024	Soil	T	7471A	Mercury	mg/kg	0.059	J	0.023	JH	180-181919-25	180-181919-2
T07A-24-36	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.11	J	0.025	H	180-181919-38	180-181919-2
T04.75C-24-36	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.25	J	0.025	H	180-181919-41	180-181919-2
T05C-24-36	10/26/2024	Soil	T	7471A	Mercury	mg/kg	0.15	J	0.025	H	180-181919-43	180-181919-2
T07.5D-24-36	10/22/2024	Soil	T	7471A	Mercury	mg/kg	0.14	J	0.023	H	180-181919-5	180-181919-2

Notes:
H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
J (laboratory qualifier) = Result is less than the reporting limit but greater than or equal to the method detection limit, 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
T = total

EHS Support Validation Report Number: 820

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Groups (SDGs):
180-184321-1 and 180-184336-1
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

EHS Support

Report Date:

April 24, 2025

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Appendix

1 Sample and Analytical Protocol Summary

Sediment 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
  - 7470A/7471A for mercury
  - 9040C/ 9045D for pH and temperature
  - 9060A for total organic carbon in aqueous samples
- The Lloyd Kahn Method for total organic carbon in sediment samples

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	Analysis	
					Metals	Gen Chem
180-184336-1	180-184336-1	T10A-24-36	Sediment	12/12/2024	X	
180-184336-1	180-184336-2	T10B-24-36	Sediment	12/12/2024	X	
180-184336-1	180-184336-3	T03.75A-0-6	Sediment	12/13/2024	X	
180-184336-1	180-184336-4	T03.75A-0-12	Sediment	12/13/2024		X
180-184336-1	180-184336-5	DUP01	Sediment	12/14/2024	X	
180-184336-1	180-184336-6	T03.75B-0-6	Sediment	12/13/2024	X	
180-184336-1	180-184336-7	T03.75B-6-12	Sediment	12/13/2024	X	
180-184336-1	180-184336-8	T03.75B-0-12	Sediment	12/13/2024		X
180-184336-1	180-184336-9	T03.5C-0-6	Sediment	12/14/2024	X	
180-184336-1	180-184336-10	T03.5C-6-12	Sediment	12/14/2024	X	
180-184336-1	180-184336-11	T03.5C-0-12	Sediment	12/14/2024		X
180-184336-1	180-184336-12	T03.5D-0-6	Sediment	12/14/2024	X	
180-184336-1	180-184336-13	T03.5D-6-12	Sediment	12/14/2024	X	
180-184336-1	180-184336-14	T03.5D-0-12	Sediment	12/14/2024		X
180-184336-1	180-184336-15	DUP03	Sediment	12/14/2024		X
180-184336-1	180-184336-16	T10Z-0-6	Sediment	12/14/2024	X	
180-184336-1	180-184336-17	T10Z-6-12	Sediment	12/14/2024	X	

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

SDG	Lab Sample ID	Field Sample ID	Sample Matrix	Sample Collection Date	Analysis	
					Metals	Gen Chem
180-184336-1	180-184336-18	T10Z-12-24	Sediment	12/14/2024	X	
180-184336-1	180-184336-19	T10Z-24-36	Sediment	12/14/2024	X	
180-184336-1	180-184336-20	T10Z-0-12	Sediment	12/14/2024		X
180-184336-1	180-184336-21	T01Z-0-6	Sediment	12/14/2024	X	
180-184336-1	180-184336-22	T01Z-6-12	Sediment	12/14/2024	X	
180-184336-1	180-184336-23	T01Z-0-12	Sediment	12/14/2024		X
180-184321-1	180-184321-1	EQB01-20241212	Water	12/12/2024	X	X
180-184321-1	180-184321-2	EQB02-20241213	Water	12/13/2024	X	X
180-184321-1	180-184321-3	EQB03-20241214	Water	12/14/2024	X	X
180-184321-1	180-184321-4	EQB04-20241215	Water	12/15/2024	X	X

Notes:
Gen chem = general chemistry
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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 technical guidance (NYSDEC, 2010), laboratory analytical methods, and professional judgment. It is assumed 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 chains of custody were properly completed; the gaps between relinquishing date/time and receiving date/time are assumed to be associated with sample shipment. 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 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 Method 6010/6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by Method 7470	Water	HNO_3 to pH less than 2	28 days
Mercury by Method 7471	Soil	Less than or equal to 6°C	28 days

Notes:
°C = degree Celsius
HNO_3 = nitric acid

Acceptance criteria for 6020 and 7470 field samples were met. Analyses performed outside of specified holding times are listed in **Table 4**. The laboratory narrative states, "The following samples were analyzed outside of analytical holding time by two to four days for Mercury due to laboratory error: T10A-24-36 (180-184336-1), T03.75A-0-6 (180-184336-3), T03.5C-6-12 (180-184336-10), T03.5D-6-12 (180-184336-13), T10Z-0-6 (180-184336-16), T10Z-6-12 (180-184336-17) and T01Z-0-6 (180-184336-21)."

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

Sample	Analysis	Technical Holding Time	Observed Holding Time
180-184336-1	Method 7471	28 days	33 days
180-184336-3			32 days
180-184336-10 180-184336-13 180-184336-16 180-184336-17 180-184336-21			31 days

Results for the samples in **Table 4** have been qualified as shown in **Table 5**.

Table 5 Preservation and Holding Time Nonconformance Actions–Metals

Quality Control Nonconformance	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

Notes:
[(1)] See **Table 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.

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]

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

[2] u = unified atomic mass unit

[3] USEPA. (2014, July). Method 6020B (SW-846): Inductively Coupled Plasma—Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. https://19january2021snapshot.epa.gov/sites/static/files/2015-12/documents/6020b.pdf

[4] Department of Defense and Department of Energy. (2021). Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. https://www.denix.osd.mil/edqw/denix-files/sites/43/2021/10/QSM-Version-5.4-FINAL.pdf

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. No detections were reported from the laboratory method blank or instrument blanks associated with field sample results in this data set. Please note that blank samples are not qualified due to contamination observed in other blanks. Sample 180-184321-3 is an equipment blank whose copper result bears a "B" flag from the laboratory because the sample was associated with method blank contamination. That laboratory flag has not been deleted or modified.

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

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/matrix spike duplicate analysis was performed on sample 180-1804336-6. 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	
180-1804336-6	Copper	Acceptable	138 percent	Greater than upper acceptance limit
180-1804336-6	Selenium	Acceptable	Acceptable	Greater than upper acceptance limit
180-1804336-6	Zinc	60 percent	72 percent	Acceptable
180-1804336-6	Mercury	Acceptable	Acceptable	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 were applied to results for the listed metals in all samples in SDG 180-184336-1 (**Table 7**).

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

Quality Control Nonconformance	Sample Result	Qualification[1]
%R: • 30–74 percent for most metals, including mercury • 20–74 percent for silver, antimony	Non-detect	UJ
	Detect	J
%R: • Less than 30 percent for most metals, including mercury • Less than 20 percent for silver, 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
		R
	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 is greater than the upper acceptance limit	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 8**) were met. Laboratory duplicate analysis was performed on sample 180-184336-6. The relationship between selenium results was outside laboratory limits but all relationships met the criteria applied during validation and are 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 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 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 five-fold dilution, then the calculated results are compared. Serial dilution analysis is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results 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 180-184336-6.

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 9**) were met. One parent sample-field duplicate sample pair was included in this data set and designated for metals analyses.

Table 9 Acceptable Parent Sample-Field Duplicate Relationships–Metals

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 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/ sediment)

Parent Sample-Field Duplicate Sample Concentrations	Difference
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

A linear range check sample was analyzed. Sample results associated with linear range check recoveries outside control limits are listed in **Table 10**.

Table 10 Observed Linear Range Check Nonconformances–Metals

Linear Range Check Sample ID	Analyte	Recovery	Associated Samples
LRC 410-590551/8	Selenium	78 percent	180-184321-3

Sample results associated with non-compliant linear range check sample recoveries are qualified in accordance with **Table 11**.

Table 11 Linear Range Nonconformance Actions–Metals

Quality Control Nonconformance	Sample Result	Sample Result Qualification[(1)]
Linear range check sample recovery is greater than 110 percent	Non-detect	No Action
	Detect	J
Linear range check sample recovery is less than 90 percent but greater than or equal to 50 percent	Non-detect	UJ
	Detect	J
Linear range check sample recovery is less than 50 percent	Non-detect	R
	Detect	J

Notes:
[(1)] See **Table 2** for qualifier definitions.

Samples in SDG 180-184336-1 are soil samples; they were analyzed for percent solids. 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.

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

Method 6020 data was reported from dilutions for the following samples: 180-184336-1, 180-184336-2, 180-184336-3, 180-184336-5, 180-184336-6, 180-184336-7, 180-184336-9, 180-184336-10, 180-

184336-12, 180-184336-13, 180-184336-16, 180-184336-17, 180-184336-18, 180-184336-19, 180-184336-21, and 180-184336-22.

Mercury results were reported from dilutions for samples 180-184336-1 and 180336-2.

4 General Chemistry Analysis

4.1 Preservation and Holding Times

Relevant preservation and holding time requirements are presented in **Table 12**.

Table 12 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
pH by Method 9040	Water	Less than or equal to 6°C	15 minutes
Total organic carbon by Method 9060A	Water	Less than or equal to 6°C	28 days
Total organic carbon by The Lloyd Kahn Method	Soil/ Sediment	Less than or equal to 6°C	14 days

Notes:
°C = degree Celsius

Analyses performed outside of the specified holding times are listed in **Table 13**.

Table 13 Observed Holding Time Nonconformances–General Chemistry

Samples	Analysis	Holding Time	Observed Holding Time
180-184336-4 180-184336-8 180-184336-11 180-184336-14 180-184336-15 180-184336-20	pH by Method 9045	7 days	17–18 days
	Temperature by Method 9045	15 minutes	
180-184321-1 180-184321-2 180-184321-3 180-184321-4	pH by Method 9040	15 minutes	6–15 days

The samples listed in **Table 13** have been qualified as shown in **Table 14**.

Table 14 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

Notes:
[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 initial calibration verification and continuing calibration verification results were within 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 total organic carbon were non-detect in the method blanks, equipment blanks, and calibration blanks in this data set.

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/matrix spike duplicate analysis was performed on sample 180-184336-11 and matrix spike analysis was performed on equipment blank 180-184321-1 for total organic carbon. Matrix spike analyses performed on equipment blanks are not evaluated because they do not provide information about field sample matrix effects. Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 15**. 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 15 Observed Matrix Spike/Matrix Spike Duplicate Nonconformances–General Chemistry

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-184336-11	Total organic carbon	Less than 30 percent	Less than 30 percent	NA

Notes:
NA = Not applicable (when a recovery is significantly low, that recovery determines the relevant result qualification. In these cases, the relative percent difference is of no consequence).

Because of these excursions, the total organic carbon result for sample 180-184336-11 has been qualified in accordance with **Table 16**.

Table 16 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

Recovery	Sample Result	Qualification[1]
	Detect	J
Matrix spike percent recovery is greater than 125 percent	Non-detect	No Action
	Detect	J

Notes:
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 17**) were met. Laboratory duplicate analysis was performed on sample 180-184336-23 for percent moisture, and on sample 180-184336-11 for pH and temperature. Sample 180-184321-2 was also used for laboratory duplicate analysis; however, laboratory duplicate analyses performed on equipment blanks are not evaluated because they do not provide information about field sample matrix effects.

Table 17 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 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 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 18**) were met. One parent sample-field duplicate sample pair was included in this data set and designated for general chemistry analyses.

Table 18 Acceptable Parent Sample-Field Duplicate Relationships–General Chemistry

Parent Sample and 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 percent (aqueous) **or** • Relative percent difference is less than or equal to 50 percent (soil/sediment)

Parent Sample and Field Duplicate Sample Concentrations	Difference
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)

4.1 Additional Notes

Samples in SDG 180-184336-1 are soil samples; they were analyzed for percent solids. 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.

Validation performed by: Maria Melendez
EHS Support LLC

Peer review performed by: Amy Coats
EHS Support LLC

5 References

New York State Department of Environmental Conservation. (2010, May 3). *DER-10: Technical Guidance for Site Investigation and Remediation*. https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

United States Environmental Protection Agency. (2017, January). *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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
EQB01-20241212	12/12/2024	Water	T	9040C	pH	SU	5.6	J	0.1	HF	180-184321-1	180-184321-1
EQB02-20241213	12/13/2024	Water	T	9040C	pH	SU	5.3	J	0.1	HF	180-184321-2	180-184321-1
EQB03-20241214	12/14/2024	Water	T	9040C	pH	SU	5.3	J	0.1	HF	180-184321-3	180-184321-1
EQB04-20241215	12/15/2024	Water	T	9040C	pH	SU	5.6	J	0.1	HF	180-184321-4	180-184321-1
T10A-24-36	12/12/2024	Soil	T	6020B	Copper	mg/kg	300	J	0.20		180-184336-1	180-184336-1
T10A-24-36	12/12/2024	Soil	T	6020B	Selenium	mg/kg	0.51	J	0.11		180-184336-1	180-184336-1
T10A-24-36	12/12/2024	Soil	T	6020B	Zinc	mg/kg	99	J	4.4		180-184336-1	180-184336-1
T10A-24-36	12/12/2024	Soil	T	7471A	Mercury	mg/kg	9.2	J	0.28	H	180-184336-1	180-184336-1
T03.5C-6-12	12/14/2024	Soil	T	6020B	Copper	mg/kg	31	J	0.15		180-184336-10	180-184336-1
T03.5C-6-12	12/14/2024	Soil	T	6020B	Zinc	mg/kg	70	J	3.4		180-184336-10	180-184336-1
T03.5C-6-12	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.14	J	0.022	H	180-184336-10	180-184336-1
T03.5C-0-12	12/14/2024	Soil	T	9045D	pH	SU	8.4	J	0.1	HF	180-184336-11	180-184336-1
T03.5C-0-12	12/14/2024	Soil	T	9045D	Temperature	deg C	18.7	J	0.1	HF	180-184336-11	180-184336-1
T03.5C-0-12	12/14/2024	Soil	T	Lloyd Kahn	Total Organic Carbon	mg/kg	17000	J	1200	F1	180-184336-11	180-184336-1
T03.5D-0-6	12/14/2024	Soil	T	6020B	Copper	mg/kg	28	J	0.25		180-184336-12	180-184336-1
T03.5D-0-6	12/14/2024	Soil	T	6020B	Zinc	mg/kg	90	J	5.6		180-184336-12	180-184336-1
T03.5D-6-12	12/14/2024	Soil	T	6020B	Copper	mg/kg	34	J	0.16		180-184336-13	180-184336-1
T03.5D-6-12	12/14/2024	Soil	T	6020B	Selenium	mg/kg	0.41	J	0.088		180-184336-13	180-184336-1
T03.5D-6-12	12/14/2024	Soil	T	6020B	Zinc	mg/kg	75	J	3.5		180-184336-13	180-184336-1
T03.5D-6-12	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.17	J	0.024	H	180-184336-13	180-184336-1
T03.5D-0-12	12/14/2024	Soil	T	9045D	pH	SU	7.8	J	0.1	HF	180-184336-14	180-184336-1
T03.5D-0-12	12/14/2024	Soil	T	9045D	Temperature	deg C	19.1	J	0.1	HF	180-184336-14	180-184336-1
DUP03	12/14/2024	Soil	T	9045D	pH	SU	7.8	J	0.1	HF	180-184336-15	180-184336-1
DUP03	12/14/2024	Soil	T	9045D	Temperature	deg c	19	J	0.1	HF	180-184336-15	180-184336-1
T10Z-0-6	12/14/2024	Soil	T	6020B	Copper	mg/kg	11	J	0.17		180-184336-16	180-184336-1
T10Z-0-6	12/14/2024	Soil	T	6020B	Zinc	mg/kg	64	J	3.7		180-184336-16	180-184336-1
T10Z-0-6	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.027	UJ	0.027	UH	180-184336-16	180-184336-1
T10Z-6-12	12/14/2024	Soil	T	6020B	Copper	mg/kg	11	J	0.21		180-184336-17	180-184336-1
T10Z-6-12	12/14/2024	Soil	T	6020B	Selenium	mg/kg	0.12	UJ	0.12	U	180-184336-17	180-184336-1
T10Z-6-12	12/14/2024	Soil	T	6020B	Zinc	mg/kg	47	J	4.7		180-184336-17	180-184336-1
T10Z-6-12	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.024	J	0.023	JH	180-184336-17	180-184336-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T10Z-12-24	12/14/2024	Soil	T	6020B	Copper	mg/kg	12	J	0.18		180-184336-18	180-184336-1
T10Z-12-24	12/14/2024	Soil	T	6020B	Selenium	mg/kg	0.1	UJ	0.10	U	180-184336-18	180-184336-1
T10Z-12-24	12/14/2024	Soil	T	6020B	Zinc	mg/kg	48	J	4.1		180-184336-18	180-184336-1
T10Z-12-24	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.023	UJ	0.023	U	180-184336-18	180-184336-1
T10Z-24-36	12/14/2024	Soil	T	6020B	Copper	mg/kg	16	J	0.16		180-184336-19	180-184336-1
T10Z-24-36	12/14/2024	Soil	T	6020B	Zinc	mg/kg	49	J	3.7		180-184336-19	180-184336-1
T10Z-24-36	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.021	UJ	0.021	U	180-184336-19	180-184336-1
T10B-24-36	12/12/2024	Soil	T	6020B	Copper	mg/kg	2200	J	10		180-184336-2	180-184336-1
T10B-24-36	12/12/2024	Soil	T	6020B	Selenium	mg/kg	1.1	J	0.12		180-184336-2	180-184336-1
T10B-24-36	12/12/2024	Soil	T	6020B	Zinc	mg/kg	440	J	23		180-184336-2	180-184336-1
T10B-24-36	12/12/2024	Soil	T	7471A	Mercury	mg/kg	10	J	0.30		180-184336-2	180-184336-1
T10Z-0-12	12/14/2024	Soil	T	9045D	pH	SU	7.6	J	0.1	HF	180-184336-20	180-184336-1
T10Z-0-12	12/14/2024	Soil	T	9045D	Temperature	deg C	19.1	J	0.1	HF	180-184336-20	180-184336-1
T01Z-0-6	12/14/2024	Soil	T	6020B	Copper	mg/kg	17	J	0.20		180-184336-21	180-184336-1
T01Z-0-6	12/14/2024	Soil	T	6020B	Selenium	mg/kg	0.52	J	0.11		180-184336-21	180-184336-1
T01Z-0-6	12/14/2024	Soil	T	6020B	Zinc	mg/kg	61	J	4.5		180-184336-21	180-184336-1
T01Z-0-6	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.083	J	0.026	H	180-184336-21	180-184336-1
T01Z-6-12	12/14/2024	Soil	T	6020B	Copper	mg/kg	20	J	0.20		180-184336-22	180-184336-1
T01Z-6-12	12/14/2024	Soil	T	6020B	Zinc	mg/kg	71	J	4.4		180-184336-22	180-184336-1
T01Z-0-12	12/14/2024	Soil	T	9045D	pH	SU	5.5	J	0.1	HF	180-184336-23	180-184336-1
T01Z-0-12	12/14/2024	Soil	T	9045D	Temperature	deg C	18.8	J	0.1	HF	180-184336-23	180-184336-1
T03.75A-0-6	12/13/2024	Soil	T	6020B	Copper	mg/kg	32	J	0.20		180-184336-3	180-184336-1
T03.75A-0-6	12/13/2024	Soil	T	6020B	Zinc	mg/kg	74	J	4.4		180-184336-3	180-184336-1
T03.75A-0-6	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.23	J	0.026	H	180-184336-3	180-184336-1
T03.75A-0-12	12/13/2024	Soil	T	9045D	pH	SU	8.2	J	0.1	HF	180-184336-4	180-184336-1
T03.75A-0-12	12/13/2024	Soil	T	9045D	Temperature	deg C	18.4	J	0.1	HF	180-184336-4	180-184336-1
DUP01	12/14/2024	Soil	T	6020B	Copper	mg/kg	41	J	0.22		180-184336-5	180-184336-1
DUP01	12/14/2024	Soil	T	6020B	Zinc	mg/kg	80	J	4.9		180-184336-5	180-184336-1
DUP01	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.2	J	0.025		180-184336-5	180-184336-1
T03.75B-0-6	12/13/2024	Soil	T	6020B	Copper	mg/kg	34	J	0.19	F1F2	180-184336-6	180-184336-1
T03.75B-0-6	12/13/2024	Soil	T	6020B	Selenium	mg/kg	0.44	J	0.11	F2	180-184336-6	180-184336-1
T03.75B-0-6	12/13/2024	Soil	T	6020B	Zinc	mg/kg	92	J	4.3	F1	180-184336-6	180-184336-1

Sample Name	Sample Date	Matrix	Fraction	Analytical Method	Analyte	Unit	Result Value	Interpreted Qualifier	Quantitation Limit Value	Lab Qualifier	Lab Sample ID	SDG
T03.75B-0-6	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.071	J	0.024	JF1F2	180-184336-6	180-184336-1
T03.75B-6-12	12/13/2024	Soil	T	6020B	Copper	mg/kg	41	J	0.20		180-184336-7	180-184336-1
T03.75B-6-12	12/13/2024	Soil	T	6020B	Zinc	mg/kg	83	J	4.3		180-184336-7	180-184336-1
T03.75B-6-12	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.2	J	0.023		180-184336-7	180-184336-1
T03.75B-0-12	12/13/2024	Soil	T	9045D	pH	SU	7.8	J	0.1	HF	180-184336-8	180-184336-1
T03.75B-0-12	12/13/2024	Soil	T	9045D	Temperature	deg C	18.3	J	0.1	HF	180-184336-8	180-184336-1
T03.5C-0-6	12/14/2024	Soil	T	6020B	Copper	mg/kg	25	J	0.19		180-184336-9	180-184336-1
T03.5C-0-6	12/14/2024	Soil	T	6020B	Zinc	mg/kg	80	J	4.3		180-184336-9	180-184336-1

Notes:
deg C = degrees Celsius
F1 = Matrix spike or matrix spike duplicate recovery exceeds control limits.
F2 = Matrix spike/matrix spike duplicate relative percent difference 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 reporting limit but greater than or equal to the method detection limit, 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 unit
T = total
U (laboratory qualifier) = Not detected at a concentration equal to or greater than the quantitation limit
U (validation qualifier) = 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.

EHS Support Validation Report Number: 821

Dyno Nobel Port Ewen Site
Port Ewen, New York

Sample Delivery Groups (SDGs): 180-184322-1 and 180-184322-3

Analyses: Metals

Review Level: Data Usability Summary Report (DUSR)

Analyses performed by:
Eurofins Lancaster Laboratories Environment Testing
Lancaster, Pennsylvania

EHS Support℠

Report Date:

April 24, 2025

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Appendix

1 Sample and Analytical Protocol Summary

Sediment 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
  - 7471A for mercury

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
180-184322-1	180-184322-1	T04D-24-36	Sediment	12/13/2024	X
180-184322-1	180-184322-2	T03.75A-6-12	Sediment	12/13/2024	X
180-184322-1	180-184322-3	T03.75A-12-24	Sediment	12/13/2024	X
180-184322-1	180-184322-5	DUP-02	Sediment	12/14/2024	X
180-184322-1	180-184322-6	T03.75B-12-24	Sediment	12/13/2024	X
180-184322-1	180-184322-8	T03.5C-12-24	Sediment	12/14/2024	X
180-184322-1	180-184322-10	T03.5D-12-24	Sediment	12/14/2024	X
180-184322-1	180-184322-12	T01Z-12-24	Sediment	12/14/2024	X
180-184322-1	180-184322-14	T01A-24-36	Sediment	12/15/2024	X
180-184322-1	180-184322-15	T01B-24-36	Sediment	12/15/2024	X
180-184322-1	180-184322-16	T02B-24-36	Sediment	12/15/2024	X
180-184322-3	180-184322-4	T03.75A-24-36	Sediment	12/13/2024	X
180-184322-3	180-184322-9	T03.5C-24-36	Sediment	12/14/2024	X
180-184322-3	180-184322-11	T03.5D-24-36	Sediment	12/14/2024	X

Notes:
Gen chem = general chemistry
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]), New York State Department of Environmental Conservation (NYSDEC) DER-10 technical guidance (NYSDEC, 2010), laboratory analytical methods, and professional judgment. It was assumed 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 relinquishing date/time and receiving date/time is assumed to be associated with sample shipment. 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 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 Method 6010/6020	Water	HNO_3 to pH less than 2	180 days
	Soil	None	180 days
Mercury by 7471	Soil	Less than or equal to 6°C	28 days

Notes:
°C = degree Celsius
HNO_3 = nitric acid

Method 6020 analyses were performed within the technical holding time. Analyses performed outside of specified holding times are listed in **Table 4**. Laboratory report narratives include the following statements:

- 180-184322-1: "The following samples were analyzed outside of analytical holding time by one to three days for Mercury due to laboratory error: T04D-24-36 (180-184322-1), T03.75A-6-12 (180-184322-2), T03.75B-12-24 (180-184322-6), T03.5C-12-24 (180-184322-8), T03.5C-12-24 (180-184322-8[MS]), T03.5C-12-24 (180-184322-8[MSD]), T03.5D-12-24 (180-184322-10), T01A-24-36 (180-184322-14) and T02B-24-36 (180-184322-16)."
- 180-184322-3: "The following samples were analyzed outside of analytical holding time for Mercury due to the request for analysis from the client was made after the holding time had expired: T03.75A-24-36 (180-184322-4), T03.5C-24-36 (180-184322-9), T03.5C-24-36 (180-184322-9[MS]), T03.5C-24-36 (180-184322-9[MSD]) and T03.5D-24-36 (180-184322-11)."

Table 4 Observed Holding Time Nonconformance–Metals

Sample	Analysis	Technical Holding Time	Observed Holding Time
180-184322-1 180-184322-2 180-184322-6 180-184322-8 180-184322-10 180-184322-14 180-184322-16	Method 7471	28 days	30–32 days
180-184322-4 180-184322-9 180-184322-11			41–48 days

Results for the samples in **Table 4** have been qualified as shown in **Table 5**.

Table 5 Holding Time Nonconformance Actions–Metals

Quality Control Nonconformance	Qualification[(1)]	
	Detected Analytes	Non-Detect Analytes
Technical holding time exceeded; analysis performed is less than or equal to 2x holding time	J	UJ
Technical holding time exceeded; analysis performed in more than 2x holding time	J	R

Notes:
[(1)] See **Table 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.

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[1] full width at 10% peak height."[2]
- "Resolution < 0.9 amu full width at 10% peak height."[3]

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.

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[1] u = unified atomic mass unit

[2] USEPA. (2014, July). Method 6020B (SW-846): Inductively Coupled Plasma—Mass Spectrometry, Revision 2, Section 10.1. Washington, DC. https://19january2021snapshot.epa.gov/sites/static/files/2015-12/documents/6020b.pdf

[3] Department of Defense and Department of Energy. (2021). Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.4, Table B-9. https://www.denix.osd.mil/edqw/denix-files/sites/43/2021/10/QSM-Version-5.4-FINAL.pdf

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 blank and instrument blanks in this data set 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

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/matrix spike duplicate analysis was performed on samples 180-184322-8 and 180-184322-9. Matrix spike recoveries and/or relative percent difference values outside control limits are presented in **Table 6**.

Table 6 Observed Matrix Spike Nonconformances–Metals

Sample ID	Analyte	Recovery		Matrix Spike/Matrix Spike Duplicate Relative Percent Difference
		Matrix Spike	Matrix Spike Duplicate	
180-184322-8	Copper	Less than 30 percent	Less than 30 percent	NA
	Mercury	143 percent	132 percent	Acceptable
180-184322-9	Copper	172 percent	167 percent	Acceptable
	Mercury	303 percent	361 percent %	Acceptable

Notes:
NA = Not applicable (when a recovery is significantly low, that recovery determines the relevant result qualification. In these cases, the relative percent difference is of no consequence).

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 to the results for listed metals in all samples in this data set (**Table 7**).

Table 7 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, antimony	Non-detect	UJ
	Detect	J
%R:	Non-detect	UJ if PDS %R is greater than or equal to 75 percent

QC Nonconformance	Sample Result	Qualification[1]
• Less than 30 percent for most metals, including mercury • Less than 20 percent for silver, antimony		R if PDS not performed or PDS %R is less than 75 percent
		R
	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 is greater than the upper acceptance limit	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 8**) were met. Laboratory duplicate analysis was performed on samples 180-184322-8 and 180-184322-9. The relationship between mercury results for 180-184322-9 was outside laboratory limits but all relationships met the criteria applied during validation and are 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 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 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 five-fold dilution, then the calculated results

are compared. Serial dilution analysis is evaluated for analytes that were detected in the original sample at concentrations sufficiently greater than the relevant quantitation limit. The results 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 180-184322-8 and 180-184322-9.

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 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 and 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 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 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

Linear range check standards were analyzed and their recoveries were within control limits.

Results reported at concentrations greater than the method detection limit but less than the reporting limit are considered estimated due to the inherent uncertainty associated with concentrations that are less than the reporting limit.

All data for method 6020 was reported from dilutions.

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.

Validation performed by: Maria Melendez
EHS Support LLC

Peer review performed by: Amy Coats
EHS Support LLC

4 References

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United States Environmental Protection Agency. (2017, January). *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. https://www.epa.gov/sites/default/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf

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
T04D-24-36	12/13/2024	Soil	T	6020B	Copper	mg/kg	41	J	0.22		180-184322-1	180-184322-1
T04D-24-36	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.73	J	0.025	H	180-184322-1	180-184322-1
T03.5D-12-24	12/14/2024	Soil	T	6020B	Copper	mg/kg	68	J	0.21		180-184322-10	180-184322-1
T03.5D-12-24	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.35	J	0.024	H	180-184322-10	180-184322-1
T03.5D-24-36	12/14/2024	Soil	T	6020B	Copper	mg/kg	330	J	0.18		180-184322-11	180-184322-3
T03.5D-24-36	12/14/2024	Soil	T	7471A	Mercury	mg/kg	4.2	J	0.13	H	180-184322-11	180-184322-3
T01Z-12-24	12/14/2024	Soil	T	6020B	Copper	mg/kg	33	J	0.22		180-184322-12	180-184322-1
T01A-24-36	12/15/2024	Soil	T	6020B	Copper	mg/kg	16	J	0.17		180-184322-14	180-184322-1
T01A-24-36	12/15/2024	Soil	T	7471A	Mercury	mg/kg	0.18	J	0.023	H	180-184322-14	180-184322-1
T01B-24-36	12/15/2024	Soil	T	6020B	Copper	mg/kg	39	J	0.19		180-184322-15	180-184322-1
T01B-24-36	12/15/2024	Soil	T	7471A	Mercury	mg/kg	0.098	J	0.024		180-184322-15	180-184322-1
T02B-24-36	12/15/2024	Soil	T	6020B	Copper	mg/kg	23	J	0.22		180-184322-16	180-184322-1
T02B-24-36	12/15/2024	Soil	T	7471A	Mercury	mg/kg	0.047	J	0.025	JH	180-184322-16	180-184322-1
T03.75A-6-12	12/13/2024	Soil	T	6020B	Copper	mg/kg	70	J	0.22		180-184322-2	180-184322-1
T03.75A-6-12	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.47	J	0.025	H	180-184322-2	180-184322-1
T03.75A-12-24	12/13/2024	Soil	T	6020B	Copper	mg/kg	130	J	0.21		180-184322-3	180-184322-1
T03.75A-12-24	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.84	J	0.025		180-184322-3	180-184322-1
T03.75A-24-36	12/13/2024	Soil	T	6020B	Copper	mg/kg	31	J	0.21		180-184322-4	180-184322-3
T03.75A-24-36	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.08	J	0.023	H	180-184322-4	180-184322-3
DUP-02	12/14/2024	Soil	T	6020B	Copper	mg/kg	110	J	0.19		180-184322-5	180-184322-1
DUP-02	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.51	J	0.023		180-184322-5	180-184322-1
T03.75B-12-24	12/13/2024	Soil	T	6020B	Copper	mg/kg	35	J	0.17		180-184322-6	180-184322-1
T03.75B-12-24	12/13/2024	Soil	T	7471A	Mercury	mg/kg	0.12	J	0.023	H	180-184322-6	180-184322-1
T03.5C-12-24	12/14/2024	Soil	T	6020B	Copper	mg/kg	210	J	0.20	F2F1	180-184322-8	180-184322-1
T03.5C-12-24	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.69	J	0.024	HF1	180-184322-8	180-184322-1
T03.5C-24-36	12/14/2024	Soil	T	6020B	Copper	mg/kg	30	J	0.19	F1	180-184322-9	180-184322-3
T03.5C-24-36	12/14/2024	Soil	T	7471A	Mercury	mg/kg	0.37	J	0.026	HF1	180-184322-9	180-184322-3

Notes:
H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
F1 = Matrix spike or matrix spike duplicate recovery exceeds control limits.
F2 = Matrix spike/matrix spike duplicate relative percent difference exceeds control limits.
J (laboratory qualifier) = Result is less than the reporting limit but greater than or equal to the method detection limit, 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 unit
T = total