

AEL environment presents

Ex Situ Bioremediation at a Large Hydrocarbon Contaminated Site



OVERVIEW

1. Site Background
2. Remediation
3. Results

SITE BACKGROUND



Site Background

Bulk Fuel Storage

- Kerosene (F2)
- Diesel (F2-F3)
- Bunker C (F2-F3)

1994 – Partially Decommissioned

- 11 tanks removed
- Underground pipes left in place



Site Background

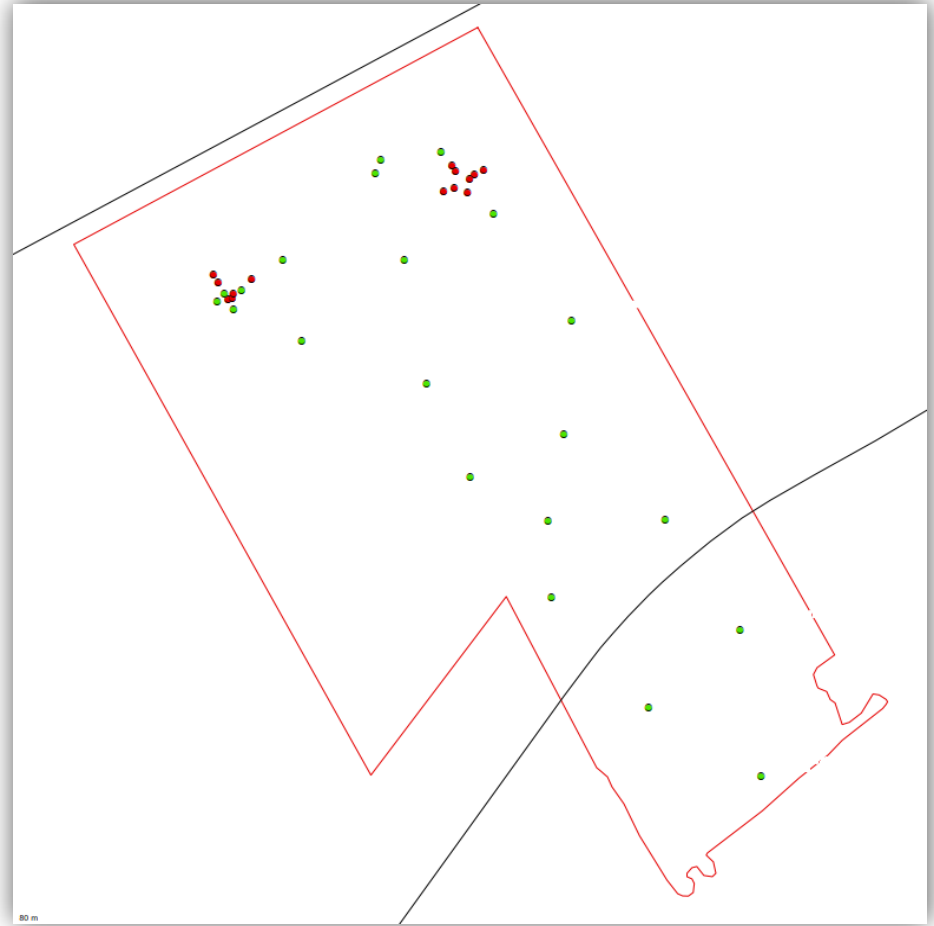
2017 – Initial Assessment

2021 – Delineation

Impacts seemed isolated to the north

- **PHCs (primarily F2)**
- **PAHs**
- **BTEX**

Clay Soil – Limited Migration?



Site Background

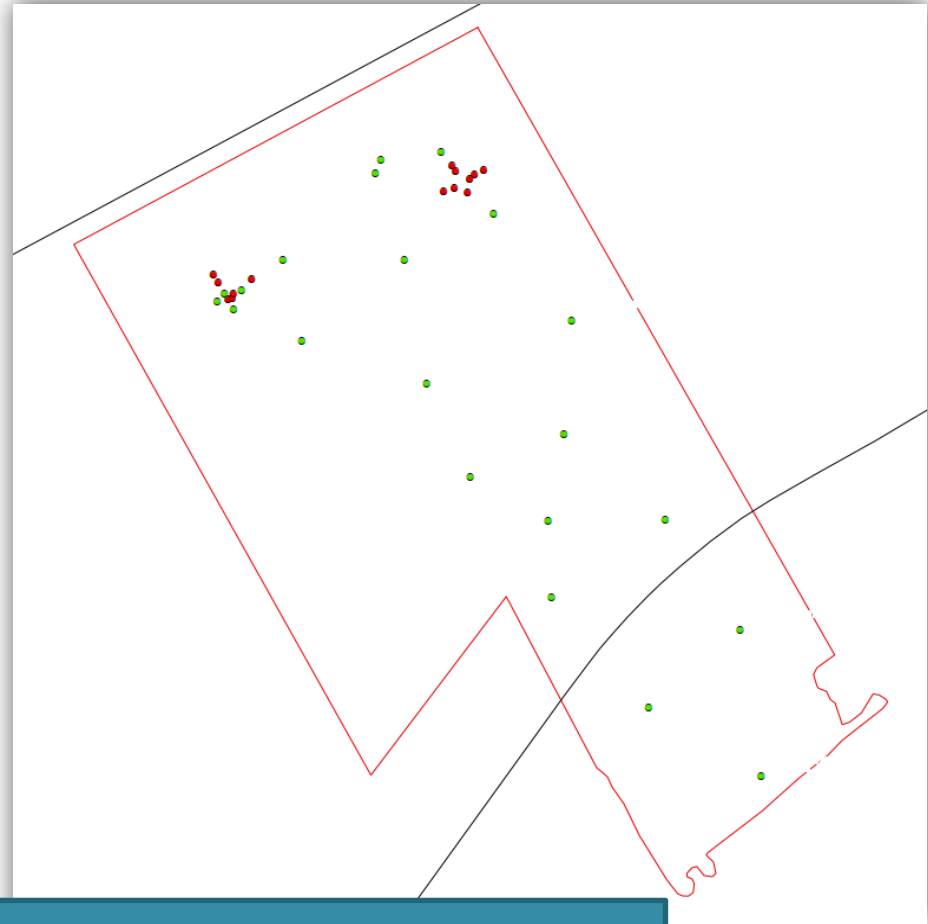
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Clay Soil – Limited Migration?



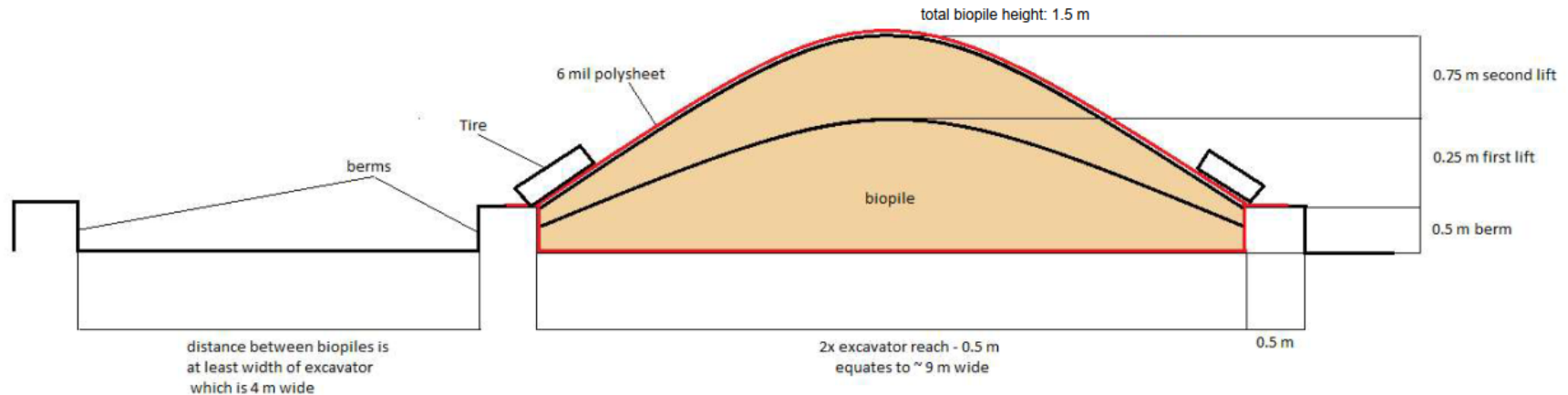
GOAL: Remediate to Criteria Specified in Terms of Sale

REMEDIATION

Remediation

Selected Remediation Approach:

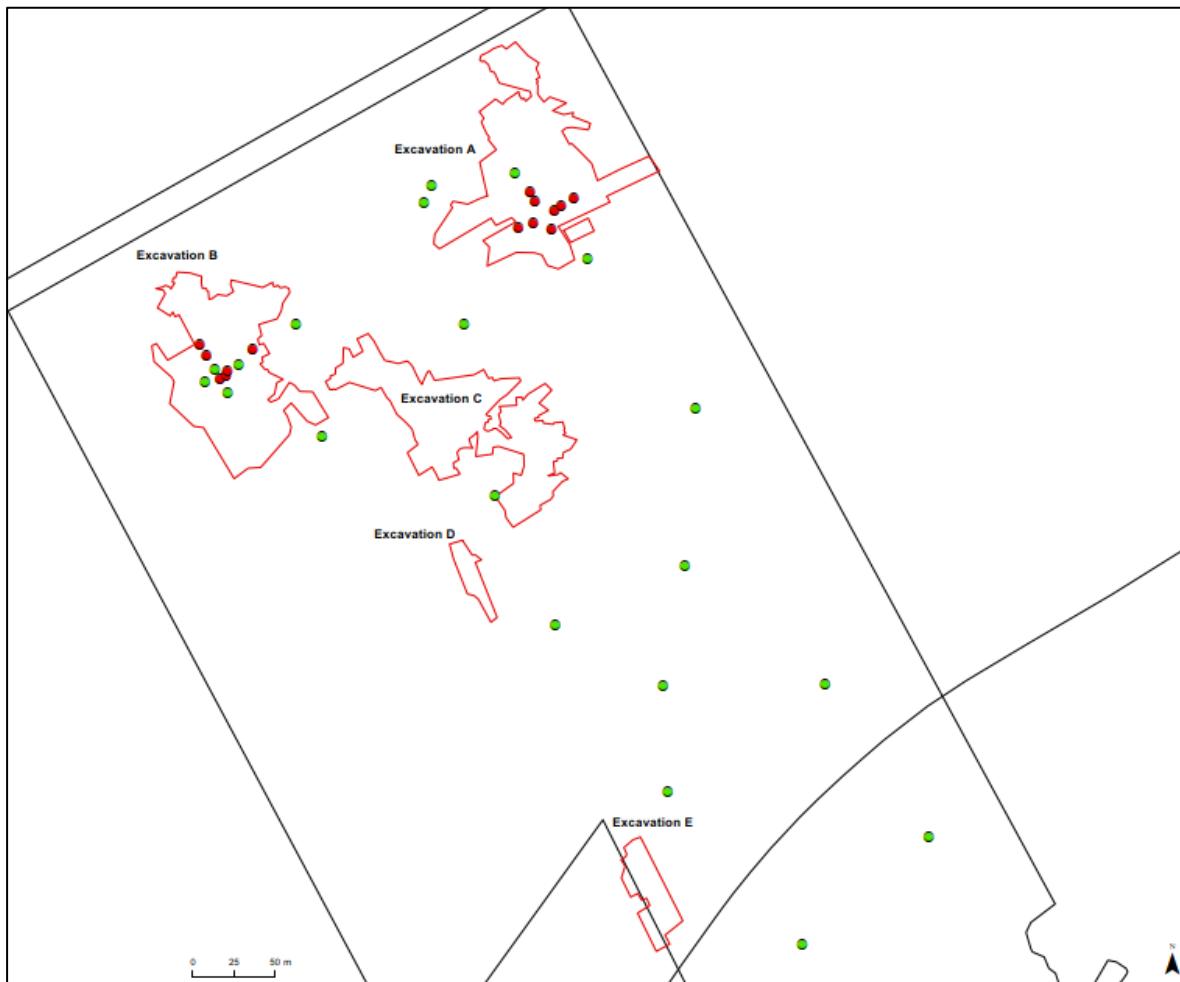
- Excavate and Biopile Soil
- Install Infiltration Galleries
- Seed Backfill with CaO_2



Remediation

Larger contaminated area than anticipated:

- Estimate: 28,920 tons, 20 days
- Reality: 145,852 tons, Ongoing



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Preferential Pathways

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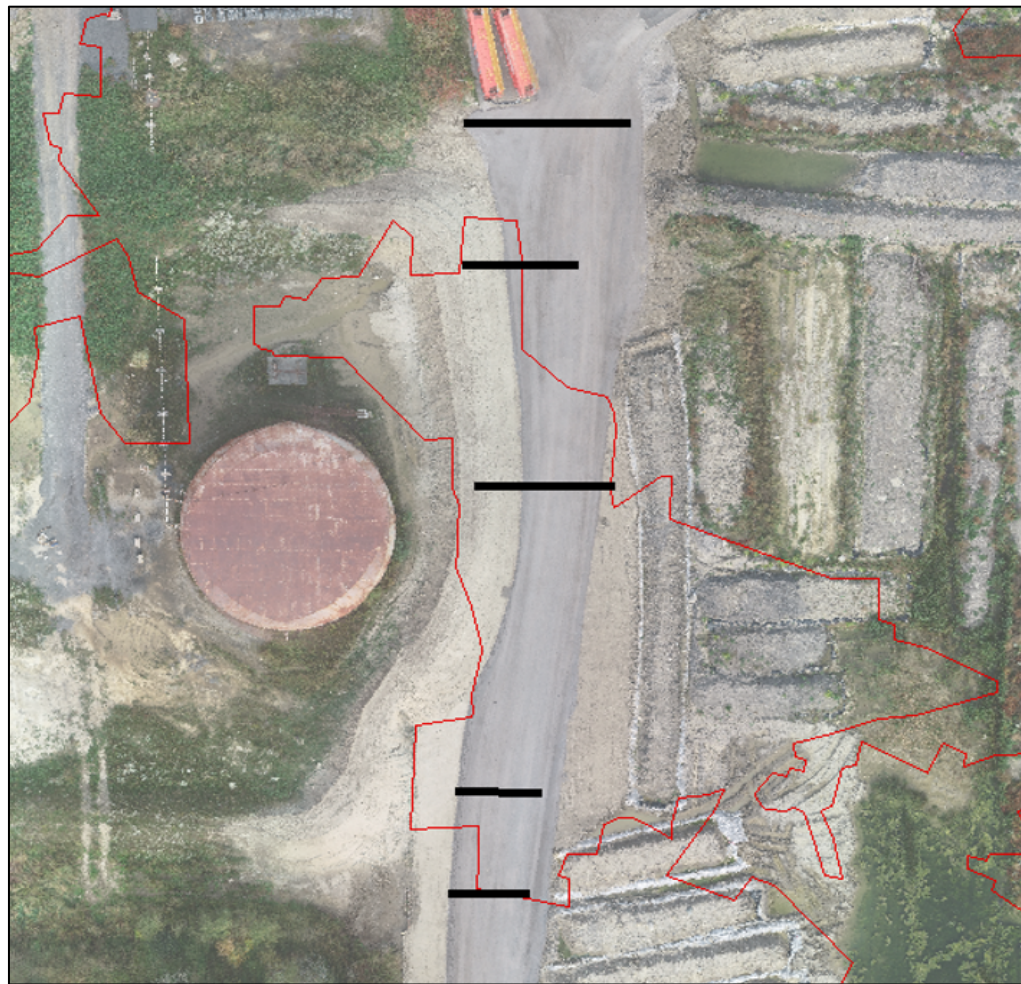


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Preferential Pathways



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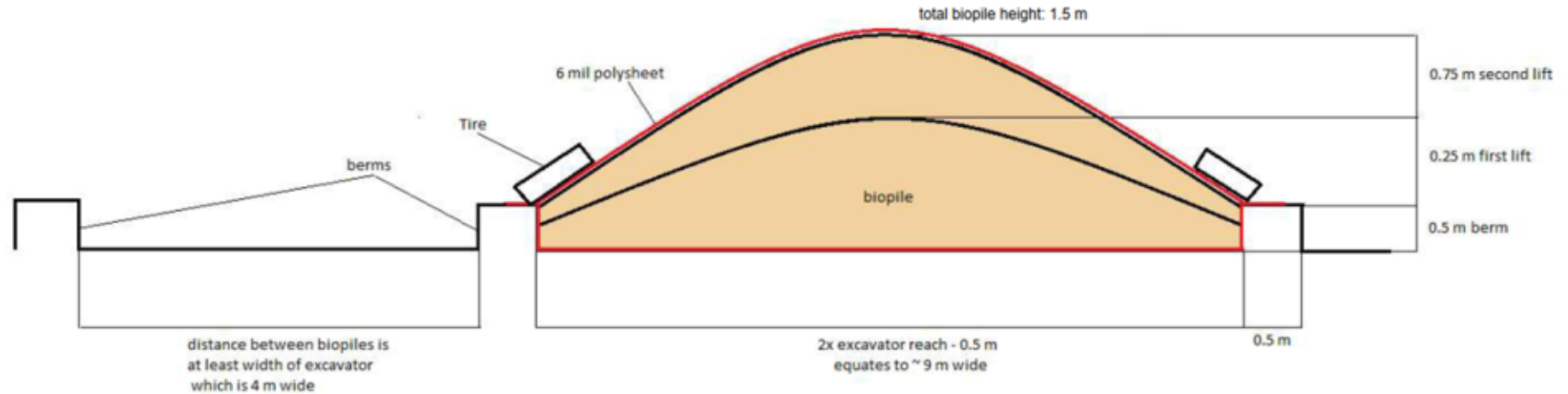
Preferential Pathways



Remediation

Biopiles:

- 145,852 Tons
- Excludes Clean Fill
- >7.29 km (4.53 mi)









Remediation

Backfilling

- Seeded with CaO_2
- Fill from Site

Infiltration Galleries

- Perforated pipe + Gravel + CaO^2
- Post-excavation groundwater sampling:
no exceedances

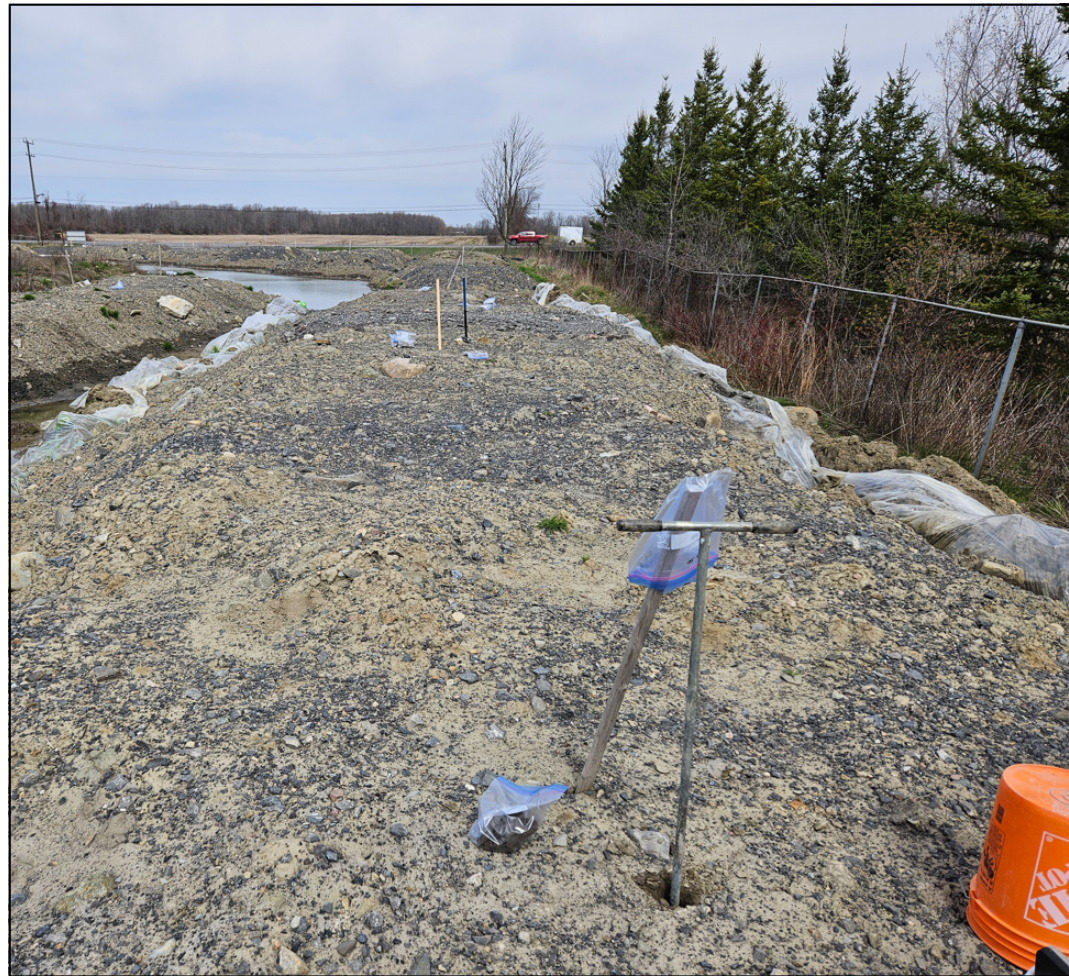


RESULTS

Results

Sampling Protocol

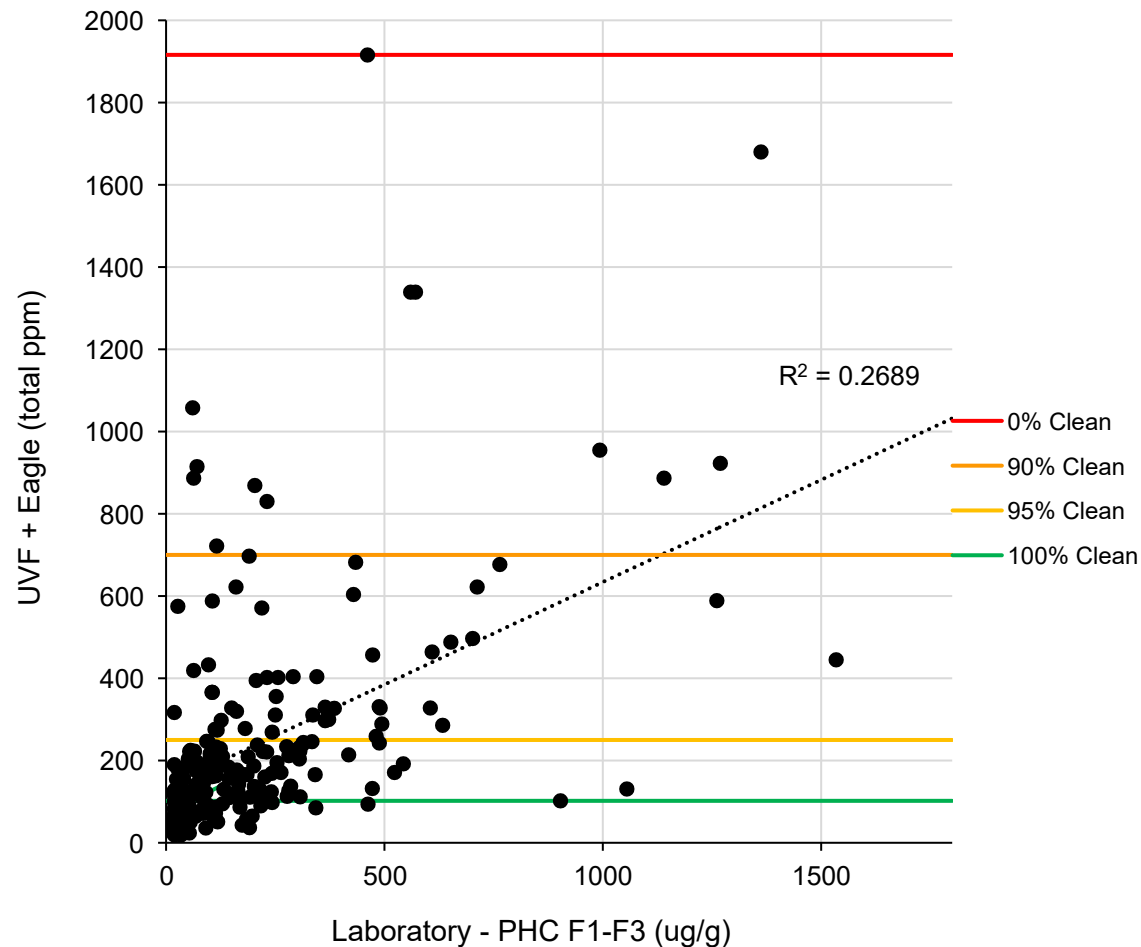
- Hand Auger
(4 depth Intervals)
- Screening
(Gas Analyzer + UVF)
- Laboratory verification
(~12.5% of samples)



Results

Screening Process

- Collect samples (217 to date)
- Generate Site Specific Screening Criteria
- Laboratory only if within acceptable threshold.



Results

To Date

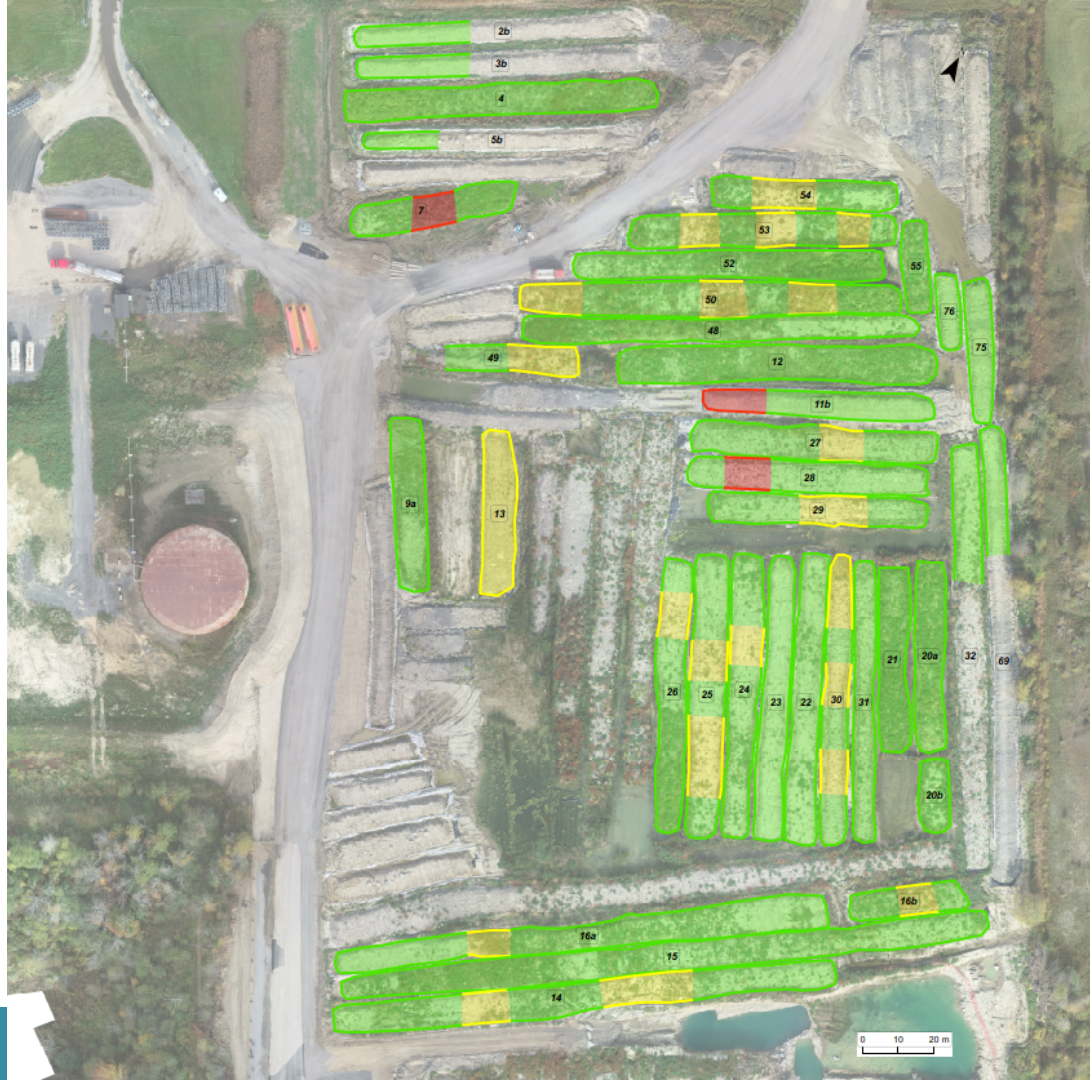
- ~10% biopiles Decommissioned

Summer/Fall 2024

- ~30% biopiles to be decommissioned
- ~60% biopiles to be Sampled

Fall 2025

- Site Closure



Questions?



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Acknowledgements

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Questions for later?

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