



# **Remediation of North West Smelting and Refining Ltd. Winnipeg, Manitoba**

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**2019 Remediation Technologies  
Symposium**

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# Acknowledgements

- **Manitoba Sustainable Development – Crystal Eyjolfson, Darrell Ouimet, Warren Rospad;**
- **Thompson Dorfman Sweatman LLP – Sheryl Rosenberg;**
- **Tervita Corporation – Kevin Gmiterek, Neil MacDonald, Rick Ridley;**
- **Colliers International – Jim Kulik;**
- **Dillon Consulting – Doug Bell, Doug Curnew, Shane Chapman, Tom Grimminck, Indra Kalinovich, Scott Hillaby, Aylene Mayor, Erin Smith, and numerous others**

# Overview

- **Site History**
- **Work Program**
- **Background Assessments**
- **Remedial Options Analysis**
- **Risk Assessment**
- **Remediation Program**

# Site History

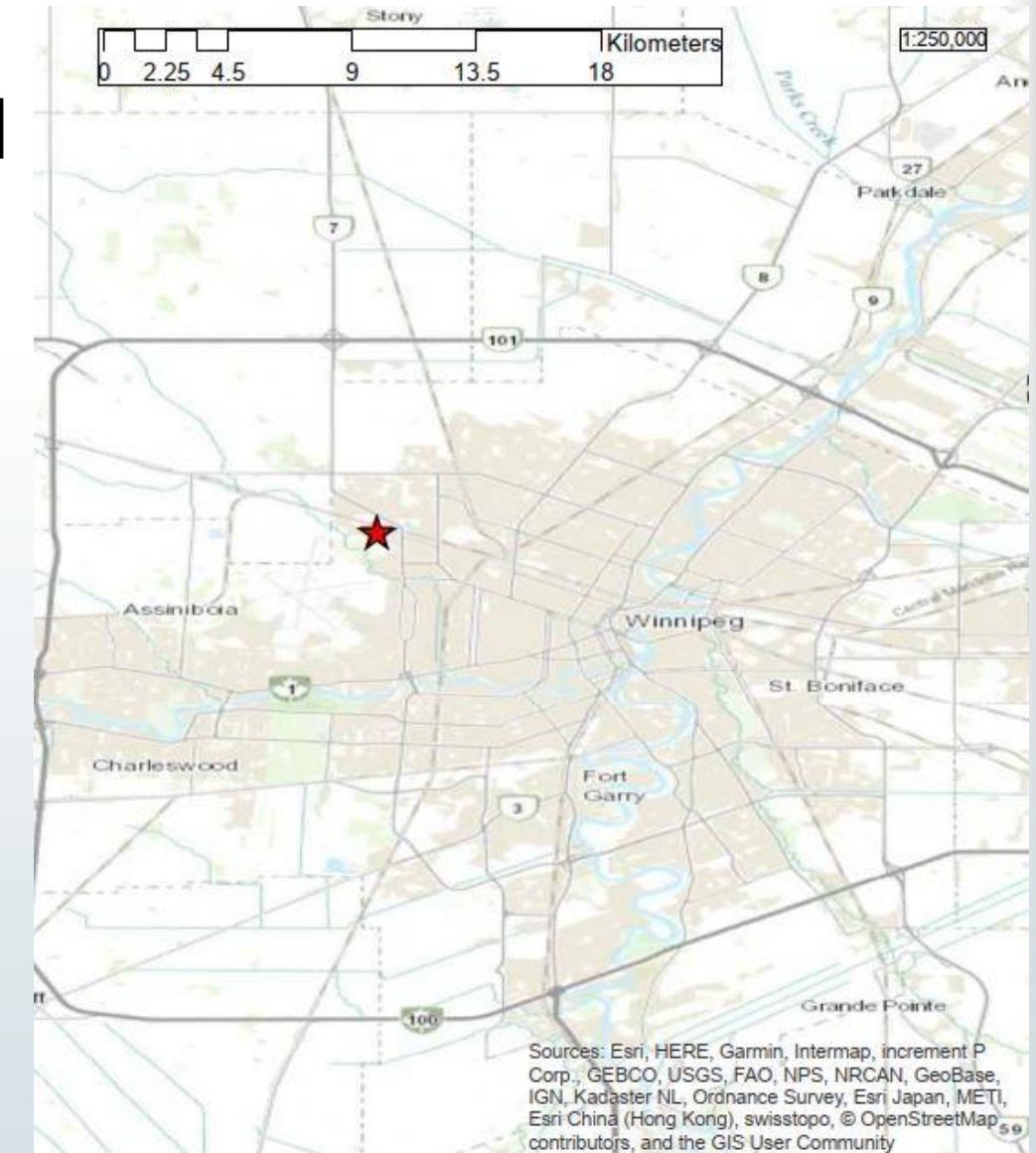
- **Former metal smelting and refining plant;**
- **Former battery recycling operation;**
- **Located in northwest Winnipeg in Omand's Creek Industrial Park;**
- **Zoned for industrial land use;**
- **Approximately 1.85 ha land size;**
- **Designated as a contaminated site;**
- **One of the most contaminated sites in the province.**

# Brownfields Redevelopment

## **Brownfield:**

**an industrial or commercial site that is idle or underused because of real or perceived environmental pollution.**<sup>1</sup>

# Remediation of North West Smelting and Refining Ltd.



## Site Location





Map Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics January 28, 2019

**Approximate site boundary**



Map Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics January 28, 2019

## Aerial view of building foundations

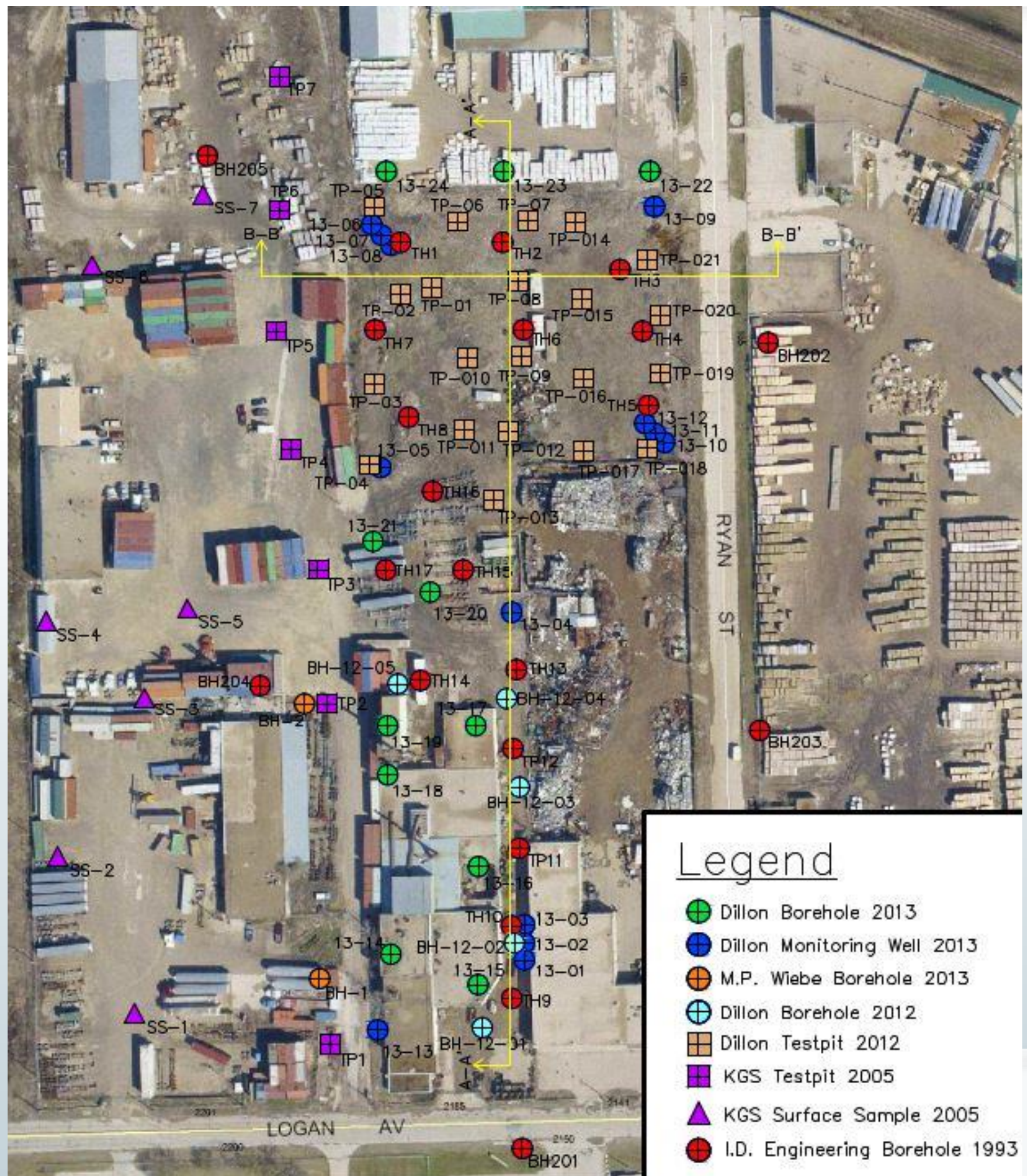


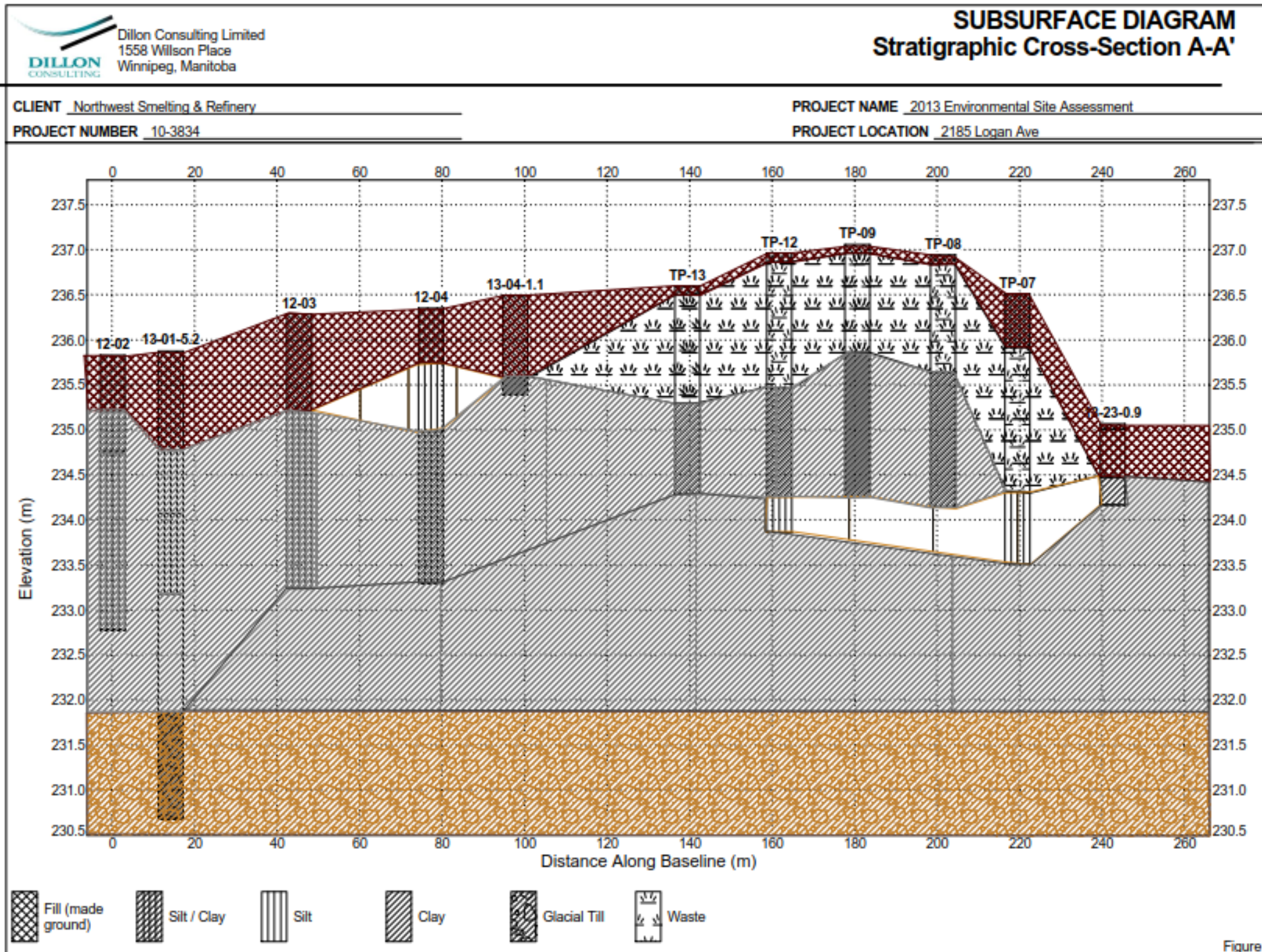
# Historical Reports

- **Investigation into Lead Contamination, I.D. Systems (IDS) Ltd., 1991**
- **Phase II Environmental Site Assessment, 2201 Logan Avenue, KGS Group, 2005**
- **180 and 123/125 Ryan Street and 2095 Logan Avenue Subsurface Investigation, Dillon Consulting Limited, 2009**
- **Phase II Environmental Site Assessment, 2201 Logan Avenue, M.P. Wiebe Environmental Engineering, 2013**

# Historical Reports: Summary of Findings

- **Metals impacts to soil – primarily lead, cadmium, arsenic;**
- **Metal impacts to groundwater;**
- **Historical dump for metal debris and battery casings on north portion of site.**







### SUBSURFACE DIAGRAM Stratigraphic Cross-Section B-B'

CLIENT Northwest Smelting & Refinery  
PROJECT NUMBER 10-3834

PROJECT NAME 2013 Environmental Site Assessment  
PROJECT LOCATION 2185 Logan Ave

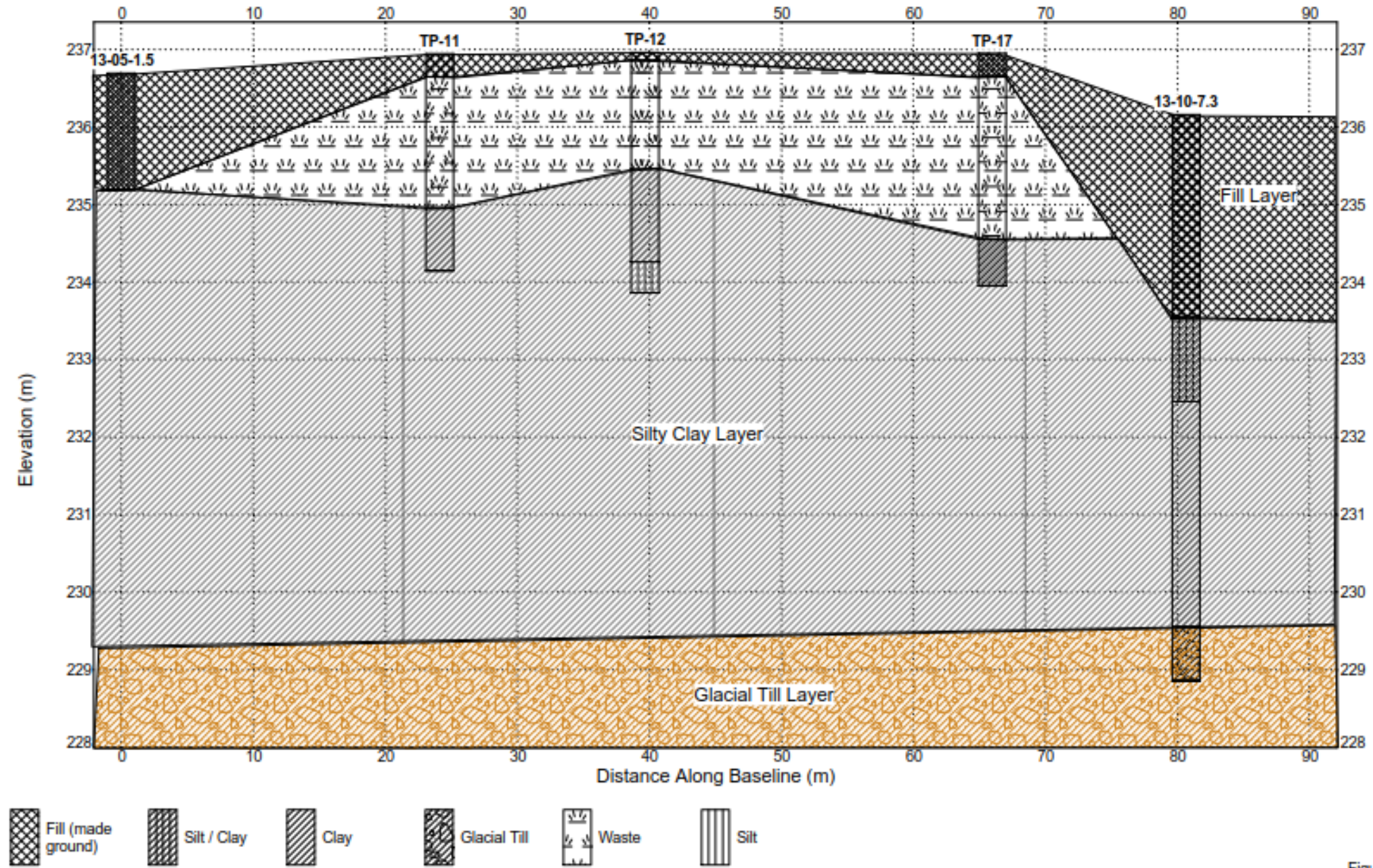


Figure 6



# Remedial Options Analysis and Risk Assessment

## Remedial Option Analysis objective:

- Screen the potentially applicable remediation and risk management options for the protection of the environment and human health

## Areas of Potential Environmental Concern

- Waste site – northern portion of site
- Subsurface impacts – southern portion of site

# Remedial Options Analysis

## Applicable technologies:

- Excavation, disposal off-site, and backfill
- Excavation, soil washing and replacement/backfill
- Surface capping and management in place
- Solidification/stabilization
- Permeable reactive barriers
- Risk assessment/risk management

# Remedial Options Analysis

## Recommended remediation methods:

- **Historical waste site on north portion of site**
  - **Re-stabilize and leave waste in-situ. Cap with engineered cover.**
- **Metals impacted soil on south portion of site**
  - **Excavate material, relocate and place below cap on northern portion of site.**



# Regulatory Process

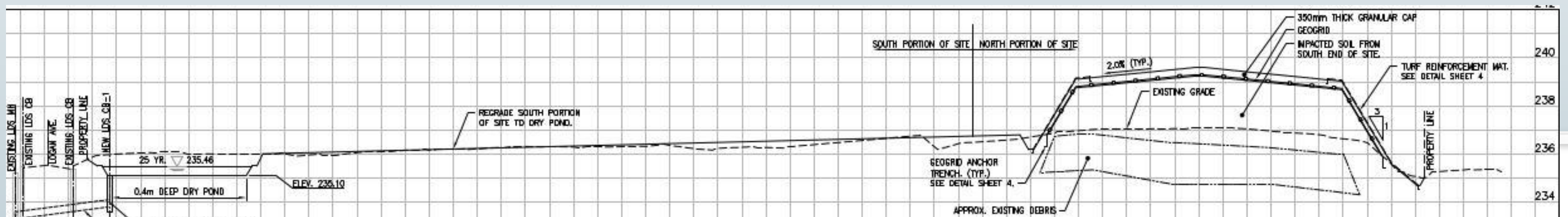
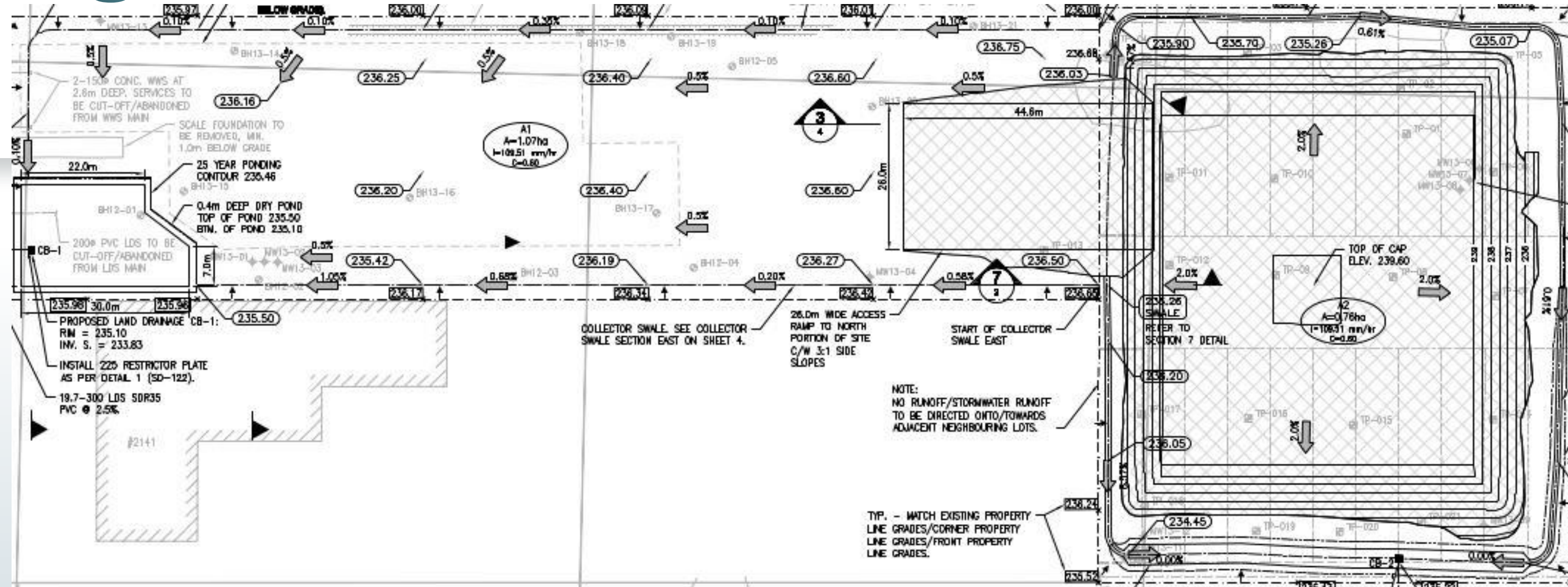
## Screened against applicable regulatory criteria:

- CCME Soil Quality Guidelines for the Protection of Environmental and Human Health
- CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil
- Dillon Consulting Human Health Risk Assessment

# Remediation Work Program

- Remediation plan development and implementation;
- Technical specifications and design drawings;
- City development permit;
- Contract documents and request for quotations from three contractors;
- Contract administration services; and,
- Construction supervision with confirmatory soil sampling and closure sampling.

# Design



# City Permits

- **Development permit had to be obtained prior to site work;**
- **Permit related to design of land drainage system and tie-ins to City services which affected the design;**
- **Demolition permit obtained by the remediation contractor.**

# Demolition

- **Removal of former building foundations;**
- **Removal of railway tracks;**
- **Monitoring well decommissioning (13);**
- **Disconnecting municipal water and drainage systems; and,**
- **Removal of lead-containing scrap pieces.**



## Foundation removal



## Foundation removal



**Secondary operation beneath foundation**



# Material Management

- Rail ties – Landfilled
- Concrete – Recycled
- Metal scrap, rebar and lead pieces – Recycled
- Asphalt – Broken down, capped on north portion of site
- Metal-impacted soils – Capped on north portion of site
- Non-compactable hazardous metal impacted material –  
Transported as hazardous waste to treatment facility



Separating rail ties



Lead Pieces



Concrete



**Metal Impacted granular fill material and asphalt**

# Site Remediation

- Excavated in sections;
- Field screening for metals using X-Ray Fluorescence (XRF) analyzer;
- Approximately 900 field-screening samples;
- Total of 494 closure samples submitted for laboratory analysis of metals.



- **Real-time metals concentrations in material**
- **Used to screen soil prior to collecting closure samples**
- **Eliminated approximately \$63,000 in lab fees**

## Vanta Handheld X-Ray Fluorescence Analyzer



Excavation in progress





Soil screening in excavation



**Battery casing debris encountered in northern section of site**



## Metal-impacted material placement and compaction

# Challenges

- **Discovery of additional impacted material below foundations including the kilns;**
- **Resulted in approximately 3,000 m<sup>3</sup> additional impacted material;**
- **Design revised to accommodate material with an enlarged and raised cap, and a wider access ramp;**
- **Increased volume of hazardous impacted materials that could not be compacted meant greater off-site disposal fees.**



**Placement of geogrid on engineered cap and ramp**



**Engineered cap construction**

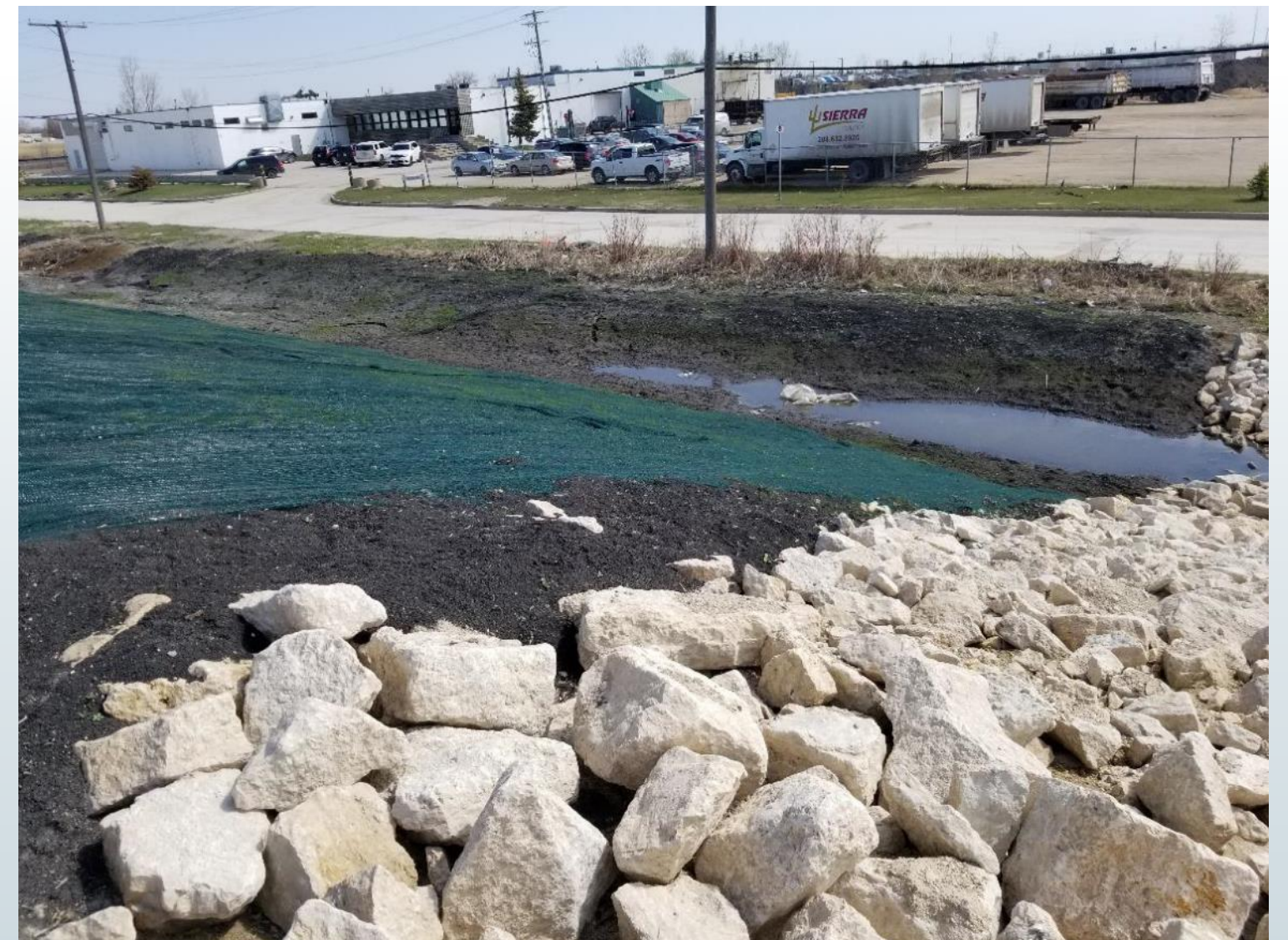
# Turf Reinforcement Mat







# Drainage



# Restoration Complete



# Summary

- **Approximately 8,500 m<sup>3</sup> of impacted soil was removed from the southern portion of site through excavation and relocated beneath the engineered cap on the northern portion of the site;**
- **Approximately 500 m<sup>3</sup> of hazardous granular material was removed from the site;**
- **Objectives of the Remediation Plan were achieved;**
- **MSD closure letter cleared the contaminated site designation;**
- **The southern portion of site is suitable to be redeveloped for commercial/industrial use;**
- **The northern section of site is designed for use a storage or parking area;**
- **Site sold to a local commercial business = success!**

**Thanks!**

**Questions?**