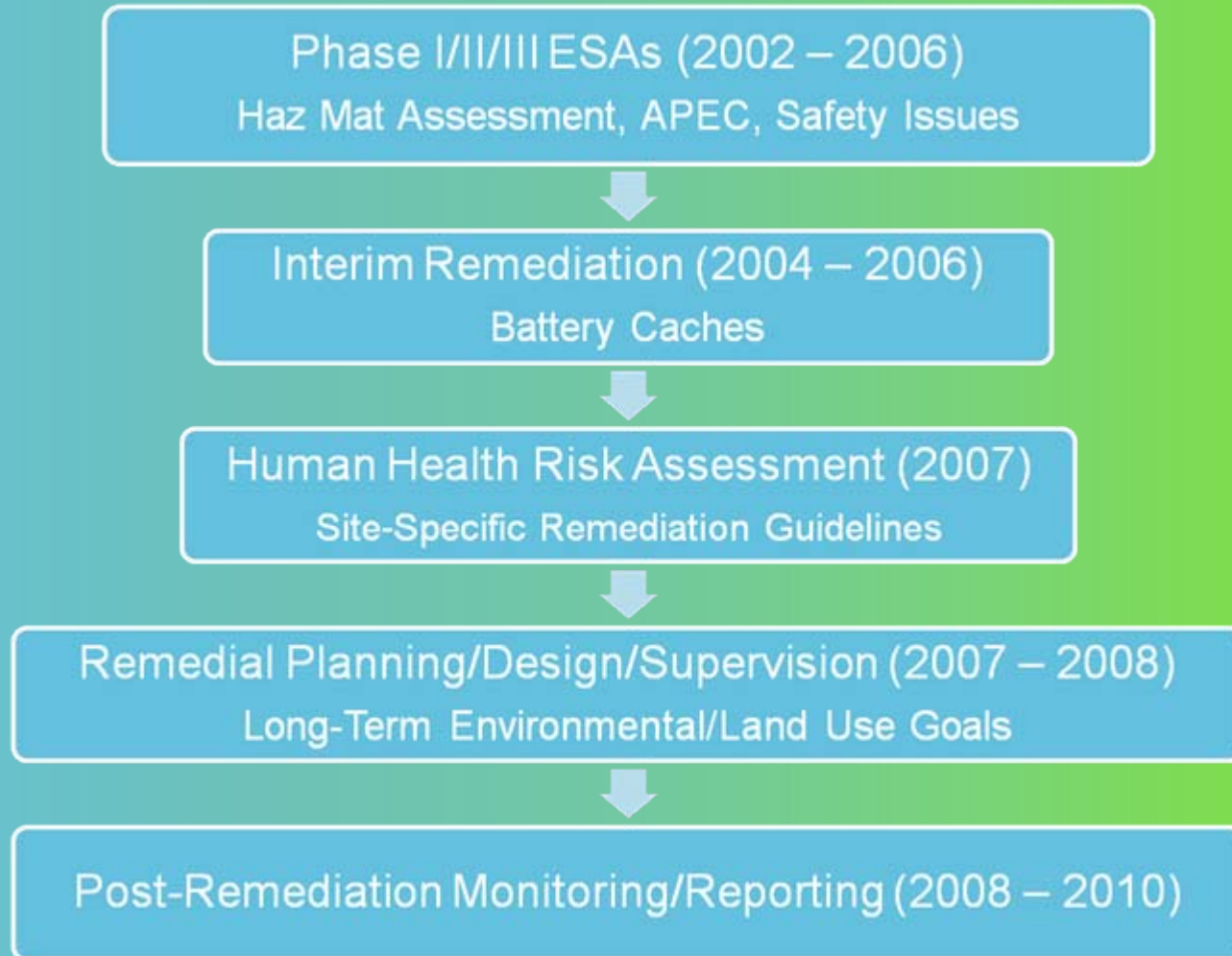


# Case Study: A Multi-Phase Remediation Strategy for the City of Brandon's 1<sup>st</sup> & Rosser Site

Scott Chapman, M.Sc., P.Eng.

# Project Overview



# Site Layout



# Site Layout





# March 2004





# March 2004





# Phase I ESA (2004)



- **Hazardous Material Assessment**
  - Bird droppings (hantavirus)
  - Asbestos
  - Lead paint
  - Drums





# Phase I ESA



- **Safety Issues**
  - Collapsing Fencing
  - Site Debris
- **Potential impacts to Soil and Groundwater (PHC, Metals, PAH)**





# Battery Casing Cache – 2005





# Battery Casing Cache – 2005





# Battery Casing Cache – Cement Stabilization

- Bench-Scale Testing
  - 10% Portland Cement
  - 15% Portland Cement
  - 20% Portland Cement



# Battery Casing Cache – 2005

- Pilot-Scale Testing
  - 600 tonnes

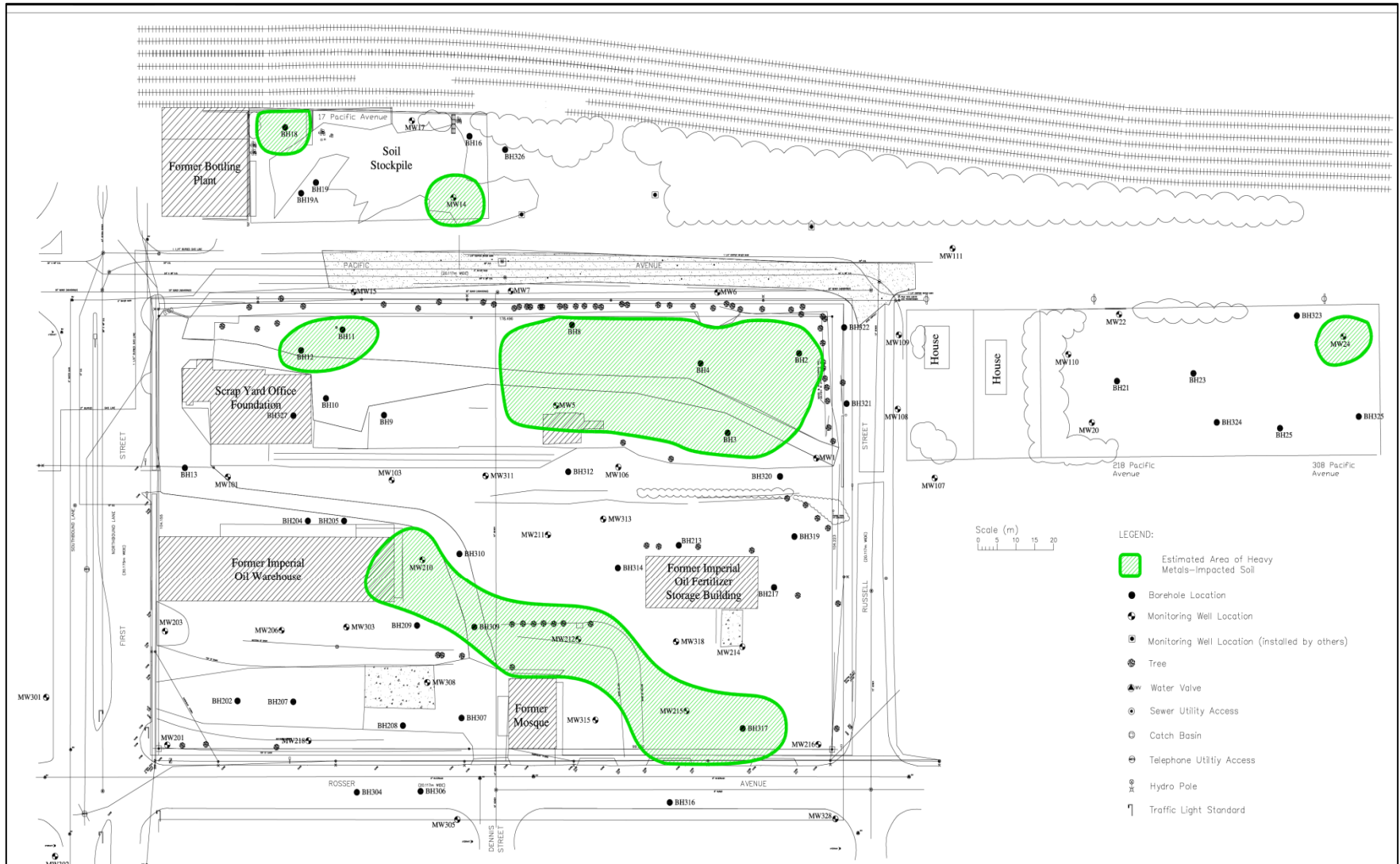




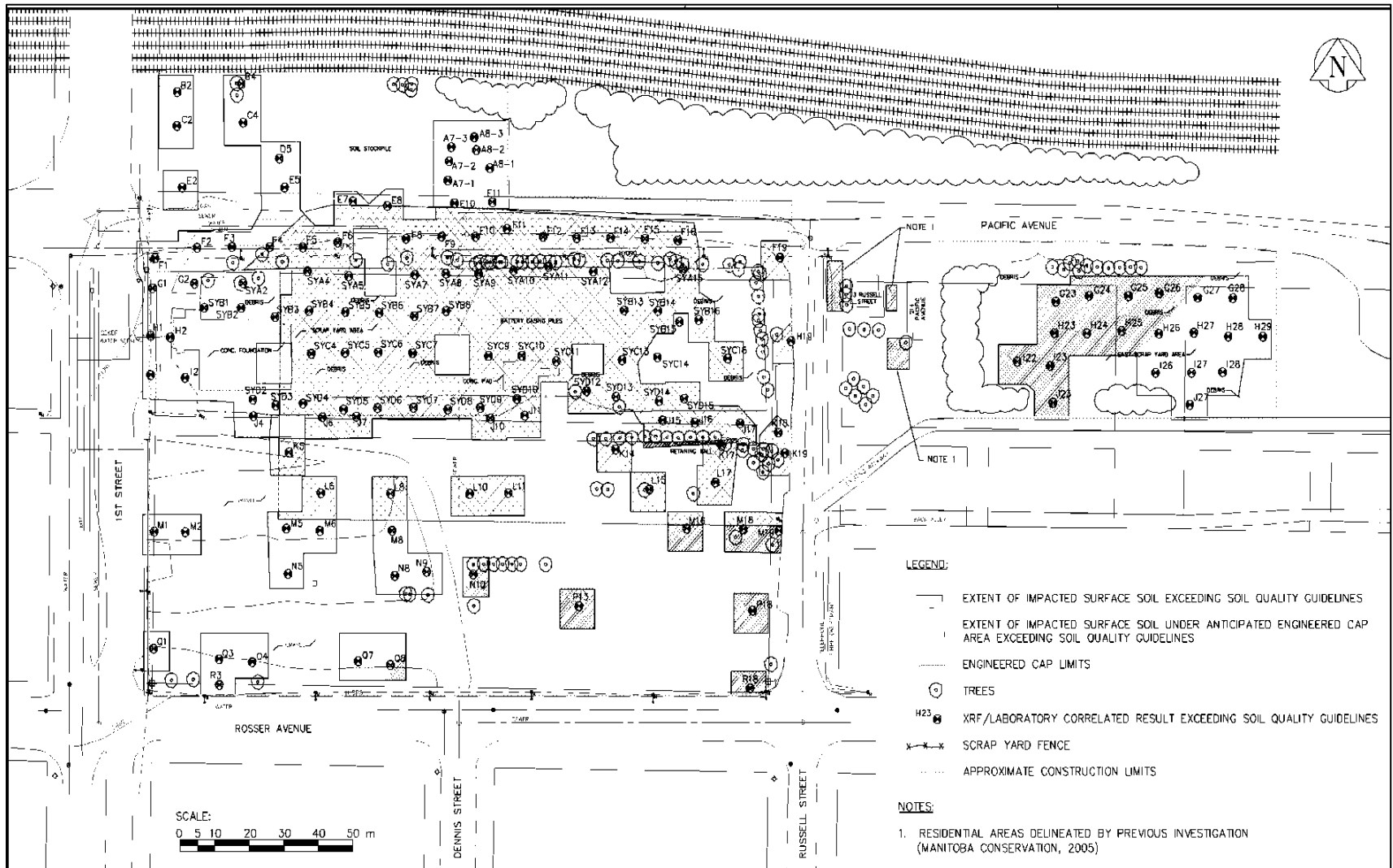
# Human Health Risk Assessment – 2007

- Completed by Dillon Consulting Ltd. for MB Conservation
- **Residential Properties**
  - Based on soil quality data collected by AECOM and Manitoba Conservation – antimony, arsenic, iron, lead impacts
    - CCME residential land use
  - Two hot spots for arsenic identified
  - SSTL of 1,170 mg/kg for lead
- **Scrap Yard/Imperial Oil Properties**
  - SSTL of 4,378 mg/kg for lead
  - Potential for PHC vapour migration to indoor air for potential future on-site buildings
  - Carcinogenic contaminants of concern (arsenic, benzene) well below acceptable risk benchmark of  $10^{-5}$

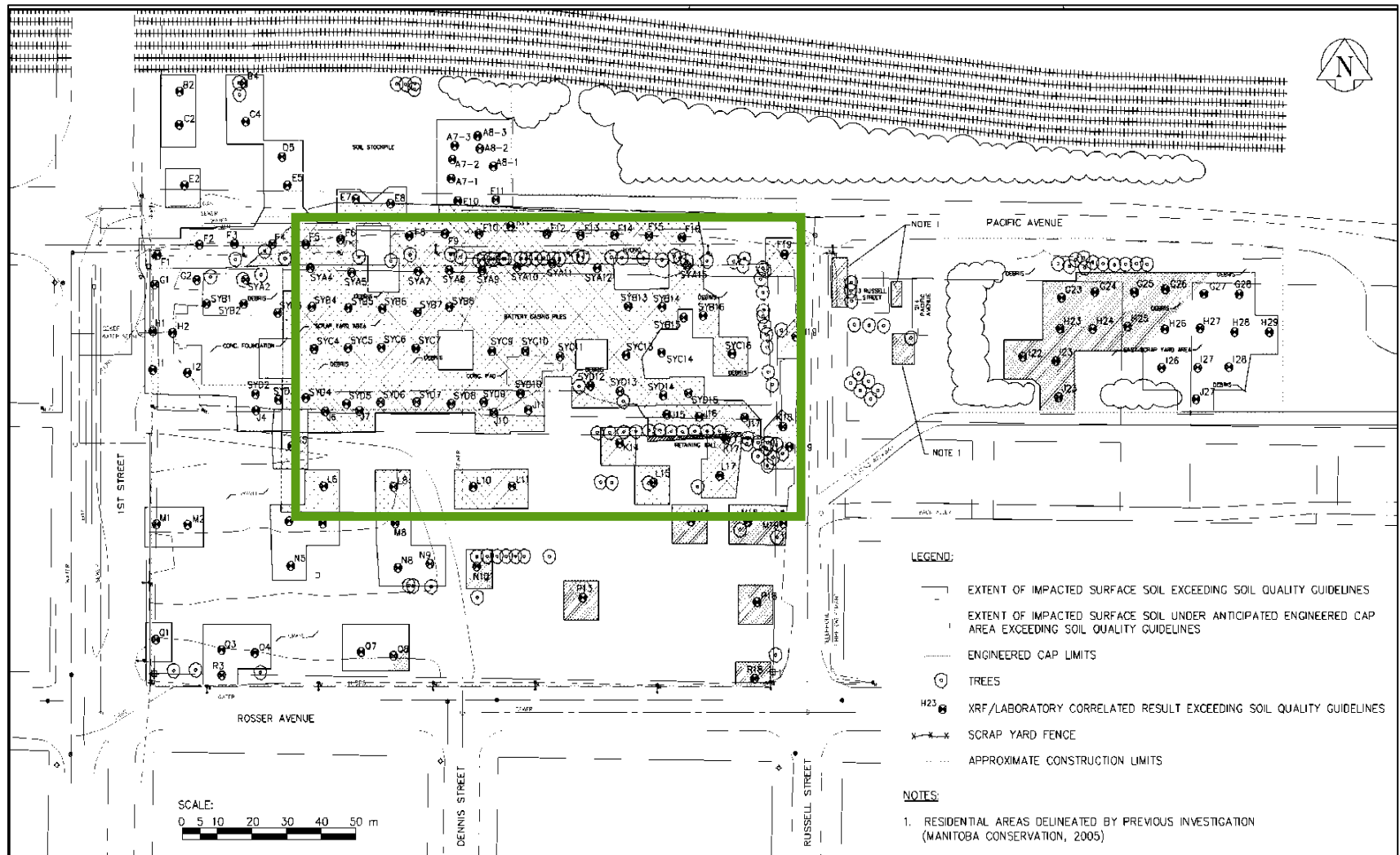
## Phase III ESA – Heavy Metals Impacted Soil



# Remedial Design – Surface Soil Impacts

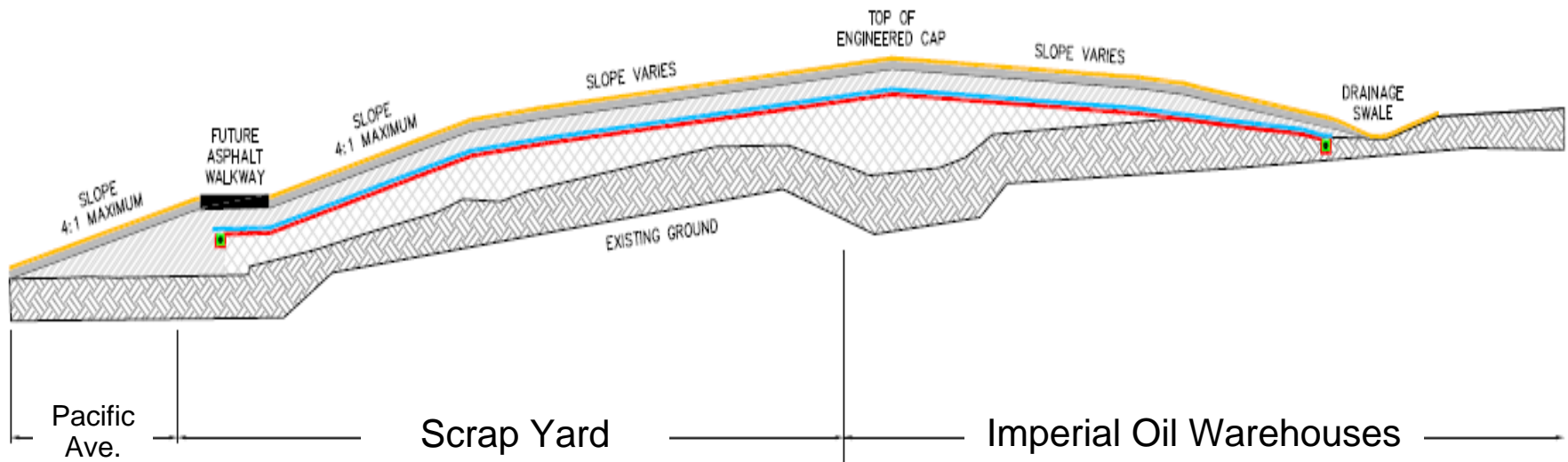
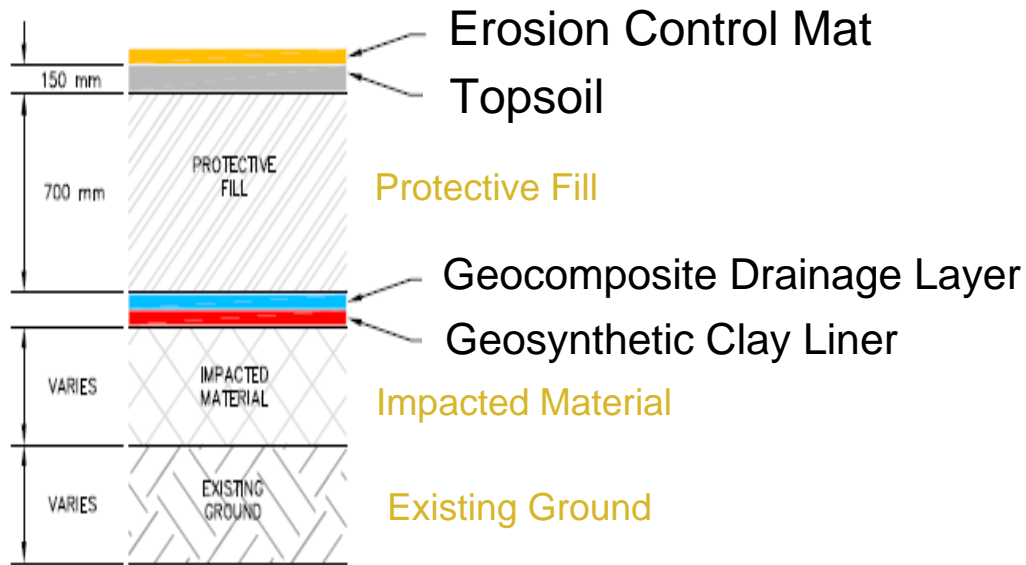


# Remedial Design – 2007





# Remedial Design



# Residential Remediation



- **Excavation of Surface Soil**
  - 30 cm depth based on site-specific soil quality guideline
  - soil contact/ingestion



- **1 year after remediation**



# Cover Placement....a little Teamwork!





# Cover Placement





# Cover Placement

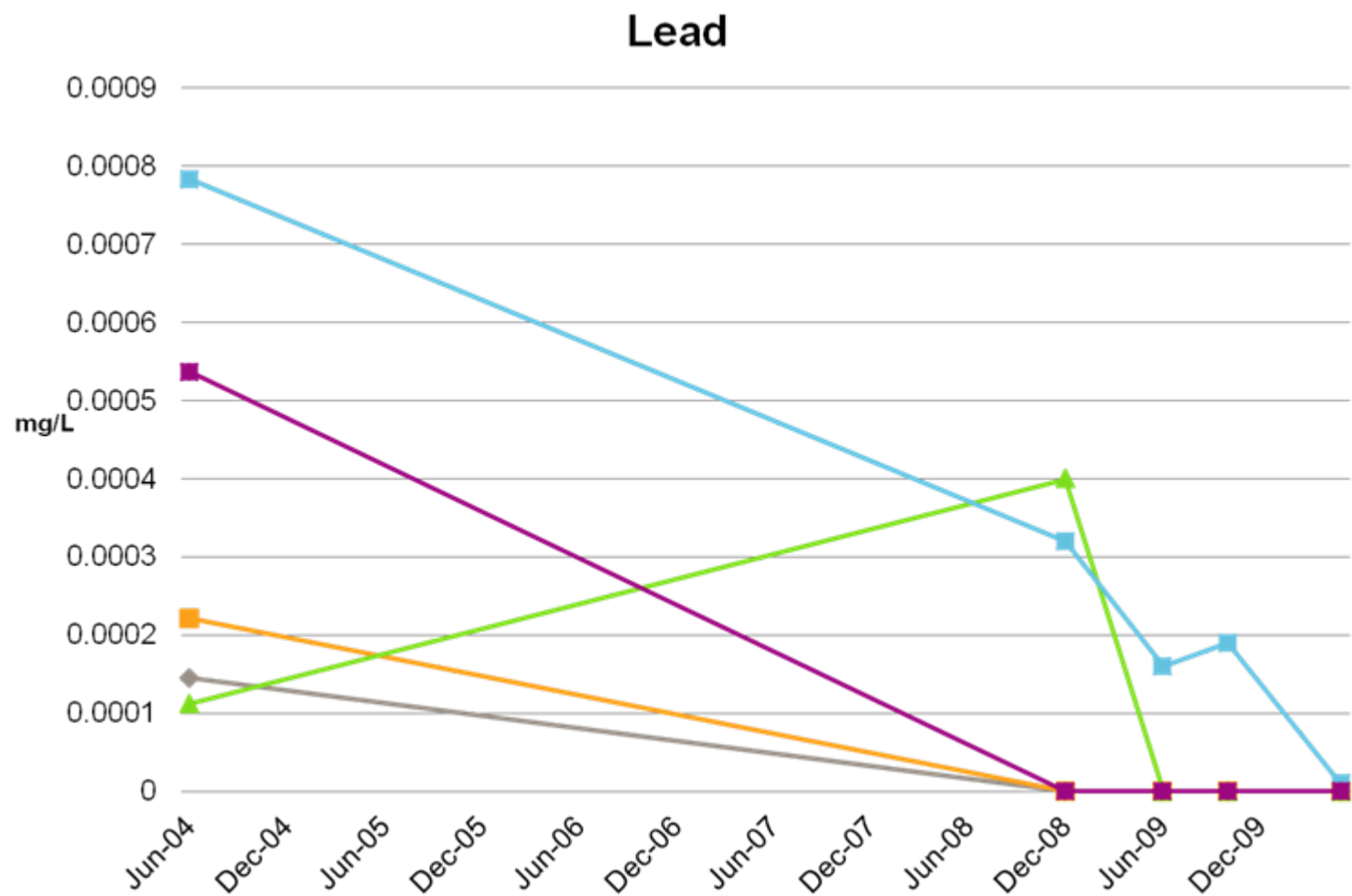




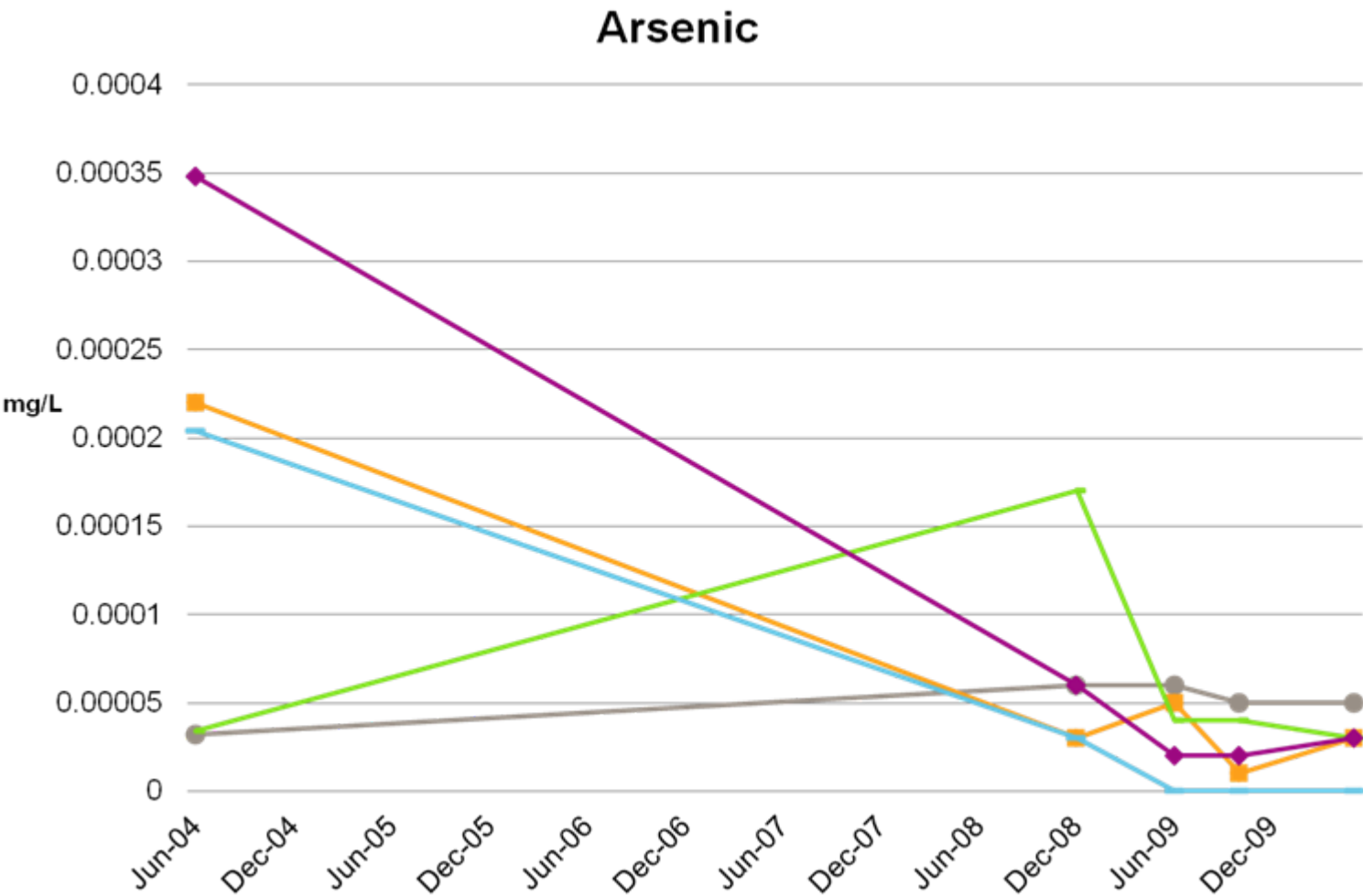
# Cover Placement



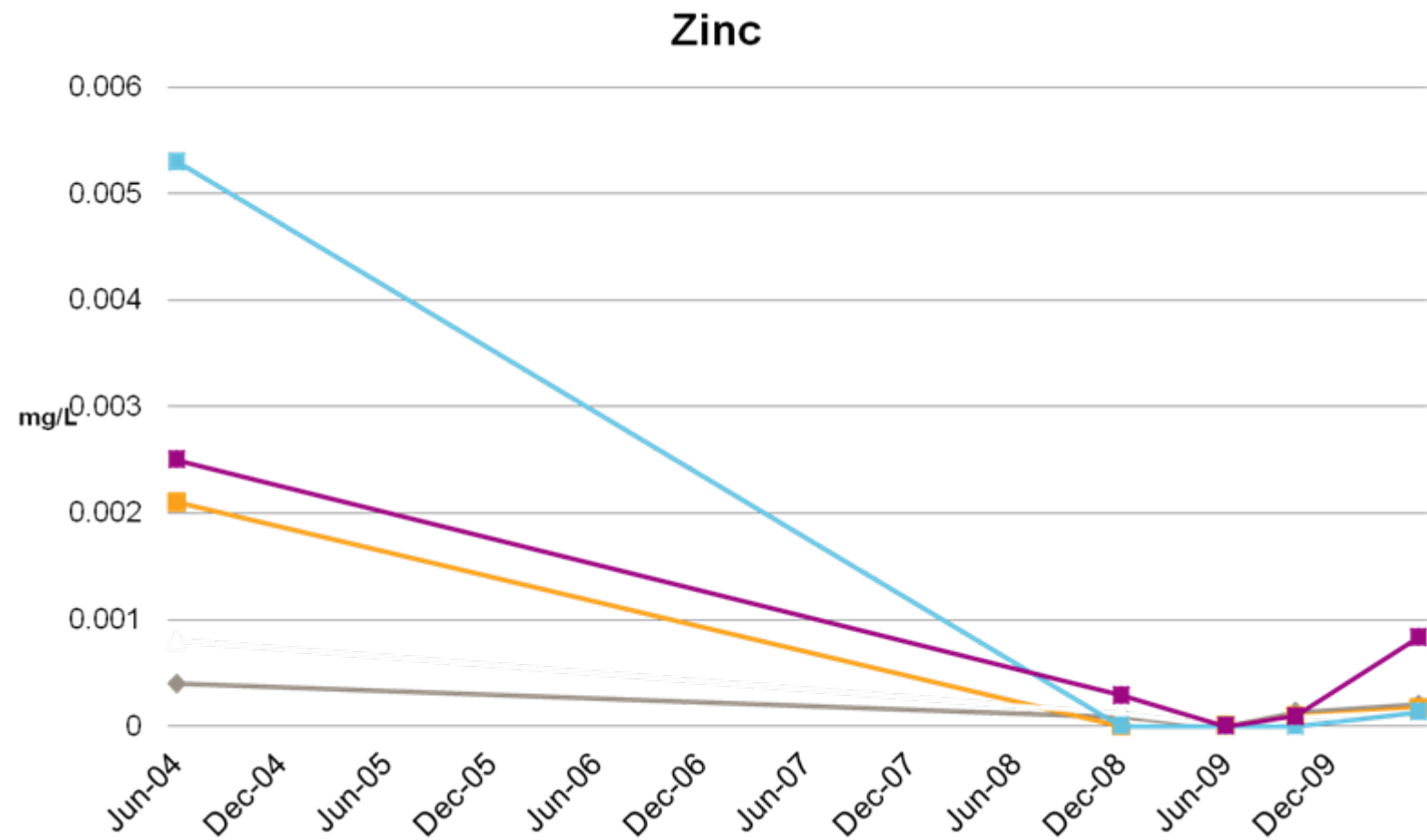
# Post-Remediation Groundwater Quality



# Post-Remediation Groundwater Quality



# Post-Remediation Groundwater Quality





# November 2008





# June 2009





# June 2009



# September 2009





# August 2010





# August 2010





# Thank You

## Acknowledgements:

City of Brandon

Manitoba Conservation

Brandon Regional Health Authority

[scott.chapman@aecom.com](mailto:scott.chapman@aecom.com)



**AECOM**