



Remediation of a Former Dry Cleaner Spruce Grove, Alberta

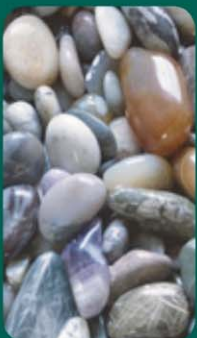
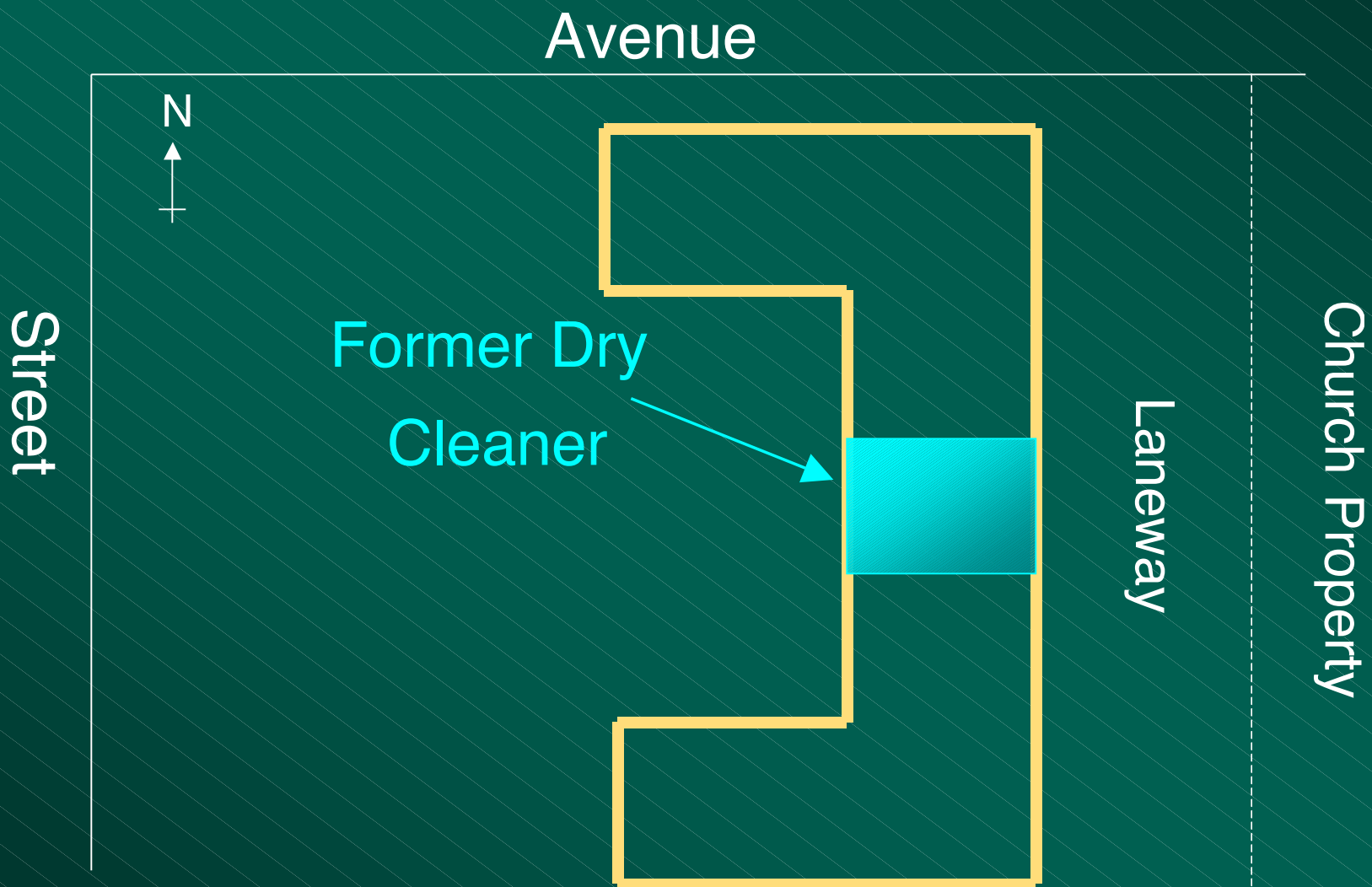
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REMTECH 2003**



Outline

- ◆ Background
- ◆ Risk Management
- ◆ Remediation Options
- ◆ Remediation Program
- ◆ Remediation Results
- ◆ Post Remediation Monitoring

Site Location

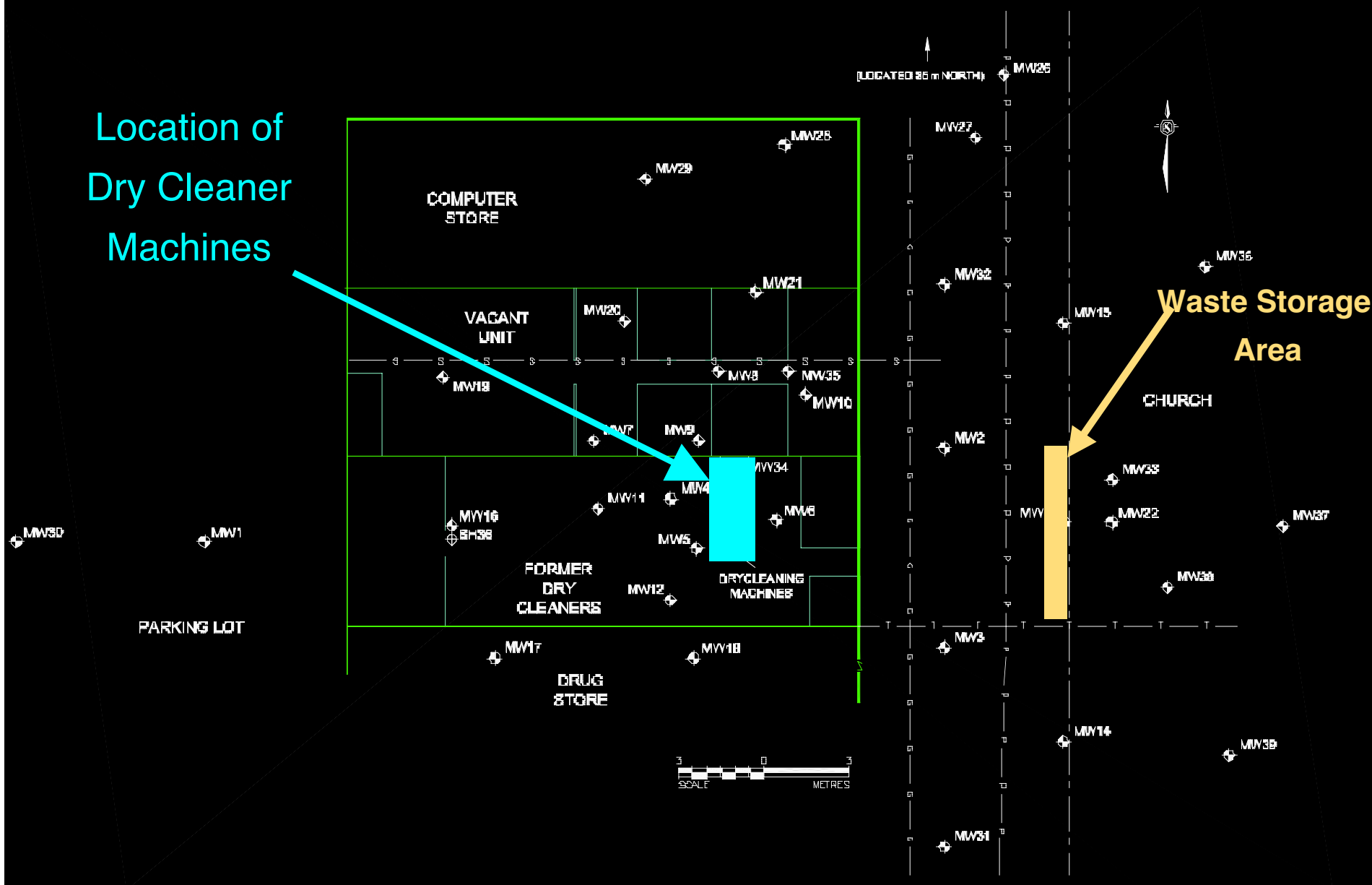


Background

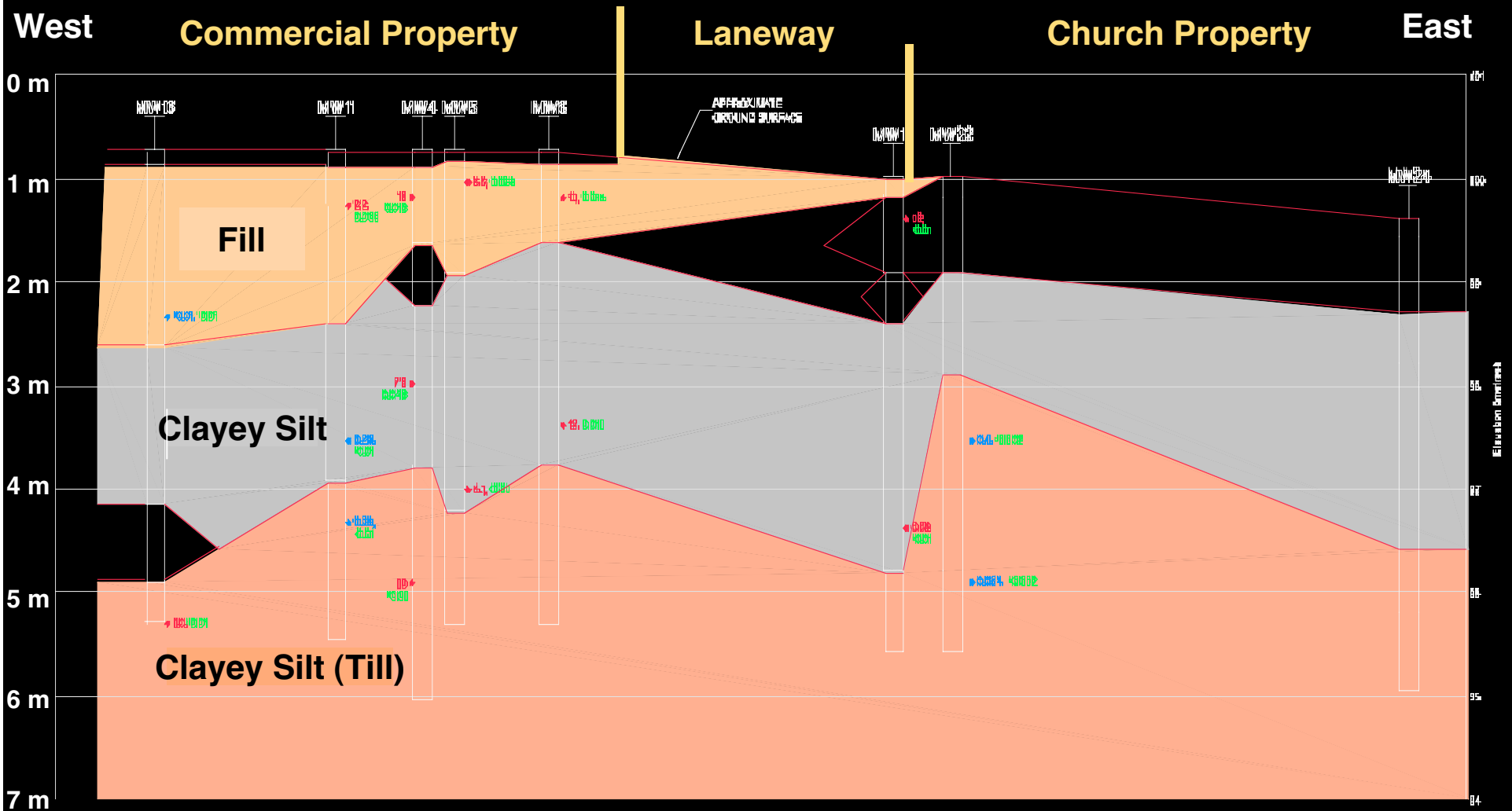
- ◆ Dry cleaning facility for 25 years
- ◆ Land zoned for commercial land-use
- ◆ 11 adjacent businesses
- ◆ Off-site land contains a church (residential land use)



Location of
Dry Cleaner
Machines



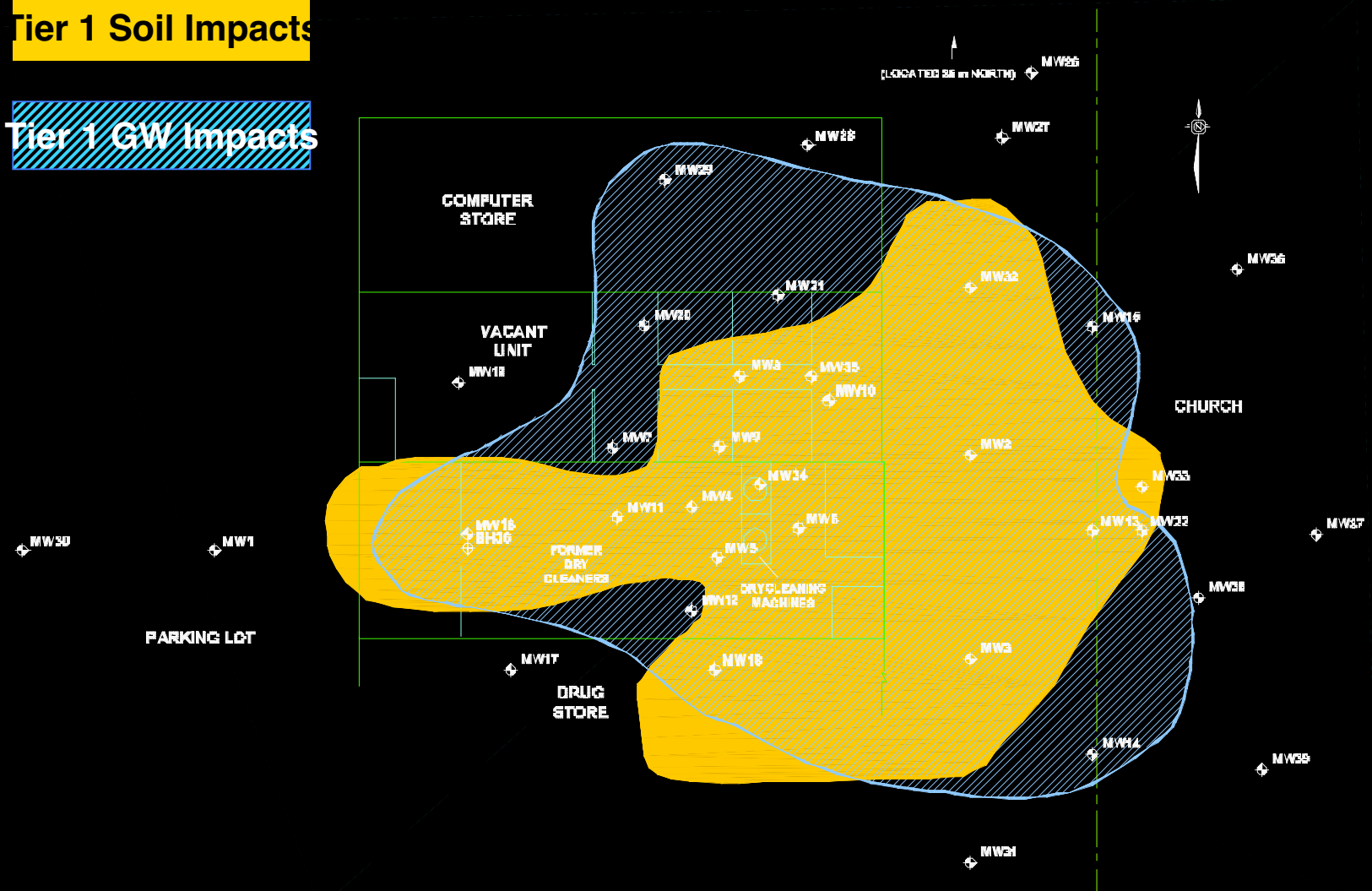
Geology



Area of Impacted Soil and Groundwater (CCME 2002)

Tier 1 Soil Impacts

Tier 1 GW Impacts





Risk Management

- ◆ Air Quality Monitoring
- ◆ Risk Assessment - No risk to current occupants and adjacent businesses
- ◆ Alberta Environment accepted risk management plan to conduct quarterly air monitoring and semi annual groundwater monitoring
- ◆ Church accepted risk management plan
- ◆ Vacated current dry cleaner tenant





Owner's Business Objectives

- ◆ Wanted to sell property
- ◆ Property worth \$3 Million in August 2000
- ◆ Property on market for 1 year
- ◆ Potential purchasers wanted **significant “hair-cut” off the purchase price and for the owner to retain all environmental liability.**
- ◆ Decision to remediate to avoid a significant reduction of purchase price

Remediation Options


- ◆ Exsitu remedial techniques were limited due to distribution of contamination in the subsurface
- ◆ Insitu remedial techniques did not meet owner's time frame and were not feasible
- ◆ Decision to derive Tier 2 soil and groundwater guidelines using the CCME 2000 and AENV 2001 methodology



Guideline Tiers

- ◆ Tier 1 – Generic Guidelines
- ◆ Tier 2 – Modified Generic Guidelines
- ◆ Tier 3 – Site Specific Risk Assessment

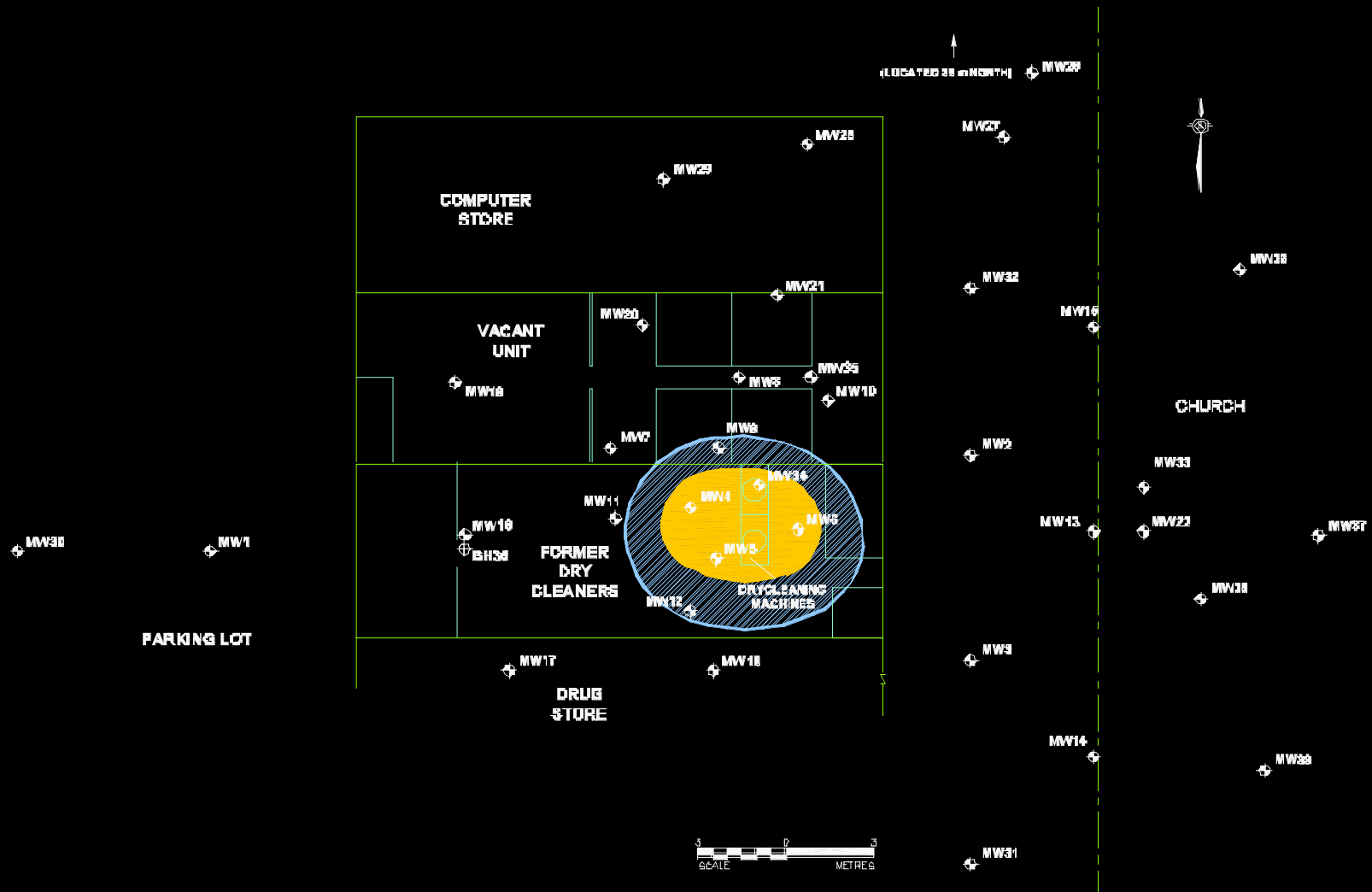




PCE Tier 2 Soil and Groundwater Guidelines

<u>Exposure Pathway</u>	<u>Guideline</u>
Human Soil Ingestion	2139 mg/kg
Human Dermal Contact	12435 mg/kg
Human Vapour Inhalation	39 mg/kg
Protection of Potable Groundwater	Not relevant
Soil Contact	34 mg/kg
Protection of Aquatic Life	Not relevant
Final Soil Guideline	34 mg/kg
Final Groundwater Guideline	13.7 mg/L

Area of Impacted Soil and Groundwater (Tier 2)



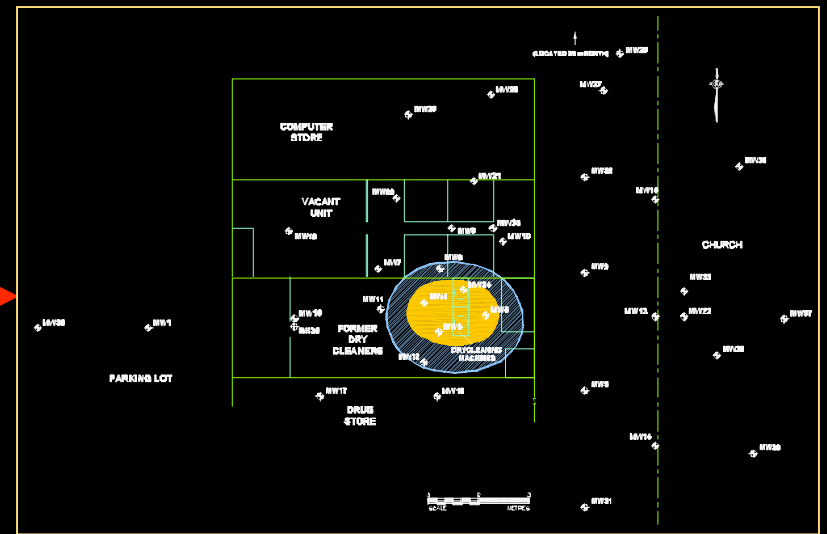
Tier 2 Approach

90% Reduction in the Volume Requiring Remediation

\$2 Million



\$0.5 Million





Remediation Program

- ◆ Source removal via soil excavation to meet Tier 2
- ◆ Insitu chemical oxidation program (potassium permanganate) as contingency for impacted groundwater if required
- ◆ Total Cost \$800,000

Communication Plan

- ◆ Letter to Tenants
- ◆ Public Meeting (Flyer)
 - Presentation/Q&A
- ◆ Tenants' Concerns
 - blocking fire lane and fire exits
 - blocking deliveries
 - vibrations (Bank)
- ◆ GMS Website



The flyer is titled "Remediation Program" and features a colorful logo of a house with a person inside. It contains several sections of text and a small illustration of a yellow excavator.

What is the nature of contamination?
The principal soil and groundwater contaminant of concern is perchloroethylene ("PCE") which is a constituent in dry cleaning fluid. PCE is a non-flammable, clear liquid with a sweet chloroform-like odor.

When was the contamination discovered?
It was discovered during a subsurface investigation conducted in 1999.

Were tenants at risk since the 1980's?
No. Gordon Associates Ltd. conducted an risk assessment in 2000 that measured PCE concentrations in the former dry cleaning unit and outside of the unit. Concentrations were well below concentrations deemed to be acceptable by Health Canada.

How long has the PCE been there?
It is believed that PCE may have been released into the underlying soil in the early 1980's up until 2001.

What health effects are associated with PCE?
Facts:
➤ PCE can affect you when inhaled over long periods of time or through direct skin exposure.
➤ Exposure to PCE can irritate the eyes, nose, mouth and throat.
➤ High exposure can cause headaches, dizziness, nausea and shortness of breath.
➤ Health Canada classifies PCE as a possible carcinogen.

When will the clean-up start and what is the duration?
The clean-up is scheduled to start August 6, 2002 and is expected to take 8 weeks.

What is the area affected?
The area affected includes the former dry cleaning unit, the adjacent vacant unit, a small portion of Shopper's Drug Mart and Computer Store and the laneway behind these units. A small area on the Church property behind the Grove Plaza Unit is also affected.

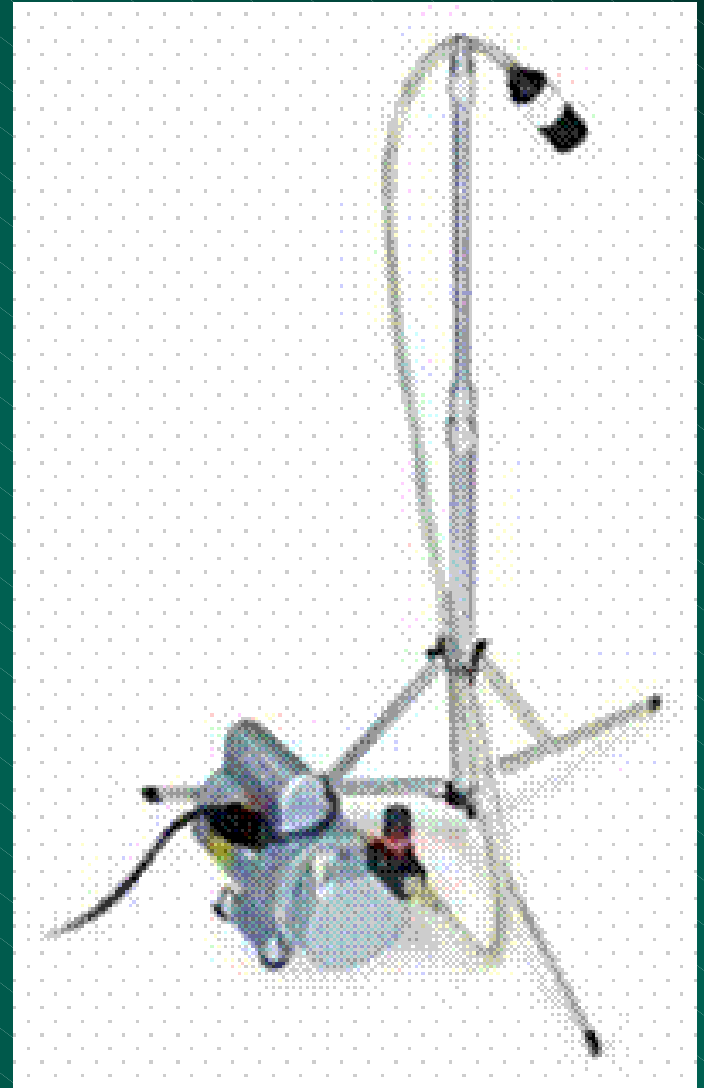
CONTACT INFORMATION

The depth of the contamination is about 6 m.

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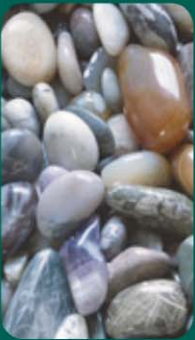
H&S and Air Quality

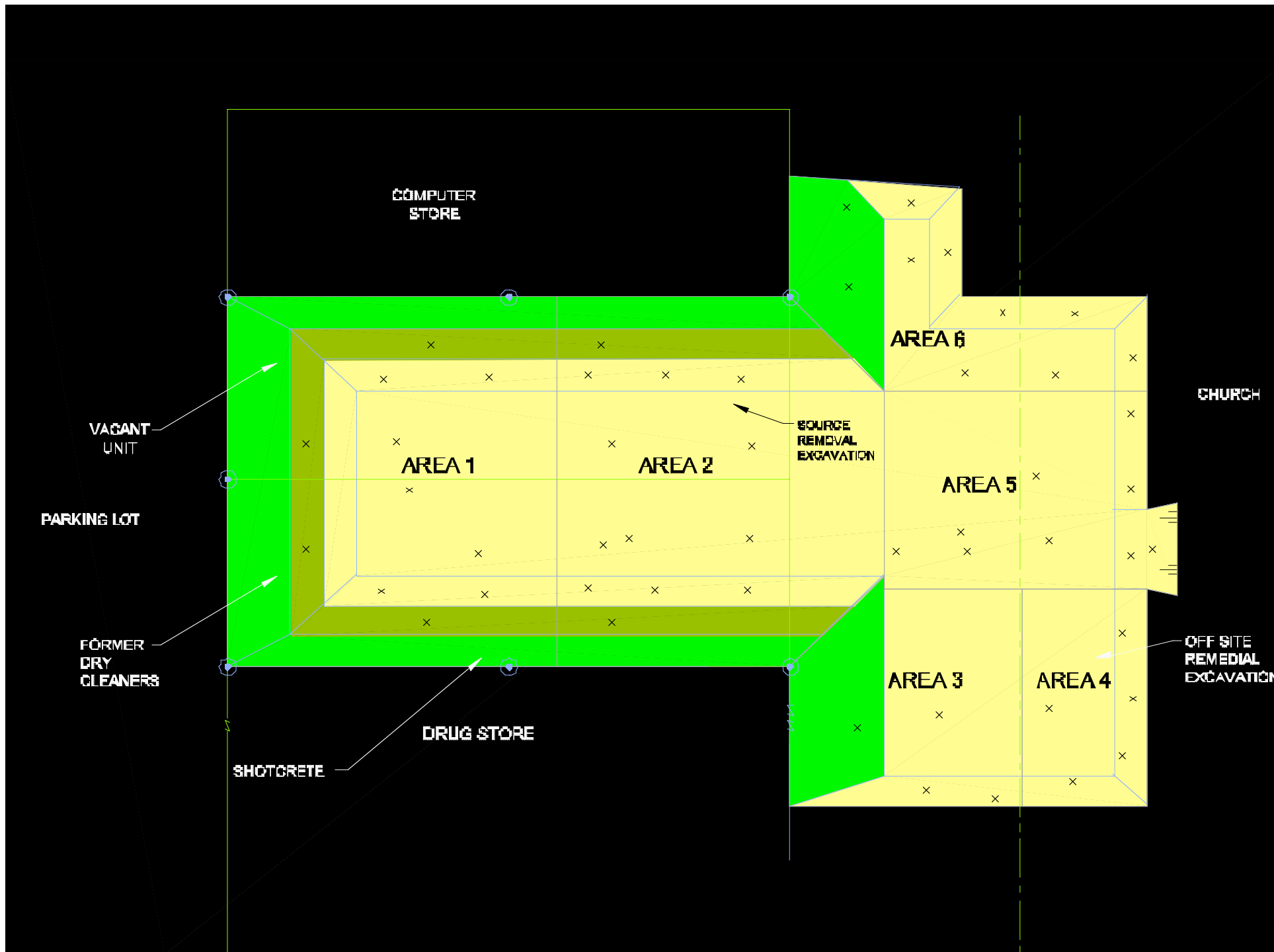
- ◆ Air quality monitoring (EHS group)
 - Two large fans used to vent working space
 - Air monitoring of all working spaces, staging area, adjacent businesses
 - intermittent (real-time) and long term (PCE, carbon



The Approach

- ◆ Interior and exterior excavations
 - interior first, then exterior
 - several smaller manageable excavations
- ◆ Removal of piles and load-bearing elements
- ◆ Reinforcement of structure
- ◆ Slopes of excavation and safety of workers
- ◆ Compaction and settlement

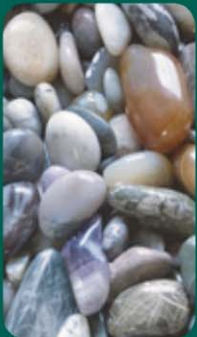




Building Preparation



Slope Management



Interior Excavation



Backfill Materials



Exterior Excavation

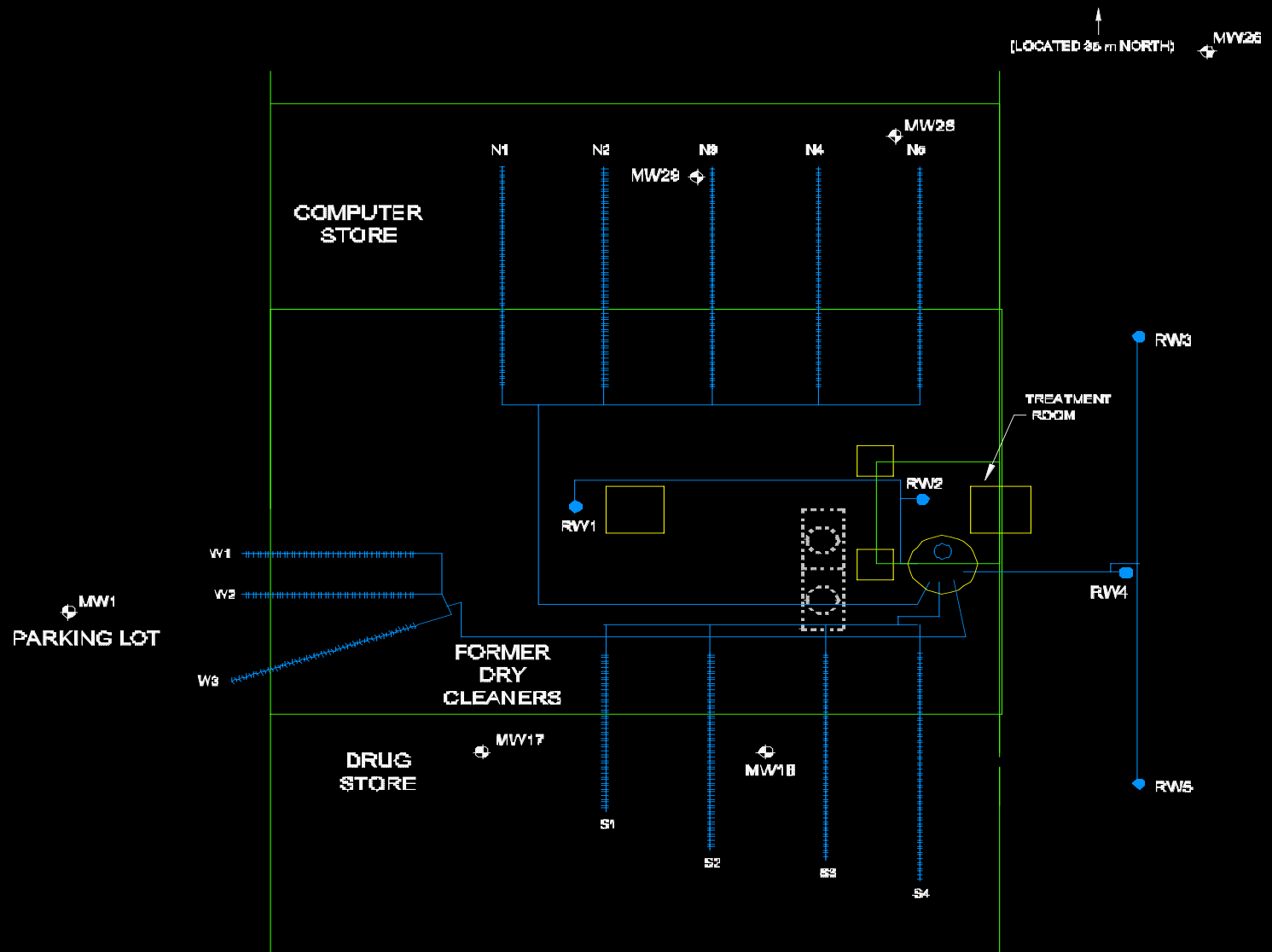
- ◆ Power, gas, phone, water, sanitary sewer
- ◆ Mystery utilities - storm sewer & power
- ◆ Two options
 - re-route
 - manage in place



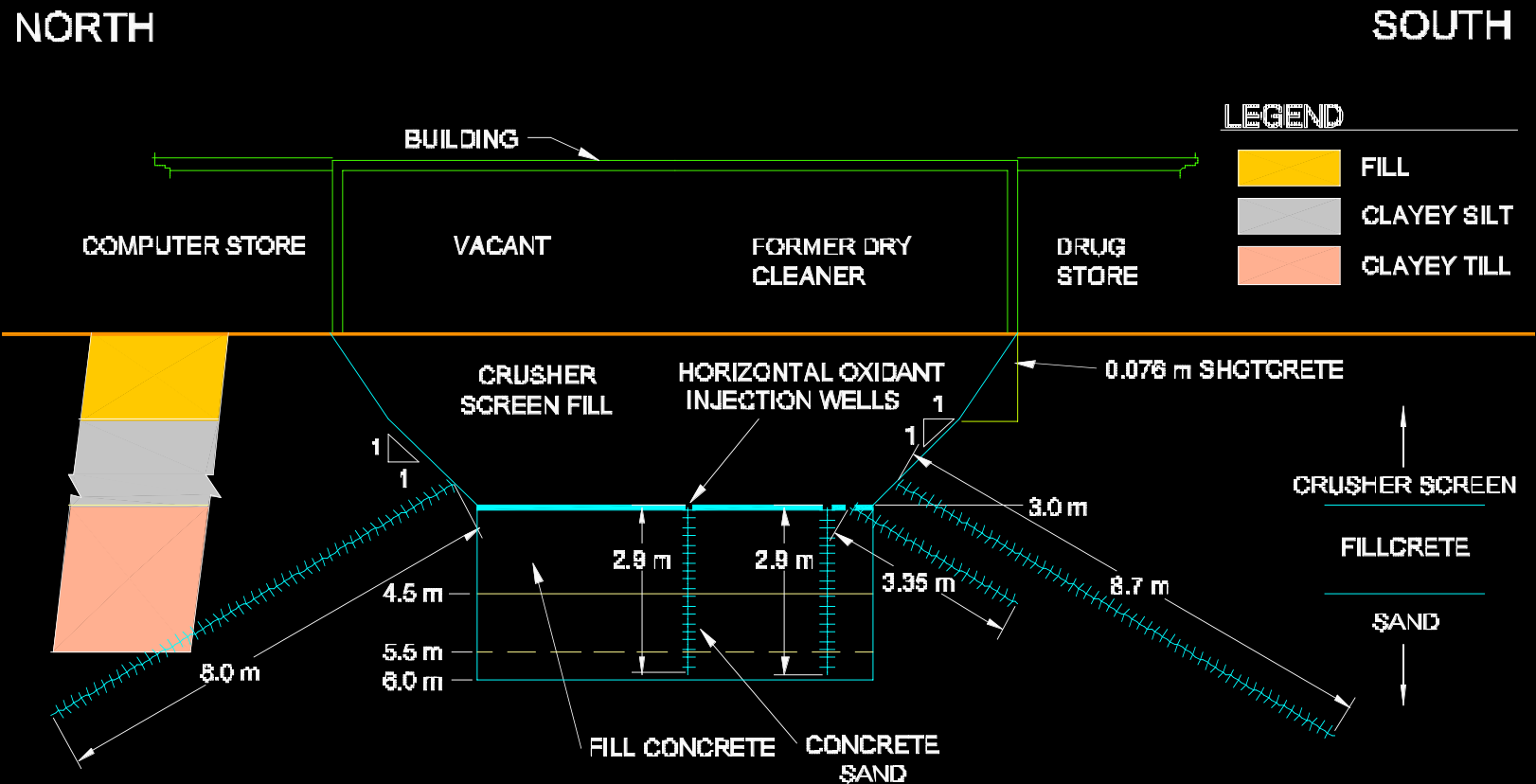
Utility Support



Contingency Oxidation System



Contingency Oxidation System



Oxidant System Installation



Oxidant System Installation



Backfill & Compaction



The Final Result





Post Remediation Monitoring

- ◆ Confirmatory soil sampling met Tier 2
- ◆ 3 and 12 months after the remediation work, groundwater samples met Tier 2
- ◆ Report submitted to Alberta Environment for “Comfort” letter
- ◆ Received “Comfort” letter on July 8, 2003
- ◆ Two vacant units have been leased
- ◆ Property is “For Sale”