



Quantum Murray LP




Remediation in and Under Buildings


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Prairies Division**

DECOMMISSIONING CYCLE



Development



Abatement



Remediation



Demolition



Waste Management



Brownfields



Emergency



Agenda

Remediation Inside Buildings

- Case Study #1 - Asbestos Abatement - Vancouver

Remediation Under Buildings

- Case Study #2 - Underpinning project - Lethbridge
- Case Study #3 - Underpinning project - Calgary
- Case Study #4 - Panel excavation and CDF backfill projects in BC

Questions / comments



Reasons for Remediation Inside Buildings

- Unsafe work/living environment needs remedy
- Improve air quality
- Building renovation in areas where hazardous materials are present
- Hazards require removal as part of demolition process
- Emergency, fire or spill response

Common Hazardous Materials

- Asbestos
- Lead paint
- Mould
- Biomedical waste
- Mercury
- Silica dust
- Rodent and bird feces
- PCB ballasts





Hazard Assessment Protocol

Recognition

If you are working in a building that may have hazardous materials present you should have an survey of the building completed prior to executing any work.

Evaluation

A qualified person should determine the risk(s) associated with the hazardous materials and determine how easily they may become disturbed to release contaminants.

Control

Eliminate exposure through barriers, engineering controls and/or personal protective equipment



Remediation Inside Buildings

Case Study #1

Vancouver International Airport Domestic Check-in Gallery Upgrade

The Challenge

- Demolish all interior fixtures, including removal of the roof system and exterior cladding
- Remove asbestos containing materials from domestic check-in gallery with a minimum disruption to the Airport Authority and its airlines.

The Solution

- An extensive asbestos abatement and demolition program undertaken in the active Domestic Terminal Building (DTB) over a two year period involving over 100 site personnel



Roof Removal and Containment



Terminal Containment



Terminal Containment





Reasons for Remediation Under a Building

- Remediation to address unsafe or unhealthy work conditions
- Site remediation in support of a property transaction where Certificate of Compliance is required
- Owner addressing off-site impacts under adjacent buildings where risk assessment is not a viable remediation solution
- To improve structure while addressing contaminant

Common Hazardous Materials

- USTs
- Hydrocarbons
- Dry cleaning chemicals
- H₂S gas
- Heavy metals
- Hydrocarbon vapours
- PCB Contaminated soil





Considerations When Underpinning

- Worker Safety!
- Confined Space
- Condition and age of structure
- Adjacent structures, retaining walls, etc.
- Depth of excavation/plume
- Condition and composition of ground
- Water table level/dewatering
- Quality of project team
- Timing of trades and supplies
- Gravity!!!



Remediation Under Buildings

Case Study #2

Underpinning and shoring between roadway and building at industrial site in Lethbridge

The Challenge

To remove 1500 m³ of contaminated soil from beneath an industrial building to a depth of 10m. Ensure main floor slab is not undermined and stocked mechanical room is kept in tact

The Solution

A design build project including underpinning one side of industrial building adjacent to the mechanical room. Shoring along roadway at opposite end using shoring caissons and timber lagging

Underpinning



Excavation







Remediation Under Buildings

Case Study #3

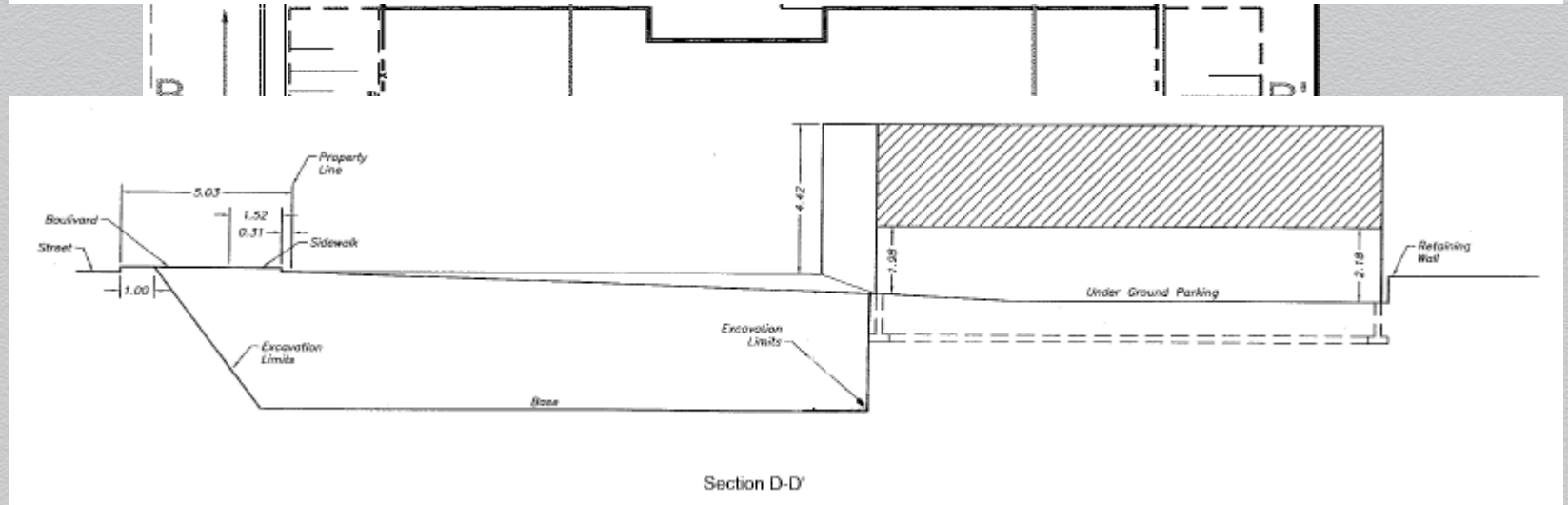
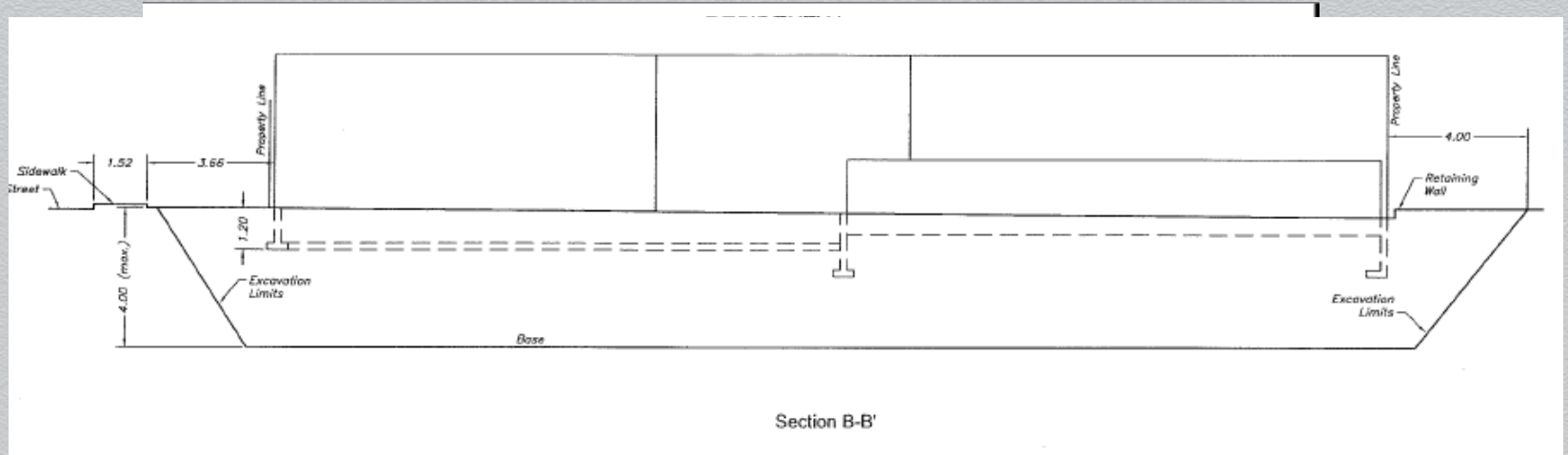
Underpinning and shoring between roadway and building at commercial site in Calgary

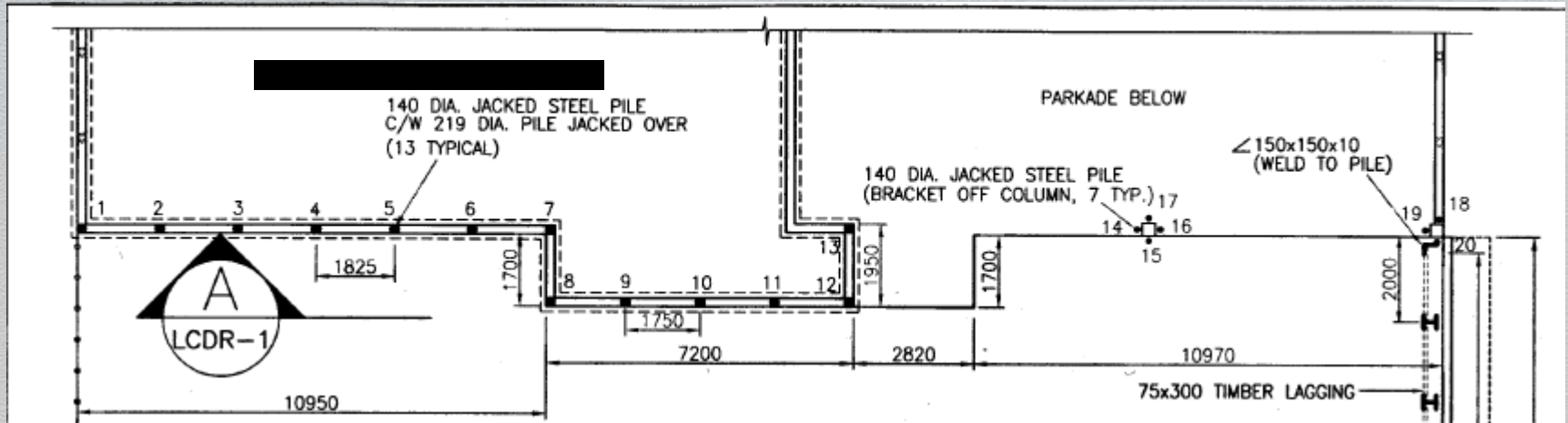
The Challenge

To remove contaminated plume from under former service station - now a restaurant. Complete work in tight timeline in order to ensure restaurant remains in business

The Solution

Another design build project including underpinning frontage of restaurant and parkade. Shoring along adjacent retaining wall using shoring caissons and timber lagging





- 13 jacked steel piles installed along front of restaurant and parkade
- Property to the south at higher elevation therefore shoring required to reinforce retaining wall
- Bulk excavation between the building and Centre Street North to a depth of 4m
- Installation of impermeable liner along south and west side
- Excavation limit up to property line therefore reinstated boulevard and curb

Underpinning



Shoring





Benefits to Underpinning Remediation

- Business occupying the building can remain in operation
- Ensuring a clean site within a project timeline as opposed to lengthy in-situ treatment systems
 - months vs. years
- Often improving the integrity of an older building
- Readily accessible technologies
- Cost effective



Remediation Under Buildings

Case Study #4

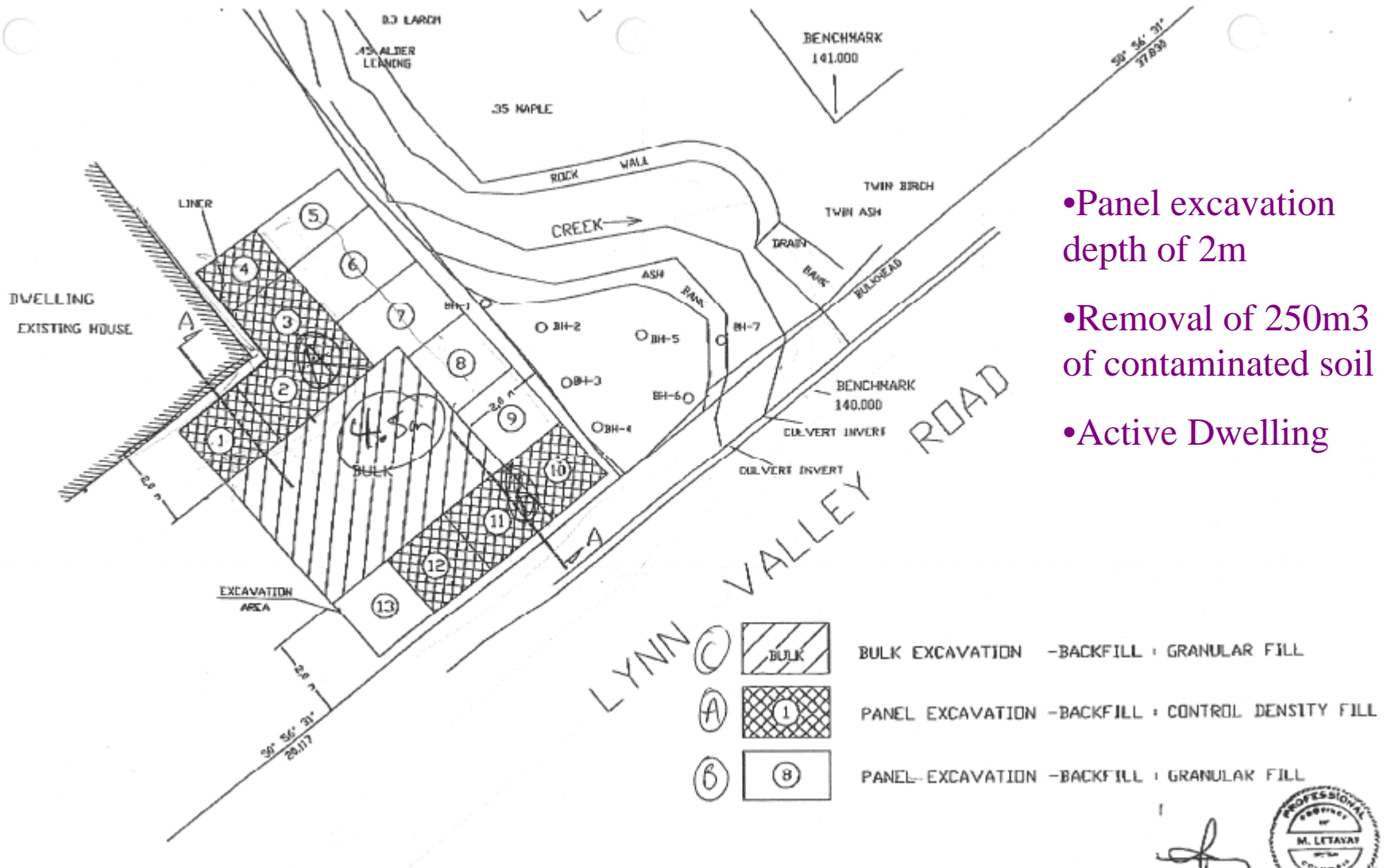
Alternating Panel Excavation and CDF backfill at Two Sites in BC

The Challenge

- To remove contaminated plume from under load bearing structures without underpinning and backfill to ensure structural integrity
- To work within a confined area in order to completely remove contaminated plume

The Solution

- Conduct alternating panel excavations to required depth in order to completely remove contamination
- Backfill using Control Density Fill (CDF) which ensures 100% compaction and integrity of structure

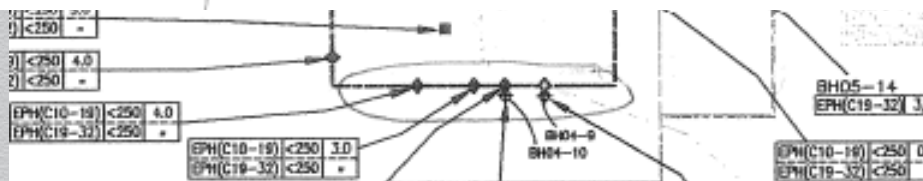
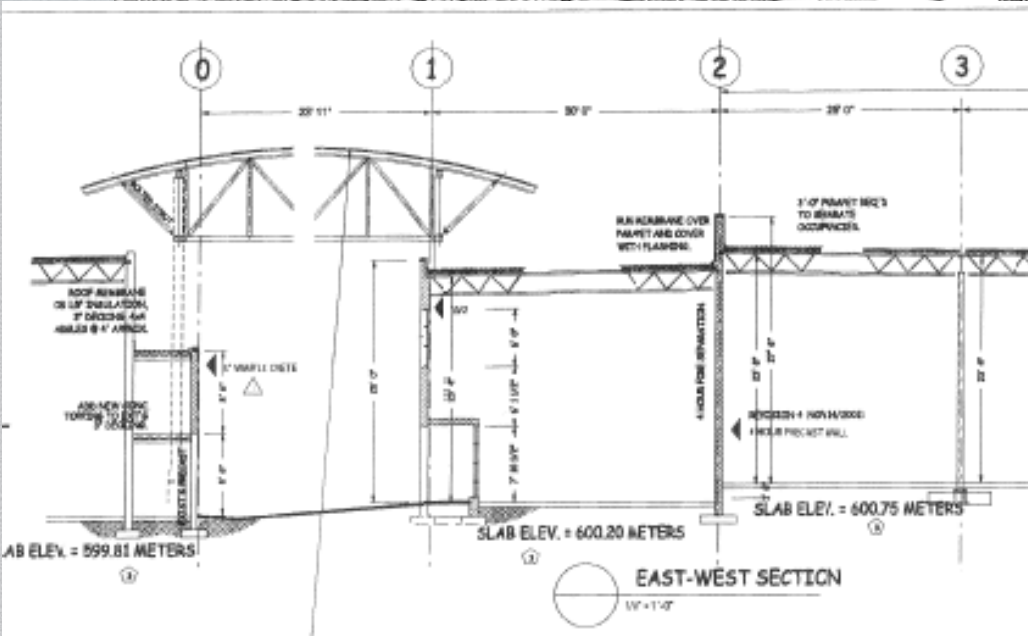
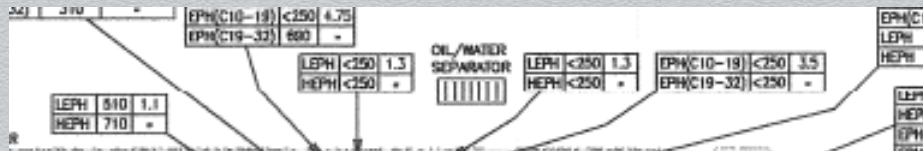


- Panel excavation depth of 2m
- Removal of 250m³ of contaminated soil
- Active Dwelling

Panel Excavation and CDF Option



Panel Excavation and CDF Option



- Depth of excavation 6m
- Mechanical room above contaminated plume
- Series of utilities to south end of mechanics bay
- Confined work area
- Contaminated plume inside building adjacent to exterior wall and canopy footing (2'*2'*4')





Benefits to Panel Excavation and CDF Backfill

- Business occupying the building can remain in operation
- Ensuring a clean site within a project timeline as opposed to lengthy in-situ treatment systems
 - months vs. years
- Often improving the integrity of an older building
- Readily accessible technologies and supplies
- Even more Cost effective

If You Can't Pin it, Move it!!!





QMLP

Thank-you

For More Info.

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References

- Russ J. Renburg, P.Eng. – W&R Foundation Specialists
- Percy Dumba – QMLP General Manager, Prairies
- Stephen Custeau, P.Eng., MBA – QMLP Principal
- Gil Fife – QMLP General Superintendent, Prairies
- Rick Henrique – QMLP Superintendent
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