

*Technical and Strategic Considerations
for the Use of Risk Assessment at a
NAPL-Impacted Brownfield*



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PRESENTATION GOALS



Project Context



Keys to Success



Project Overview



Project Outcome



Strategy



Wider Applicability

Can this project serve as an example for consultants and real estate developers to move forward on NAPL-impacted properties?



WHO WE ARE



Founded in 1995



Employee-Owned



120+ employees



Health and Safety
Focused



Commitment to
Diversity and
Inclusion



Inogen Alliance
Partner for
Canada





Multi-disciplinary engineering and science consultancy

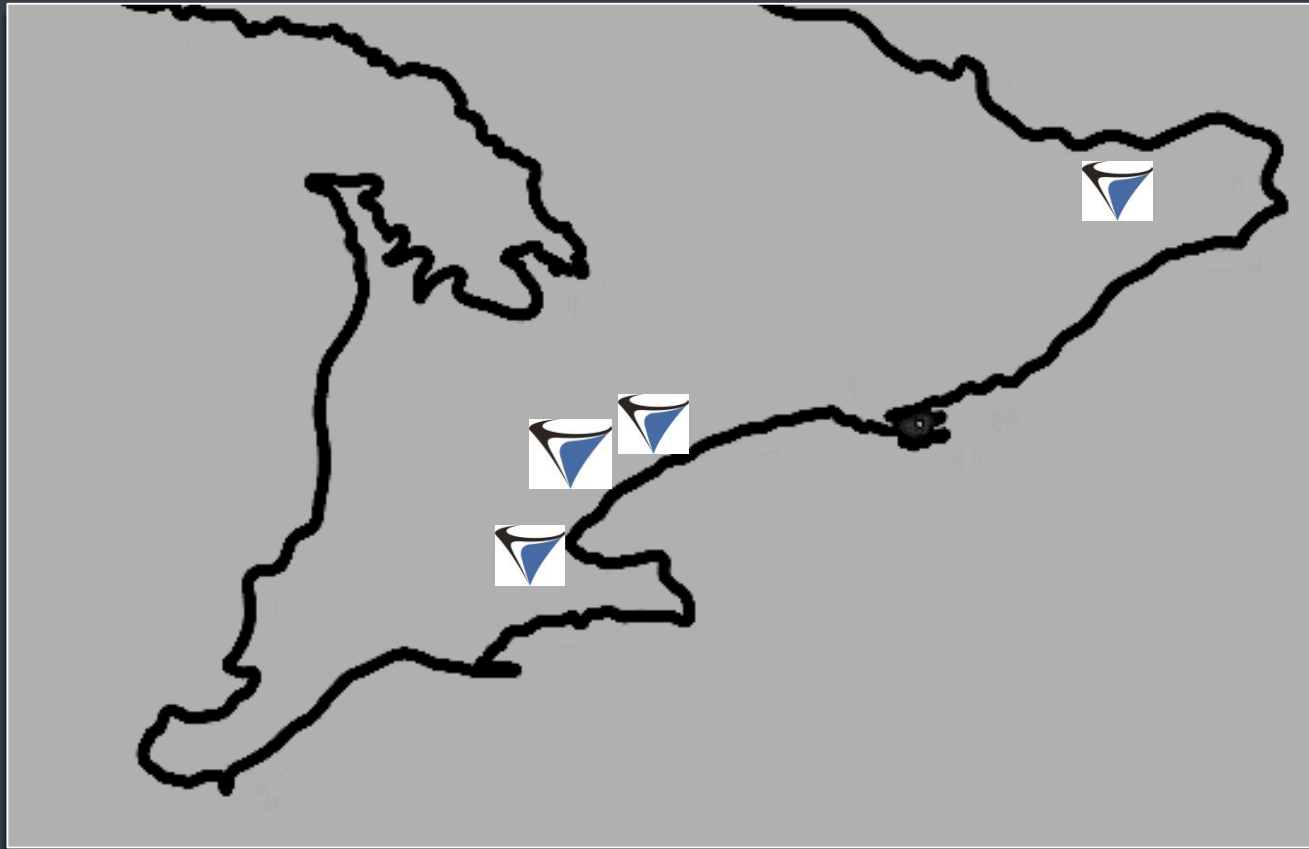
- Environmental
- Geotechnical
- Hydrogeology
- Ecology
- Building Science
- EHS

Diverse client base

- Real Estate Development
- Property Management
- Petroleum
- Insurance
- Government Agencies
- Municipalities



OUR PRESENCE



Toronto Office

90 Scarsdale Road
Toronto, Ontario
416-245-0011

Hamilton Office

65 Nebo Road
Hamilton, Ontario
905-632-5939

Durham Office

1333 Thornton Road S, Unit 2
Oshawa, Ontario
905-739-3202

Ottawa Office

20 Gurdwara Road, Unit 1
Ottawa, Ontario
613-745-6471



PROJECT CONTEXT



Retail Fuel Outlet and
Garage operating
since 1950s



Leaking USTs
(for decades?)



Extensive area of
impact and presence
of LNAPL discovered
in 1990s



25 years of remedial
activity with
diminishing returns



PROJECT CONTEXT



Petroleum impacts have migrated to off-site locations



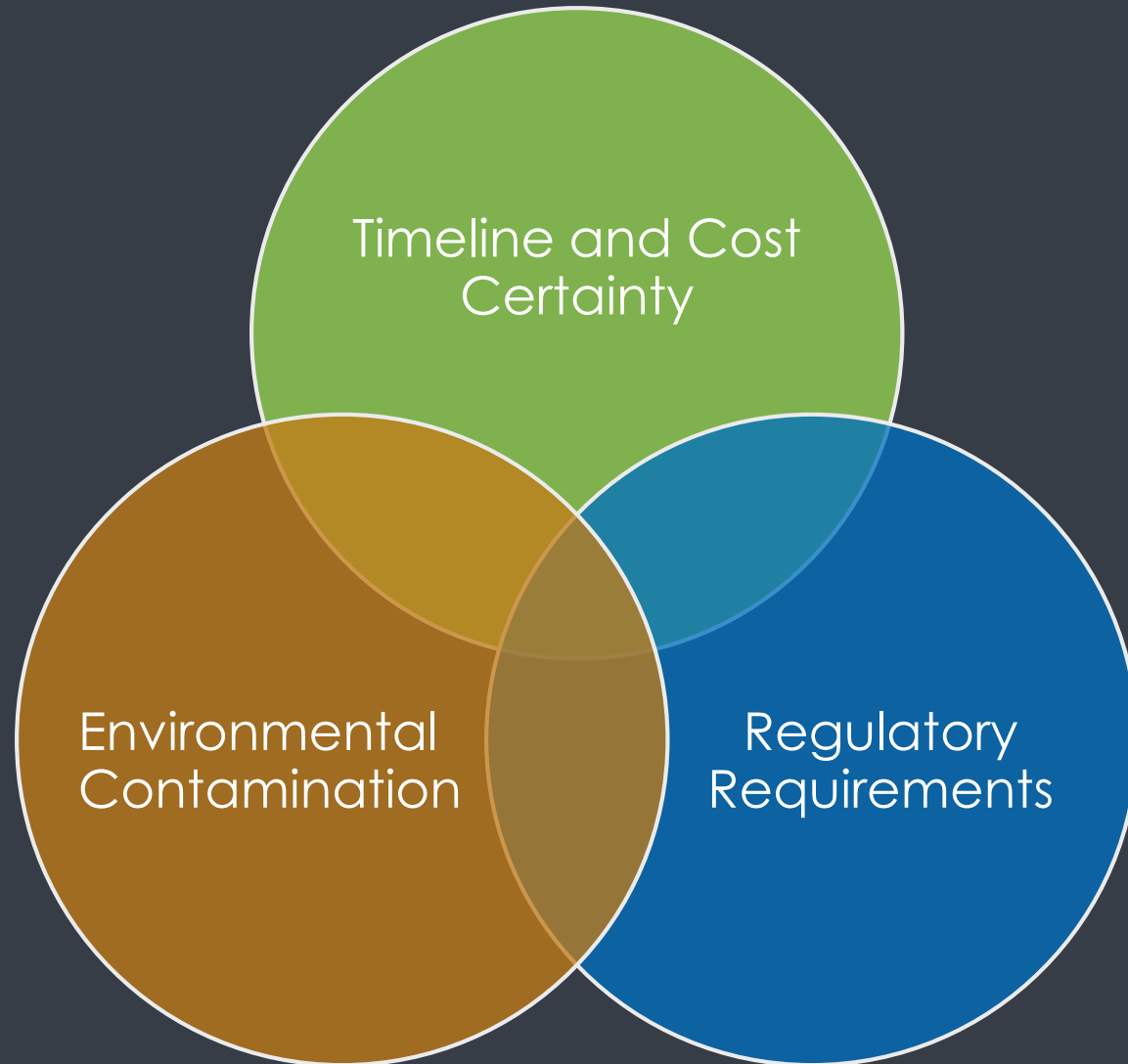
Need to divest – preferably for residential use



How can we file an RSC?
What are the project considerations?



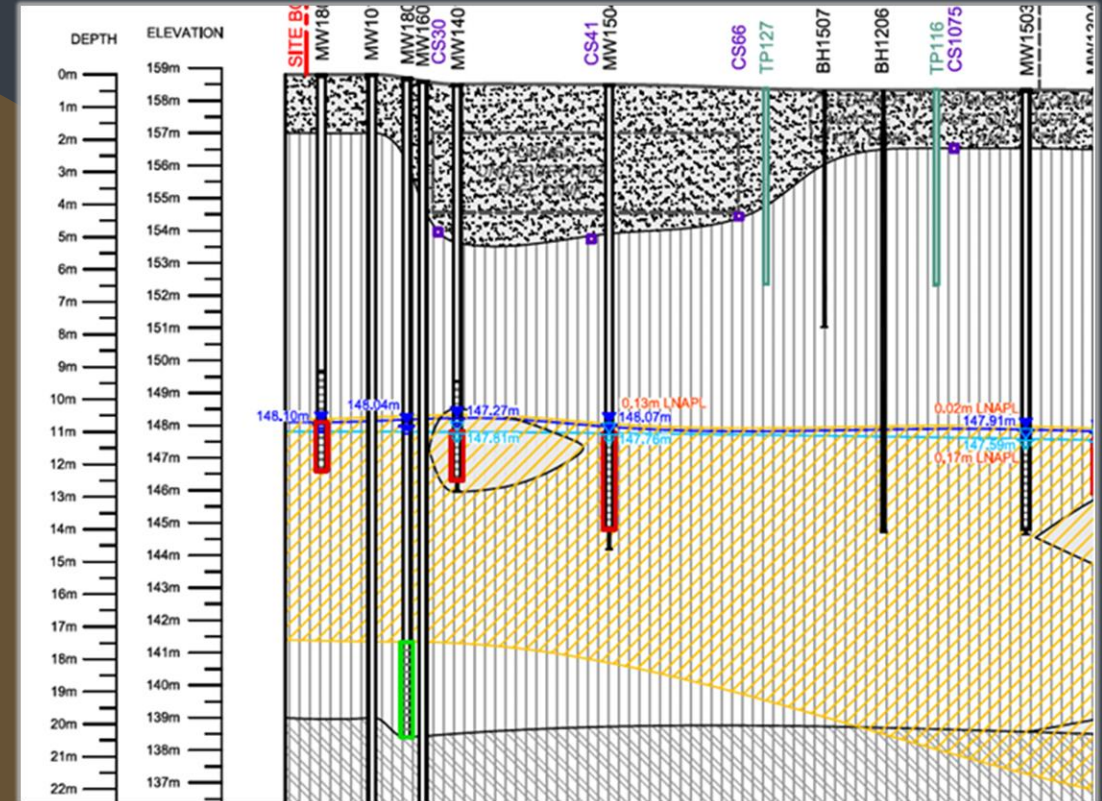
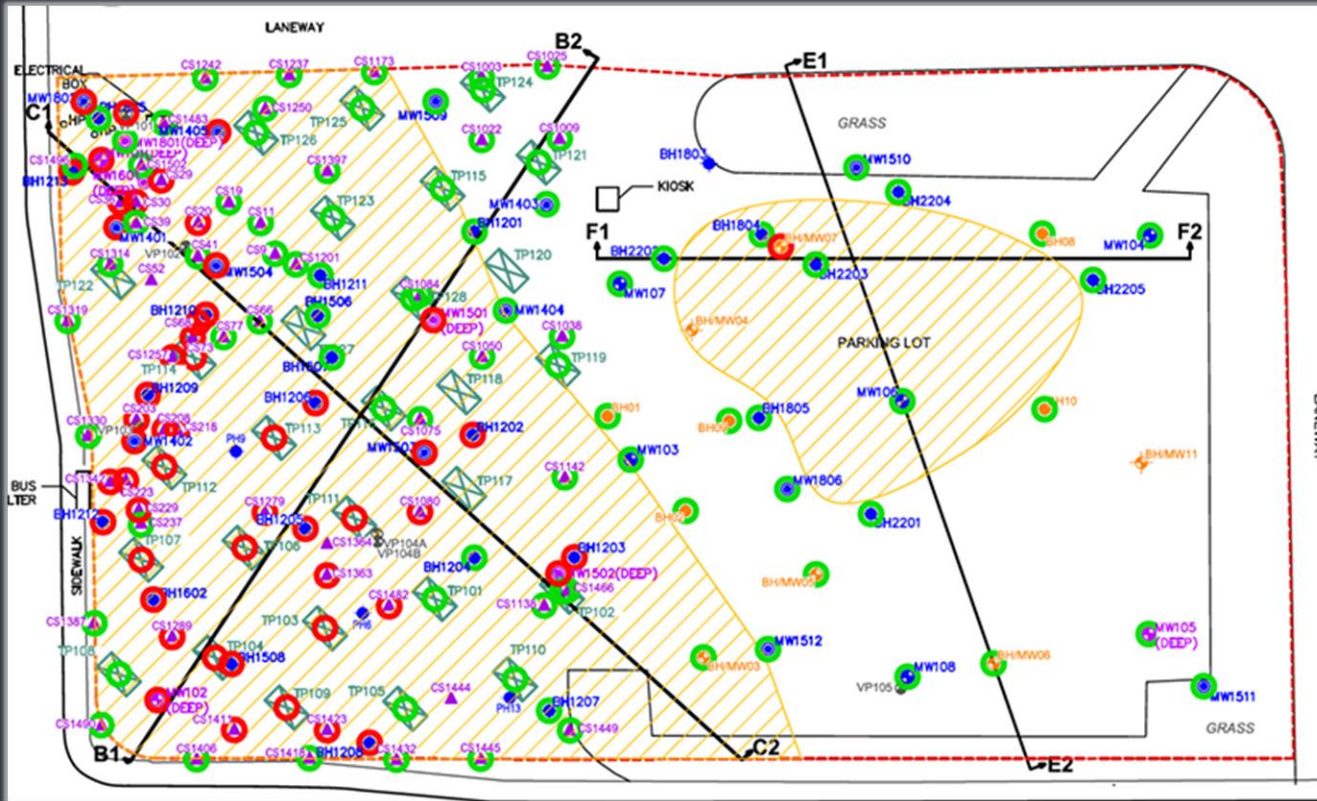
PROJECT CONSIDERATIONS



What is the most **practical and cost-effective** solution that meets the **regulatory requirements** and effectively deals with the **contamination?**



ENVIRONMENTAL CONTAMINATION





REGULATORY REQUIREMENTS

- O. Reg. 153/04 requires the filing of Record of Site Condition for change in property use
- Requires all contaminant concentrations meet applicable Site Condition Standards

OR

- Set Property-Specific Standards (with or without Risk Management) through a Risk Assessment

MECP policy requires that free-phase product be removed to the extent “technologically practicable”

No consideration of costs



TIMELINE AND COST CERTAINTY

- Uncertainty regarding success of conventional remedial excavation approaches
- Ontario's regulatory requirements require six months of groundwater monitoring post-excavation
- Risk Assessment process can be lengthy for more complicated sites
- Reasonable certainty is essential to developers
- Costs associated with construction activities and loans are significant
- Many moving parts involving planning and permits, financing, sales, etc.



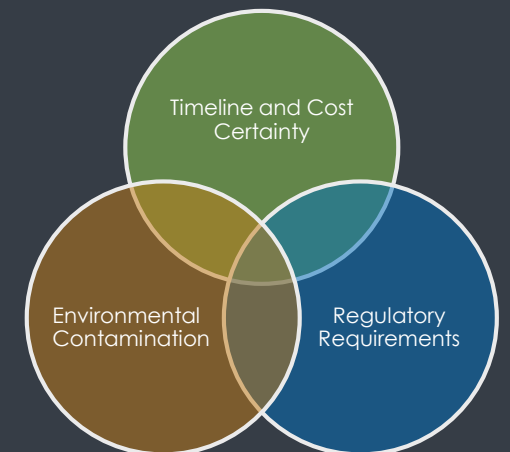
POTENTIAL OPTIONS

Remediation through Development

- Remove petroleum and VOC impacts as part of bulk excavation
- Requires over-excavation and remedial groundwater monitoring with open excavation
- Significant uncertainty if all contamination could be remediated, or within allotted timeframe

Checklist

- Environmental contamination
- Regulatory requirements
- Timeline and cost certainty





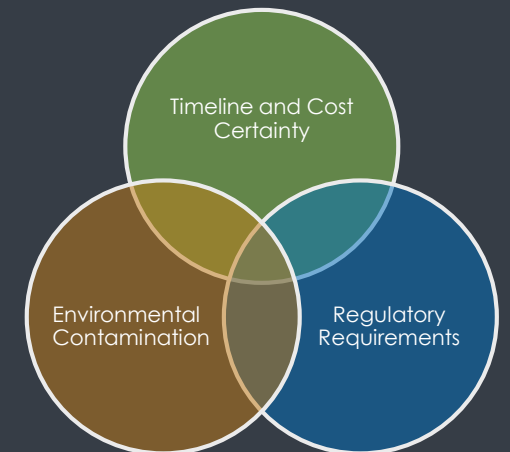
POTENTIAL OPTIONS

Risk Assessment

- Risk Assessment that assumes ongoing presence of NAPL
- NAPL CSM requires detailed delineation and ground-truthing
- Risk assessment process represents a delay pre-construction
- Extensive investigation and RMMs are expensive
- Still best option to limit costs during construction phase

Checklist

- Environmental contamination
- Regulatory requirements
- Timeline and cost certainty

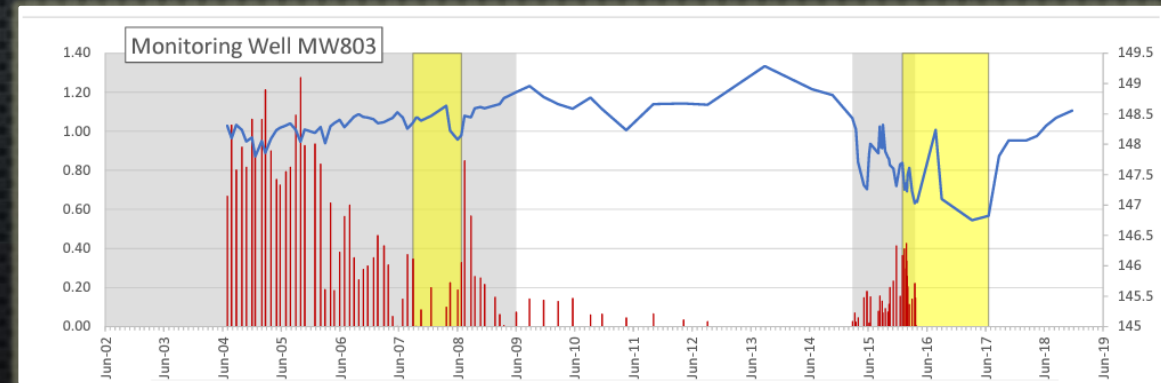
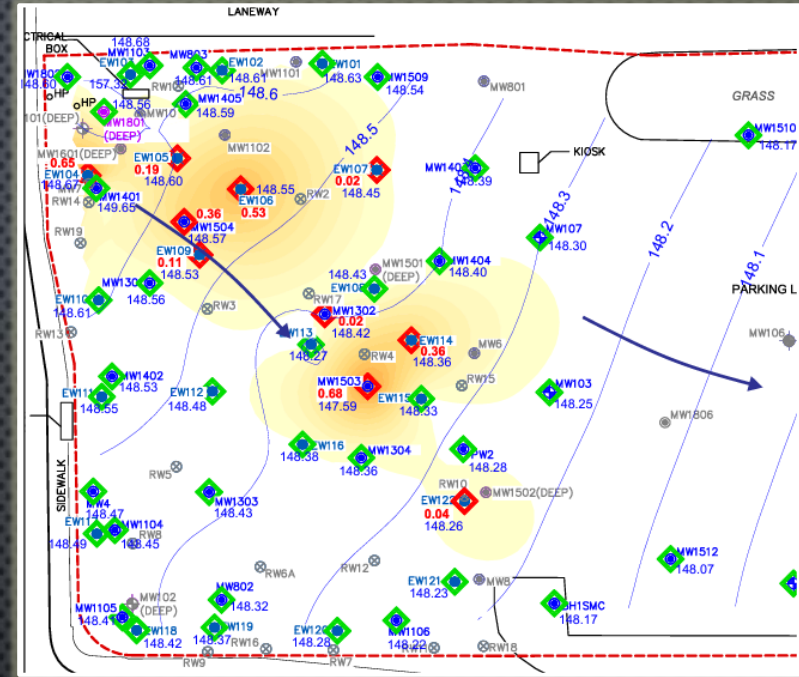




KEYS TO SUCCESS

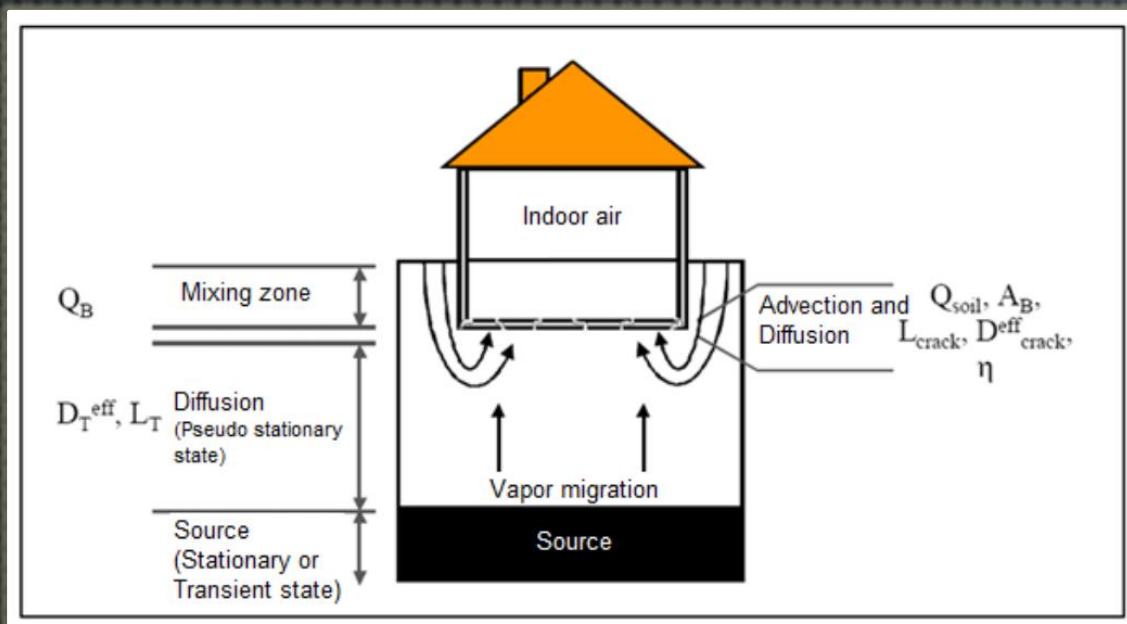
LNAPL CSM

- Long-term monitoring and remediation provided strong delineation of impacted areas
- Gave confidence to MECP that LNAPL was characterized and stable



KEYS TO SUCCESS

LNAPL Vapour Modelling



Gouvêa Júnior, J.C.R., 2019. Soil Vapor Intrusion. NICOLE Brasil.

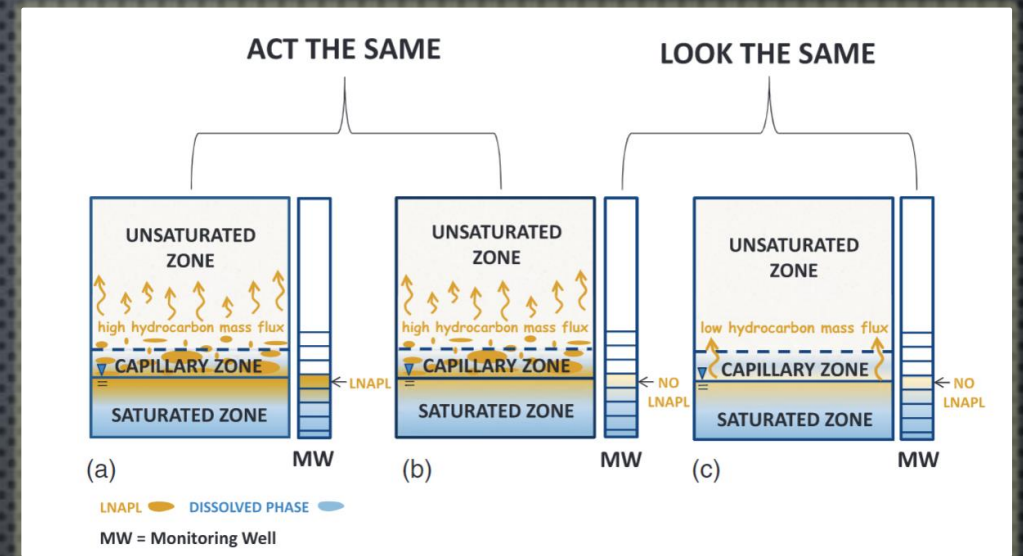
- Vapour intrusion models generally invalidated by presence of product
- Developed a model to estimate sub-surface vapour concentrations assuming the presence of LNAPL
- Required an understanding of the product type and main constituents



KEYS TO SUCCESS

Ground Truthed Data

- Soil vapour data were collected in LNAPL areas to determine the accuracy of the modelling and assumptions
- Provided confidence to MECP that the approach and outputs were sound




Lahvis, M.A., et al., 2013. Vapor Intrusion Screening at Petroleum UST Sites. *Groundwater Monitoring & Remediation* 33, no. 2: 53-67



KEYS TO SUCCESS

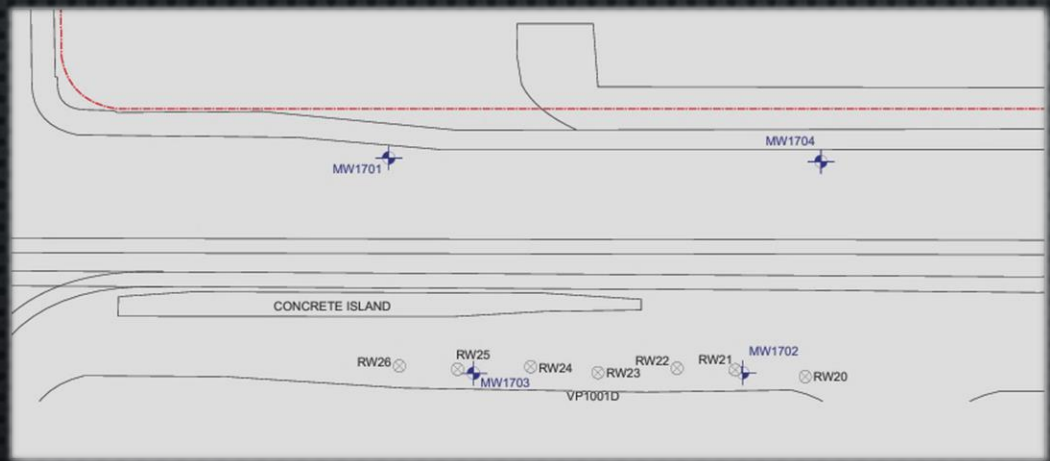
Certificate of Property Use

Ontario 

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

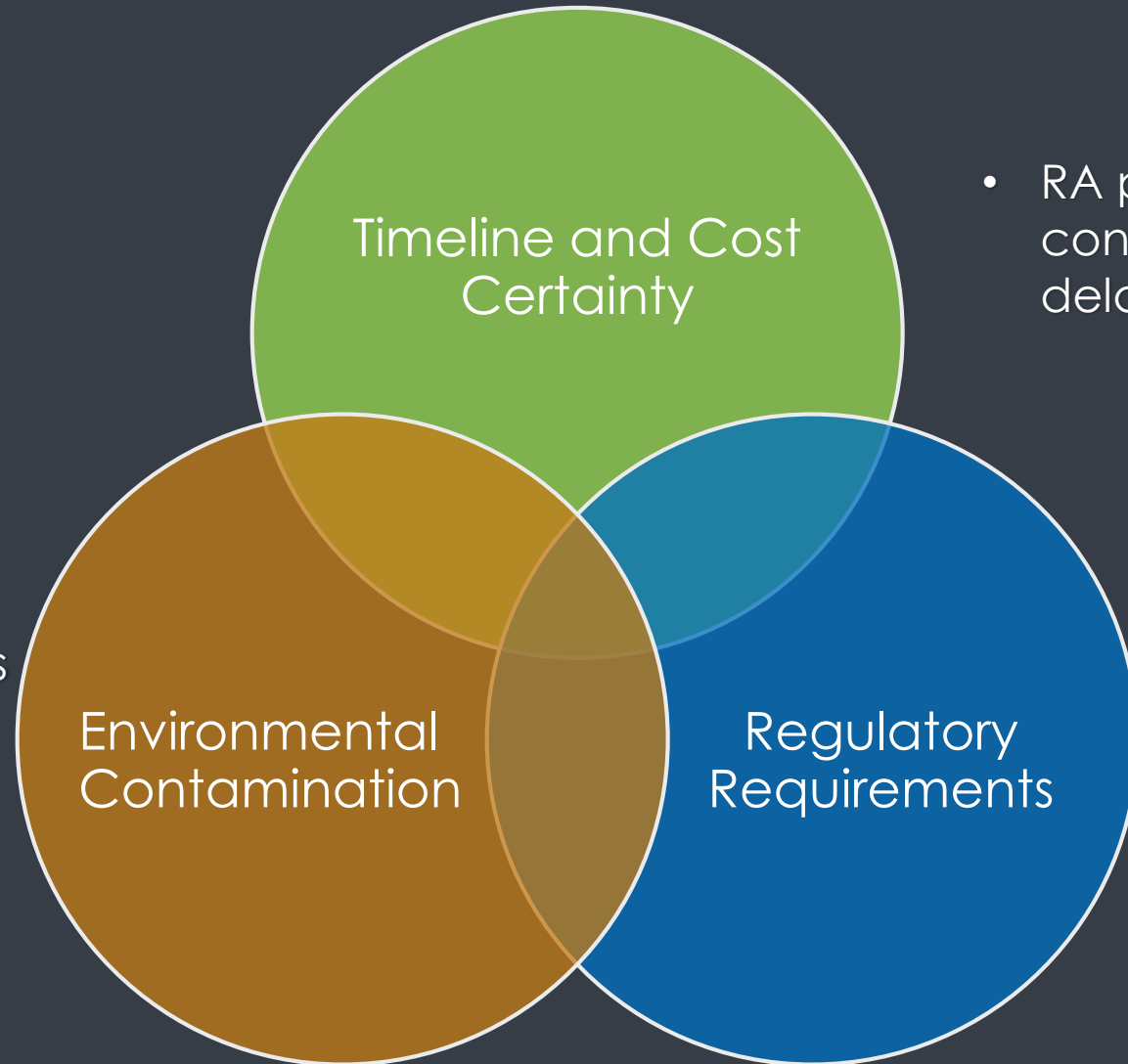
Certificate of Property Use
Issued under the authority of the Environmental Protection Act, R.S.O. 1990, c. E.19, sections 168.6 (CPU) and 197 (Order)

- Locking your client into a CPU isn't often the best approach BUT provides certainty for the Regulator
- Allows MECP to have confidence in the approach and risk management
- Engagement with MECP to understand their concerns
 - NAPL stability
 - Off-site migration
 - Exposure scenarios





PROJECT OUTCOME



- Some impacts to be managed in-place
- Accepted RA with RMMs
- CPU considers and manages off-site concerns

- RA process is slow but construction isn't delayed

- RA with inflated PSS
- CPU
- RSC filed



WIDER APPLICABILITY

- Brownfields represent the best opportunity to address Canada's housing crisis
 - Large number of urban brownfields throughout Canada
 - Many brownfields have NAPL present
- 



WIDER APPLICABILITY

- Standard models don't consider separate source types and phase-separate liquids
- Need to ground truth available data with consideration of exposure pathways of concern
- Property-Specific Standards in presence of NAPL are meaningless



WIDER APPLICABILITY

- MECP policy still poses a challenge
 - Limits redevelopment of NAPL sites
 - What happens if a site doesn't have 25 years of clean up history?
 - Is it time to reconsider the objectives and desired outcomes of the policy?



CONTACT US

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