Soil Contamination

Design Impacts and Lessons Learned

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Project Manager, City of Belleville

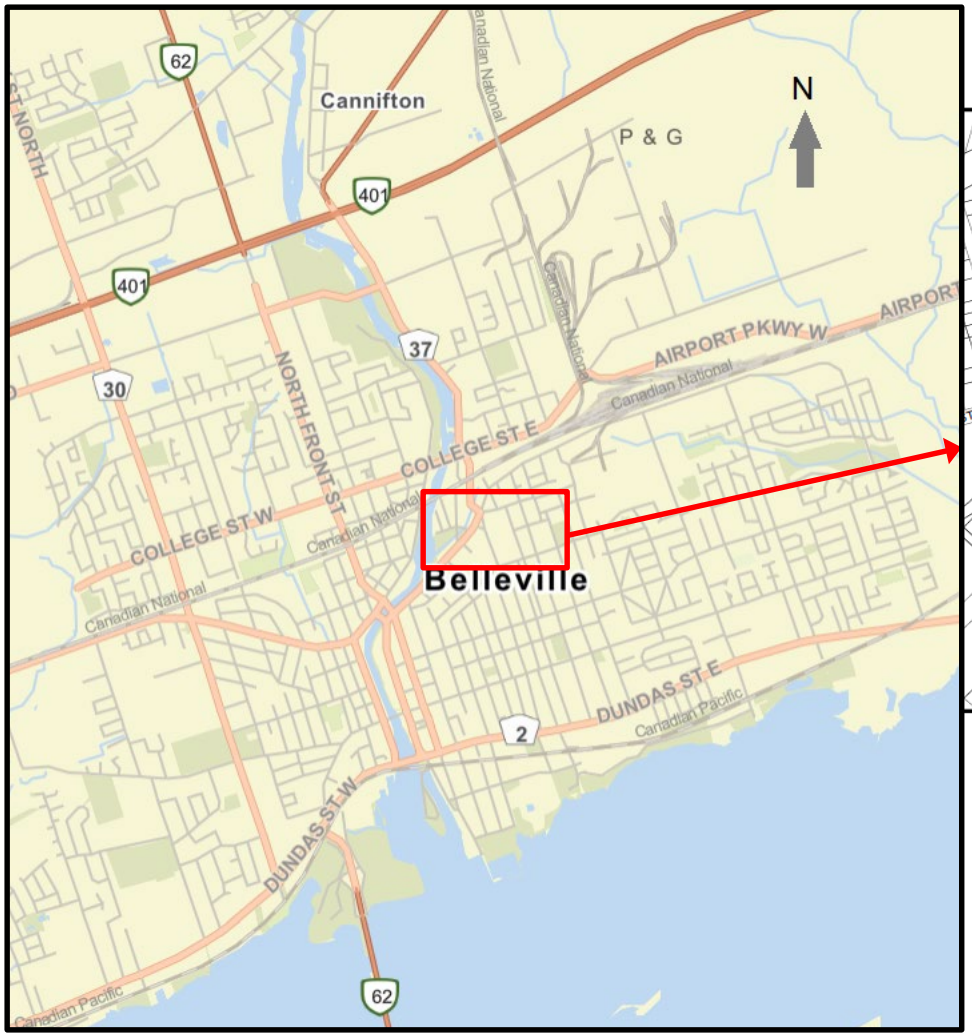
2022 Municipal Engineer's Association Conference – November 16, 2022

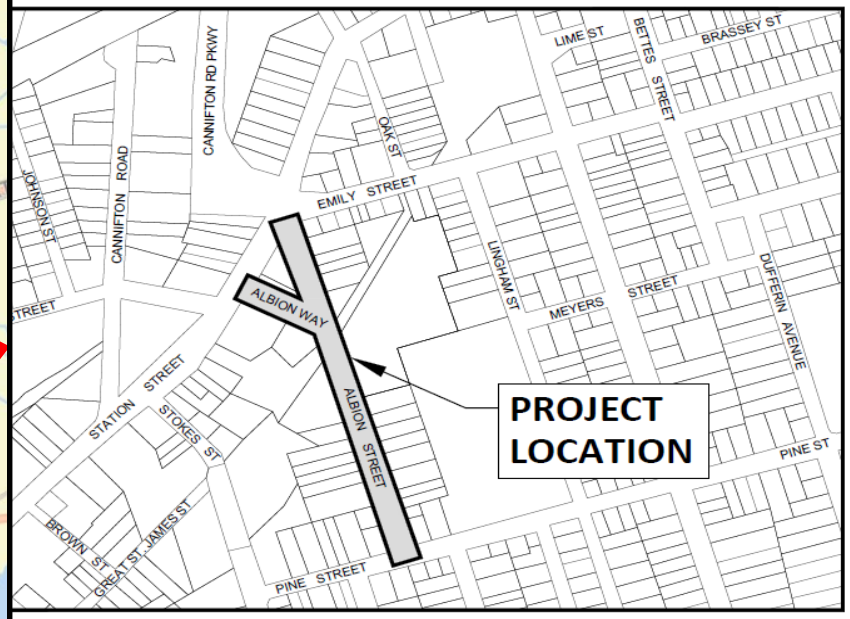
Soil Contamination
Design Impacts and Lessons Learned

1. Project Location
2. Project Background & Design
3. O.Reg. 406/19: On-Site and Excess Soil Management
4. Soil Investigations & Local Contaminants
5. Project Impacts & the Watermain Design
6. Current Project Status
7. Questions

Soil Contamination - Design Impacts and Lessons Learned

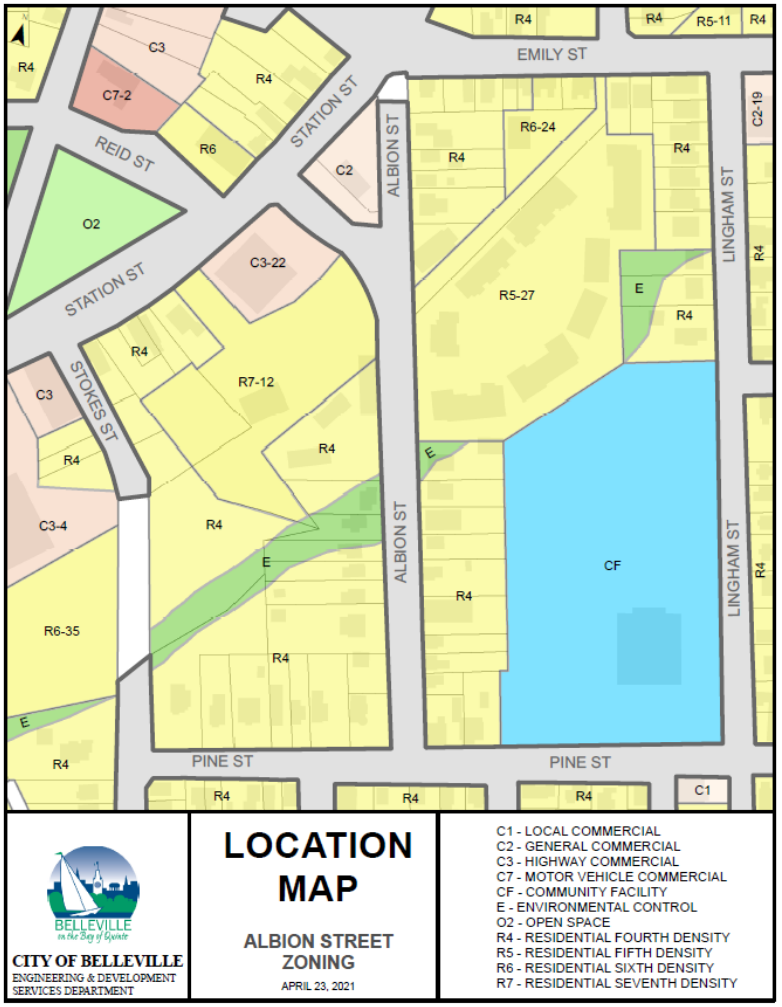
Project Location



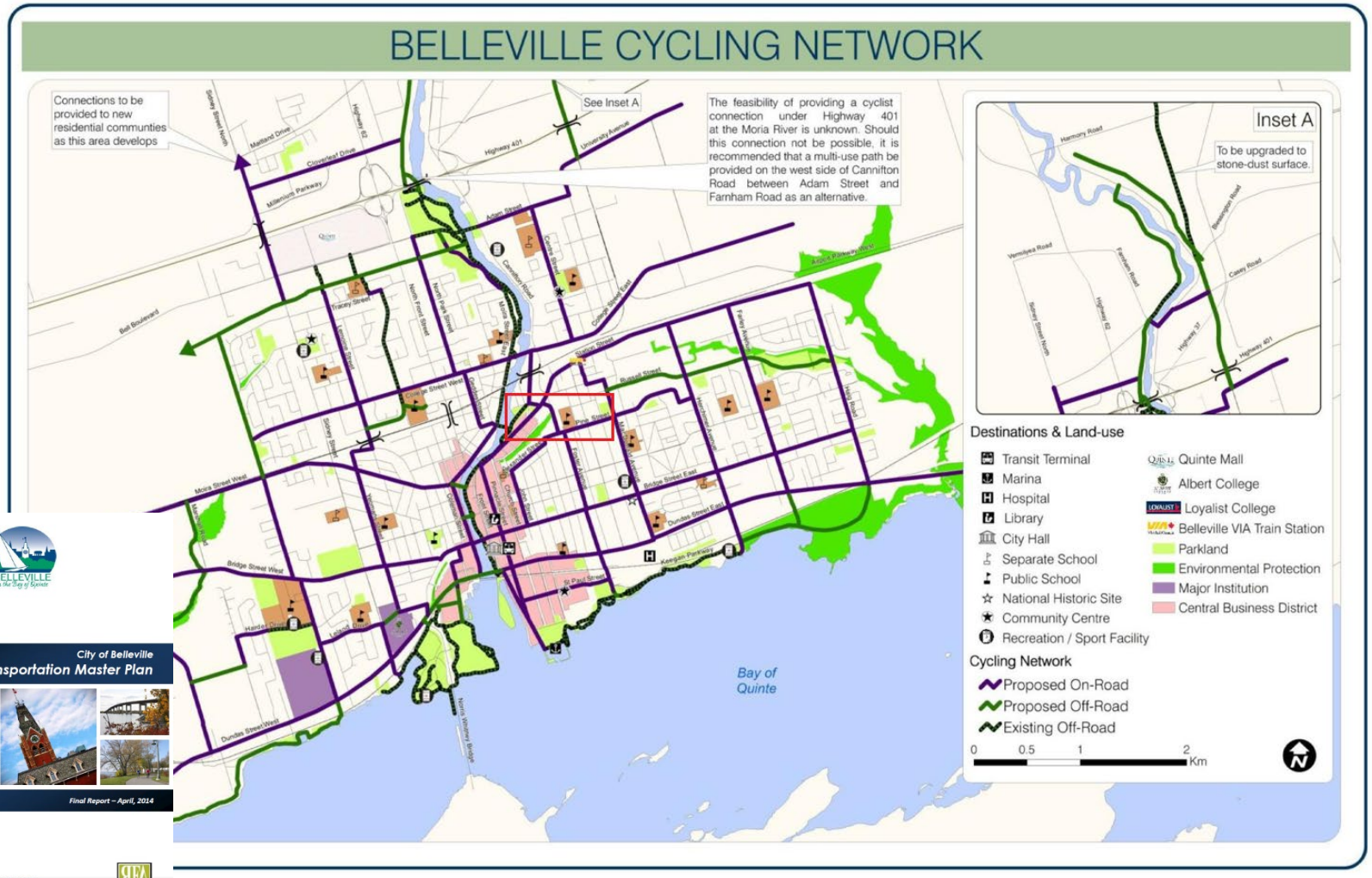


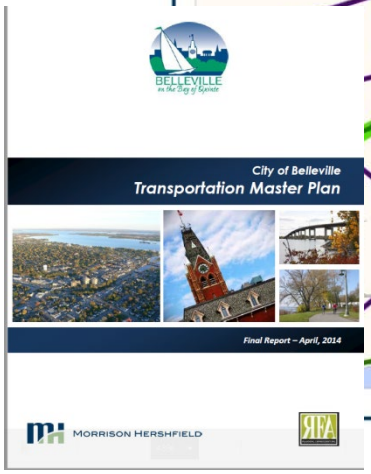
Project Location

- The roadway is within an urban part of the City
- Is surrounded by single family and multi-unit residential homes on the south
- Commercial, single family and multi unit residential lots to the north



Project Background - City Cycling Network



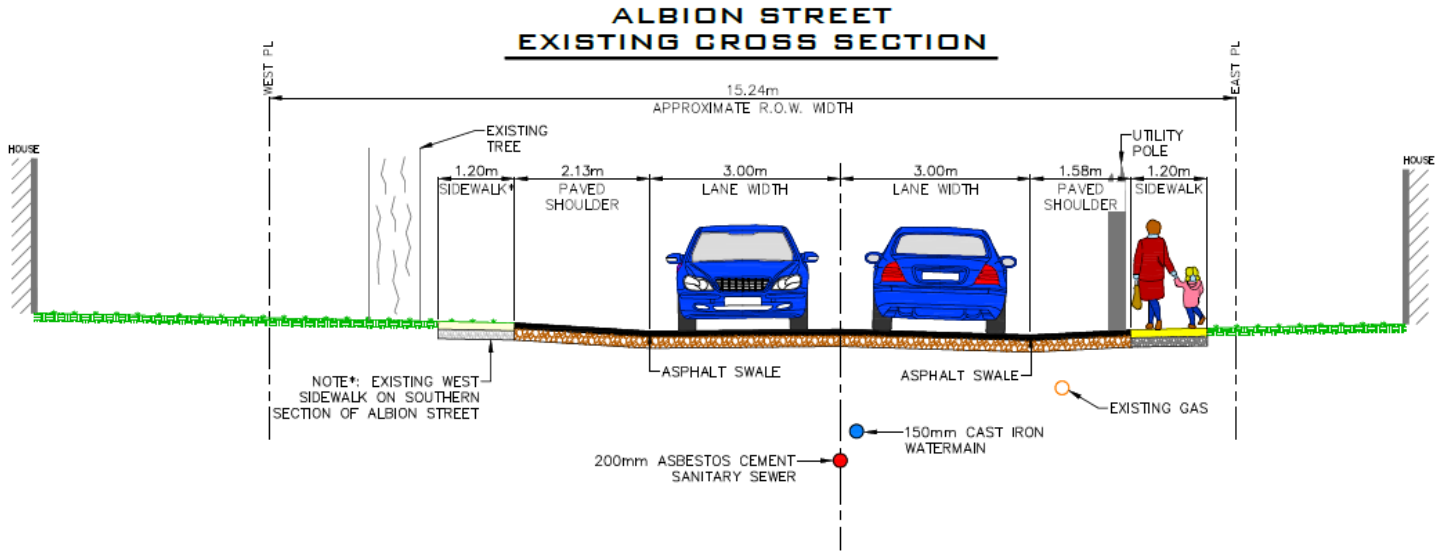


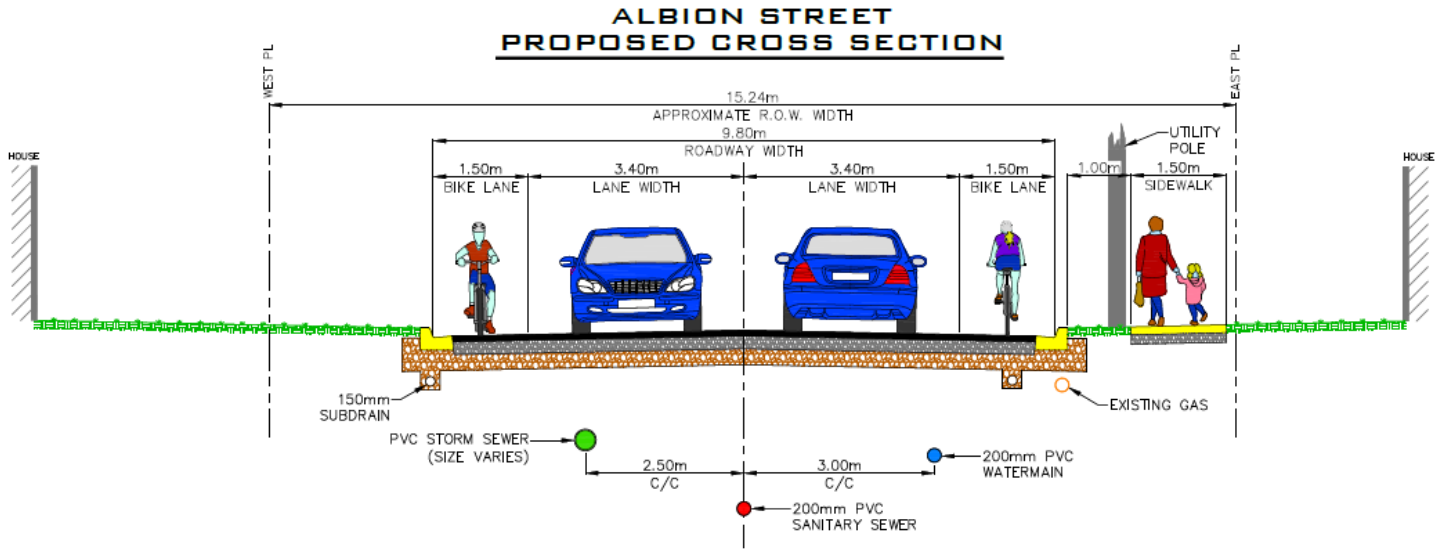
Project Background - Existing Street

- Storm water is managed via overland flow through paved shoulders, channeling water to the north

- Asphalt and paved shoulders are in poor to very poor condition

Proposed Design





Soil Investigations

O.Reg. 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT

Ontario

Additional Soil Testing and Reporting is Required, including preparing an:

- Assessment of Past Uses
- Sampling Analysis Plan
- Soil Condition Report

Confirming the soil condition and where excess soil can be transported.

Soil Investigations

O.Reg. 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT

- Prepared for the implementation of O.Reg. 406/19
- Estimated our Excess Soil Volume for the Site: roughly 5,000 cubic meters
- Completed an additional 28 excess soil characterization tests collected from 10 boreholes as a part of our geotechnical investigations
- Total geotechnical investigation costs, completed in 2021,were:
  - $14,570 Geotechnical Investigation & Reporting (including boreholes)
  - $16,510 for Excess Soil Testing & Reporting

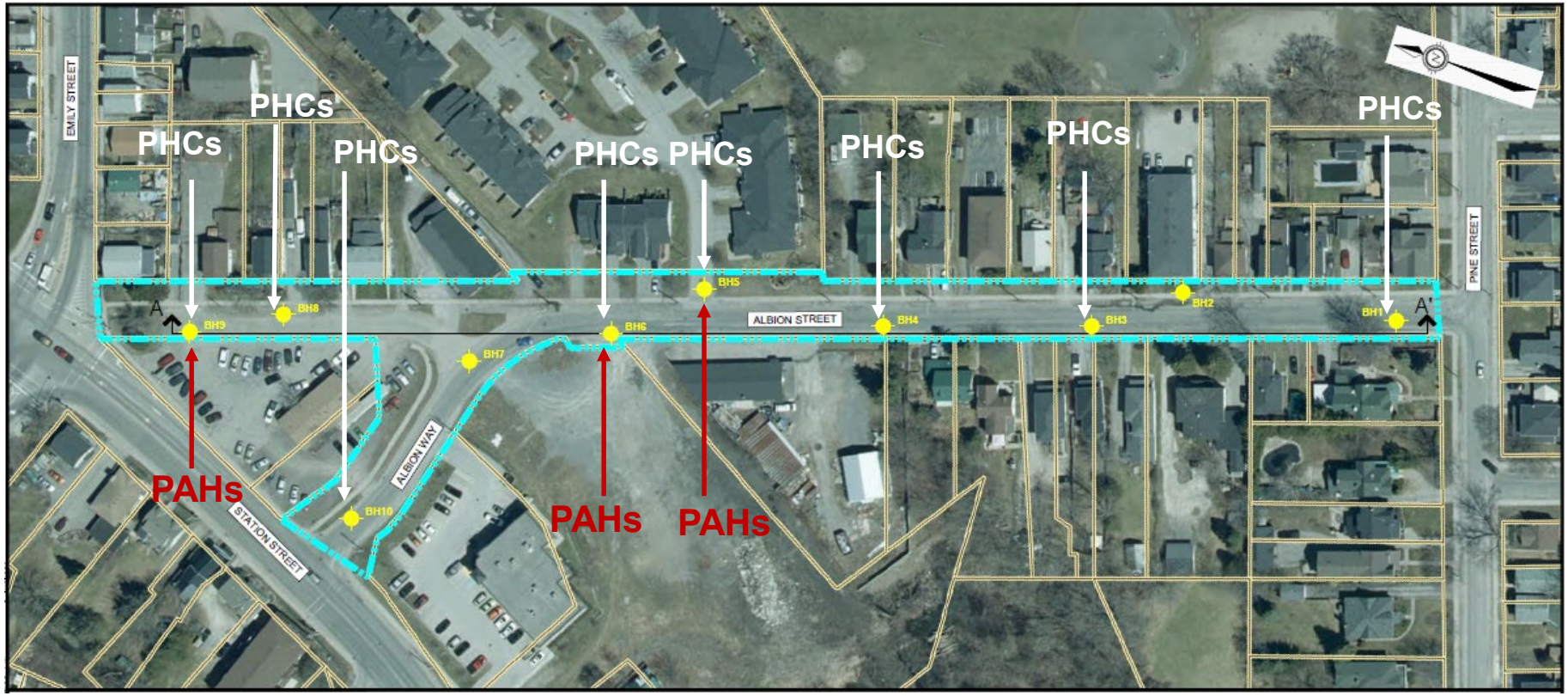
    $30,910 Total (less HST)

Soil Investigations

Select contamination was found during soil investigations:

- Electrical Conductivity (EC)
- Metals (Barium & Colbalt)
- Sodium Absorption Ratio (SAR)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Petroleum Hydrocarbons (PHCs)

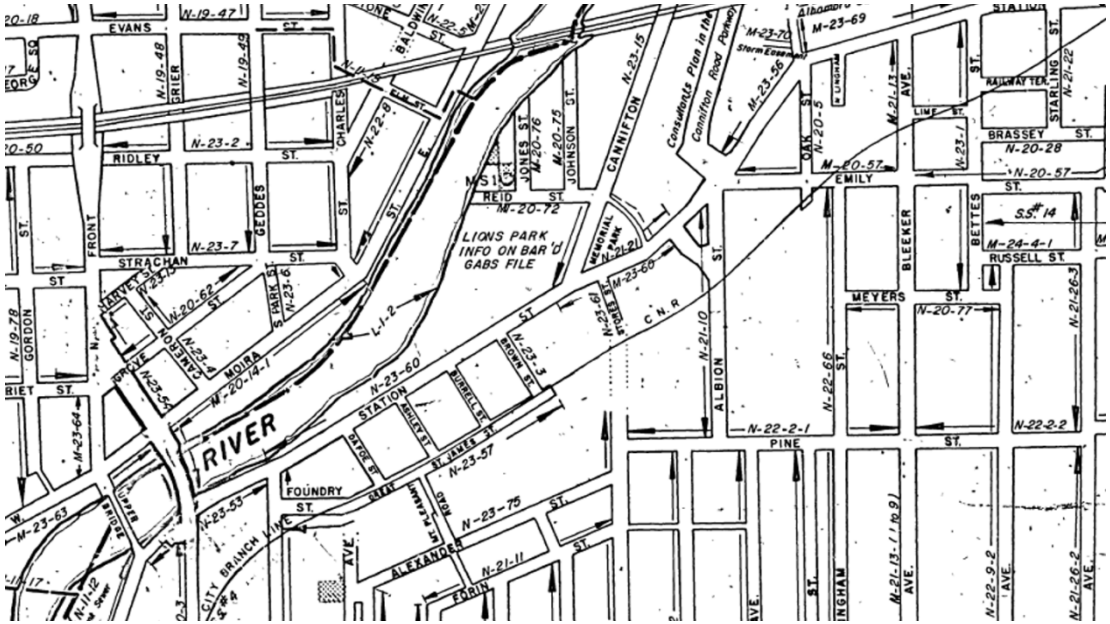
Soil Investigations



Soil Investigations

Possible Reasons for Soil Contamination:

- A former rail line ran through the project site, light industrial activities were associated with that rail line
- There is a used car dealership at the north end of the site
- Potential coal-gas distribution lines used prior to natural gas

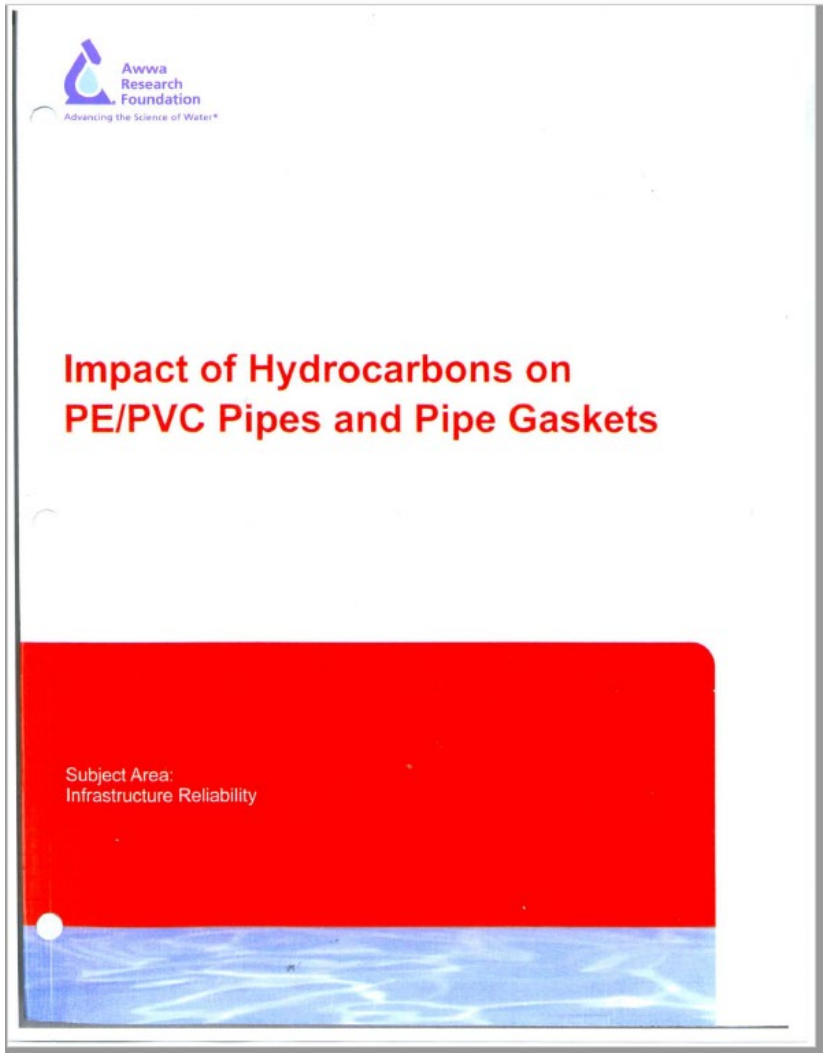


Soil Contamination
Design Impacts and Lessons Learned

What impacts are/will these contaminants have on our road reconstruction project?

Is there more to consider beyond just soil transfer and removal?

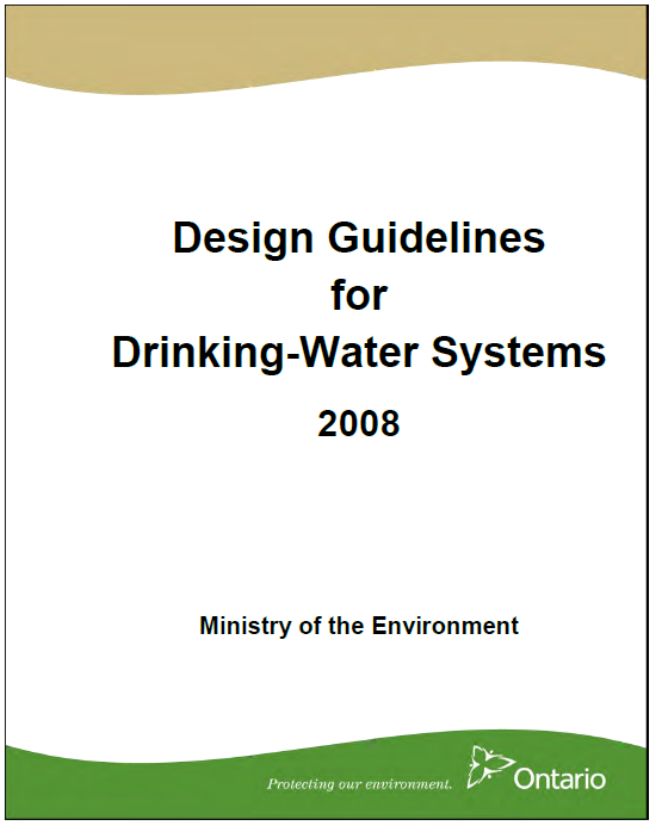
Impacts on Watermain Material



The American Water Works Association (AWWA) identifies that:

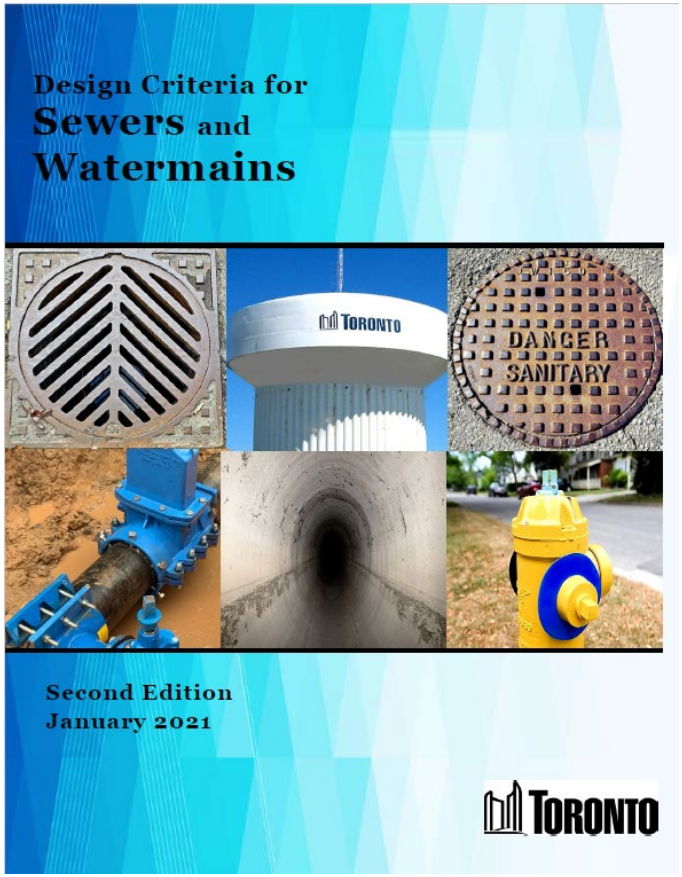
- Polyethylene Ethylene (PE) Pipe is susceptible to Petroleum Hydrocabon (PHC) permeation
- PVC pipe is resistant to most hydrocarbons, though nitrile gaskets are recommended
- When Polycyclic Aromatic Hydrocarbons (PAHs) and Volatile Organic Compounds (VOCs) are encountered, metallic pipe is recommended

Impacts on Watermain Material



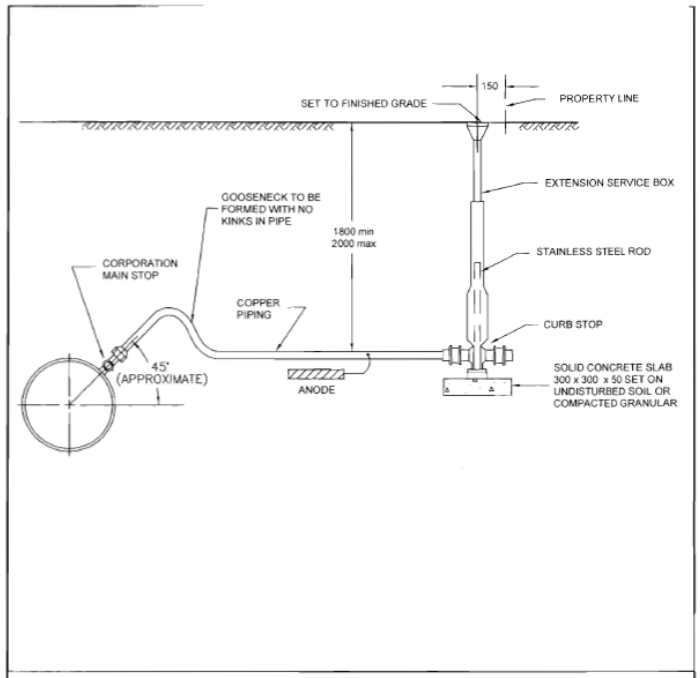
"Avoid HDPE where gasoline contamination may exist and PVC where dry cleaning solvent may be present" – MOE's 2008 Design Criteria for Drinking Water system

"Thermoplastic pipe shall not be used in soil with high VOCs — organic solvents and petroleum products — or in areas with a high risk of contamination such as near buried petroleum fuel tanks, gas stations and petro storage areas. As an alternative, metal pipes with nitrile gaskets will be used." – City of Toronto Design Criteria, Jan. 2021



Impacts on Watermain Material

Specification of Copper Services



NOTES:

1. DRAWING NOT TO SCALE.
2. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
3. NO JOINTS TO BE MADE IN SERVICE PIPE BETWEEN MAIN STOP AND CURB STOP WITHOUT APPROVAL FROM THE CITY.
4. ALL WATER SERVICES TO BE INSTALLED AT RIGHT ANGLES TO THE WATERMAIN AND UP TO 45° FROM THE HORIZONTAL UNLESS APPROVED OTHERWISE.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH SS-WD-1140.
6. PROVIDE CORROSION PROTECTION IN ACCORDANCE WITH SS-WD-1160.
7. WATER SERVICES TO BE SEPARATED FROM SEWER SERVICES IN A MANNER SIMILAR TO THAT FOR WATERMAIN PIPE AS OUTLINED IN SS-WD-1110.

City of Belleville
Environmental and Operational Services Department
Environmental Services Division

Issue Date: January 16, 2012
Revision Date:

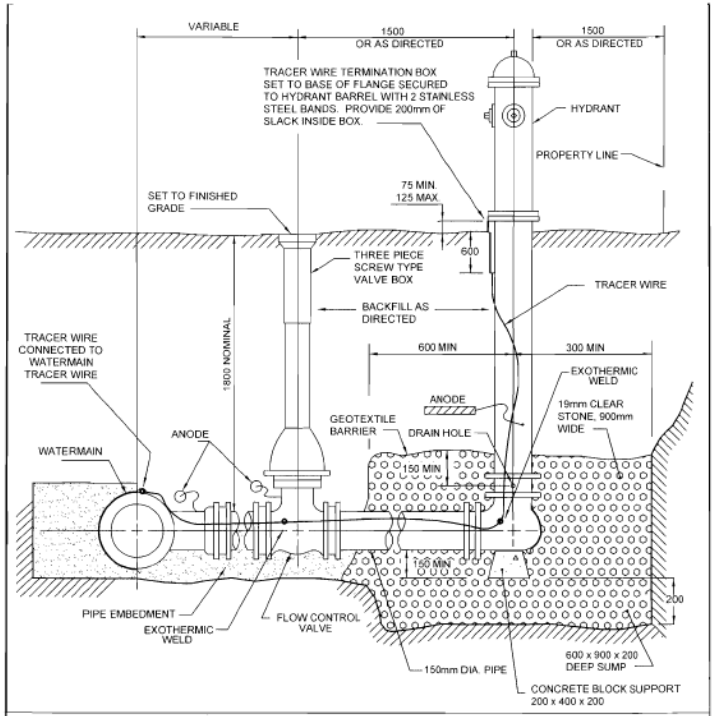
STANDARD DRAWING

Copper Water Service

Drawn By: T. Richardson
Reviewed By: D. Collins
Approved By: R. Reinert

Dwg. No: SD-WD-1201
Rev. No. 0

Watermain material adjustment to Ductile Iron



NOTES:

1. DRAWING NOT TO SCALE.
2. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE NOTED.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH SS-WD-1130.
4. HYDRANT TO BE YELLOW IN COLOUR.
5. ALL JOINTS TO BE MECHANICALLY RESTRAINED.
6. HYDRANT LEAD TRACER WIRE CONNECTION TO WATER MAIN TRACER WIRE TO BE MADE WITH SPLIT-BOLT BURNDY CONNECTOR.
7. TRACER WIRE CONNECTION AT VALVE AND BOOT WITH EXOTHERMIC WELD.
8. PROVIDE CORRISION PROTECTION IN ACCORDANCE WITH SS-WD-1160.

City of Belleville
Environmental and Operational Services Department
Environmental Services Division

Issue Date: January 16, 2012
Revision Date:

STANDARD DRAWING

Fire Hydrant Installation

Drawn By: T. Richardson
Reviewed By: D. Collins
Approved By: R. Reinert

Dwg. No: SD-WD-1101
Rev. No. 0

Project Status

- The Project was awarded to Cooney Excavating
- Project Ground Breaking – July 2022

COONEY
EXCAVATING LTD.

https://inquinte.ca/story/work-begins-on-albion-street-reconstruction

Project Status

- The road was closed
- Road construction started at the north end of the project

Project Status

Project Status

- Temporary water, like the project, is installed in phases
- Anticipated Completion Summer 2023

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Questions?

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References

Slide 8 Image: https://stock.adobe.com/ca/search/images?k=%22dirt+pile%22&asset_id=463357680

Slide 12 Image: https://www.pinterest.ca/pin/1110348483102310536/

Slide 16 Cooney Excavating Logo: https://cooneyexcavating.ca/

Slide 18 Image: https://stock.adobe.com/images/questions-asking-man-person-figure-3d-question-mark-red-interrogation-point-sign-symbol-icon-isolated-on-white-background/197472369

THANK YOU!

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