Underground Utilities - A Serious Consideration for the Toronto Coordinated Services Program

Presented by:
***Laurie LeBlanc**, C. Tech.*

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Survey Time!

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Underground Utilities; A Serious Consideration for the Toronto Water and Transportation Coordinated Services Program

Agenda

- Who is responsible for the Program?
- What does the Program look like?
- SUE specific to this Program
- Specific problem solvers employed

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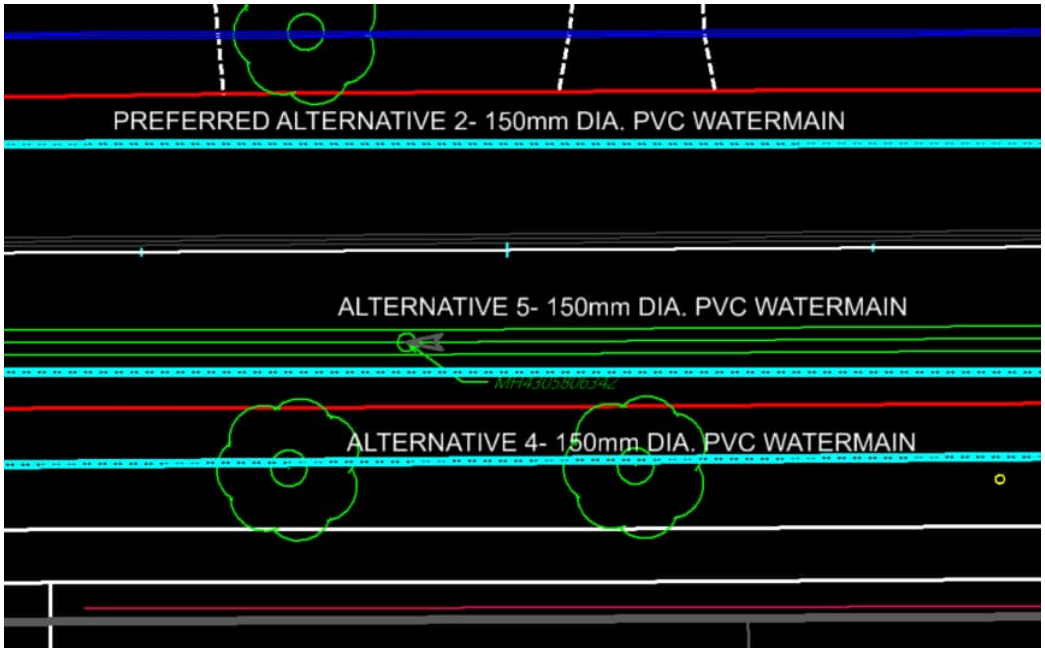
What is the Toronto Water and Transportation Coordinated Services Program?

Design → **Construction**



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Who is Responsible?

Engineering and Construction Services (ECS)

Standalone Underground Unit (SU)

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Who is Responsible?

Standalone Underground Unit (SU)

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What is the Toronto Water and Transportation Coordinated Services Program?

Toronto Water Division > Transportation Services

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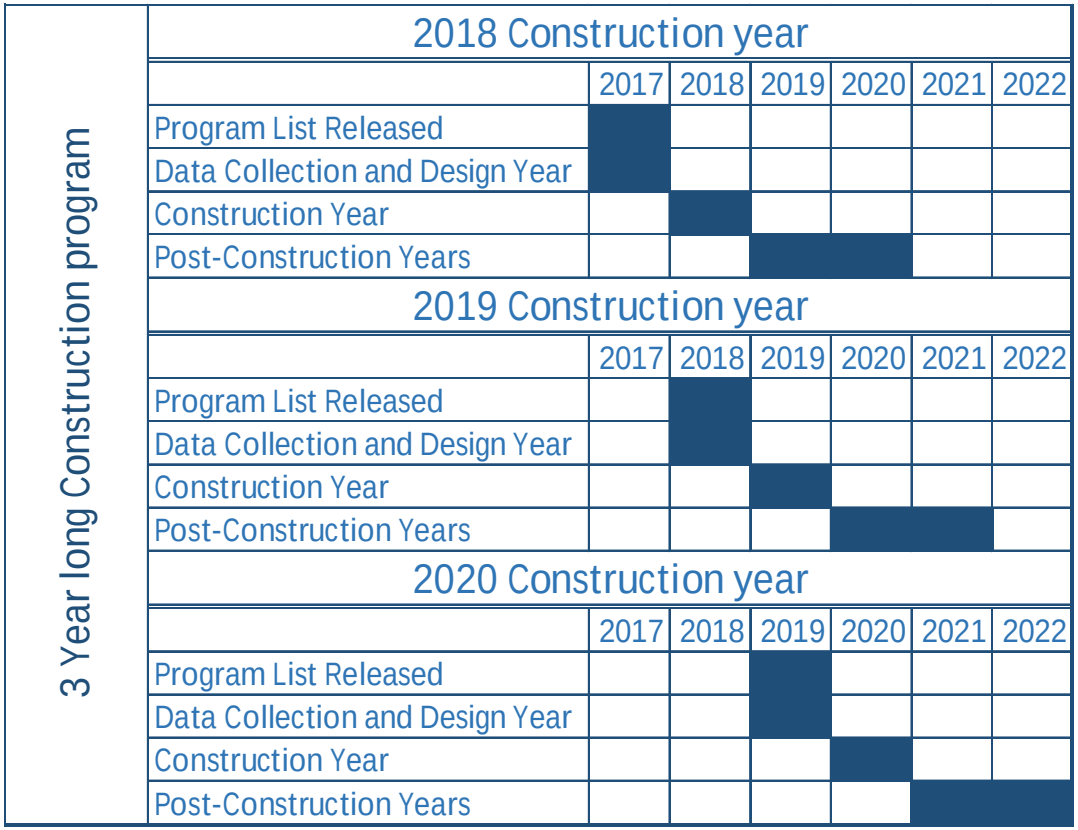
What is the Toronto Water and Transportation Coordinated Services Program?



What is the Toronto Water and Transportation Coordinated Services Program?

Prime Consultant Responsibilities:

- Final Design
- Drawings
- Pricing forms
- Specifications
- And Special Provisions

+

Owner Responsibilities:

- Collate Tender Documents
- Tenders the Projects
- Award the Contracts

= CONSTRUCTION

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How are Underground Utilities Managed?

"The Consultant shall engage, retain, coordinate and manage the service of a Subsurface Utility Engineering (SUE) Service provider necessary to complete the tasks under this assignment" – City of Toronto

"the collection and depiction of subsurface utility information shall conform to the applicable provisions of the ASCE 38" – City of Toronto

SUE is the necessary Engineering required to optimize designs, construction, control costs and mitigate risks…..It is not a series of designations and test holes added to a CAD file and call it a day!

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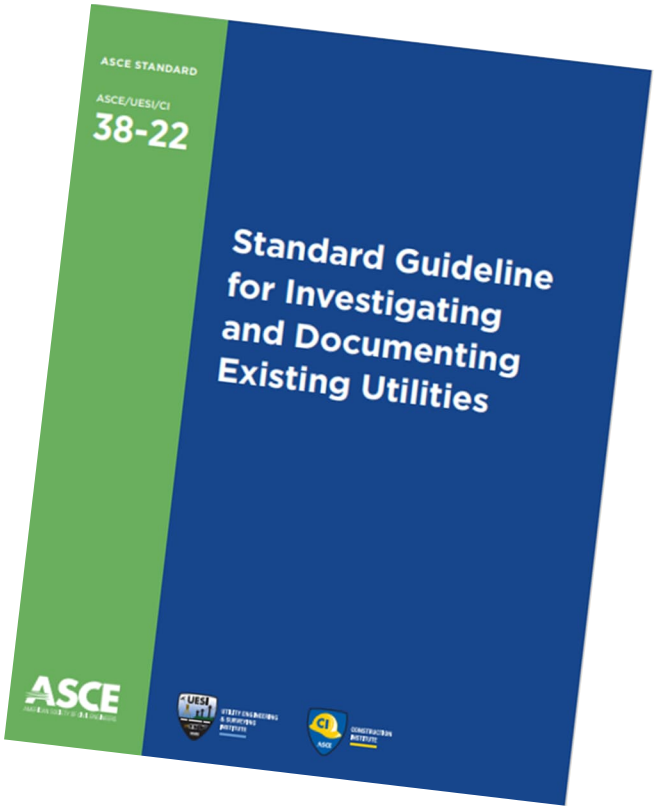
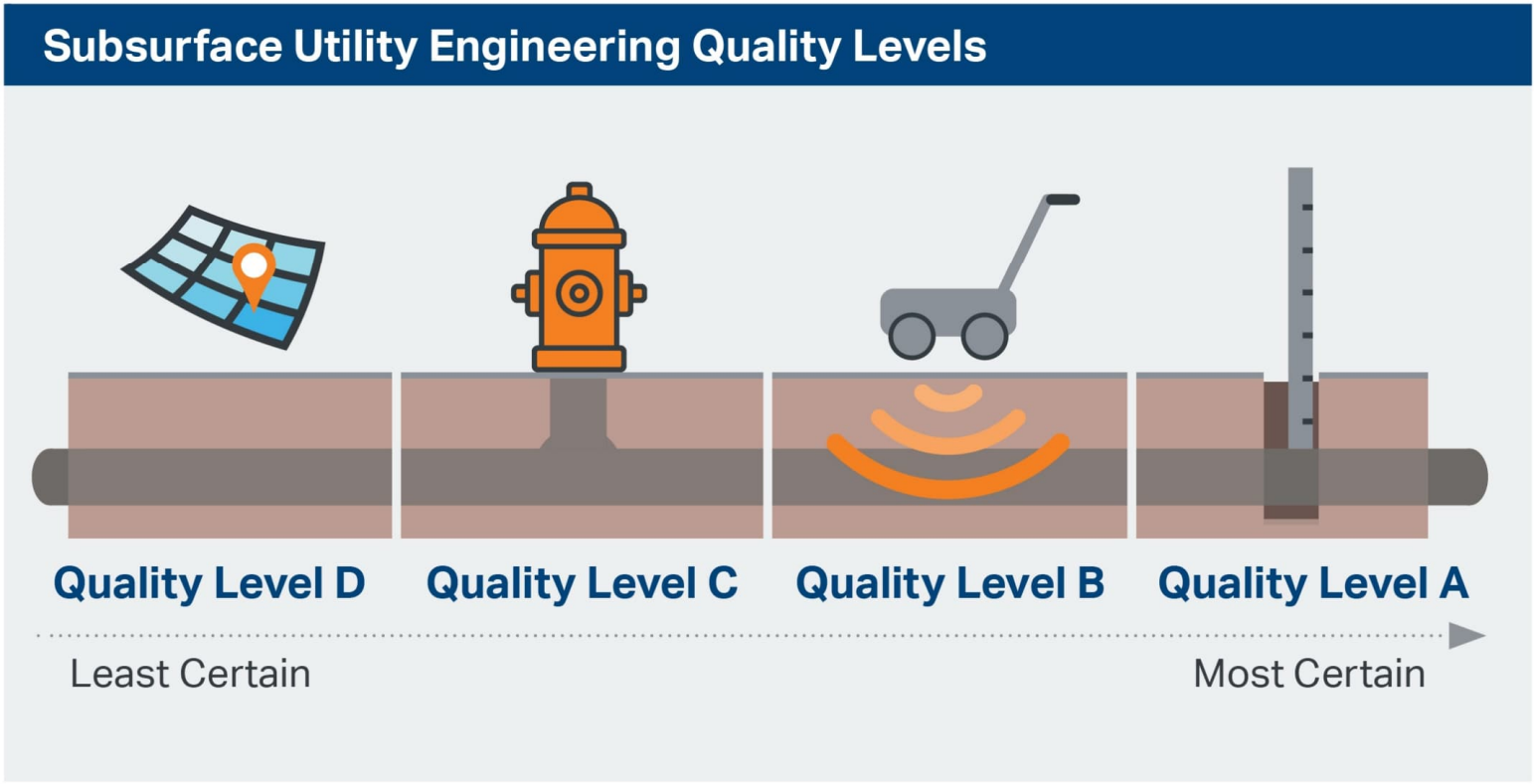
How are Underground Utilities Managed?

Subsurface Utility Engineering (SUE): The specialty practice of Civil Engineering's Utility Engineering branch that includes the investigation, analysis, judgment, and depiction of existing utility networks.

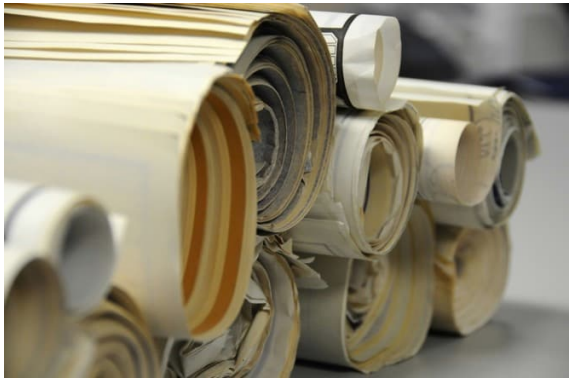


Subsurface Utility Engineering and the ASCE 38



ASCE Standard 38 - Quality Level D

Definition: A value assigned to a Utility Segment or Utility Feature not visible at the ground surface whose estimated position is judged through Utility records, information from others, or from visual clues such as pavement cuts, obvious trenches, or existence of service.



Records Research:

- As-built records
- Utility system drawings
- Oral recollections
- One-Call
- Visual site inspection

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ASCE Standard 38 - Quality Level C

Definition: A value assigned to a Utility Segment not visible at the ground surface whose estimated position is judged through correlating Utility records or similar evidence to Utility Features, visible aboveground and/or underground. The Utility Anchor Point on the Utility Features shall be tied to the Project Survey Datum with an accuracy of 60 mm horizontal.

Using Surveyed Surface Features

- Correlating underground utility segments to the visible surface features, such as :
  - Valves
  - Sewer maintenance holes
  - The end of QL-B segments
- Reconciled to ASCE Quality Level D
- Primarily used for sewer and large pipe networks

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ASCE Standard 38 - Quality Level B

Definition: A value assigned to a Utility Segment or subsurface Utility Feature whose existence and horizontal position is based on Geophysical Methods combined with professional judgment and whose location is tied to the Project Survey Datum

Utility Designating:

1. Utility detected through appropriate geophysical methods
2. The geophysical signal was judged to be reliable
3. The interpreted position was judged based on knowledge and use of geophysical science, Utility design and installation practices, available records, visual features, and influence of site conditions
4. The source Designation has been tied to the Project Survey Datum with an accuracy of 60 mm horizontally

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ASCE Standard 38 - Quality Level A

Definition: A value assigned to a portion of a Utility Segment or subsurface Utility Feature that is directly exposed and measured and whose location and dimensions are tied to the Project Survey Datum. The Utility Segment or subsurface Utility Feature shall be tied to the Project Survey Datum with an accuracy 30 mm vertical and 60 mm horizontal for the measurements of the outside limits of the Utility Feature or Utility Segment that is exposed

Vacuum Excavation

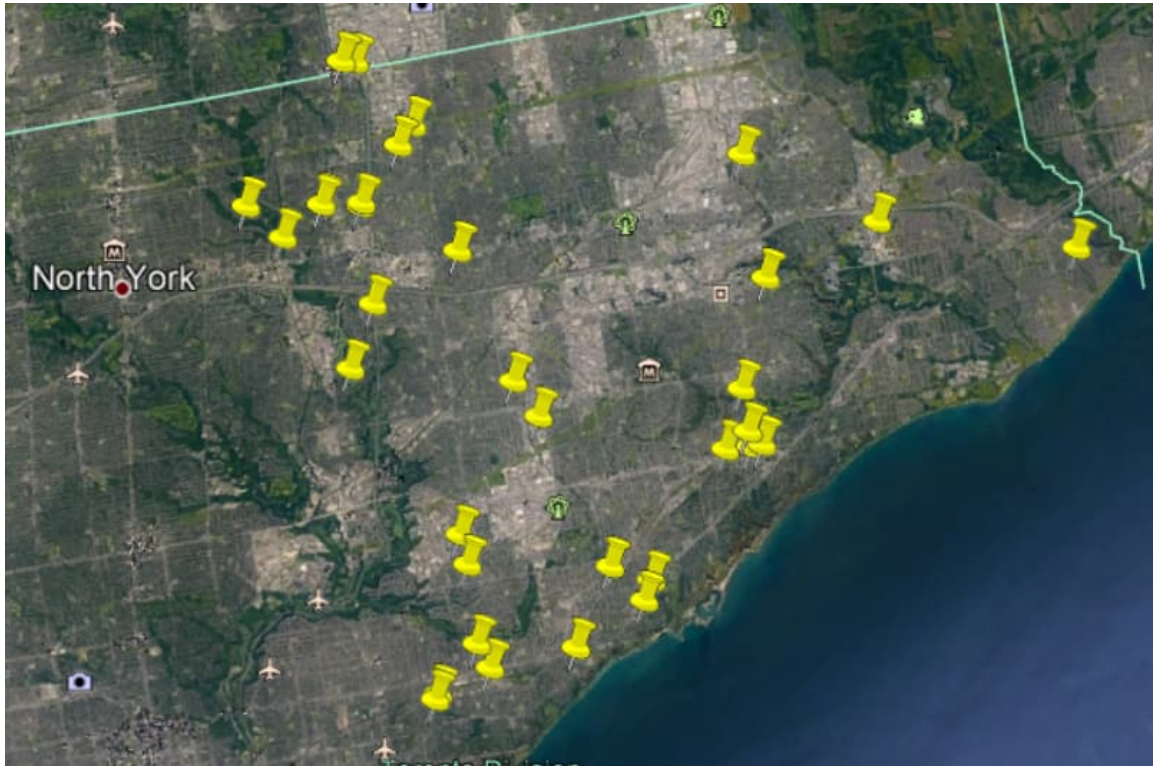
- Physically expose & visually verify the utility
- Record utility size and material information
- Note survey location in 3D (X,Y & Z)

Documenting Underground Utilities – The Data Collection and Design Year

Program List

Documenting Underground Utilities – The Data Collection and Design Year

Program List by Map



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Documenting Underground Utilities – The Data Collection and Design Year

Phase 1

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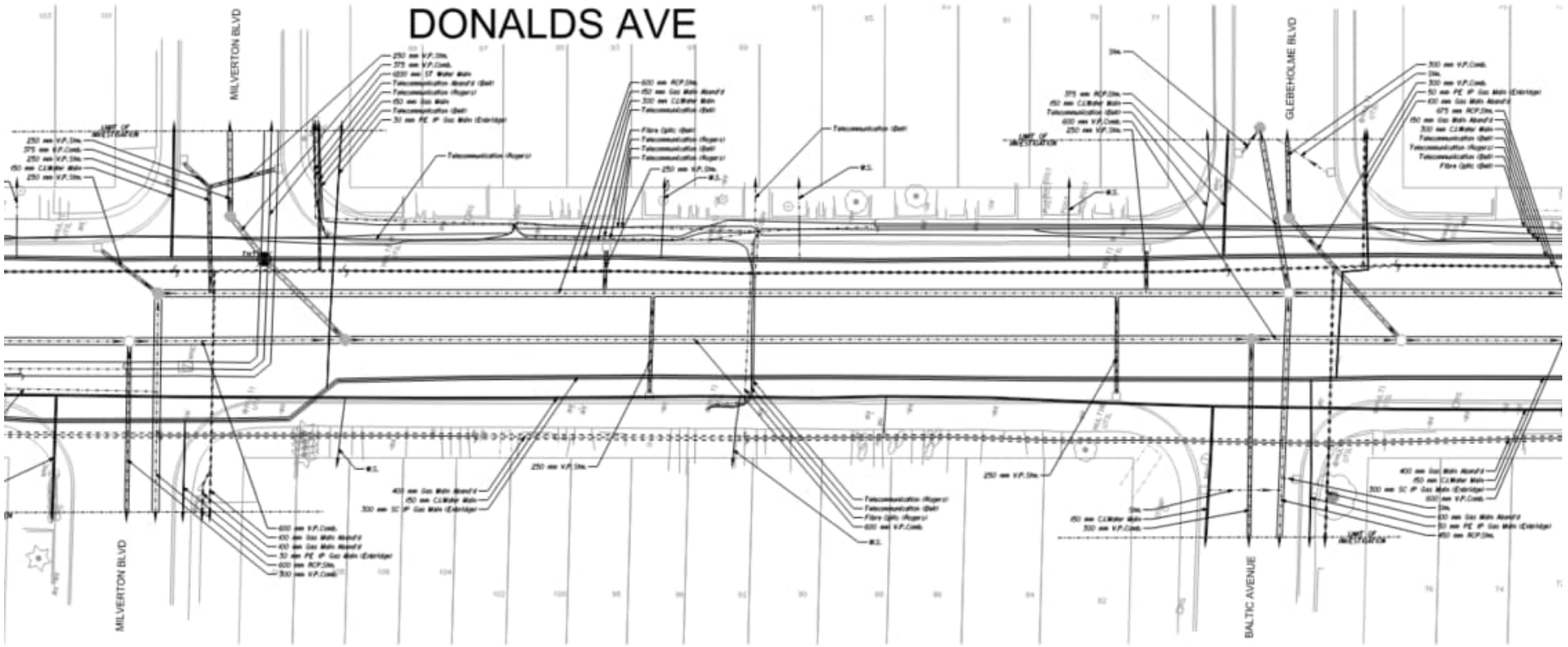
Documenting Underground Utilities – The Data Collection and Design Year



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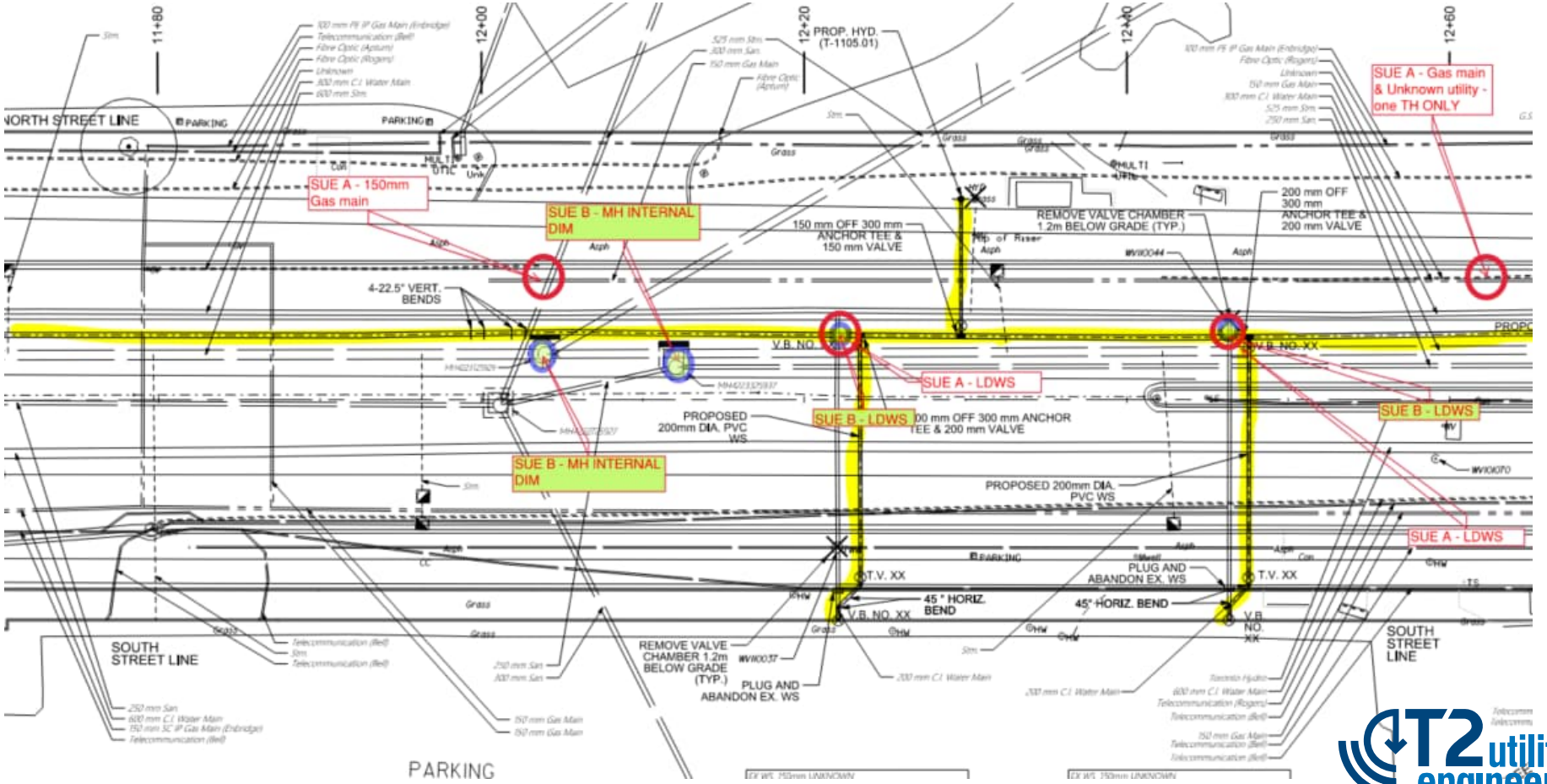

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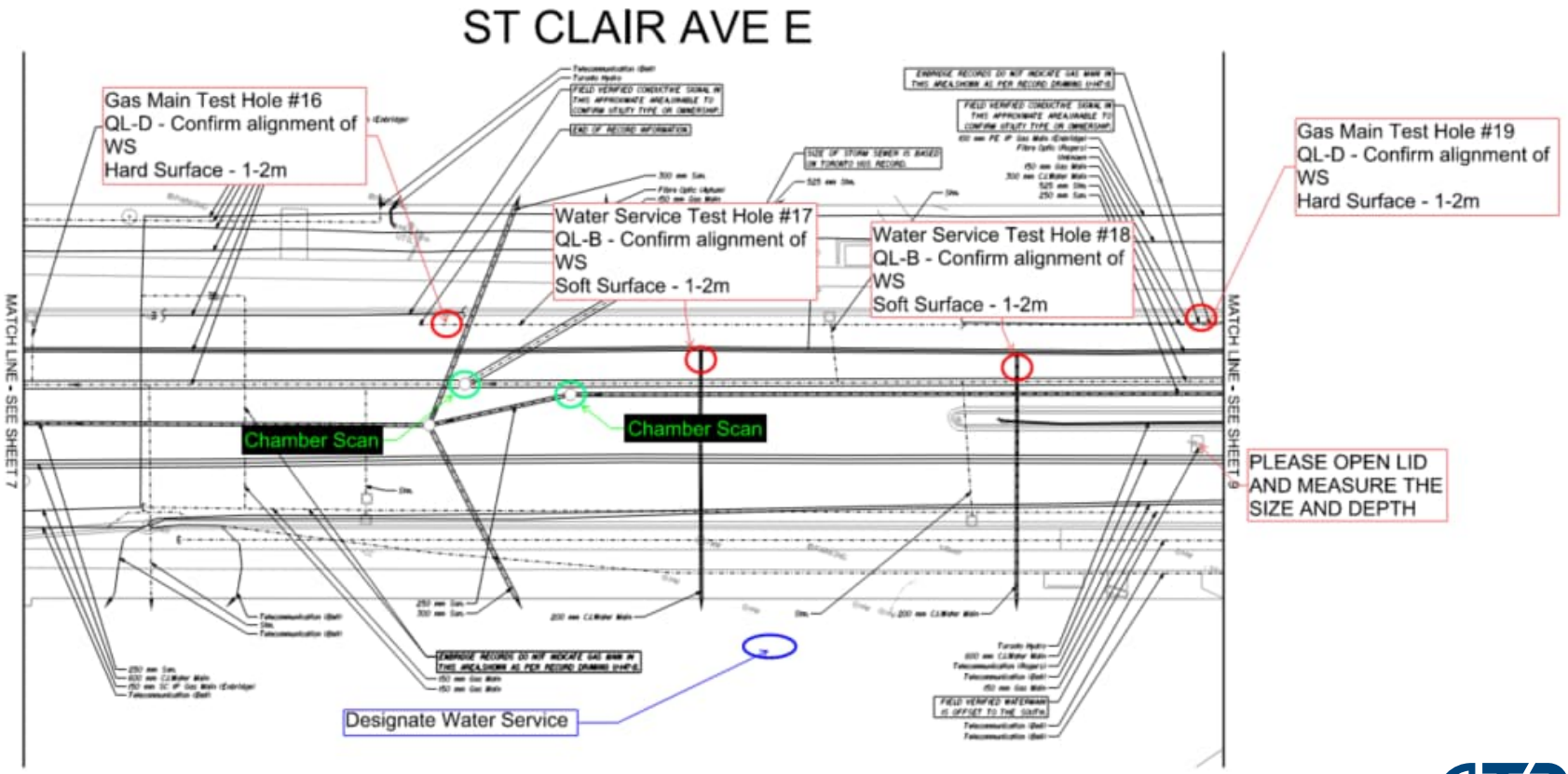
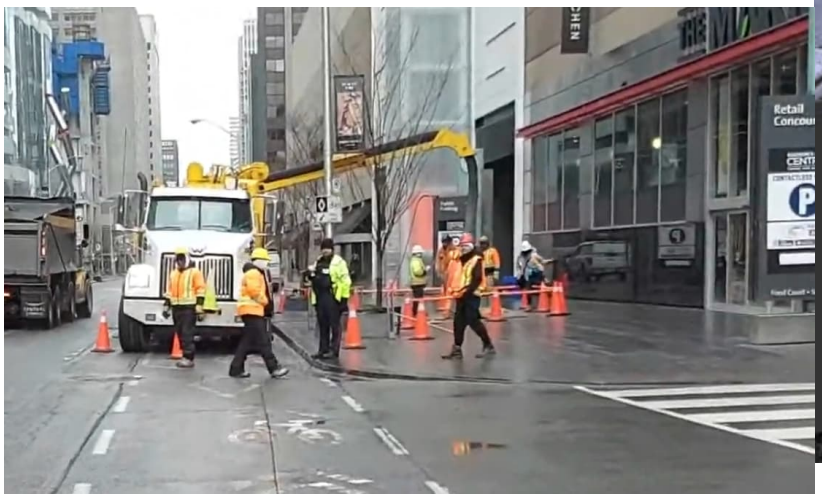


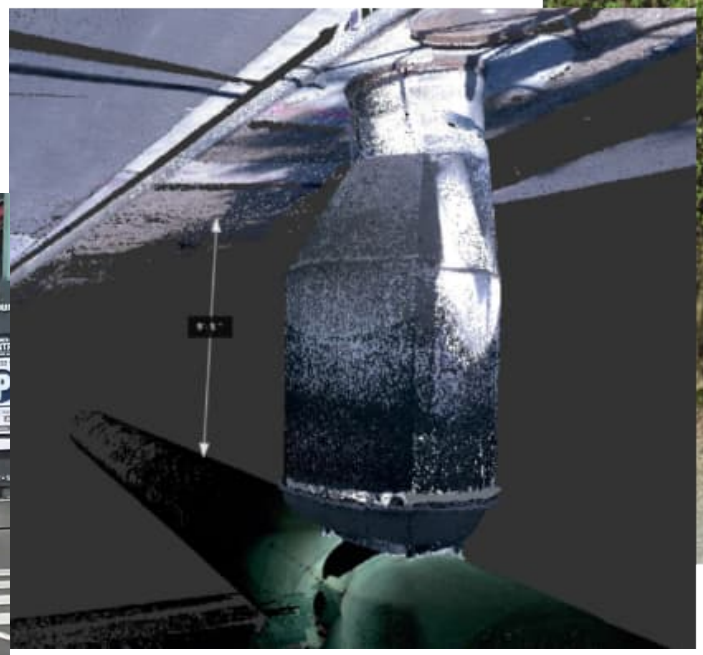
Documenting Underground Utilities – The Data Collection and Design Year

-Water Service Mapping

-Chamber Dimensioning

-Test Holes





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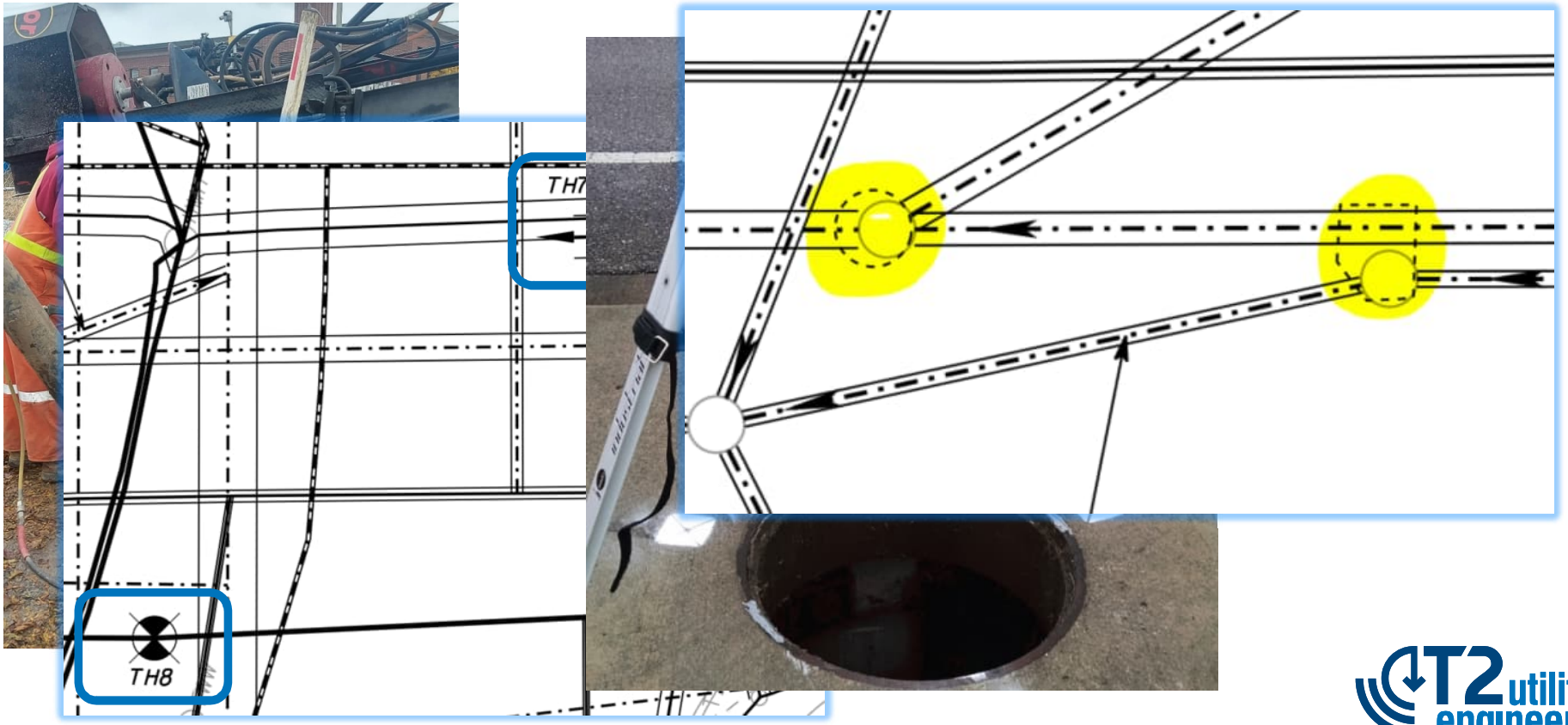
Documenting Underground Utilities – The Data Collection and Design Year

Phase 2



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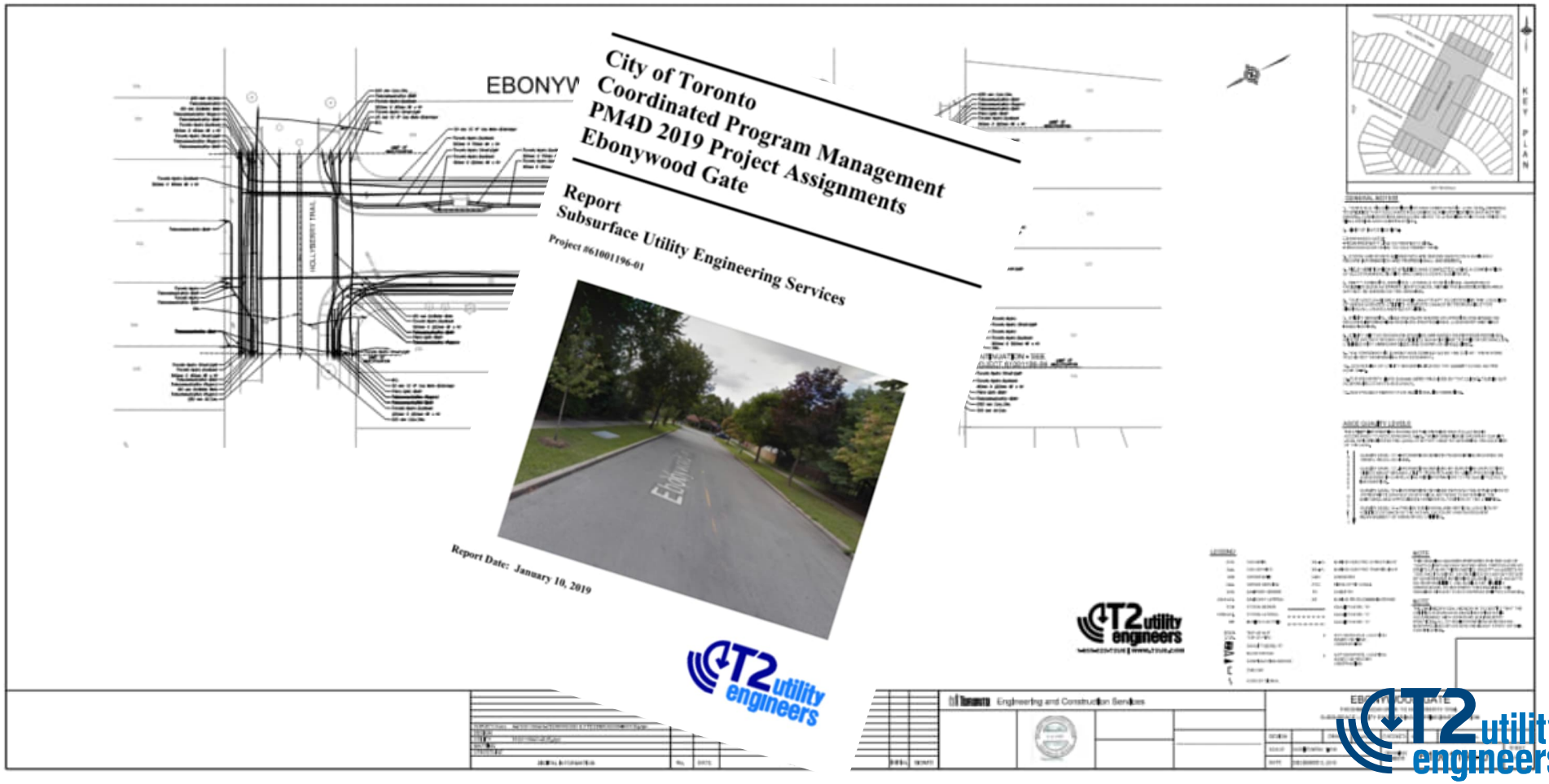

Specific Problem Solvers

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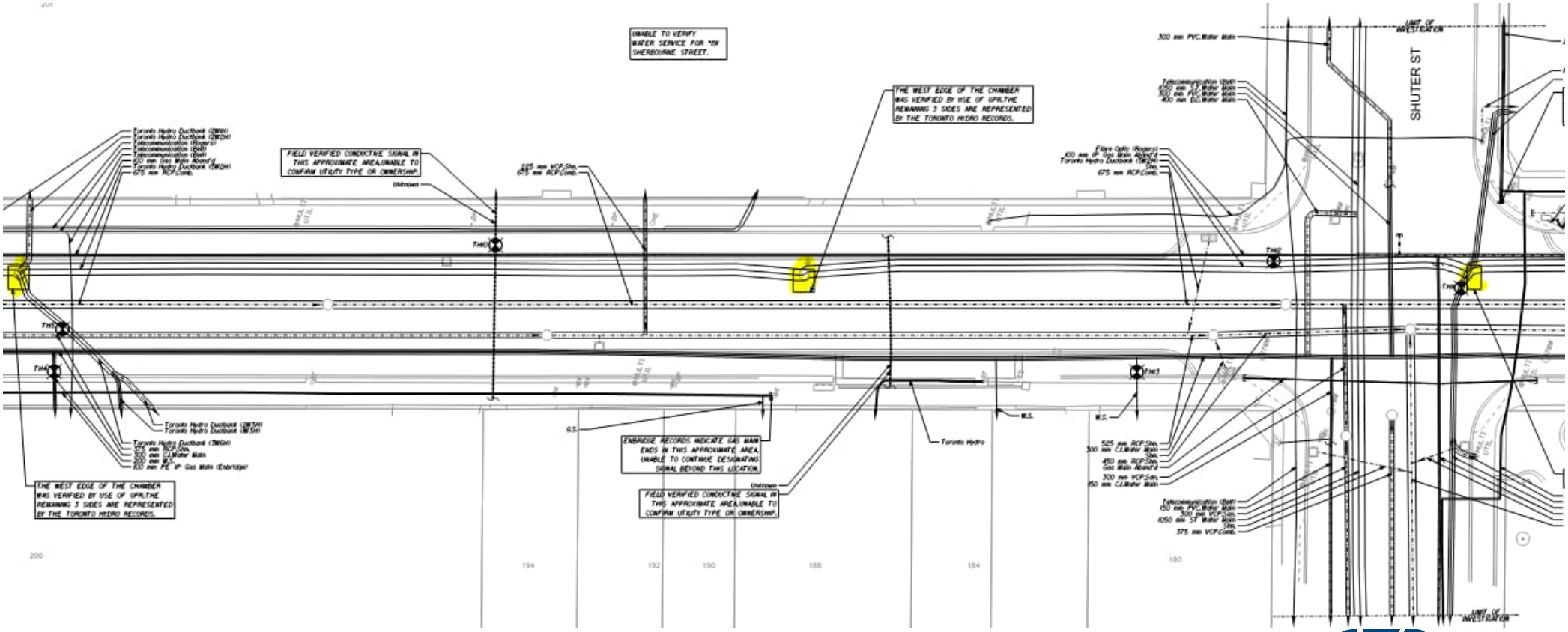
Specific Problem Solvers – Scenario 1



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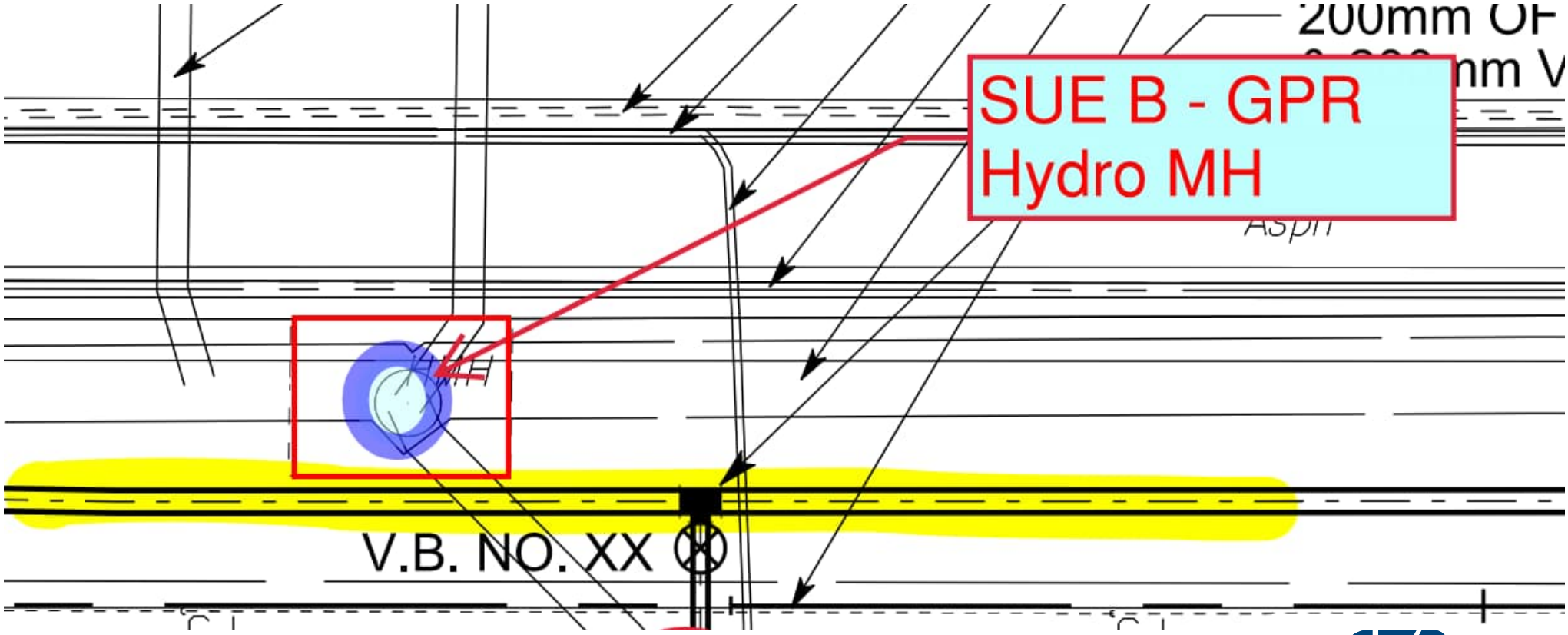

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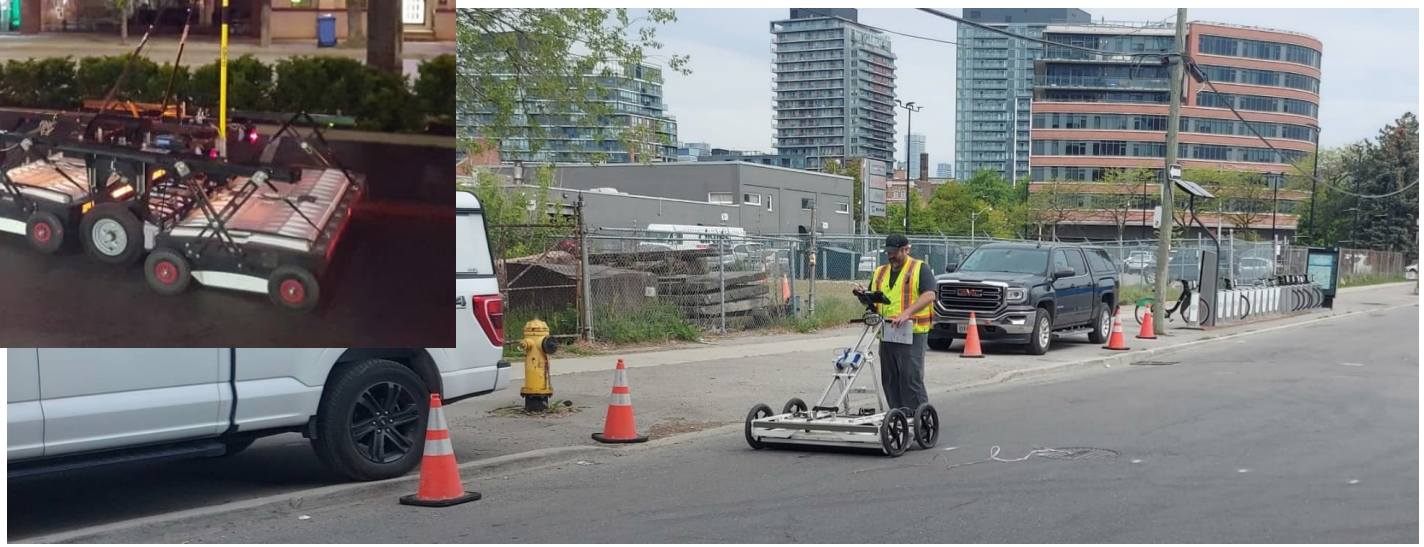
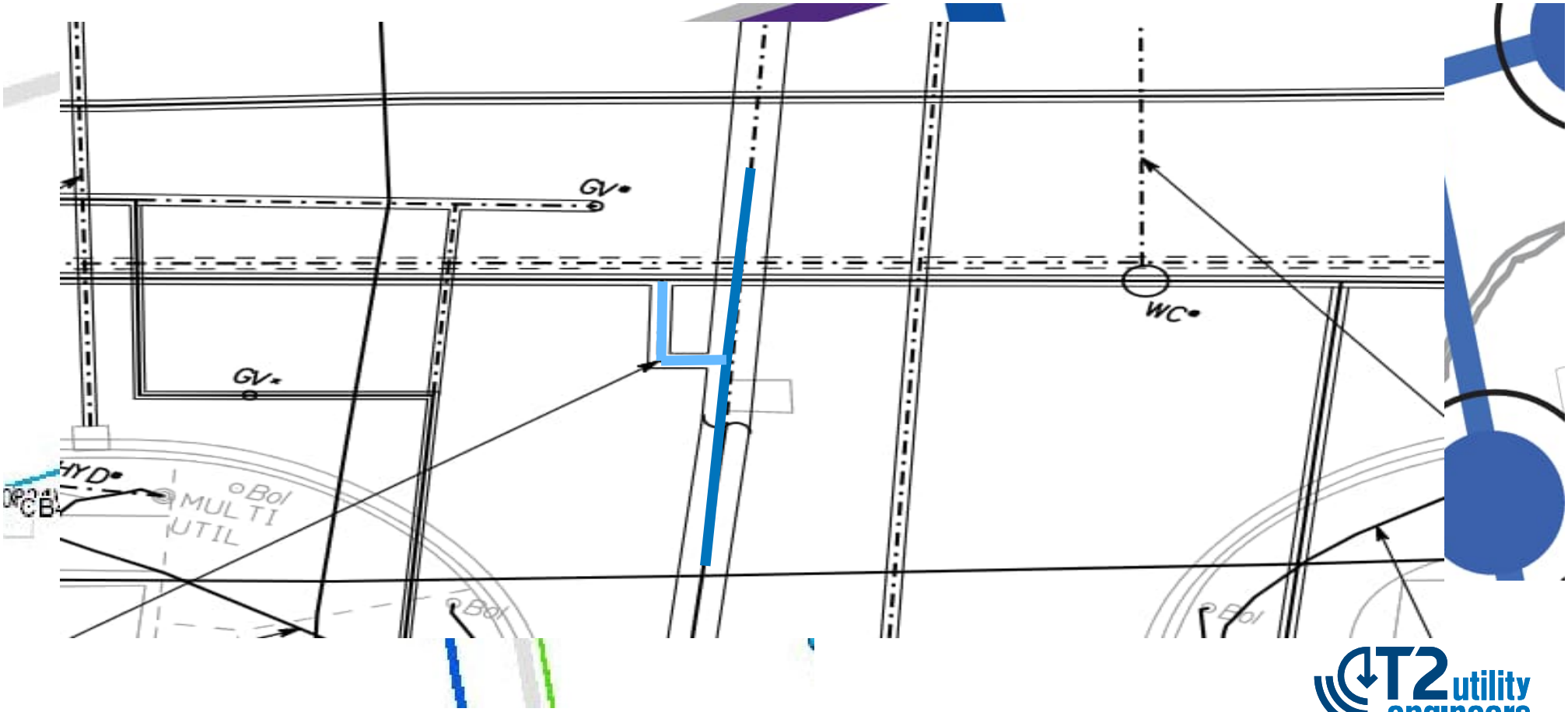


Specific Problem Solvers – Scenario 2



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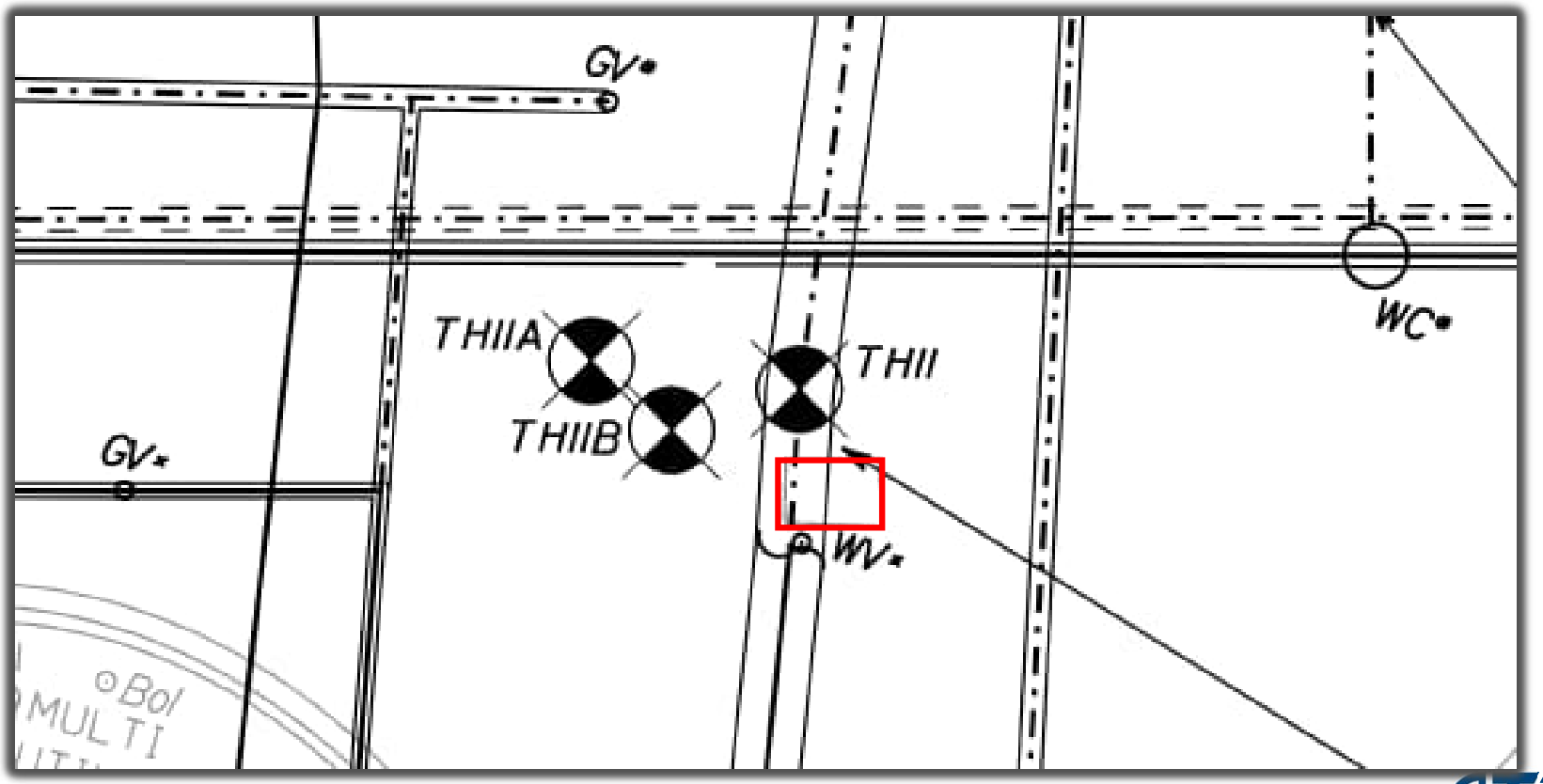
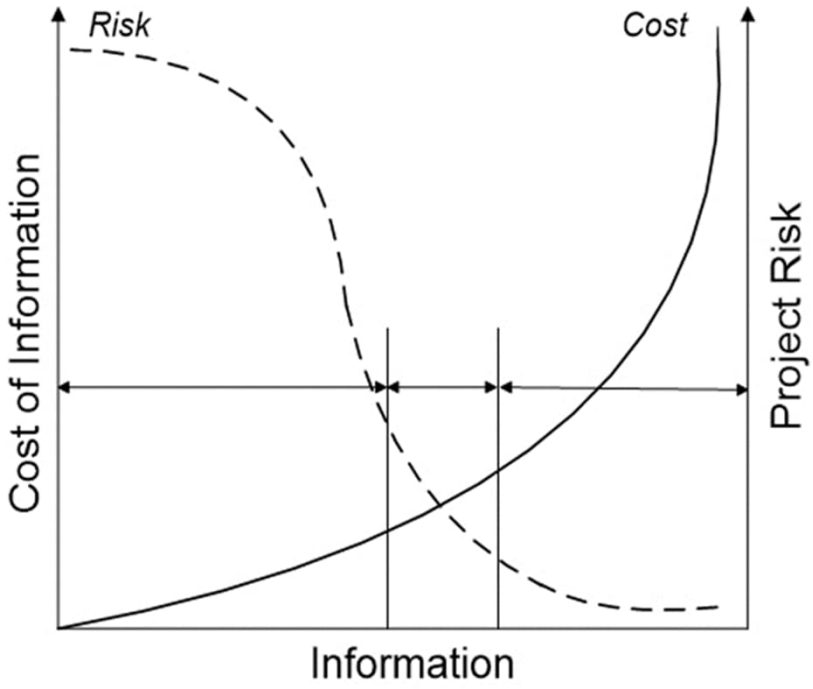
Specific Problem Solvers – Scenario 2



Specific Problem Solvers – Scenario 3

Specific Problem Solvers



University of Toronto

- Commissioned by Ontario Sewer & Watermain Contractors Association
- $2.56 Return on $1.00 Investment