2018 ROW Management Conference

Transportation Association of Canada Guideline for Utility Coordination on P3 Projects

Lawrence Arcand, P.Eng – President
Steve Murphy, C.E.T. – Chair OPWA ROWM Committee

November 13, 2018

Why a New Guideline for P3 Utility Coordination

Region of Waterloo's Light Rail Transit System

VIVA next

HURONTARIO LIGHT RAIL TRANSIT (LRT)

GORDIE HOWE INTERNATIONAL BRIDGE

EGLINTON CROSSTOWN

Hamilton Light Rail Transit

Highway 407 East Extension

London (Ontario) looks to LRT

Ottawa Light Rail Transit

T2 utility engineers

Agenda

How to approach to Utility Risk Mitigation on P3 Projects

- Effective use of SUE
- Effective Utility Coordination - Design, Bid, Build & P3 Projects
- Utility Design

Hurontario LRT Application

Q & A

Agenda

How to approach to Utility Risk Mitigation on P3 Projects

- Effective use of SUE
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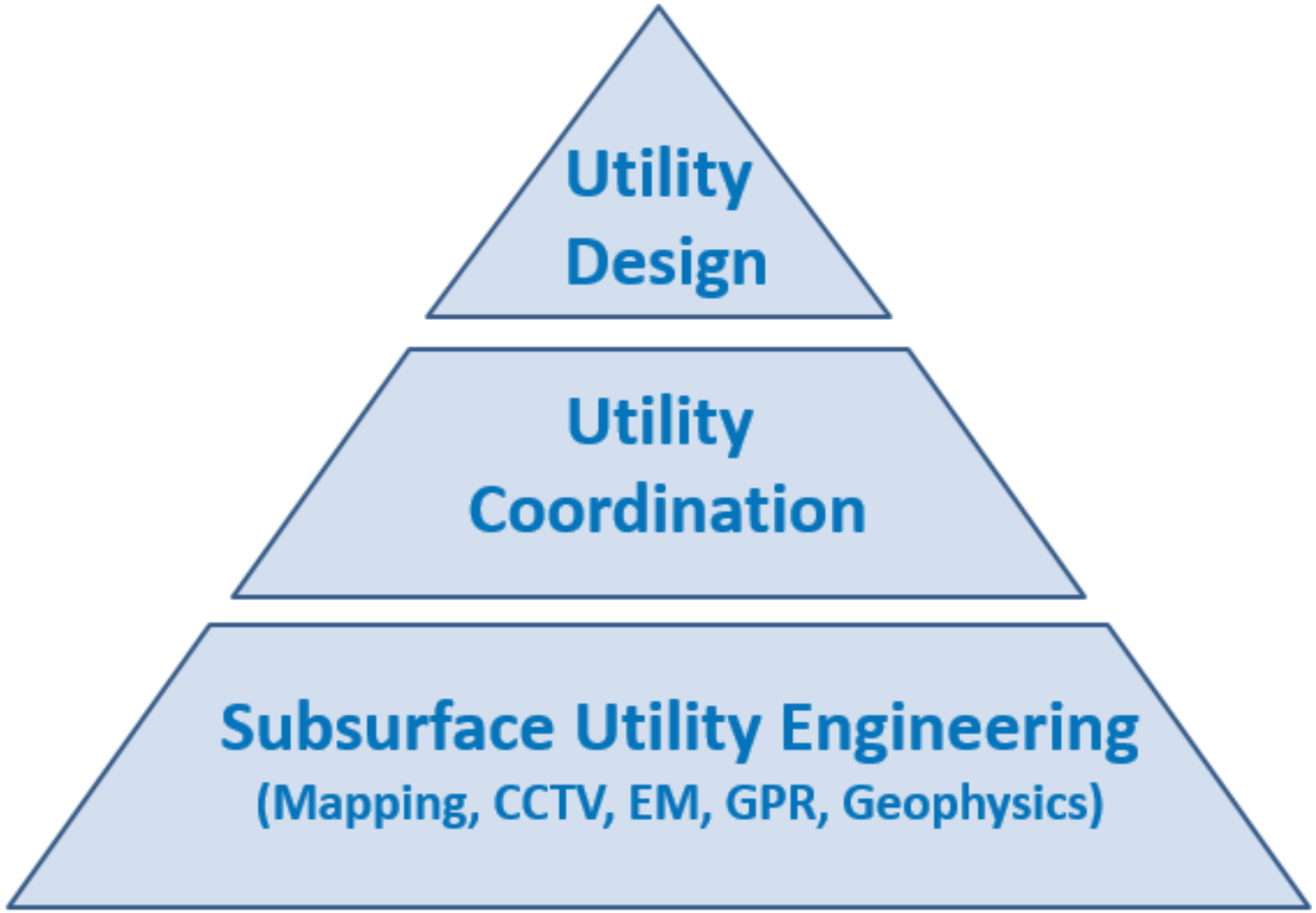
- Utility Design

Hurontario LRT Application

Q & A

An Effective approach to Utility Risk Mitigation for P3 Projects

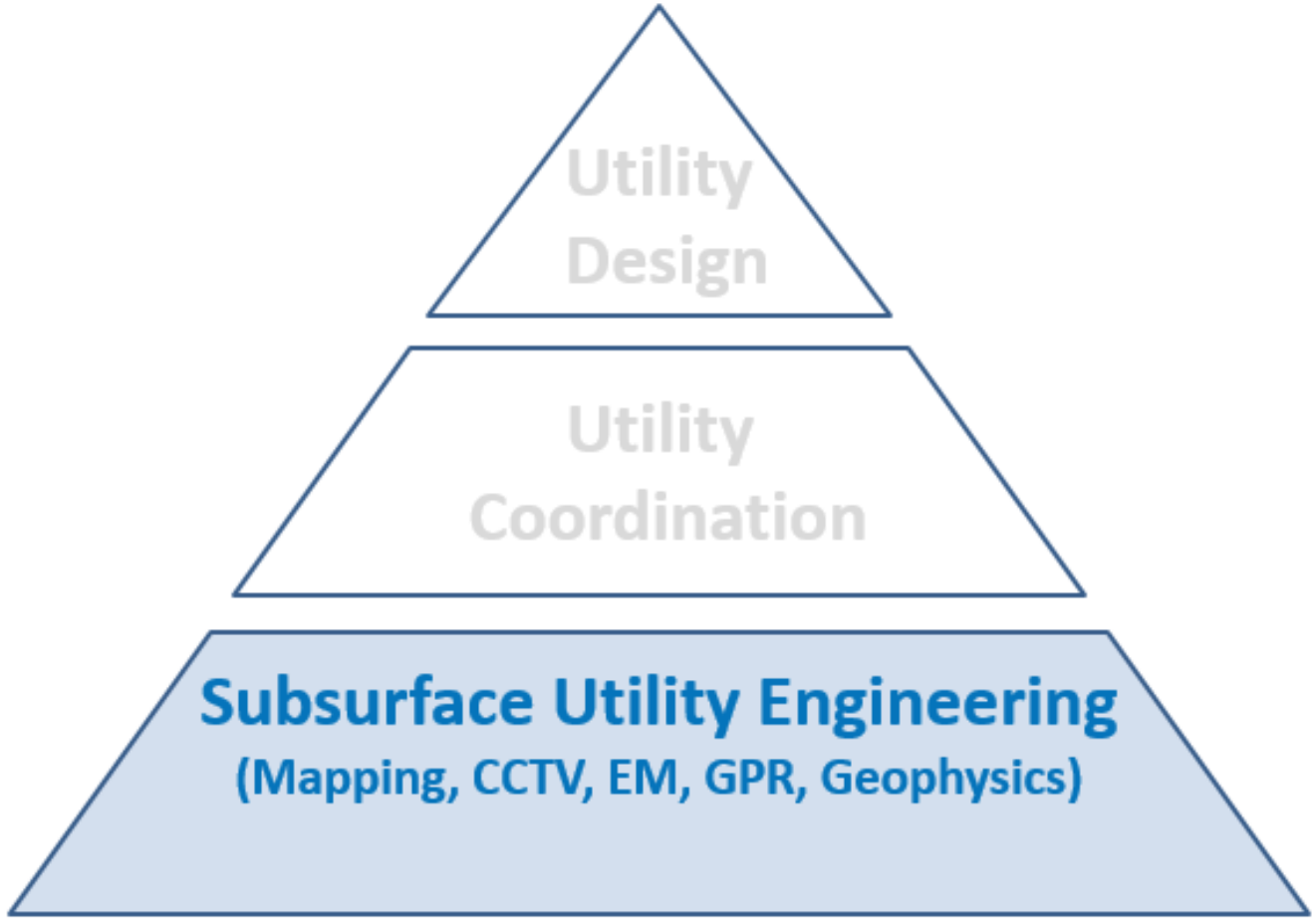


T2 utility engineers

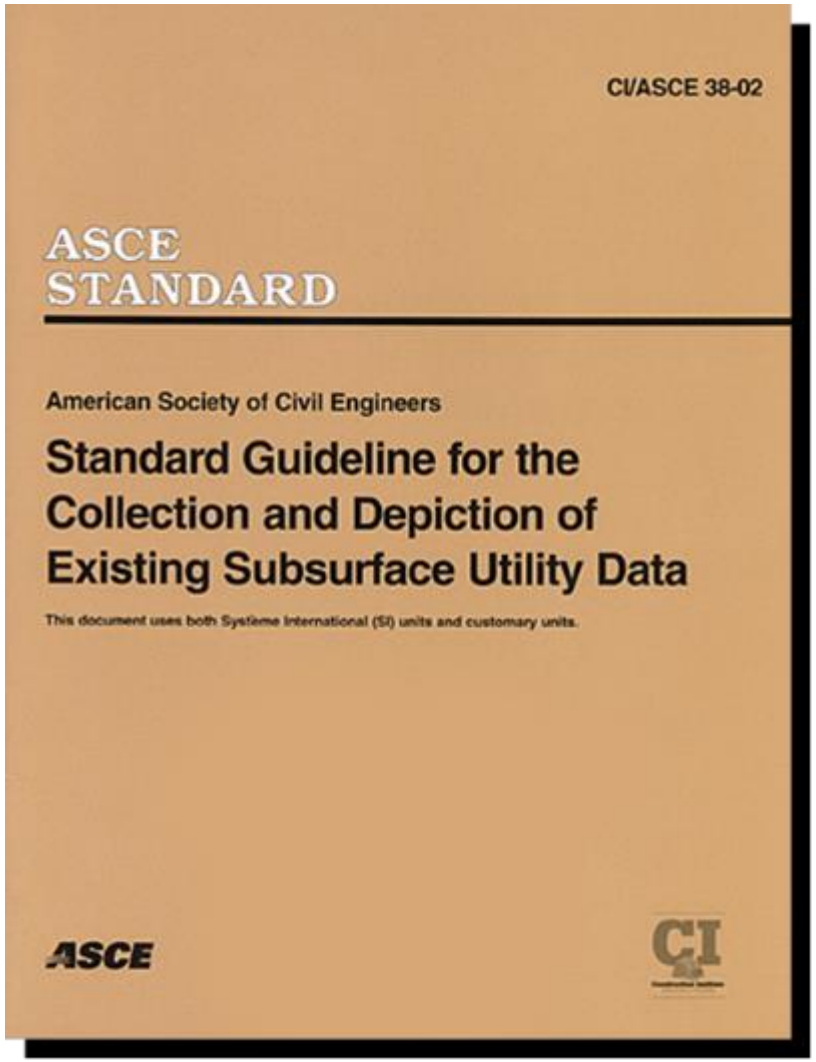
Utility Risk Mitigation

- Effective use of SUE
- Effective Utility Coordination
- Utility Design

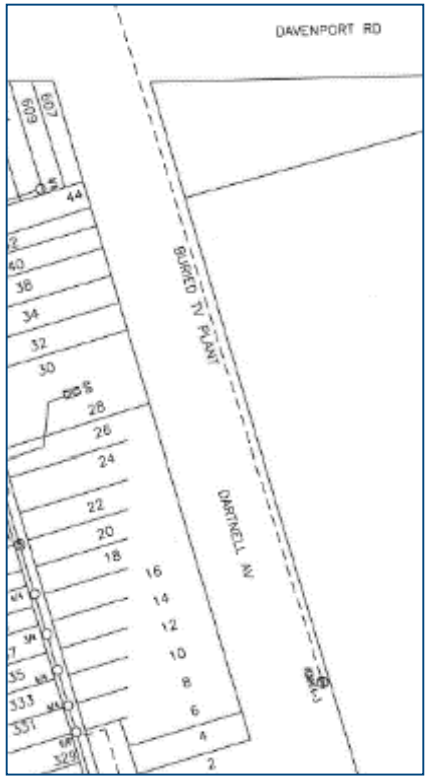
SUE – Subsurface Utility Engineering



Standards – ASCE 38-02

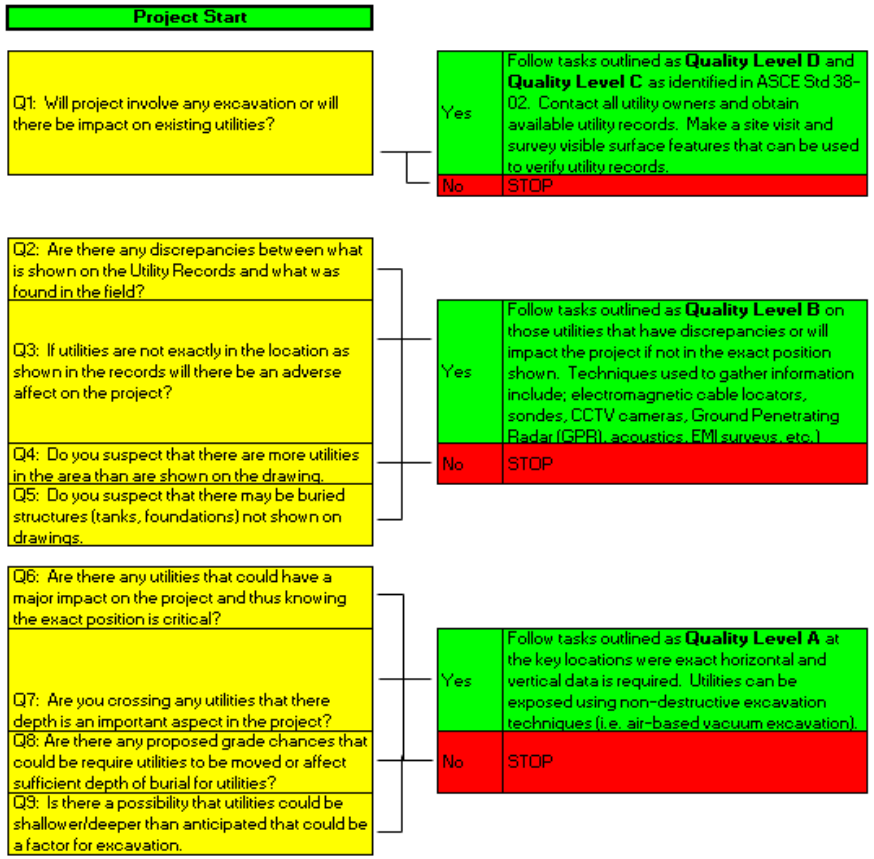


SUE Quality Levels



A B C D

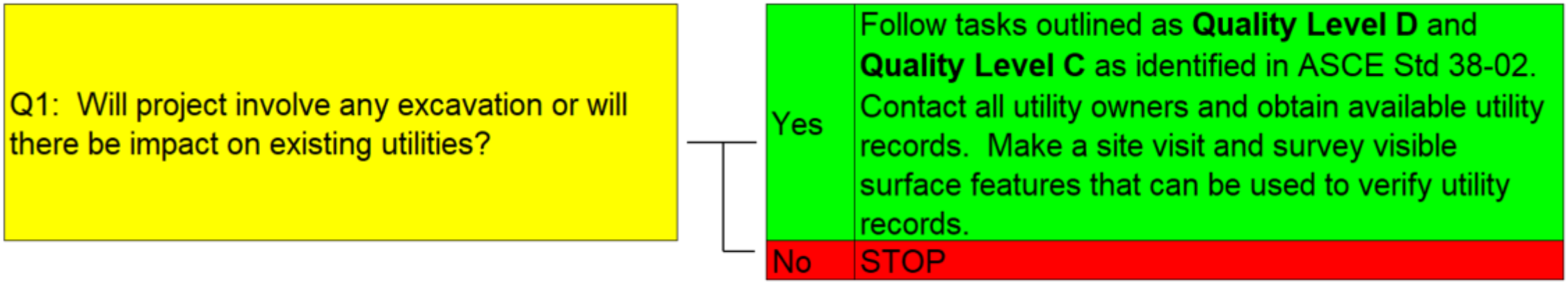
Standards – ASCE 38-02



How do I decide what Quality Level to use?

Communicate with your SUE Consulting Engineer!

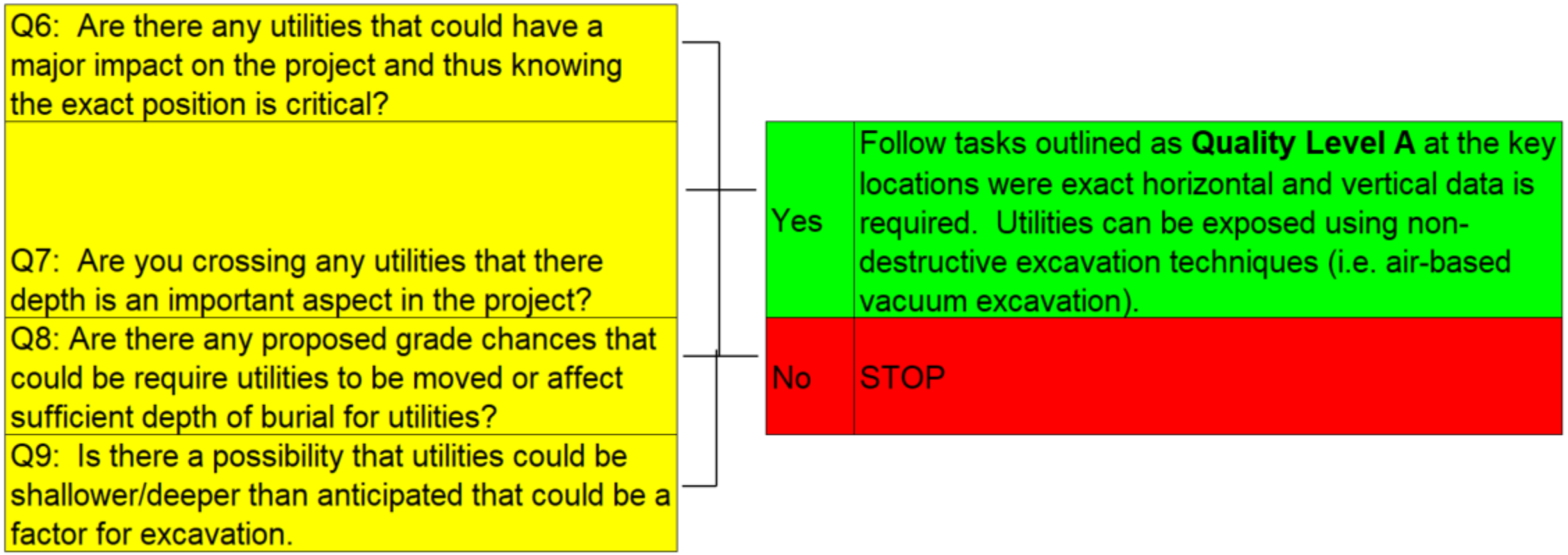
Standards – ASCE 38-02



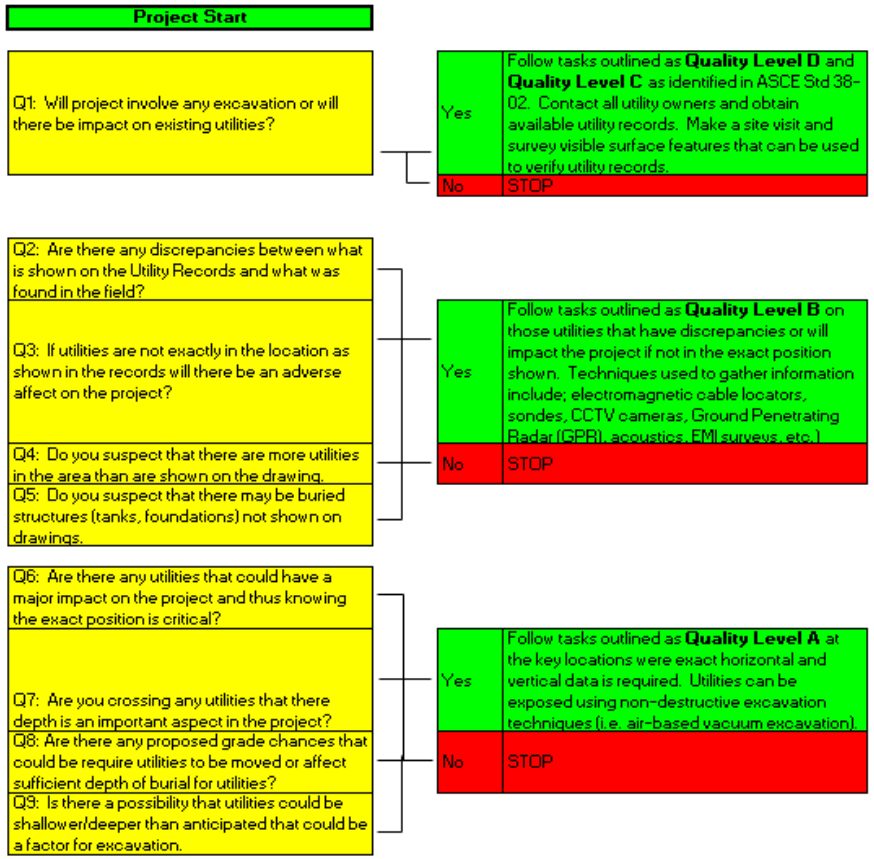
Standards – ASCE 38-02

Q2: Are there any discrepancies between what is shown on the Utility Records and what was found in the field?	Yes	Follow tasks outlined as **Quality Level B** on those utilities that have discrepancies or will impact the project if not in the exact position shown. Techniques used to gather information include; electromagnetic cable locators, sondes, CCTV cameras, Ground Penetrating Radar (GPR), acoustics, EMI surveys, etc.)
Q3: If utilities are not exactly in the location as shown in the records will there be an adverse affect on the project?		
Q4: Do you suspect that there are more utilities in the area than are shown on the drawing.	No	STOP
Q5: Do you suspect that there may be buried structures (tanks, foundations) not shown on drawings.		

Standards – ASCE 38-02



Standards – ASCE 38-02



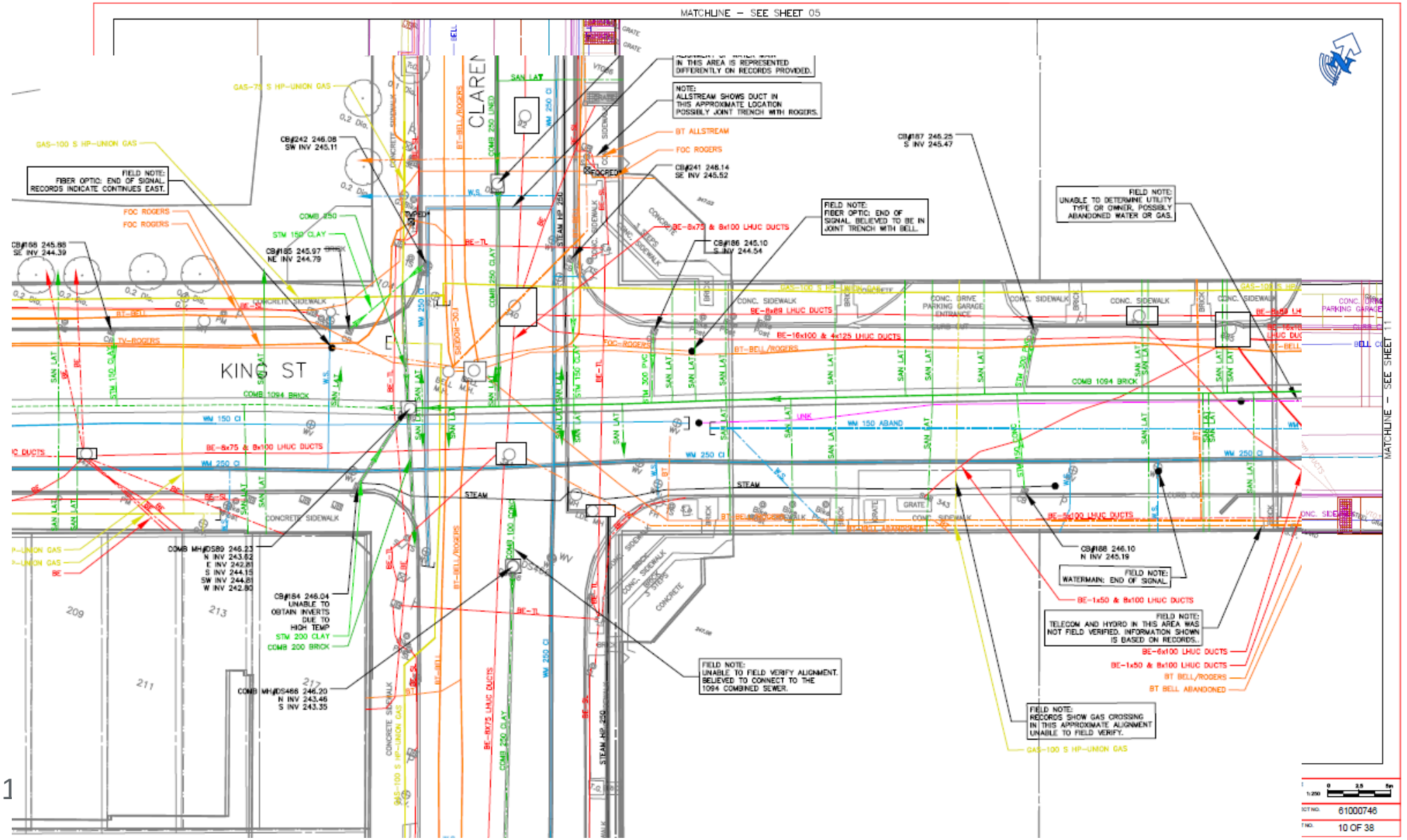
Additional Questions to ask

What is the overall dollar value of project? - Balancing cost for investigation vs. overall cost of project.

What is the overall importance of project? - How will running into utility problems which increase costs, and delay project completion be perceived.

What is the potential safety risks involved with the project? - What type of utilities are present?

SUE Investigation – QLD vs QLB

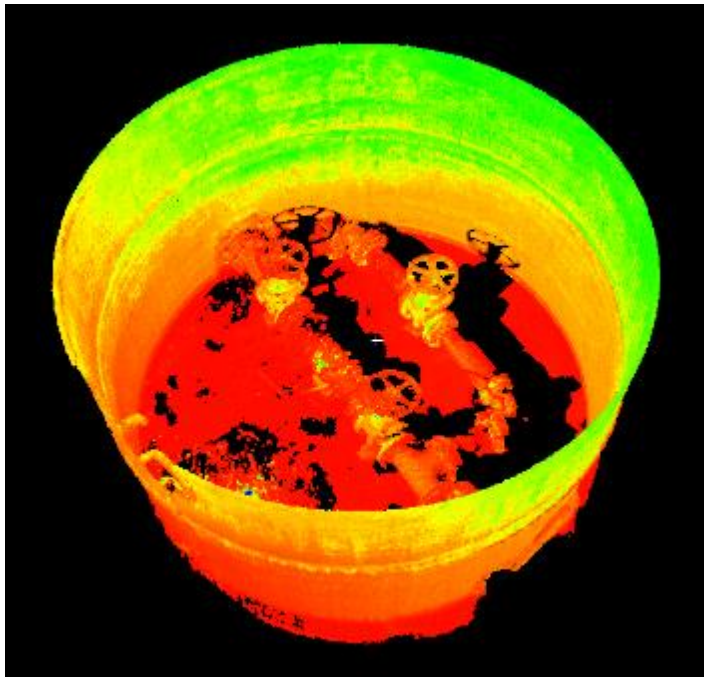


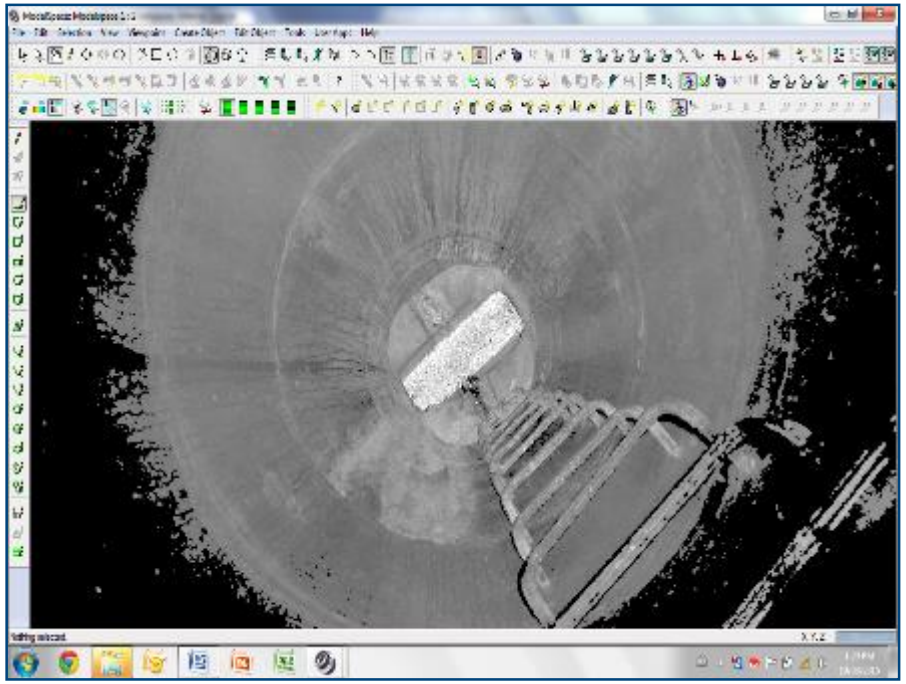
QLB – Using the required equipment to obtain the horizontal alignment

- Electromagnetic Methods
  - Cable Locate Equipment
  - Sonde
  - CCTV Camera with sonde
  - Ground Penetrating Radar
    - Additional Methods:
    - Acoustic
    - Lidar

MH Inspection – BLK360

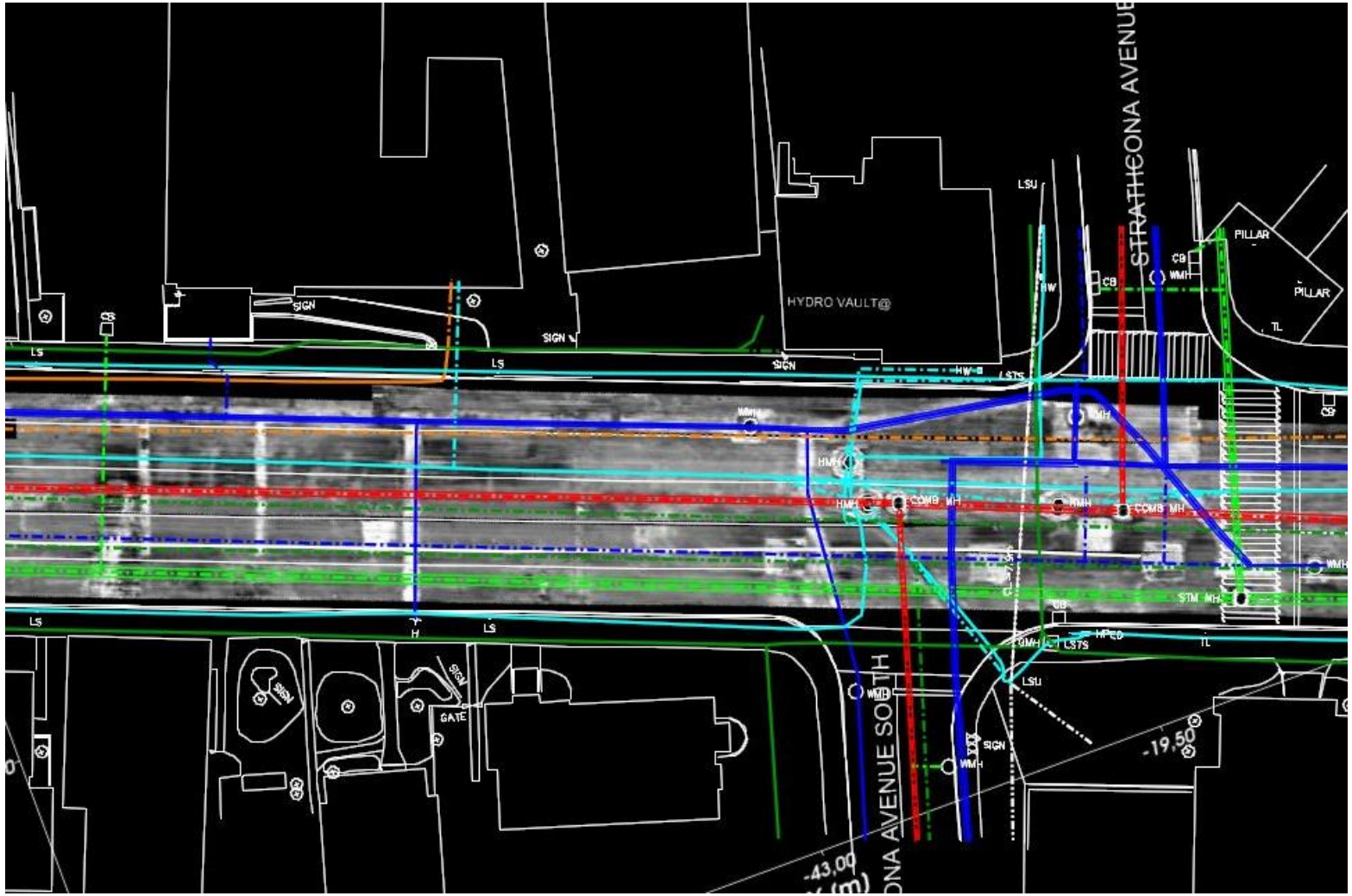
MH Inspection – BLK360





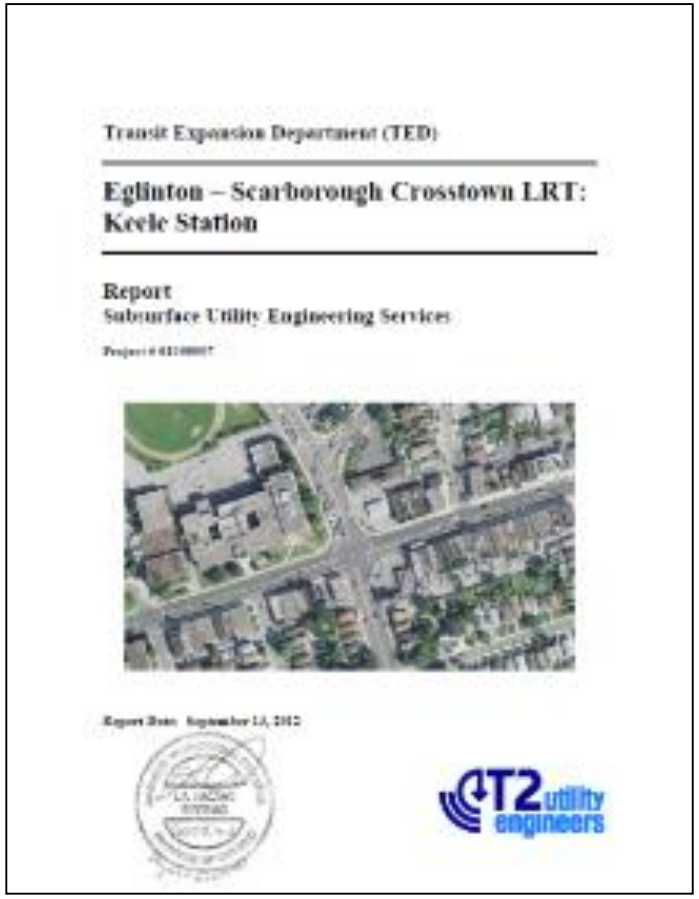
Multi-Channel GPR

Multi-Channel GPR



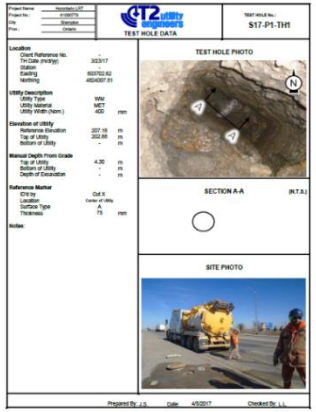
Results - MCGPR

SUE Deliverables


Transit Expansion Department (TED)

Eglinton – Scarborough Crosstown LRT:
Keele Station

Report
Subsurface Utility Engineering Services

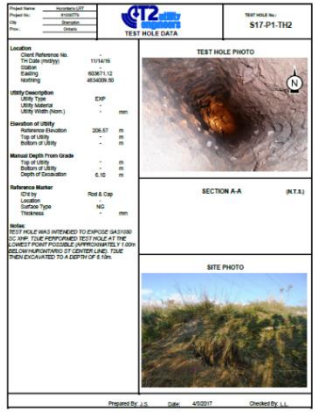

TEST HOLE DATA

S17-P1-TH1

TEST HOLE PHOTO

SECTION A-A

SITE PHOTO

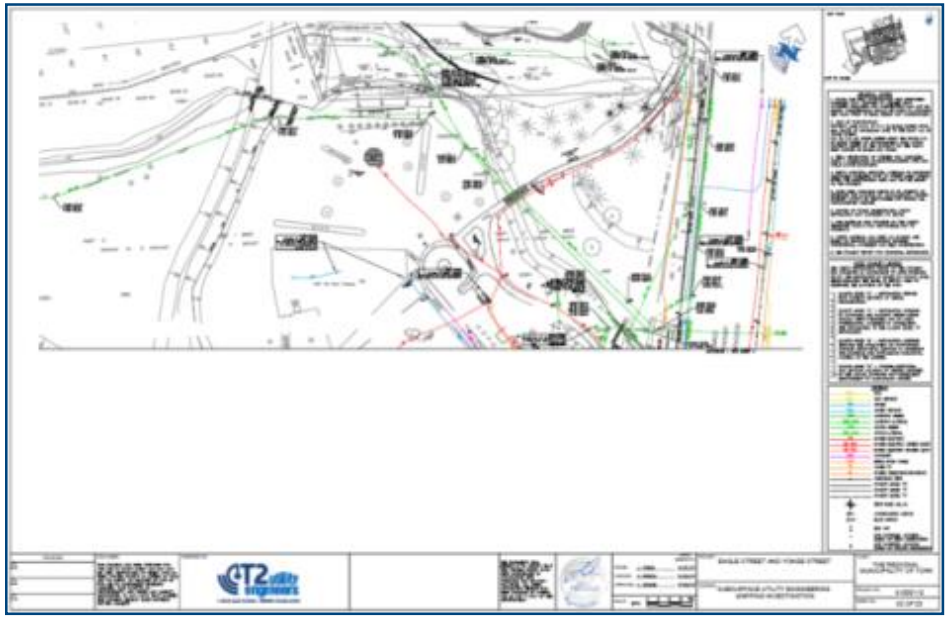

TEST HOLE DATA

S17-P1-TH2

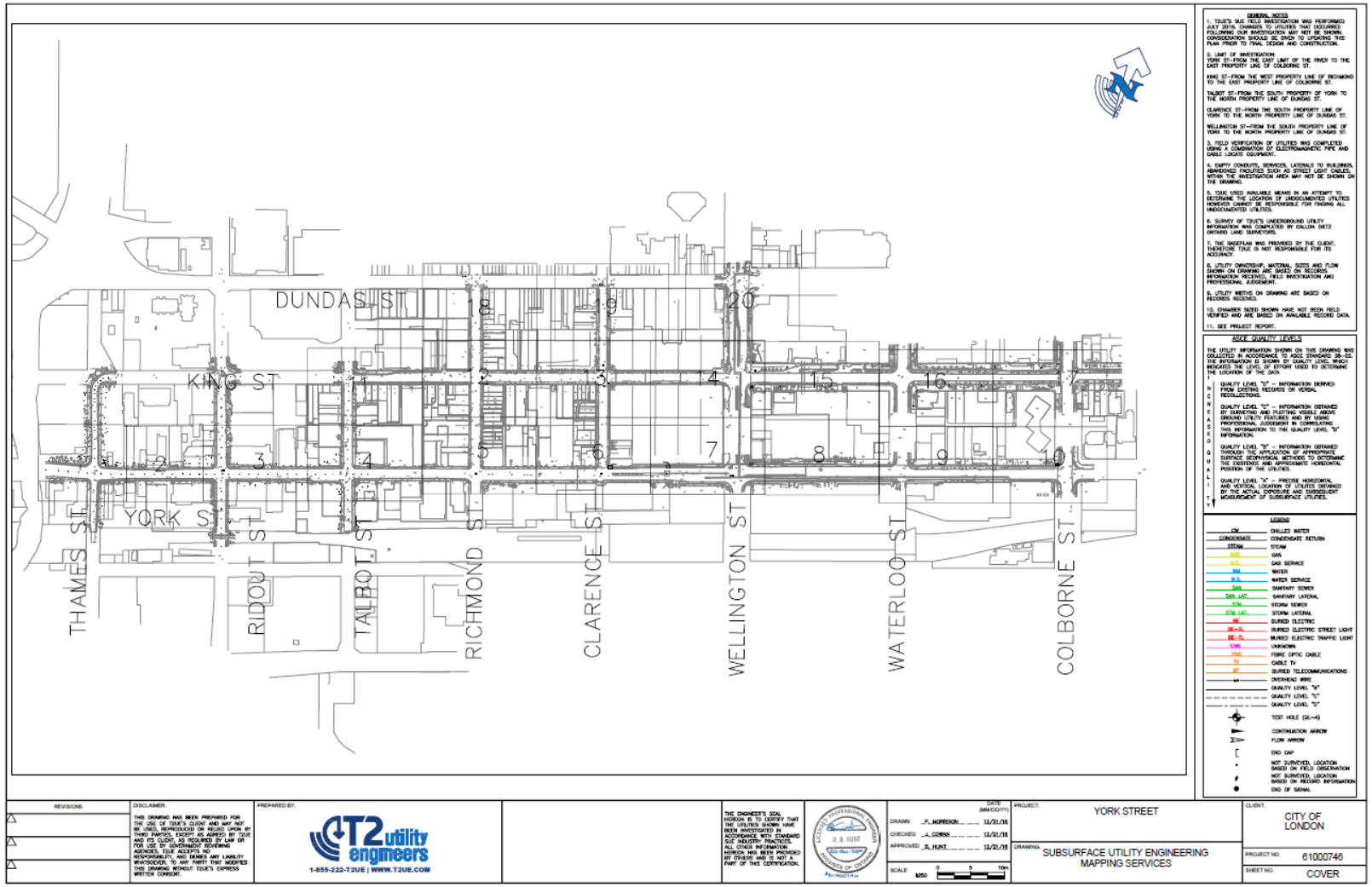
TEST HOLE PHOTO

SECTION A-A

SITE PHOTO



SUE Deliverables



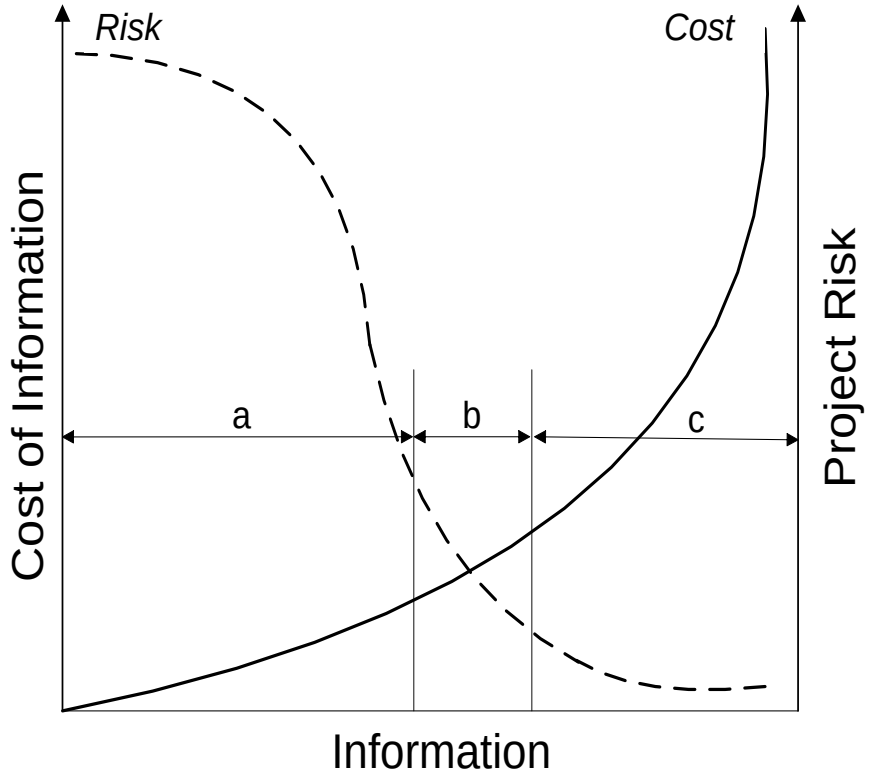
Why use SUE?

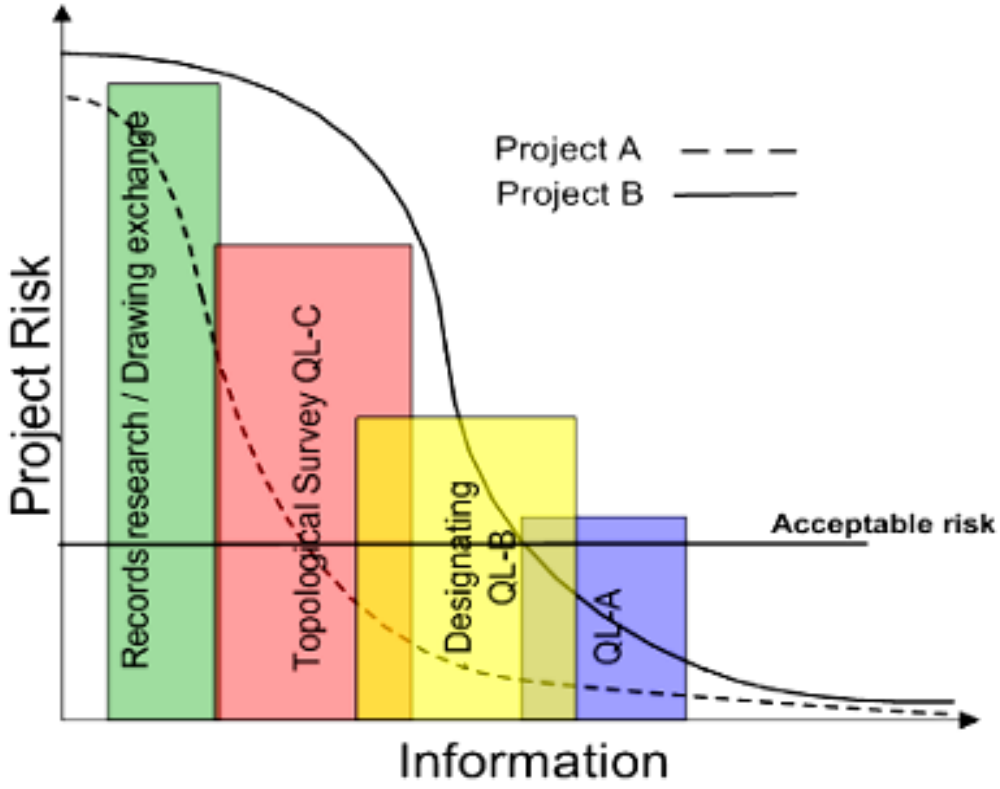
- SUE will provide the designers, engineers and utility coordinators with valuable information during the design stage, utilizing recognized standards and best practices.

- Clearly define conflicts and relocations
- Reduces re-design costs
- Reduces project costs
- Reduces project delays
- Improves project safety
- SUE reduces Edmonton's overall RISK

T2 utility engineers

SUE and Risk Management



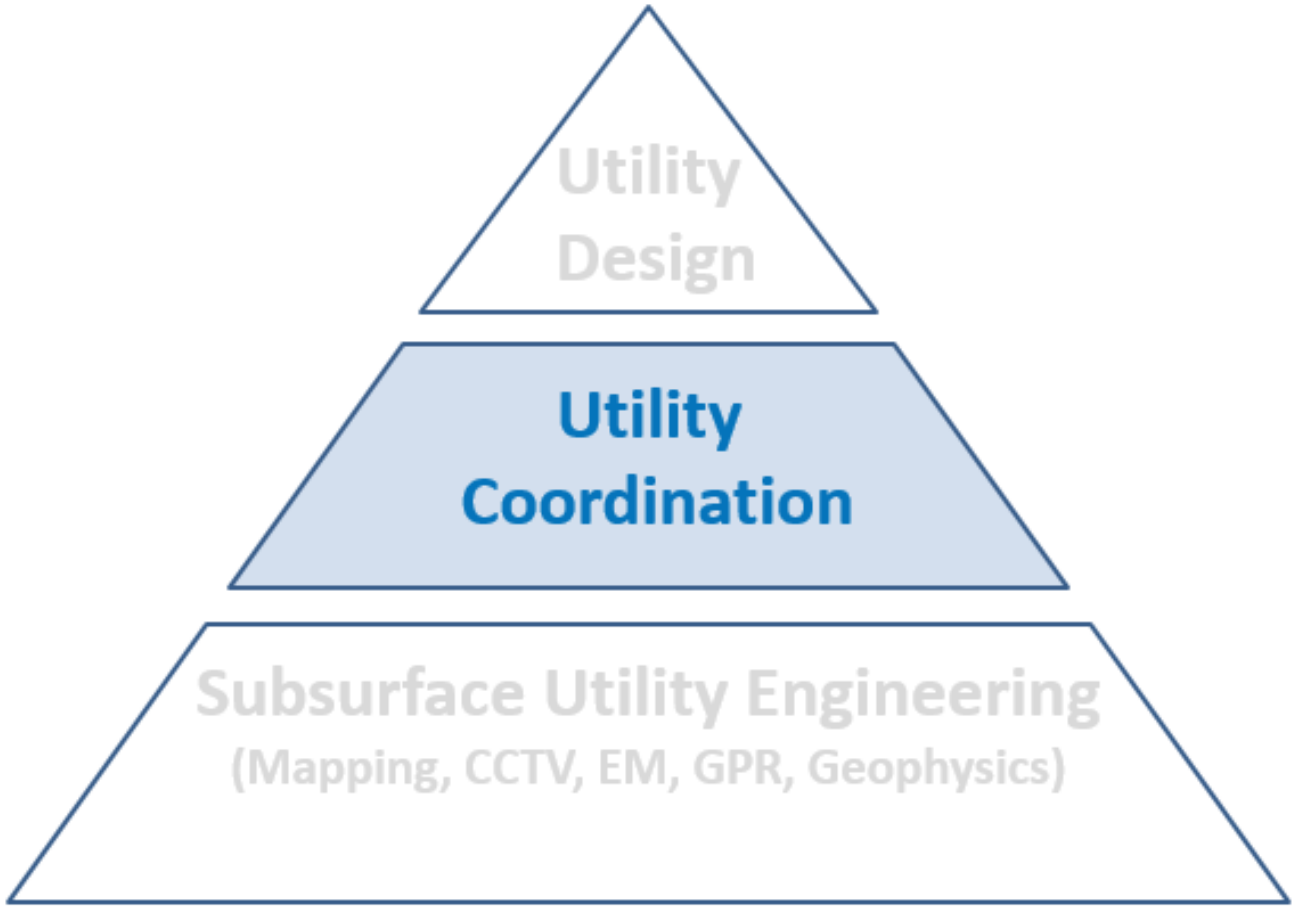


ROI - $3.41 (U of T Study)

T2ue's Approach to Utility Risk Mitigation

- Effective use of SUE
- Effective Utility Coordination – Design, Bid, Build vs P3 Projects
- Utility Design

Utility Coordination



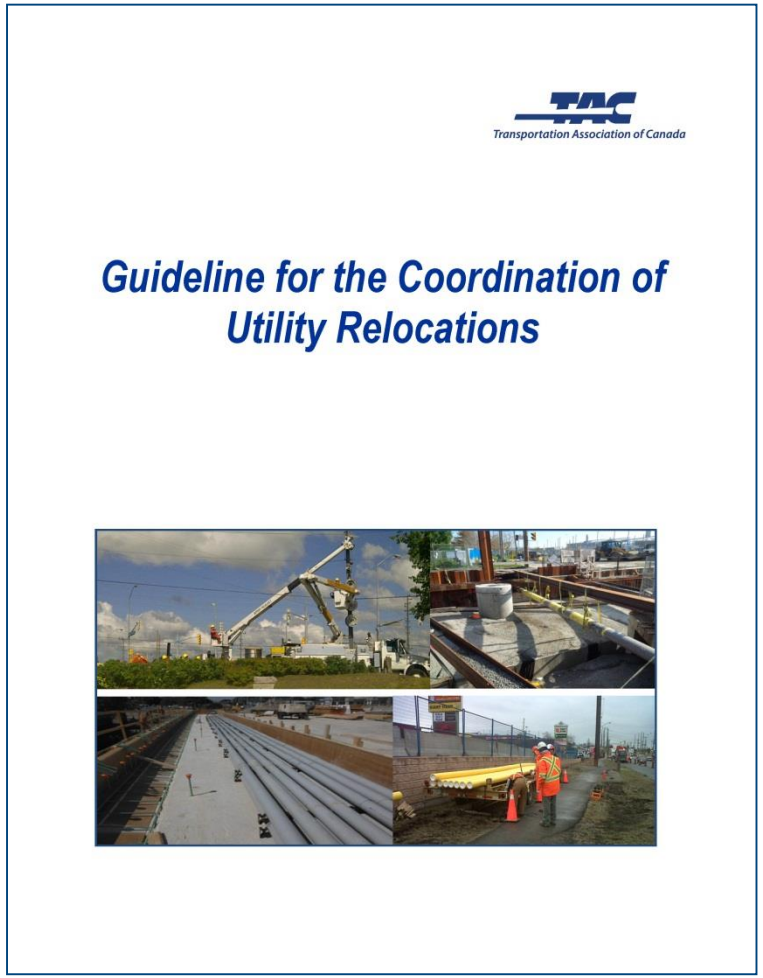
TAC Guideline for the Coordination of Utility Relocations - DBB

- TAC Committee

- Representation from Municipalities, Utilities and Consultants across the country

TAC Guideline for the Coordination of Utility Relocations - DBB

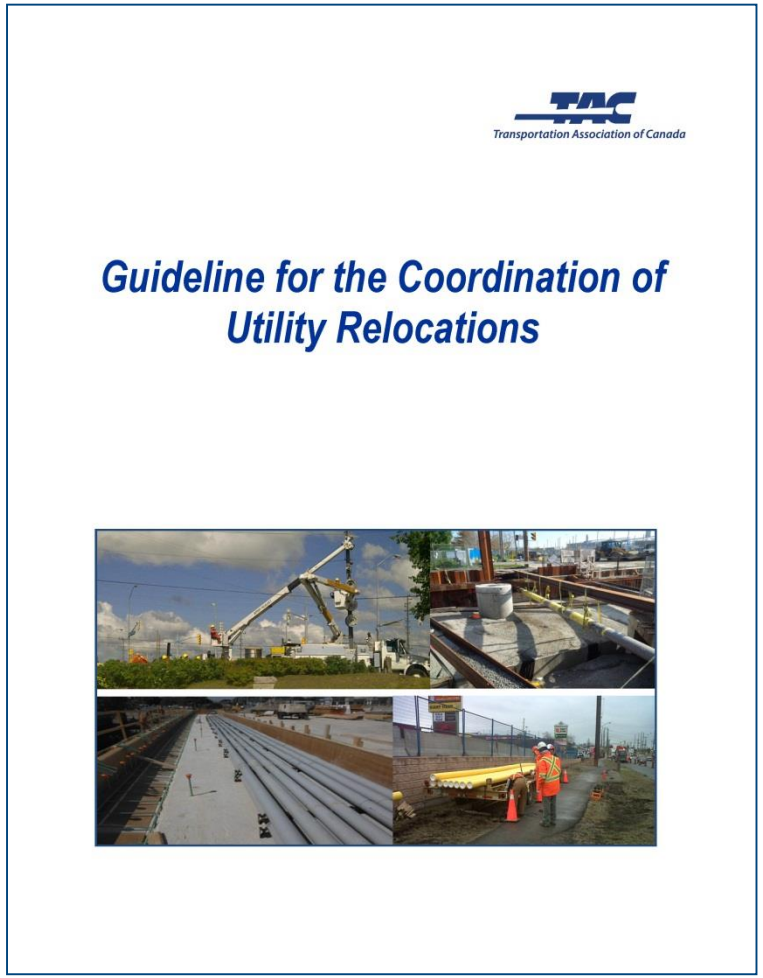
- Project was initiated in spring 2013
- All content developed by the subcommittee
- Inclusive development & review process



TAC Guideline for the Coordination of Utility Relocations - DBB

- Goal: 2016 publication

  Goal Accomplished!!!

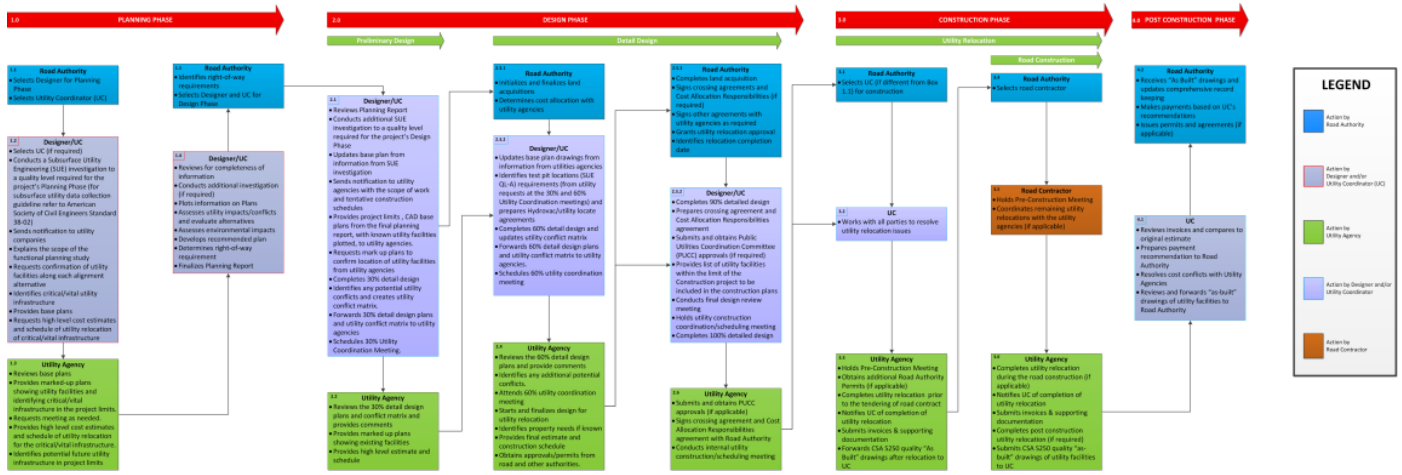


TAC Guideline for the Coordination of Utility Relocations - DBB

Transportation Association of Canada

Guideline for the Coordination of Utility Relocations

GUIDELINE FOR THE COORDINATION OF UTILITY RELOCATION FLOW CHART



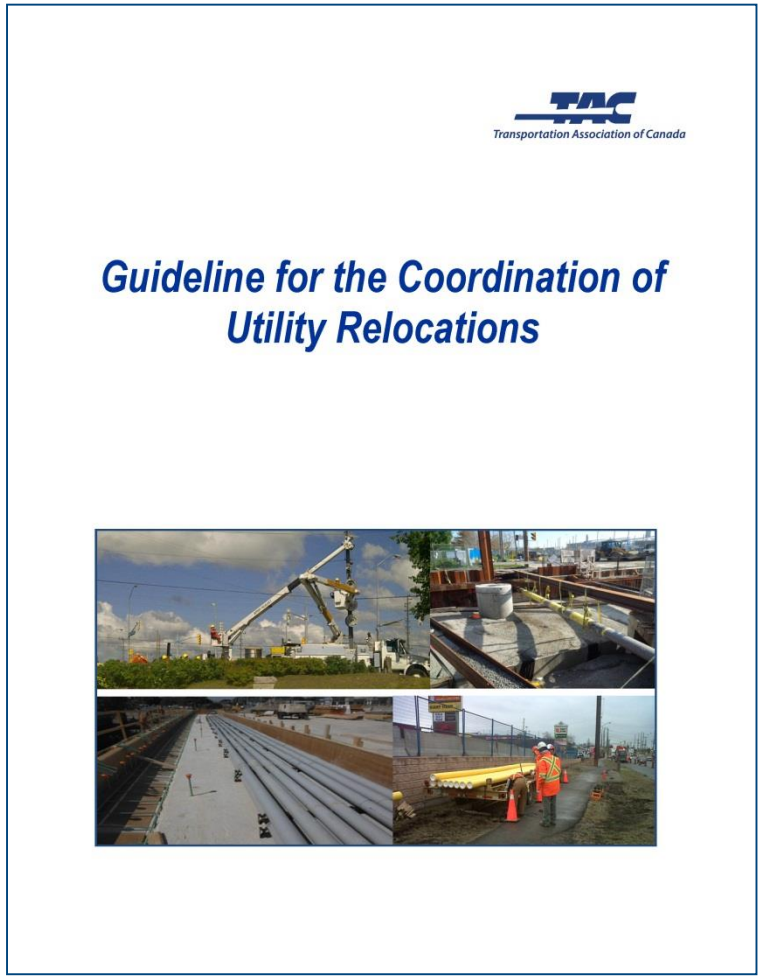
Utility Coordination for P3 Projects

- TAC Committee

- Representation from Municipalities, Utilities and Consultants across the country

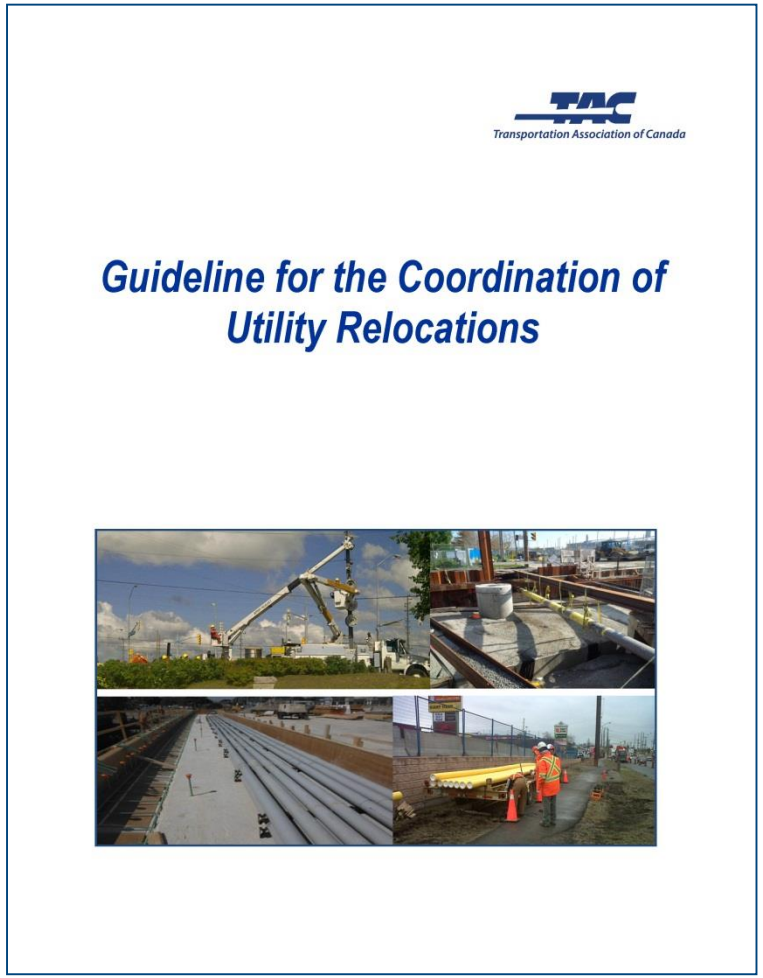
TAC Guideline for the Coordination of Utility Relocations – P3

- Project was initiated in spring 2017
- All content developed by the subcommittee
- Inclusive development & review process

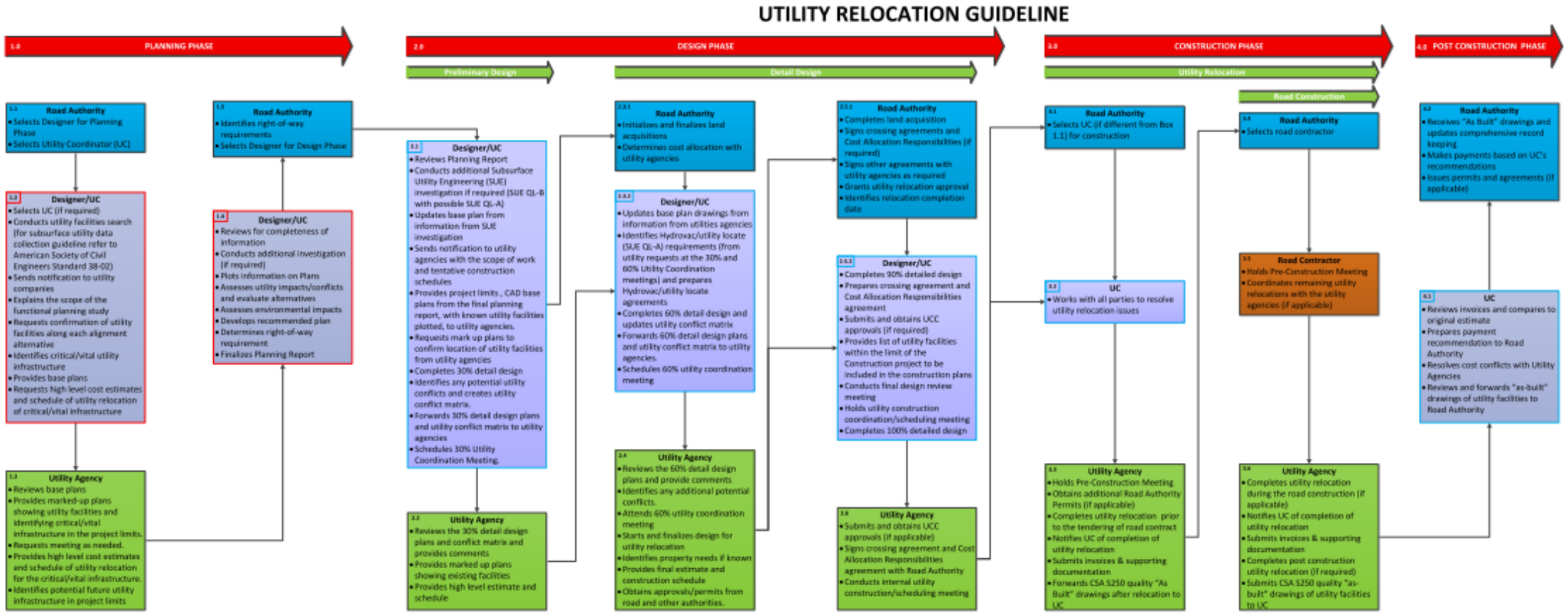


TAC Guideline for the Coordination of Utility Relocations – P3

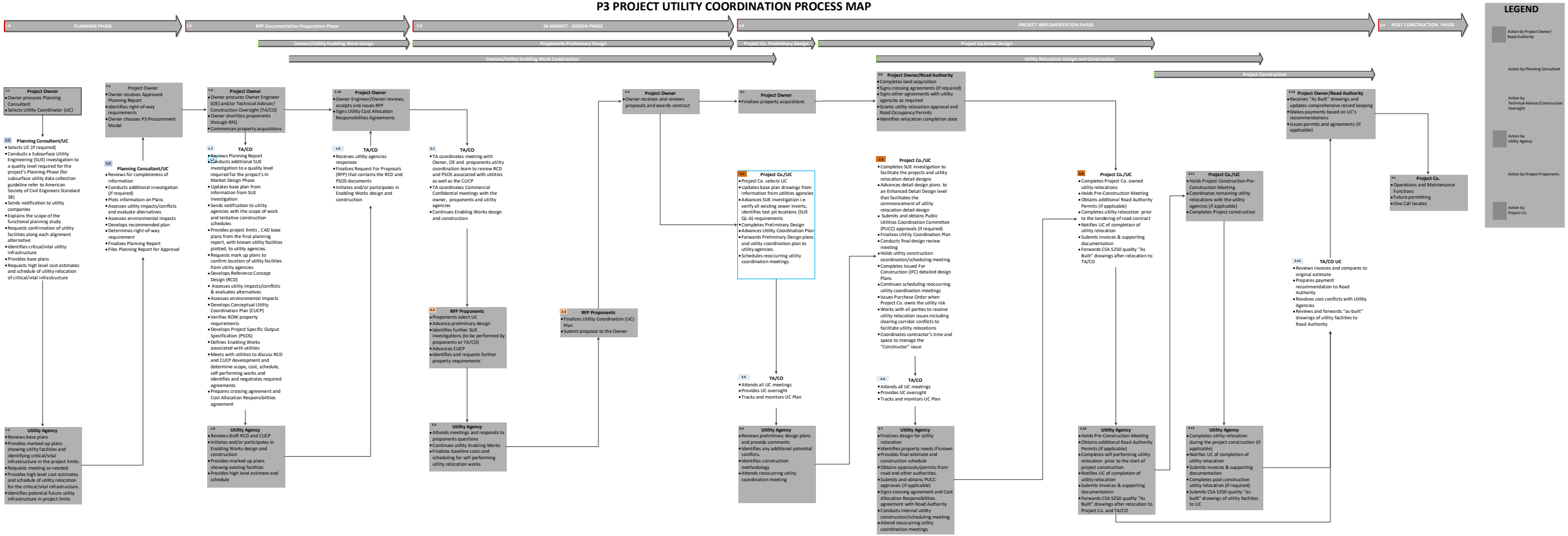
- Goal: 2020 publication



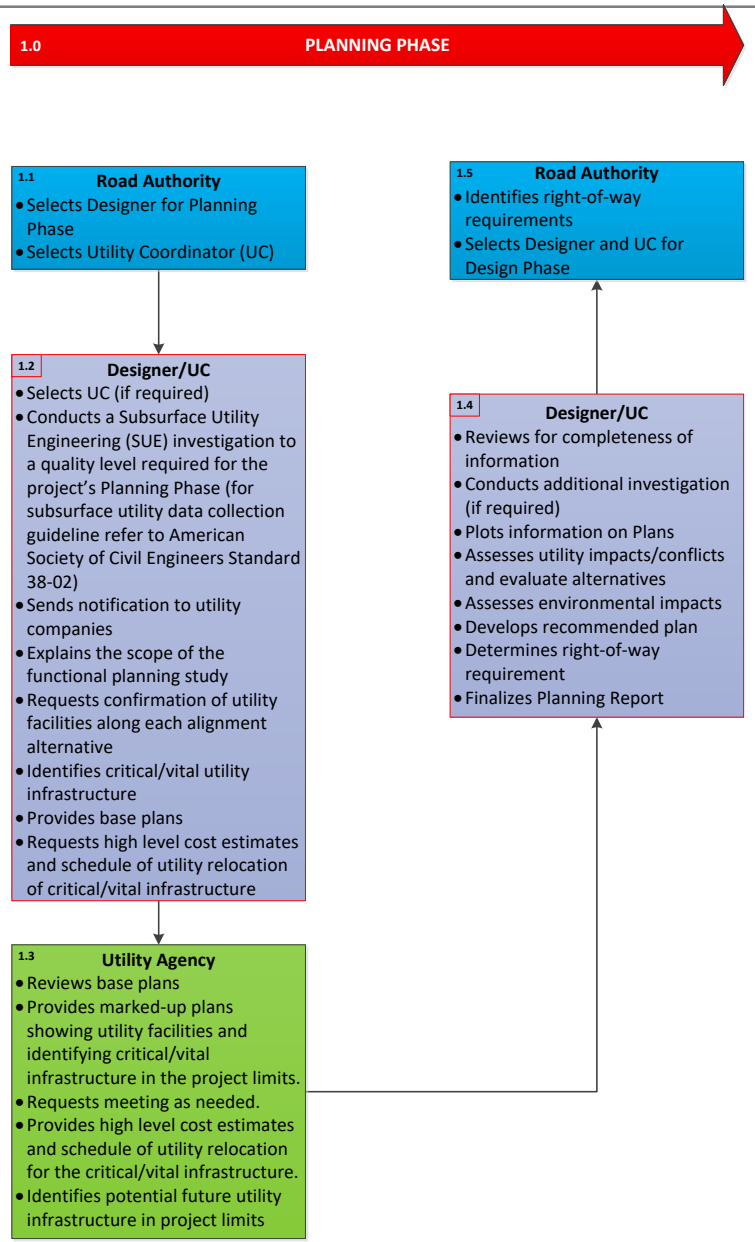
TAC Guideline for the Coordination of Utility Relocations - DBB



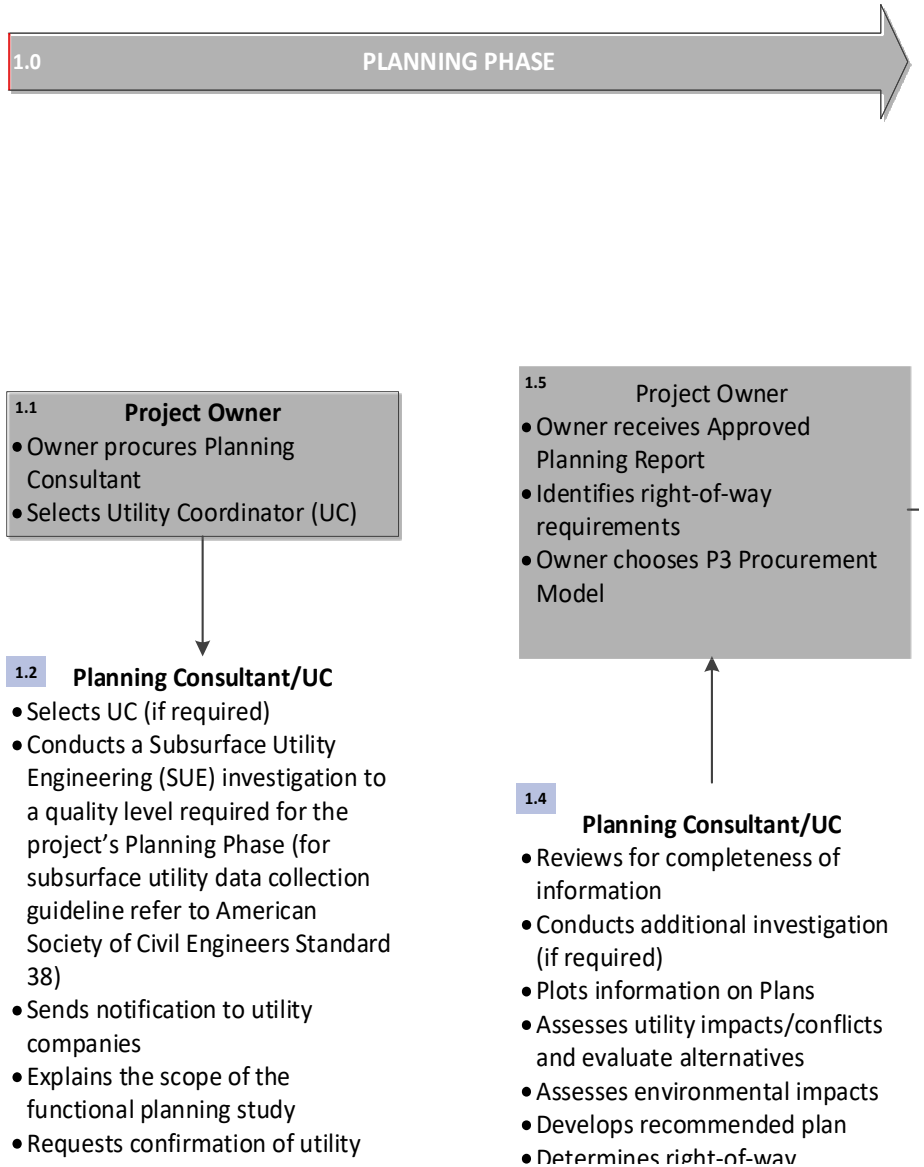
TAC Guideline for Utility Coordination – Public, Private, Partnership (P3)



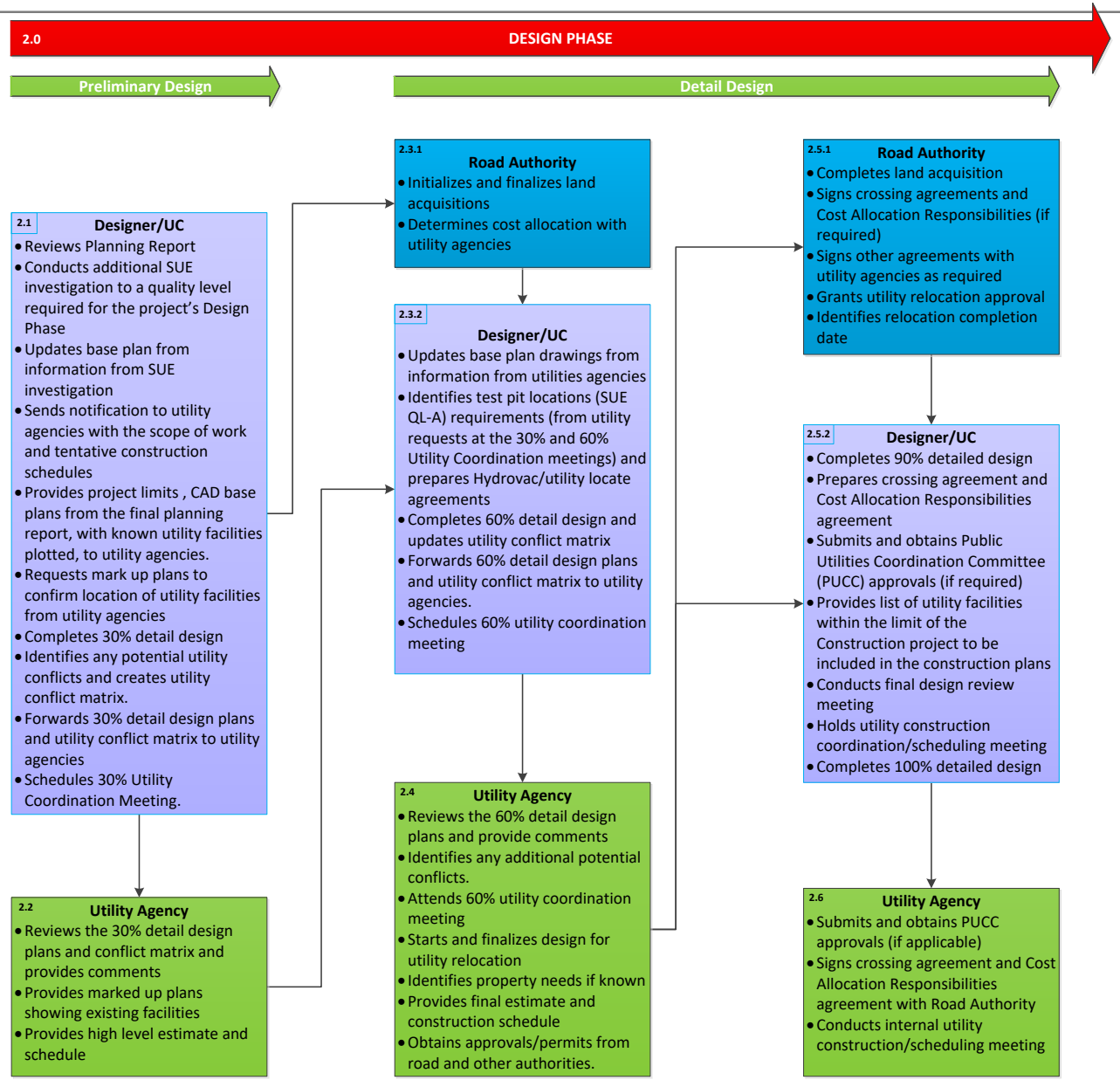
TAC Utility Coordination – Design, Bid, Build (DBB) Phases



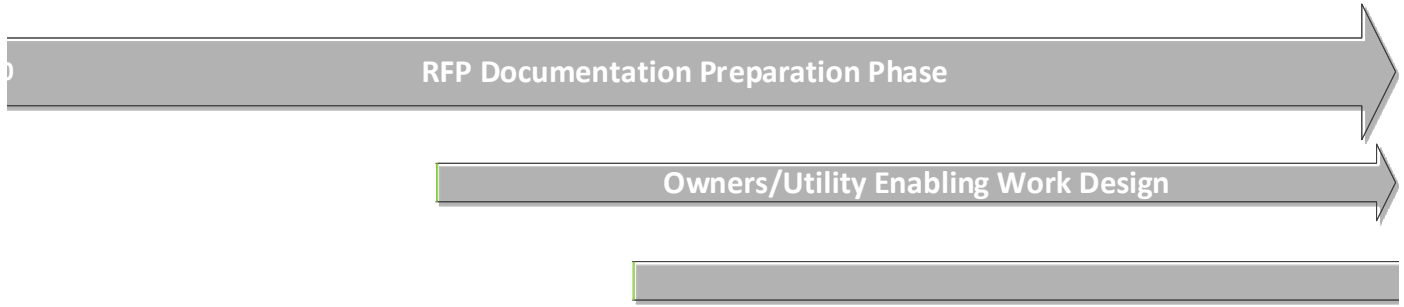
TAC Utility Coordination – P3 Phases



TAC Utility Coordination – Design, Bid, Build Phases



TAC Utility Coordination – P3 Phases



1.6 Project Owner

- Owner procures Owner Engineer (OE) and/or Technical Advisor/ Construction Oversight (TA/CO)
- Owner shortlists proponents through RFQ
- Commences property acquisitions

1.7 TA/CO

- Reviews Planning Report
- Conducts additional SUE investigation to a quality level required for the project's In Market Design Phase
- Updates base plan from information from SUE investigation
- Sends notification to utility

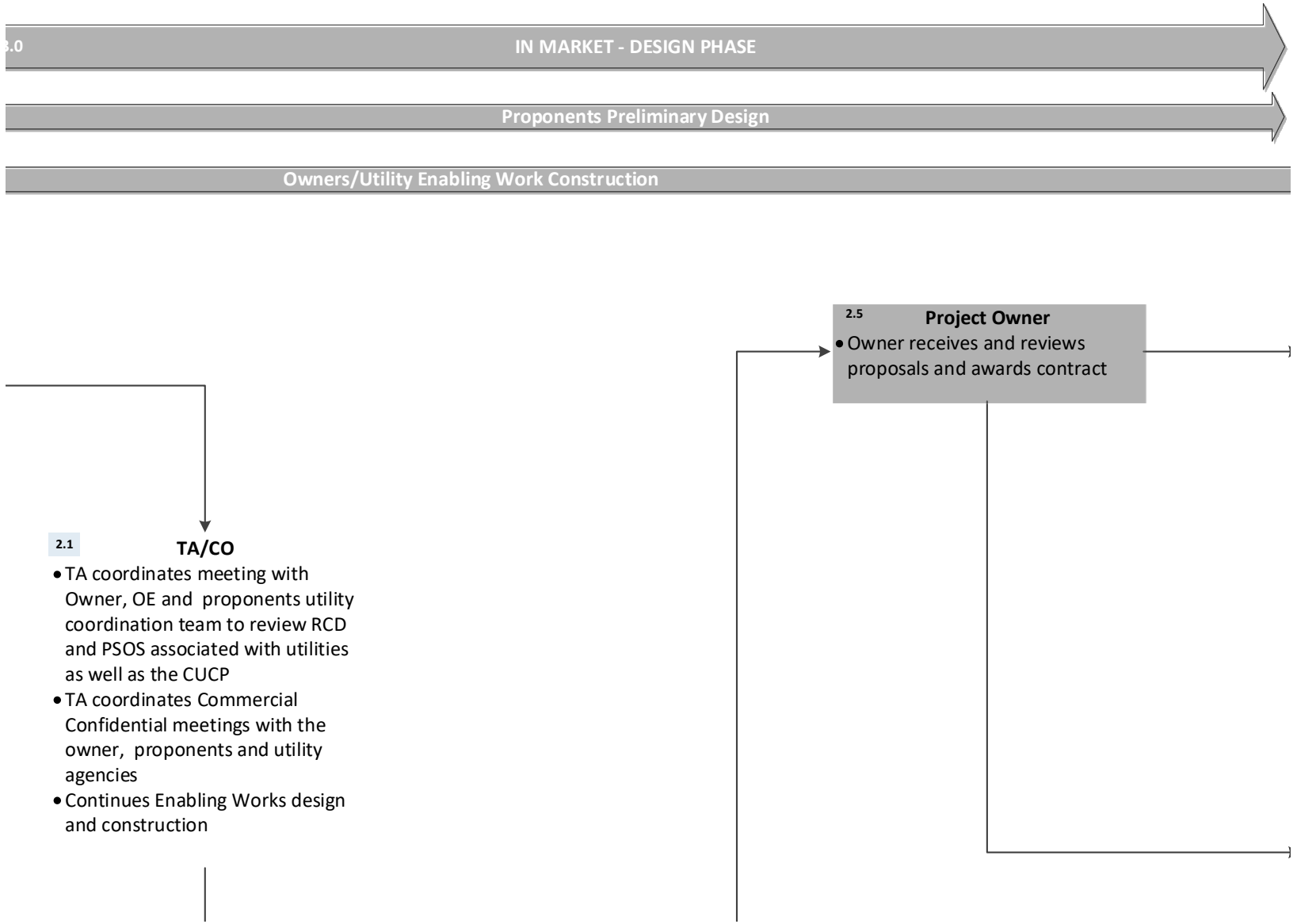
1.10 Project Owner

- Owner Engineer/Owner reviews, accepts and issues RFP
- Signs Utility Cost Allocation Responsibilities Agreements

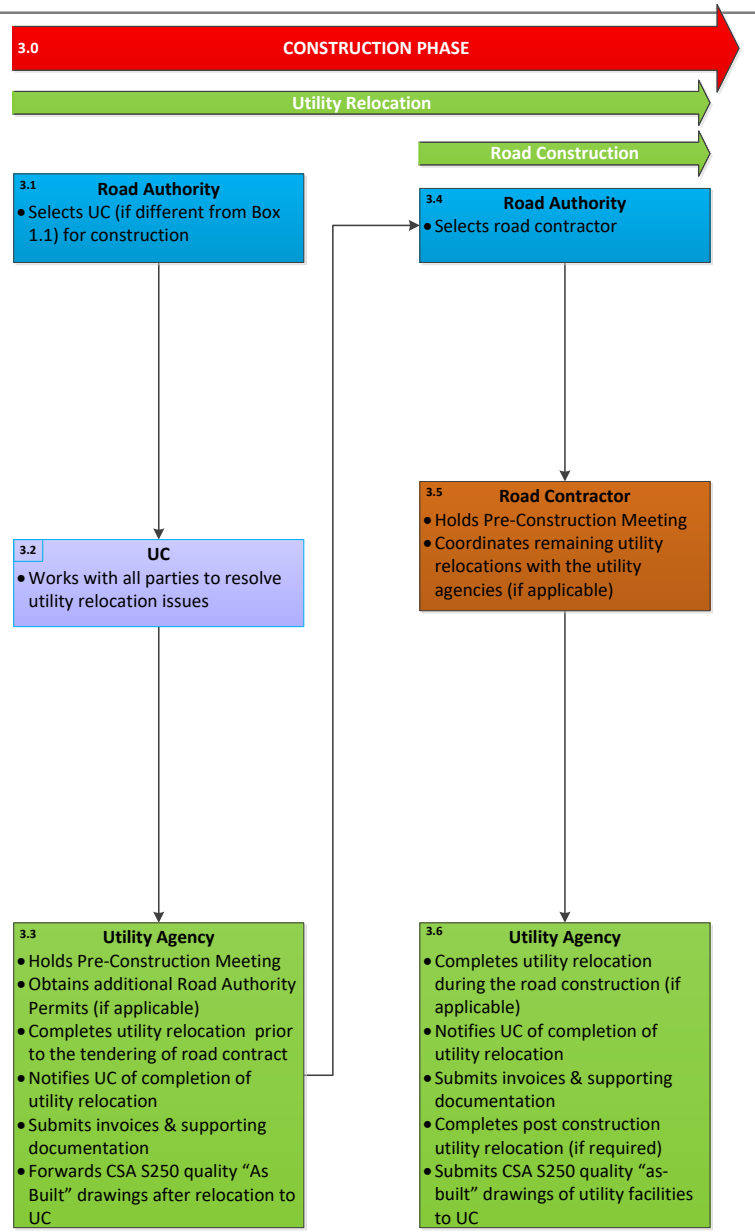
1.9 TA/CO

- Receives utility agencies responses
- Finalizes Request For Proposals (RFP) that contains the RCD and PSOS documents
- Initiates and/or participates in Enabling Works design and construction

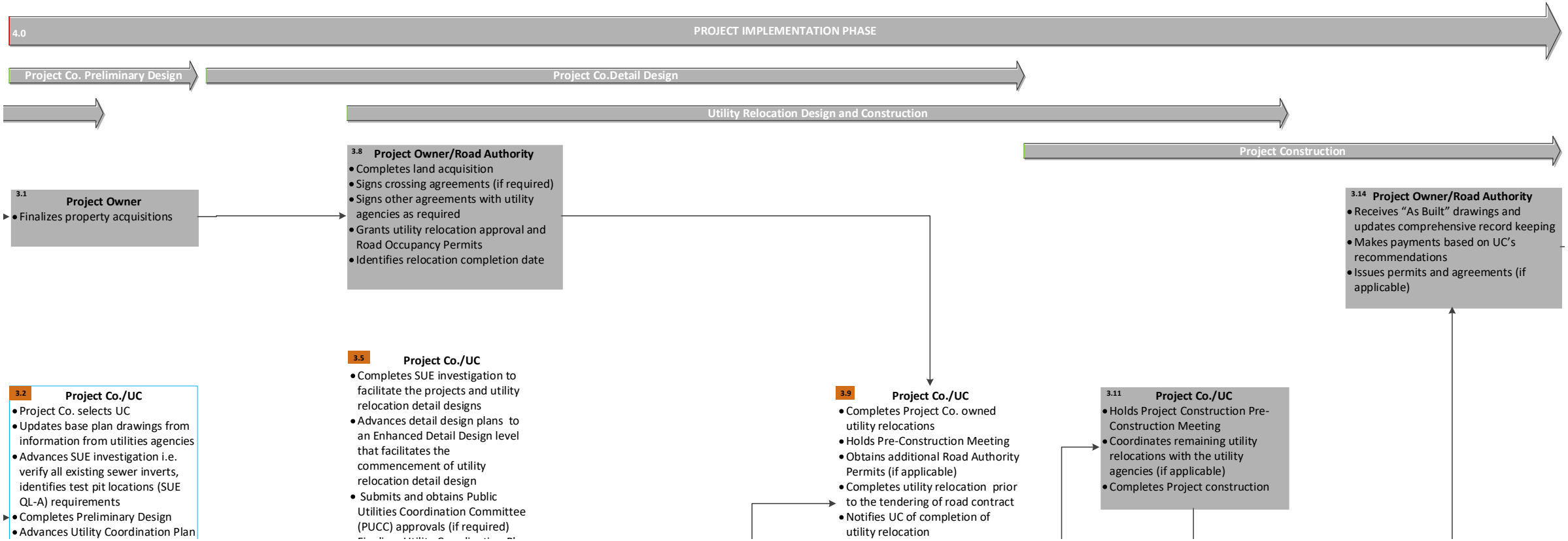
TAC Utility Coordination – P3 Phases



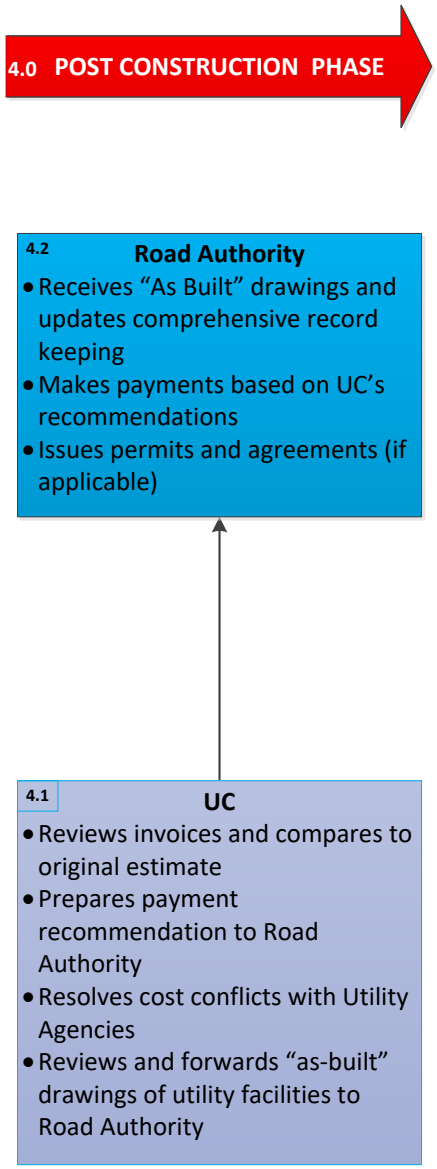
TAC Utility Coordination – Design, Bid, Build Phases



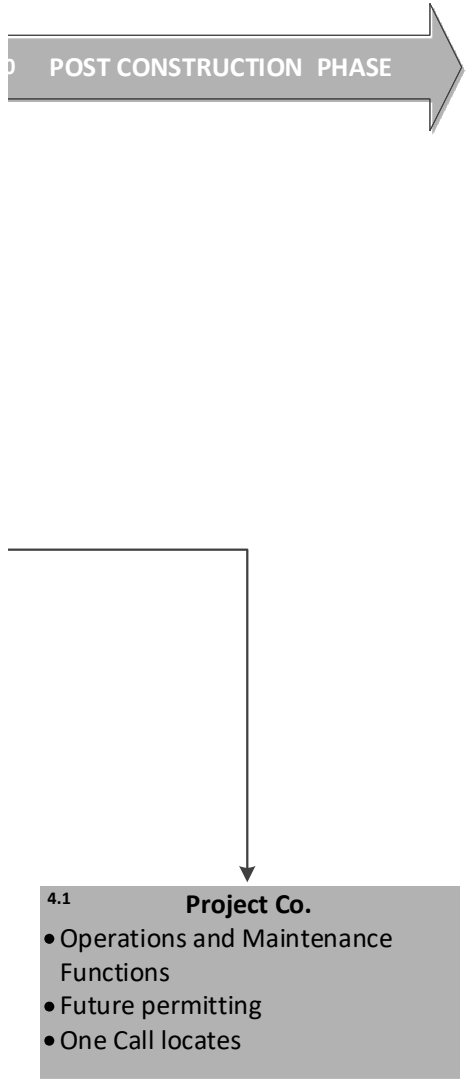
TAC Utility Coordination – P3 Phases



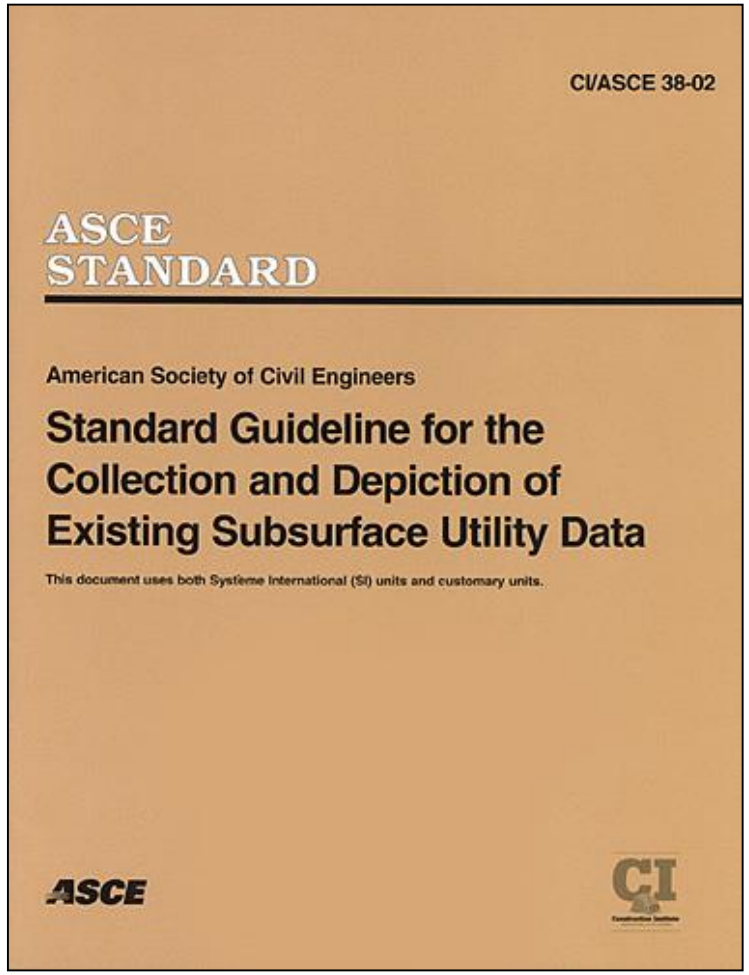
TAC Utility Coordination – Design, Bid, Build Phases

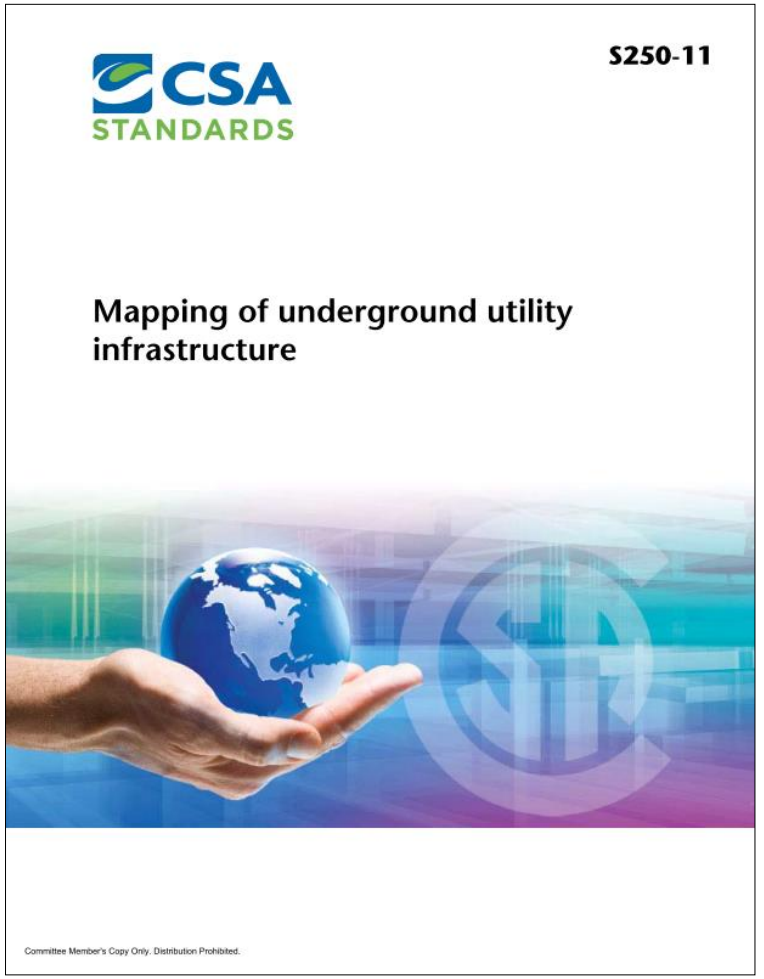


TAC Utility Coordination – P3 Phases



Utility Coordination Tools for DBB and P3 Projects - Standards





Utility Coordination Tools for DBB and P3 Projects

Utility Conflict Matrix

	B	C	D	E	F	G	H	I	J	K	N	O	P	Q	R	T	U	V	W	X	Y	Z	AA	AB
57	EXISTING								CONFLICT IDENTIFICATION				RELOCATION CONCEPT (Numbers refer to Relocation Concept Notes)			PROTECTION		MISCELLANEOUS						N
58	CONFLICT	UTILITY TYPE (Table	LOCATION	STA. (Start)	STA. (Finish)	Size (size or mm)	Material (Table 2)	PROPOSED TOP OF R	Conflict Type (Table	DCM Zone (See Note 1)	Conflict (Y	Conflict To Be Determined (SU	May Remain (See RCN	Support/ Protect (From other	Permanent Relocation	Permanent	Temporary	Comments	Test Hole Required	Enabling works	Type of Work	Quantity	Comments from UC Meeting	Column1
160	93	GM	Jane	11+345	11+345	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
161	94	GM	Jane	11+355	11+355	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
162	95	GM	Jane	11+395	11+395	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing SW curb of	Y	N	Pipe			
163	96	GM	Jane	11+405	11+405	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S Centre median of Jane St	Y	N	Pipe			
164	97	GM	Jane	11+420	11+420	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing SE curb of Finch	Y	N	Pipe			
165	98	GM	Jane	11+423	11+423	760	STL-XHP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing SE curb of Finch	Y	N	Pipe			
166	99	GM	Jane	11+500	11+500	760	STL-XHP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
167	100	GM	Jane	11+510	11+510	760	STL-XHP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
168	101	GM	Jane	11+585	11+585	760	STL-XHP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
169	102	GM	Jane	11+595	11+595	760	STL-XHP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
171	104	GM	Jane	11+500	11+500	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
172	105	GM	Jane	11+510	11+510	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
173	106	GM	Jane	11+585	11+585	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
174	107	GM	Jane	11+595	11+595	300	STL-HP	?	[]	NA	Y	Y	8,15	N	TBD	Y	N	Utility crossing S curb of Finch	Y	N	Pipe			
542	543	BE (SL)	Jane	11+279	11+320	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	(3) LS to be relocated	Y	N	C/C			
543	545	BE (SL)	Jane	11+280	11+293	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing N curb, (3) LS to be relocated	Y	N	C/C			
544	547	BE (SL)	Jane	11+300	11+380	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing North curb of Finch, (7) LS to be relocated	Y	N	C/C			
545	548	BE (SL)	Jane	11+322	11+322	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing south curb of Finch, HJB to be relocated, LS to be relocated	Y	N	C/C			
546	549	BE (SL)	Jane	11+341	11+341	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing south curb of Finch, (1) LS to be relocated	Y	N	C/C			
547	550	BE (SL)	Jane	11+351	11+351	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing South curb , (1) LS to be relocated	Y	N	C/C			
548	551	BE (SL)	Jane	11+370	11+370	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing South curb of Finch, (2) LS to be relocated	Y	N	C/C			
551	556	BE (SL)	Jane	11+435	11+500	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing S curb of Finch, (5) LS to be relocated	Y	N	C/C			
552	557	BE (SL)	Jane	11+510	11+609	UNK	UNK	?	[]	NA	Y	Y	8,14	N	TBD	N	N	Utility crossing N curb, (6) LS to be relocated	Y	N	C/C			
852	822	BT-BELL	Jane	11+300	11+300	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing N curb of Finch	Y	N	Structure			
853	823	BT-BELL	Jane	11+320	11+320	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing N curb of Finch	Y	N	Structure			
854	824	BT-BELL	Jane	11+330	11+330	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing N curb of Finch	Y	N	Structure			
855	825	BT-BELL	Jane	11+356	11+356	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing N curb of Finch	Y	N	Structure			
856	826	BT-BELL	Jane	11+395	11+395	UNK	UNK	?	⊥	1,2,3	Y	Y	4,11	N	TBD	N	N	Utility within URA	Y	N	Structure			
857	827	BT-BELL	Jane	11+395	11+395	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing SW curb of	Y	N	Structure			
858	828	BT-BELL	Jane	11+424	11+424	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing SE curb of Finch	Y	N	Structure			
859	829	BT-BELL	Jane	11+420	11+420	UNK	UNK	?	⊥	1,2,3	Y	Y	4,11	N	TBD	N	N	Utility within URA	Y	N	Structure			
860	830	BT-BELL-ROG	Jane	11+420	11+420	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	Utility crossing NE curb of Finch	Y	N	Structure			
861	831	BT-BELL	Jane	11+442	11+442	UNK	UNK	?	[]	NA	Y	Y	8,11	N	TBD	N	N	MH in road ROW - Bell to confirm if MH needs	Y	N	Structure			
862	832	TV-ROG	Jane	11+472	11+472	UNK	UNK	?	[]	NA	Y	Y	8,13	N	TBD	N	N	Utility crossing N curb of Finch	Y	N	Duct			
863	833	TV-ROG	Jane	11+467	11+467	UNK	UNK	?	⊥	1,2,3	Y	Y		N	TBD	N	N	Utility within URA	Y	N	Duct			
864	834	TV-ROG	Jane	11+467	11+467	UNK	UNK	?	[]	NA	Y	Y	8,13	N	TBD	N	N	Utility crossing SE curb of Finch	Y	N	Duct			

Utility Coordination Tools for P3 Projects

Utility Coordination Plan

Utility Coordination Tools for P3 Projects

Utility Responsibility Matrix

Utility Coordination Tools for P3 Projects

Utility Risk Registry

Utility Coordination Tools for P3 Projects

Utility Baseline Document

Utility Coordination DBB - P3 Comparison

DBB

- ASCE & CSA Standards
- Utility Conflict Matrix
- 4 Phases

P3

- ASCE & CSA Standards
- Utility Conflict Matrix
- 5 Phases
- Utility Coordination Plan
- Utility Responsibility Matrix
- Utility Risk Registry
- Utility Baseline Document

Additional P3 Utility Risks

- Utility Agreements (i.e. Templates for ProjectCo, Crossing Agreements for Pipelines)

- PUCC and Other Permitting Processes

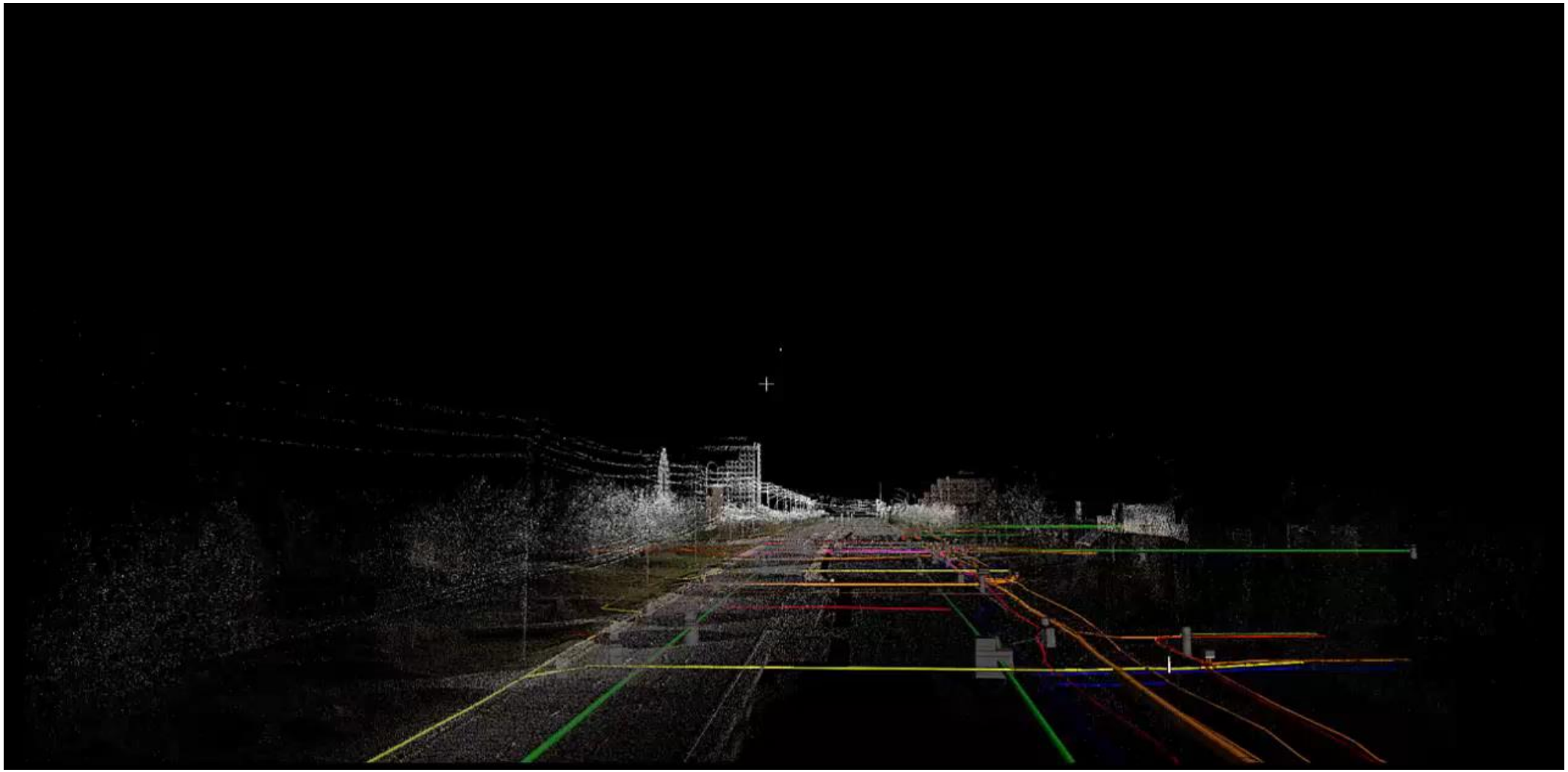
- Obtaining adequate utility information (i.e. design/construction production rates and schedules, estimates etc.) utilizing conceptual design

Applying TAC P3 Utility Coordination Flow Chart Principles

Hurontario LRT

- SUE Investigation
- Utility Conflict Matrix (approximately 1200 Conflicts identified)
- Composite Utility Drawing (3D Utility Model)

3D Model Deliverable



Applying TAC P3 Utility Coordination Flow Chart Principles

Hurontario LRT

- SUE Investigation
- Utility Conflict Matrix (approximately 1200 Conflicts identified)
- Composite Utility Drawing (3D Utility Model)
- Utility Coordination Drawing
- Utility Responsibility Matrix
- Utility Baseline Document (UBD)
- PSOS / PA Input
- Preparatory Works / RFI's / X-Sections
- RFI's from Proponents In-Market
- Participation / Facilitation of Running Meetings
  Utility Coordination, Utility Working Group, PMT /TA, CCM, TM

Questions

Thank you

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