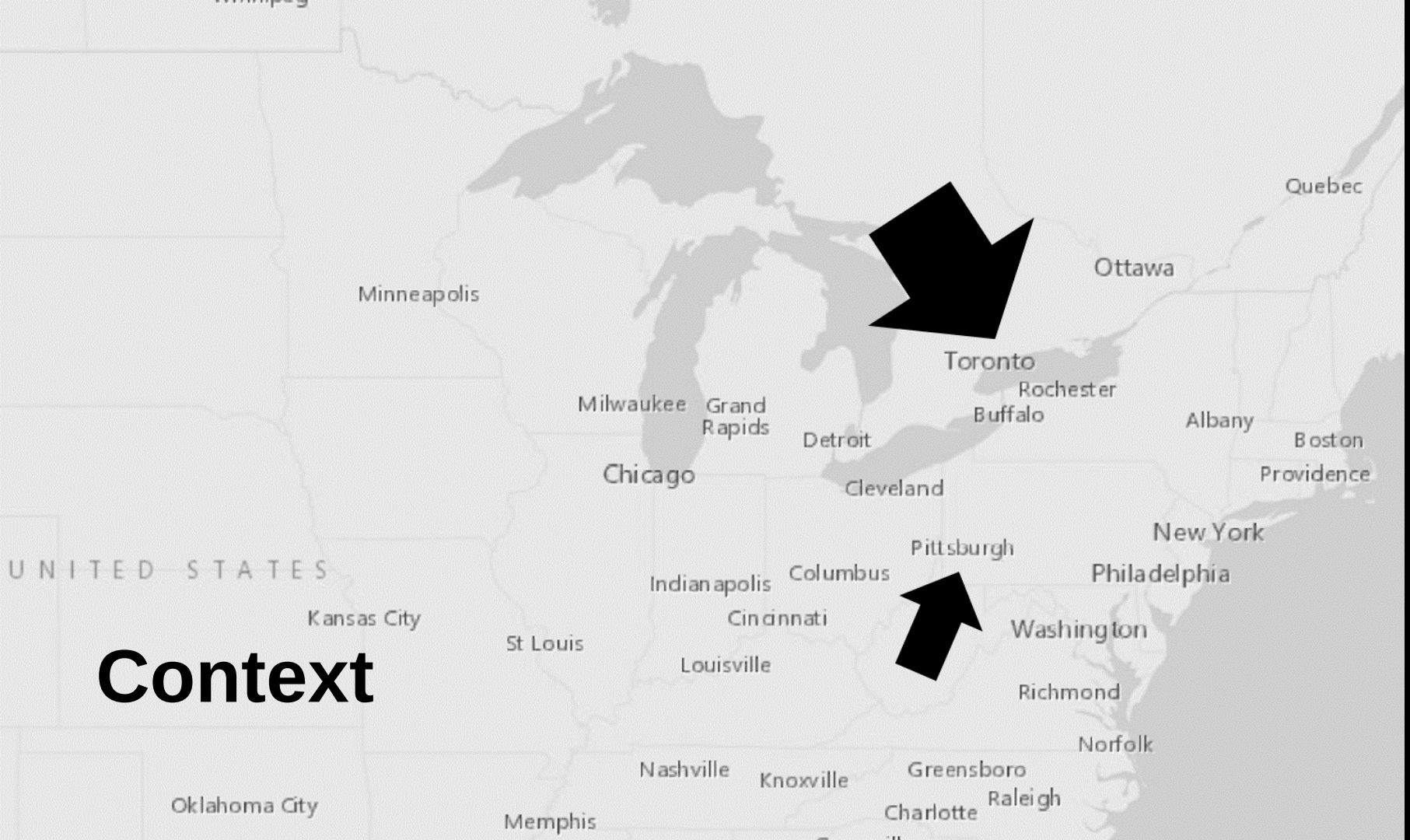
Planning for Resilient Rapid Transit in Toronto

Context


Quebec
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Kansas City
Cincinnati
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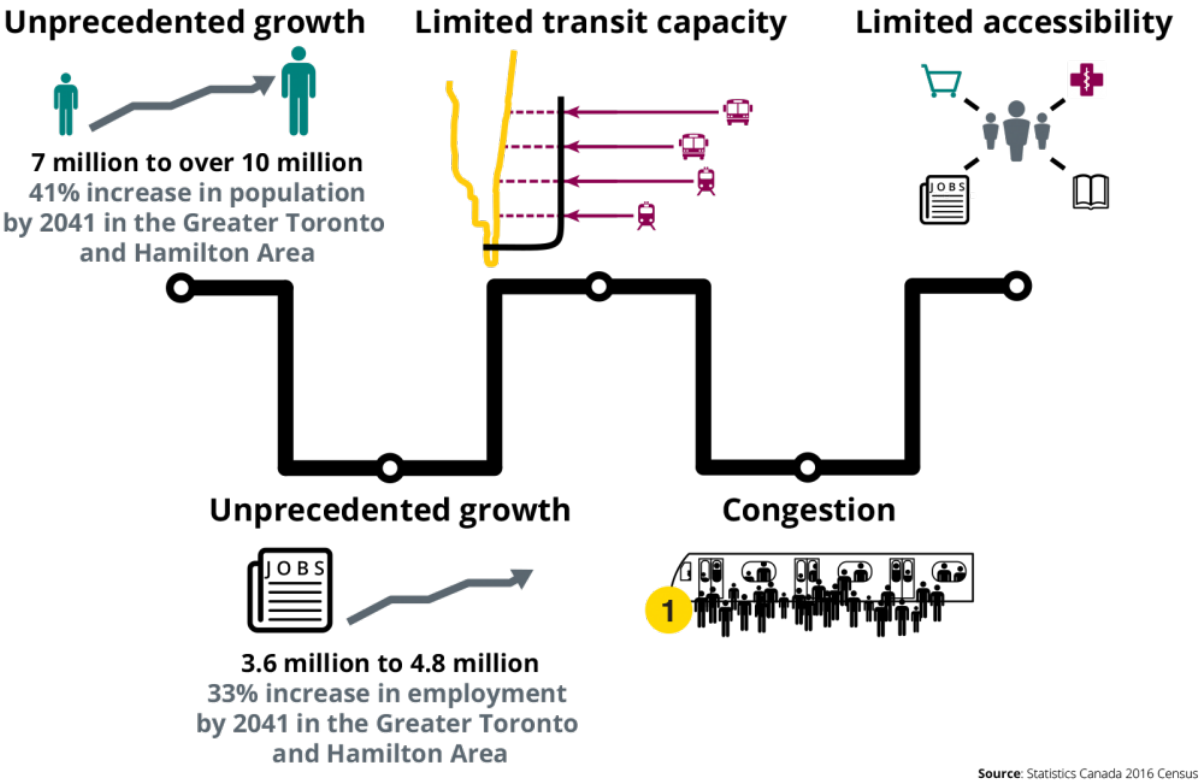
St Louis
Louisville
Richmond
Norfolk
Nashville
Knoxville
Greensboro
Raleigh
Oklahoma City
Charlotte
Memphis

Source: TTC, 2018



Source: Statistics Canada 2016 Census

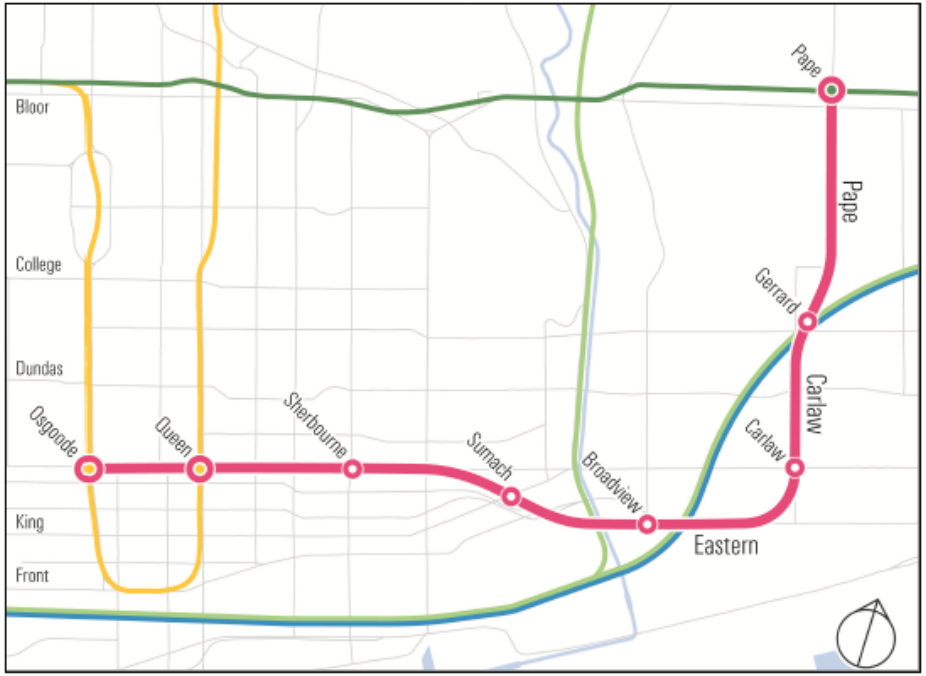
1 Crowding on Line 1 Yonge - Morning Rush Hour

Source: TTC, 2016

Seeking Relief

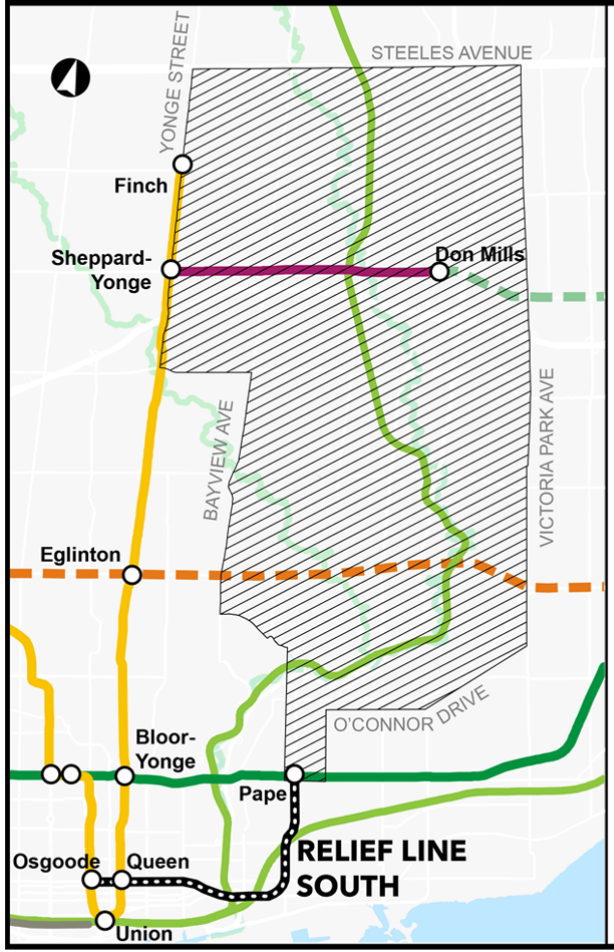
The Relief Line South

- 7.5 km long subway
- 8 stations
- Currently in preliminary (15-30%) design
- Construction unfunded but a municipal and regional priority
- Projected to open some time between 2028 and 2031



The Relief Line North Project Assessment

RELIEF LINE NORTH STUDY AREA



EXISTING RAPID TRANSIT

- Line 1 Yonge-University
- Line 2 Bloor-Danforth
- Line 4 Sheppard
- GO Rail
- UP Express

PROJECTS IN DELIVERY*

- Eglinton Crosstown
- Sheppard East LRT

- Interchange Stations
- Relief Line South

NOTE

*Projects In Delivery are under construction or in the engineering design stage.

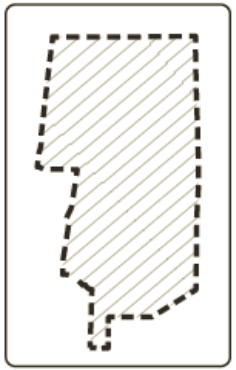
RELIEF LINE
NORTH

Base data from Land Information Ontario & Statistics Canada.

2018 — 2019 — 2020

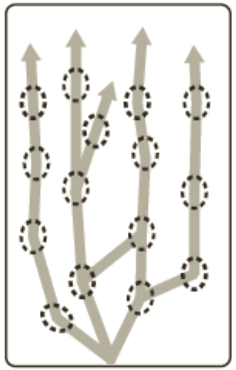
CONSULTATION ROUND 1	CONSULTATION ROUND 2	CONSULTATION ROUND 3	CONSULTATION ROUND 4

STUDY PHASE 1	STUDY PHASE 2



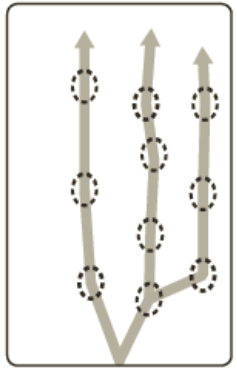
Step 1

Define the project



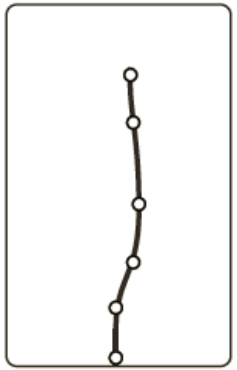
Step 2

Identify a long list of station areas and corridor options



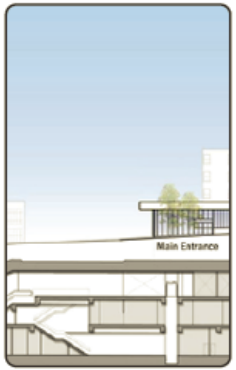
Step 3

Analyze options, including potential alignments and technologies, to identify a short list of station areas and corridor options



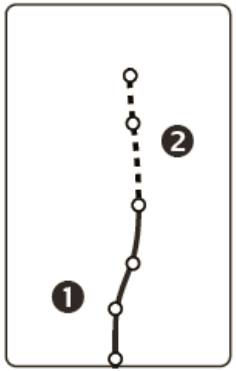
Step 4

Evaluate the short list of options through an Initial Business Case to determine a preferred alignment



Step 5

Develop a conceptual design for the project



Step 6

Determine phasing for construction and implementation

Transit Project Assessment Process (TPAP)

Environmental Assessment

Source: Toronto Star, 2018

Source: Toronto Star, 2013

Source: CBC, 2018

Integrating Resilience into the RLPA

Consider

& Impacts to the project and to the network

& Impacts of short and long term stressors

Throughout the evaluation process

4 Principles

1. Robustness
2. Redundancy
3. Safe to Fail
4. Adaptable

Application

Example Criteria

- Transportation Network Connectivity & Flexibility:
  - Does this line improve the reliability and redundancy of the transit network? What is the ability of the line to handle shutdowns on rapid transit lines or additional passengers from shutdowns to major roads?
- Relief to Eglinton-Yonge Station
  - How much relief will the alignment provide to Eglinton- Yonge Station?
- Flood Prevention
  - Does the option cross floodprone areas/is the option at risk for flooding during construction and operation? If so, what is the difficulty associated with the option for dealing with flooding? Can the option withstand worsened flooding attributed to climate change?

Final Thoughts

- Some resilience criteria have had a significant impact in evaluation, especially those related to:
  - Relief
  - Network connectivity and flexibility
  - Environmental constraints
- Additional resilience-related criteria will be brought into the evaluation as the RLNPA progresses
  - Many of the additional criteria relate to design
- Although not every resilience-related criterion will impact evaluation, they are still important to consider to help identify potential weaknesses or constraints