Planning for Resilient Rapid Transit in Toronto
Context
Unprecedented growth
7 million to over 10 million
41% increase in population by 2041 in the Greater Toronto and Hamilton Area

Limited transit capacity

Limited accessibility

Unprecedented growth
3.6 million to 4.8 million
33% increase in employment by 2041 in the Greater Toronto and Hamilton Area

Congestion

Source: Statistics Canada 2016 Census
Crowding on Line 1 Yonge - Morning Rush Hour

- Finch
- North York Centre
- Sheppard-Yonge
- York Mills
- Lawrence
- Eglinton
- Davisville
- St. Clair
- Summerhill
- Rosedale
- Bloor-Yonge
- Wellesley
- College
- Dundas
- Queen
- King
- Union

- Less than 85% full: Sufficient capacity to serve demand
- Between 85% and 100% full: Approaching capacity, crowded vehicles
- 100% full: Capacity exceeded, trains bypassing stations

With the rollout of the new Toronto Rocket subway fleet in 2014, capacity increased by 10%. This has resulted in a minor improvement for certain sections, however, Bloor Station to College Station remains at or above capacity.

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
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

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

Base data from Land Information Ontario & Statistics Canada.
**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)**

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