WELCOME

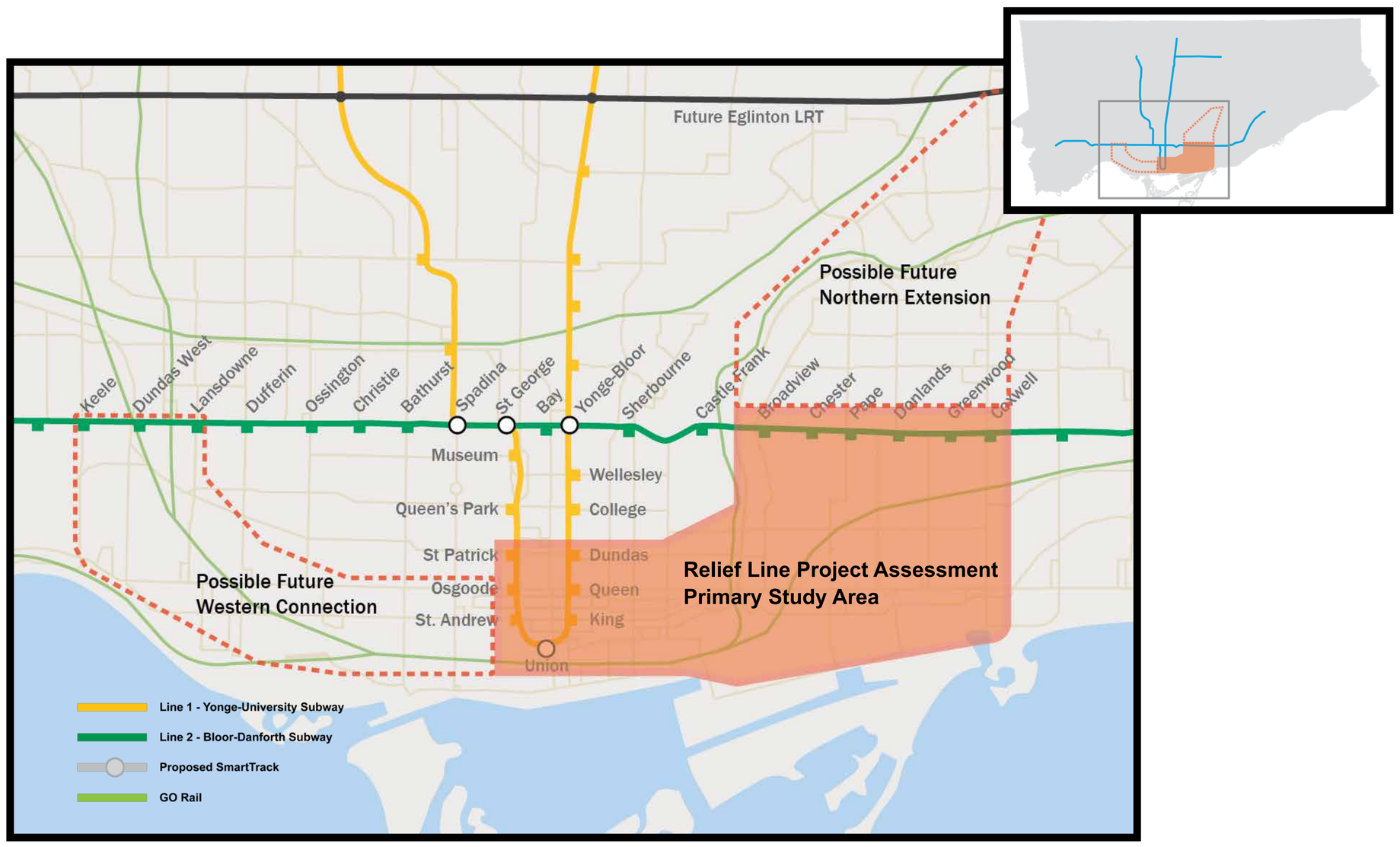
LOCAL SEGMENT

PUBLIC MEETING

RELIEF LINE

TORONTO

Relief Line Study Area and Process



PHASE 1A:
Setting the Stage

Finalize study process:
- Terms of Reference
- Public Consultation Plan

PHASE 1B:
Opportunity and Rationale

- Introduce study
- Provide synopsis of existing and future conditions
- Provide background work including technology analysis

PHASE 2:
Long List of Options

- Develop and finalize evaluation framework for route and station options
- Develop long list of station options

PHASE 3:
Short List of Options

- Develop shortlist of route and station options

WE ARE HERE

PHASE 4:
Recommended Option

- Analyze and evaluate shortlist of options
- Identify draft recommended options

EVALUATION OF RELIEF LINE ROUTE AND STATION OPTIONS

CONSULTATION

Spring 2014 ····· 2017

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Background

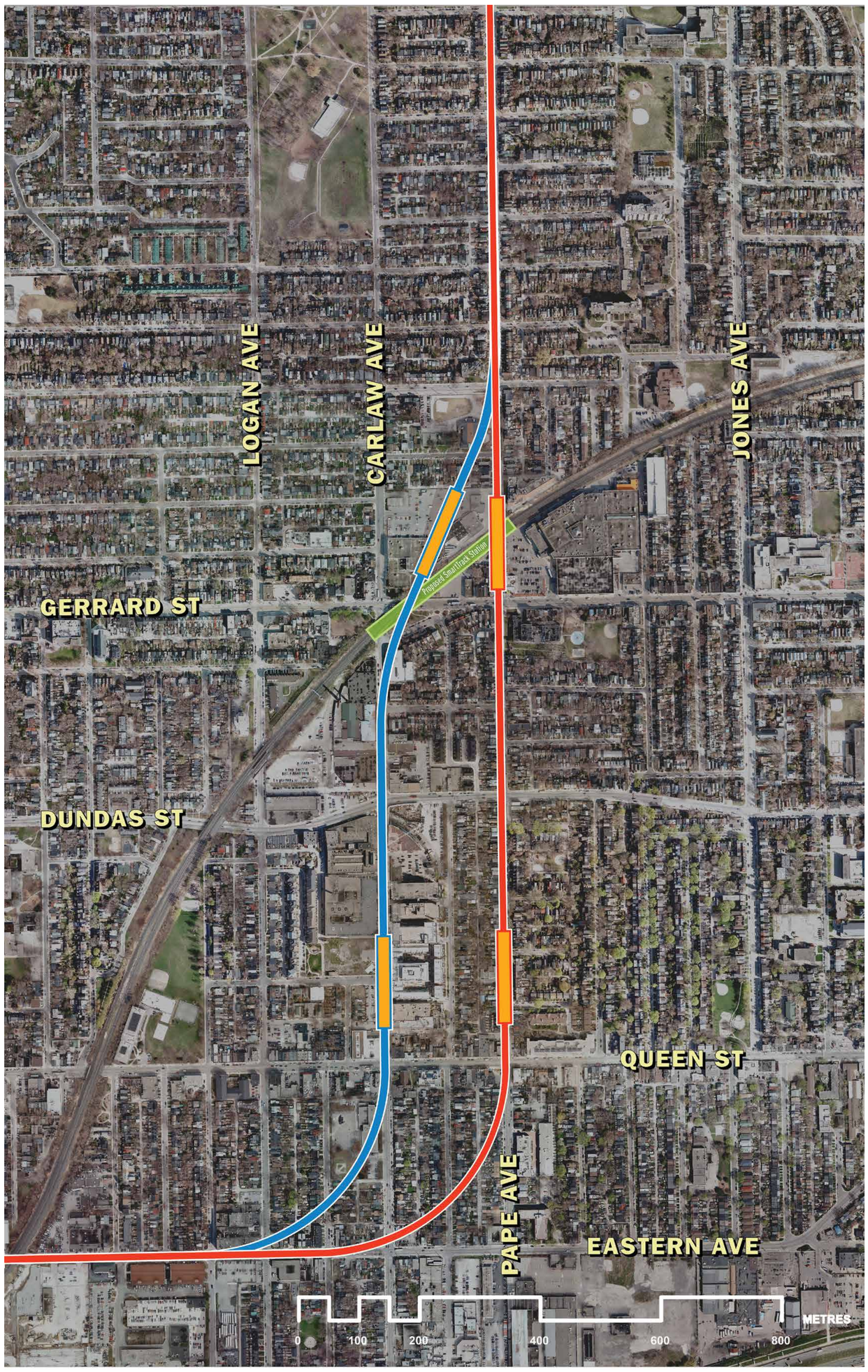
2009	**City Council** approved Yonge North Extension EA, contingent on Relief Line and City/TTC commence study to determine need for the Relief Line
2012	**Downtown Rapid Transit Expansion Study** concluded that initial phase of Relief Line and GO Transit improvements would help ease crowding on the transit network
2012	**Relief Line** identified as part of the "Next Wave" of transit projects in the Metrolinx Big Move plan and is identified by Metrolinx as a priority for future transit investment
2014	**Relief Line Project Assessment** launched. City/TTC commence planning for the preferred route alignment and station locations for the Relief Line, to deliver planning approvals in mid-2016. The relationship between SmartTrack and the Relief Line is being reviewed as part of this work.
2015	**Yonge Relief Network Study** recommendations approved by Metrolinx Board. Allows project development for the Yonge North Subway Extension. Affirms that the Relief Line Project Assessment needs to continue, to ensure that a project is ready by 2031.
2016	On March 31, 2016 **City Council approved the preferred corridor for Relief Line** from Pape to Downtown via Queen/Eastern.
July 2016	**City Council approved Relief Line Initial Business Case and Preferred Alignment for Relief Line (Pape to Downtown via Queen/Eastern)** subject to assessment of an additional alignment west of Pape, within a local segment between Gerrard and Queen.

Local Segment Options Evaluated

1) Subway running under **Pape** from Queen to Danforth, with stations near Queen and Gerrard

2) Subway running under **Carlaw** from Queen to the GO Rail Corridor, then running diagonally under commercial and residential properties to connect to Pape near Riverdale Avenue, with stations near Queen and Gerrard

Planning and design for Relief Line and SmartTrack is being coordinated to provide for a good interchange connection. Discussions with Metrolinx are underway.



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Local Segment Characteristics

Pape Avenue

- Low-density residential street
- Classified as a local road
- Roadway width: 7.4 metres
- Right-of-way width: 18.3 metres
- Official Plan land use designation is Residential
- Estimated existing population along Pape: 1,100 *

Carlaw Avenue

- Mixed-use street with mid-rise buildings, including residential, retail, and offices.
- Classified as a minor arterial
- Roadway width: 12.2 metres
- Right-of-way width: 20.1 metres
- Official Plan designation is Employment; Site and Area Specific Policy 247 also permits residential and live/work uses and retail
- Carlaw and Dundas Community Initiative was a response to the redevelopment taking place and recommends public realm improvements
- Surface transit route along Carlaw: 72 Pape bus
- Existing population along Carlaw: 2,500 *

* Estimated using 2016 Census data

Technical Work Completed for Local Segment Options

ACTIVITY	DESCRIPTION
Evaluation of Local Segment Options	Comprehensive evaluation based on wide variety of technical data and information
Geotechnical/ Seismic Analysis	Field analysis to map geological conditions (e.g. soils, bedrock) will be used as input for noise and vibration analysis
Existing Subway Noise and Vibration Testing	Noise and vibration data from the Bloor-Danforth Subway was compared to data from the Sheppard Subway to confirm the significant reduction in vibration has been achieved as a result of depth and new track design
Analysis of Potential Real Estate Impacts	Study potential real estate impacts on existing residential properties of construction and operation of the Relief Line along Pape or Carlaw, focussing in the area from Queen to Gerrard.
Underground Building Constraints Investigation	Examination of building permit drawings to identify potential underground constraints for subway construction (i.e. deep foundations, underground parking)
Utility Constraints Investigation	Detailed investigation to identify potential constraints of existing and planned underground services and utilities (e.g. water, sewer, hydro)

Technical Work Completed for Local Segment Options

Underground Building Constraints Investigation

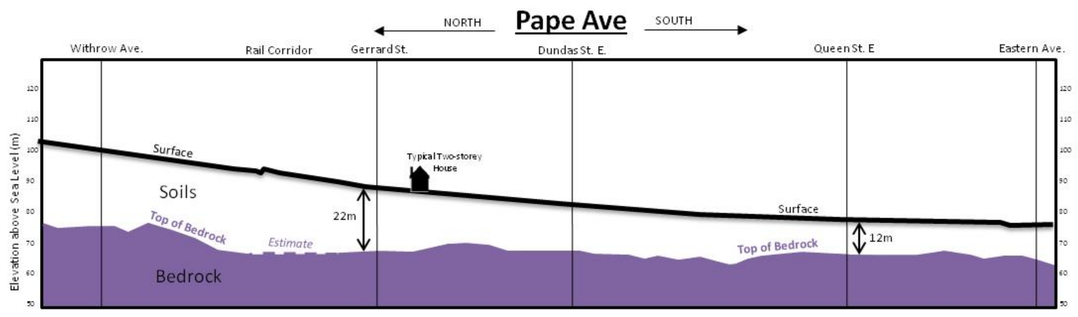
- Tunnels will be deep enough to avoid conflicts with building and bridge foundations for either Pape or Carlaw options
- There are a few underground parking garages near stations that would need to be considered during the design process

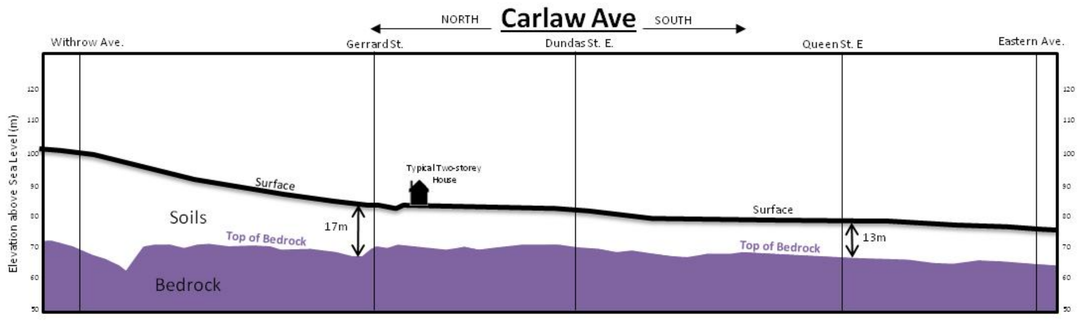
Underground Utility Constraints Investigation

- Some utility conflicts have been identified which would need to be considered during the design process:
  - 3m (10') Combined Sewer along Gerrard located approximately 20 metres underground which both options would need to avoid
  - 1.8m (6') Combined Sewer along Carlaw which would require reconstruction/ relocation prior to or as part of Relief Line construction

Underground Geotechnical Constraints Investigation

- Boreholes drilled along Pape and Carlaw in Fall 2016
- Results from boreholes drilled along Pape and Carlaw in Fall 2016 confirm bedrock location and soil composition:
  - 14m - 24m below Pape
  - 12m - 18m below Carlaw
- This information is used for the design and analysis work (e.g., noise and vibration, tunneling methodology, utility plan, etc.)





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Technical Work Completed for Local Segment Options

Study of Potential Real Estate Impacts Conclusions

- In general, transit has a positive impact on real estate markets in terms of demand and pricing.

- After construction of the Relief Line is complete:
  - Both Carlaw and Pape options likely to experience net positive real estate impacts within the area in general
  - Net positive real estate impacts expected for most low-density property values, especially within walking distance of a station
  - Some homes immediately adjacent to a station may have limited negative impacts, which could include a lower value or weaker price appreciation. Through more detailed station design, techniques would be explored to mitigate potential impacts.
  - Apartments/condos can expect to display a strong value premium

- During construction of the Relief Line:
  - Potential for temporary negative impacts to the value of a property and to the ability to sell a property during construction
  - Living conditions may be more stressful
  - Real estate market is still expected to display strong demand characteristics

- A copy of the report is available for review at this meeting. You can also view it online at reliefline.ca

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Local Segment Preferred Alignment

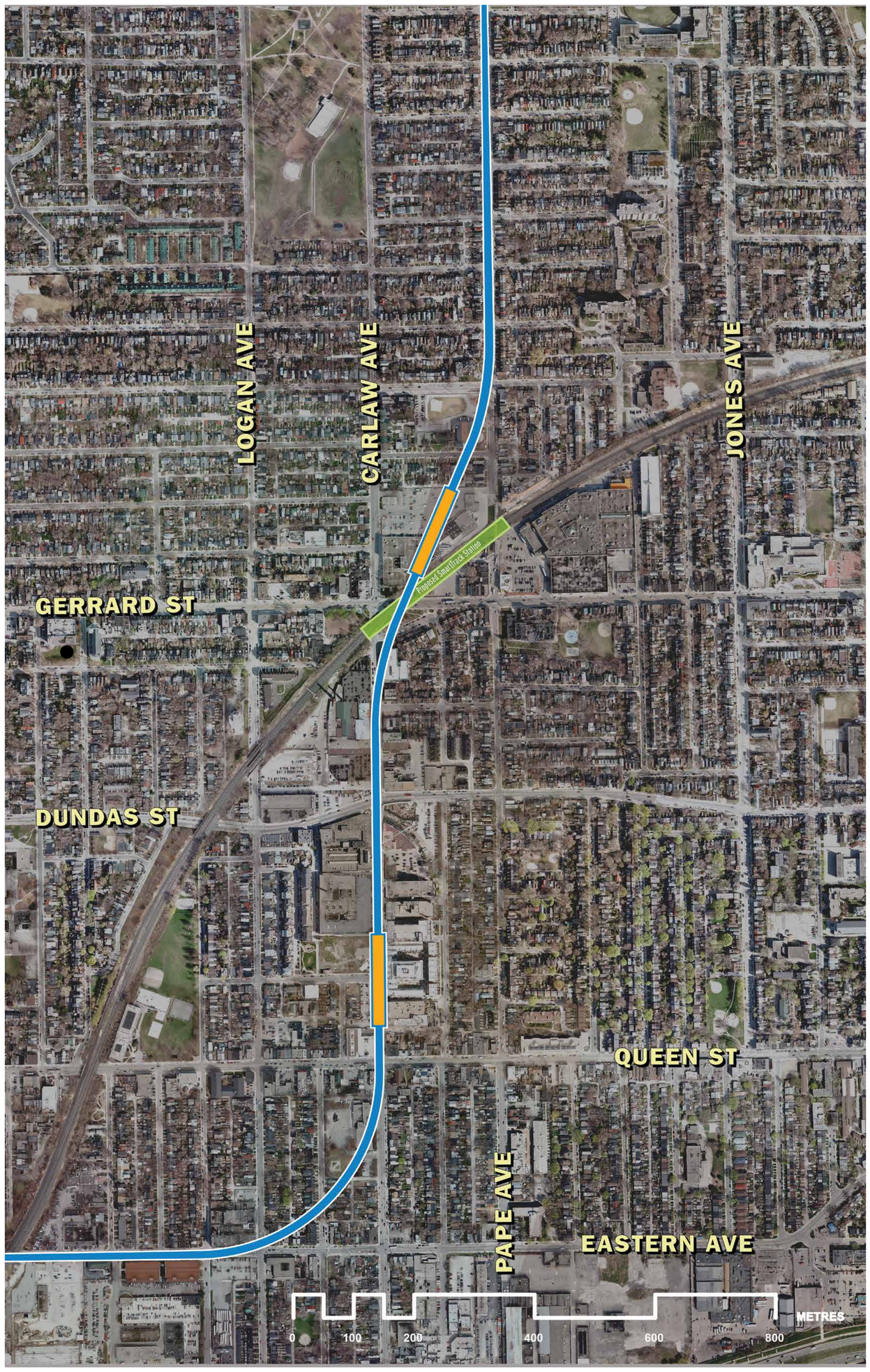
Carlaw option is preferred based on the technical analysis

Best achieves city-building objectives

- Helps strengthen the area as a hub for business and transitioning residential uses as envisioned by Special Policy Area 247
- Station at Queen-Carlaw would invite a high level of activity that would support the emerging higher density, mixed-use Carlaw and Dundas area
- Station at Queen serves a higher concentration of projected future employment and supports existing businesses
- Both stations can be well-integrated into the existing urban fabric

Best opportunities for transit network connectivity with SmartTrack and surface transit

Most compatible with preserving integrity of existing neighbourhood



What could we expect during construction?

Impacts on existing surface transit and traffic movement can be expected regardless of which alignment is selected.

Maintaining Surface Transit During Construction

- Optimize sequencing of construction of the Relief Line
- Temporary diversion of Queen streetcars west of Don Valley may be required
- Use of replacement buses

Maintaining Vehicle Movement

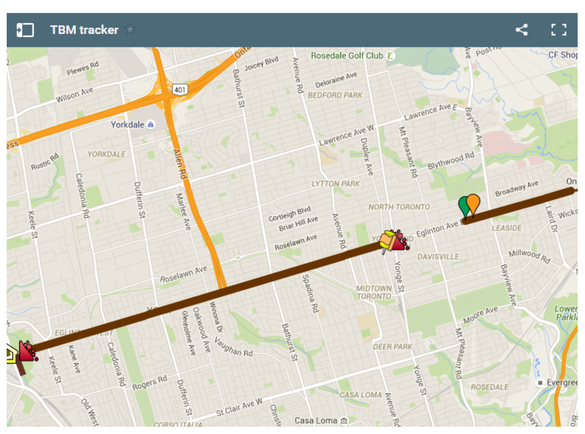
- Optimize sequencing of construction of the Relief Line
- Deck over construction open cut locations to permit traffic movement above while completing station construction
- Explore alternative station construction methods to the traditional open cut method – such as mining the station from underground
- Use of standard traffic engineering improvements (e.g. adjusting signal phasing and green time, prohibiting curb parking, enforcing prevailing traffic and parking prohibitions, etc.)

Recent case studies

- Toronto-York Spadina Subway Extension (TYSSE)
  - At Keele Station, decking has allowed for the preservation of one travel lane in each direction
  - At Steeles West Station complete decking has allowed for near normal traffic operations above
- The Eglinton Crosstown
  - Some stations are being mined rather than using open cut (such as Bathurst Station and Avenue Station)

Example of decking above construction area – allows for near normal traffic operations

Tunnel Boring Machine (TBM) being used on the Eglinton Crosstown



TBM tracker on the Eglinton Crosstown LRT – available on the project website

Would my property be affected?

The exact properties affected will not be known until work begins on the preferred alignment. Regardless of alignment, some properties will be affected. Most will only experience minor impacts.

What to expect

- Short-term access limitations during construction
- Longer-term access limitations during construction necessary where ground stabilization, underpinning, and other construction activities close to or within buildings would occur
- Possible acquisition of property for construction access and staging for tunnelling below
- Permanent acquisition of private property along alignment to allow for construction of station entrances, ancillary facilities (such as ventilation), and emergency exits

Affected owners

- For locations where it would not be feasible for the project to maintain reasonable access to residents and businesses, compensation may be considered for lost rental value, temporary relocation, etc.
- For property takings, compensation based on fair market value and, in the case of partial takings, reduction (if any) of the value of the remaining property
- Compensation for relocation services, replacement housing, etc.

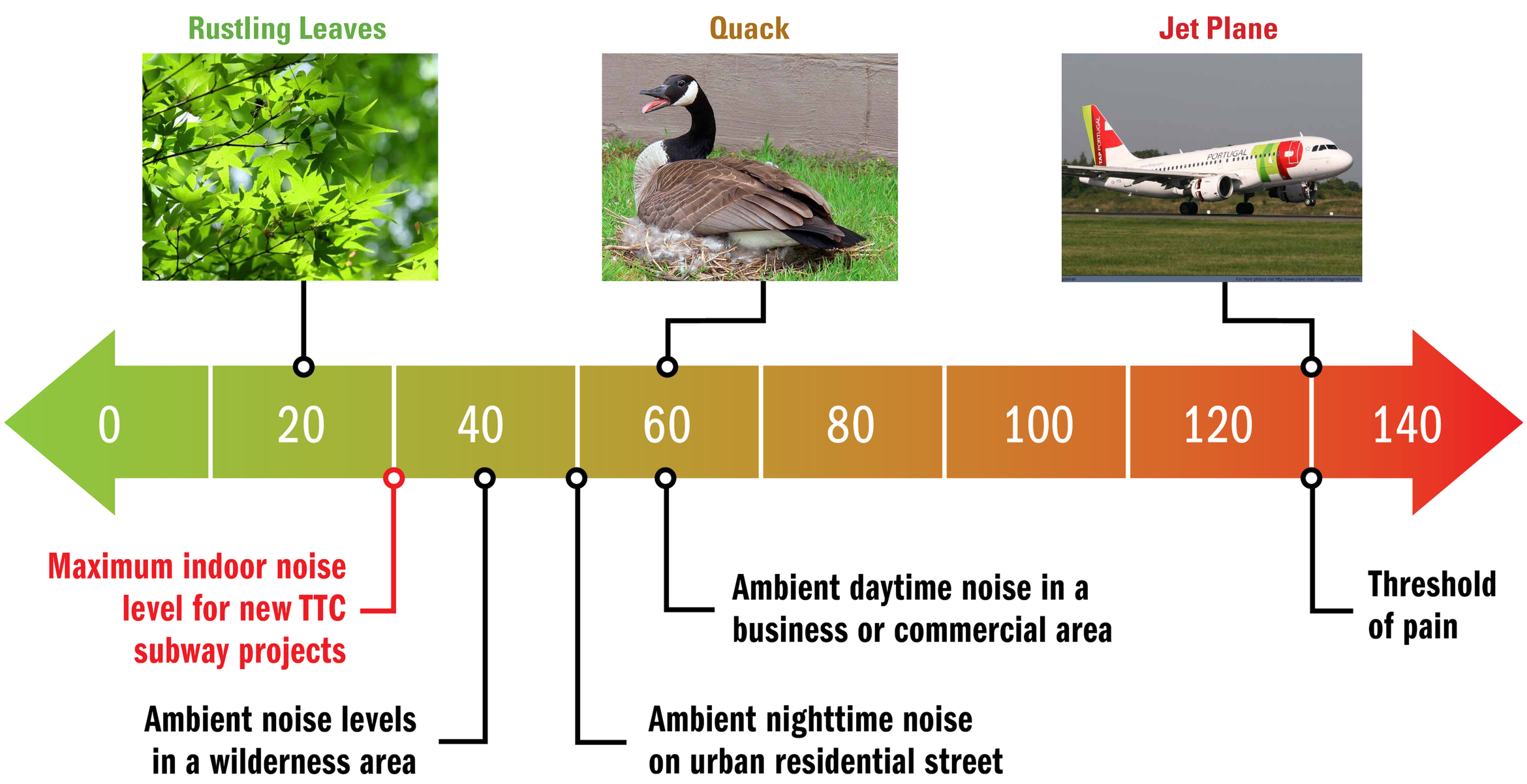
Noise Control on the Relief Line

Regulatory Approach

- Noise will be assessed in accordance with the TTC/Ministry of Environment and Climate Change protocol
- Construction noise will be further constrained by City of Toronto by-laws.

Land use	Maximum Noise Level (dBA)
Sensitive Receptors (includes residential)	30
Institutional	35
Commercial	40
Industrial	45

The subway will be designed to be below 30 dB in residential areas, lower than the typical background noise for urban residential areas.



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Vibration Control on the Relief Line

Regulatory Approach

- Vibration will be assessed in accordance with the TTC/Ministry of Environment and Climate Change protocol
- Construction vibration will be further constrained by City of Toronto by-laws.

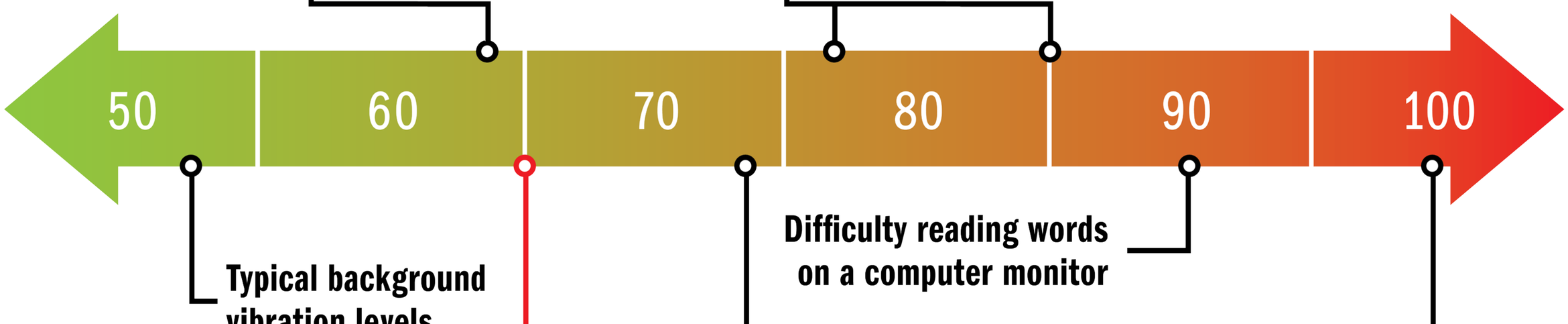
Land use	Maximum Vibration Level (VdB)
Sensitive Receptors (includes residential)	65
Institutional	70
Commercial	75
Industrial	80

The subway will be designed to be below the approximate level of human perception (65 VdB)

Typical Bus or Truck (Smooth Road)

Heavy Commuter Rail

Blasting



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Technical Work Completed for Local Segment Options

Vibration Comparison – Sheppard Subway and Bloor-Danforth Subway

Vibration levels for Sheppard Subway and Bloor-Danforth Subway were measured to compare differences. Sheppard is much more comparable to Relief Line since it is deeper than Bloor-Danforth.

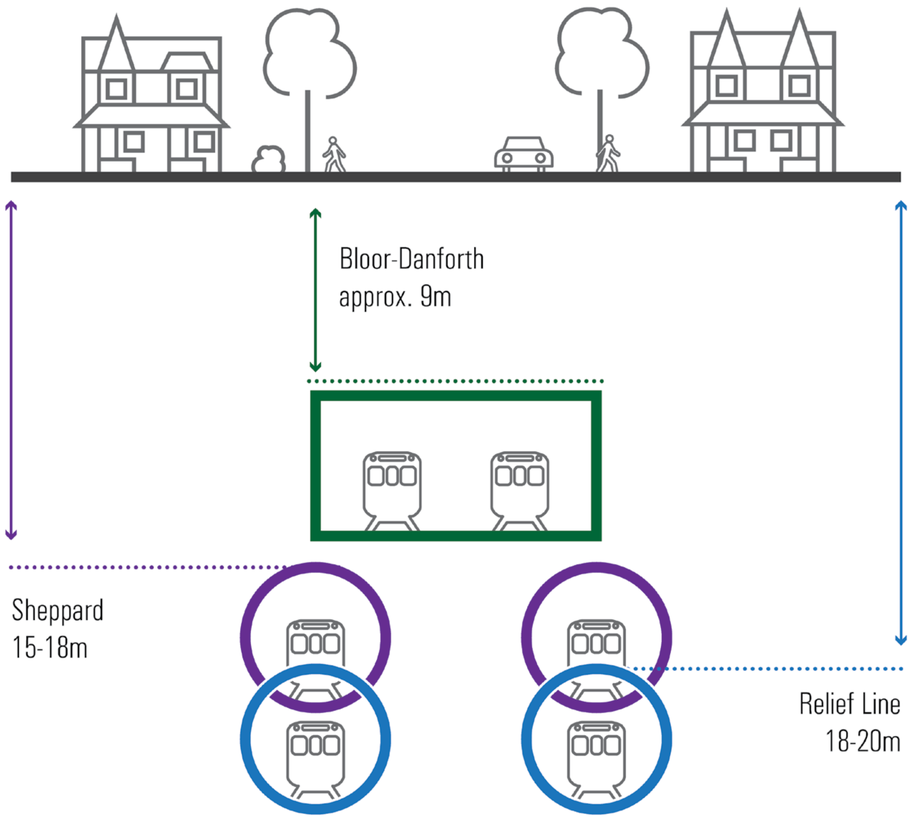
Key Conclusions

- The deeper the tunnel, the greater the reduction
- Bedrock absorbs vibration better than soft soils
- Contemporary track design for Sheppard results in reductions

Implications for the Relief Line

- Relief Line is more comparable to the Sheppard Subway as it will be deeper than Danforth, and possible even deeper than the Sheppard line (~18-25 metres).
- Tunnel will be mostly in bedrock
- Relief Line will be built with state-of-the art tunnel design (floating slab)
- Depth combined with geotechnical conditions and newer technologies will help to reduce potential for vibration/noise.

Comparison of Subway Tunnel Depth



All subway projects must now be designed to meet or exceed TTC and Ministry of Environment and Climate Change's stringent noise and vibration standards.