



# **The Ontario Line: Building it the Better Way**

**A Health Impact Assessment of the Construction Phase  
of the Ontario Line in South Riverdale**

**LOSE**

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# THE ONTARIO LINE: BUILDING IT THE BETTER WAY

## Health Impact Assessment of the Construction Phase of the Ontario Line in South Riverdale

The Ontario Line, once built, is expected to improve Toronto's transit network and to be of benefit to the city. However, there are numerous issues with the plans for its construction and operation. In November 2021, Save Jimmie Simpson and South Riverdale Community Health Centre released a health impact assessment ([2021 HIA](#))<sup>1</sup> that compared the community health impacts of operating an underground option for the portion for the Ontario Line that will pass through South Riverdale to an aboveground one as proposed by Metrolinx. The conclusion of that HIA is that the underground option proposed by community members and based on the former Relief Line plan, is healthier for the local area.

Building new transit infrastructure causes disruption in the neighbourhoods it crosses. Residents, businesses, including the Business Improvement Areas (BIAs), of South Riverdale (also known as Leslieville and Riverside) are concerned about the negative impacts that the construction of the Ontario Line above ground will have on the community. This apprehension is heightened by the exceptionally negative impacts that the construction of the Eglinton Crosstown has had and continues to have on the neighbourhoods it passes through — due to numerous delays, this project has gone on for 10 years and there is still no end in sight. It is important that all necessary measures are taken to minimise any negative impacts related to the construction of the Ontario Line to ensure the long-term viability and health of the community.

This report provides more detail on potential health impacts on health related to the construction phase. It compares the construction of an underground line to an aboveground alignment as proposed by Metrolinx. Information on potential impacts were obtained primarily from the environmental studies that were prepared for the Relief Line and the Ontario Line.<sup>2</sup>

### CONCLUSION

The most effective way to minimise the negative impacts of construction of the Ontario Line on businesses and residents of South Riverdale is to build it underground, mainly following the former Relief Line route, rather than above ground along the GO railway line (the 'joint corridor') as Metrolinx currently proposes. Building the line underground would mean less disruption to the neighbourhood, including less noise, less dust and less construction traffic.

The various impacts of the two alternatives that could occur during construction as identified in 2018 Relief Line Environmental Project Report and the 2022 Ontario Line Environmental Impact Assessment Report<sup>3,4</sup> are highlighted in **Table 1** of the Appendix. While the types of impact identified are similar for both options, there are differences in magnitude. Exposure to noise and

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<sup>1</sup> Macfarlane (2021) Towards a Healthier Riverside and Leslieville: A Health Impact Assessment of the Ontario Line. Prepared for Save Jimmie Simpson and the South Riverdale Community Health Centre. <https://www.srchc.ca/wp-content/uploads/2021/10/A-HEALTH-IMPACT-ASSESSMENT-OF-THE-ONTARIO-LINE-Nov-2021.pdf>

<sup>2</sup> HDR (2018) Relief Line South environmental project report.

Ontario Line Technical Advisor (2022) Environmental Impact Assessment Report

<sup>3</sup> HDR (2018) cited above.

<sup>4</sup> Ontario Line Technical Advisor (2022) cited above.

dust from construction has negative impact on people's health. In addition, neighbourhood disruption impacts the viability of businesses, which is detrimental to both the short and long-term well-being of the community. Greater effort is needed to minimise the negative impacts to businesses during construction.

The aboveground alignment as proposed by Metrolinx, requires the expansion or reconstruction of six bridges and will result in substantial surface work including the widening and raising of the rail bed. Most of the work would occur above ground and truck routes would be primarily through residential neighbourhoods. As well, because construction will be along an active rail corridor, more of the work will need to occur at night. While neither of environmental assessment reports quantify impacts, an aboveground alignment is expected to create more disruption to the neighbourhood during construction compared to an underground one.

## **WHAT IS METROLINX PROPOSING?**

The portion of track that traverses South Riverdale is referred to by Metrolinx as the Lakeshore East Joint Corridor, as this segment of the Ontario Line would travel above ground beside the GO trains. As currently proposed, the above ground construction along this approximately 1.5 km section requires:

1. Adding 2 additional tracks to this part of the rail corridor (between Eastern Avenue and Pape Avenue)
2. Grading, installing, or upgrading of vegetated slopes
3. Building retaining walls, likely 20 feet (6 metres) high
4. Relocating or protecting utilities
5. Rebuilding or replacing 6 bridges at Eastern, Queen, Dundas, Logan and Gerrard (2 bridges)
6. Building a portal (a large opening where trains enter and exit the underground track) at Pape Avenue and Langley Street

## **When would it happen?**

The start of the early works was originally scheduled for fall of 2022. The timings for the initial work below are the latest available projections, but these start dates are expected to be further delayed.

**Rail Corridor Works:** November 2022 to October 2026, which includes GO tracks re-alignment/expansion and adding OL tracks, construction of retaining walls, noise barriers and in-corridor drainage

**Bridge Works:** November 2022 to October 2026, which includes construction at the Eastern Avenue, Queen Street, Dundas Street and Logan Avenue bridges, with the projected timelines

- Eastern Ave. Bridge Nov 2022 to Oct 2026
- Queen St. Bridge April 2023 and June 2025
- Dundas St. Bridge April 2023 and July 2025
- Logan Ave. Bridge April 2023 and June 2025<sup>5</sup>

**Gerrard Street Portal:** Work is anticipated to begin after financial close of the procurement package.<sup>6</sup>

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<sup>5</sup> Toronto Transportation Services Presentation to the Community Ward 14 Toronto-Danforth 30 March 2022.

<sup>6</sup> <https://www.metrolinxengage.com/en/content/ontario-line-neighbourhood-updates-east-gerrard-tunnel-portal> (Accessed 2022-10-14)

This will be followed by the laying the tracks and the construction of the stations. In 2021, Metrolinx estimated that construction would be complete by end of 2029.<sup>7</sup>

## HEALTH IMPACTS OF CONSTRUCTION

While information on health impacts of construction of rapid transit is limited, we do know that construction-related noise, vibration, and dust (particulate matter) as well as exhaust from vehicles and equipment, affect people who live and work nearby. There are also health and safety implications for workers, pedestrians, and cyclists.<sup>8</sup> Exposure to light and noise pollution, especially at night, is also a concern. In addition, construction affects traffic flows (walking, cycling, transit and cars) and impedes access to buildings. This may negatively affect the viability of businesses around the construction zones.

### Noise

Noise may cause annoyance, disturb sleep, and disrupt other activities. Exposure to noise at night is of greater concern as this is the time when most people sleep. As the 2021 HIA noted, the World Health Organization considers annoyance and sleep disturbance as health outcomes because these factors are possible pathways of noise-induced cardiovascular and metabolic diseases (for example diabetes). A monitoring study commissioned by Toronto Public Health found that noise levels at sites close to construction activities were higher than the overall average noise levels for Toronto. Short-term exposure to noise can have adverse impacts on learning, memory, stress hormones, and sleep quality including reported awakenings. High noise levels result in various adverse impacts: annoyance, reduction in children's performance in school, sleep disturbance, changes in mood, impact on heart rate, hearing loss, and stress-related health effects.

Sleep is important for people's physical and mental health and overall well-being. Both a lack of sleep and sleep disturbance are associated with an increased risk of a wide range of chronic diseases. The European Environment Agency had reported a threshold of 32 dBA for sleep disturbance.<sup>9</sup>

The health impact assessment for the Red Line Transit Project in Baltimore notes:

*Equipment utilized for construction is reported to be significantly louder than ambient noise levels.... Despite the intermittent use of such equipment, exposure to loud noise can have a number of negative health effects on wellbeing and quality of life. Research shows a causal association between noise and levels of annoyance, disruptions in school children's performance, sleep disturbance, mood, heart rate, hearing loss, and stress-related health effects....*

*Some effects of sleep disturbance include interruptions to brain restoration and cardiovascular respite that normally occur during sleep. Sleep disturbance can also affect mood, reduce cognitive abilities and boost epinephrine levels which contribute to stress.*

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<sup>7</sup> See: <https://hdr.wistia.com/medias/czrk84lfbg> (Accessed 2022-10-14)

<sup>8</sup> HDR (2018) cited above.

<sup>9</sup> Toronto Public Health (2017) How Loud is Too Loud? Health Impacts of Environmental Noise in Toronto. Technical Report.

*These health effects are important considerations during the building of the Red Line because much of construction will take place near schools and dense residential zones. Noise from construction will almost certainly directly affect groups sensitive to sound, which include children, the elderly, the sick, and shift workers.<sup>10</sup>*

It is common practice to install hoarding or other barriers to reduce the impact of noise created during construction. A study of construction-related noise and vibration measured levels of noise on various floors of a 31-story residential building. This study found the levels of noise were generally lower on higher floors, but those on the 7th floor were consistently higher than on the 4th floor.<sup>11</sup> This suggests that noise barriers are less effective at preventing noise reaching the higher floors of a building adjacent to construction sites.

Health Canada's guidance for evaluating noise in environmental assessments notes that when mitigating short-term construction noise exposure (exposure less than 1 year) consideration should be given to potential impacts on sleep and thus efforts should be made to keep sound levels inside bedrooms less than 30 dBA for continuous noise sources and 45 dBA LA(max) for discrete noise events.<sup>12</sup> If exposure to construction noise is a year or more, Health Canada suggests that the implementation of mitigation measures when noise levels result in a 6.5 percent increase in people reporting to be 'highly annoyed'. Examples of mitigation measures are provided in the appendix of Health Canada's guidance.<sup>13</sup>

## **Vibration**

As the 2021 HIA indicates, vibrations impact sleep quality. Vibrations may cause people to wake up in the night or to wake up too early, and to have greater difficulty of going back to sleep. Exposure to vibration results in more reported sleep disturbance. As well, fewer people indicate feeling restored after their sleep. Construction vibration and noise often occur together and there are more reports of annoyance and sleep disturbance when people are exposed to them at the same time. Vibrations have been found to increase heart rates and affect sleep structure (for example, reduction in REM sleep, shorter time between falling asleep and first awakening, and shorter uninterrupted time in slow wave sleep). As described in the noise section above, sleep disturbance is associated with a host of diseases.

## **Air Quality**

Demolition, earthworks, track-out and building activities create dust and will negatively impact air quality around the site. Most of the fugitive dust emissions from construction sites are made up of larger particles with about 15 percent being fine particles (PM2.5).<sup>14</sup> Fine particles, also emitted from the diesel-powered engines in trucks and equipment, are of greater concern for health.

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<sup>10</sup> Ricklin, Anna (2008) The Red Line Transit Project Health Impact Assessment. Baltimore City Department of Transportation.

<sup>11</sup> Zou, Chao and colleagues (2020) Evaluation of Building Construction-Induced Noise and Vibration Impact on Residents. Sustainability 12: 1579. doi:10.3390/su12041579

<sup>12</sup> dBA: Level of sound measure A-weighted decibels. LA(max): maximum A-weighted sound level

<sup>13</sup> Health Canada (2017) Guidance for evaluating human health impacts in environmental assessment: noise.

<sup>14</sup> Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction.

Short-term exposure to air pollution can lead to adverse health impacts, especially among susceptible and sensitive individuals such as children and older adults. Health effects related to short-term exposures to air pollution include cough, shortness of breath, wheezing, asthma, chronic obstructive pulmonary disease (COPD), other respiratory diseases and cardiovascular effects.<sup>15</sup> Given that construction activities will increase air pollution in the vicinity, it can be expected to increase the associated burden of illness, though the degree to which this occurs is difficult to quantify.<sup>16</sup> Dust control measures and the use of low or no-emission vehicles and equipment can reduce the amount of air pollution created during construction.

## **Disruption**

Constructing new transit infrastructure causes disruption. Long-term disruption can affect the viability of local businesses and result in either displacement or closure, with detrimental impact on the community and the health of people most affected. It is therefore important to minimise any such disruption.

Road narrowing, turning restrictions, detours, and road closures are among the factors that impact the flow of pedestrian, cyclist and vehicular traffic which can lead to fewer customers and thus negatively impact business volume. Hoarding may reduce both the visibility of a commercial enterprise and the aesthetic of pedestrian space and roadway, making the area less enticing to visit. Dust and noise will reduce the enjoyment of the space and negatively impact some businesses. Depending on the nature of the disruption and the period over which construction will take place, this could affect the viability of commercial enterprises and thus the liveability of South Riverdale in the long-term.

## **Mitigation**

The environmental assessment reports for both the Relief Line and the Ontario Line outlined proposed mitigation measures which could be used to reduce the negative impacts that construction activities would have on the community, its residents and businesses. These are highlighted in **Table 2** of the Appendix.

Measures to minimise the adverse impacts on businesses have not been fully addressed.<sup>17</sup> Strategies that are effective in helping small businesses survive transit construction includes reaching out and engaging with them long before construction starts to learn about their operational needs so that these can be integrated into the planning process. It also involves working with businesses to strengthen their operations and viability when needed, and

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<sup>15</sup> City of Toronto (2017) Avoiding the TRAP: Traffic-Related Air Pollution in Toronto and Options for Reducing Exposure.

Manisalidis and colleagues (2020) Environmental and health impacts of air pollution: A review. *Frontiers in Public Health* 8:14. doi: 10.3389/fpubh.2020.00014.

<sup>16</sup> Walton, Heather and Li Yan (2014) Health effects of short-term exposures to air pollution with particular reference to the concentration range on high and very high days. London: Environmental Research Group, King's College London for Transport for London.

<sup>17</sup> Lay, Jennifer (2022) Riverside BIA Comments Regarding Council Item EX33.1 Metrolinx Traffic Management Plan Report: "Metrolinx Transit Expansion Projects – Second Quarter 2022" (<http://www.toronto.ca/legdocs/mmis/2022/cc/comm/communicationfile-152667.pdf>).

implementation of collective promotional activities. Establishing a business advisory prior to the start of construction provides a venue where concerns can be raised and solutions fashioned.<sup>18</sup>

## **OVERALL CONSTRUCTION IMPACTS**

### *Underground option*

Building the transit line underground using a tunnel boring machine would avoid most negative impacts to vegetation and wildlife habitat. It would also result in less disruption to South Riverdale as it would limit exposure to noise, create less fugitive dust, and reduce impact on automobile traffic and surface transit services. It would allow give more flexibility to limit the amount of work occurring at night which would reduce exposure to noise, vibration and light at night that would otherwise negatively impact sleep.

For the Relief Line, the tunnelling was proposed to start from three launch shafts, two along Eastern Avenue, just east of the Don River, and one along Pape just north of The Danforth. An extraction shaft, where the boring machine would exit, was planned for Pape Avenue just south of Danforth Avenue. Given these access points, most of the truck traffic related to earth removal would have close access to the Don Valley Parkway and be outside of residential areas.

The construction of an underground line would cause some surface disruption around the station locations and emergency exit buildings as these would be built using cut and cover techniques. Placement of decking over the excavated portion of the right-of-way during underground construction activities would maintain pedestrian and bicycle access.

### *Aboveground option*

In comparison, for the aboveground alignment, the work would have more direct impacts on the neighbourhood. Metrolinx is proposing 14 truck and equipment access points along the rail corridor, raising the railway bed, installation of new bridges, and the building of the Gerrard Street portal in a mostly residential neighbourhood, close to an elementary school. All of these would result in much higher truck traffic in residential neighbourhoods, greater potential for fugitive dust, greater exposure to construction-related noise and lighting, and more road closures. As well, the construction would occur in a currently active railway corridor. To reduce disruption of the existing rail service this will require a large part of the work to occur at night that would then result in more night-time light and noise which can be expected to contribute to sleep disturbance among many residents who live close by.

### *Mitigation measures*

The construction of any transit infrastructure causes disruption. Especially when construction takes place over the course of years, this can be detrimental to the survival of businesses in the area. The issue of disruption and impact on the viability of businesses in South Riverdale are top of mind given the experience along the Eglinton Crosstown.<sup>19,20</sup> Minimising neighbourhood

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<sup>18</sup> Jacob Wascalus (2014) Helping small businesses survive big construction: Strategies from the Green Line LRT project <https://www.minneapolisfed.org/article/2014/helping-small-businesses-survive-big-construction-strategies-from-the-green-line-lrt-project> (accessed 2022-09-29)

<sup>19</sup> Fleguel, Jordan (2022) Eglinton Crosstown delay will continue to hurt small businesses: BIA chair. CTV News, 27 September. <https://toronto.ctvnews.ca/eglinton-crosstown-delay-will-continue-to-hurt-small-businesses-bia-chair-1.6085731> (Accessed 2022-09-29)

<sup>20</sup> Lay, Jennifer (2022) cited above.

disruption and providing supports to local businesses are essential to maintain the long-term health and viability of South Riverdale.

Mitigation measure, such as those identified in **Table 2** of the Appendix, are typically implemented to reduce negative impacts. To minimise any adverse impact and enable businesses to thrive, it is essential to implement strategies to support them. These include reaching out to the business community well in advance of the start of the work, involving them in the planning process, including troubleshooting and identifying mitigation measures, and providing financial and other assistance that can ensure businesses remain viable which will then allow them to contribute to the health of the community in the long term. This has obviously not been done in relation to the Ontario Line construction plans.

Neighbourhood disruption impacts the viability of businesses, which is detrimental to both the short and long-term well-being of the community. Building the line underground would mean less disruption to the neighbourhood, including less noise, less dust and less construction traffic. Exposure to noise and dust from construction has negative impact on people's health. In addition, building underground would mean much lower exposure to noise and light at night.

As noted in the 2021 HIA, when tunnelling is used, an underground alignment is less disruptive overall to the community. Therefore, the most effective way to minimise the negative impacts of construction of the Ontario Line on South Riverdale is to build it underground rather than above ground along the existing railway line (the 'joint corridor') as Metrolinx currently proposes.



## APPENDIX

### Potential Impacts

**Table 1** provides a summary of the potential impacts of construction as identified in the 2018 Relief Line South Environmental Report and the 2022 Ontario Line Environmental Impact Assessment Report. These are the impacts as described by the organizations responsible for the projects (i.e., the TTC and Metrolinx). They may not include impacts identified by others, such as local residents.

**Table 1: Comparison of the selected impacts of construction as identified in the 2018 Relief Line South Environmental Report and 2022 Ontario Line Environmental Impact Assessment Report**<sup>21,22,23</sup>

<b>Relief Line Report (underground)</b>	<b>Ontario Line Report (aboveground)</b>	<b>Preferred Option</b>
<b>Vegetation, Wildlife and Terrestrial Habitat</b> <ul style="list-style-type: none"> <li>The majority of the Project will be constructed underground and as such avoids most impacts to vegetation and wildlife habitat</li> <li>Some surface impacts during required open cut construction</li> </ul>	<b>Wildlife and wildlife habitat</b> <ul style="list-style-type: none"> <li>Disturbance, displacement or mortality of wildlife or habitat loss/degradation, including potential Significant Wildlife Habitat and species at risk</li> <li>The proposed access points along the rail corridor will involve the removal of 53 trees at 11 locations</li> </ul>	<b>Underground:</b> Less impact to the natural environment

<sup>21</sup> The Relief Line and the Ontario Line South start and end outside the boundaries of the neighbourhood of interest in this report. Therefore, some of the information in this table may refer to portions of the line outside of South Riverdale.

<sup>22</sup> HDR (2018) Relief Line South environmental project report.

<sup>23</sup> Ontario Line Technical Advisor (2022) Environmental Impact Assessment Report; Toronto Parks Forestry and Recreation Presentation to the Community Ward 14 Toronto-Danforth 30 March 2022; Toronto Transportation Services Presentation to the Community Ward 14 Toronto-Danforth 30 March 2022.

<p><b>Impacts of the Project on Climate Change</b></p> <ul style="list-style-type: none"> <li>Greenhouse gas (GHG) emissions associated with construction activities are attributable to: <ul style="list-style-type: none"> <li>Manufacturing of construction materials</li> <li>Energy consumed at construction sites</li> <li>Energy used in the movement of people, materials and equipment to and from the site, and</li> <li>Infrastructure design and size</li> </ul> </li> </ul>	<p><b>Impacts of the Project on Climate Change</b></p> <p>Not addressed: <i>No mention of measures that would be taken to minimise the emissions of greenhouse gases during the construction of the Ontario Line</i></p>	<p><b>Insufficient information to determine</b></p>
<p><b>Impacts of Climate Change on the Project</b></p> <ul style="list-style-type: none"> <li>Increasing incidents of extreme weather events due to climate change have the potential to result in power outages, damage to infrastructure, and disruption to transportation which can ultimately delay construction of the Relief Line South. In addition, health and safety of construction personnel may be compromised during these extreme events</li> </ul>	<p><b>Impacts of Climate Change on the Project</b></p> <p>Not addressed: <i>No recognition that extreme weather events associated with a warmer climate could have an impact on the project during construction</i></p>	<p><b>Insufficient information to conclude</b></p>
<p><b>Air Quality</b></p> <ul style="list-style-type: none"> <li>Suspended particulate matter (SPM or dust) is the primary contaminant of concern that may impact air quality during the construction of Relief Line South infrastructure</li> </ul>	<p><b>Air Quality</b></p> <ul style="list-style-type: none"> <li>Potential air quality impacts could include effects from fuel combustion and particulate emissions</li> </ul>	<p><b>Underground:</b></p> <p>Less impact on local air quality</p>

<p><b>Noise and Vibration</b></p> <ul style="list-style-type: none"> <li>• Perceptible noise and vibration from the construction of the stations and other surface infrastructure, and potentially during the construction of the tunnel</li> </ul>	<p><b>Construction Noise</b></p> <ul style="list-style-type: none"> <li>• Environmental noise may cause annoyance, disturb sleep, and disturb other activities</li> </ul> <p><b>Construction Vibration</b></p> <ul style="list-style-type: none"> <li>• Vibration may cause damage to buildings, utilities and other structures.</li> <li>• Exposure to vibration may result in public annoyance and complaints.</li> <li>• Vibration from tunneling can cause annoyance, interfere with human activities and vibration-sensitive equipment operation</li> </ul>	<p><b>Underground:</b> Less exposure to noise, especially at night</p>
<p><b>Buildings and Property</b></p> <ul style="list-style-type: none"> <li>• Property required for construction of the Project include construction staging and laydown areas, launch and extraction shafts, open cut excavation areas, and temporary underground easements</li> <li>• Indirect property impacts may also occur during construction that relate to the disruption to residents and businesses caused by construction activities</li> </ul>	<p><b>Socio-Economic and Land Use Characteristics</b></p> <ul style="list-style-type: none"> <li>• Permanent and temporary property acquisition</li> <li>• Nuisance impacts from construction activities</li> <li>• Note: <i>Metrolinx does not mention the important loss of park space during construction</i></li> </ul>	<p><b>Underground:</b> Less surface disruption</p>
<p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>• Construction work can impair the visual setting of the surrounding environment on a temporary basis</li> <li>• Other concerns that may be associated with construction include mud tracking; improperly stored construction debris; and damage to trees, and other elements of the public realm</li> </ul>	<p><b>Built Form and Visual Characteristics</b></p> <ul style="list-style-type: none"> <li>• Visual impacts from construction areas/activities</li> <li>• Note: <i>This includes removal of more trees &amp; vegetation along the rail corridor and in parks</i></li> </ul>	<p><b>Underground:</b> Less surface disruption</p>

<p><b>Human Health and Safety</b></p> <ul style="list-style-type: none"> <li>Local employees and residents as well as Transit Project construction workers will potentially be affected by construction-related noise, vibration and dust</li> <li>Another important issue is the health and safety of construction workers. Construction can also have health and safety implications for pedestrians and cyclists, due to the increased potential for tripping and slipping hazards and bike lane and sidewalk closures or detours</li> </ul>	<p><b>Human Health and Safety</b></p> <ul style="list-style-type: none"> <li>Note: <i>Metrolinx has said that health is outside the scope of their assessment</i></li> </ul>	<p><b>Underground:</b> Less disruption to the community and the environment is anticipated</p>
<p><b>Built Heritage Resources and Cultural Heritage Landscape</b></p> <ul style="list-style-type: none"> <li>Project construction may impact properties of known or potential cultural heritage value or interest; direct impacts include destruction of, or damage to, heritage attributes during excavations and construction of new components</li> <li>Indirect impacts are primarily from construction vibration, and may damage heritage attributes during excavation and construction of above and below grade project components</li> </ul>	<p><b>Built Heritage Resources and Cultural Heritage Landscapes</b></p> <p>The Ontario Line South Study Area includes 124 Built Heritage Resources, Cultural Heritage Landscapes, and Heritage Conservation Districts (HCD). The following potential impacts have been identified:</p> <ul style="list-style-type: none"> <li>Riverdale HCD: Encroachment into the HCD causing a physical impact, including introduction of new elements, alterations to a contributing property, or diminishment in integrity of the HCD due to the introduction of new elements</li> <li>Carlaw Avenue and Gerrard Street East Subway: New physical element or alteration (impacts to heritage attribute)</li> <li>400 Carlaw Avenue, 240 and 242 First Avenue: Demolition of all or part of the resource</li> <li>220 Langley Avenue: Encroachment</li> <li>Note: <i>Some heritage sites are within the zone of influence and could be affected by vibration</i></li> </ul>	<p><b>Underground:</b> Fewer heritage properties affected</p>

<p><b>Pedestrian, Cycling, Automobile, and Transit Movements</b></p> <ul style="list-style-type: none"> <li>• Potential disruption will be limited due to the tunnelling construction method for the line sections. However, cut-and-cover works will directly impact: <ul style="list-style-type: none"> <li>• Existing surface transit service</li> <li>• Existing subway service at the connecting stations and wye track connections to Line 2</li> <li>• Traffic, including both vehicular and pedestrian/cyclist movements</li> <li>• Driveways and private roads for adjacent properties</li> <li>• Sidewalks and building entrances/exits for adjacent properties, and</li> <li>• Bicycle lanes</li> </ul> </li> </ul>	<p><b>Traffic and Transportation</b></p> <p>Note: <i>While the impacts are described as temporary, the construction period is expected to last at least 8 years</i></p> <ul style="list-style-type: none"> <li>• 14 Rail Corridor Truck Accesses for Early Works (8 at a time), with an expected truck volume of up to 5 trucks per hour at each access point</li> <li>• Temporary impacts such as narrowed pedestrian paths, and partial or full closure of sidewalks</li> <li>• Closure of curb lanes in some areas and full closures on Queen Street, Carlaw Avenue and Gerrard Street will affect cyclists</li> <li>• Impacts on several transit routes: Lane closures are expected to cause additional delays due to reduced roadway capacity; full roadway closures will result in temporary discontinuation of streetcar operation and bus detours around the closure area</li> <li>• Lane closures and width reductions on Bain Avenue and Pape Avenue; Lane and road closures for utility relocations just north of the Gerrard portal on Langley Avenue, Riverdale Avenue, Pape Avenue and Carlaw Avenue; permanent loss of some on-street parking spaces near the Riverside/Leslieville Station</li> <li>• Some on-street parking spaces will be closed for utility relocations</li> </ul>	<p><b>Underground:</b></p> <p>Less surface disruption</p>
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## Possible mitigation

**Table 2** summarises possible mitigations identified through the environmental assessment process. These measures may or may not be provided depending on legal requirements, budget considerations and other factors, and while they will reduce the impact, they may not eliminate them. Local residents and businesses may find that the organizations responsible do not provide satisfactory resolutions to issues.

**Table 2: Comparison of proposed mitigation measures as identified in the 2018 Relief Line South Environmental Report and 2022 Ontario Line Environmental Impact Assessment Report**<sup>24,25,26</sup>

<b>Relief Line Report (underground)</b>	<b>Ontario Line Report (aboveground)</b>
<p><b>Vegetation, Wildlife and Terrestrial Habitat</b></p> <ul style="list-style-type: none"> <li>• Clearing to occur outside of the breeding bird window</li> <li>• Vegetation will be replanted/restored when construction period according to City vegetation compensation protocols.</li> </ul>	<p><b>Wildlife and wildlife habitat</b></p> <ul style="list-style-type: none"> <li>• If wildlife is encountered, measures will be implemented to avoid, as much as possible, destruction, injury, or interference with the species, and/or its habitat</li> <li>• Prior to construction, investigation will be undertaken of the Project footprint for wildlife and wildlife habitat</li> <li>• Onsite inspection will be undertaken to confirm the implementation of the mitigation measures and identify corrective actions</li> <li>• Preparation of an Arborist Report addressing tree removals and adherence to Metrolinx's Vegetation Guideline (2020b) and City bylaws as appropriate</li> </ul>
<p><b>Impacts of the Project on Climate Change</b></p> <ul style="list-style-type: none"> <li>• Best management practices will be implemented to minimize the potential release of GHG emissions during construction, including ensuring that construction equipment is well maintained.</li> </ul>	<p><b>Impacts of the Project on Climate Change</b> <i>Not addressed</i></p>
<p><b>Impacts of Climate Change on the Project</b></p> <ul style="list-style-type: none"> <li>• Adequate plans for severe weather events and emergencies, closures and rerouting, will be implemented</li> <li>• Health and safety plans to ensure that personnel are properly trained to recognize and respond to hazards and emergencies caused by extreme weather events.</li> </ul>	<p><b>Impacts of Climate Change on the Project</b> <i>Not addressed</i></p>

<sup>24</sup> The Relief Line and the Ontario Line South start and end outside the boundaries of the neighbourhood of interest in this report. Therefore, some of the information in this table may refer to portions of the line outside of South Riverdale.

<sup>25</sup> HDR (2018) Relief Line South environmental project report.

<sup>26</sup> Ontario Line Technical Advisor (2022) Environmental Impact Assessment Report; Toronto Parks Forestry and Recreation Presentation to the Community Ward 14 Toronto-Danforth 30 March 2022; Toronto Transportation Services Presentation to the Community Ward 14 Toronto-Danforth 30 March 2022.

<p><b>Air Quality</b></p> <ul style="list-style-type: none"> <li>• Best management practices will be implemented to prevent the potential release of dust and other airborne pollutants off site.</li> </ul>	<p><b>Air Quality</b></p> <ul style="list-style-type: none"> <li>• A quantitative assessment will be conducted once sufficient detail on the construction planning is available</li> <li>• Develop and implement a detailed construction air quality management plan</li> <li>• Adhere to the Canada Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities and the Ontario Technical Bulletin Management Approaches for Industrial Fugitive Dust Sources</li> </ul>
<p><b>Noise and Vibration</b></p> <ul style="list-style-type: none"> <li>• Use alternate criteria when completing City of Toronto Vibration Control Form to minimise property damage.</li> <li>• Control measures to prevent potential disturbance from tunnel and surface construction equipment and activities to nearby receptors: protocols for receiving, investigating, and addressing noise complaints, and pro-active communication.</li> </ul>	<p><b>Construction Noise</b></p> <ul style="list-style-type: none"> <li>• Equipment should be acquired based on Ontario NPC-115 and NPC-118 guidelines</li> <li>• Noise barriers with a minimum height of 5 m</li> <li>• Development and implementation of a construction noise assessment and management plan to address areas where noise limits may be exceeded</li> </ul> <p><b>Construction Vibration</b></p> <ul style="list-style-type: none"> <li>• A vibration mitigation plan and a vibration monitoring program should be prepared for areas within the zone of influence</li> <li>• Note: <i>There are Built Heritage Resources within the zone of influence</i></li> </ul>
<p><b>Buildings and Property</b></p> <ul style="list-style-type: none"> <li>• The City will negotiate temporary easements and construction agreements with property owners; compensation is intended to leave the affected owner “whole,” thereby mitigating any impacts.</li> <li>• Contractor(s) to minimize any inconvenience caused by construction activities to business owners, residents, and property owners</li> <li>• A Construction Liaison Committee to act as the community’s advocate.</li> <li>• Properties at risk of impact from settlement or vibration will be identified through the establishment of a zone of influence.</li> </ul>	<p><b>Socio-Economic and Land Use Characteristics</b></p> <ul style="list-style-type: none"> <li>• Develop a strategy to reduce the impacts of light pollution, trespass, and glare</li> <li>• Develop a communications protocol</li> <li>• Develop an erosion and sediment control plan</li> <li>• Perform regular monitoring</li> <li>• See also measures related to air quality and noise</li> </ul>
<p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>• Measures to minimize adverse aesthetic impacts associated with construction will be taken, including providing hoardings and storing debris appropriately.</li> </ul>	<p><b>Built Form and Visual Characteristics</b></p> <ul style="list-style-type: none"> <li>• A screened enclosure for the development site</li> <li>• Temporary landscaping</li> <li>• Comply with applicable municipal by-laws and Ministry of Transportation practices</li> <li>• Does construction of the noise wall fit here?</li> </ul>
<p><b>Human Health and Safety</b></p> <ul style="list-style-type: none"> <li>• Plans detailed in other sections, such as noise and vibration, will address many concerns.</li> <li>• proponent will monitor contractor compliance with applicable legislation and regulations.</li> </ul>	<p><b>Human Health and Safety</b> Not addressed</p>

<p><b>Built Heritage Resources and Cultural Heritage Landscape</b></p> <ul style="list-style-type: none"> <li>Property specific recommendations for cultural heritage resources include avoidance, protection during adjacent excavation and construction, and further impact assessment and conservation planning to ensure impacts from all project components will be mitigated during detailed design and construction.</li> </ul>	<p><b>Built Heritage Resources and Cultural Heritage Landscapes</b></p> <p>Consult with the City of Toronto and</p> <ul style="list-style-type: none"> <li>Riverdale Heritage Conservation District (HCD): Site-specific mitigation, includes sensitive and compatible design, record, repair and restore where possible, alterations complimentary and subordinate to the cultural heritage value and heritage attributes of the HCD</li> <li>220 Langley Avenue: Sensitive design</li> <li>Carlaw Avenue and Gerrard Street East Subways, 400 Carlaw Avenue: Documentation and salvage, interpretation/commemoration framework</li> <li>240 and 242 First Avenue: Documentation and salvage, apply sensitive and compatible design, interpretation/commemoration framework</li> </ul>
<p><b>Pedestrian, Cycling, Automobile, and Transit Movements</b></p> <ul style="list-style-type: none"> <li>During the design phase, traffic management plans will be developed. Trade-offs between minimizing construction duration and maintaining access will be addressed.</li> <li>Work will be carried out in a manner as to ensure the least interference with pedestrians and cyclists, and will include temporary decking, fencing, pavement markings, etc. as required to provide safe, accessible, and continuous routes.</li> </ul>	<p><b>Traffic and Transportation</b></p> <ul style="list-style-type: none"> <li>Protection for a minimum sidewalk width of 2.1 metres as per City of Toronto Standards, where feasible</li> <li>Signage and wayfinding</li> <li>Public information campaigns</li> <li>Temporary traffic signal (Gerrard St E./Carlaw Av)</li> <li>1-metre-wide clearance from the streetcar track bed is proposed for space for cyclists</li> <li>Metrolinx will work with TTC and event organizers to mitigate traffic, transit and cyclist impacts</li> </ul>