

Appendix F Alternative Routes Evaluation Table

Power Downtown Toronto – Class Environmental Assessment

Alternative Routes Evaluation

	Criteria Group/ Criteria	Indicator	Open Cut Route 2 (Sherbourne St. – Shuter St. – Mutual St. – Gould St./Edward St. – Elizabeth St.)	Open Cut Route 4 (Sherbourne St. – The Esplanade – George St. – Gerrard St. – Elizabeth St.)	Tunnel Route 1 (Sherbourne St. – Dundas St. – Bay St.)	Tunnel Route 2 (Sherbourne St. – Moss Park – George St. – Dundas St. – Bay St.)
Socio-Economic Environment						
1	Potential for construction to disrupt communities	Anticipated construction activities, magnitude and length of time of disruption (e.g., noise and vibration, dust).	<p>Less preferred</p> <ul style="list-style-type: none"> Both open cut alternatives have the potential for construction noise and dust to disrupt neighbourhoods along the full route for an anticipated overall construction period of approximately 32 months.¹ Construction would be carried out in stages, which would limit the length of construction within each stage. Notable vibration impacts to neighbouring buildings are not anticipated from open cut construction. Construction disruption from open cut alternatives is anticipated to be similar to other road/utility related construction. The construction would comply with noise by-laws. 	<p>Less preferred</p> <ul style="list-style-type: none"> Both open cut alternatives have the potential for construction noise and dust to disrupt to neighbourhoods along the full route for an anticipated overall construction period of approximately 28 months.¹ Construction would be carried out in stages, which would limit the length of construction within each stage. Notable Vibration impacts to neighbouring buildings are not anticipated from open cut construction. Construction disruption from open cut alternatives is anticipated to be similar to other road/utility related construction. The construction would comply with noise by-laws. 	<p>Preferred</p> <ul style="list-style-type: none"> Surface construction at tunnel shaft locations has the potential for construction related noise and dust. Tunnel route 1 has one mid shaft proposed near the intersection of Shuter St. and Sherbourne St. which would take about three months to construct (plus utility relocation, if required); an entry shaft at Esplanade TS that would remain open for the approximate two year duration of the construction; and an exit shaft at Terauley TS which may be open for up to two years but would be less active. Noise and vibration caused by Tunnel Boring Machines (TBMs) has been measured for similar tunnels in the past. Based on past experience, it is anticipated that no noise or vibration will be perceptible at the surface.² Construction disruption from tunnel alternatives is anticipated to be similar to noise levels produced at typical high-rise developments across the city. The construction would comply with noise by-laws. 	<p>Preferred</p> <ul style="list-style-type: none"> Surface construction at tunnel shaft locations has the potential for construction related noise and dust. Tunnel route 2 has a mid shaft proposed at George St. at Dundas St. which would be active for the approximately two year construction duration; an entry shaft at Esplanade TS that would be active for the approximate two year duration of the construction; and an exit shaft at Terauley TS which may be open for up to approximately 2 years but would be less active. Noise and vibration caused by TBMs has been measured for similar tunnels in the past. Based on past experience, it is anticipated that no noise or vibration will be perceptible at the surface. Construction disruption from tunnel alternatives is anticipated to be similar to noise levels produced at typical high-rise developments across the city. The construction would comply with noise by-laws.

¹ Power Downtown Toronto Route Recommendation Report, RVA, 2020

² Power Downtown Toronto Route Recommendation Report, RVA, 2020

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2	Potential for impacts on key institutional uses and emergency services	Number of hospitals, fire, police and EMS stations directly along the route that could be impacted by surface construction. Number of schools directly along route that could be impacted by surface construction.	Less Preferred <ul style="list-style-type: none"> This alternative would have minimal impact on institutions as there is one elementary school (Gabrielle Roy Elementary School) and no high schools along Open Cut Route 2. This alternative would run along Gould St. at the Ryerson University campus. Hydro One has committed to using underground construction techniques to maintain the integrity of the surface and minimize impacts to the area. Access to the university would be maintained. This alternative would have no impact on access to emergency services as there are no emergency service stations or hospitals along the route. 	Least Preferred <ul style="list-style-type: none"> There is potential for impact on institutions as Open Cut Route 4 passes two elementary schools (St. Michael Catholic School, Gabrielle-Roy Elementary School) and a recreation centre (St. Lawrence Community Rec. Center). Access to these facilities would be maintained. There is potential for impact on some access to emergency services as this alternative passes two hospitals (Sick Kids Hospital and Toronto General Hospital). 	Preferred <ul style="list-style-type: none"> There is no potential for impact on institutions or access to emergency services as there are no schools emergency service stations or hospitals near the proposed mid shaft location near the intersection of Shuter St. and Sherbourne St. 	Less Preferred <ul style="list-style-type: none"> There is no potential for impact on access to emergency services as there are no emergency service stations or hospitals near the proposed mid shaft location near the intersection of George St. and Dundas St. There is potential for impact on institutions as the proposed mid shaft is adjacent to the Gabrielle-Roy Elementary School. Access to the school would be maintained.
3	Potential for impact on businesses	Extent of surface construction on streets designated as Priority Retail Streets.	Less Preferred <ul style="list-style-type: none"> This route requires crossing Yonge St., which is designated as a Priority Retail Street. It is anticipated that the crossing would use the open cut technique to cross Yonge St. Impact on businesses is anticipated to be significant. 	Less Preferred <ul style="list-style-type: none"> This route requires crossing Yonge St., which is designated as a Priority Retail Street. It is anticipated that the crossing would use the open cut technique to cross Yonge St. Impact on businesses is anticipated to be significant 	Preferred <ul style="list-style-type: none"> While this route crosses Yonge St., due to the deep tunnelling construction technology, there is no anticipated impact to Priority Retail Streets. 	Preferred <ul style="list-style-type: none"> While this route crosses Yonge St., due to the deep tunnelling construction technology, there is no anticipated impact to Priority Retail Streets.
4	Potential for displacement of existing uses	Number and character of areas required for permanent surface infrastructure (e.g., proposed shaft locations).	Preferred <ul style="list-style-type: none"> There would be no displacement of existing uses for permanent infrastructure. 	Preferred <ul style="list-style-type: none"> There would be no displacement of existing uses for permanent infrastructure. 	Less Preferred <ul style="list-style-type: none"> The proposed location for the exit shaft (Terauley TS) may result in a permanent installation on an existing City of Toronto parking lot and potential removal of parking uses. 	Less Preferred <ul style="list-style-type: none"> The proposed location for the exit shaft (Terauley TS) may result in a permanent installation on an existing City of Toronto parking lot and potential removal of parking uses.

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					<ul style="list-style-type: none"> The proposed mid shaft for Tunnel Route 1 is within the City of Toronto road allowance and will not result in permanent displacement of uses. 	<ul style="list-style-type: none"> The proposed mid shaft for Tunnel Route 2 is within the City of Toronto road allowance and will not result in permanent displacement of uses.
5	Potential impact to streetscape/ public realm amenities	Extent of surface construction that has the potential to impact recently redeveloped public realm amenities, streetscape or park.	<p>Less Preferred</p> <ul style="list-style-type: none"> The following recent, current, or planned streetscape projects could be impacted by construction: <ul style="list-style-type: none"> Gould St. is currently undergoing a revitalization to promote pedestrian use as part of the Ryerson University Campus. Hydro One has committed to using underground construction techniques to maintain the integrity of the surface and minimize impacts to the area. The “Yonge TOMorrow” project is meant to increase pedestrian space between Queen St. and College St. on Yonge St. Construction timing for this project is unknown. There is potential to provide streetscape improvements as rehabilitation after construction, however, having no surface impact is considered better than having to rehabilitate. Therefore, the open cut options are less preferred than the tunnel options. 	<p>Less Preferred</p> <ul style="list-style-type: none"> The following recent, current, or planned streetscape projects could be impacted by construction: <ul style="list-style-type: none"> The “Yonge TOMorrow” project is meant to increase pedestrian space between Queen St. and College St. Construction timing for this project is unknown. George St. revitalization project includes streetscaping on George St. between Dundas St. and Gerrard St. Construction contract award is anticipated in mid-2021.³ Construction is planned along the west side of Moss Park. The City Parks, Forestry and Recreation Division is looking at improvements to John Innes Community Recreation Centre, the park and the arena.⁴ There is potential to provide streetscape improvements as rehabilitation after construction, however, having no surface impact is considered better than having to 	<p>Less Preferred</p> <ul style="list-style-type: none"> The following recent, current, or planned streetscape projects could be impacted by construction of the proposed mid shaft: <ul style="list-style-type: none"> Shuter St. road resurfacing work including installation of permanent bike lane and cycle track east of Sherbourne St. Construction is anticipated to begin and be completed in 2020.⁵ 	<p>Less Preferred</p> <ul style="list-style-type: none"> The City Parks, Forestry and Recreation Division is looking at improvements to John Innes Community Recreation Centre, the park and the arena.⁶ This alternative involves minimal surface construction, however for the proposed mid shaft, a full road closure would be required for approximately four months and a partial closure would be required for approximately two years on George St. south of Dundas St.) The tunnel may impact plans for geothermal heating of the surface recreation facilities.

³ <https://www.toronto.ca/city-government/accountability-operations-customer-service/long-term-vision-plans-and-strategies/george-street-revitalization/>

⁴ <https://www.toronto.ca/city-government/planning-development/construction-new-facilities/improvements-expansion-redevelopment/moss-park-redevelopment/>

⁵ <https://www.toronto.ca/community-people/get-involved/public-consultations/infrastructure-projects/bike-lane-upgrade-to-cycle-track-on-shuter-street/>

⁶ <https://www.toronto.ca/city-government/planning-development/construction-new-facilities/improvements-expansion-redevelopment/moss-park-redevelopment/>

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				rehabilitate. Therefore, the open cut options are less preferred than the tunnel options.		
6	Potential for disruption to vehicular traffic	Extent of surface construction that could be within the road. Approximate length of construction period.	Least Preferred <ul style="list-style-type: none"> Construction area of up to two lane-width for the approximately 32-month construction period is anticipated to pose in significant potential to disrupt traffic on Sherbourne St. No full road closures are anticipated. Construction would be staged, minimizing the length of disruption in each area. 	Least Preferred <ul style="list-style-type: none"> Construction area of up to two lane-width for the approximately 28-month construction period is anticipated to pose in significant potential to disrupt traffic and on-street parking on Gerrard St. No full road closures are anticipated. Construction would be staged, minimizing the length of disruption in each area. 	Preferred <ul style="list-style-type: none"> The construction of the proposed mid shaft would require lane temporary restrictions on Shuter St. near the intersection of Sherbourne St. for a period of approximately three months resulting in potential to disrupt traffic. No full road closures are anticipated. Short-term traffic disruptions (i.e., hours) may occur when the TBM is delivered and removed. The tunnelling alternative would require the removal of excavated rock. This would add trucks to the road on the rock haul route, which could have a traffic disruption impact. 	Less Preferred <ul style="list-style-type: none"> The construction of the proposed mid shaft would require a partial closure on George St. immediately south of Dundas St. for the full two-year construction period, resulting in some potential to disrupt traffic. A full closure of George St. south of Dundas would be required for approximately four months. Short-term traffic disruptions (i.e., hours) may occur when the TBM is delivered and removed. The tunnelling alternative will require the removal of excavated rock. This would add trucks to the road on the rock haul route, which could have a traffic disruption impact.
7	Potential for disruption to transit	Number of crossings of transit infrastructure (e.g., streetcar). Construction method for streetcar track crossings.	Equally Preferred <ul style="list-style-type: none"> While this alternative crosses three streetcar tracks (King Street, Queen Street and Dundas Street), Hydro One would use hand-mined tunnelling technique in these areas, resulting in minimal to no disruption to surface transit. Discussions with TTC would be required to confirm the construction method to cross the Yonge St. subway to avoid transit disruption. 	Equally Preferred <ul style="list-style-type: none"> While this alternative crosses three streetcar tracks (King Street, Queen Street and Dundas Street), Hydro One would use hand-mined tunnelling technique in these areas, resulting in minimal to no disruption to surface transit. Discussions with TTC would be required to confirm the construction method to cross the Yonge St. subway to avoid transit disruption. 	Equally Preferred <ul style="list-style-type: none"> This alternative would not impact surface transit routes. Discussion with TTC will be required to confirm whether construction would disrupt the Yonge St. subway. 	Equally Preferred <ul style="list-style-type: none"> This alternative would not impact surface transit routes. Discussion with TTC will be required to confirm whether construction would disrupt the Yonge St. subway.

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8	Potential for disruption to cycling	Number of bike lanes that could be impacted by surface construction. Approximate length of construction period.	Least Preferred <ul style="list-style-type: none"> This alternative would involve surface construction on two roads with existing bike lanes: Sherbourne St. (cycle track) and Shuter St. (bike lane). Significant potential for disruption to cycling as one cycling track on (Sherbourne St.) would be closed during construction for approximately 32 months. 	Least Preferred <ul style="list-style-type: none"> This alternative involves surface construction on two roads with existing bike lanes: Sherbourne St. (cycle track) and Gerrard St. (cycle track/bike lane). Significant potential for disruption to cycling as one cycling track on Sherbourne St. will be closed during construction for approximately 28 months. The cycling track/bike lane on Gerrard would remain open during construction but would require realignment. 	Less Preferred <ul style="list-style-type: none"> The tunnelling technology would result in no disruption to bike lanes during tunnel construction. The proposed mid shaft near the intersection of Shuter St. and Sherbourne St. does have the potential to impact the Shuter St. bike lane during its construction, planned to take approximately three months (plus utility relocation, if required). If Sherbourne St. is used for trucking out materials, safety precautions should be taken to minimize potential impacts to cyclist on the Sherbourne cycle track. 	Preferred <ul style="list-style-type: none"> The tunnelling technology would result in no disruption to bike lanes during construction. The proposed mid shaft on George Street would not be constructed on roads with existing bike lanes. If Sherbourne St. is used for trucking out materials, safety precautions should be taken to minimize potential impacts to cyclist on the Sherbourne cycle track.
9	Potential for disruption to pedestrians	Extent of surface construction areas that could be within the sidewalk. Approximate length of construction period.	Least Preferred <ul style="list-style-type: none"> Construction is likely to be within the road right-of-way rather than the sidewalk. However, surface construction in the road would have some potential to impact pedestrians over the approximately 32-month construction period. 	Least Preferred <ul style="list-style-type: none"> Construction is likely to be within the road right-of-way rather than the sidewalk. However, surface construction in the road would have some potential to impact pedestrians over the approximately 28-month construction period. 	Preferred <ul style="list-style-type: none"> Construction of the proposed mid shaft near the intersection of Shuter St. and Sherbourne St. has some potential for impacts to pedestrians over the approximately three-month construction period (plus utility relocation, if required). 	Less Preferred <ul style="list-style-type: none"> Construction of the proposed mid shaft at George St. south of Dundas St. has some potential for impacts to pedestrians over an approximately two-year period.
10	Potential impact to cultural heritage resources	Number of designated or listed heritage buildings/ properties adjacent to areas	Less Preferred <ul style="list-style-type: none"> Based on the findings of a Cultural Heritage Analysis, there are approximately 46 identified cultural heritage buildings/properties along the route. The potential for impact to these properties is minimal. The exception to this 	Less Preferred <ul style="list-style-type: none"> Based on the findings of a Cultural Heritage Analysis, there are approximately 42 identified cultural heritage buildings/properties along the route. The potential for impact to these properties is minimal. The exception to this 	Preferred <ul style="list-style-type: none"> Based on the findings of a Cultural Heritage Analysis, there are 23 identified cultural heritage building/properties along the route. The potential for impact to these properties is minimal. The exception to this is Terauley TS where 	Preferred <ul style="list-style-type: none"> Based on the findings of a Cultural Heritage Analysis, there are 17 identified cultural heritage building/properties along the route. The potential for impact to these properties is minimal. The exception to this is Terauley TS where

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		of surface construction.	is Terauley TS where care would need to be taken to preserve the heritage character of the building.	is Terauley TS where care would need to be taken to preserve the heritage character of the building.	care would need to be taken to preserve the heritage character of the building.	care would need to be taken to preserve the heritage character of the building.
		Extent of surface construction through areas of archaeological potential.	Preferred <ul style="list-style-type: none"> A Stage 1 Archeological Assessment was conducted and concluded that there is a low potential for the presences of significant archaeological resources within the road allowance along Open Cut Route 2. The study further concluded that these areas are recommended to be considered free from further archeological concern. 	Least Preferred <ul style="list-style-type: none"> A Stage 1 Archeological Assessment was conducted and concluded that there is a low potential for the presences of significant archaeological resources within the road allowance along Open Cut Route 2. The study further concluded that these areas are recommended to be considered free from further archeological concern. The Stage 1 Archaeological Assessment also determined that there is a moderate potential for the presence of significant archaeological resources within Moss Park. 	Preferred <ul style="list-style-type: none"> A Stage 1 Archeological Assessment was conducted and concluded that there is a low potential for the presences of significant archaeological resources within the road allowance along Tunnel Route 1. The study further concluded that these areas are recommended to be considered free from further archeological concern. Note: The tunnel construction is anticipated to be in bedrock approximately 25m below grade; only the shafts installed at ground level would require precautions to avoid the disturbance of areas identified as having archaeological potential. 	Less Preferred <ul style="list-style-type: none"> A Stage 1 Archeological Assessment was conducted and concluded that there is a low potential for the presences of significant archaeological resources within the road allowance along Tunnel Route 1. The study further concluded that these areas are recommended to be considered free from further archeological concern. The Stage 1 Archaeological Assessment also determined that there is a moderate potential for the presence of significant archaeological resources within Moss Park. Note: The tunnel construction is anticipated to be in bedrock approximately 25m below grade; only the shafts installed at ground level would require precautions to avoid the disturbance of areas identified as having archaeological potential.
11	Health and safety considerations	Anticipated construction activities and potential for health and safety impacts on workers or the	Least Preferred <ul style="list-style-type: none"> This alternative would result in open excavation in proximity to the public for the approximately 32-month construction period. Worker health and safety is regulated by the Ontario Health and Safety Act (OHSA) and all alternatives will be carried out in 	Least Preferred <ul style="list-style-type: none"> This alternative would result in open excavation in proximity to the public for the approximately 28-month construction period. Worker health and safety is regulated by the Ontario Health and Safety Act (OHSA) and all alternatives will be carried out in 	Preferred <ul style="list-style-type: none"> This alternative would result in open excavation in proximity to the public for the approximately three month construction of the proposed mid shaft. Worker health and safety is regulated by the Ontario Health and Safety Act (OHSA) and all alternatives will be carried out in 	Less Preferred <ul style="list-style-type: none"> This alternative would result in open excavation in proximity to the public for the proposed mid shaft. This shaft would remain open for approximately two years. Worker health and safety is regulated by the Ontario Health and Safety Act (OHSA) and all alternatives will be carried out in

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		public during construction.	manner that keeps workers safe during construction.	manner that keeps workers safe during construction.	manner that keeps workers safe during construction.	manner that keeps workers safe during construction.
		Proximity of energized assets to employees during maintenance.	Preferred <ul style="list-style-type: none"> While performing inspections employees are not required to access joint bays while assets are energized. However, if absolutely necessary, they may be accessed live to perform repairs. 	Preferred <ul style="list-style-type: none"> While performing inspections, employees are not required to access joint bays while assets are energized. However, if absolutely necessary, they may be accessed live to perform repairs. 	Less Preferred <ul style="list-style-type: none"> Employees are required to be in close proximity to energized assets during inspection and maintenance of tunnel assets. 	Less Preferred <ul style="list-style-type: none"> Employees are required to be in close proximity to energized assets during inspection and maintenance of tunnel assets.
		Proximity of energized assets to the public during operation.	Less Preferred <ul style="list-style-type: none"> This alternative requires joints to be installed in joint bays near the surface and therefore in close proximity to the public. 	Less Preferred <ul style="list-style-type: none"> This alternative requires joints to be installed in joint bays near the surface and therefore in close proximity to the public. 	Preferred <ul style="list-style-type: none"> In this alternative, all joints are contained within the tunnel far from the public. 	Preferred <ul style="list-style-type: none"> In this alternative, all joints are contained within the tunnel far from the public.
	Overall Socio-Economic Preference				Tunnel Route 1 is preferred from a Socio-Economic Perspective	
Natural Environment						
12	Potential for impact on wildlife habitats and natural areas	Area of vegetation potentially impacted by surface construction.	Leass Preferred <ul style="list-style-type: none"> May require the removal of street trees/landscape trees along the full route. 	Less Preferred <ul style="list-style-type: none"> May require the removal of street trees/landscape trees along the full route, including those in Moss Park. 	Preferred <ul style="list-style-type: none"> Surface construction would be limited to the proposed shaft location near the intersection of Shuter St. and Sherbourne St., so the potential for street tree removal would be limited. If selected, some trees may be removed to facilitate the installation of the exit shaft in the parking lot west of Terauley TS. 	Preferred <ul style="list-style-type: none"> Surface construction would be limited to the proposed shaft location at George St. and Dundas St. so the potential for street tree removal would be limited. Some vegetation planted on the proposed mid shaft location (which is part of the City road allowance) would be removed to facilitate the installation of the mid shaft.

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13	Potential to encounter contaminated soil	Known historic uses in the vicinity of the construction area that have potential to result in contaminated soils.	<p>Equally Preferred</p> <ul style="list-style-type: none"> All alternatives are in a heavily urbanized environment which presents the possibility of coming into contact with contaminated soil due to previous uses. The potential to encounter contaminated soil is particularly relevant on the portion of the route south of Front St. as this area is lakefill.⁷ 	<p>Equally Preferred</p> <ul style="list-style-type: none"> All alternatives are in a heavily urbanized environment which presents the possibility of coming into contact with contaminated soil due to previous uses. The potential to encounter contaminated soil is particularly relevant on the portion of the route south of Front St. as this area consist of lakefill. 	<p>Equally Preferred</p> <ul style="list-style-type: none"> All alternatives are in a heavily urbanized environment which presents the possibility of coming into contact with contaminated soil due to previous uses. The potential to encounter contaminated soil is particularly relevant on the portion of the route south of Front St. as this area is lakefill. Deep tunnelling also has the potential to encounter contaminated bedrock containing BTEX (Benzene, Toluene, and Ethylbenzene). 	<p>Equally Preferred</p> <ul style="list-style-type: none"> All alternatives are in a heavily urbanized environment which presents the possibility of coming into contact with contaminated soil due to previous uses. The potential to encounter contaminated soil is particularly relevant on the portion of the route south of Front St. as this area is lakefill. Deep tunnelling also has the potential to encounter contaminated bedrock containing BTEX (Benzene, Toluene, and Ethylbenzene).
14	Potential for surface water or source water impacts	Number of crossings of known underground rivers. ⁸	<p>Equally Preferred</p> <ul style="list-style-type: none"> This alternative crosses identified lost rivers up to five times. These lost rivers represent former creeks that have been buried by urban development and now exist within storm sewers. There is minimal impact anticipated. 	<p>Equally Preferred</p> <ul style="list-style-type: none"> This alternative crosses identified lost rivers up to six times. These lost rivers represent former creeks that have been buried by urban development and now exist within storm sewers. There is minimal impact anticipated. 	<p>Equally Preferred</p> <ul style="list-style-type: none"> This alternative crosses identified lost rivers up to five times. These lost rivers represent former creeks that have been buried by urban development and now exist within storm sewers. There is minimal impact anticipated. 	<p>Equally Preferred</p> <ul style="list-style-type: none"> This alternative crosses identified lost rivers up to four times. These lost rivers represent former creeks that have been buried by urban development and now exist within storm sewers. There is minimal impact anticipated.
		Extent and character of construction that will fall within TRCA’s Highly	<ul style="list-style-type: none"> All routes fall within lands categorized as an Event Based Area or a Highly Vulnerable Aquifer as stipulated by the Credit Valley, Toronto and Region and Central Lake (CTC) Source Protection Region. Water discharge will be planned and managed in compliance with applicable legislation. 	<ul style="list-style-type: none"> All routes fall within lands categorized as an Event Based Area or a Highly Vulnerable Aquifer as stipulated by the CTC Source Protection Region. Water discharge will be planned and managed in compliance with applicable legislation. 	<ul style="list-style-type: none"> All routes fall within lands categorized as an Event Based Area or a Highly Vulnerable Aquifer as stipulated by the CTC Source Protection Region. Water discharge will be planned and managed in compliance with applicable legislation. 	<ul style="list-style-type: none"> All routes fall within lands categorized as an Event Based Area or a Highly Vulnerable Aquifer as stipulated by the CTC Source Protection Region. Water discharge will be planned and managed in compliance with applicable legislation.

⁷ Power Downtown Toronto Route Recommendation Report, RVA, 2020

⁸ http://mercator.geog.utoronto.ca/georia/lostrivers/leaflet-storymap_webtest/disappearing.html

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		Vulnerable Aquifer (HVA) areas. ⁹				
	Overall Natural Environment Preference			Tunnel Routes 1 and 2 are Preferred from a Natural Environment Perspective	Tunnel Routes 1 and 2 are Preferred from a Natural Environment Perspective	
Technical Considerations						
15	Potential for construction complexity	Number of major road, transit and utility crossings (e.g., trunk mains and Enwave tunnels, etc.).	Less Preferred <ul style="list-style-type: none"> • Open Cut Route 2 would include construction across: <ul style="list-style-type: none"> ○ More than 10 major roads (Sherbourne St., Front St., King St., Adelaide St., Richmond St., Queen St., Shuter St., Jarvis St., Church St., Yonge St., Bay St. and Dundas St.) which will require hand tunnelling; ○ Three streetcar tracks which would require hand tunnelling; and ○ The Yonge St. subway which is at a very shallow depth. Coordination with TTC would be required to facilitate this construction. 	Less Preferred <ul style="list-style-type: none"> • Open Cut Route 4 would include construction across: <ul style="list-style-type: none"> ○ More than 10 major roads (Sherbourne St., The Esplanade, George St., Front St., King St., Adelaide St., Richmond St., Queen St., Shuter St., Dundas St., Gerrard St., Jarvis St., Church St., Yonge St., and Bay St.) which would require hand tunnelling; ○ Three streetcar tracks which will require hand tunnelling; and ○ The Yonge St. subway which is at a very shallow depth. Coordination with TTC would be required to facilitate this construction. 	Preferred <ul style="list-style-type: none"> • Tunnel Route 1 would not involve construction across major roads or surface transit routes. • Both tunnel routes would need to be deeper than the future Ontario Line. Discussions to date indicate that this alternative could be constructed without impact to the Ontario Line. • Both tunnel routes would need to cross below the Yonge St. subway line. • Both tunnel routes would need to cross above the existing Enwave Deep Lake Water Cooling (DLWC) tunnel. • Note: The tunnel construction is anticipated to be in bedrock 	Preferred <ul style="list-style-type: none"> • Tunnel Route 2 would not involve construction across major roads or surface transit routes. • Both tunnel routes would need to be deeper than the future Ontario Line. Discussions to date indicate that this alternative could be constructed without impact to the Ontario Line. • Both tunnels would need to cross the Yonge St. subway line. • Both tunnels would need to cross above the existing Enwave Deep Lake Water Cooling (DLWC) tunnel. • Note: The tunnel construction is anticipated to be in bedrock

⁹ Consultation with Toronto Region Conservation Authority

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Alternative Routes Evaluation

	Criteria Group/ Criteria	Indicator	Open Cut Route 2 (Sherbourne St. – Shuter St. – Mutual St. – Gould St./Edward St. – Elizabeth St.)	Open Cut Route 4 (Sherbourne St. – The Esplanade – George St. – Gerrard St. – Elizabeth St.)	Tunnel Route 1 (Sherbourne St. – Dundas St. – Bay St.)	Tunnel Route 2 (Sherbourne St. – Moss Park – George St. – Dundas St. – Bay St.)
					approximately 25m below grade; only the shafts installed at ground level would require coordination with other utilities and planned surface work.	approximately 25m below grade; only the shafts installed at ground level would require coordination with other utilities and planned surface work.
		Extent of potential utility conflict.	<ul style="list-style-type: none"> There are significant utilities under the city streets. Both open cut alternatives would require several reduced clearances and relocations to facilitate the construction of the project. 	<ul style="list-style-type: none"> There are significant utilities under the city streets. Both open cut alternatives would require several reduced clearances and relocations to facilitate the construction of the project. 	<ul style="list-style-type: none"> Due to the depth of the tunnel, no utility conflicts have been identified at the tunnel level for either tunnel routes considered. Shaft locations may require some minor utility relocation. 	<ul style="list-style-type: none"> Due to the depth of the tunnel, no utility conflicts have been identified at the tunnel level for either tunnel routes considered. Shaft locations may require some minor utility relocation.
16	Potential need for Property	Potential need to acquire new property or easements.	Preferred <ul style="list-style-type: none"> As construction is planned within the road allowance, no easements would be required for this route. 	Least Preferred <ul style="list-style-type: none"> As the majority of construction is planned within the road allowance, an easement would only be required to cross along the west side of Moss Park. 	Less Preferred <ul style="list-style-type: none"> As the majority of construction is planned within the road allowance, the only additional property right that may be required would be near Terauley TS to facilitate the exit shaft installation. 	Least Preferred <ul style="list-style-type: none"> An easement would be required to cross Moss Park. There is potential that additional property rights may be required near Terauley TS to facilitate the exit shaft installation.
17	Potential for conflict during construction coordination	Potential for conflict in construction execution and/or the opportunity to coordinate	Less Preferred <ul style="list-style-type: none"> The routes with extensive surface construction would have greater need for coordination: <ul style="list-style-type: none"> Extensive coordination with utilities and the City would be required. 	Less Preferred <ul style="list-style-type: none"> The routes with extensive surface construction would have greater need for coordination: <ul style="list-style-type: none"> Extensive coordination with utilities and the City would be required. 	Preferred <ul style="list-style-type: none"> The tunnel routes would require less coordination as surface construction would be limited. Coordination with Toronto Hydro, Enwave (DWLC), Metrolinx (Ontario Line) 	Preferred <ul style="list-style-type: none"> The tunnel routes would require less coordination as surface construction would be limited. Coordination with Toronto Hydro, Enwave (DWLC), Metrolinx (Ontario Line) and TTC (Yonge St. subway) will be required.

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Alternative Routes Evaluation

	Criteria Group/ Criteria	Indicator	Open Cut Route 2 (Sherbourne St. – Shuter St. – Mutual St. – Gould St./Edward St. – Elizabeth St.)	Open Cut Route 4 (Sherbourne St. – The Esplanade – George St. – Gerrard St. – Elizabeth St.)	Tunnel Route 1 (Sherbourne St. – Dundas St. – Bay St.)	Tunnel Route 2 (Sherbourne St. – Moss Park – George St. – Dundas St. – Bay St.)
		construction with others.	<ul style="list-style-type: none"> ○ Construction would be required in a number of locations where there are existing and potential future moratoriums on Dundas St., Yonge St., Sherbourne St., Bay St. and George St. ○ Construction would need to be coordinated with a number of development projects on Front St., Sherbourne St., Shuter St., Jarvis St., Edward St., Bay St., Mutual St., and Yonge St. ● It is noted that all routes would involve a minimal amount of construction within the City of Toronto restricted construction zone. 	<ul style="list-style-type: none"> ○ Construction would be required in a number of locations where there are existing and potential future moratoriums on Dundas St., Yonge St., Sherbourne St., Bay St. and George St. ○ Construction would need to be coordinated with a number of residential and commercial developments on Dundas St., George St., Gerrard St., and Edward St. ● It is noted that all routes would involve a minimal amount of construction within the City of Toronto restricted construction zone. 	<p>and TTC (Yonge St. subway) will be required.</p> <ul style="list-style-type: none"> ● It is noted that all routes would involve a minimal amount of construction within the City of Toronto restricted construction zone. 	<ul style="list-style-type: none"> ● It is noted that all routes would involve a minimal amount of construction within the City of Toronto restricted construction zone.
18	Potential operation risks	Potential for cable being damaged during operation.	<p>Less Preferred</p> <ul style="list-style-type: none"> ● The City road allowance is shared by a number of utilities. Due to possible/proposed proximity of the duct bank to neighbouring utilities, there would be a possibility of damage to Hydro One infrastructure in the future from other surface construction work. 	<p>Less Preferred</p> <ul style="list-style-type: none"> ● The City road allowance is shared by a number of utilities. Due to possible/proposed proximity of the duct bank to neighbouring utilities, there would be a possibility of damage to Hydro One infrastructure in the future from other surface construction work. 	<p>Preferred</p> <ul style="list-style-type: none"> ● Infrastructure contained within a deep tunnel would face less risk of damage from other surface construction work. 	<p>Preferred</p> <ul style="list-style-type: none"> ● Infrastructure contained within a deep tunnel would face less risk of damage from other surface construction work.
	Overall Technical Preference			Tunnel Route 1 is Preferred from a Technical Perspective		
Cost						

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Alternative Routes Evaluation

	Criteria Group/ Criteria	Indicator	Open Cut Route 2 (Sherbourne St. – Shuter St. – Mutual St. – Gould St./Edward St. – Elizabeth St.)	Open Cut Route 4 (Sherbourne St. – The Esplanade – George St. – Gerrard St. – Elizabeth St.)	Tunnel Route 1 (Sherbourne St. – Dundas St. – Bay St.)	Tunnel Route 2 (Sherbourne St. – Moss Park – George St. – Dundas St. – Bay St.)
19	Project costs	Approximate civil construction cost. ¹⁰	Preferred • The approximate construction cost for Open Cut Route 2 is \$42.5 million.	Less Preferred • The approximate construction cost for Open Cut Route 4 is \$46.5 million.	Least Preferred • The approximate construction cost for Tunnel Route 1 is \$49.7 million.	Least Preferred • The approximate construction cost for Tunnel Route 2 is \$49.2 million.
		Approximate annual maintenance cost.	Less Preferred • The approximate annual operations and maintenance cost for the Open Cut Route is \$22,000.	Less Preferred • The approximate annual operations and maintenance cost for the Open Cut Route is \$22,000.	Preferred • The approximate annual operations and maintenance cost for the Tunnel Route is \$10,000.	Preferred • The approximate annual operations and maintenance cost for the Tunnel Route is \$10,000.
		Project cost – Long-term costs related to operations, maintenance, rehabilitation and replacement. ¹¹	Preferred • The project cost for Open Cut Route 2 is approximately \$67 million.	Less Preferred • The project cost for Open Cut Route 4 is approximately \$73 million.	Preferred • The project cost for Tunnel Route 1 is approximately \$64 million.	Preferred • The project cost for Tunnel Route 2 is approximately \$63 million.
	Overall Cost Preference		Open Cut Route 2, Tunnel Route 1 and Tunnel Route 2 are Preferred from a Cost Perspective		Open Cut Route 2, Tunnel Route 1 and Tunnel Route 2 are Preferred from a Cost Perspective	Open Cut Route 2, Tunnel Route 1 and Tunnel Route 2 are Preferred from a Cost Perspective
	OVERALL CONCLUSION				TUNNEL ROUTE 1 IS THE PREFERRED ALTERNATIVE	

¹⁰ Costs estimates include civil works only which represents the largest distinguishing cost. Other costs such as cable work will be smaller and/or relatively similar for all alternatives.

¹¹ Power Downtown Toronto Route Recommendation Report, RVA, 2020